

Doddridge County Sheriff
Flood Plain Ordinance Fund

1011
69-217/515

DATE July 2, 2013

PAY TO THE
ORDER OF ANTERO RESOURCES

\$ 3,043.66

Three Thousand Fourty-Three Dollars and 66/100-----

DOLLARS

Security features
included.
Details on back.



Ralph Anderson
Beth A. Rogers

MEMO #13-016 Robert Williams Pad Reimbursement

MP

⑈001011⑈ ⑆051502175⑆

1196499⑈



Vendor Name	Vendor No.	Date	Check Number	Check Total
DODDRIDGE COUNTY COMMISSION	43312	Jun-21-2013	32211	\$3,151.22

VOUCHER	VENDOR INV #	INV DATE	TOTAL AMOUNT	PRIOR PMTS & DISCOUNTS	NET AMOUNT
06-AP-10287	TWILLIAMSPAD	06/21/13	3,151.22	0.00	3,151.22
FLOOD PLAIN PERMIT APP - ROBERT WILLIAMS PAD					
TOTAL INVOICES PAID					3,151.22

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

Michael Headley
 Sheriff of Doddridge County

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

Doddridge County, West Virginia

No. 4773

Date: June 25, 2013
 Customer copy

Received: #13-016 Antero Resources \$3,151.22

In Payment For: 318 Building Permits (LP)

For: 12-Flood Plain Ordinanc Fund #20 Fund

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

Michael Headley
 Sheriff of Doddridge County

Doddridge County Flood Plain Refund Calculator (if not in Flood Plain)**Robert Williams Pad**

Estimated Construction Costs	\$330,244.00
Amount over \$100,000	\$230,244.00
Drilling Oil and Gas Well Fee	\$1,000.00
Deposit for additional charges	\$1,000.00
\$5 per \$1,000 over \$100,000	\$1,151.22
Amount Due with application	\$3,151.22
95% of Application Fee minus \$1,000 deposit	\$2,043.66
Cost for Permit	\$107.56
Total Refund (Includes 100% of 1,000 deposit)	\$3,043.66



June 21, 2013

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

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

Mr. Wellings:

Antero Resources Appalachian Corporation (Antero) would like to submit a Doddridge County Floodplain permit application for our Robert Williams Drill Pad. Our project is located in Doddridge County, Central District and per FIRM map #54017C0200C & 54017C0255C, this location is not within the floodplain.

225 10/04/2011

Attached you will find the following:

- Doddridge County Floodplain Permit Application
- FIRM Map
- A detailed set of plans signed by a WV licensed professional engineer
- Site Safety Plan

If you have any questions please feel free to contact me at (303) 357-6820.

Thank you in advance for your consideration.

Sincerely,

Shauna Redican
Permit Representative
Antero Resources Appalachian Corporation

Enclosures

2013 JUN 25 PM 2:35
CLERK OF COURTS
DODDRIDGE COUNTY, WV

516-1111

DODDRIDGE COUNTY FLOODPLAIN DEVELOPMENT PERMIT APPLICATION

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

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

APPLICANT'S SIGNATURE



DATE June 21, 2013

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

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

Antero Resources Appalachian Corporation - Shauna Redican,
Permit Representative

APPLICANT'S NAME:

ADDRESS: 1625 17th Street, Denver, CO 80202

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

BUILDER'S NAME: Antero Resources Appalachian Corporation

ADDRESS: 1625 17th Street, Denver, CO 80202

TELEPHONE NUMBER: (303) 357-7310

ENGINEER'S NAME: Kleinfelder

ADDRESS: 230 Executive Dr, Suite 122, Cranberry Township, PA 16066

TELEPHONE NUMBER: 724-772-7072

PROJECT LOCATION:

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

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

RR 1 Box 212, West Union, WV 26456

DISTRICT: Central

DATE/FROM WHOM PROPERTY

PURCHASED: N/A

LAND BOOK DESCRIPTION:

DEED BOOK REFERENCE: DB 252, Page 128

TAX MAP REFERENCE: TM 15, Pcl 6.4

EXISTING BUILDINGS/USES OF PROPERTY: None

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

ADDRESS OF AT LEAST ONE ADULT RESIDING IN EACH RESIDENCE LOCATED UPON THE SUBJECT PROPERTY RR 1 Box 212, West Union, WV 26456

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

DESCRIPTION OF WORK (CHECK ALL APPLICABLE BOXES)

A. STRUCTURAL DEVELOPMENT

ACTIVITY

STRUCTURAL TYPE

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

B. OTHER DEVELOPMENT ACTIVITIES:

- | | | | | | | | |
|-------------------------------------|---|--------------------------|--------|-------------------------------------|----------|--------------------------|------------|
| <input checked="" type="checkbox"/> | Fill | <input type="checkbox"/> | Mining | <input checked="" type="checkbox"/> | Drilling | <input type="checkbox"/> | Pipelining |
| <input checked="" type="checkbox"/> | Grading | | | | | | |
| <input type="checkbox"/> | Excavation (except for STRUCTURAL DEVELOPMENT checked above) | | | | | | |
| <input type="checkbox"/> | Watercourse Altercation (including dredging and channel modification) | | | | | | |
| <input checked="" type="checkbox"/> | Drainage Improvements (including culvert work) *Culvert to be removed as shown on page 8 of attached Robert Williams Pad Design | | | | | | |
| <input checked="" type="checkbox"/> | Road, Street, or Bridge Construction *Access Road Construction as shown on page 8 of attached Robert Williams Pad Design | | | | | | |
| <input type="checkbox"/> | Subdivision (including new expansion) | | | | | | |
| <input type="checkbox"/> | Individual Water or Sewer System | | | | | | |
| <input type="checkbox"/> | Other (please specify) | | | | | | |

C. STANDARD SITE PLAN OR SKETCH

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

ACTUAL TOTAL CONSTRUCTION COSTS OF THE COMPLETE DEVELOPMENT IRRESPECTIVE OF WHETHER ALL OR ANY PART OF THE SUBJECT PROPOSED CONSTRUCTION PROJECT IS WITHIN THE FLOODPLAIN \$ 330,244.19

*See attached Floodplain Calculation Fee

D. ADJACENT AND/OR AFFECTED LANDOWNER

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: N/A
ADDRESS: _____

NAME: _____
ADDRESS: _____

NAME: _____
ADDRESS: _____

NAME: _____
ADDRESS: _____

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

NAME: N/A
ADDRESS: _____

NAME: _____
ADDRESS: _____

NAME: _____
ADDRESS: _____

NAME: _____
ADDRESS: _____

E. CONFIRMATION FORM

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

- (A) PERSONAL SERVICE OF PROCESS BY THE DODDRIDGE COUNTY SHERIFF AT THE RATES PERMITTED BY LAW FOR SUCH SERVICE.
- (B) SERVICE BY CERTIFIED MAIL RETURN RECEIPT REQUESTED.
- (C) PUBLICATION.

- (D) COURT REPORTING SERVICES AT ANY HEARINGS REQUESTED BY THE APPLICANT.
- (E) CONSULTANTS AND/OR HEARING EXPERTS UTILIZED BY DODDRIDGE COUNTY FLOODPLAIN ADMINISTRATOR/MANAGER OR FLOODPLAIN APPEALS BOARD FOR REVIEW OF MATERIALS AND/OR TESTIMONY REGARDING THE EFFICACY OF GRANTING OR DENYING THE APPLICANT'S FLOODPLAIN PERMIT.

NAME (PRINT): Anthony Smith
 SIGNATURE: [Signature] DATE: 6/24/13

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

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

THE PROPOSED DEVELOPMENT:

THE PROPOSED DEVELOPMENT IS LOCATED ON:

FIRM Panel: 255 225
 Dated: 10/04/2011

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

Is located in Special Flood Hazard Area.
 FIRM zone designation _____
 100-Year flood elevation is: _____ NGVD (MSL)

Unavailable

The proposed development is located in a floodway.
 FBFM Panel No. _____ Dated _____

See section 4 for additional instructions.

SIGNED *Dan Wellings*

DATE 06/25/2013

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

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

- A plan showing the location of all existing structures, water bodies, adjacent roads, lot dimensions and proposed development.
- Development plans, drawn to scale, and specifications, including where applicable: details for anchoring structures, storage tanks, proposed elevation of lowest floor, (including basement or crawl space), types of water resistant materials used below the first floor, details of flood proffing of utilities located below the first floor and details of enclosures below the first floor. Also _____

- Subdivision or other development plans (If the subdivision or development exceeds 50 lots or 5 acres, whichever is the lesser, the applicant must provide 100-year flood elevations if they are not otherwise available).
- Plans showing the extent of watercourse relocation and/or landform alterations.
- Top of new fill elevation _____ Ft. NGVD (MSL).
For floodproofing structures applicant must attach certification from registered engineer or architect.
- Certification from a registered engineer that the proposed activity in a regulatory floodway will not result in any increase in the height of the 100-year flood. A copy of all data and calculations supporting this finding must also be submitted.
- Manufactured homes located in a floodplain area must have a West Virginia Contractor's License and a Manufactured Home Installation License as required by the Federal Emergency Management Agency (FEMA).

Other:

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

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

SIGNED *Dan Wellings* DATE 06/25/2013

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

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

CONDITIONS: _____

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

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

COMPLETE 1 OR 2 BELOW:

- 1 Actual (As-Built) Elevation of the top of the lowest floor (including basement or crawl space is _____ FT. NGVD (MSL)
- 2 Actual (As Built) elevation of floodproofing is _____ FT. NGVD (MSL)

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

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

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

INSPECTIONS:

DATE: _____ BY: _____
DEFICIENCIES ? Y/N

COMMENTS _____

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

Certificate of Compliance issued: DATE: _____ BY: _____

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

PERMIT NUMBER: 13-016

PERMIT DATE: 6/25/2013

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 *Dan Wellings* DATE 06/25/2013

ANTERO RESOURCES APPALACHIAN CORPORATION

SCHEDULE OF QUANTITIES

SCHEDULE OF QUANTITIES				
ROBERT WILLIAMS DRILL PAD SITE				
CLEARING & GRUBBING; EROSION & SEDIMENT CONTROLS				
	QUANTITY	UNIT		
MOBILIZATION	1.0	EA	\$19,140.00	\$19,140.00
CONSTRUCTION ENTRANCE	1.0	EA	\$3,172.76	\$3,172.76
CLEARING & GRUBBING	8.4	AC	\$4,513.25	\$37,866.17
TREE REMOVAL	0.4	AC	\$2,953.00	\$1,181.20
18" COMPOST FILTER SOCK	1394.0	LF	\$7.94	\$11,061.39
SUPER SILT FENCE	674.0	LF	\$8.48	\$5,718.41
R-3 RIP RAP (ROCK FILTER OUTLETS)	4.0	TON	\$20.00	\$80.00
AASHTO #57 STONE (ROCK FILTER OUTLETS)	3.0	TON	\$8.00	\$24.00
EROSION CONTROL MATTING - NORTH AMERICAN GREEN SC250 SLOPE MATTING	4010.0	SY	\$4.00	\$16,040.00
EROSION CONTROL MATTING - NORTH AMERICAN GREEN S150BN SLOPE MATTING	7097.0	SY	\$1.50	\$10,645.50
TOTAL				\$104,929.42
SITE				
	QUANTITY	UNIT		
DRILL PAD EXCAVATION (CUT TO FILL)	16522.0	CY	\$3.75	\$61,957.50
ACCESS ROADS EXCAVATION (CUT TO FILL)	9160.0	CY	\$4.16	\$38,082.70
WATER CONTAINMENT PAD EXCAVATION (CUT TO FILL)	0.0	CY	\$4.13	\$0.00
MATERIAL SPOIL	7315.0	CY	\$3.84	\$28,053.03
TOPSOIL	4588.0	CY	\$4.09	\$18,744.53
ROADSIDE DITCH	1120.0	LF	\$3.99	\$4,467.20
TOTAL				\$151,304.95
SUMP(S) PER ANTERO RESOURCES STANDARD DETAIL				
	QUANTITY	UNIT		
INSTALL 102" x 78" x 44" PRE CAST SUMP - SEE ANTERO RESOURCES SUMP DETAIL	5.0	EA	\$844.22	\$4,221.09
VALVE BOX HDPE PIPE (MINIMUM 12" DIAMETER x 48" HEIGHT)	1.0	EA	\$545.50	\$545.50
4" PVC CONNECTIVE PIPE (ANTERO SUMP DRAIN DETAIL)	505.0	LF	\$9.42	\$4,759.26
PVC PIPE OUTLET PROTECTION - R-3 RIP RAP	5.1	TON	\$20.00	\$102.00
TOTAL				\$9,627.86
AGGREGATE SURFACING - SPREADING, COMPACTION, and/or INSTALLATION				
	QUANTITY	UNIT		
DRILL & WATER CONTAINMENT PAD AASHTO #1 (8" THICK)	2846.0	TON	\$2.59	\$7,371.14
DRILL & WATER CONTAINMENT PAD 1 1/2" or 3/4" CRUSHER RUN STONE (2" THICK)	921.0	TON	\$2.89	\$2,662.71
DRILL & WATER CONTAINMENT PAD GEOTEXTILE FABRIC (US 200)	11157.0	SY	\$1.06	\$11,789.23
ACCESS ROADS 6" OR 4" MINUS CRUSHER RUN AGGREGATE (8" THICK)	1224.0	TON	\$2.83	\$3,468.51
ACCESS ROAD 1 1/2" OR 3/4" CRUSHER RUN STONE (2" THICK)	330.0	TON	\$2.95	\$974.44
ACCESS ROADS GEOTEXTILE FABRIC (US 200)	3138.0	SY	\$1.02	\$3,194.48
TOTAL				\$29,460.52
ROAD CULVERTS				
	QUANTITY	UNIT		
15" RCP	166.0	LF	\$42.00	\$6,972.00
R-3 RIP RAP (INLETS/OUTLETS)	28.0	TON	\$20.00	\$560.00
AASHTO #57 STONE (INLETS)	16.0	TON	\$8.00	\$128.00
AASHTO #1 STONE (DITCH CHECKS)	22.0	TON	\$2.59	\$56.98
AASHTO #57 STONE (DITCH CHECKS)	16.0	TON	\$8.00	\$128.00
DITCH/CHANNEL LINING - R-3 RIP RAP (CHANNEL)	11.0	TON	\$20.00	\$220.00
DITCH/CHANNEL LINING - R-4 RIP RAP (ACCESS ROAD)	81.0	TON	\$26.28	\$2,128.95
DITCH/CHANNEL LINING - R-5 RIP RAP (ACCESS ROAD)	86.0	TON	\$32.00	\$2,752.00
DITCH/CHANNEL LINING - NORTH AMERICAN GREEN SC250 MATTING	542.0	SY	\$4.00	\$2,168.00
TOTAL				\$15,113.93
MOBILE WATER CORRAL				
	QUANTITY	UNIT		
10,000 BBL MOBILE WATER CORRAL	1.0	EA		\$0.00
TOTAL				\$0.00
SEEDING				
	QUANTITY	UNIT		
SITE SEEDING (LIME, FERTILIZER, SEEDING, AND HYDRO-MULCH w/TACK (HYC-2 OR EQUAL))	5.3	AC	\$3,301.25	\$17,496.63
RECLAMATION SEEDING (LIME, FERTILIZER, SEEDING, AND HYDRO-MULCH w/TACK (HYC-2 OR EQUAL))	0.7	AC	\$3,301.25	\$2,310.88
TOTAL				\$19,807.50
UNFORESEEN SITE CONDITIONS				
	QUANTITY	UNIT		
ROCK CLAUSE - BLASTING	0.0	CY	\$3.27	\$0.00
ROCK CLAUSE - HOE RAMMING	0.0	CY	\$11.35	\$0.00
FRENCH DRAINS	0.0	FT	\$10.93	\$0.00
PHASE 1 FENCING - STEEL CORRUGATED PANELS w/T" POST (10 FT CENTERS) - WETLAND PROTECTION	0.0	LF	\$10.60	\$0.00
PHASE 2 FENCING - FILTER SOCK OUTSIDE OF PHASE 3 FENCING - WETLAND PROTECTION	0.0	LF	\$6.35	\$0.00
PHASE 3 FENCING - ORANGE SAFETY FENCE w/T" POST (10FT CENTERS) - WETLAND PROTECTION	0.0	LF	\$4.00	\$0.00
TEMPORARY SEEDING	0.0	AC	\$1,962.50	\$0.00
CONSTRUCTION STAKEOUT	0.0	HOUR	\$105.00	\$0.00
JUTE MATTING - SLOPE MATTING	0.0	SY	\$2.13	\$0.00
TOTAL				\$0.00
GRAND TOTAL				\$330,244.19



Well Site Safety Plan

Antero Resources

Well Name: Leggett Unit 1H, Leggett Unit 2H, Pike Unit 1H, Pike Unit 2H, James Unit 1H, James Unit 2H, McGee Unit 1H, McGee Unit 2H

Pad Location: ROBERT WILLIAMS PAD
Doddridge County/ Central District

GPS Coordinates: Lat 39°14'15.63"/Long 80°51'45.57" (NAD83)

Driving Directions to Robert Williams Pad:

From Greenwood:

Head Southeast on Co Route 50/30/Old U.S. 50 W/Sunnyside Rd for 3.4 miles. Turn right onto Co Route 21/Oxford Rd and continue for 2 miles. Turn right onto Co Route 21/1/Cabin Run.

After 0.1 miles, access road will be on the right.

Approval Sheet

The West Virginia Department of Environmental Protection Office of Oil and Gas has set forth minimum requirements for a Well Site Safety Plan which shall be submitted with each horizontal well application. A horizontal well shall be any well which meets the definition as provided for in Title 35, Series 8, Section 2.2 of the West Virginia Department of Environmental Protection Office of Oil and Gas.

Approved Safety Plans should be maintained and available at the drilling rig at all times and provided to the local emergency planning committee for the emergency planning district in which the well work will occur or to the county office of emergency services at least seven days before commencement of well work or site preparation work that involves any disturbance of land.

The Safety Plan, once approved, may only be modified upon approval by the West Virginia Department of Environmental Protection Office of Oil and Gas ("Office").

This plan has met the requirements of the West Virginia Department of Environmental Protection Office of Oil and Gas Well Site Safety Plan Standards.

Approved this day _____ of month _____, 20__ by

_____ Date: _____

_____ Date: _____

Plan Modification*

Revision No.	Description of Revision	Antero Preparer	Antero Reviewer/Approver	Agency Approval	Date

*The Office of Oil and Gas must approve all changes and modifications to previously approved plans.

Site Specific Safety Plan

Antero Resources

1.0 Siting Requirements

1.1. Exhibit 1 provides a plan view map showing the well location, access road, pits, flare lines, dwellings, and noting the north and prevailing wind directions.

1.2. Exhibit 2 also provides an area topographical map showing the well site location

2.0 Site Safety Plan

2.1. Safety Meeting

Safety meetings will be conducted as follows:

- Pre-Drilling,
- Pre-Completion,
- Pre-Workover
- Post Accident/Near Miss, and
- As-Needed.

Safety meetings should be held on-site weekly, at a minimum, prior to the beginning of operations, and:

- Includes personnel employed and involved in the operations, and
- Includes the District Oil and Gas Inspector (or other designated Office of Oil and Gas representative, for the pre-spud meeting only).

Typically, contractor of the operator will conduct these safety meetings with Antero Resources personnel participating as needed. Please list the above personnel as a record of attendance using the form found in Appendix A, or one similar. These records may be maintained separate from this plan.

2.2 Personnel and Visitor Log

This log is intended to provide a current headcount of all persons present at the site at any given time. All personnel and visitors must sign in upon entering the site and sign out upon departure. This log, or one similar, is provided in Appendix B and will be maintained at all times by the Drilling Supervisor or Toolpusher.

2.3 Evacuation Plan

The Drilling Supervisor or Toolpusher will establish a muster point at which all persons on site will assemble for personnel safety and verification of headcount. This point will be located at the entrance to the site.

In the event of an emergency requiring the evacuation of personnel, an audible or visual alarm will be sounded. The Drilling Supervisor and/or the Toolpusher will determine if local residents should be evacuated at this time depending on the outcome of their assessment of the situation.

If local resident evacuation is indicated, the Drilling Supervisor and/or the Toolpusher will be responsible for notifying the local impacted residents, or the local authorities will take this responsibility depending on the urgency, availability and direction of the local authorities. Local authorities have indicated that they will take this responsibility typically and will notify of evacuation mandates via television and radio media announcements in addition to public address units on patrol vehicles. In the event that Antero is directed to take this responsibility, notification will be by dispatching a worker to each affected residence to inform them of evacuation requirements and procedures. See section 8.1 for additional information.

Evacuated local residents may be temporarily housed in local hotels depending on the severity and duration of the emergency. Included in Exhibits 1 & 2 are maps and drawings that may assist in the emergency response and evacuation process.

The Drilling Supervisor and/or the Toolpusher will secure the Personnel and Visitor log before evacuating the site in order to perform a headcount at the muster point.

2.4 Emergency Response Personnel

Requesting public emergency response assistance for this location would be accomplished by the Drilling Supervisor or Toolpusher via telephone to Harrison County Dispatch which can be reached by dialing 911. From there, they will dispatch the appropriate and available emergency response agencies depending on the nature and extent of the emergency.

A list of Emergency Contacts, including Antero's 24 hour emergency contact telephone number, any contractors of the operator, the Department, the local oil and gas inspector, and local emergency response units are found in Appendix C. This list will be posted at the well site.

2.5 Local Schools and Public Facilities

In the event of an emergency requiring the evacuation of schools and public facilities the Drilling Supervisor or Toolpusher will make the required notifications unless the local public emergency responders take on this responsibility. Generally, local emergency responders have stated that they will assume this responsibility. Exhibit 3 lists all schools and public facilities, with their contact information, within a one-mile radius of the horizontal well location.

2.6 Material Safety Data Sheets

The Drilling Supervisor or Contractor of the Operator will maintain Material Data Safety Sheets (MSDS) for all materials and chemicals used on the well site. The MSDS sheets should be located in the Company Representatives Office on-site. Copies of the MSDS sheets may also be obtained from the area Safety Coordinator, the operator contact for maintaining MSDSs, by calling the local Antero Resource Office at 304-622-3842. See Appendix F for a list of hazardous chemicals used during phases of operation.

3.0 Casing Requirements

3.1 Geologic Prognosis

A list of anticipated freshwater, saltwater, oil and gas, hydrogen sulfide, thief zones, and high pressure and high volume zones, including their expected depth are attached to this plan in Exhibit 4, WW-6B.

3.2 Casing and Cementing Program

Exhibit 4 shows the detailed casing and cementing program, which meets the standards of the American Petroleum Institute (API) and employs a minimum of three strings of casing which are of sufficient weight, quantity and quality for the anticipated conditions to be encountered. This

casing and cementing program is designed to maintain well control and integrity. The casing setting depths are sufficient to cover and seal off those zones as identified in Exhibit 4.

4.0 BOP Requirements

4.1 BOP Equipment

The following is a list of all BOP equipment with types, sizes and ratings to be utilized and available during the drilling, completion and work-over of the well.

5M system:

- Annular preventer*
- Pipe ram, blind ram, and, if conditions warrant, as specified by the authorized officer, another pipe ram shall also be required*
- A second pipe ram preventer shall be used with a tapered drill string
- Drilling spool, or blowout preventer with 2 side outlets (choke side shall be a 3-inch minimum diameter, kill side shall be at least 2-inch diameter)*
- 3 inch diameter choke line
- 2 choke line valves (3 inch minimum)*
- Kill line (2 inch minimum)
- 2 chokes with 1 remotely controlled from rig floor
- 2 kill line valves and a check valve (2 inch minimum)*
- Upper kelly cock valve with handle available
- When the expected pressures approach working pressure of the system, 1 remote kill line tested to stack pressure (which shall run to the outer edge of the substructure and be unobstructed)
- Lower kelly cock valve with handle available
- Safety valve(s) and subs to fit all drill string connections in use
- Inside BOP or float sub available
- Pressure gauge on choke manifold
- All BOPE connections subjected to well pressure shall be flanged, welded, or clamped*

- Fill-up line above the uppermost preventer.

If repair or replacement of the BOPE is required after testing, this work shall be performed prior to drilling out the casing shoe.

When the BOPE cannot function to secure the hole, the hole shall be secured using cement, retrievable packer or a bridge plug packer, bridge plug, or other acceptable approved method to assure safe well conditions.

Minimum standards for choke manifold equipment.

- i. All choke lines shall be straight lines unless turns use tee blocks or are targeted with running tees, and shall be anchored to prevent whip and reduce vibration.
- ii. Choke manifold equipment configuration shall be functionally equivalent to the appropriate example diagram shown in Appendix C. The actual configuration of the chokes may vary.

All valves (except chokes) in the kill line choke manifold, and choke line shall be a type that does not restrict the flow (full opening) and that allows a straight through flow).

Pressure gauges in the well control system shall be a type designed for drilling fluid service

5M and higher system accumulator shall have sufficient capacity to open the hydraulically-controlled gate valve (if so equipped) and close all rams plus the annular preventer (for 3 ram systems add a 50 percent safety factor to compensate for any fluid loss in the control system or preventers) and retain a minimum pressure of 200 psi above precharge on the closing manifold without use of the closing unit pumps. The fluid reservoir capacity shall be double the usable fluid volume of the accumulator system capacity and the fluid level of the reservoir shall be maintained at the manufacturer's recommendations. Two independent sources of power shall be available for powering the closing unit pumps. Sufficient nitrogen bottles are suitable as a backup power source only, and shall be recharged when the pressure falls below manufacturer's specifications.

Accumulator Precharge Pressure Test

This test shall be conducted prior to connecting the closing unit to the BOP stack and at least once every 6 months. The accumulator pressure shall be corrected if the measured precharge pressure is found to be above or below the maximum or minimum limit specified below (only nitrogen gas may be used to precharge):

Power Availability

Power for the closing unit pumps shall be available to the unit at all times so that the pumps shall automatically start when the closing valve manifold pressure has decreased to the pre-set level.

Accumulator Pump Capacity

Each BOP closing unit shall be equipped with sufficient number and sizes of pumps so that, with the accumulator system isolated from service, the pumps shall be capable of opening the hydraulically-operated gate valve (if so equipped), plus closing the annular preventer on the smallest size drill pipe to be used within 2 minutes, and obtain a minimum of 200 psi above specified accumulator precharge pressure.

Locking Devices

A manual locking device (i.e., hand wheels) or automatic locking devices shall be installed on all systems of 2M or greater. A valve shall be installed in the closing line as close as possible to the annular preventer to act as a locking device. This valve shall be maintained in the open position and shall be closed only when the power source for the accumulator system is inoperative.

Accumulator working pressure rating	Minimum acceptable operating pressure	Desired precharge pressure	Maximum acceptable precharge pressure	Minimum acceptable precharge pressure
1,500 psi	1,500 psi	750 psi	800 psi	700 psi
2,000 psi	2,000 psi	1,000 psi	1,100 psi	900 psi
3,000 psi	3,000 psi	1,000 psi	1,100 psi	900 psi

Remote Controls

Remote controls shall be readily accessible to the driller. Remote controls for all 3M or greater systems shall be capable of closing all preventers. Remote controls for 5M or greater systems shall be capable of both opening and closing all preventers. Master controls shall be at the accumulator and shall be capable of opening and closing all preventers and the choke line valve (if so equipped). No remote control for a 2M system is required.

4.2 Procedure and Schedule for Testing BOP Equipment

Well Control Equipment Testing

- i. Perform all tests described below using clear water or an air..
- ii. Ram type preventers and associated equipment shall be tested to approved stack working pressure if isolated by test plug or to 80 percent of internal yield pressure of casing if BOP stack is not isolated from casing. Pressure shall be maintained for at least 10 minutes or until requirements of test are met, whichever is longer. If a test plug is utilized, no bleed-off of pressure is acceptable. For a test not utilizing a test plug, if a decline in pressure of more than 10 percent in 30 minutes occurs, the test shall be considered to have failed. Valve on casing head below test plug shall be open during test of BOP stack.
- iii. Annular type preventers shall be tested to 70 percent of rated working pressure. Pressure shall be maintained at least 10 minutes or until provisions of test are met, whichever is longer.
- iv. As a minimum, the above test shall be performed:
 - a. when initially installed:
 - b. whenever any seal subject to test pressure is broken:
 - c. following related repairs: and
 - d. 30-day intervals.
- v. Valves shall be tested from working pressure side during BOPE tests with all downstream valves open.
- vi. When testing the kill line valve(s), the check valve shall be held open or the ball removed.
- vii. Annular preventers shall be functionally operated at least weekly.
- viii. Pipe and blind rams shall be activated each trip, however, this function need not be performed more than once a day.
- ix. A BOPE pit level drill shall be conducted weekly for each drilling crew.
- x. Pressure tests shall apply to all related well control equipment.
- xi. All of the above described tests and/or drills shall be recorded in the drilling log.
- xii. For intermediate wellbore drilling phase, the BOP equipment will be pressure and function tested upon initial installation.
- xiii. For the bottom and horizontal wellbore drilling phase, the BOP equipment will be pressure and function tested upon initial installation, weekly, and after each bit trip.

4.3 BOP Installation Schedule

The BOP will be installed after running surface casing as well as after running intermediate casing. BOP equipment shall be installed on the innermost string of casing after the surface casing.

4.4 Well Control Training

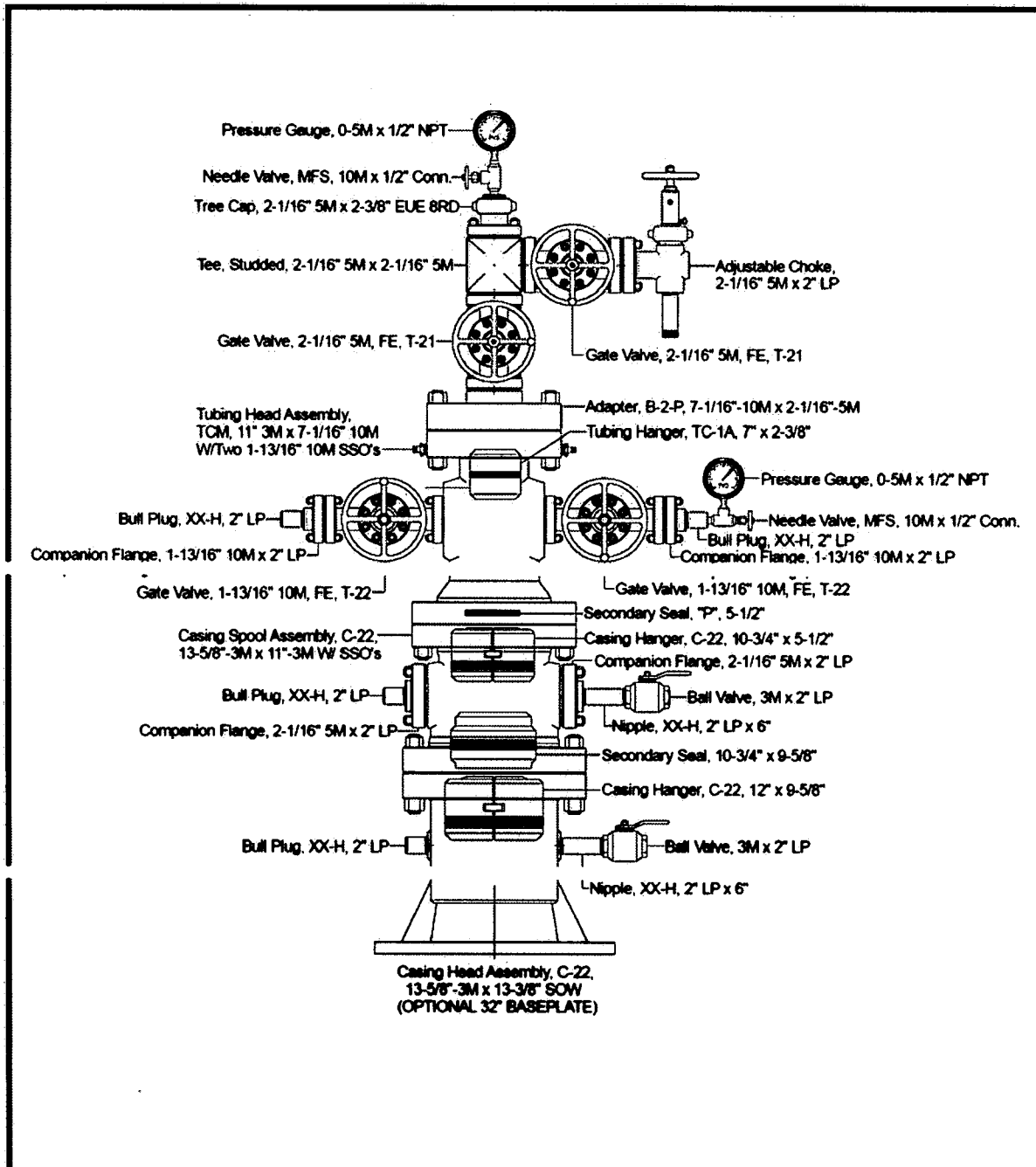
All Drilling Supervisors and Toolpushers used on this well will be IADC trained and certified. A trained person will be present during the drilling operations. Training certificates will be available for review on the location. The list of personnel with said training is provided in Appendix E.

4.5 Drilling Record

The Drilling Supervisor will maintain detailed records of significant drilling events such as lost circulation, hydrogen sulfide gas, fluid entry, kicks and abnormal pressures through the electronic data entry and recording system, Wellview. This system allows the Drilling Supervisor to enter daily reports containing the specified information. The records are then retained electronically at Antero Main Office in Denver, CO.

The Emergency Response Plan for this operating area requires the Drilling Supervisor to notify the district oil and gas inspector or the designated Office of Oil and Gas representative any unusual drilling events such as hydrogen sulfide gas or significant kicks that occur during drilling operations. Any encounter of hydrogen sulfide gas requires immediate notification of the Office of Oil and Gas.

4.6 Schematic and Description of the Wellhead Assembly



5.0 Well Flaring Operations

5.1 Size, Construction and Length of Flare Line

The flare line will be a 4" diameter, steel line that extends 50' from the well. The line will be anchored to the surface of the ground by cross pinning it in place using metal staking at multiple points along the line.

The choke assembly is described in previous section of this document and in drawing "5M Choke Manifold Equipment" BLM drawing Onshore Oil and Gas Order Number 2, Appendix D.

We do not anticipate flaring since we would first attempt to route the flow to the Gas Buster and work the gas kick off from there. Flaring would occur as a last resort or if needed.

5.2 Flare Lighting System

The system for lighting the flare will be an automatic flare igniter using a solar collector panel and battery charger system. A second igniter will be installed as a backup. Should flaring be required or needed.

The Drilling Supervisor will give notification to the local fire department prior to lighting the flare, if practicable, or as soon as possible thereafter.

5.3 Flare Safe Distances

The flare line(s) discharge shall be located not less than 50 feet from the well head, having straight lines unless turns are targeted with running tees, and shall be positioned downwind of rig and trailers. The flare system shall have an effective method for ignition. All flammable material beyond the end of the flare line will be cleared to a minimum distance of 50feet.

5.4 Flare Duration

The flare duration should not exceed the maximum time requirements needed to complete the operation.

6.0 Well Killing Operations

6.1 Mud Mixing Inventory

The following shows the inventory of all materials that will be on-site for the mixing of mud:

- 20 sack of Soda Ash
- 480 sacks of KCL
- 200 sacks of Biolose
- 40 sack of Xan-Plex
- 20 buckets of X-Cide 102
- 3 Drums of KD-40
- 5 Buckets of LD-S
- 15 super sack of MIL Bar
- 100 sacks of Soletex
- 40 Sacks of Graphite
- 300 Sack of Salt

Volume of mixed mud = pit volume + equivalent volume in tanks
= 500 bbls + 500 bbls
= 1000 bbls total

Mixed Mud Weight The mixed mud weight will vary depending on the bottom hole pressures and will be calculated and adjusted as we gather more information; we intend to use 12.8 lb – 13.0 lb mud but will adjust the mud weight as information becomes available

Volume of Add'l

Weighting Mat'l Antero will have the necessary materials available to mix up enough mud to weight the mud up 1 lb more than the mud used for drilling; as an estimate, we expect to have 10 pallets of barite on site and 12 pallets of bentonite

Volume Water for Mixing The rig has a 400 bbl rig water tank and the location will have 800 bbls additional in separate tanks.

6.2 Mud Mixing Units

The drilling rig is equipped with 2 mud tanks with agitators and jets such that it can make two pills.

6.3 Kill Procedures

The following paragraph describes the methodology and type of kill procedures that will be used if needed. These procedures are recognized by the IADC.

Once a Kick is detected a prompt shut in of the well is essential. The exact shut in method will be dictated by the operation being performed at the time of the kick, available equipment, plus other extenuating circumstance. The following types of kill operations may be performed to bring the well back under control. The different methods listed below to be used will be determined by the operation being performed at the time of the kick.

Kill Procedures

- 1.) Drillers Method
- 2.) Wait and Weight Method
- 3.) Circulate and Weight Method
- 4.) Concurrent Method
- 5.) Reverse Circulation Method
- 6.) Dynamic Kill Method
- 7.) Bullheading Method
- 8.) Volumetric Method

7.0 Hydrogen Sulfide Operations

7.1 H₂S Monitoring

The equipment and method used for the monitoring, detection and warning of the presence of hydrogen sulfide gas during drilling, completions and work-over operations will be portable electronic gas detection such as BW gas detectors or equivalent. These detectors will be

typically located near the well bore on the drilling rig, outside the data van or on the drillers stand.

7.2 H2S Training

All personnel that will be involved in the drilling operations will be trained in H2S in drilling operations to a minimum of the awareness level. Additional training will be given to the Drilling Supervisors both in H2S and emergency response duties related specifically to air toxins. All of the aforementioned training will be completed prior to spudding the well. These records may be kept separate from this plan.

7.3 Personal Protection Equipment

The following personal protection equipment will be available and in use as needed on location:

- Fire Retardant Clothing (FRC),
- Hardhats,
- safety shoes,
- safety glasses and/or safety goggles/face shields,
- hearing protection earplugs,
- cotton and chemical resistant work gloves, and
- dust mask respirators.

In the event that other hazards are identified or presented during the drilling operation, we will attempt to eliminate the hazard, and if not practical, additional PPE will be provided to mitigate the risk to the worker. In the event that H2S is detected, a hazard assessment will be performed for this exposure along with risk mitigation.

7.4 H2S Notification and Control

The emergency alarm will be audible or visual type which will be detectable by all personnel on location. If dangerous levels of H2S are detected, we will immediately implement our Emergency Response Plan which will provide for site control and evacuation as needed. Generally, the site will be secured such that access is allowed only for trained emergency response personnel. Site security will be accomplished by trained workers stationed at safe points on the perimeter and access road to the site.

If H2S is detected and confirmed, a telephonic notification will be made to the local oil and gas inspector.

8.0 Notification and Protection Zone Standards

8.1 Method of Notification

In an emergency which requires the notification of residents and emergency personnel that may be affected during drilling such as release of H₂S, flaring, etc., the emergency response plan will be immediately implemented. This plan specifies the roles and responsibilities of on-site personnel in case of emergency and addresses emergency notification of potentially affected residents and public emergency response personnel.

In general under the situation presently described, after the activation of the emergency alarm, the on-site personnel will muster for a headcount by the On-Scene Incident Commander which is usually the Drilling Supervisor or Toolpusher. After initial assessment of the situation, the OSIC will notify the public emergency response agency from which direction will be taken. If the agency directs, on-site personnel will notify all local impacted residents of the incident by dispatching a worker by truck to each potentially affected residence. If the public emergency responder does not direct this notification to be made by the operator, then the public response agency will be responsible for this notification. The local emergency responders have, in general, stated that emergency notification of local residents will be accomplished by their means including television and radio announcement as well as public address systems on patrol vehicles. Antero safety coordinators who are located in the field may assist with the notification of local residents.

8.2 Established Protection Zones

Protection zones will be established and maintained based on the nature, extent and severity of the event. These protection zones will be based on those safe distances outlined in the applicable portions of the DOT Emergency Response Guidebook.

Safety Meeting Log

Date: _____ Location(Pad): _____ Well Name: _____

	<u>Name</u>	<u>Organization</u>	<u>Job Title</u>
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____
7.	_____	_____	_____
8.	_____	_____	_____
9.	_____	_____	_____
10.	_____	_____	_____
11.	_____	_____	_____
12.	_____	_____	_____
13.	_____	_____	_____
14.	_____	_____	_____
15.	_____	_____	_____
16.	_____	_____	_____
18.	_____	_____	_____
19.	_____	_____	_____
20.	_____	_____	_____
21.	_____	_____	_____
22.	_____	_____	_____
23.	_____	_____	_____
24.	_____	_____	_____
25.	_____	_____	_____

Appendix C.

EMERGENCY CONTACT LIST AND PHONE NUMBERS

Contact	Phone Number
<p>Designated Person and Incident Commander:</p> <p>John Kawcak, <i>Operations Manager</i> Tim Culberson, <i>Midstream Construction Manager</i> Terry Wyckoff, <i>Midstream Production Manager</i></p>	<p>817.368.1553 John 918.916.0116 Tim 304.991.0720 Terry</p>
<p>Designated Backup Person Incident Commander/Response Coordinator:</p> <p>Mike Ward Ricky Jones Norman Wood Stanley Dudley Jeff Partridge Landon West Tim Henrich Mike Alcorn James Harvey Tim Murrell Delf Martinez Ralph Ybarra Virgil Gaither James Neal</p>	<p>580.276.7484 Mike 580.927.6276 Ricky 903.353.4429 Norman 970.618.7602 Stanley 940.577.2288 Jeff 940.389.0602 Landon 720.530.3059 Tim H. 304.627.7070 Mike 918.916.4340 James 903.256.6040 Tim 970.629.0055 Delf 580.927.5606 Ralph 580.504.2366 Virgil 607.644.8701 James</p>
<p>Frontier #3 Frontier #14 Frontier #17 Frontier #8 Frontier #22 Hall Drilling #3</p>	<p>832.487.7965 Rig Sat Phone 713.758.0662 Rig Sat Phone 713.758.0730 Rig Sat Phone 832.531.7014 Rig Sat Phone 713.758.0893 Rig Sat Phone 713.758.0881 Rig Sat Phone</p>
<p>Antero Resources Denver Office 1625 17th Street, Suite 300 Denver, CO 80202</p>	<p>Office: (303) 357-7310 Fax: 303-357-7315</p>
<p>Environmental Manager Jerry Alberts</p>	<p>Direct: (303) 357-7341 Cell: 720-201-0160 24hr</p>

Contact	Phone Number
Safety Manager Rick Blankenship	Direct: (303) 357-7378 Cell: (720) 235-2775 24hr
Vice President Production Kevin Kilstrom	Direct: (303) 357-7335 Cell: (303) 808-0254 24hr
Federal and State Agencies	
National Response Center	(800) 424-8802
West Virginia Office of Water Resources' Emergency Notification Number, Oil Spill Response	1-800-642-3074
West Virginia Office of Oil and Gas Sam Ward, WVDEP Inspector – Harrison County Joe Taylor, WVDEP Inspector – Tyler County David Cowan, WVDEP Inspector – Ritchie County Douglas Newlon, WVDEP Inspector – Doddridge County	(304) 389-7583 cell Sam Ward (304) 380-7469 cell Joe Taylor (304) 389-3509 cell David Cowan (304) 932-8049 cell Douglas Newlon
Environmental Protection Agency (EPA) Region 3	Phone: 215-814-3231 Fax: 215-814-3163
West Virginia Worker's Compensation	1-888-4WVCOMP 1-304-926-3400
West Virginia Fish and Wildlife Service, Field Office, Elkins, WV	Phone: 304-636-6586 Fax: 304-636-7824
US OSHA Charles Green	1-800-321-OSHA (1-800-321-6742) 304.347.5937
Local Agencies and Responders	
Sheriff/Police/Fire Department	911
Harrison County LEPC	304.624.9700 John Keeling
Hospital- United Hospital Center--Clarksburg	304. 624.2121
Harrison County Emergency and Dispatch Business Office	911 304.623.6559

Contact	Phone Number
Doddridge County Emergency	911 304.873.3253
Doddridge County LEPC	304.782.2124 Roland W. Kniceley
WV Highway Patrol	304,782,2124 doddridgeoes@dishmail.net
Public Water Intakes (see App G for add'l points)	to be determined
Waste Removal	
TK Stanley—Waste Removal, Vac Truck	304.622.6677
Stallion	330.760.4248
Waste Management	
Contractors	
Hall Drilling Services MT Hall	304588 3368
TK Stanley	304.622.6677
Cleanup Crews	
Ryan Environmental	304.641.0244
Water Haulers	
TK Stanley	304.476.0396
Hall Drilling	304.483.8125
Frac Tank Suppliers	
TK Stanley—Frac Tank Rental	304.622.6677
Stallion	330.760.4248
Winch Trucks	
TK Stanley	304.476.9588

Contact	Phone Number
Water Moving/Pumping	
TK Stanley	304.476.0396
Pumping Services—Kill Fluids	
Halliburton—Jane Lew	724.743.6601 Central Dispatch
Light Plants	254.434.1469 Hot Lights- Josh
Wolfpack	304-623-1199.
BOPs	
Blue Dot	304.290.7399
Snubbing Services	Basic Energy- 724-825-2548 Bryan Berlison
Cudd Well Control	713.849.2769 Houston
Wild Well Control	281.353.5481
Roustabout Crews	740.473-1305 Hall Drilling Office 304.588.66474 Hall Drilling- Jack 601.410.7440- TK Stanley Office 724.984.7626- TK Stanley- Brett

WV Emergency Reporting

In the event of a hazardous waste or hazardous material release or emergency, please contact:
1-800-642-3074.

Additional Contact Information

1-800-424-8802 National Response Center

1-304-558-5938 DEP Elkview Emergency Response Unit

Email Contacts:

Mike Dorsey Mike.H.Dorsey@wv.gov

Rusty Joins Rusty.T.Joins@wv.gov

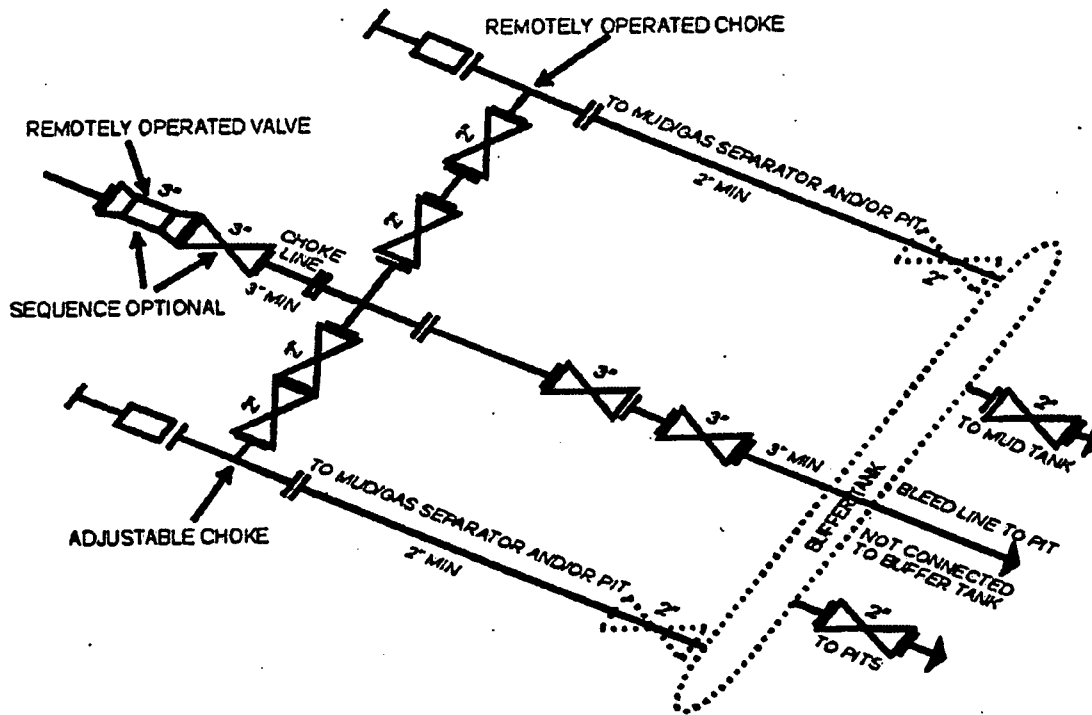
WHERE TO FIND HELP

Doddridge County:

Ambulance, Fire, Law Enforcement Emergencies Call 911
Poison Control Center....1-304-388-4211 or 1-800-222-1222
Emergency Alert System Radio WFBY-FM 106.5

FIRE:	
Doddridge County Ambulance Authority	304-838-5718
Greenwood V.F.D	304-873-3669
McClellan V.F.D	304-782-2774
Smithburg V.F.D	304-873-1493
West Union V.F.D	304-873-1391
B.A.N.C.S V.F.D	304-873-3722
EMS:	
Doddridge County Office of Emergency Service	304-782-2124
Doddridge County EMS	304-873-3330
LAW ENFORCEMENT:	
Doddridge County Sheriff Department	304-873-1000
West Union Police Department	304-873-1107
West Virginia State Police Doddridge County Detachment	304-873-2101
OTHER IMPORTANT NUMBERS:	
W.V. Dept. of Health & Human Resources	304-627-2295
National Response Center (Chemical, Oil Spills & Chemical/Biological Terrorism) (State Emergency Spill Notification)	1-800-424-8802 1-800-642-3074
Allegheny Power	1-800-255-3443
WV State Fire Marshal (Arson Hotline)	304-588-2191 1-800-233-3473
Dominion Hope Gas	1-800-688-4673

Appendix D: Choke Manifold Schematic



5M CHOKES MANIFOLD EQUIPMENT - CONFIGURATION OF CHOKES MAY VARY

Although not required for any of the choke manifold systems, buffer tanks are sometimes installed downstream of the choke assemblies for the purpose of manifolding the bleed lines together. When buffer tanks are employed, valves shall be installed upstream to isolate a failure or malfunction without interrupting flow control. Though not shown on 2M, 3M, 10M, OR 15M drawings, it would also be applicable to those situations.

[54 FR 39528, Sept. 27, 1989]

Appendix E. List of Well Control Trained Personnel

1. John Kawcak- Antero
2. Mike Ward- Drilling Consultant
3. Ricky Jones- Drilling Superintendent
4. Mike Alcorn- Drilling Superintendent
5. Landon West- Completion Consultant
6. Jeff Partridge-Completion Consultant
7. Norman Wood- Drilling Consultant
8. Delf Martinez- Drilling Consultant
9. James Harvey- Drilling Consultant
10. Steve Guffey- Drilling Consultant
11. Tim Murell- Drilling Consultant
12. James Neal-Drilling Consultant
13. Virgil Gaither-Drilling Consultant
14. Ralph Ybarra- Drilling Consultant
15. Bob Belcher- Completion Consultant (Willowbend)
16. Kris Humpert- Completion Consultant (Willowbend)
17. Ronnie Fuller- Completion Consultant (Willowbend)
18. Trevor Lively- Completion Consultant (Willowbend)
19. Trey Armstrong- Completion Consultant (Willowbend)
20. Gary Linn- Completion Consultant (Willowbend)
21. Justin Bowers- Completion Consultant (Willowbend)
22. Michael Petitt- Completion Consultant (Willowbend)
23. Stephen Sanders- Completion Consultant (Willowbend)

Appendix F. List of Hazardous Chemicals used during Phases of Operation:

<u>Chemical Name</u>	<u>Daily Qty. on Location</u>	<u>Storage Container</u>
	<u>Construction</u>	
Diesel Fuel Oil	2000 Gallons	Double Walled Tank
	<u>Drilling</u>	
Airfoam HD	275 gallons	Drum
Alpha 1655	220 gallons	Drum
Aluminum Stearate	150 lbs	Tote
Caustic Soda	1500 lbs	Bag
Claytrol	440 gallons	Drum
Conqor 404	55 gallons	Drum
Diesel Fuel Oil	8000 gallons	Double Walled Tank
Gear Oil	250 gallons	Double Walled Tank
Hydraulic Fluid	250 gallons	Double Walled Tank
KCL (Potassium Chloride)	15000 lbs	Bag
LD-9	100 gallons	Bucket
Lime	2500 lbs	Bag
Mil-Bar	80000 lbs	Super Sack
Mil-Lube	220 gallons	Drum
Milmica	2500 lbs	Bag
Mil-Pac LV	2500 lbs	Bag
Mil-Plug (Walnut Shells)	5000 lbs	Bag
Milstarch	10000 lbs	Bag
Mineral Oil	265 gallons	Tote
Motor Oil	250 gallons	Double Walled Tank
New-Drill	160 gallons	Bucket
Perma-Lose HT	10000 lbs	Bag
Salt	30000 lbs	Super Sack
Soda Ash	1000 lbs	Bag
SWF	265 gallons	Drum
W.O. Defoam	160 gallons	Bucket
Xan-Plex D	1200 lbs	Bag
X-Cide 102	160 gallons	Bucket
	<u>Completions</u>	
15% Hydrochloric Acid	1000 gallons	Acid Tanker
DAP 901 (Scale Inhibitor)	284 gallons	Tote
DAP-923 (Acid Additive)	1.8 gallons	Acid Tanker
Diesel Fuel Oil	8000 gallons	Tanker
DWP-111 (Gel)	4980 gallons	Tote
DWP-204 (Buffer)	496 gallons	Tote
DWP-612 (FR)	1116 gallons	Tote
DWP-901 (Oxide Breaker)	1112 pounds	Bucket
DWP-944 (Biocide)	224 gallons	Tote
Oil 40 (Pump Flush)	300 gallons	Tote
EB-4L(Gel Breaker)	362 gallons	Tote
HCl Acid	1000 gallons	Tanker
KR-153SL(Biocide)	74 gallons	Tote

Appendix F. CONTINUED

Completions -CONTINUED

Super Scale Inhibitor	112 gallons	Tote
WFR-3B(Friction Reducer)	372 gallons	Tote

Service/Work over

FR-1100(Friction Reducer)	800 gallons	Bucket
FR-1205(Pipe on Pipe)	265 gallons	Bucket
FR1302(Liquid Beads)	80 gallons	Bucket
FR-1400(Gel Sweep/Friction Reducer)	550 gallons	Tote
76 Dynalife LEP Grease	20 gallons	Bucket
LithoPlex rt. No. 2 grease	2 gallons	Tube
Hi Temp red grease	3 gallons	Tube
50/50 antifreeze	15 gallons	Bucket
Hydraulic oil 68	15 gallons	Bucket
Hydraulic oil 46	25 gallons	Bucket
Premium Lithium grease	1 gallon	Spray Can
P.B. Blaster	2 gallons	Spray Can
Transmission fluid	10 gallons	Bucket
Max-gear	15 gallons	Bucket
Brakleen	3 gallons	Spray Can
Off-road diesel	700 gallons	Double Walled Tank

Reclamation

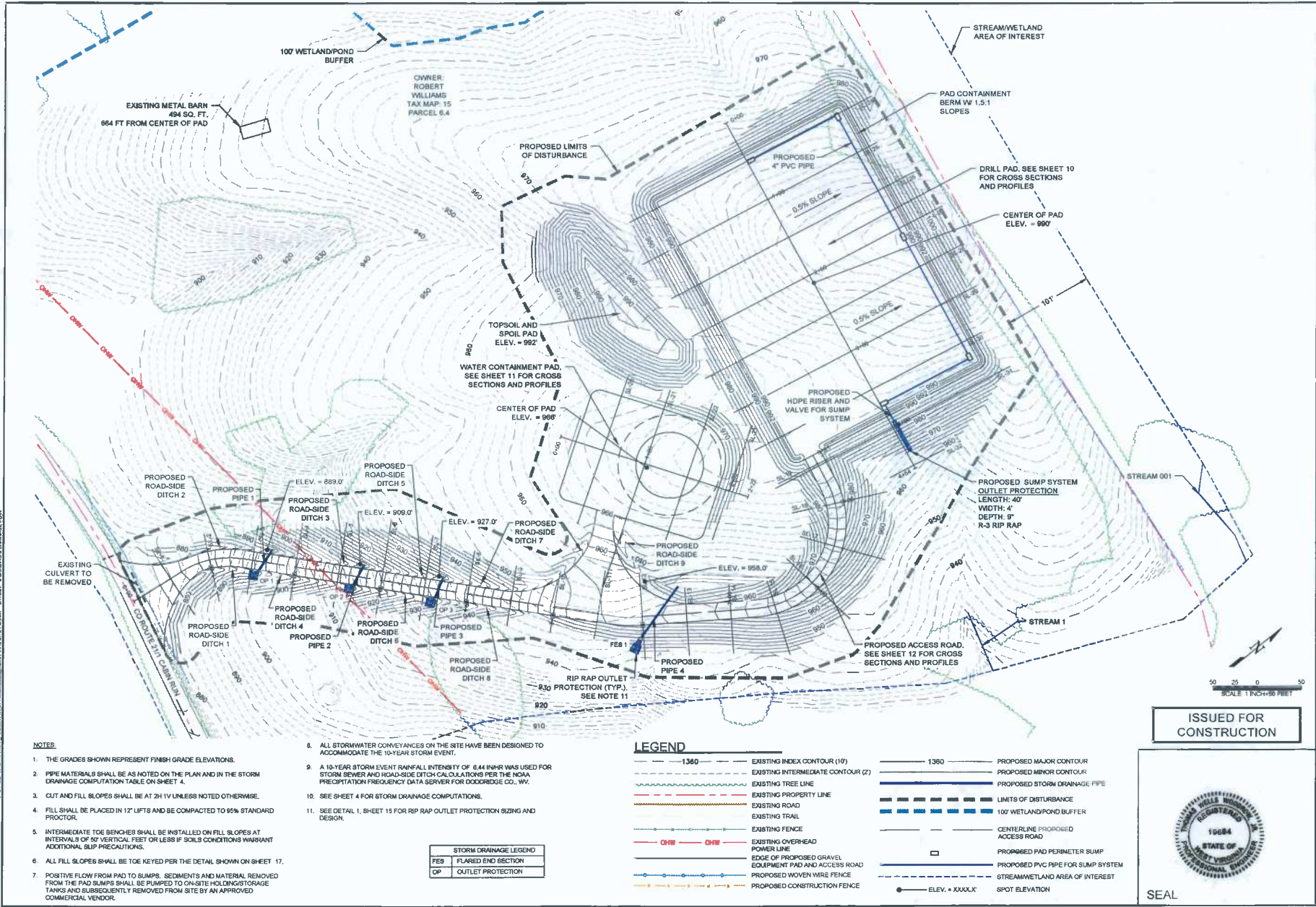
Diesel Fuel Oil	2000 gallons	Double Walled Bulk Tank
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Salem Compressor Station

Used Oil	50 barrels	Bulk Tank
Compressor Oil	1600 gallons	Bulk Tank
Engine Oil	1600 gallons	Bulk Tank
Ethylene Glycol	2000 gallons	Bulk Tank
Produced Water	420 barrels	Bulk Tank

Note: The attached list represents anticipated materials used for planned operations on the well site. In the event of an unplanned event on the well site, additional materials may be required. Additional MSDS for any unplanned events will be maintained on the well site in accordance with OSHA CFR 1910.1200 standards.

The Drilling Supervisor or Contractor of the Operator will maintain Material Data Safety Sheets (MSDS) for all materials and chemicals used on the well site in accordance with OSHA CFR 1910.1200 standards. The MSDS should be located in the Company Representative's Office on-site. Copies of the MSDS may also be obtained from the area Safety Coordinator, the operator contact for maintaining MSDS, by calling the local Antero Resource Office at 304-622-3842 or 800-878-1373.



- NOTES**
- THE GRADES SHOWN REPRESENT FINISH GRADE ELEVATIONS.
 - PIPE MATERIALS SHALL BE AS NOTED ON THE PLAN AND IN THE STORM DRAINAGE COMPUTATION TABLE ON SHEET 4.
 - CUT AND FILL SLOPES SHALL BE AT 2H:1V UNLESS NOTED OTHERWISE.
 - FILL SHALL BE PLACED IN 12" LIFTS AND BE COMPACTED TO 95% STANDARD PROCTOR.
 - INTERMEDIATE TOE BENCHES SHALL BE INSTALLED ON FILL SLOPES AT INTERVALS OF 50' VERTICAL FEET OR LESS IF SOILS CONDITIONS WARRANT ADDITIONAL SLIP PRECAUTIONS.
 - ALL FILL SLOPES SHALL BE TOE KEYED PER THE DETAIL SHOWN ON SHEET 17.
 - POSITIVE FLOW FROM PAD TO SUMPS. SEDIMENTS AND MATERIAL REMOVED FROM THE PAD SUMPS SHALL BE PUMPED TO ON-SITE HOLDING STORAGE TANKS AND SUBSEQUENTLY REMOVED FROM SITE BY AN APPROVED COMMERCIAL VENDOR.
 - ALL STORMWATER CONVEYANCES ON THE SITE HAVE BEEN DESIGNED TO ACCOMMODATE THE 10-YEAR STORM EVENT.
 - A 10-YEAR STORM EVENT RAINFALL INTENSITY OF 5.44 IN/HR WAS USED FOR STORM SEWER AND ROAD-SIDE DITCH CALCULATIONS PER THE NOAA PRECIPITATION FREQUENCY DATA SERVER FOR DODDRIDGE CO., WV.
 - SEE SHEET 4 FOR STORM DRAINAGE COMPUTATIONS.
 - SEE DETAIL 1, SHEET 15 FOR RIP RAP OUTLET PROTECTION SIZING AND DESIGN.

STORM DRAINAGE LEGEND	
FE8	FLARED END SECTION
OP	OUTLET PROTECTION

LEGEND

1360	EXISTING INDEX CONTOUR (10')	1360	PROPOSED MAJOR CONTOUR
---	EXISTING INTERMEDIATE CONTOUR (2')	---	PROPOSED MINOR CONTOUR
---	EXISTING TREE LINE	---	PROPOSED STORM DRAINAGE PIPE
---	EXISTING PROPERTY LINE	---	LIMITS OF DISTURBANCE
---	EXISTING ROAD	---	100' WETLAND/POND BUFFER
---	EXISTING TRAIL	---	CENTERLINE PROPOSED ACCESS ROAD
---	EXISTING FENCE	---	PROPOSED PAD PERIMETER SUMP
---	EXISTING OVERHEAD POWER LINE	---	PROPOSED PVC PIPE FOR SUMP SYSTEM
---	EDGE OF PROPOSED GRAVEL EQUIPMENT PAD AND ACCESS ROAD	---	STREAM/WETLAND AREA OF INTEREST
---	PROPOSED WOVEN WIRE FENCE	---	SPOT ELEVATION
---	PROPOSED CONSTRUCTION FENCE		

ISSUED FOR CONSTRUCTION



SEAL

NO.	REVISION	BY	DATE
1			
2			
3			
4			
5			

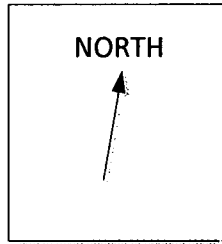
KLEINFELDER
Bright People. Right Solutions.
200 EXECUTIVE DRIVE, SUITE 122
PH 724.772.7070 FAX 724.772.9078
www.kleinfelder.com
120202
CORPORATE & DRAINAGE, INC.

ROBERT WILLIAMS DRILL PAD GRADING & DRAINAGE PLAN
ANTERO RESOURCES OPERAL/ACTUAL CORPORATION
ROBERT WILLIAMS DRILL PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY WEST VIRGINIA

DESIGNED BY:	RAP
MODIFIED BY:	JDF
CHECKED BY:	JDF
DATE:	05-16-2013
SCALE:	
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS	0' 0.5' 1.0' 1.5' 2.0'
CONSTRUCTION	8
	8 of 21 sheets



EXHIBIT 1
ROBERT
WILLIAMS
PAD



PREVAILING WIND
DIRECTION NNE



EXHIBIT 1, PAGE 3

DRILLING LAYOUT/FLARE LINES/PREVAILING WINDS

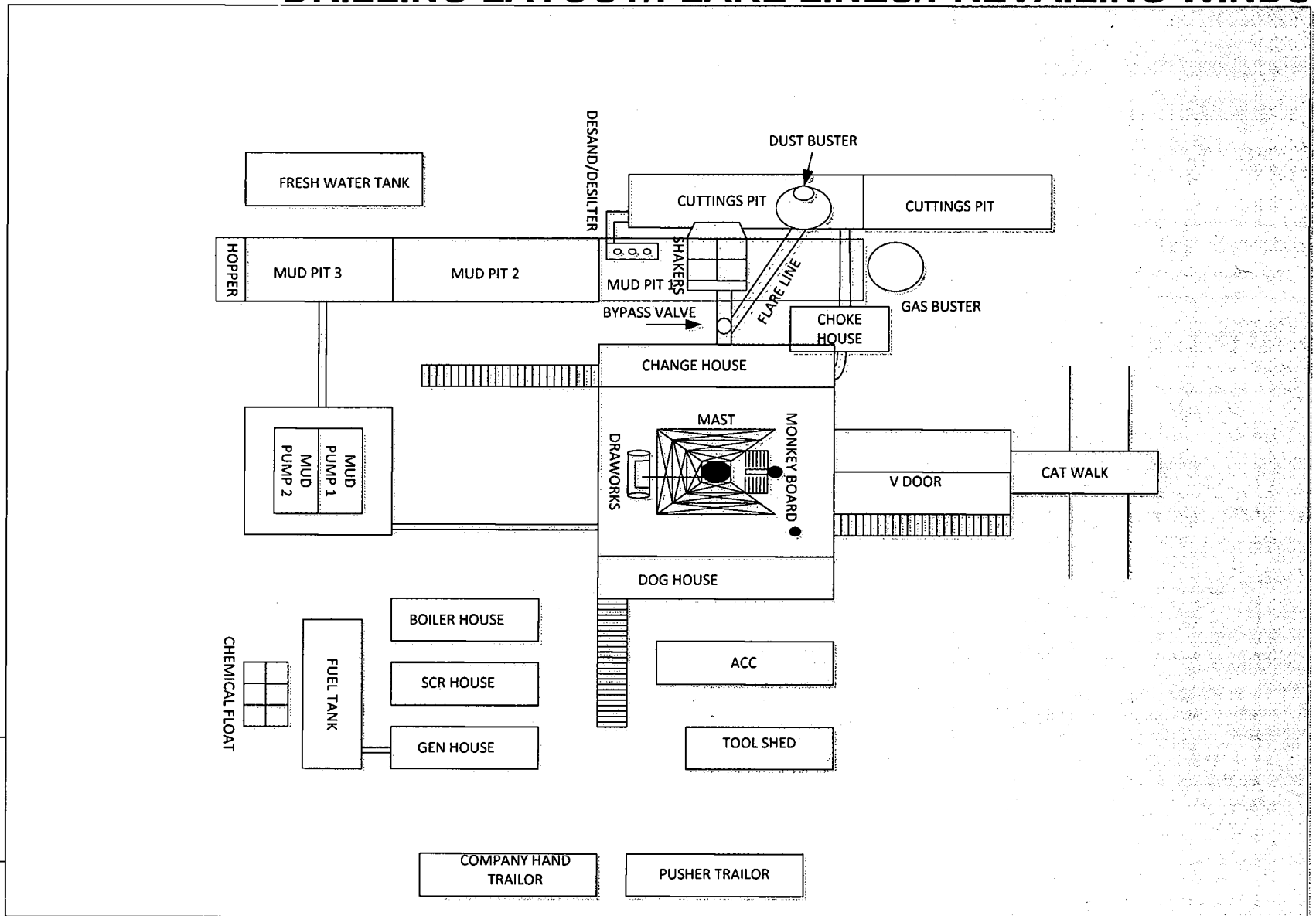
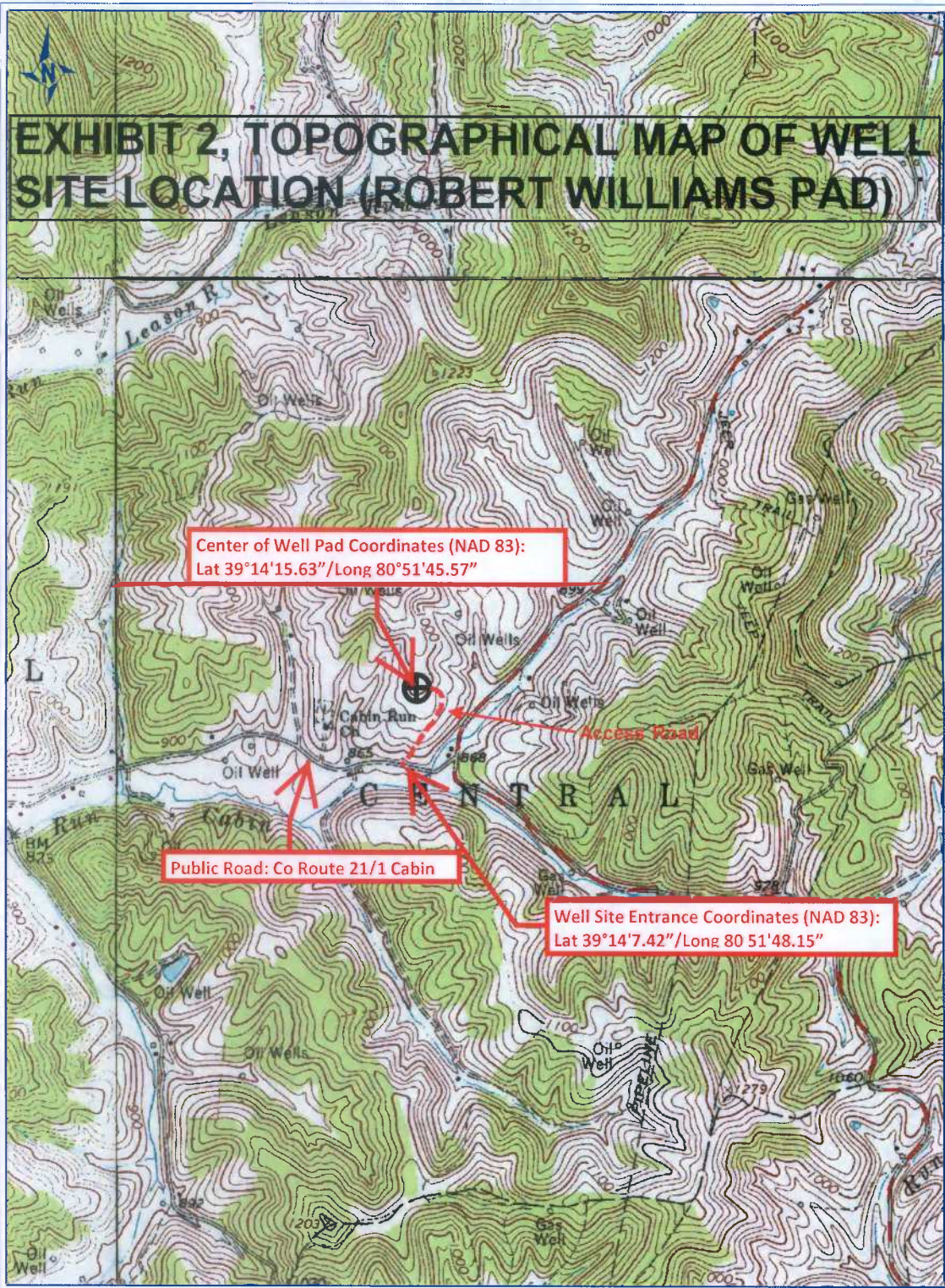


EXHIBIT 2, TOPOGRAPHICAL MAP OF WELL SITE LOCATION (ROBERT WILLIAMS PAD)



PETRA 5/8/2013 2:57:06 PM

Antero Resources Corp
APPALACHIAN BASIN
Robert Williams Pad
Doddridge County
REMARKS QUADRANGLE: OXFORD/WEST UNION WATERSHED: TRIBUTARY OF CABIN RUN DISTRICT: CENTRAL
By: ECM
<p>0 2,500 5,000 FEET</p>

**ROBERT WILLIAMS PAD - EXHIBIT 3
LIST OF ALL SCHOOLS & PUBLIC FACILITIES WITHIN A
ONE- MILE RADIUS OF PROPOSED WELL SITE**

Facility Name	Telephone Number
None identified within a 1-mile radius	

EXHIBIT 4.a to SSP- WW-6B FORM

WW - 6B
(3/13)

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: Antero Resources Appalachian Corporation 494488557 017-Doddridge Central Oxford 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Leggett Unit 1H Well Pad Name: Robert Williams Pad

3 Elevation, current ground: -1000' Elevation, proposed post-construction: 990'

4) Well Type: (a) Gas Oil Underground Storage

Other _____

(b) If Gas: Shallow Deep

Horizontal

5) Existing Pad? Yes or No: No

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):

Marcellus Shale: 6,700' TVD, Anticipated Thickness- 60 Feet, Associated Pressure- 3100#

7) Proposed Total Vertical Depth: 6,700' TVD

8) Formation at Total Vertical Depth: Marcellus

9) Proposed Total Measured Depth: 16,000' MD

10) Approximate Fresh Water Strata Depths: 79', 217'

11) Method to Determine Fresh Water Depth: Offset well records. Depths have been adjusted according to surface elevations.

12) Approximate Saltwater Depths: 921', 1547'

13) Approximate Coal Seam Depths: 200', 733', 1482'

14) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated

15) Does proposed well location contain coal seams directly overlying or adjacent to an active mine? If so, indicate name and depth of mine: No

16) Describe proposed well work: Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale

17) Describe fracturing/stimulating methods in detail:

Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 8.40 acres

19) Area to be disturbed for well pad only, less access road (acres): 3.38 acres

Page 1 of 3

20)

CASING AND TUBING PROGRAM

<u>TYPE</u>	<u>Size</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft.</u>	<u>FOOTAGE: For Drilling</u>	<u>INTERVALS: Left in Well</u>	<u>CEMENT: Fill -up (Cu. Ft.)</u>
Conductor	20"	New	H-40	94#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/ 48#	300'	300'	CTS, 417 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2450'	2450'	CTS, 998 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	16000'	16000'	4002 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7000'	
Liners							

<u>TYPE</u>	<u>Size</u>	<u>Wellbore Diameter</u>	<u>Wall Thickness</u>	<u>Burst Pressure</u>	<u>Cement Type</u>	<u>Cement Yield</u>
Conductor	20"	24"	0.438"	1530	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	Class A	1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	Class A	1.18
Intermediate						
Production	5-1/2"	8-3/4" & 8-1/2"	0.361"	12630	Lead-H/POZ & Tall - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11200		
Liners						

PACKERS

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

21) Describe centralizer placement for each casing string.

Conductor: no centralizers

Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.

Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.

Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

22) Describe all cement additives associated with each cement type.

Conductor: no additives, Class A cement.

Surface: Class A cement with 2% calcium and 1/4 lb flake, 5 gallons of clay treat

Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat

Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51

Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

23) Proposed borehole conditioning procedures.

Conductor: blowhole clean with air, run casing, 10 bbls fresh water.

Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.

Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.

Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.

*Note: Attach additional sheets as needed.

EXHIBIT 4.b to SSP- WW-6B FORM

WW - 6B
(3/13)

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator: Antero Resources Appalachian Corporation 494488557 017-Doddridge Central Oxford 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Leggett Unit 2H Well Pad Name: Robert Williams Pad

3 Elevation, current ground: -1000' Elevation, proposed post-construction: 990'

4) Well Type: (a) Gas Oil Underground Storage

Other

(b) If Gas: Shallow Deep

Horizontal

5) Existing Pad? Yes or No: No

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):

Marcellus Shale: 6,700' TVD, Anticipated Thickness- 60 Feet, Associated Pressure- 3100#

7) Proposed Total Vertical Depth: 6,700' TVD

8) Formation at Total Vertical Depth: Marcellus

9) Proposed Total Measured Depth: 16,000' MD

10) Approximate Fresh Water Strata Depths: 79', 217'

11) Method to Determine Fresh Water Depth: Offset well records. Depths have been adjusted according to surface elevations.

12) Approximate Saltwater Depths: 921', 1547'

13) Approximate Coal Seam Depths: 200', 733', 1482'

14) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated

15) Does proposed well location contain coal seams directly overlying or adjacent to an active mine? If so, indicate name and depth of mine: No

16) Describe proposed well work: Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale

17) Describe fracturing/stimulating methods in detail:

Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 8.40 acres

19) Area to be disturbed for well pad only, less access road (acres): 3.38 acres

20)

CASING AND TUBING PROGRAM

<u>TYPE</u>	<u>Size</u>	<u>New or Used</u>	<u>Grade</u>	<u>Weight per ft.</u>	<u>FOOTAGE: For Drilling</u>	<u>INTERVALS: Left in Well</u>	<u>CEMENT: Fill -up (Cu. Ft.)</u>
Conductor	20"	New	H-40	94#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/ 48#	305'	305'	CTS, 424 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2455'	2455'	CTS, 1000 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	16000'	16000'	4000 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7000'	
Liners							

<u>TYPE</u>	<u>Size</u>	<u>Wellbore Diameter</u>	<u>Wall Thickness</u>	<u>Burst Pressure</u>	<u>Cement Type</u>	<u>Cement Yield</u>
Conductor	20"	24"	0.438"	1530	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	Class A	1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	Class A	1.18
Intermediate						
Production	5-1/2"	8-3/4" & 8-1/2"	0.361"	12630	Lead-HPOZ & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11200		
Liners						

PACKERS

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

21) Describe centralizer placement for each casing string.

Conductor: no centralizers

Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.

Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.

Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

22) Describe all cement additives associated with each cement type.

Conductor: no additives, Class A cement.

Surface: Class A cement with 2% calcium and 1/4 lb flake, 5 gallons of clay treat

Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat

Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51

Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

23) Proposed borehole conditioning procedures.

Conductor: blowhole clean with air, run casing, 10 bbls fresh water.

Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.

Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.

Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.

*Note: Attach additional sheets as needed.

EXHIBIT 4.c to SSP- WW-6B FORM

STATE OF WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS WELL WORK PERMIT APPLICATION

1) Well Operator: Antero Resources Appalachian Corporation 494488557 017-Doddridge Central Oxford 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Pike Unit 1H Well Pad Name: Robert Williams Pad

3 Elevation, current ground: -1000' Elevation, proposed post-construction: 990'

4) Well Type: (a) Gas Oil Underground Storage
Other _____
(b) If Gas: Shallow Deep
Horizontal

5) Existing Pad? Yes or No: No

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Marcellus Shale: 6,700' TVD, Anticipated Thickness- 60 Feet, Associated Pressure- 3100#

7) Proposed Total Vertical Depth: 6,700' TVD

8) Formation at Total Vertical Depth: Marcellus

9) Proposed Total Measured Depth: 16,000' MD

10) Approximate Fresh Water Strata Depths: 79', 217'

11) Method to Determine Fresh Water Depth: Offset well records. Depths have been adjusted according to surface elevations.

12) Approximate Saltwater Depths: 921', 1547'

13) Approximate Coal Seam Depths: 200', 733', 1482'

14) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated

15) Does proposed well location contain coal seams directly overlying or adjacent to an active mine? If so, indicate name and depth of mine: No

16) Describe proposed well work: Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale

17) Describe fracturing/stimulating methods in detail:
Antero plans to pump slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 8.40 acres

19) Area to be disturbed for well pad only, less access road (acres): 3.38 acres

WW - 6B
(3/13)

20)

CASING AND TUBING PROGRAM

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill -up (Cu. Ft.)
Conductor	20"	New	H-40	94#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/ 48#	310'	310'	CTS, 431 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2460'	2460'	CTS, 1002 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	16000'	16000'	3999 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7000'	
Liners							

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
Conductor	20"	24"	0.438"	1530	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	Class A	1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	Class A	1.18
Intermediate						
Production	5-1/2"	8-3/4" & 8-1/2"	0.361"	12630	Lead-H/POZ & Tail - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11200		
Liners						

PACKERS

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

21) Describe centralizer placement for each casing string.

Conductor: no centralizers

Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.

Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.

Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

22) Describe all cement additives associated with each cement type.

Conductor: no additives, Class A cement.

Surface: Class A cement with 2% calcium and 1/4 lb flake, 5 gallons of clay treat

Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat

Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51

Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

23) Proposed borehole conditioning procedures.

Conductor: blowhole clean with air, run casing, 10 bbls fresh water.

Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.

Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.

Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls berite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.

*Note: Attach additional sheets as needed.

EXHIBIT 4.d to SSP- WW-6B FORM

**STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION**

1) Well Operator: Antero Resources Appalachian Corporation 494488557 017-Doddridge Central Oxford 7.5'
Operator ID County District Quadrangle

2) Operator's Well Number: Pike Unit 2H Well Pad Name: Robert Williams Pad

3 Elevation, current ground: ~1000' Elevation, proposed post-construction: 990'

4) Well Type: (a) Gas Oil Underground Storage
Other _____
(b) If Gas: Shallow Deep
Horizontal

5) Existing Pad? Yes or No: No

6) Proposed Target Formation(s), Depth(s), Anticipated Thicknesses and Associated Pressure(s):
Marcellus Shale: 6,700' TVD, Anticipated Thickness- 60 Feet, Associated Pressure- 3100#

7) Proposed Total Vertical Depth: 6,700' TVD

8) Formation at Total Vertical Depth: Marcellus

9) Proposed Total Measured Depth: 16,000' MD

10) Approximate Fresh Water Strata Depths: 79', 217'

11) Method to Determine Fresh Water Depth: Offset well records. Depths have been adjusted according to surface elevations.

12) Approximate Saltwater Depths: 921', 1547'

13) Approximate Coal Seam Depths: 200', 733', 1482'

14) Approximate Depth to Possible Void (coal mine, karst, other): None anticipated

15) Does proposed well location contain coal seams directly overlying or adjacent to an active mine? If so, indicate name and depth of mine: No

16) Describe proposed well work: Drill, perforate, fracture a new horizontal shallow well and complete Marcellus Shale

17) Describe fracturing/stimulating methods in detail:
Antero plans to pump Slickwater into the Marcellus Shale formation in order to ready the well for production. The fluid will be comprised of approximately 99 percent water and sand, with less than 1 percent special-purpose additives as shown in the attached "List of Anticipated Additives Used for Fracturing or Stimulating Well."

18) Total area to be disturbed, including roads, stockpile area, pits, etc, (acres): 8.40 acres

19) Area to be disturbed for well pad only, less access road (acres): 3.38 acres

20)

CASING AND TUBING PROGRAM

TYPE	Size	New or Used	Grade	Weight per ft.	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill -up (Cu. Ft.)
Conductor	20"	New	H-40	94#	40'	40'	CTS, 38 Cu. Ft.
Fresh Water	13-3/8"	New	J-55/H-40	54.5#/ 48#	315'	315'	CTS, 438 Cu. Ft.
Coal	9-5/8"	New	J-55	36#	2465'	2465'	CTS, 1004 Cu. Ft.
Intermediate							
Production	5-1/2"	New	P-110	20#	16000'	16000'	3997 Cu. Ft.
Tubing	2-3/8"	New	N-80	4.7#		7000'	
Liners							

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield
Conductor	20"	24"	0.438"	1530	Class A	1.18
Fresh Water	13-3/8"	17-1/2"	0.38"/0.33"	2730/1730	Class A	1.18
Coal	9-5/8"	12-1/4"	0.352"	3520	Class A	1.18
Intermediate						
Production	5-1/2"	8-3/4" & 8-1/2"	0.361"	12630	Lead-H/POZ & Tall - H	H/POZ-1.44 & H-1.8
Tubing	2-3/8"	4.778"	0.19"	11200		
Liners						

PACKERS

Kind:	N/A			
Sizes:	N/A			
Depths Set:	N/A			

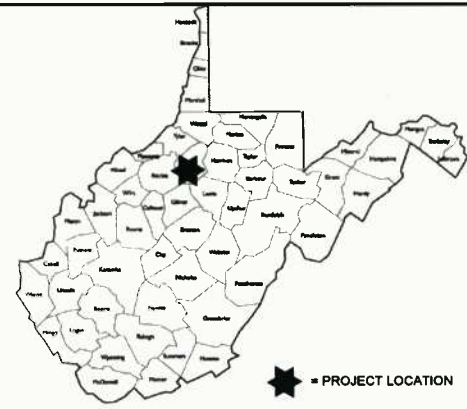
21) Describe centralizer placement for each casing string. Conductor: no centralizers
Surface Casing: one centralizer 10' above the float shoe, one on the insert float collar and one every 4th joint spaced up the hole to surface.
Intermediate Casing: one centralizer above float joint, one centralizer 5' above float collar and one every 4th collar to surface.
Production Casing: one centralizer at shoe joint and one every 3 joints to top of cement in intermediate casing.

22) Describe all cement additives associated with each cement type. _____
Conductor: no additives, Class A cement.
Surface: Class A cement with 2% calcium and 1/4 lb flake, 5 gallons of clay treat
Intermediate: Class A cement with 1/4 lb of flake, 5 gallons of clay treat
Production: Lead cement- 50/50 Class H/Poz + 1.5% salt + 1% C-45 + 0.5% C-16a + 0.2% C-12 + 0.45% C-20 + 0.05% C-51
Production: Tail cement- Class H + 45 PPS Calcium Carbonate + 1.0% FL-160 + 0.2% ACGB-47 + 0.05% ACSA-51 + 0.2% ACR-20

23) Proposed borehole conditioning procedures. Conductor: blowhole clean with air, run casing, 10 bbls fresh water.
Surface: blowhole clean with air, trip to conductor shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate pipe capacity + 40 bbls fresh water followed by 25 bbls bentonite mud, 10 bbls fresh water spacer.
Intermediate: blowhole clean with air, trip to surface casing shoe, trip to bottom, blowhole clean with air, trip out, run casing, circulate 40 bbls brine water followed by 10 bbls fresh water and 25 bbls bentonite mud, pump 10 bbls fresh water.
Production: circulate with 14 lb/gal NaCl mud, trip to middle of lateral, circulate, pump high viscosity sweep, trip to base of curve, pump high viscosity sweep, trip to top of curve, trip to bottom, circulate, pump high viscosity sweep, trip out, run casing, circulate 10 bbls fresh water, pump 48 bbls barite pill, pump 10 bbls fresh water followed by 48 bbls mud flush and 10 bbls water.

*Note: Attach additional sheets as needed.

ROBERT WILLIAMS DRILL PAD SITE DESIGN & CONSTRUCTION PLAN, EROSION & SEDIMENT CONTROL PLANS ANTERO RESOURCES APPALACHIAN CORPORATION



PROJECT CONTACTS

PROJECT OWNER

ANTERO RESOURCES
981 E WASHINGTON AVE
PO BOX 309
ELLENBORO, WV 26346

CONTACT: ANTHONY SMITH
FIELD ENGINEER
304.869.3405 OFFICE
304.673.6196 CELL

CONTACT: JOHN KAWCAK
ENGINEER
817.368.1553

CONTACT: ELI WAGONER
ENVIRONMENTAL
ENGINEER
304.622.3842, EXT 311
OFFICE

CONTACT: AARON KUNZLER
CONSTRUCTION
SUPERVISOR
405.227.8344

LOCATION SURVEYOR

A-1 SURVEYING
421 MAIN STREET
LACEYVILLE, PA 18623
570.527.1168 OFFICE

ENGINEER OF RECORD

KLEINFELDER EAST, INC.
CONTACT: THOMAS W. WOODROW, PE
WV PE #19684
230 EXECUTIVE DRIVE, SUITE 122
CRANBERRY TOWNSHIP, PA 16066
724.772.7072 OFFICE
724.772.7079 FAX

ENVIRONMENTAL/ DELINEATION BOUNDARY

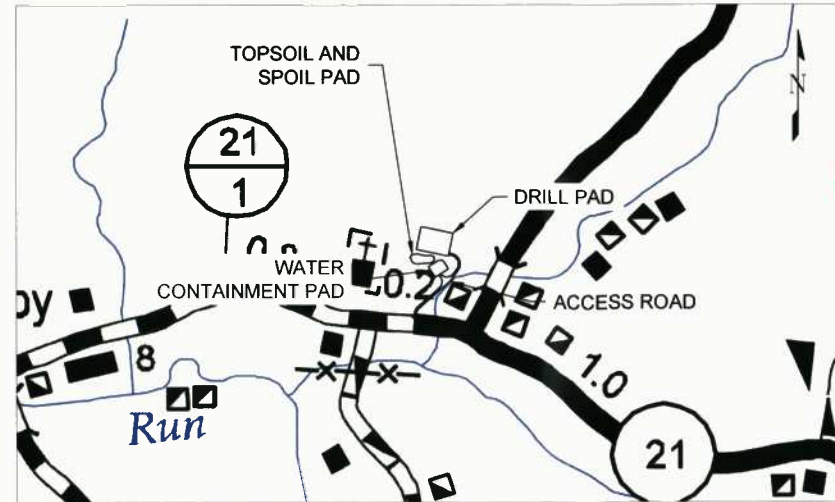
GAI CONSULTANTS, INC.
CONTACT: JAYME FULLER
300 SUMMERS STREET, SUITE 1100
CHARLESTON, WV 25301
304.926.8100 OFFICE
614.499.6258 CELL

TOPO SURVEYOR

A-1 SURVEYING
421 MAIN STREET
LACEYVILLE, PA 18623
570.527.1168 OFFICE



NORTH MERIDIAN REFERENCED TO NAD83 WEST VIRGINIA STATE PLANE NORTH ZONE
AFFECTED TAX PARCELS: ROBERT WILLIAMS TAX MAP: 15 PARCEL: 6.4 STATE CODE: 54 COUNTY CODE: 9 CENTRAL DISTRICT
LITTLE KANAWHA WATERSHED
SCALE: 1 INCH = 1000 FEET



PLAN REPRODUCTION WARNING

THE PLANS HAVE BEEN CREATED ON ANSI D (22"x34") SHEETS. FOR REDUCTIONS, REFER TO GRAPHIC SCALE.

THE PLANS HAVE BEEN CREATED FOR FULL COLOR PLOTTING. ANY SET OF THE PLANS THAT IS NOT PLOTTED IN FULL COLOR SHALL NOT BE CONSIDERED ADEQUATE FOR CONSTRUCTION PURPOSES.

"WARNING": INFORMATION MAY BE LOST IN COPYING AND/OR GRAY SCALE PLOTTING.

WELL HEAD LAYOUT

WELL NAME	NAD 83 (WV NORTH ZONE)			
	NORTHING	EASTING	LATITUDE	LONGITUDE
PIKE UNIT 1H	271609.24	1582513.33	39° 14' 15.63"	-80° 51' 46.05"
PIKE UNIT 2H	271607.06	1582523.53	39° 14' 15.61"	-80° 51' 45.92"
LEGGETT UNIT 1H	271604.89	1582532.94	39° 14' 15.59"	-80° 51' 45.80"
LEGGETT UNIT 2H	271602.72	1582542.35	39° 14' 15.57"	-80° 51' 45.68"
MCGEE UNIT 2H	271600.55	1582552.55	39° 14' 15.55"	-80° 51' 45.55"
MCGEE UNIT 1H	271598.38	1582561.96	39° 14' 15.53"	-80° 51' 45.43"
JAMES UNIT 1H	271596.20	1582572.15	39° 14' 15.51"	-80° 51' 45.30"
JAMES UNIT 2H	271595.05	1582581.58	39° 14' 15.50"	-80° 51' 45.18"
FUTURE WELL	271592.87	1582591.77	39° 14' 15.48"	-80° 51' 45.05"
FUTURE WELL	271590.70	1582601.18	39° 14' 15.46"	-80° 51' 44.93"

WELL HEAD LAYOUT

WELL NAME	NAD 27 (WV NORTH ZONE)		UTM ZONE 17 (METERS)	
	NORTHING	EASTING	NORTHING	EASTING
PIKE UNIT 1H	271574.55	1613954.43	4343161.14	511841.26
PIKE UNIT 2H	271572.38	1613964.62	4343160.53	511844.38
LEGGETT UNIT 1H	271570.21	1613974.03	4343159.92	511847.26
LEGGETT UNIT 2H	271568.04	1613983.44	4343159.30	511850.13
MCGEE UNIT 2H	271565.98	1613985.77	4343158.69	511850.85
MCGEE UNIT 1H	271563.70	1614003.05	4343158.08	511856.13
JAMES UNIT 1H	271561.52	1614013.24	4343157.47	511859.25
JAMES UNIT 2H	271560.36	1614022.67	4343157.16	511862.12
FUTURE WELL	271558.18	1614032.87	4343156.55	511865.24
FUTURE WELL	271556.02	1614042.27	4343155.94	511868.12

SHEET INDEX

PAGE NO.	DESCRIPTION
1	COVER PAGE & LOCATION MAP
2	SCHEDULE OF QUANTITIES
3 - 4	NOTES
5	EXISTING CONDITIONS
6	OVERALL SITE PLAN
7	ACCESS ROAD PLAN AND PROFILE
8	GRADING & DRAINAGE PLAN
9	EROSION & SEDIMENT CONTROL PLAN
10	DRILL PAD CROSS SECTION & PROFILE
11	WATER CONTAINMENT PAD CROSS SECTION & PROFILE
12	ACCESS ROAD CROSS SECTION & PROFILE
13 - 20	DETAILS
21	RECLAMATION PLAN

SITE LOCATIONS

DESCRIPTION	NAD 83 (WV NORTH ZONE)		UTM ZONE 17 (METERS)	
	LATITUDE	LONGITUDE	NORTHING	EASTING
CENTER OF PAD	39° 14' 15.63"	-80° 51' 45.57"	4343160.87	511852.75
CENTER OF WATER CONTAINMENT PAD	39° 14' 12.83"	-80° 51' 45.02"	4343074.86	511866.08
BEGIN ACCESS ROAD	39° 14' 07.42"	-80° 51' 48.15"	4342907.89	511791.33

**ISSUED FOR
CONSTRUCTION**

WELL LOCATION RESTRICTIONS

DRILL PAD IS TO COMPLY WITH WELL LOCATION RESTRICTIONS OF WV CODE 22-6A-12. THE PADS COMPLY WITH THE FOLLOWING RESTRICTIONS:

- 250' FROM AN EXISTING WELL OR DEVELOPED SPRING USED FOR HUMAN OR DOMESTIC ANIMALS
- 625' FROM AN OCCUPIED DWELLING OR BARN GREATER THAN 2500 SF USED FOR POULTRY OR DAIRY MEASURED FROM THE CENTER OF THE PAD
- 100' FROM EDGE OF DISTURBANCE TO WETLANDS, PERENNIAL STREAMS, NATURAL OR ARTIFICIAL LAKE, POND OR RESERVOIR
- 300' FROM EDGE OF DISTURBANCE TO NATURALLY REPRODUCING TROUT STREAMS
- 1000' OF SURFACE OR GROUND WATER INTAKE TO A PUBLIC WATER SUPPLY



SEAL

DESIGN CERTIFICATION

THE DRAWINGS, CONSTRUCTION NOTES, AND REFERENCE DIAGRAMS ATTACHED HERETO HAVE BEEN PREPARED IN ACCORDANCE WITH THE WEST VIRGINIA CODE OF STATE RULES, DIVISION OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS §35-4-21.

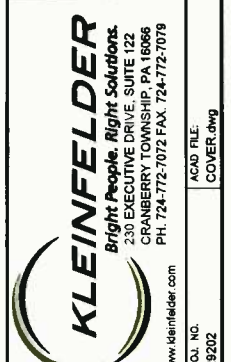
MM-109 PERMIT

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

LOD AREAS (ACRES)		
DESCRIPTION	AREA	AFFECTED TAX PARCELS
ACCESS ROAD	3.02	ROBERT WILLIAMS TAX MAP: 15 PARCEL 6.4
DRILL PAD	3.38	
WATER CONTAINMENT PAD	1.18	
SPOIL PAD	0.82	
TOTAL	8.40	
TOTAL WOODED AREA	0.40	
TOTAL NON-WOODED AREA	8.00	

FLOODPLAIN CONDITIONS	
DO SITE CONSTRUCTION ACTIVITIES TAKE PLACE IN FLOODPLAIN:	NO
PERMIT NEEDED FROM COUNTY FLOODPLAIN COORDINATOR:	NO
HEC-RAS STUDY COMPLETED:	N/A
FLOODPLAIN SHOWN ON DRAWINGS:	N/A
FIRM MAP NUMBER(S) FOR SITE:	54017C0200C
ACREAGES OF CONSTRUCTION IN FLOODPLAIN:	N/A

LENGTH (FEET)	
DESCRIPTION	FEET
COUNTY ROUTE TO DRILL PAD	961
TOTAL	961



**ROBERT WILLIAMS DRILL PAD
COVER PAGE & LOCATION MAP**
ANTERO RESOURCES APPALACHIAN CORPORATION
ROBERT WILLIAMS DRILL PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY WEST VIRGINIA 129202

DESIGNED BY:	RAP
MODIFIED BY:	RAP
CHECKED BY:	JDF
DATE:	05-16-2013
SCALE:	
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 0.5 1.0 1.5 2.0	
CONSTRUCTION	
1	
1 of 21 sheets	

SCHEDULE OF QUANTITIES			
ROBERT WILLIAMS DRILL PAD SITE			
CLEARING & GRUBBING; EROSION & SEDIMENT CONTROLS			
	QUANTITY	UNIT	
MOBILIZATION	1.0	EA	\$0.00
CONSTRUCTION ENTRANCE	1.0	EA	\$0.00
CLEARING & GRUBBING	8.4	AC	\$0.00
TREE REMOVAL	0.4	AC	\$0.00
18" COMPOST FILTER SOCK	1394.0	LF	\$0.00
SUPER SILT FENCE	674.0	LF	\$0.00
R-3 RIP RAP (ROCK FILTER OUTLETS)	4.0	TON	\$0.00
AASHTO #57 STONE (ROCK FILTER OUTLETS)	3.0	TON	\$0.00
EROSION CONTROL MATTING - NORTH AMERICAN GREEN SC250 SLOPE MATTING	4010.0	SY	\$0.00
EROSION CONTROL MATTING - NORTH AMERICAN GREEN S150BN SLOPE MATTING	7097.0	SY	\$0.00
TOTAL			\$0.00
SITE			
	QUANTITY	UNIT	
DRILL PAD EXCAVATION (CUT TO FILL)	16522.0	CY	\$0.00
ACCESS ROADS EXCAVATION (CUT TO FILL)	9160.0	CY	\$0.00
WATER CONTAINMENT PAD EXCAVATION (CUT TO FILL)	0.0	CY	\$0.00
MATERIAL SPOIL	7315.0	CY	\$0.00
TOPSOIL	4588.0	CY	\$0.00
ROADSIDE DITCH	1120.0	LF	\$0.00
TOTAL			\$0.00
SUMP(S) PER ANTERO RESOURCES STANDARD DETAIL			
	QUANTITY	UNIT	
INSTALL 102" x 78" x 44" PRE CAST SUMP - SEE ANTERO RESOURCES SUMP DETAIL	5.0	EA	\$0.00
VALVE BOX HDPE PIPE (MINIMUM 12" DIAMETER x 48" HEIGHT)	1.0	EA	\$0.00
4" PVC CONNECTIVE PIPE (ANTERO SUMP DRAIN DETAIL)	505.0	LF	\$0.00
PVC PIPE OUTLET PROTECTION - R-3 RIP RAP	5.1	TON	\$0.00
TOTAL			\$0.00
AGGREGATE SURFACING - SPREADING, COMPACTION, and/or INSTALLATION			
	QUANTITY	UNIT	
DRILL & WATER CONTAINMENT PAD AASHTO #1 (8" THICK)	2846.0	TON	\$0.00
DRILL & WATER CONTAINMENT PAD 1 1/2" OR 3/4" CRUSHER RUN STONE (2" THICK)	921.0	TON	\$0.00
DRILL & WATER CONTAINMENT PAD GEOTEXTILE FABRIC (US 200)	11157.0	SY	\$0.00
ACCESS ROADS 6" OR 4" MINUS CRUSHER RUN AGGREGATE (8" THICK)	1224.0	TON	\$0.00
ACCESS ROAD 1 1/2" OR 3/4" CRUSHER RUN STONE (2" THICK)	330.0	TON	\$0.00
ACCESS ROADS GEOTEXTILE FABRIC (US 200)	3138.0	SY	\$0.00
TOTAL			\$0.00

*TOPSOIL QUANTITY FOR THIS SITE WAS ESTIMATED AT A UNIFORM THICKNESS OF 6" OVER THE ENTIRE EXCAVATED AREA. ACTUAL QUANTITY MAY VARY.

ROBERT WILLIAMS DRILL PAD QUANTITIES							
DESCRIPTION	CUT (CY)	FILL (CY)	BASE (CY)	SPOIL (CY)	BORROW (CY)	MAX. SLOPE	LENGTH OF SLOPE
DRILL PAD	15166	17755	2417	N/A	172	N/A	N/A
ACCESS ROAD	9804	9520	872	1155	N/A	20.00%	200'
STORAGE PAD	5642	11	682	6313	N/A	N/A	N/A
TOPSOIL AND SPOIL PAD	54	7315	0	N/A	7261	N/A	N/A
TOTALS	30666	34601	3971	7468	7433	N/A	N/A
		TOTAL CUT (CY)					
				36			

ROBERT WILLIAMS DRILL PAD SITE			
ROAD CULVERTS			
	QUANTITY	UNIT	
15" RCP	166.0	LF	\$0.00
R-3 RIP RAP (INLETS/OUTLETS)	28.0	TON	\$0.00
AASHTO #57 STONE (INLETS)	16.0	TON	\$0.00
AASHTO #1 STONE (DITCH CHECKS)	22.0	TON	\$0.00
AASHTO #57 STONE (DITCH CHECKS)	16.0	TON	\$0.00
DITCH/CHANNEL LINING - R-3 RIP RAP (CHANNEL)	11.0	TON	\$0.00
DITCH/CHANNEL LINING - R-4 RIP RAP (ACCESS ROAD)	81.0	TON	\$0.00
DITCH/CHANNEL LINING - R-5 RIP RAP (ACCESS ROAD)	86.0	TON	\$0.00
DITCH/CHANNEL LINING - NORTH AMERICAN GREEN SC250 MATTING	542.0	SY	\$0.00
TOTAL			\$0.00
MOBILE WATER CORRAL			
	QUANTITY	UNIT	
10,000 BBL MOBILE WATER CORRAL	1.0	EA	\$0.00
TOTAL			\$0.00
SEEDING			
	QUANTITY	UNIT	
SITE SEEDING (LIME, FERTILIZER, SEEDING, AND HYDRO-MULCH w/TACK (HYC-2 OR EQUAL))	5.3	AC	\$0.00
RECLAMATION SEEDING (LIME, FERTILIZER, SEEDING, AND HYDRO-MULCH w/TACK (HYC-2 OR EQUAL))	0.7	AC	\$0.00
TOTAL			\$0.00
UNFORESEEN SITE CONDITIONS			
	QUANTITY	UNIT	
ROCK CLAUSE - BLASTING	0.0	CY	\$0.00
ROCK CLAUSE - HOE RAMMING	0.0	CY	\$0.00
FRENCH DRAINS	0.0	FT	\$0.00
PHASE 1 FENCING - STEEL CORRUGATED PANELS w/T" POST (10 FT CENTERS) - WETLAND PROTECTION	0.0	LF	\$0.00
PHASE 2 FENCING - FILTER SOCK OUTSIDE OF PHASE 3 FENCING - WETLAND PROTECTION	0.0	LF	\$0.00
PHASE 3 FENCING - ORANGE SAFETY FENCE w/T" POST (10FT CENTERS) - WETLAND PROTECTION	0.0	LF	\$0.00
TEMPORARY SEEDING	0.0	AC	\$0.00
CONSTRUCTION STAKEOUT	0.0	HOUR	\$0.00
JUTE MATTING - SLOPE MATTING	0.0	SY	\$0.00
TOTAL			\$0.00
GRAND TOTAL			\$0.00

WETLAND IMPACTS (SQURE FEET)			
WETLAND AND IMPACT CAUSE	FILL (SF)	CONST. DISTURB TO LOD (LF)	TOTAL IMPACT (SF)
WETLAND 1	N/A	0	0
WETLAND 2	N/A	0	0
POND 1	N/A	0	0
WETLAND 3	N/A	0	0
		TOTAL	0
		TOTAL ACRES	0

EPHEMERAL STREAM IMPACT (LINEAR FEET)				
DESCRIPTION	CULVERT (LF)	INLETS/OUTLETS STRUCTURES (LF)	CONST. DISTURB TO LOD (LF)	TOTAL IMPACT (LF)
STREAM 1	N/A	N/A	0	0
			TOTAL	0

INTERMITTENT STREAM IMPACT (LINEAR FEET)				
DESCRIPTION	CULVERT (LF)	INLETS/OUTLETS STRUCTURES (LF)	CONST. DISTURB TO LOD (LF)	TOTAL IMPACT (LF)
STREAM 2	N/A	N/A	0	0
			TOTAL	0

GRADING	
CUT SLOPE	2:1
FILL SLOPE	2:1
PAD CONTAINMENT BERM SLOPE	1.5:1
CUT SHRINK FACTOR	-
FILL SHRINK FACTOR	-
DRILL PAD ELEVATION	990
WATER CONTAINMENT PAD ELEVATION	966

ASSUMPTIONS:

- GRADING DOES NOT ACCOUNT FOR CUT AND FILL SHRINK FACTORS

ISSUED FOR CONSTRUCTION



SEAL

NO.	REVISION	BY	DATE
1			
2			
3			
4			
5			

NO.	REVISION	BY	DATE
1			
2			
3			
4			
5			

KLEINFELDER
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230 EXECUTIVE DRIVE, SUITE 122
CRANBURY TOWNSHIP, PA 16066
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www.kleinfelder.com
PROJ. NO. 129202
ACAD FILE NOTES.dwg

ROBERT WILLIAMS DRILL PAD SCHEDULE OF QUANTITIES
ANTERO RESOURCES APPALACHIAN CORPORATION
ROBERT WILLIAMS DRILL PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY WEST VIRGINIA

DESIGNED BY:	RAP
MODIFIED BY:	RAP
CHECKED BY:	JDF
DATE:	05-16-2013
SCALE:	
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS	
CONSTRUCTION	
2	
2 of 21 sheets	

GENERAL NOTES

- ANTERO RESOURCES WILL OBTAIN AN ENCROACHMENT PERMIT (FORM MM-109) FROM THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
- ANY DISCREPANCIES FOUND BETWEEN THE DRAWINGS AND SPECIFICATIONS AND SITE CONDITIONS OR ANY INCONSISTENCIES OR AMBIGUITIES IN DRAWINGS OR SPECIFICATIONS SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER, IN WRITING, WHO SHALL PROMPTLY ADDRESS SUCH PROBLEMS. WORK DONE BY THE CONTRACTOR AFTER THE DISCOVERY OF SUCH DISCREPANCIES, INCONSISTENCIES, OR AMBIGUITIES SHALL BE DONE AT THE CONTRACTOR'S RISK.
- WORK ON THIS PROJECT SHALL CONFORM TO THE LATEST EDITIONS OF THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION (WVDEP) EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE HANDBOOK, IN THE EVENT OF CONFLICT BETWEEN THE DESIGN, SPECIFICATIONS, OR PLANS, THE MOST STRINGENT WILL GOVERN.
- THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL PUBLIC OR PRIVATE UTILITIES WHICH LIE IN OR ADJACENT TO THE CONSTRUCTION SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR, AT HIS OR HER EXPENSE, OF ALL EXISTING UTILITIES DAMAGED DURING CONSTRUCTION. FORTY-EIGHT HOURS PRIOR TO ANY EXCAVATION THE CONTRACTOR SHALL CALL MISS UTILITY AT 1-800-245-4848.
- INSTALLATION OF CONCRETE, CORRUGATED METAL OR HDPE STORM PIPE SHALL BE IN CONFORMANCE WITH THESE DRAWINGS.
- ALL MATERIALS USED FOR FILL OR BACK FILL SHALL BE FREE OF WOOD, ROOTS, ROCKS, BOULDERS OR ANY OTHER NON-COMPACTABLE SOIL TYPE MATERIALS. UNSATISFACTORY MATERIALS ALSO INCLUDE MAN MADE FILLS AND REFUSE DEBRIS DERIVED FROM ANY SOURCE.
- MATERIALS USED TO FILL AROUND DRAINAGE STRUCTURES IN UTILITY TRENCHES OR ANY OTHER DEPRESSION REQUIRING FILL OR BACK FILL SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY THE STANDARD PROCTOR TEST AS SET FORTH IN ASTM STANDARD D-698. THE MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE LIMITS OF THE STANDARD PROCTOR TEST RESULTS. SOME SOILS CANNOT BE COMPACTED TO 95% OF THE STANDARD PROCTOR AT PLUS OR MINUS 4% MOISTURE CONTENT. THE CONTRACTOR SHALL PRIOR TO ANY OPERATIONS INVOLVING FILLING OR BACK FILLING, SUBMIT THE RESULTS OF THE PROCTOR TEST TOGETHER WITH A CERTIFICATION THAT THE SOIL TESTED IS REPRESENTATIVE OF THE MATERIALS TO BE USED ON THE PROJECT. THE TESTS SHALL BE CONDUCTED BY A CERTIFIED MATERIALS TESTING LABORATORY AND THE CERTIFICATIONS MADE BY A LICENSED PROFESSIONAL ENGINEER REPRESENTING THE LABORATORY. THE CONTRACTOR IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH THESE TESTS AND THEIR SUBMITTALS.
- FILL SHALL BE PLACED IN LIFTS AT A MAXIMUM UNCOMPACTED DEPTH OF 12" WITH SOIL FREE FROM AGGREGATES EXCEEDING 6".
- ALL TEST RESULTS SHALL BE SUBMITTED TO THE ENGINEER. FAILURE TO CONDUCT DENSITY TESTS SHALL BE CAUSE FOR NON-ACCEPTANCE OF THE FACILITY. TESTS SHALL BE CONDUCTED AT THE SOLE COST OF THE CONTRACTOR OR HIS AGENT.
- A PRE-CONSTRUCTION CONFERENCE SHALL BE HELD PRIOR TO THE START OF CONSTRUCTION.
- 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. THE MOISTURE CONTENT SHALL BE CONTROLLED WITHIN PLUS OR MINUS 4% OF THE OPTIMUM TO FACILITATE COMPACTION. GENERALLY, UNSATISFACTORY MATERIALS INCLUDE MATERIALS CLASSIFIED IN ASTM D-2487 AS PT, CH, MH, OL, OH AND ANY SOIL TOO WET TO FACILITATE COMPACTION. CH AND MH SOILS MAY BE USED SUBJECT TO APPROVAL OF THE ENGINEER. SOILS SHALL HAVE A MINIMUM DRY DENSITY OF 92 LB/CF PER ASTM D-698 AND SHALL HAVE A PLASTICITY INDEX LESS THAN 17.
- CONTRACTOR SHALL SUBMIT A GENERIC GROUNDWATER PROTECTION PLAN (GPP) TO THE WVDEP GROUND WATER PROGRAM. THE GROUNDWATER PROTECTION PLAN SHALL BE ADHERED TO DURING CONSTRUCTION.
- EXISTING FEATURES AND PROPERTY BOUNDARIES LOCATED BY A PROFESSIONAL LAND SURVEYOR NOT LICENSED IN WEST VIRGINIA. SERVICES REQUIRING A WEST VIRGINIA LICENSED SURVEYOR SHALL BE THE RESPONSIBILITY OF THE OWNER.

EROSION & SEDIMENT CONTROL NARRATIVE

- PROJECT DESCRIPTION: THE PURPOSE OF THIS PROJECT IS TO GRADE AND INSTALL EROSION AND SEDIMENT CONTROL MEASURES, IN PREPARATION FOR THE CONSTRUCTION OF A GAS WELL PAD NEAR GREENWOOD, WEST VIRGINIA, IN DODDRIDGE COUNTY. THE CONSTRUCTION INCLUDES ONE ACCESS ROAD, ONE WATER CONTAINMENT PAD, ONE DRILL PAD, STORM WATER CONTROLS, AND INCIDENTAL WORK.
- EXISTING SITE CONDITIONS: THE EXISTING SITE IS PREDOMINATELY FIELDS WITH MODERATELY STEEP TOPOGRAPHY WITH GREATER THAN 20% SLOPES. NO EROSION IS NOTICED ON SITE, OR IN ANY NATURAL DRAINAGE WAYS.
- ADJACENT PROPERTY: THE SITE IS BORDERED ON THE SOUTH AND EAST BY COUNTY ROADS AND ON THE WEST AND NORTH BY FIELDS.
- SOILS: NO SOIL STUDIES OR SUBSURFACE INVESTIGATIONS WERE PERFORMED FOR THIS PROJECT.
- OFF SITE AREAS: THERE SHALL BE NO BORROW AREA OUTSIDE OF THE PROPOSED GRADING AND CONSTRUCTION AREA.
- CLEARING OF VEGETATION SHOULD BE KEPT TO THE MINIMUM NECESSARY FOR CONSTRUCTION PLUS THE INSTALLATION OF SEDIMENT CONTROLS.
- CRITICAL EROSION AREAS MAINTENANCE: ALL 3:1 SLOPES AND STEEPER, DITCHES AND OTHER CONTROLS SHALL BE CONSIDERED CRITICAL EROSION AREAS. THESE AREAS SHALL BE MONITORED & MAINTAINED DAILY AND AFTER EACH RAIN FALL OF 0.5 INCH OR GREATER. 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.
- EROSION AND SEDIMENT CONTROL MEASURES: UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE CURRENT WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL. THE CONTRACTOR SHALL OBTAIN A COPY OF THIS MANUAL FROM THE WVDEP WEBSITE AND CONSTRUCT ALL DEVICES BASED ON THIS MANUAL OR A HANDBOOK THAT IS COMPARABLE OR EXCEEDS THE SPECIFICATIONS OF THE WEST VIRGINIA MANUAL. THE MINIMUM STANDARDS OF THIS MANUAL SHALL BE ADHERED TO UNLESS OTHERWISE WAIVED OR APPROVED BY A VARIANCE. SEE PLANS FOR ALL PROPOSED EROSION AND SEDIMENT CONTROL MEASURES.
- STRUCTURAL PRACTICES:
 - DIVERSION DITCHES: WILL BE CONSTRUCTED AS SHOWN ON THE PLANS.
 - DIVERSION BERMS: WILL BE CONSTRUCTED AS SHOWN ON THE PLANS.
 - OUTLET PROTECTION: WILL BE CONSTRUCTED AS SHOWN ON THE PLANS.
 - SILT SOXX/SUPER SILT FENCE: WILL BE CONSTRUCTED AS SHOWN ON THE PLANS.
- VEGETATIVE PRACTICE TOPSOILING: TOPSOIL WILL BE STRIPPED FROM THE SITE AND STOCKPILED AS SHOWN ON THE PLANS. UPON THE COMPLETION OF THE PROJECT, TOPSOIL WILL BE PLACED ON ALL DISTURBED AREAS AT A MINIMUM DEPTH OF 4 INCHES. TEMPORARY SEEDING: ALL DENUDED AREAS LEFT DORMANT FOR MORE THAN 21 DAYS SHALL BE SEED WITH A FAST GERMINATING SEED. THE TIME OF YEAR WILL BE THE BASIS FOR THE SEED MIXTURE. PERMANENT SEEDING: ALL SEEDED AREAS WILL BE RESEED, MULCHED AND FERTILIZED AS NEEDED TO OBTAIN AN ADEQUATE STAND OF GRASS. PERMANENT SEEDING SHALL BE PLACED WITHIN SEVEN DAYS UPON ACHIEVING FINAL GRADE. WATER, MULCH, AND RESEED AS NECESSARY TO OBTAIN AN ADEQUATE STAND OF VEGETATION.
- MANAGEMENT STRATEGIES: CONSTRUCTION WILL BE SEQUENCED SO THAT GRADING OPERATIONS WILL BEGIN AND END AS SOON AS POSSIBLE. THE JOB SUPERINTENDENT SHALL BE RESPONSIBLE FOR THE INSTALLATION AND MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROL MEASURES. AFTER ACHIEVING ADEQUATE STABILIZATION THE TEMPORARY EROSION AND SEDIMENT CONTROLS SHALL BE REMOVED AND ANY AREAS DISTURBED DURING THIS PROCESS SHALL BE STABILIZED.
- PERMANENT STABILIZATION: ALL AREAS LEFT UNCOVERED BY EITHER BUILDINGS OR PAVEMENT SHALL BE STABILIZED WITH PERMANENT SEEDING IMMEDIATELY FOLLOWING FINISH GRADING AND WITHIN 7 DAYS. AT NO TIME SHALL LAND LAY DORMANT FOR LONGER THAN 21 DAYS.
- MAINTENANCE AND OTHER CONSIDERATIONS AND GROUND WATER PROTECTION: ALL EROSION AND SEDIMENT CONTROL MEASURES WILL BE CHECKED DAILY AND AFTER EACH RAINFALL OF 0.5 INCH OR MORE. THEY WILL BE INSPECTED FOR UNDERMINING, DETERIORATION, EROSION AND EXCESS DEPOSITED MATERIAL. ALL DEFICIENCIES WILL BE CORRECTED IMMEDIATELY. EXCESS MATERIAL WILL BE SPREAD ON THE SITE IN A MANNER WHERE IT IS NOT LIKELY TO ERODE IN THE FUTURE. CLEANING PROCEDURES WILL BE COMPLETED AT REGULAR INTERVALS AND AT LEAST WHEN SEDIMENT REACHES 33% OF CAPACITY, OR AS SHOWN ON APPLICABLE DETAILS. RECORDS OF CLEANING AND CORRECTIONS WILL BE MAINTAINED BY THE CONTRACTOR. THE "GENERIC GROUNDWATER PROTECTION PLAN FOR CONSTRUCTION SITES" (GPP) WILL BE USED AND AVAILABLE ON SITE AT ALL TIMES. AN AREA WILL BE PROVIDED FOR VEHICLE AND EQUIPMENT MAINTENANCE. MOBILE FUEL TRUCKS WITH APPROVED TANKS WILL BE USED ON THE SITE. PORTABLE SANITARY FACILITIES WILL BE AVAILABLE FOR EMPLOYEES. IF CONCRETE IS USED, EXCESS CONCRETE WILL BE DISPOSED OF PROPERLY AND NOT ALLOWED TO REMAIN ON THIS SITE. MACHINERY WILL NOT BE ALLOWED IN LIVE STREAMS. FLUIDS SUCH AS DIESEL FUEL, GAS, OIL OR ANTIFREEZE WILL BE KEPT IN PROPER CONTAINERS AND ANY SPILLAGE WILL BE CLEANED AND TAKEN OFF SITE TO A PROPER FACILITY. SOLID OR HAZARDOUS WASTES WILL BE DISPOSED IN ACCORDANCE WITH APPROPRIATE STATE AND FEDERAL REGULATIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAKE CHANGES AND NOTIFY WVDEP ON ANY CHANGES TO GPP. A FINAL INSPECTION WILL BE MADE AT THE CONCLUSION OF THE PROJECT AND ALL CORRECTIONS MADE BEFORE SIGN-OFF OF THE PROJECT SITE.

SEQUENCE OF BMP INSTALLATION AND REMOVAL

- CONSTRUCTION MUST BE IN ACCORDANCE WITH THE FOLLOWING SEQUENCE. THIS SEQUENCE IS DESIGNED TO MINIMIZE SOIL EROSION AND SEDIMENTATION. THE CONTRACTOR MAY DEVIATE SLIGHTLY FROM THE STAGING OF PERMANENT SITE IMPROVEMENTS, BUT NO DEVIATION FROM THE RELATIVE ORDER OF EROSION AND SEDIMENTATION CONTROL MEASURES WILL BE ALLOWED.
- THE STAGING OF EARTHMOVING ACTIVITIES FOR THIS PROJECT IS A GENERAL DESCRIPTION OF THE WORK REQUIRED. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH COMPANY STANDARDS, THE WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION REGULATIONS AND ALL OTHER APPLICABLE FEDERAL, STATE OR LOCAL REQUIREMENTS.
- THE APPROVED EROSION AND SEDIMENTATION CONTROL PLAN INCLUDING THE SOIL EROSION CONTROL DRAWINGS SHALL BE AVAILABLE ON SITE AT ALL TIMES DURING EARTH DISTURBANCE.
- ALL BMPs SHALL BE INSPECTED AFTER EACH MEASURABLE RAINFALL RUNOFF EVENT. ANY NECESSARY REPAIRS MUST BE MADE IMMEDIATELY TO ENSURE EFFECTIVE AND EFFICIENT OPERATION.
- A PRE-CONSTRUCTION CONFERENCE WILL BE HELD ON SITE WITH CONTRACTOR TO REVIEW THE CONSTRUCTION DRAWINGS AND PROVIDE ANY REQUESTED GUIDANCE.
 - STAKE/FLAG DISTURBED WORK AREA, CLEARLY IDENTIFYING WETLAND AND STREAM EDGES AND BUFFERS. INSTALL SIGNS TO DESIGNATE THE AREA AND ORANGE SAFETY FENCE TO IDENTIFY IMPORTANT PROJECT ATTRIBUTES SUCH AS APPROVED ACCESS ROADS, NO REFUELING ZONES, WETLAND/STREAM BOUNDS, ETC.
 - CONSTRUCT THE CONSTRUCTION ENTRANCE.
 - CONSTRUCT ALL PROPOSED SEDIMENT CONTROL DEVICES AS SOON AS CLEARING AND GRUBBING OPERATIONS ALLOW. DIVERSIONS AND SEDIMENT BASINS SHALL BE SEEDDED AND MULCHED IMMEDIATELY.
 - PRIOR TO GRADING OR OTHER EARTH DISTURBANCE ON THE PARCEL, PERMANENT DOWN SLOPE BMPs ARE TO BE INSTALLED.
 - CLEAR AND GRUB, REMOVE TOPSOIL AND PLACE AS SHOWN ON THE PLANS. TOPSOIL STOCKPILE TO BE SEEDDED AND MULCHED. EAS BMPs SHALL BE CONSTRUCTED AROUND TOPSOIL STOCKPILES AS SHOWN.
 - GRADING OPERATIONS AS REQUIRED. CUT SLOPES AND ALL SLOPES SHALL BE TOPSOILED AS NEEDED. DITCH LINES SHALL BE CLEANED. ALL DITCHES WILL HAVE AT LEAST GRASS LINING PROTECTION OR AS SPECIFIED IN SITE CALCULATIONS ON SHEET 4.
 - THE ACCESS ROAD SHALL BE CONSTRUCTED UP TO THE PROPOSED PADS. THE ACCESS ROAD SHALL RECEIVE A STONE SURFACE.
 - INSTALL PROPOSED EQUIPMENT PAD AND EQUIPMENT PAD BERMS.
 - CULVERT INLET AND OUTLET PROTECTION SHALL BE CONSTRUCTED IMMEDIATELY UPON PLACEMENT OF INLETS AND CULVERTS. INSTALLATION OF MATTING AND/OR RIP RAP TO OCCUR ONCE DITCHES ARE CONSTRUCTED.
 - SIDE SLOPE STABILIZATION MATTING AND STABILIZATION SHALL OCCUR AS SOON AS POSSIBLE.
 - AT THE END OF EACH WORK DAY, WHERE THE PARCEL HAS BEEN GRADED, INCLUDING ANY STRIPPING, STUMPING, LEVELING, 2:1 ON SIDE SLOPES, ETC. BMPs ARE TO BE INSTALLED. IN NO CASE IS THE CONTRACTOR TO LEAVE THE JOB SITE AT THE END OF THE WORK DAY WITHOUT TEMPORARY OR PERMANENT BMPs BEING INSTALLED. THE CONTRACTOR IS NOT REQUIRED TO MAINTAIN WATERBARS DURING THE WORK DAY UNLESS THE ENVIRONMENTAL INSPECTOR DETERMINES THAT THERE IS A RISK OF A RAIN EVENT THAT WARRANTS THEIR IMMEDIATE INSTALLATION.
 - WHEN FINAL GRADE IS ACHIEVED, TOPSOIL TO BE PLACED ON ALL DISTURBED AREAS NOT LINED. SEED ALL DISTURBED AREAS AS REQUIRED. A SOIL SAMPLE SHOULD BE TAKEN AND TESTED TO DETERMINE RECOMMENDED RATES. IF NO SOILS SAMPLE IS TAKEN THE FOLLOWING RATES SHOULD BE APPLIED AS A MINIMUM: LIME AT A RATE OF 4 TONS PER ACRE. FERTILIZE AT A RATE OF 500 LBS. OF 10-20-10 PER ACRE. SEED WITH 45 LBS. PER ACRE OF TALL FESCUE AND 20 LBS. PER ACRE OF PERENNIAL RYE GRASS.
 - LIME, FERTILIZER, AND SEED WILL BE APPLIED. HYDRO-MULCH PRODUCTS SHALL BE MIXED AND INSTALLED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS, OR EROSION CONTROL BLANKET SHALL BE INSTALLED PER PLANS & SPECIFICATIONS.
 - FINAL SEEDING MUST OCCUR WITHIN 7 DAYS OF FINAL GRADING.
 - WHEN SITE IS STABILIZED, ALL EROSION AND SEDIMENT CONTROL MEASURES CAN BE REMOVED AND REPAIR/STABILIZE THOSE AREAS IN ACCORDANCE WITH STATE STANDARDS.
 - MAKE MODIFICATIONS FOR PERMANENT STORMWATER MANAGEMENT.
 - FINAL SITE INSPECTION. A NOTICE OF TERMINATION SHOULD BE FILED WITH DEP UPON FINAL STABILIZATION.

GENERAL EROSION & SEDIMENT CONTROL NOTES

- THE CONTRACTOR SHALL ARRANGE FOR A PRE-CONSTRUCTION CONFERENCE WITH THE APPROPRIATE EROSION AND SEDIMENT CONTROL INSPECTOR 48 HOURS PRIOR TO BEGINNING WORK.
- ALL EROSION CONTROL DEVICES AS SHOWN OR AS REQUIRED, ARE TO BE CONSTRUCTED TO THE CURRENT STANDARDS AND SPECIFICATIONS OF THE WEST VIRGINIA EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE MANUAL AND ARE TO BE IN PLACE PRIOR TO ALL CONSTRUCTION.
- EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED CONTINUOUSLY, RELOCATED WHEN AND AS NECESSARY AND SHALL BE CHECKED AFTER EVERY RAINFALL. SEEDDED AREAS SHALL BE CHECKED REGULARLY AND SHALL BE WATERED, FERTILIZED, RESEEDDED AND MULCHED AS NECESSARY TO OBTAIN A DENSE STAND OF GRASS.
- ALL DRAIN INLETS SHALL BE PROTECTED FROM SILTATION. INEFFECTIVE PROTECTION DEVICES SHALL BE IMMEDIATELY REPLACED AND THE INLET CLEANED. FLUSHING IS NOT AN ACCEPTABLE METHOD OF CLEANING.
- PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 21 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.
- DURING CONSTRUCTION OF THE PROJECT, SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING DEVICES.
- SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE.
- STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS IMPOUNDMENTS, DIKES AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.
- ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, UNLESS OTHERWISE AUTHORIZED BY THE ENGINEER. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.
- NO SEDIMENT TRACKING ON THE ROADWAY IS ALLOWED. IN THE EVENT THAT SEDIMENT IS INADVERTENTLY TRACKED ONTO THE ROAD, THE ROAD SHALL BE CLEANED THOROUGHLY BY THE END OF EACH DAY. SEDIMENT SHALL BE REMOVED FROM ROADS BY SHOVELING OR PICKUP SWEEPING AND SHALL BE TRANSPORTED TO A CONTROLLED SEDIMENT DISPOSAL AREA. STREET WASHING OF SEDIMENTS TO THE STORM DRAIN SYSTEM IS NOT ALLOWED. IF STREET WASH WASTEWATER CAN BE CONTROLLED FROM ENTERING THE STORM DRAINAGE SYSTEM, THEN IT SHALL BE PUMPED BACK ONTO THE SITE, CONTAINED AND DISPOSED OF PROPERLY.
- ALL DISTURBED AREAS NOT PAVED OR BUILT UPON SHALL BE HYDRO-SEEDDED AND FERTILIZED, PERFORM PERMANENT TOP SOILING, SEEDING AND FERTILIZING AS SOON AFTER FINISH GRADING AS POSSIBLE. SEEDING SHALL COMPLY WITH THE FOLLOWING:
 - TOPSOIL - 4 INCH MINIMUM FOR PERMANENT TURF.
 - FERTILIZER - 500 LBS. PER ACRE OF 10-20-10 FERTILIZER OR EQUIVALENT POUNDAGE OF DIFFERENT ANALYSIS. WORK INTO SOIL PRIOR TO SEEDING.
 - LIME (PERMANENT SEEDING) - AGRICULTURAL LIME SPREAD AT RATE OF 4 TONS PER ACRE. WORK INTO SOIL PRIOR TO SEEDING.
 - MULCH OR EROSION CONTROL BLANKET (ECB) - WOOD FIBER OR CHOPPED STRAW AT RATE OF 2 TONS PER ACRE. HYDRO-MULCH AT RATE OF 30 BALES PER ACRE. ECB SHALL BE PER PLANS.
 - SEED - 45 LBS. PER ACRE TALL FESCUE AND 20 LBS. PER ACRE PERENNIAL RYE GRASS. TO BE SEEDDED WITH HYDRO-SEEDER

NO.	REVISION	BY	DATE

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ROBERT WILLIAMS DRILL PAD NOTES

ANTERO RESOURCES APPALACHIAN CORPORATION
ROBERT WILLIAMS DRILL PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY
WEST VIRGINIA

ISSUED FOR CONSTRUCTION



SEAL

DESIGNED BY: RAP
MODIFIED BY: RAP
CHECKED BY: JDF
DATE: 05-16-2013
SCALE:
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 0.5 1.0 1.5 2.0
CONSTRUCTION
3
3 of 21 sheets

ATTACHED IMAGES: Image.dwg, Logo.dwg, Title Block.dwg
ATTACHED XREFS: Antero.dwg, Title.dwg, CAD FILE: W:\ConAntero\Facilities\Robert Williams\Design\Final SITE PLANS - LAYOUT - 3 NOTES

PLOTTED: 16 May 2013, 4:21 pm, RParker

CONSTRUCTION SPECIFICATIONS

- THE DRILL PAD AND WATER CONTAINMENT PAD SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AND THE SCOPE OF WORK AND SHALL CONFORM GENERALLY WITH THE GRADES, BERMS, AND DIMENSIONS SHOWN.
- THE CONSTRUCTION DOCUMENTS SHOW THE EXISTING AND PROPOSED GRADES AND BERMS, ETC. THAT ALL CUT AND FILL ESTIMATES ARE BASED UPON THE ENGINEER'S ESTIMATES OF THE QUANTITIES ARE ONLY ESTIMATES AND MAY CHANGE BASED ON ACTUAL FIELD CONDITIONS.
- THE GRADES, BERMS, DEPTHS, AND DIMENSIONS MAY CHANGE BASED ON ACTUAL FIELD CONDITIONS. THE ENGINEER RESERVES THE RIGHT TO CHANGE GRADES, BERMS, DEPTHS AND DIMENSIONS AS NECESSARY TO MEET FIELD CONDITIONS.
- THE CONTRACTOR SHALL PROVIDE THE ENGINEER ALL REASONABLE FACILITIES AND PROVIDE INFORMATION AND SAMPLES AS REQUIRED BY THE ENGINEER FOR PROPER MONITORING AND TESTING OF MATERIAL WORKMANSHIP.
- THE CONTRACTOR SHALL HAVE ON SITE AT ALL TIMES WHEN CONSTRUCTION IS IN PROGRESS A COMPETENT SUPERINTENDENT THOROUGHLY FAMILIAR WITH THE CONSTRUCTION OF EARTH BERMS AND EMBANKMENTS, THE COMPACTION OF SOILS AND PLACEMENTS OF LINERS.
- THE CONTRACTOR SHALL INSTALL SILT SOCK PRIOR TO CLEARING AND GRUBBING AS SHOWN ON THE DRAWINGS IN ACCORDANCE WITH WVDEP BEST MANAGEMENT PRACTICES MANUAL CHAPTER 3. SURFACE WATER SHALL BE DIVERTED AWAY FROM ALL EXCAVATIONS AND THE FACE OF ALL FILLS TO PREVENT FLOODING AND SOFTENING OF THE SUBGRADE OR COMPACTED MATERIALS.
- CLEARING AND GRUBBING SHALL REMOVE ALL BRUSH, TREES, ROOTS, STUMPS, FENCES, SIGNS OR ANY OTHER MATERIAL THAT IS NOT TO BE REUSED FOR THE CONSTRUCTION. SOME STUMPS MAY REMAIN AT THE APPROVAL OF THE ENGINEER. NO CLEARING DEBRIS SHALL BE BURIED ON-SITE. FOR CLEARING WITHIN PERMITTED LOD, STUMPS AND ROOTS LARGER THAN 2 INCHES IN DIAMETER SHALL BE COMPLETELY GRUBBED AND PROPERLY DISPOSED OF OFF-SITE. ALL TIMBER, TREETOPS, BRANCHES, STUMP LESS THAN 2 INCHES IN DIAMETER, ETC., WILL BE CHIPPED, GROUND, AND/OR MULCHED AND USED AS SITE BMP'S WITH THE REMAINDER BEING PROPERLY DISPOSED OF OFF-SITE. CLEARING TO BE COMPLETE ONLY AS NEED WITHIN THE LOD TO CONSTRUCT THE FACILITY AS DEPICTED.
- TOP SOIL SHALL BE STRIPPED AND STOCKPILED WITH APPROPRIATE STABILIZATION TO PREVENT EROSION. THE TOP SOIL SHALL BE REUSED DURING THE RECLAMATION PROCESS AS NEEDED.
- PRIOR TO PLACING ANY FILL, THE EXPOSED SUBGRADE SHALL BE COMPACTED AND PROOF ROLLED TO PRODUCE A STABLE AND UNYIELDING SITE.
- RIPRAP USED AS OUTLET PROTECTION MUST BE HARD, ANGULAR AND OF A QUALITY RESISTANT TO WEATHERING AND DISINTEGRATION. RIPRAP SHOULD BE GROUDED ON STEEP OR LENGTHY FILL SLOPES WITH A MINIMUM THICKNESS TWO TIMES THE MAXIMUM STONE DIAMETER, BUT NOT LESS THAN SIX INCHES.
- ALL FILL SHALL BE PLACED IN LOOSE LIFTS OF UP TO 12" AND SHALL BE COMPACTED TO AT LEAST 95% OF THE LABORATORY MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR TEST METHOD (ASTM D 698). THE MOISTURE CONTENT WILL BE CONTROLLED IN ACCORDANCE WITH THE LIMITS OF THE STANDARD PROCTOR TEST RESULTS. SOME SOILS CANNOT BE COMPACTED TO 95% OF THE STANDARD PROCTOR AT PLUS OR MINUS 4% MOISTURE CONTENT. CONTRACTOR IS RESPONSIBLE FOR THE ORIGINAL SOIL TEST AND PROVIDING A COPY OF THE RESULTS WITH MOISTURE-DENSITY CURVE TO THE ENGINEER. THE CONTRACTOR SHALL DO IN-PLACE DENSITY TESTS EVERY THIRD LIFT OF SOIL. FIELD DENSITY TESTS FOR COMPACTION SHALL BE PERFORMED IN ACCORDANCE WITH ASTM D 2922 (NUCLEAR METHOD). RECORDS SHALL BE MAINTAINED OF TEST LOCATION AND RESULTS AND PROVIDED TO THE ENGINEER ON REQUEST. AREAS THAT FAIL FOR COMPACTION SHALL BE REMOVED, RE-COMPACTED AND RETESTED FOR COMPLIANCE. IN LIEU OF STANDARD PROCTOR TESTING, THE CONTRACTOR MAY PROOF-ROLL THE SOIL EVERY 24" OF SOIL LIFT WITH A LOADED 15 TON TANDEM DUMP TRUCK. SOIL THAT DEFLECTS UNDER THE REAR WHEELS GREATER THAN 1/2" SHALL BE REMOVED, RE-COMPACTED AND RETESTED. COMPACTION OF SOIL SHALL BE DONE WITH A 5 TON SMOOTH, SHEEPS FOOT, OR VIBRATORY ROLLER.
- ON-SITE FILL SHALL BE USED TO THE MAXIMUM EXTENT POSSIBLE. ANY IMPORTED FILL SHALL BE CERTIFIED BY THE CONTRACTOR TO BE CLEAR OF ALL HAZARDOUS SUBSTANCES OR MATERIALS. IF MATERIAL IS ENCOUNTERED THAT CANNOT BE RIPPED BY A CAT D6 WITH A SINGLE TOOTH RIPPER, THEN THE CONTRACTOR SHALL CONTACT THE ENGINEER WHO WILL VISIT THE SITE AND DETERMINE IF THE MATERIAL MAY BE USED AS IS OR MUST BE REMOVED BY OTHER MEANS. IF UNSUITABLE SOILS IN THE SUBGRADE ARE FOUND THEY SHALL BE REMOVED AND REPLACED WITH APPROPRIATE FILL AT THE CONTRACTOR'S EXPENSE AND THE ENGINEER'S DIRECTION.
- IF SPRINGS OR SEEPS ARE ENCOUNTERED, SUBSURFACE DRAINAGE FEATURES SHALL BE INSTALLED PRIOR TO FILL PLACEMENT. CONTACT ENGINEER FOR EVALUATION AND RECOMMENDATION OF CORRECTIVE MEASURES.
- THE FILL TOE FOR ALL EMBANKMENTS SHALL BE BENCHMARKED OR KEYPED INTO THE NATURAL SOIL. ALL FILL TOES SHALL BE SUPPORTED BY COMPETENT BEDROCK OR SOIL MATERIAL.

CONSTRUCTION SPECIFICATIONS (CONT.)

- FILL PLACED AGAINST EXISTING SLOPES SHALL BE BENCHMARKED INTO THE EXISTING MATERIAL DURING ALL PLACEMENT TO REDUCE THE POTENTIAL FOR DEVELOPMENT OF A SMOOTH INTERFACE BETWEEN THE FILL AND EXISTING SLOPE.
- ANY SOFT AREAS SHALL BE OVER-EXCAVATED TO A FIRM MATERIAL AND BACKFILLED WITH A WELL COMPACTED STRUCTURAL FILL.
- FILL REQUIRED TO OBTAIN DESIGN GRADES SHALL BE PLACED AS CONTROLLED, COMPACTED. ALL THE FILL SHALL BE FREE OF TRASH, WOOD, TOPSOIL, ORGANICS, COAL, COAL MINE REFUSE, FROZEN MATERIAL AND PIECES OF ROCK GREATER THAN 6" IN ANY DIMENSION.
- DURING PLACEMENT OF MATERIAL, MOISTEN OR AERATE EACH LAYER OF FILL, AS NECESSARY, TO OBTAIN THE REQUIRED COMPACTION. FILL SHOULD NOT BE PLACED ON SURFACES THAT ARE MUDDY OR FROZEN, OR HAVE NOT BEEN APPROVED BY PRIOR PROOF-ROLLING. FREE WATER SHALL BE PREVENTED FROM APPEARING ON THE SURFACE DURING OR SUBSEQUENT TO COMPACTION OPERATIONS.
- SOIL MATERIAL WHICH IS REMOVED BECAUSE IT IS TOO WET TO PERMIT PROPER COMPACTION MAY BE SPREAD AND ALLOWED TO DRY. DRYING CAN BE FACILITATED BY DISKING OR HARROWING UNTIL THE MOISTURE CONTENT IS REDUCED TO AN ACCEPTABLE LEVEL. WHEN THE SOIL IS TOO DRY, WATER MAY BE UNIFORMLY APPLIED TO THE LAYER TO BE COMPACTED.
- THE FILL OUTSLOPES SHALL BE OVERBUILT AND TRIMMED BACK TO DESIGN CONFIGURATIONS TO VERIFY PROPER COMPACTION.
- GRANULAR MATERIALS, SUCH AS AASHTO NO. 57 STONE SHALL BE COMPACTED TO 85% OF ITS RELATIVE DENSITY, AS DETERMINED BY ASTM D 4253 AND D 4254 TEST METHODS.
- PHOTOGRAPHIC DOCUMENTATION SHALL BE TAKEN BY THE CONTRACTOR AND PROVIDED TO THE ENGINEER OF THE FOLLOWING ACTIVITIES:
 - SITE AFTER CLEARING AND GRUBBING;
 - THE SITE AFTER TOPSOIL REMOVAL;
 - TOE KEY AND INSPECTION TRENCH CONSTRUCTION;
 - DAILY PHOTOS OF CUT AND FILL OPERATIONS;
 - PROOF-ROLLING TESTS.
- THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH A COMPLETE BINDER THAT INCLUDES ALL PHOTO DOCUMENTATION, ALL COMPACTION TEST REPORTS, RESULTS AND MAPS, AND A REPORT OF ALL CUT AND FILL VOLUMES IN CUBIC YARDS.

RECLAMATION NOTES

- THE WATER CORRAL MUST BE REMOVED PRIOR TO BACKFILLING THE WATER CONTAINMENT PAD. ANY REMAINING FLUID MUST BE DISPOSED OF IN AN APPROVED MANNER.
- DRILL CUTTINGS, DRILLING MUD AND LINER, FOR WELLS PERMITTED UNDER WV CODE 22-6A AND 35CSR-8, MUST BE REMOVED FROM SITE AND DISPOSED OF AT AN APPROVED SOLID WASTE FACILITY OR IF THE SURFACE OWNER CONSENTS THE DRILL-CUTTINGS AND ASSOCIATED DRILLING MUD MAY BE MANAGED ON SITE IN A MANNER APPROVED BY THE SECRETARY.
- THE OPERATOR SHALL GRADE OR TERRACE AND PLANT, SEED OR SOD THE AREA DISTURBED THAT IS NOT REQUIRED IN PRODUCTION OF THE WELL IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL PLAN.
- INSTALL ALL PERMANENT WATER DRAINAGE AND DIVERSION DITCHES. IN AREAS OF LONG SLOPES, IT MAY BE DESIRABLE TO INSTALL ANGLED DIVERSION DITCHES TO AID IN CONTROLLING WATER RUNOFF AND EROSION.
- STOCKPILED TOPSOIL SHOULD BE RE-SPREAD OVER DISTURBED AREA. TOPSOIL SHOULD NOT BE ADDED TO SLOPES STEEPER THAN 2:1 UNLESS GOOD BONDING TO THE SUB-SOIL CAN BE ACHIEVED.
- PRIOR TO SEEDING, SOIL SHOULD BE LOOSENEED BY DISKING, BULLDOZER TRACKING, ETC. NOTE THAT BULLDOZER TRACKING CAN COMPACT WET CLAY SOILS AND RESTRICT ESTABLISHMENT OF VEGETATION.
- MAINTAINING SEDIMENT BARRIERS IS CRITICAL UNTIL VEGETATION IS REESTABLISHED. TEMPORARY SEDIMENT CONTROL DEVICES SUCH AS SUPER SILT FENCING SHALL BE REMOVED ALONG WITH SEDIMENT AFTER AT LEAST A 70% VEGETATIVE COVER IS ESTABLISHED.

GEOTECHNICAL NOTES

- THE CONTOUR GRADING PLAN SHOWN ON THIS DRAWING HAS BEEN DEVELOPED WITHOUT SITE SPECIFIC GEOTECHNICAL DATA. THE SITE SPECIFIC GEOTECHNICAL CONDITIONS REQUIRE VERIFICATION PRIOR TO CONSTRUCTION. THESE GEOTECHNICAL CONDITIONS MAY REQUIRE DESIGN REVISIONS TO THE CONTOUR GRADING PLAN.
- EARTHWORK QUANTITIES BASED ON THE ASSUMPTION THAT CUT MATERIALS WILL BE SUITABLE FOR FILL MATERIAL.
- THE AREAS TO BE EXCAVATED OR OCCUPIED BY FILL, SHALL BE CLEARED AND GRUBBED OF ALL TREES, STUMPS, LARGE ROOTS, BOULDERS, AND DEBRIS. REFER TO NOTE 7 OF THE CONSTRUCTION SPECIFICATIONS FOR REMOVAL/DISPOSAL.
- ALL FILL SHALL BE CLEAN AND FREE OF ROOTS, SOD OR OTHER DELETERIOUS MATERIALS.
- DURING COLD WEATHER CONDITIONS, CONTRACTOR SHALL CUT FROM SMALL AREAS FOR FILL TO MITIGATE FROST DEVELOPMENT ON FILL MATERIAL AND CONTRACTOR SHALL FILL IN SMALL AREAS TO PREVENT FROST DEVELOPMENT BETWEEN LIFTS. CONTRACTOR SHALL NOT PLACE FILL DURING PERIODS OF SNOW.
- STOCKPILES SHOULD BE COMPACTED AND SMOOTH DRUM ROLLED TO PROMOTE RUNOFF AND LIMIT INFILTRATION.

ROBERT WILLIAMS SITE CALCULATIONS

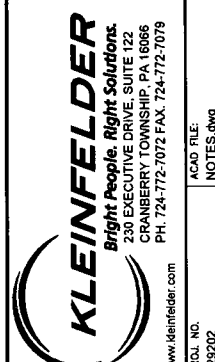
Slope Number	Distance	Slope Gradient (H:1)	Soil Type	K Factor	Material *	ASL bare (In)	ASL mat (In)	SLT (In)	Safety Factor	Remarks	Staple Pattern
Slope 1	44	2	Silt Loam	0.33	S150BN	1.040	0.092	0.25	1.563	STABLE	C
Slope 2	24	2	Silt Loam	0.33	S150BN	0.631	0.030	0.25	4.821	STABLE	C
Slope 3	56	2	Silt Loam	0.33	S150BN	1.268	0.127	0.25	1.127	STABLE	C
Slope 4	24	2	Silt Loam	0.33	S150BN	0.631	0.030	0.25	4.821	STABLE	C
Slope 5	25	2	Silt Loam	0.33	S150BN	0.653	0.032	0.25	4.471	STABLE	C
Slope 6	60	2	Silt Loam	0.33	SC250	1.343	0.075	0.25	1.919	STABLE	D
Slope 7	41	2	Silt Loam	0.33	S150BN	0.981	0.080	0.25	1.778	STABLE	C
Slope 8	68	2	Silt Loam	0.33	SC250	1.434	0.080	0.25	1.797	STABLE	D

* Information Provided by North American Green ECMDS Version 5.0

ACCESS ROAD CROSS-DRAINS		INLET AREA (ac)	tc TIME OF CONC.	I INTENSITY (in/hr)	Cc (INLET AREA)	Q FLOW (cfs)	Q TOTAL FLOW (cfs)	SLOPE (ft/ft)	Dtheo (in)	SIZE (in)	Vfull (ft/sec)	LENGTH (ft)	UPPER INVERT (ft)	LOWER INVERT (ft)	TOP EL (ft)	PIPE MATERIAL
PIPE	STATION															
P1	1+64	0.26	5.0	6.44	0.44	0.74	0.74	0.0469	5.0	15	11.4	32.00	887.00	885.50	-	RCP
P2	2+72	0.33	5.0	6.44	0.41	0.87	0.87	0.0500	5.2	15	11.8	30.00	907.00	905.50	-	RCP
P3	3+66	0.61	5.0	6.44	0.71	2.79	2.79	0.0484	8.1	15	11.6	31.00	925.00	923.50	-	RCP
P4	6+17	0.84	5.0	6.44	0.53	2.86	2.86	0.0205	9.6	15	7.5	73.00	951.50	950.00	-	RCP

Channel/Berm Name	Runoff Coefficient, C	10-year Rainfall Intensity, I (in/hr)	Drainage Area, A (acres)	Q (cfs)	Total Runoff, Q (cfs)	Upper Station	Lower Station	Length (ft)	Channel Section	Bottom Width (ft)	Left Side Slope, Z:1 (ft)	Right Side Slope, Z:1 (ft)	Channel Depth (ft)	Channel Slope (ft/ft)	Normal Depth (ft)	Freeboard (ft)	Shear Stress (lb/ft ²)	Velocity (fps)	n Value	Temporary Liner*	Permanent Liner*
Road-side Ditch 1	0.47	6.44	0.17	0.51	5.77	01+50	00+00	160.00	Trapezoidal	2.00	2.00	2.00	1.50	0.069	0.37	1.13	1.59	5.69	0.040	NAG SC-250	NAG SC-250
Road-side Ditch 2	0.59	6.44	0.10	0.38	0.38	01+60	00+00	160.00	Triangular	-	2.00	2.00	1.50	0.088	0.32	1.18	1.75	1.86	0.063	R-4 RIPRAP	R-4 RIPRAP
Road-side Ditch 3	0.44	6.44	0.26	0.74	0.74	02+80	01+80	100.00	Trapezoidal	2.00	2.00	2.00	1.50	0.200	0.14	1.36	1.75	2.32	0.063	R-4 RIPRAP	R-4 RIPRAP
Road-side Ditch 4	0.53	6.44	0.09	0.31	4.52	02+80	01+50	130.00	Trapezoidal	2.00	2.00	2.00	1.50	0.154	0.31	1.19	2.98	5.57	0.040	NAG SC-250	NAG SC-250
Road-side Ditch 5	0.41	6.44	0.33	0.87	0.87	03+60	02+80	80.00	Trapezoidal	2.00	2.00	2.00	1.50	0.225	0.17	1.33	2.39	2.19	0.080	R-5 RIPRAP	R-5 RIPRAP
Road-side Ditch 6	0.53	6.44	0.08	0.27	3.34	03+60	02+80	80.00	Trapezoidal	2.00	2.00	2.00	1.50	0.225	0.24	1.26	3.37	5.61	0.040	NAG SC-250	NAG SC-250
Road-side Ditch 7	0.71	6.44	0.61	2.79	2.79	05+50	03+60	200.00	Trapezoidal	2.00	2.00	2.00	1.50	0.170	0.23	1.27	2.44	4.93	0.040	NAG SC-250	NAG SC-250
Road-side Ditch 8	0.62	6.44	0.07	0.28	0.28	04+70	03+60	110.00	Trapezoidal	2.00	2.00	2.00	1.50	0.218	0.06	1.44	0.82	2.20	0.043	R-3 RIPRAP	R-3 RIPRAP
Road-side Ditch 9	0.65	6.44	0.15	0.63	0.63	05+50	06+30	100.00	Triangular	-	2.00	2.00	2.00	0.120	0.40	1.60	3.00	1.97	0.080	R-5 RIPRAP	R-5 RIPRAP

*CONTRACTOR TO INSTALL CHECK DAMS ALONG DITCH SECTION. SEE DETAIL ON SHEET 16 FOR SPACING REQUIREMENTS.



ROBERT WILLIAMS DRILL PAD NOTES
 ANTERO RESOURCES APPALACHIAN CORPORATION
 ROBERT WILLIAMS DRILL PAD
 CENTRAL DISTRICT
 DODDRIDGE COUNTY WEST VIRGINIA

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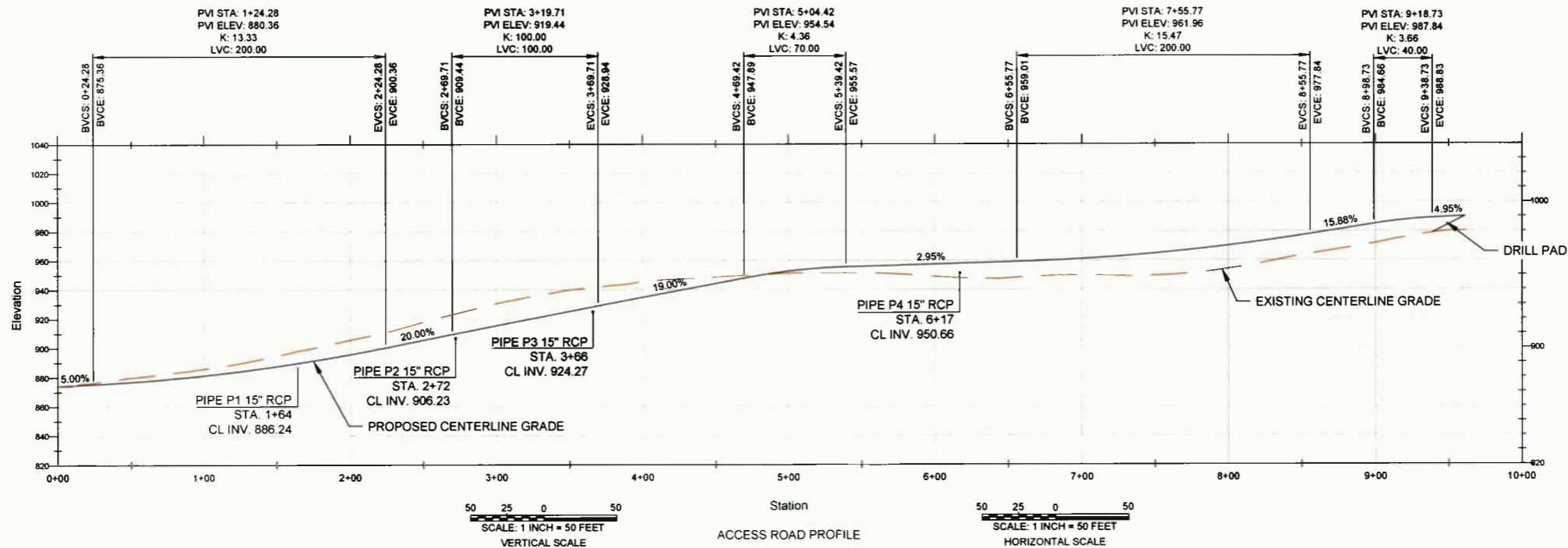
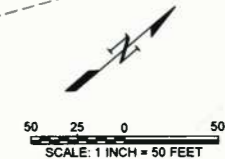
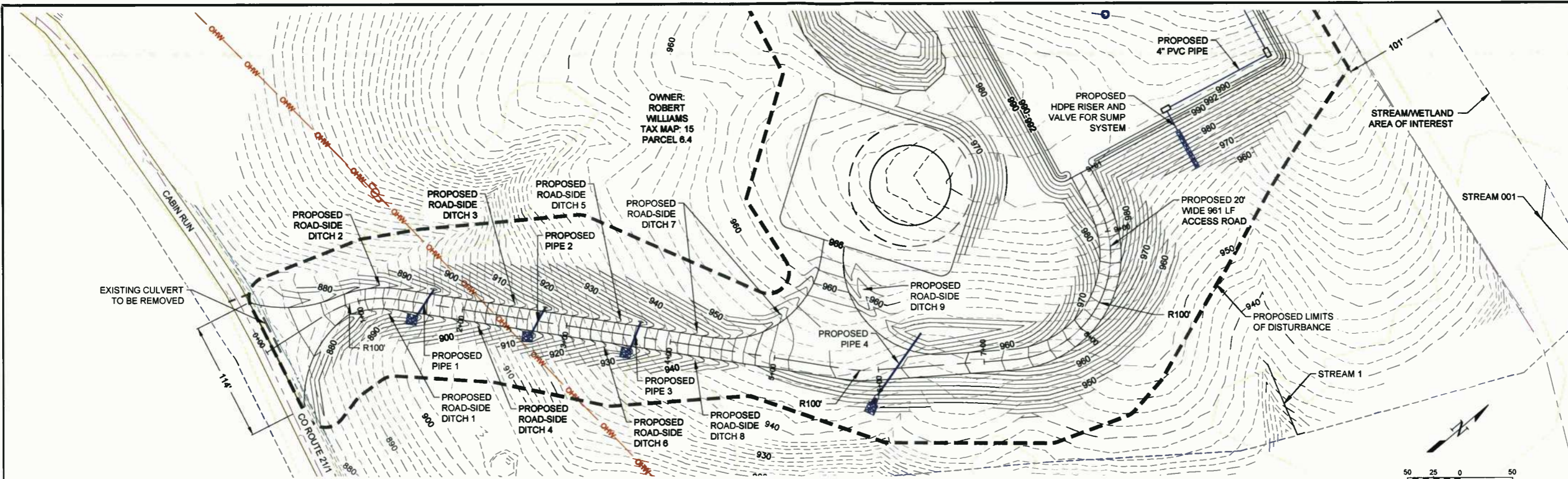


DESIGNED BY: RAP
 MODIFIED BY: RAP
 CHECKED BY: JDF
 DATE: 05-16-2013
 SCALE:
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PLOTTED: 16 May 2013, 4:22pm, RParke

ATTACHED IMAGES: X:\Robert Williams_Base\West AR_XRef\X:\Robert Williams_Civil\XRef\X:\Robert Williams_Aerial\CAD FILE\W:\Civ\Antero_Features\Robert Williams\Design\OverFinal SITE PLANS_LAYOUT_7 ACCESS ROAD PLAN AND PROFILE



LEGEND

- 1360 --- EXISTING INDEX CONTOUR (10')
- 1360 --- EXISTING INTERMEDIATE CONTOUR (2')
- - - - - EXISTING CULVERT
- - - - - EXISTING TREE LINE
- - - - - EXISTING PROPERTY LINE
- - - - - EXISTING ROAD
- PROPOSED WELL HEAD
- PAD PERIMETER SUMP
- EDGE OF PROPOSED GRAVEL EQUIPMENT PAD
- OHW --- OHW EXISTING OVERHEAD POWER LINE
- PROPOSED CONSTRUCTION FENCE
- PROPOSED SECURITY FENCE
- 1360 --- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED STORM DRAINAGE PIPE
- LIMITS OF DISTURBANCE
- STREAM/WETLAND AREA OF INTEREST
- PROPOSED PVC PIPE FOR SUMP SYSTEM

NOTES:

1. SEE SHEET 9 FOR EROSION & SEDIMENT CONTROL MEASURES.
2. SEE SHEET 13 FOR TYPICAL ACCESS ROAD CROSS-SECTION.

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OWNER: ROBERT WILLIAMS
TAX MAP: 15
PARCEL 6.4

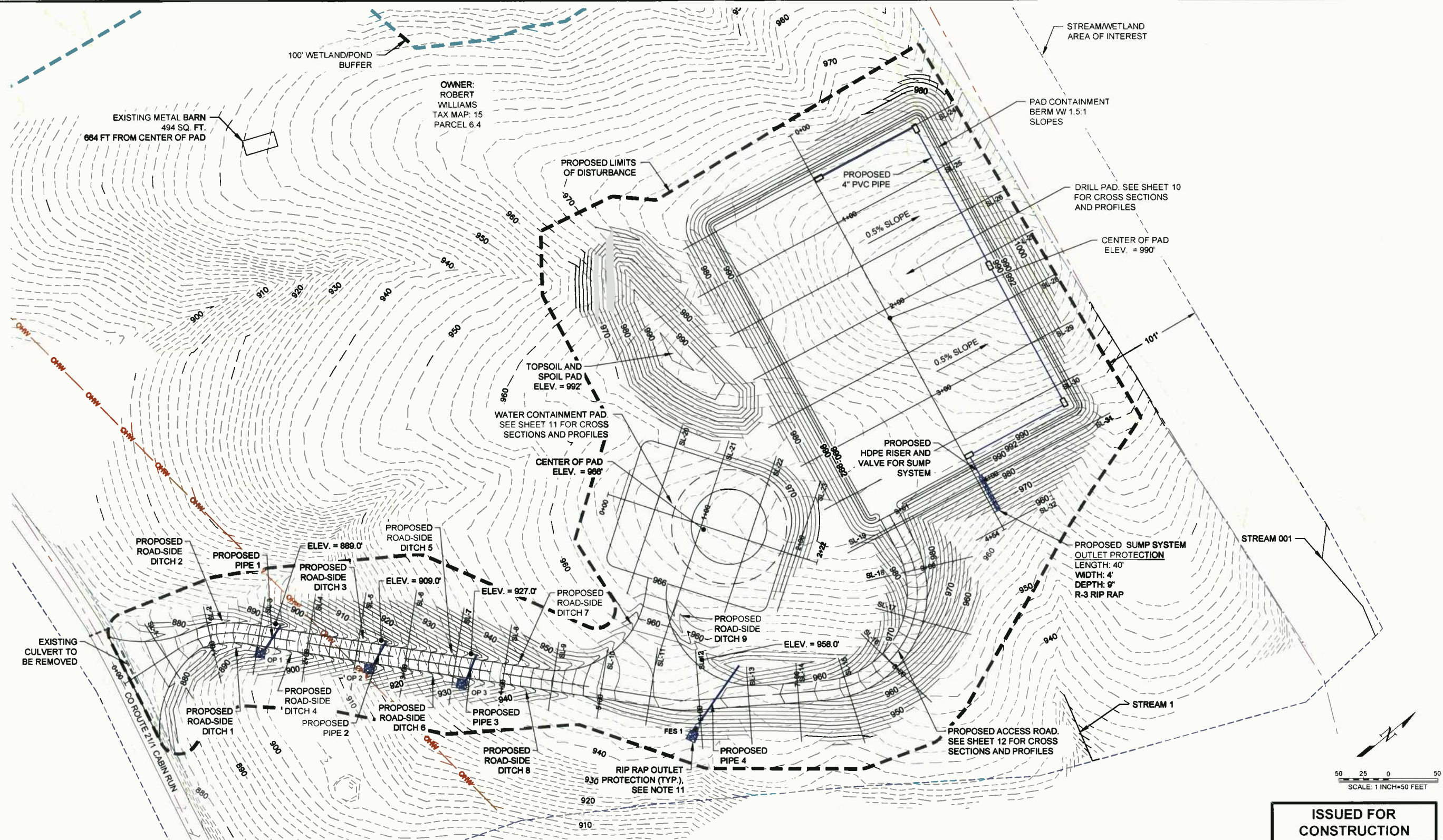
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PROJ. NO. 129202
ACAD FILE: ACCESS ROAD PLAN AND PROFILE.dwg

ROBERT WILLIAMS DRILL PAD ACCESS ROAD PLAN AND PROFILE
ANTERO RESOURCES APPALACHIAN CORPORATION
ROBERT WILLIAMS DRILL PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY
WEST VIRGINIA

DESIGNED BY: RAP
MODIFIED BY: RAP
CHECKED BY: JDF
DATE: 05-16-2013
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CONSTRUCTION
7
7 of 21 sheets

PLOTTED: 16 May 2013, 4:23pm, RParker

ATTACHED IMAGES: XREF: ANTERO 11117 TITLE BLOCK XREF: X:Robert Williams, Base: XREF: X:Robert Williams, Aerial
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 CAD FILE: W:\Civil\Antero\Projects\Robert Williams\Design\Civil\FINAL SITE PLANS_LAYOUT_8 GRADING & DRAINAGE PLAN



- NOTES:**
- THE GRADES SHOWN REPRESENT FINISH GRADE ELEVATIONS.
 - PIPE MATERIALS SHALL BE AS NOTED ON THE PLAN AND IN THE STORM DRAINAGE COMPUTATION TABLE ON SHEET 4.
 - CUT AND FILL SLOPES SHALL BE AT 2H:1V UNLESS NOTED OTHERWISE.
 - FILL SHALL BE PLACED IN 12" LIFTS AND BE COMPACTED TO 95% STANDARD PROCTOR.
 - INTERMEDIATE TOE BENCHES SHALL BE INSTALLED ON FILL SLOPES AT INTERVALS OF 50' VERTICAL FEET OR LESS IF SOILS CONDITIONS WARRANT ADDITIONAL SLIP PRECAUTIONS.
 - ALL FILL SLOPES SHALL BE TOE KEYED PER THE DETAIL SHOWN ON SHEET 17.
 - POSITIVE FLOW FROM PAD TO SUMPS. SEDIMENTS AND MATERIAL REMOVED FROM THE PAD SUMPS SHALL BE PUMPED TO ON-SITE HOLDING/STORAGE TANKS AND SUBSEQUENTLY REMOVED FROM SITE BY AN APPROVED COMMERCIAL VENDOR.
 - ALL STORMWATER CONVEYANCES ON THE SITE HAVE BEEN DESIGNED TO ACCOMMODATE THE 10-YEAR STORM EVENT.
 - A 10-YEAR STORM EVENT RAINFALL INTENSITY OF 6.44 IN/HR WAS USED FOR STORM SEWER AND ROAD-SIDE DITCH CALCULATIONS PER THE NOAA PRECIPITATION FREQUENCY DATA SERVER FOR DODDRIDGE CO., WV.
 - SEE SHEET 4 FOR STORM DRAINAGE COMPUTATIONS.
 - SEE DETAIL 1, SHEET 15 FOR RIP RAP OUTLET PROTECTION SIZING AND DESIGN.

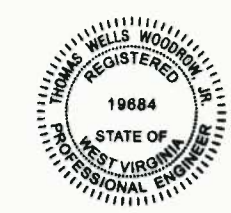
STORM DRAINAGE LEGEND

FES	FLARED END SECTION
OP	OUTLET PROTECTION

LEGEND

1360	EXISTING INDEX CONTOUR (10')	1360	PROPOSED MAJOR CONTOUR
---	EXISTING INTERMEDIATE CONTOUR (2')	---	PROPOSED MINOR CONTOUR
---	EXISTING TREE LINE	---	PROPOSED STORM DRAINAGE PIPE
---	EXISTING PROPERTY LINE	---	LIMITS OF DISTURBANCE
---	EXISTING ROAD	---	100' WETLAND/POND BUFFER
---	EXISTING TRAIL	---	CENTERLINE PROPOSED ACCESS ROAD
---	EXISTING FENCE	---	PROPOSED PAD PERIMETER SUMP
---	EXISTING OVERHEAD POWER LINE	---	PROPOSED PVC PIPE FOR SUMP SYSTEM
---	EDGE OF PROPOSED GRAVEL EQUIPMENT PAD AND ACCESS ROAD	---	STREAM/WETLAND AREA OF INTEREST
---	PROPOSED WOVEN WIRE FENCE	---	SPOT ELEVATION
---	PROPOSED CONSTRUCTION FENCE	---	

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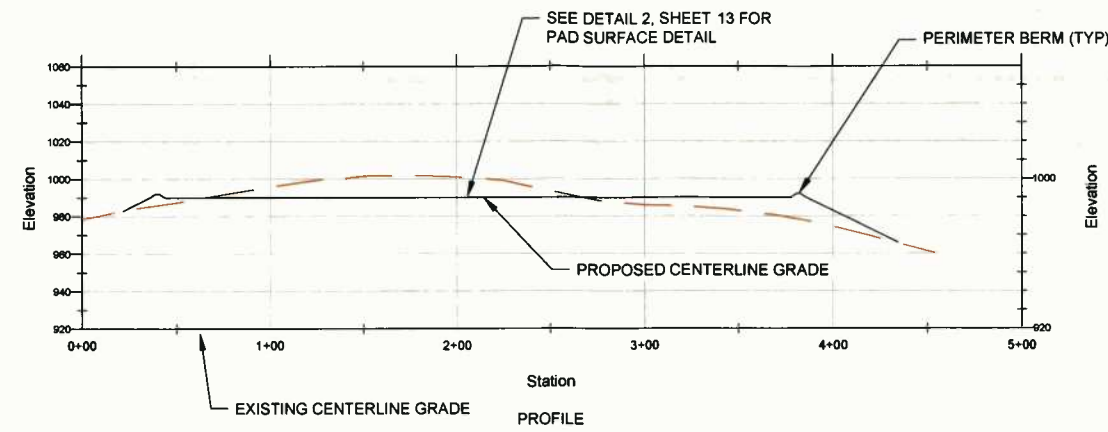
OWNER: ROBERT WILLIAMS
 TAX MAP: 15 PARCEL 6.4

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 PROJ. NO. 129202

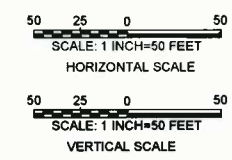
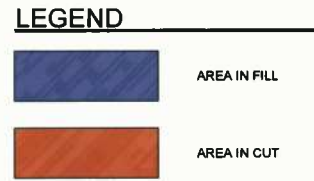
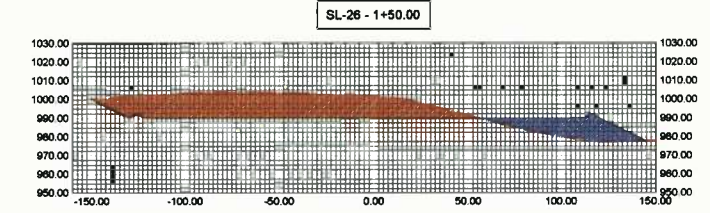
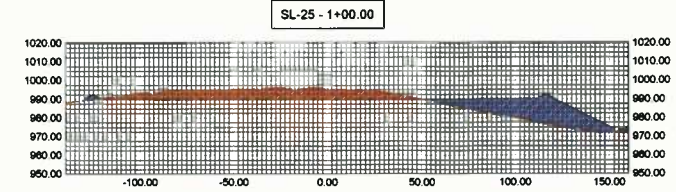
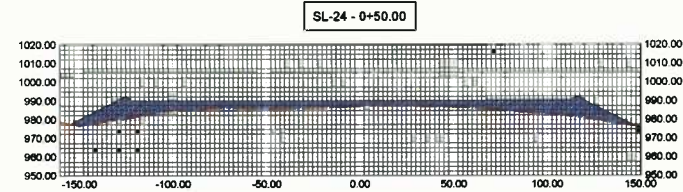
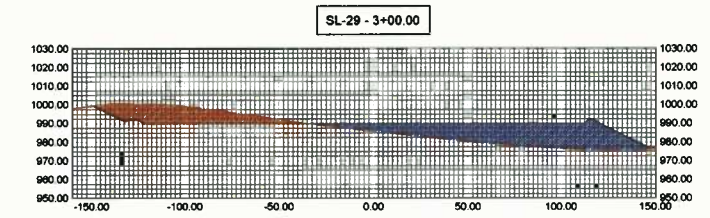
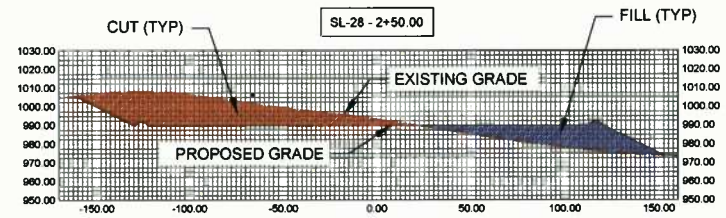
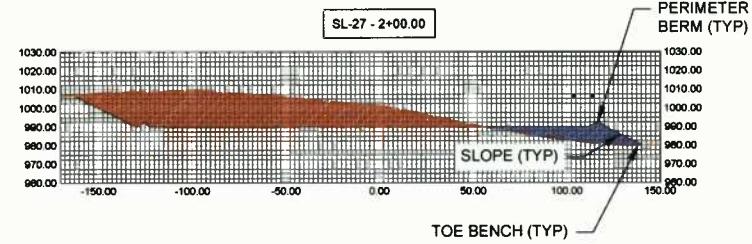
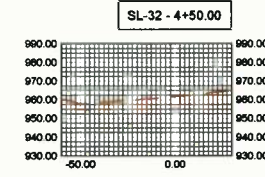
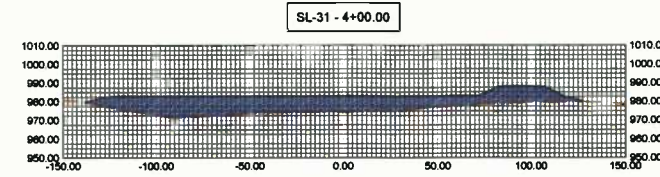
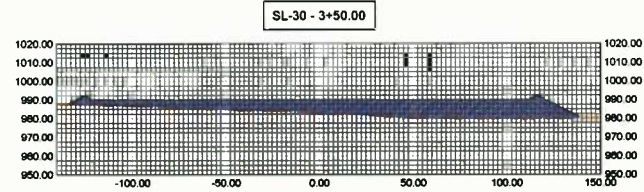
ROBERT WILLIAMS DRILL PAD GRADING & DRAINAGE PLAN
 ANTERO RESOURCES APPALACHIAN CORPORATION
 ROBERT WILLIAMS DRILL PAD
 CENTRAL DISTRICT
 DODDRIDGE COUNTY WEST VIRGINIA

DESIGNED BY: RAP
MODIFIED BY: RAP
CHECKED BY: JDF
DATE: 05-16-2013
SCALE: ORIGINAL SCALE IN INCHES FOR REDUCED PLANS
0 0.5 1.0 1.5 2.0
CONSTRUCTION
8
8 of 21 sheets

PLOTTED: 16 May 2013, 4:24pm, RParker



NOTES:
 1. PAD SURFACE AS SHOWN IS SLOPED (0.5% GRADE). ALL GRADING AND MODIFICATIONS TO THE PAD SURFACE SHALL BE PERFORMED PER THE OWNER'S DIRECTION.



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ACAD FILE: DRILL PAD PROFILE & X-SECTION.dwg

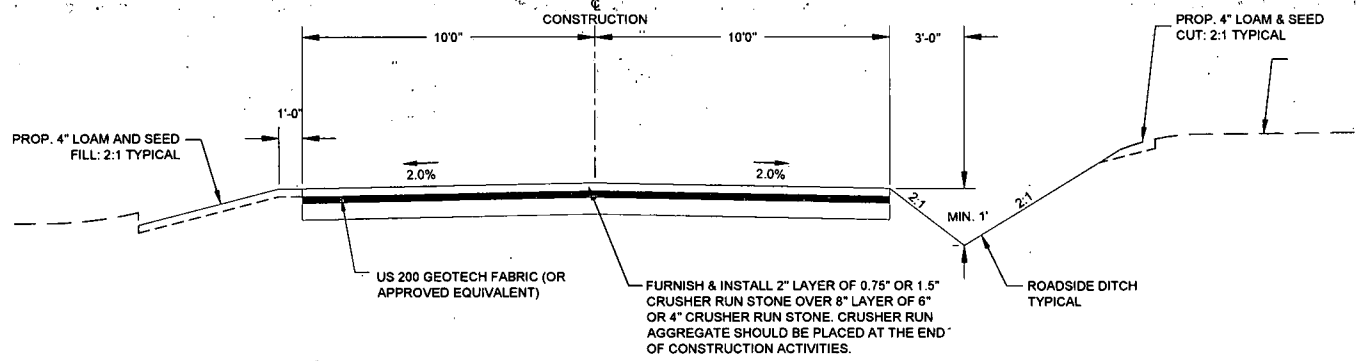
**ROBERT WILLIAMS DRILL PAD
 DRILL PAD CROSS SECTION &
 PROFILE**

ANTERO RESOURCES APPALACHIAN CORPORATION
 ROBERT WILLIAMS DRILL PAD
 CENTRAL DISTRICT
 DODDRIDGE COUNTY
 WEST VIRGINIA

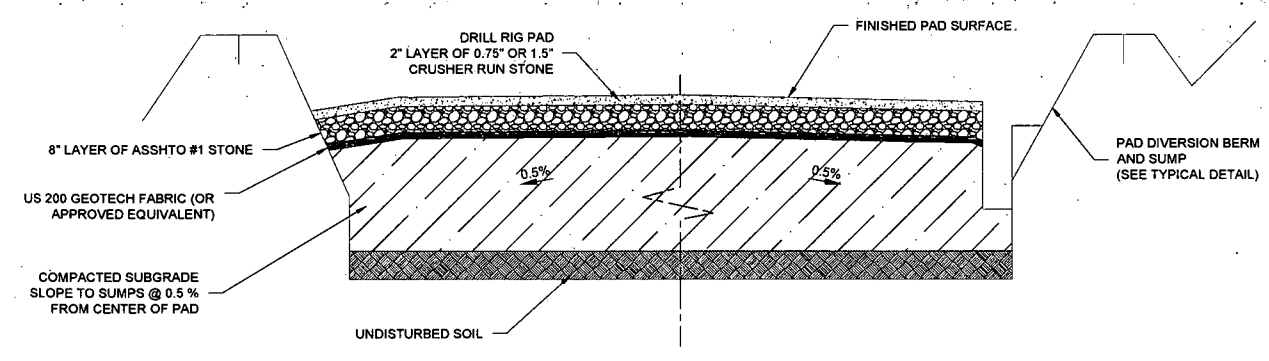
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SCALE:
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CONSTRUCTION
10
10 of 21 sheets

ATTACHED IMAGES: Xref: ANTERO 1117 TITLE BLOCK Xref: A: Robert Williams, Base: A: Robert Williams, Aerial: A: Robert Williams, Civil: A: Robert Williams, D: D:\Projects\1117\1117.dwg, LAYOUT: 10 DRILL PAD CROSS SECTION & PROFILE

PLOTTED: 16 May 2013, 4:24pm, RParker



1 TYPICAL SECTION - SITE ACCESS DRIVE
13 NTS

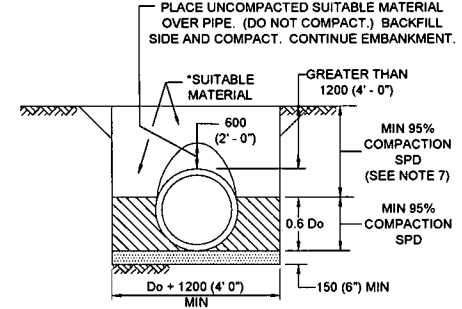


2 TYPICAL PAD CROSS-SECTION DETAIL
13 NTS

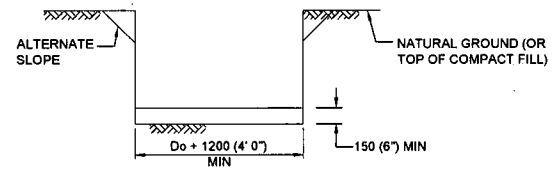
PIPE INSTALLATION PROCEDURES

- CONSTRUCTION DETAILS BELOW COVER THE FOLLOWING CONDITIONS:
- A. PIPE LYING ON TOP OF THE NATURAL GROUND, ROCK OR COMPACTED (97% SPD) FILL.
 - B. THE EXISTING GROUND IS BETWEEN THE TOP AND THE BOTTOM OF THE PROPOSED PIPE AND THE PIPE IS TO BE COVERED WITH EARTH FILL.
 - C. THE TOP OF PIPE IS BELOW THE LEVEL OF THE NATURAL GROUND OR COMPACTED FILL (TO MINIMUM 97% SPD) AND TO BE COVERED WITH EARTH FILL TO HEIGHTS ABOVE THE NATURAL GROUND.
- STEP 1: REMOVE TOPSOIL (COMPRESSIBLE LAYER OF ORGANIC MATERIAL) TO A WIDTH EQUAL TO 5 OUTSIDE DIAMETERS OF THE PIPE IN ALL FILL CONDITIONS ABOVE A, B & C. ALSO IF SPECIFIED ON THE CONTRACT DRAWING, UNDERCUT FOR THE DEPTH BELOW THE BEDDING AS SHOWN BY DESIGN (MAKE MIN WIDTH 5 DIAMETERS OF PIPE). PAY AS CLASS 1 EXCAVATION.
- STEP 2: CONSTRUCT THE EMBANKMENT TO 1200 (4' - 0") ABOVE THE TOP OF PIPE OR TO THE SUBGRADE ELEVATION, WHICHEVER IS LESS. FOR PIPES 1800 (72") OR GREATER SEE NOTE 1.
- STEP 3: EXCAVATE THE TRENCH TO TEN WIDTH OF THE OUTSIDE DIAMETER OF THE PIPE BARREL PLUS 1200 (4' - 0") AND CREATE AN APPROPRIATE BEDDING 150 (6") DEEP.

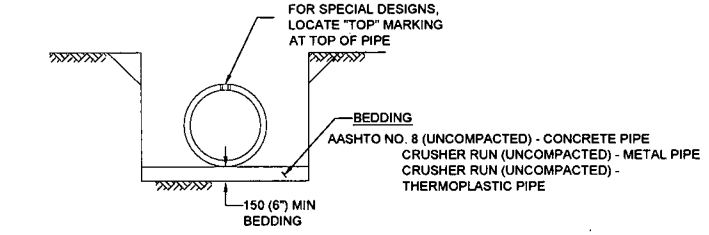
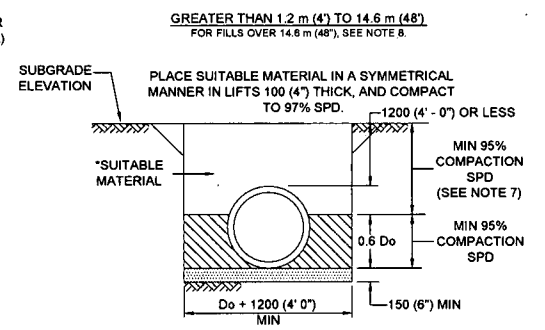
STEP 6A: PLACE CRUSHER RUN COARSE AGGREGATE MATERIAL IN LIFTS 100 (4") THICK, ADJACENT TO THE LOWER HAUNCHES TO A HEIGHT OF 0.6 Do. COMPACT TO 95% SPD. TEST THE SIDE OF BACKFILL MATERIAL AND CONTINUE EMBANKMENT IN ACCORDANCE WITH PUBLICATION 408, SECTION 601.



3 TYPICAL PAD CONTAINMENT BERM DETAIL
13 NTS



- STEP 4: FOR CONCRETE PIPE, IF THIS EXCAVATION IS THROUGH ROCK, OR HARD SHALE, OR IN AREAS OF UNDERCUT, PROVIDE 150+40 MM/M (6"-1/2" INCH/FT) OF Do+1200 (4' - 0") BELOW THE INTENDED BOTTOM ELEVATION OF THE PIPE. 400 (16") MAX.
- NOTE: IF UNSUITABLE MATERIAL IS FOUND, UNDERCUT AS DIRECTED AND BACKFILL WITH SUITABLE MATERIAL TO BOTTOM OF BEDDING ELEVATION. (UNLESS OTHERWISE SPECIFIED.)
- STEP 5: LAY PIPE ON APPROPRIATE BEDDING. SEE STEP 6D FOR METAL PIPE ARCH AND METAL PLATE PIPE ARCH.



- STEP 6: FOR CONCRETE PIPE, SEE 6A. FOR METAL PIPE AND METAL PLATE PIPE, SEE STEP 6B. FOR THERMOPLASTIC PIPE, SEE STEP 6C. FOR METAL PIPE ARCH AND METAL PLATE PIPE ARCH, SEE STEP 6D.

5 CIRCULAR PIPE INSTALLATION
13 NTS

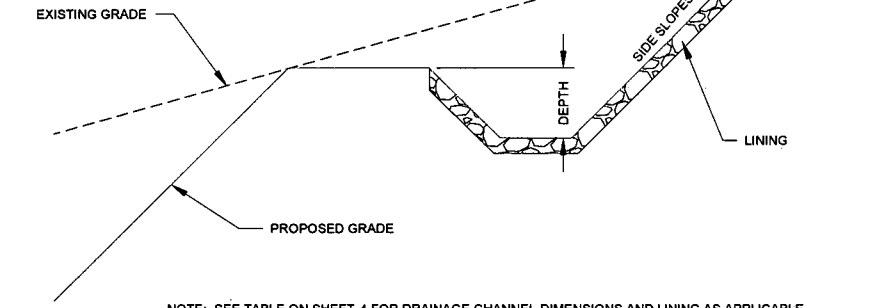
LEGEND

AGGREGATE FOR BEDDING (AASHTO NO. 8)

COARSE AGGREGATE (CRUSHER RUN)

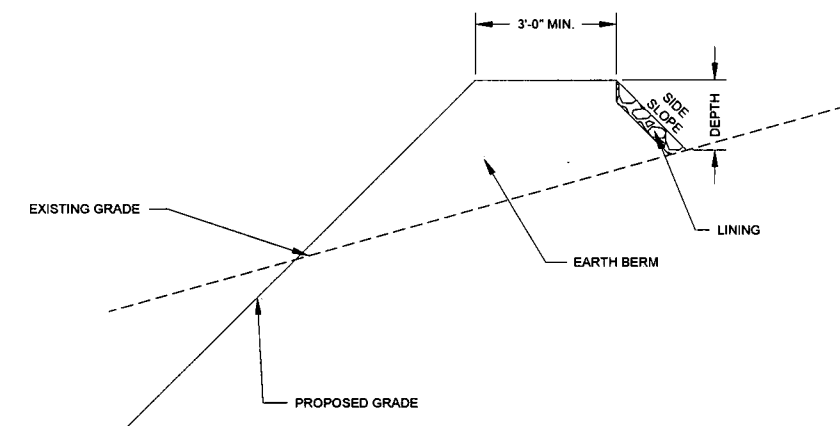
Do = OUTSIDE DIAMETER OF PIPE, MILLIMETERS (INCHES)
SPD = STANDARD PROCTOR DENSITY
ID = INSIDE DIAMETER

*SUITABLE MATERIAL = MATERIAL CONTAINING NO DEBRIS, ORGANIC MATTER, FROZEN MATERIAL OR LARGE STONES WITH A DIAMETER GREATER THAN ONE-HALF THE THICKNESS OF THE COMPACTED LAYERS BEING PLACED.



4 TYPICAL DRAINAGE CHANNEL DETAIL
13 NTS

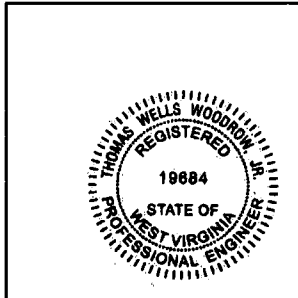
NOTE: SEE TABLE ON SHEET 4 FOR DRAINAGE CHANNEL DIMENSIONS AND LINING AS APPLICABLE.



6 TYPICAL DRAINAGE BERM DETAIL
13 NTS

NOTE: SEE TABLE ON SHEET 4 FOR DRAINAGE BERM DIMENSIONS AND LINING AS APPLICABLE.

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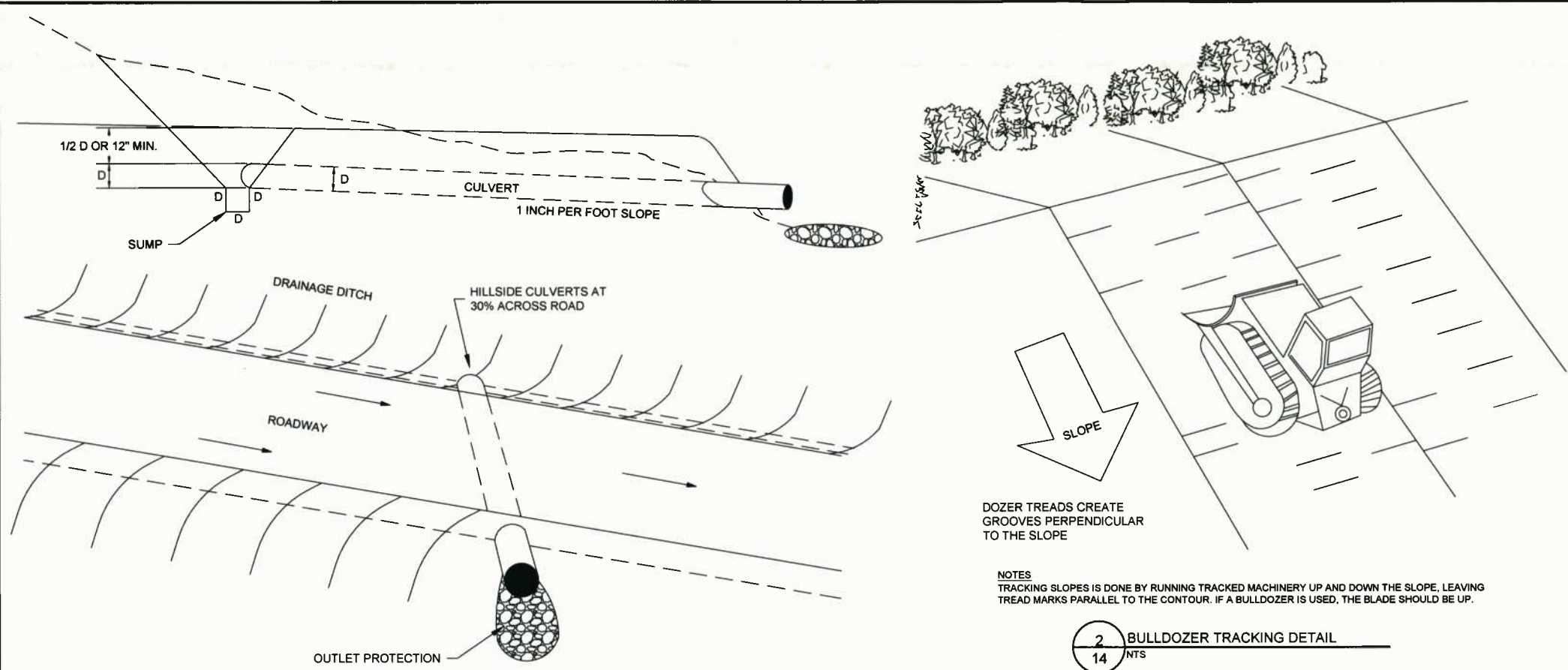
ROBERT WILLIAMS DRILL PAD DETAILS

ANTERO RESOURCES APPALACHIAN CORPORATION
ROBERT WILLIAMS DRILL PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY
WEST VIRGINIA

DESIGNED BY: RAP
MODIFIED BY: RAP
CHECKED BY: JOF
DATE: 05-16-2013
SCALE:
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS
0 0.5 1.0 1.5 2.0
CONSTRUCTION
13
13 of 21 sheets

ATTACHED IMAGES: I:\PROJECTS\CHESAPEAKE\30038-04\0303.dwg
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 10-15-12 REVISED BY: CAL

PLOTTED: 16 May 2013, 4:25pm, RParker



2 BULLDOZER TRACKING DETAIL
14 NTS

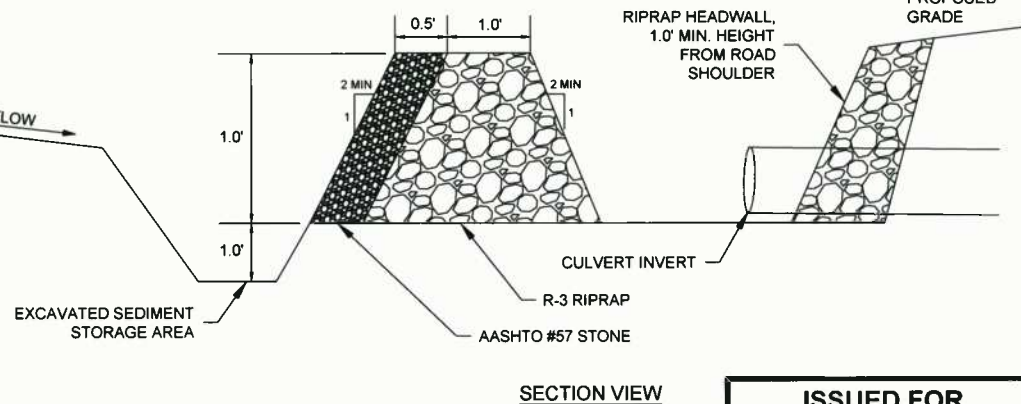
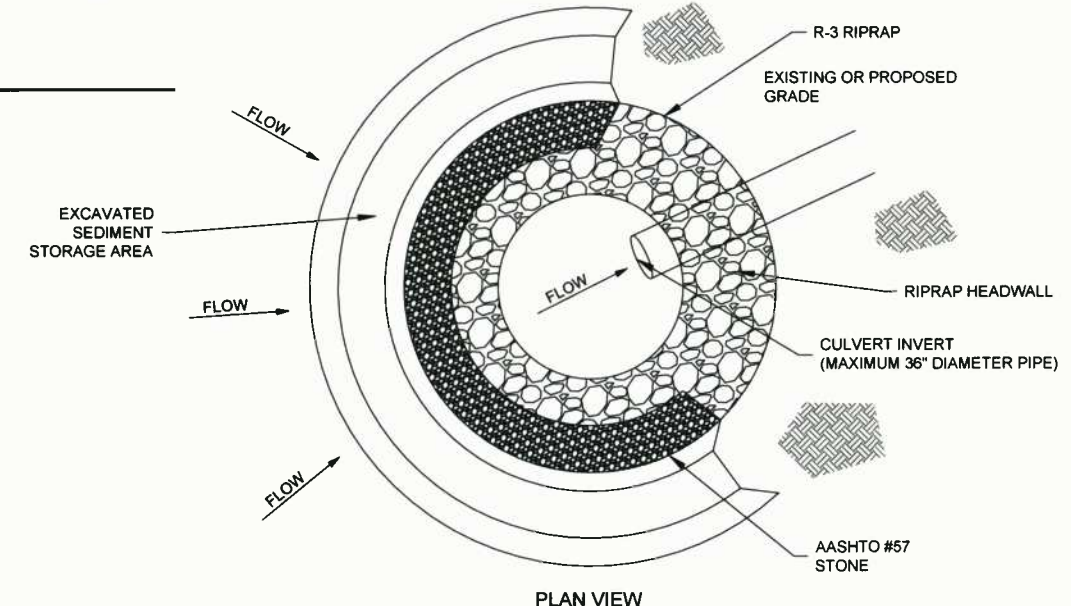
NOTES
TRACKING SLOPES IS DONE BY RUNNING TRACKED MACHINERY UP AND DOWN THE SLOPE, LEAVING TREAD MARKS PARALLEL TO THE CONTOUR. IF A BULLDOZER IS USED, THE BLADE SHOULD BE UP.

Color/Pattern	Description
Yellow Ribbon	Yellow Ribbon used to indicate top of Cut (C) Cut to be determined at time of submittal Slope determined by the design
Yellow and Orange Ribbon	Yellow and Orange Ribbon used to indicate Grade at Top of Pad/Pool/Pit
Orange Ribbon	Orange Ribbon used to indicate top of Fill (F) Fill to be determined at time of submittal Slope determined by the design
Pink Ribbon	Pink Ribbon used to indicate Top Hole Location Pink Ribbon used to indicate Survey Control Location
Pink & Black Stripe Ribbon	Pink & Black Stripe Ribbon used to indicate Vertical Cut (VC) at Pad/Pool/Pit corner or edge Pink & Black Stripe Ribbon used to indicate Vertical Fill (VF) at Pad/Pool/Pit corner or edge Vertical Cut/Vertical Fill to be determined at time of submittal
Blue & White Stripe Ribbon	Blue & White Stripe Ribbon used to indicate existing Infrastructure/Structure Items
Orange & Black Stripe Ribbon	Orange & Black Stripe Ribbon used to indicate Vertical Cut (VC) at Cornerline or edge of access road Orange & Black Stripe Ribbon used to indicate Vertical Fill (VF) at Cornerline or edge of access road
Pink & White Stripe Ribbon	Pink & White Stripe Ribbon used to indicate Existing and Settlement Control Structures Six Feet (6') Reinforced Fiber Fence (RF) Super Six Fence (S6F) Fiber Rock (FR)
Orange & White Stripe Ribbon	Orange & White Stripe Ribbon used to indicate Topsoil Sample Locations
Blue Ribbon	Blue Ribbon used to indicate Centerline (C) Ditch
Blue Ribbon	Blue Ribbon used to indicate Ditch (DTM) Settlement Traps

3 ANTERO RESOURCES STANDARD RIBBON COLOR SCHEME
14 NTS

CONSTRUCTION SPECIFICATIONS
1. CULVERTS WITH OUTLETS ONTO LENGTHY FILL SLOPES MAY REQUIRE SLOPE DRAINS WITH OUTLET PROTECTION DEPENDING ON THE STEEPNESS OF THE OUTSLOPE.
2. RIPRAP USED AS OUTLET PROTECTION MUST BE HARD, ANGULAR AND OF A QUALITY RESISTANT TO WEATHERING AND DISINTEGRATION. RIPRAP SHOULD BE GROUTED ON STEEP OR LENGTHY FILL SLOPES WITH A MINIMUM THICKNESS TWO TIMES THE MAXIMUM STONE DIAMETER, BUT NOT LESS THAN SIX INCHES.

1 DITCH RELIEF CULVERT DETAIL
14 NTS



SECTION VIEW

ISSUED FOR CONSTRUCTION

DESIGN CRITERIA AND CONSTRUCTION SPECIFICATIONS

1. MINIMUM STONE HEIGHT SHOULD BE 1.0' WITH SIDE SLOPES NO STEEPER THAN 2:1. THE STONE "HORSESHOE" AROUND THE PIPE INLET SHOULD BE CONSTRUCTED OF R-3 RIPRAP WITH A MINIMUM CREST WIDTH OF 1.0'. THE OUTSIDE FACE OF THE RIPRAP SHOULD BE COVERED WITH A 6" THICK LAYER OF #57 STONE.
2. THE EMBANKMENT OVER THE PIPE MUST BE PROTECTED FROM OVERTOPPING. THE TOP OF THE STONE SHOULD BE A MINIMUM OF 1.0' BELOW THE TOP OF THE FILL OVER THE PIPE AND TIE INTO THE FILL ON BOTH SIDES OF THE PIPE. THE INSIDE TOE OF THE RIPRAP SHOULD BE NO CLOSER THAN 2' FROM THE CULVERT OPENING TO ALLOW PASSAGE OF HIGH FLOWS.
3. THE SEDIMENT STORAGE AREA SHOULD BE EXCAVATED UPSTREAM OF THE ROCK PIPE INLET PROTECTION, WITH A MINIMUM DEPTH OF 1.0' BELOW GRADE.
4. CLEAR THE AREA OF ALL DEBRIS THAT MIGHT HINDER EXCAVATION AND DISPOSAL OF SPOIL.
5. INSTALL THE R-3 RIPRAP IN A SEMI-CIRCLE AROUND THE PIPE INLET. THE STONE SHOULD BE BUILT UP HIGHER ON EACH END WHERE IT TIES INTO THE EMBANKMENT. THE MINIMUM CREST WIDTH OF THE RIPRAP SHOULD BE 1.0', WITH A MINIMUM BOTTOM WIDTH OF 5.0'. THE MINIMUM HEIGHT SHOULD BE 1.0', BUT ALSO LOWER THAN THE SHOULDER OF THE EMBANKMENT OR DIVERSIONS.
6. THE SEDIMENT STORAGE AREA SHOULD BE EXCAVATED AROUND THE OUTSIDE OF THE STONE HORSESHOE 1.0' BELOW NATURAL GRADE.
7. WHEN THE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED, FILL DEPRESSION AND ESTABLISH FINAL GRADING ELEVATIONS, COMPACT AREA PROPERLY, AND STABILIZE WITH GROUND COVER.

4 ROCK PIPE INLET PROTECTION
14 NTS



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ROBERT WILLIAMS DRILL PAD DETAILS

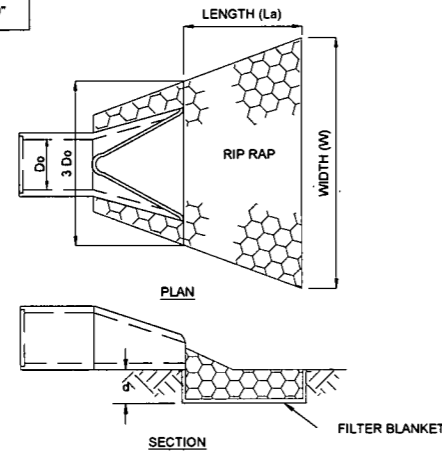
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ROBERT WILLIAMS DRILL PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY WEST VIRGINIA

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MODIFIED BY: RAP
CHECKED BY: JDF
DATE: 05-16-2013
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ORIGINAL SCALE IN INCHES FOR REDUCED PLANS
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CONSTRUCTION
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14 of 21 sheets

PLOTTED: 16 May 2013, 4:25pm - RParker

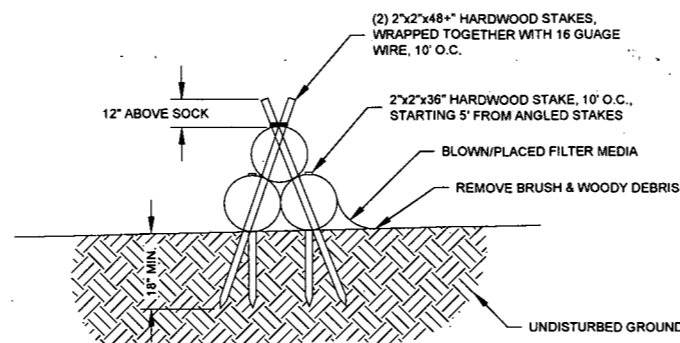
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OUTLET	Do	3Do	La	W	RIP RAP	d
OP 1	15"	3.75'	8'	7'	R-3 RIPRAP	9"
OP 2	15"	3.75'	8'	7'	R-3 RIPRAP	9"
OP 3	15"	3.75'	8'	7'	R-3 RIPRAP	9"
FES 1	15"	3.75'	8'	7'	R-3 RIPRAP	9"

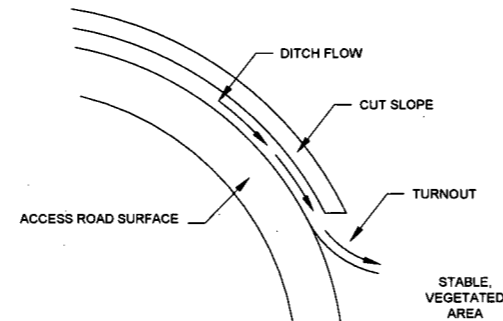


- NOTES:**
- IF FLARED END SECTION IS DISCHARGING INTO DITCH FROM THE SIDE, EXTEND RIP RAP UP DITCH BANK ON OFF-SIDE A MINIMUM OF 4 FEET.
 - USE WIDE RIP RAP GRADATION, FILTER BLANKET REQUIREMENTS, AND MAXIMUM VELOCITIES PER TABLE 3 OF THE "EROSION AND SEDIMENT POLLUTION CONTROL MANUAL" FOR FILTER BLANKET SELECTION.
 - A SUITABLE NON-WOVEN GEOTEXTILE FABRIC, USED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS, MAY BE SUBSTITUTED FOR FILTER BLANKET STONE UNDER THE RIPRAP.
 - d = 1.5 TIMES THE MAXIMUM STONE DIAMETER BUT NOT LESS THAN 6".

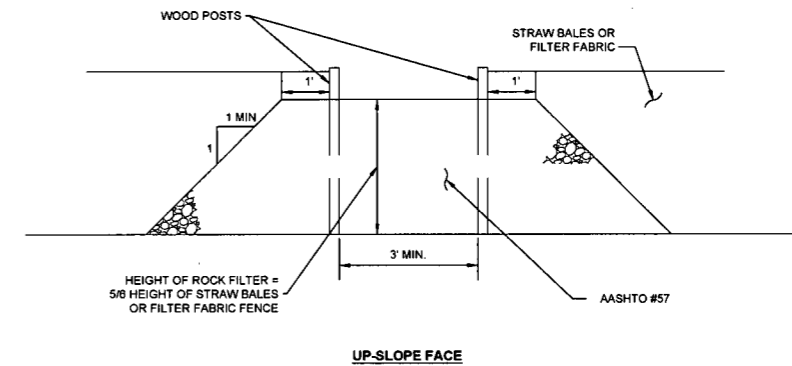
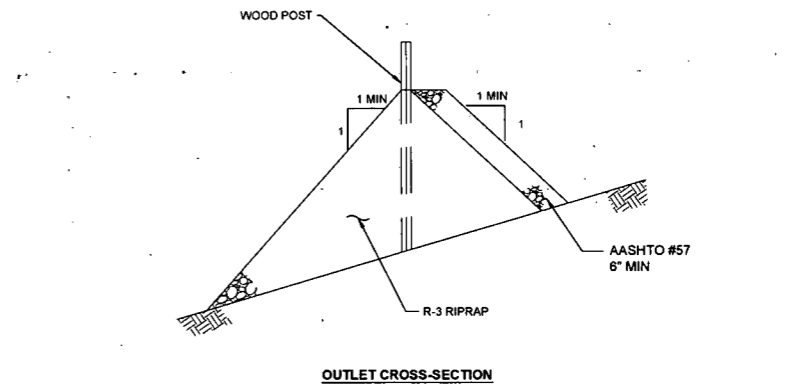
1 RIP RAP OUTLET PROTECTION
15 NTS



2 TRIPLE STACKED FILTER SOCK
15 NTS

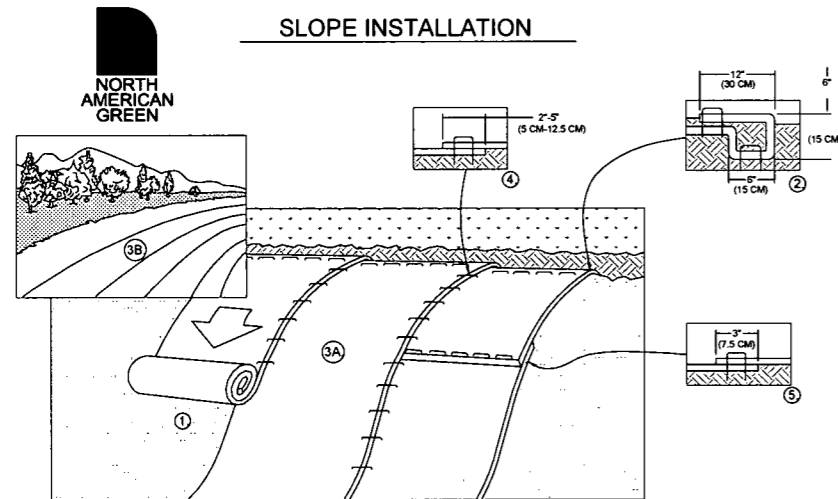


3 TURN OUT DETAIL
15 NTS



Sediment must be removed when accumulations reach 1/3 the height of the outlet.

4 ROCK FILTER OUTLETS
15 NTS



- PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
- BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) APART ACROSS THE WIDTH OF THE BLANKET.
- ROLL THE BLANKETS (A) DOWN OR (B) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
- THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2" - 5" (5 CM - 12.5 CM) OVERLAP DEPENDING ON BLANKET TYPE.
- CONSECUTIVE BLANKETS SPICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5 CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30 CM) APART ACROSS ENTIRE BLANKET WIDTH. NOTE: IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.

DETAIL AND LANGUAGE PROVIDED BY NORTH AMERICAN GREEN REV. 1/2004

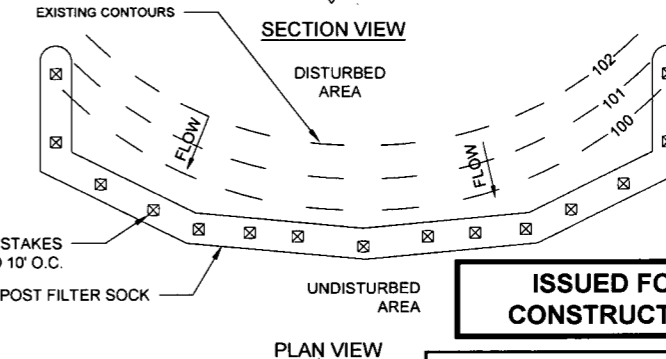
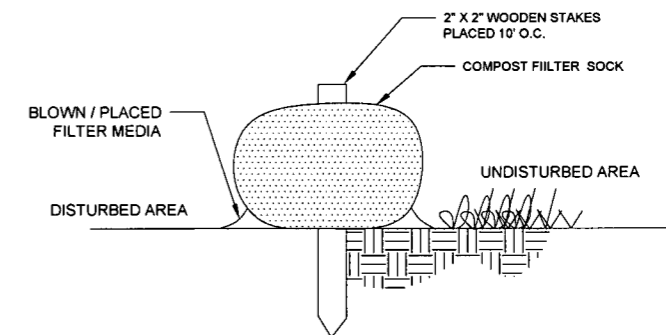
5 SLOPE PROTECTION INSTALLATION
15 NTS

COMPOST SOCK FABRIC MINIMUM SPECIFICATIONS					
MATERIAL TYPE	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament POLYPROPYLENE (MFFP)	HEAVY DUTY Multi-Filament Polypropylene (HDMFFP)
MATERIAL CHARACTERISTICS	PHOTO-DEGRADABLE	PHOTO-DEGRADABLE	BIO-DEGRADABLE	PHOTO-DEGRADABLE	PHOTO-DEGRADABLE
SOCK DIAMETERS	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"
MESH OPENING	3/8"	3/8"	3/8"	3/8"	3/8"
TENSILE STRENGTH		26 psi	26 psi	44 psi	202 psi
ULTRA VIOLET STABILITY % ORIGINAL STRENGTH (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
MINIMUM FUNCTIONAL LONGEVITY	6 MONTHS	9 MONTHS	6 MONTHS	1 YEAR	2 YEARS
TWO-PLY SYSTEMS					
INNER CONTAINMENT NETTING	HDPE				
	CONTINUOUSLY WOUND FUSION-WELDED JUNCTURES 3/4" X 3/4" MAX. APERTURE SIZE				
OUTER FILTRATION MESH	COMPOSITE POLYPROPYLENE FABRIC (WOVEN LAYER AND NON-WOVEN FLEECE MECHANICALLY FUSED VIA NEEDLE PUNCH)				
	3/16" MAX. APERTURE SIZE				
SOCK FABRICS COMPOSED OF BURLAP MAY BE USED ON PROJECTS LASTING 6 MONTHS OR LESS.					

COMPOST STANDARDS	
ORGANIC MATTER CONTENT	80%-100% (DRY WEIGHT BASIS)
ORGANIC PORTION	FIBROUS AND ELONGATED
pH	5.5-8.0
MOISTURE CONTENT	35%-55%
PARTICLE SIZE	98% PASS THROUGH 1" SCREEN
SOLUBLE SALT CONCENTRATION	5.0 dS/m (mmhos/cm) MAXIMUM

- NOTES:**
- SOCK FABRIC SHALL MEET STANDARDS OF TABLE SHOWN ABOVE. COMPOST SHALL MEET THE STANDARDS OF TABLE SHOWN BELOW.
 - COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE SOCK SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN SOCK ALIGNMENT. STAKES MAY BE INSTALLED IMMEDIATELY DOWNSLOPE OF THE SOCK IF SO SPECIFIED BY THE MANUFACTURER.
 - TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.
 - ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE ABOVEGROUND HEIGHT OF THE SOCK AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.
 - SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
 - BIODEGRADABLE FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
 - UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

6 COMPOST FILTER SOCK DETAIL
15 NTS



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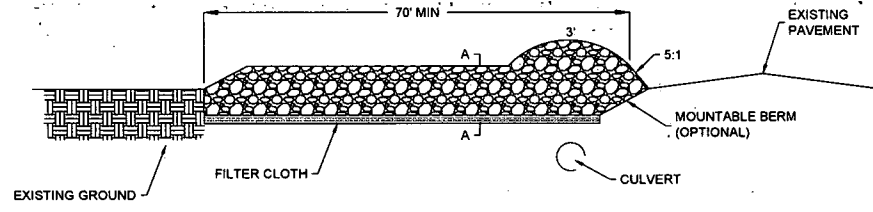
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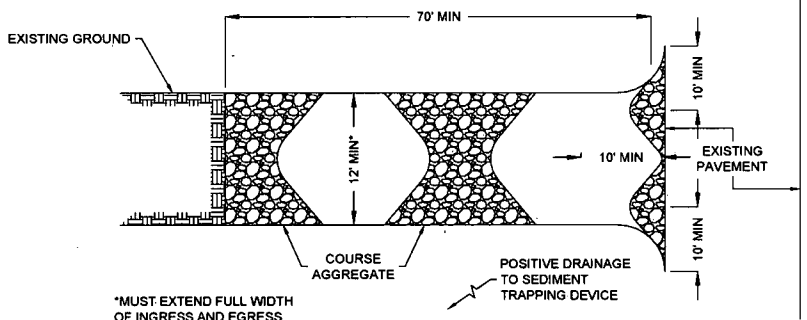
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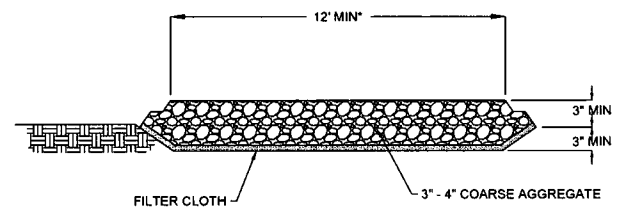
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SIDE ELEVATION



PLAN VIEW



SECTION A-A

CONSTRUCTION SPECIFICATIONS

- CLEAR THE ENTRANCE AND EXIT AREA OF ALL VEGETATION, ROOTS, AND OTHER OBJECTIONABLE MATERIAL AND PROPERLY GRADE IT.
- PLACE THE 3 INCH CRUSHED ROCK TO MATCH FINISHED GRADE AT THE ROADWAY AND SMOOTH IT.
- PROVIDE DRAINAGE WHERE NEEDED TO CARRY WATER TO A SEDIMENT TRAP OR OTHER SUITABLE OUTLET.

MAINTENANCE:

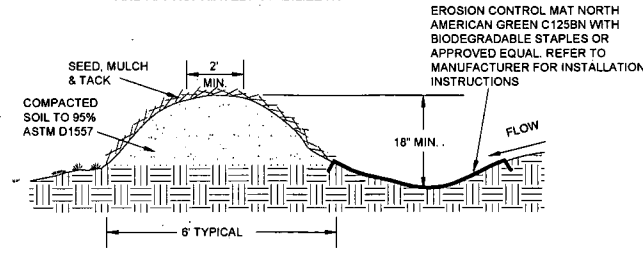
MAINTAIN THE GRAVEL PAD IN A CONDITION TO PREVENT MUD OR SEDIMENT FROM LEAVING THE CONSTRUCTION SITE. THIS MAY REQUIRE PERIODIC TOP-DRESSING WITH ADDITIONAL 3 INCH CRUSHED ROCK. IMMEDIATELY REMOVE ALL OBJECTIONABLE MATERIALS SPILLED, WASHED, OR TRACKED ONTO PUBLIC ROADWAYS.

MAINTENANCE SHOULD BE PROVIDED DAILY, BUT AT A MINIMUM EVERY SEVEN DAYS AND AFTER EVERY RAIN OF 0.5 INCH OR GREATER.

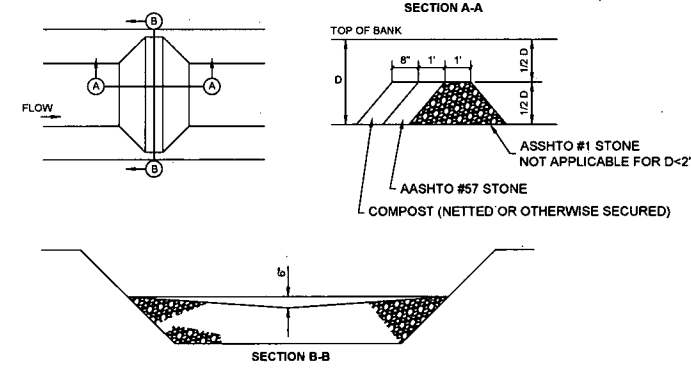
- INSTALLATION**
- WHEN CLEARING THE LOCATION FOR THE DIVERSION, ONLY CLEAR ENOUGH ROOM FOR CONSTRUCTION AND MAINTENANCE EQUIPMENT ACCESS. DO NOT CLEAR ANY ADDITIONAL AREA UNTIL ALL EROSION CONTROL DEVICES ARE IN PLACE.
 - REMOVE ALL STUMPS, ROOTS AND OTHER DEBRIS AND DISPOSE OF THEM PROPERLY.
 - INSTALL DIVERSION AND COMPACT AS SHOWN IN DETAIL. INSURE POSITIVE DRAINAGE DURING CONSTRUCTION OF BERM.
 - SCARIFY, SEED, MULCH AND TACK DISTURBED AREAS IMMEDIATELY UPON COMPLETION OF BERM.
 - INSTALL EROSION CONTROL MAT N.A.G. C125BN PER MANUFACTURER'S RECOMMENDATIONS AND KEY INTO SIDES OF CHANNEL TO PREVENT WATER FROM UNDERMINING OR DAMAGING CHANNEL LINER.

MAINTENANCE

INSPECT TEMPORARY DIVERSIONS ONCE A WEEK AND AFTER EVERY RAINFALL. IMMEDIATELY REMOVE SEDIMENT FROM THE FLOW AREA AND REPAIR THE DIVERSION RIDGE. CAREFULLY CHECK OUTLETS AND MAKE TIMELY REPAIRS AS NEEDED. WHEN THE AREA PROTECTED IS PERMANENTLY STABILIZED, REMOVE THE RIDGE AND THE CHANNEL TO BLEND WITH THE NATURAL GROUND LEVEL AND APPROPRIATELY STABILIZE IT.



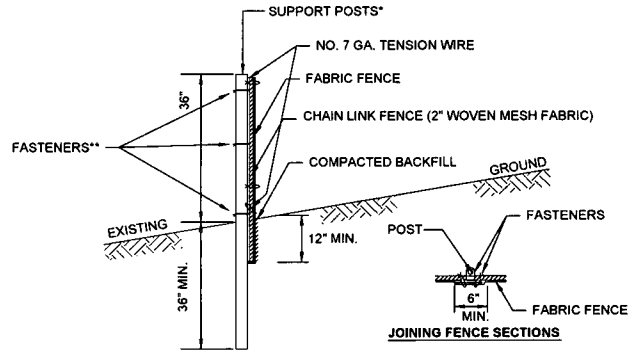
2 TEMPORARY DIVERSION BERM
16 NTS



DESIGN CRITERIA

- CHECK DAMS SHALL BE UTILIZED IN SMALL OPEN CHANNELS THAT DRAIN 5 ACRES OR LESS.
- CHECK DAMS SHALL NOT BE UTILIZED IN CHANNELS OF LESS THAN 2 FEET TOTAL DEPTH.
- THE DRAINAGE AREA OF THE DITCH OR SWALE BEING PROTECTED SHALL NOT EXCEED 2 ACRES WHEN 2 TO 4 INCH AGGREGATE IS USED ALONE, AND SHALL NOT EXCEED 5 ACRES WHEN A COMBINATION OF 4 TO 8 INCH AGGREGATE (ADDED FOR STABILITY) AND THE SMALLER AGGREGATE IS USED.
- THE CENTER OF THE CHECK DAM MUST BE AT LEAST 6 INCHES LOWER THAN THE OUTER EDGES. THIS IS THE SINGLE MOST IMPORTANT ASPECT IN THE INSTALLATION OF THE ROCK CHECK DAM.
- THE MAXIMUM SPACING BETWEEN THE DAMS SHOULD BE SUCH THAT THE TOE OF THE UPSTREAM DAM IS AT THE SAME ELEVATION AS THE TOP OF THE DOWNSTREAM DAM. THE MAXIMUM DISTANCE BETWEEN ROCK CHECK DAMS IS 300 FEET.

4 ROCK CHECK DAMS
16 NTS



* POSTS SPACED @ 10' MAX. USE 2 1/2" DIA. GALVANIZED OR ALUMINUM POSTS OR 4" x 4" POST.

** CHAIN LINK FENCE SHALL BE FASTENED SECURELY TO THE FENCE POST WITH WIRE TIES OR STAPLES. GEOTEXTILE FABRIC SHALL BE FASTENED SECURELY TO THE CHAIN LINK FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP AND MID-SECTIONS.

NO. 7 GA. TENSION WIRE INSTALLED HORIZONTALLY AT TOP AND BOTTOM OF CHAIN-LINK FENCE.

FILTER FABRIC FENCE SHOULD BE PLACED AS CLOSE TO THE CONTOUR AS POSSIBLE. NO SECTION OF SILT FENCE SHOULD EXCEED A GRADE OF 5 PERCENT FOR MORE THAN A DISTANCE OF 20 FEET.

THE LENGTH OF SLOPE ABOVE THE FENCE SHALL NOT EXCEED 400 FEET IN STEEP TERRAIN. IN FLATTER AREAS THE LENGTH CAN BE EXTENDED WITH THE APPROVAL OF THE ENGINEER.

SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE ABOVE GROUND HEIGHT OF THE FENCE.

3 SUPER SILT FENCE DETAIL
16 NTS

1 STONE CONSTRUCTION ENTRANCE
16 NTS

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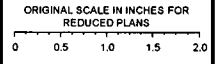
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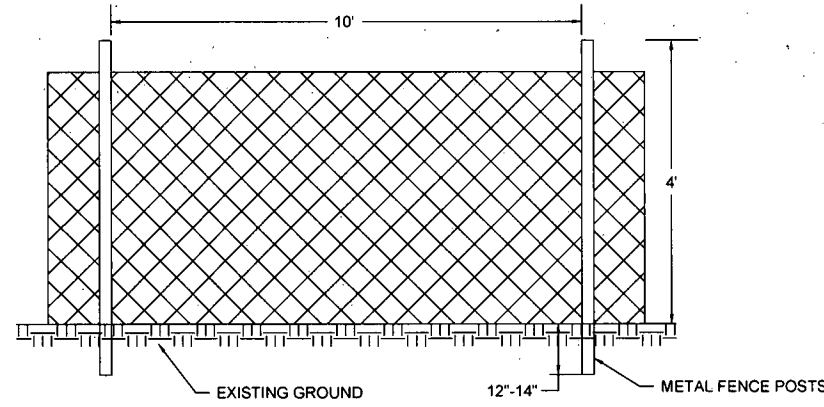
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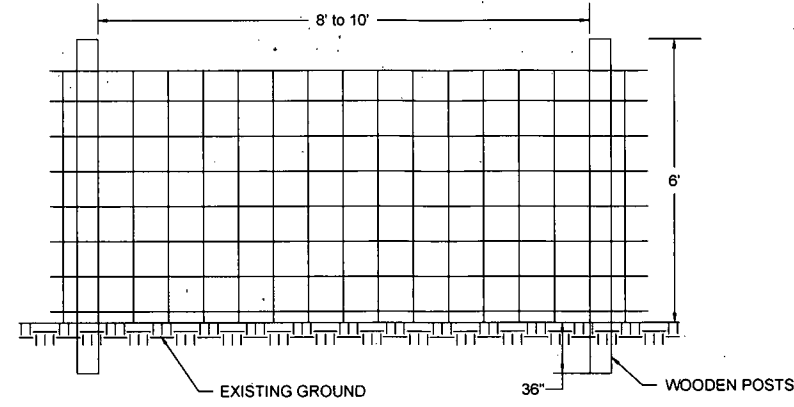
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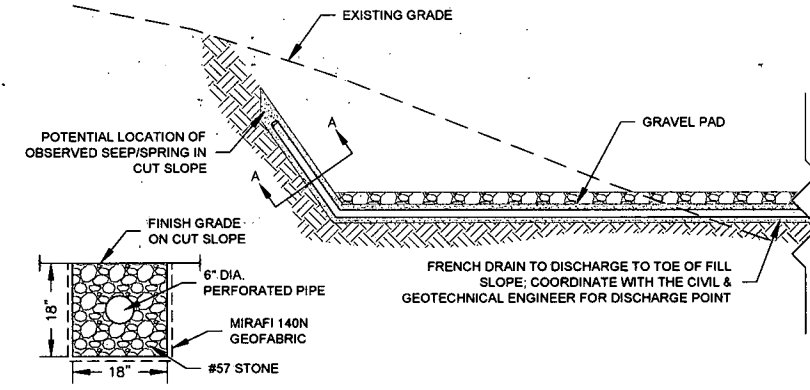
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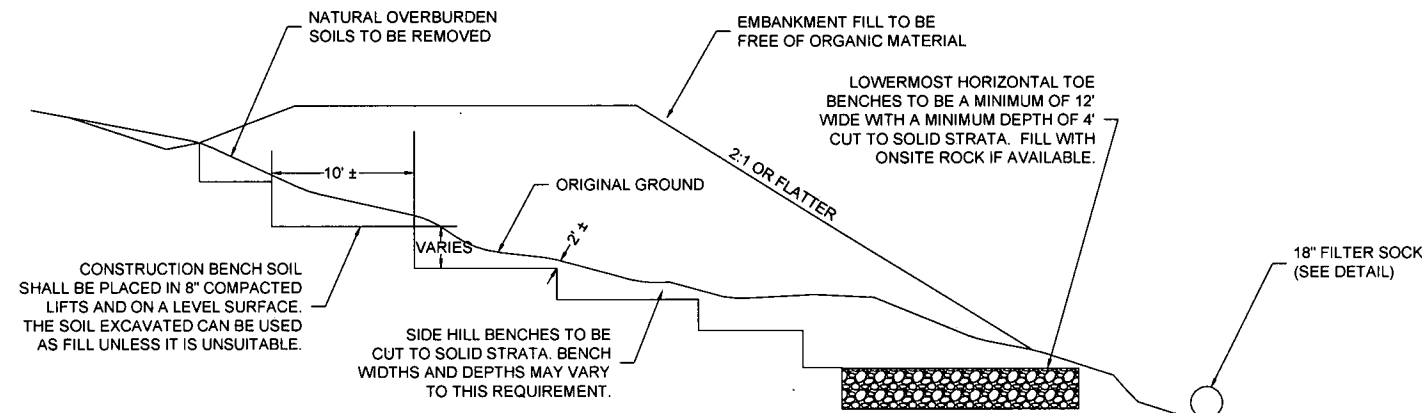
1 TYPICAL CONSTRUCTION FENCE DETAIL
17 NTS



2 TYPICAL WOVEN WIRE FENCE DETAIL
17 NTS



3 SEEP/SPRING FRENCH DRAIN DETAIL
17 NTS



4 EMBANKMENT FILL BENCH DETAIL (TYP.)
17 NTS

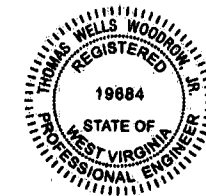
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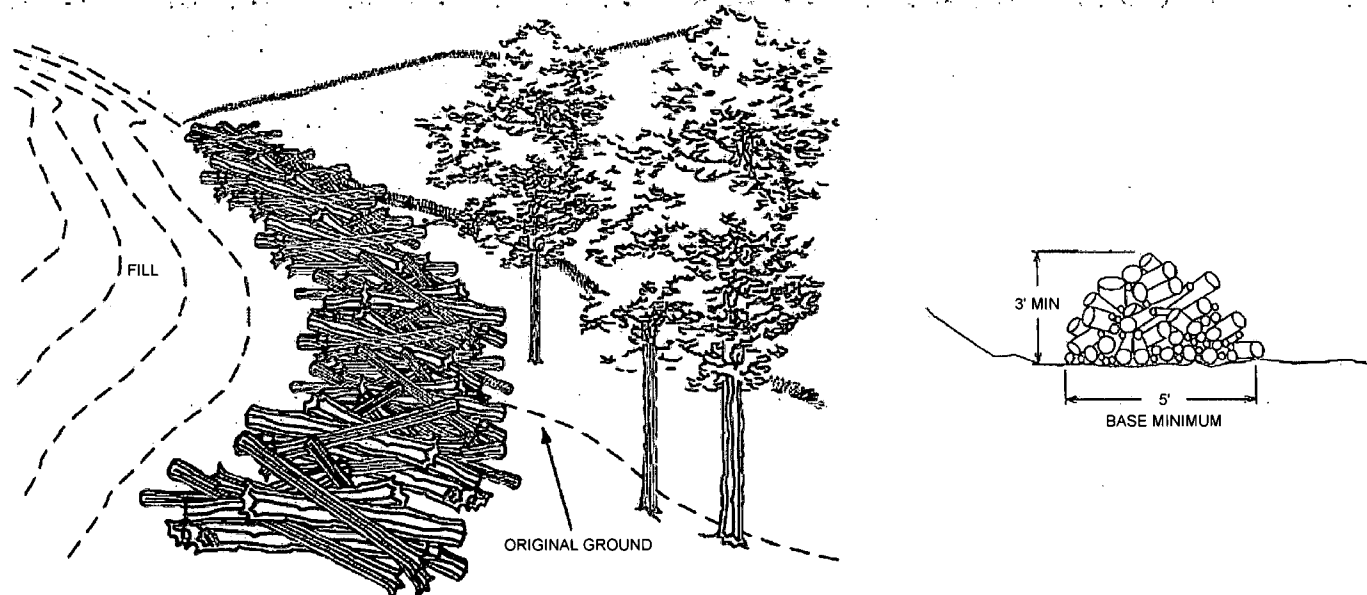
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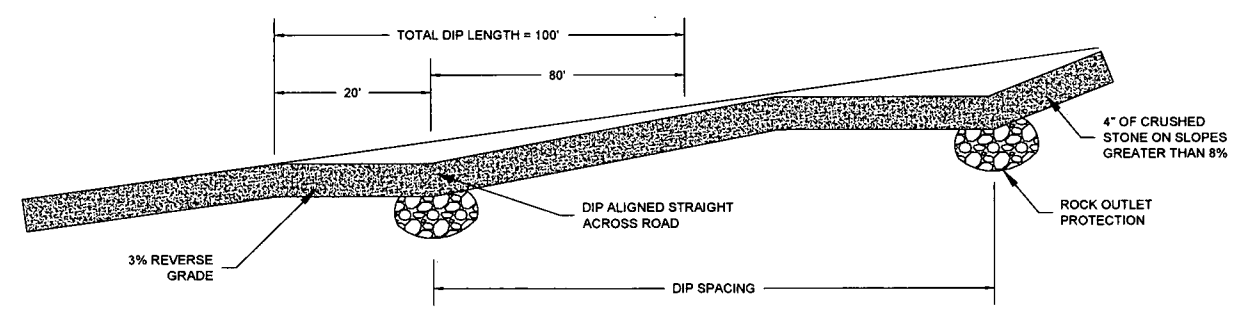
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CONSTRUCTION
17
17 of 21 sheets



SEAL



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NTS
BRUSH PILE SEDIMENT BARRIER



- DESIGN CRITERIA**
1. MAXIMUM ROAD GRADE ON WHICH DIPS CAN BE CONSTRUCTED IS 10%
 2. A 3% REVERSE GRADE SHOULD BE CONSTRUCTED IN THE EXISTING ROADBEND, BY CUTTING UPGRADE OF THE DIP LOCATION.
 3. BROADBASED DIP SHOULD BE ARMORED WITH STONE TO WITHSTAND EXPECTED TRAFFIC.
 4. DRAINAGE OUTLET PROTECTION SHALL BE PROVIDED WITH APPROPRIATE SEDIMENT BARRIER STRUCTURES.

SPACING OF CROSS DRAINS

ROAD GRADE (%)	DISTANCE BETWEEN DRAINS (FT)
2	300
3	235
4	200
5	180
6	165
7	155
8	150
9	145
10	140

2
18
NTS
BROAD-BASED DIP DETAIL

ISSUED FOR CONSTRUCTION

SEAL

NO.	REVISION	BY	DATE

KLEINFELDER
Bright People. Right Solutions.
230 EXECUTIVE DRIVE, SUITE 122
CRANBERRY TOWNSHIP, PA 16066
PH. 724-772-7072 FAX. 724-772-7079
www.kleinfelder.com

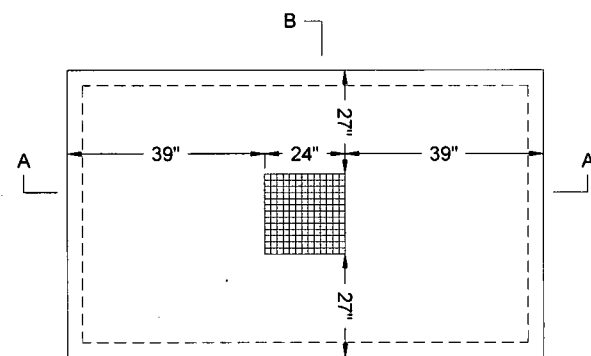
ACAD FILE: DETAILS.dwg
PROJ. NO. 128202

ROBERT WILLIAMS DRILL PAD DETAILS

ANTERO RESOURCES APPALACHIAN CORPORATION
ROBERT WILLIAMS DRILL PAD
CENTRAL DISTRICT
DODDRIDGE COUNTY WEST VIRGINIA

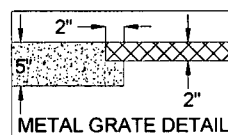
DESIGNED BY: RAP
MODIFIED BY: RAP
CHECKED BY: JDF
DATE: 05-16-2013
SCALE:
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS
0 0.5 1.0 1.5 2.0
CONSTRUCTION
18
18 of 21 sheets

ATTACHED IMAGES: I:\projects\CHESAPEAKE\8836\CA003.PK
ATTACHED XREFS: XREF ANTERO 11-17 TITLE BLOCK
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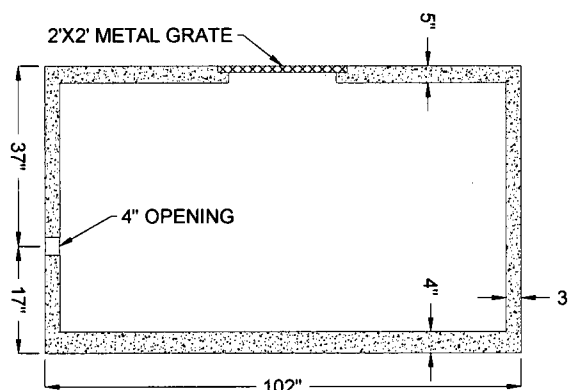


PLAN VIEW: LOW PROFILE TANK CATCH BASIN

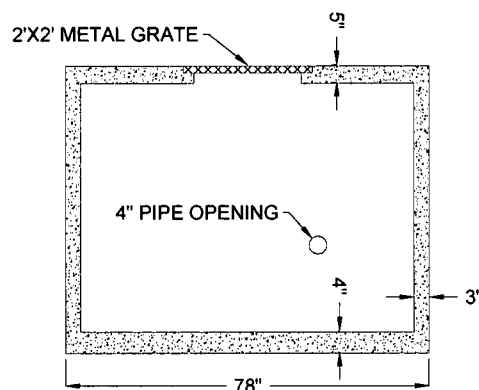
RITCHIE CONCRETE
LOW PROFILE TANK
CATCH BASIN
1,000 GALLON
CAPACITY



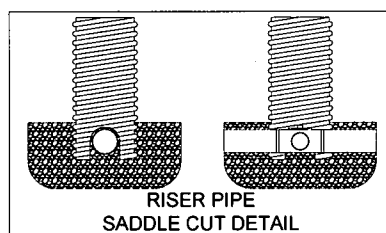
METAL GRATE DETAIL



SECTION A-A: LOW PROFILE TANK CATCH BASIN

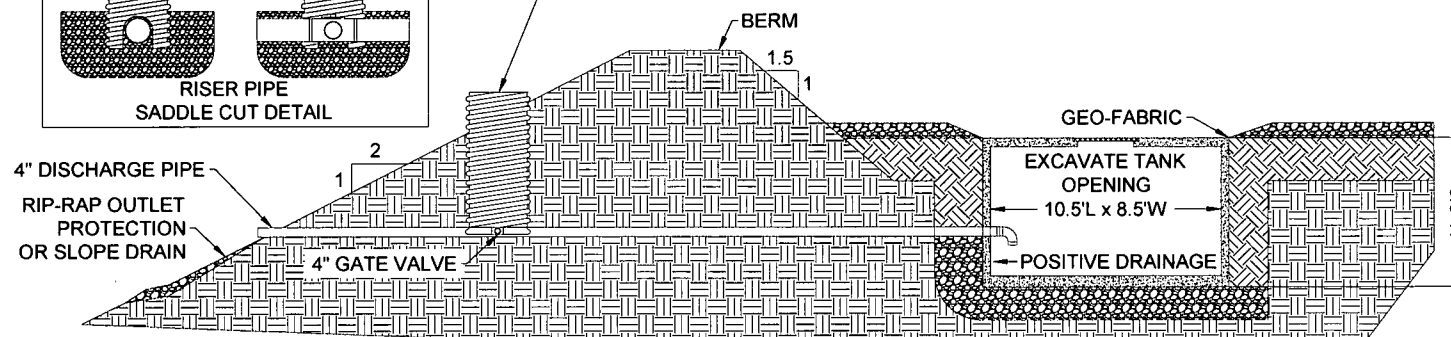


SECTION B-B: LOW PROFILE TANK CATCH BASIN



RISER PIPE
SADDLE CUT DETAIL

INSTALL HDPE PIPE
RISER FOR VALVE ACCESS
(MIN. 8" DIA. PIPE)



1
19
PAD DEWATERING SYSTEM (SUMP SYSTEM)
NTS

INSTALLATION SEQUENCE

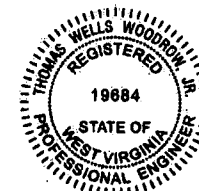
- CONSTRUCT WELL PAD TO SUBGRADE.
- EXCAVATE SUMP HOLE 1' LARGER THAN THE LENGTH, WIDTH, AND HEIGHT OF TANK.
- USE CRUSHER RUN STONE TO PREPARE THE BOTTOM OF THE EXCAVATION. MAKE SURE TO LEVEL THE TANK FROM SIDE TO SIDE AND HAVE POSITIVE FLOW TOWARD THE OUTLET (APPROXIMATELY 1-2").
- MAKE CERTAIN THE OUTLET ON THE TANK LINES UP WITH THE DISCHARGE DITCH FOR INSTALLING THE DISCHARGE PIPE AND VALVE.
- SET THE TANK IN THE EXCAVATION AND LEVEL.
- INSTALL PIPE SECTION, (APPROXIMATELY 1-2' PIECE) INTO THE OUTLET FITTING ON THE TANK. USE HYDRAULIC CEMENT AROUND THE CONNECTION TO ENSURE POSITIVE SEAL.
- INSTALL 4" VALVE ONTO SHORT SECTION OF THE PIPE WITH GLUE (MAKE CERTAIN TO CLEAN AND PRIME BOTH VALVE AND PIPE BEFORE GLUING CONNECTION).
- INSTALL SECTIONS OF PIPE ONTO THE OUTLET SIDE OF THE VALVE UNTIL THE PIPE EXTENDS THROUGH THE BERM AND SLOPE APPROXIMATELY 1'. LEAVE THE END OF THE PIPE EXPOSED (MAKE CERTAIN TO CLEAN AND PRIME THE PIPE AND JOINTS BEFORE GLUING THE CONNECTIONS).
- MAKE CERTAIN THAT THE PIPE IS SUPPORTED AND MAINTAINS POSITIVE FLOW AWAY FROM THE VALVE. USE EXCAVATED SOIL FROM THE DISCHARGE DITCH TO SUPPORT THE PIPE.
- INSTALL THE RISER FOR THE VALVE. USE A SECTION OF HDPE PIPE WITH A LARGER DIAMETER THAN THE VALVE (MINIMUM 8" DIAMETER HDPE PIPE). CUT A "SADDLE" ON THE BOTTOM OF THE RISER PIPE SO THAT THE RISER PIPE WILL REST ON THE DISCHARGE PIPE, SURROUNDING THE VALVE AND KEEPING DIRT AWAY FROM THE OPERATION OF THE VALVE.
- FILL AROUND THE VALVE WITH CRUSHER RUN STONE AND 1' ON THE RISER PIPE TO KEEP SOIL OUT.
- STABILIZE THE RISER PIPE SO THAT IT REMAINS PERPENDICULAR TO THE VALVE (RISER PIPE NEEDS TO BE PERPENDICULAR TO ALLOW SMOOTH OPERATION OF HANDLE AND VALVE). MAKE SURE TO REMOVE THE FACTORY HANDLE ON THE VALVE AND TO FIT "I" HANDLE (ALTERNATE HANDLE) ONTO THE EXPOSED PLUG ON THE TOP OF THE VALVE.
- BEGIN BACKFILLING THE TANK EXCAVATION AND DISCHARGE DITCH, USE THE SOIL EXCAVATED FROM THE TANK HOLE TO BACKFILL THE TANK AND DISCHARGE DITCH. DO NOT BACKFILL WITH ANY LARGE ROCKS AGAINST THE TANK AND BE CERTAIN NOT TO OVER-COMPACT AROUND THE TANK. IMPROPER BACKFILLING AND OVER-COMPACTION AROUND THE TANK WILL LEAD TO THE TANK COLLAPSING. IT IS RECOMMENDED THAT FINER SOILS ARE USED TO BACKFILL AROUND THE TANK AND DISCHARGE PIPE TO REDUCE VOIDS AND EXCESSIVE SETTLING.
- ONCE BACKFILLING IS COMPLETE, THE TOP OF THE TANK SHOULD BE FLUSH WITH THE SUB-GRADE.
- CUT THE RISER PIPE OFF 2' ABOVE SUB-GRADE TO ALLOW FOR THE RISER PIPE TO EXTEND 1' ABOVE THE FINAL GRADE AND KEEP SURFACE WATER FROM ENTERING THE PIPE.
- REPAIR THE PAD BERM AND FILL SLOPE.
- INSTALL RIP-RAP SPILLWAY FROM THE DISCHARGE PIPE OUTLET TO THE BOTTOM OF THE SLOPE. DEPENDING ON SITE CONDITIONS, THE SPILLWAY WILL DISCHARGE THROUGH A LEVEL SPREADER TO VEGETATION OR E&S CONTROLS OR DISCHARGE FROM THE SPILLWAY INTO AN ACCESS ROAD DITCH.
- WITH TANK INSTALLATION COMPLETE, THE WELL PAD CAN THEN BE STONED. WHEN USING GEO-FABRIC (TYPAR), BE SURE TO LAP THE FABRIC OVER THE EDGE OF THE LID ON THE TANK. THIS LAP WILL HELP RUN-OFF TO FLOW INTO THE TANK. TAPER STONE DOWN FROM THE PAD TO THE TANK, SO THERE IS NOT A "LIP" OR TRIP HAZARD ON THE EDGE OF STONE.
- BE SURE NOT TO RUN A SMOOTH DRUM OR SHEEPS-FOOTED ROLLER OVER THE TANK LID OR VIBRATE TOO CLOSE TO THE SIDES OF THE TANK. COMPACTING OR OPERATING HEAVY EQUIPMENT NEAR THE TANK MAY CAUSE THE WALLS ON THE TANK TO FAIL. KEEP TRAFFIC OFF OF THE TANK. IT IS RECOMMENDED THAT BARRIERS BE INSTALLED TO PREVENT TRAFFIC FROM DRIVING OVER OR PARKING ON OR NEAR THE TANK.

OPERATIONAL NOTE:

THE DEWATERING VALVE WILL REMAIN CLOSED DURING DRILLING AND COMPLETION OPERATIONS. ANY WATER CAPTURED DURING THE DRILLING AND COMPLETION OPERATIONS WILL BE TESTED PRIOR TO BEING DISCHARGED OR PUMPED BY A COMMERCIAL VENDOR. AFTER DRILLING AND COMPLETION OPERATIONS ARE COMPLETE, THE VALVE WILL BE OPENED BY A DESIGNATED RESPONSIBLE PERSON ONLY.

**ISSUED FOR
CONSTRUCTION**

DESIGNED BY: RAP
 MODIFIED BY: RAP
 CHECKED BY: JDF
 DATE: 05-16-2013
 SCALE:
 ORIGINAL SCALE IN INCHES FOR REDUCED PLANS
 0 0.5 1.0 1.5 2.0
 CONSTRUCTION
19
 19 of 21 sheets



SEAL

NO.	REVISION	BY	DATE
1			
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DETAILS**
 ANTERO RESOURCES APPALACHIAN CORPORATION
 ROBERT WILLIAMS DRILL PAD
 CENTRAL DISTRICT
 WEST VIRGINIA
 DODDRIDGE COUNTY

ATTACHED IMAGES: images Chesapeake-2013-05-16-1117.dwg
 ATTACHED XREFS: xref Antero 1117.dwg
 10-15-12 REVISED BY: CAL

PLOTTED: 16 May 2013, 4:25pm, RParter

Tensar. NORTH AMERICAN GREEN

Tensar International Corporation
5401 St. Wendel-Cynthiana Road
Poseyville, Indiana 47633
Tel. 800.772.2040
Fax 812.657.0247
www.nsgreen.com

**Material and Performance Specification
S150BN Erosion Control Blanket**

Description		Index Property	Test Method	Typical
<p>The short-term double net erosion control blanket shall be a machine-produced mat of 100% agricultural straw with a functional longevity of up to 12 months. (NOTE: functional longevity may vary depending upon climatic conditions, soil, geographical location, and elevation). The blanket shall be of consistent thickness with the straw evenly distributed over the entire area of the mat. The blanket shall be covered on the top and bottom sides with a 100% biodegradable woven natural fiber netting. The netting shall consist of machine directional strands formed from two intertwined yarns with cross directional strands interwoven through the twisted machine strands (commonly referred to as a Leno weave) to form an approximate 0.50 x 1.0 (1.27 x 2.54 cm) mesh. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers with degradable thread. The blanket shall be manufactured with a colored thread stitched along both outer edges (approximately 2.5 inches [6.35 cm] from the edge) as an overlap guide for adjacent mats.</p> <p>The S150BN shall meet Type 2.D specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.17</p>		Thickness	ASTM D6525	0.31 in (7.87 mm)
		Resiliency	ECTC Guidelines	80.5%
		Water Absorbency	ASTM D1117	381%
		Mass/Unit Area	ASTM 6475	9.29 oz/yd ² (315 g/m ²)
		Swell	ECTC Guidelines	15%
		Smolder Resistance	ECTC Guidelines	Yes
		Stiffness	ASTM D1368	6.23 oz-in
		Light Penetration	ECTC Guidelines	10.1%
		Tensile Strength - MD	ASTM D6818	189.6 lbs/ft (2.81 kN/m)
		Elongation - MD	ASTM D6818	10.4%
Tensile Strength - TD	ASTM D6818	214.8 lbs/ft (3.19 kN/m)		
Elongation - TD	ASTM D6818	6.8%		
Material Content				
Matrix	100% Straw Fiber	0.5 lbs/yd ² (0.27 kg/m ²)		
Netting	Top - Leno woven 100% biodegradable organic jute	9.3 lb/1000 ft ² (4.5 kg/100 m ²)		
	Bottom - 100% biodegradable organic jute	7.7 lb/1000 ft ² (3.76 kg/100 m ²)		
Thread	degradable			
Standard Roll Sizes				
Width	6.67 ft (2.03 m)	8.0 ft (2.4 m)	15.5 ft (4.72 m)	
Length	108 ft (32.92 m)	112 ft (34.14 m)	90 ft (27.43 m)	
Weight ± 10%	52.22 lbs (23.69 kg)	65.28 lbs (29.61 kg)	101.2 lbs (45.9 kg)	
Area	80 yd ² (66.9 m ²)	100 yd ² (64.8 m ²)	155 yd ² (129.6 m ²)	
	Leno Weave Top Only	Leno Top and Bottom	Leno Top and Bottom	
Bench Scale Testing (NTPEP)				
Test Method	Parameters	Results		
ECTC 2 Rainfall	50 mm (2 in)/hr-30 min	SLR** = 16.19		
	100mm (4 in)/hr-30 min	SLR** = 15.74		
ECTC 3 Shear Res.	150 mm (6 in)/hr-30 min	SLR** = 15.31		
	Shear at 0.50 inch soil loss	2.1lbs/ft ²		
ECTC 4 Germination	Top Soil, Fescue, 21 day incubation	239% improvement of biomass		
** Bench Scale tests should not be used for design purposes				
** Soil Loss Ratio = Soil Loss Bare Soil/Soil Loss with RECP				
Maximum Permissible Shear Stress				
Unvegetated Shear Stress	1.85 lbs/ft ² (88 Pa)			
Unvegetated Velocity	6.00 ft/s (1.83 m/s)			
Slope Design Data: C Factors				
Slope Length (L)	Slope Gradient (S)			
	≤ 3:1	3:1 - 2:1	≥ 2:1	
≤ 20 ft (6 m)	0.00014	0.039	NA	
20-50 ft	0.01	0.070	NA	
≥ 50 ft (15.2 m)	0.02	0.100	NA	
Roughness Coefficients - Unveg.				
Flow Depth	Manning's n			
≤ 0.50 ft (0.15 m)	0.055			
0.50 - 2.0 ft	0.055 - 0.021			
≥ 2.0 ft (0.60 m)	0.021			
Proud Participant of:				

Tensar International Corporation warrants that at the time of delivery the product furnished hereunder shall conform to the specification stated herein. Any other warranty including merchantability and fitness for a particular purpose, are hereby excluded. If the product does not meet specifications on this page and Tensar is notified prior to installation, Tensar will replace the product at no cost to the customer. This product specification supersedes all prior specifications for the product described above and is not applicable to any products shipped prior to January 1, 2011.

1 NORTH AMERICAN GREEN S150BN EROSION CONTROL BLANKET (OR EQUIVALENT)
20 NTS

Tensar. NORTH AMERICAN GREEN

Tensar International Corporation
5401 St. Wendel-Cynthiana Road
Poseyville, Indiana 47633
Tel. 800.772.2040
Fax 812.657.0247
www.nsgreen.com

**Material and Performance Specification
SC250 Turf Reinforcement Mat**

Description		Index Property	Test Method	Typical
<p>The composite turf reinforcement mat (C-TRM) shall be a machine-produced mat of 70% straw and 30% coconut fiber matrix incorporated into permanent three-dimensional turf reinforcement matting. The matrix shall be evenly distributed across the entire width of the matting and stitch bonded between a heavy duty UV stabilized nettings with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings, an ultra heavy UV stabilized, dramatically corrugated (crimped) intermediate netting with 0.5 x 0.5 inch (1.27 x 1.27 cm) openings, and covered by an heavy duty UV stabilized nettings with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings. The middle corrugated netting shall form prominent closely spaced ridges across the entire width of the mat. The three nettings shall be stitched together on 1.50 inch (3.81 cm) centers with UV stabilized polypropylene thread to form permanent three-dimensional turf reinforcement matting. All mats shall be manufactured with a colored thread stitched along both outer edges as an overlap guide for adjacent mats.</p> <p>The SC250 shall meet Type SA, B, and C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.18</p>		Thickness	ASTM D6525	0.72 in (18.3 mm)
		Resiliency	ASTM 6524	95.2%
		Density	ASTM D792	0.53 oz/in ³
		Mass/Unit Area	ASTM 6566	17.88oz/yd ² (606 g/m ²)
		UV Stability	ASTM D4355 /1000 hr	100%
		Porosity	ECTC Guidelines	99%
		Stiffness	ASTM D1368	222.65 oz-in
		Light Penetration	ECTC Guidelines	8.9%
		Tensile Strength - MD	ASTM D6818	620 lbs/ft (9.05 kN/m)
		Elongation - MD	ASTM D6818	35%
Tensile Strength - TD	ASTM D6818	737 lbs/ft (10.75 kN/m)		
Elongation - TD	ASTM D6818	16%		
Material Content				
Matrix	70% Straw Fiber	0.35 lbs/yd ² (0.27 kg/m ²)		
	30% Coconut Fiber	0.15 lbs/yd ² (0.09 kg/m ²)		
Netting	Top and Bottom, UV stabilized Polypropylene	5 lb/1000 ft ² (2.44 kg/100 m ²)		
	Middle, Corrugated UV stabilized Polypropylene	24 lb/1000 ft ² (11.7 kg/100m ²)		
Thread	Polypropylene, UV stable			
Standard Roll Sizes				
Width	6.5 ft (2.0 m)			
Length	55.5 ft (16.9 m)			
Weight ± 10%	34 lbs (15.42 kg)			
Area	40 yd ² (33.4 m ²)			
Maximum Permissible Shear Stress				
Phase 1 Unvegetated	Short Duration	3.0 lbs/ft ² (144 Pa)	Long Duration	1.5 lbs/ft ² (120Pa)
Phase 2 Partially Veg.	8.0 lbs/ft ² (383 Pa)	8.0 lbs/ft ² (383 Pa)	8.0 lbs/ft ² (383 Pa)	8.0 lbs/ft ² (383 Pa)
Phase 3 Fully Veg.	10.0 lbs/ft ² (480 Pa)	10.0 lbs/ft ² (480 Pa)	10.0 lbs/ft ² (480 Pa)	10.0 lbs/ft ² (480 Pa)
Unvegetated Velocity	9.5 ft/s (2.9 m/s)			
Vegetated Velocity	15 ft/s (4.6 m/s)			
Slope Design Data: C Factors				
Slope Length (L)	Slope Gradient (S)			
	≤ 3:1	3:1 - 2:1	≥ 2:1	
≤ 20 ft (6 m)	0.0010	0.0209	0.0507	
20-50 ft	0.0081	0.0266	0.0574	
≥ 50 ft (15.2 m)	0.0455	0.0555	0.081	
Roughness Coefficients - Unveg.				
Flow Depth	Manning's n			
≤ 0.50 ft (0.15 m)	0.040			
0.50 - 2.0 ft	0.040-0.012			
≥ 2.0 ft (0.60 m)	0.011			
Proud Participant of:				
Bench Scale Testing (NTPEP)				
Test Method	Parameters	Results		
ECTC 2 Rainfall	50 mm (2 in)/hr-30 min	SLR** = 18.25		
	100mm (4 in)/hr-30 min	SLR** = 20.97		
ECTC 3 Shear Res.	150 mm (6 in)/hr-30 min	SLR** = 22.74		
	Shear at 0.50 inch soil loss	7.7 lbs/ft ²		
ECTC 4 Germination	Top Soil, Fescue, 21 day incubation	523% improvement of biomass		
** Bench Scale tests should not be used for design purposes				
** Soil Loss Ratio = Soil Loss Bare Soil/Soil Loss with RECP				

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2 NORTH AMERICAN GREEN SC250 TURN REINFORCEMENT MATTING (OR EQUIVALENT)
20 NTS

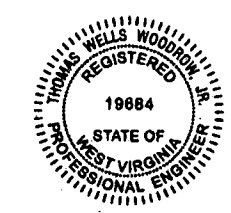
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CENTRAL DISTRICT
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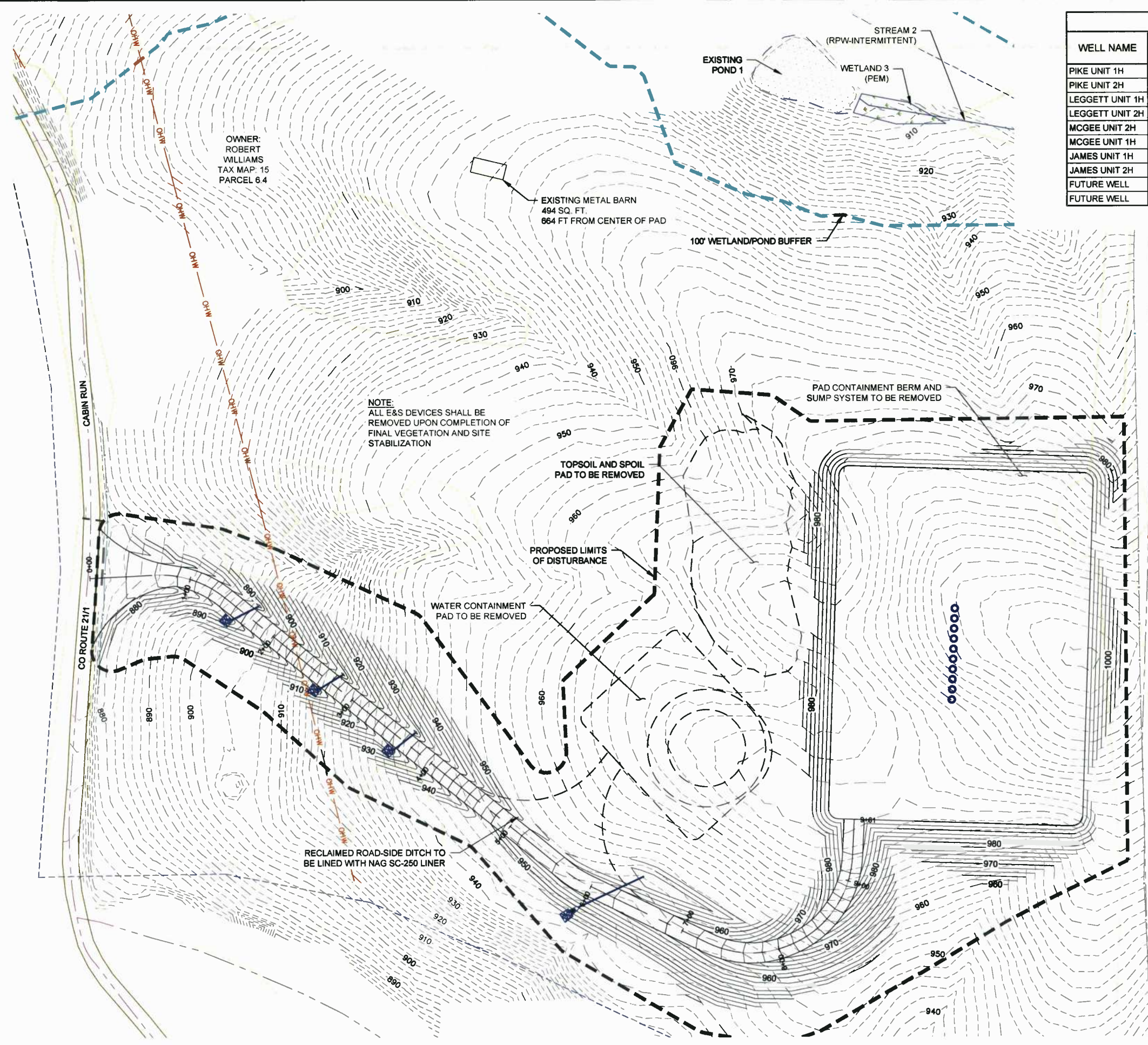
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0 0.5 1.0 1.5 2.0
CONSTRUCTION
20
20 of 21 sheets



ATTACHED IMAGES: Images - CHEAPEAKE-2013-04-09-03.jpg
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 10-15-12 REVISED BY: CAL
 PLOTTED: 16 May 2013, 4:25pm, RPainter

ATTACHED IMAGES: XREF: ANTERO 11117 TITLE BLOCK, XREF: X:Robert Williams, Base, XREF: X:Robert Williams, Aerial
 ATTACHED XREFS: XREF: ANTERO 11117 TITLE BLOCK, XREF: X:Robert Williams, Civil, XREF: X:Robert Williams, Aerial
 CAD FILE: W:\CON\ANTERO\Projects\Robert Williams\Design\Civil\FINAL SITE PLANS_LAYOUT 21 RECLAMATION PLAN



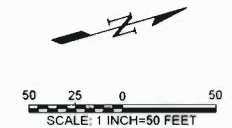
OWNER:
 ROBERT
 WILLIAMS
 TAX MAP: 15
 PARCEL 6.4

NOTE:
 ALL E&S DEVICES SHALL BE
 REMOVED UPON COMPLETION OF
 FINAL VEGETATION AND SITE
 STABILIZATION

WELL HEAD LAYOUT				
WELL NAME	NAD 83 (WW NORTH ZONE)			
	NORTHING	EASTING	LATITUDE	LONGITUDE
PIKE UNIT 1H	271609.24	1582513.33	39° 14' 15.63"	-80° 51' 46.05"
PIKE UNIT 2H	271607.06	1582523.53	39° 14' 15.61"	-80° 51' 45.92"
LEGGETT UNIT 1H	271604.89	1582532.94	39° 14' 15.59"	-80° 51' 45.80"
LEGGETT UNIT 2H	271602.72	1582542.35	39° 14' 15.57"	-80° 51' 45.68"
MC GEE UNIT 2H	271600.55	1582552.55	39° 14' 15.55"	-80° 51' 45.55"
MC GEE UNIT 1H	271598.38	1582561.96	39° 14' 15.53"	-80° 51' 45.43"
JAMES UNIT 1H	271596.20	1582572.15	39° 14' 15.51"	-80° 51' 45.30"
JAMES UNIT 2H	271595.05	1582581.58	39° 14' 15.50"	-80° 51' 45.18"
FUTURE WELL	271592.87	1582591.77	39° 14' 15.48"	-80° 51' 45.05"
FUTURE WELL	271590.70	1582601.18	39° 14' 15.46"	-80° 51' 44.93"

- LEGEND**
- 1360 --- EXISTING INDEX CONTOUR (10')
 - EXISTING INTERMEDIATE CONTOUR (2')
 - 1360 --- PROPOSED MAJOR CONTOUR
 - PROPOSED MINOR CONTOUR
 - EXISTING ROAD
 - EXISTING TREE LINE
 - EXISTING PROPERTY LINE
 - EXISTING TRAIL
 - EXISTING FENCE
 - OHW --- OHW --- EXISTING OVERHEAD POWER LINE
 - PROPOSED CONSTRUCTION FENCE
 - EDGE OF PROPOSED GRAVEL EQUIPMENT PAD AND ACCESS ROAD
 - LIMITS OF DISTURBANCE
 - 100' WETLAND/POND BUFFER
 - STREAM/WETLAND AREA OF INTEREST

- NOTES:**
- MUNICIPAL BOUNDARY LINES SHOWN ARE APPROXIMATE IN LOCATION, BASED ON MAPS BY OTHERS, AND MAY NOT CORRESPOND TO THE LEGAL LOCATION.
 - UTILITY LOCATIONS SHOWN ARE APPROXIMATE AND NOT GUARANTEED TO BE COMPLETE.
 - NO PERMANENT PUBLIC SANITARY SEWER NOR POTABLE WATER IS PROPOSED AT THE SITE.
 - NO BUFFER AREAS, PLANTINGS, OR LANDSCAPING ARE PROPOSED AT THE SITE. NO PERMANENT OPEN SPACE OR PUBLIC USE AREAS ARE PROPOSED AT THE SITE.
 - FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE (FIRM) PANEL 54017C0200C INDICATES NO SPECIAL FLOOD HAZARD AREAS WITHIN THE PROJECT AREA.
 - ALL PROPOSED SLOPES ARE 2H:1V EXCEPT WHERE NOTED.
 - FILL OVER 50 VERTICAL FEET ON SPOIL PAD NEEDS A 10' BENCH.
 - ALL FILL SLOPES SHALL BE TOE KEYED PER THE DETAIL SHOWN ON SHEET 17.



**ISSUED FOR
 CONSTRUCTION**



SEAL

NO.	REVISION	BY	DATE
ROBERT WILLIAMS DRILL PAD RECLAMATION PLAN			
ANTERO RESOURCES APPALACHIAN CORPORATION ROBERT WILLIAMS DRILL PAD CENTRAL DISTRICT DODDRIDGE COUNTY WEST VIRGINIA			
DESIGNED BY: RAP MODIFIED BY: RAP CHECKED BY: JDF DATE: 05-16-2013 SCALE: ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 0.5 1.0 1.5 2.0 CONSTRUCTION <div style="text-align: center; font-size: 24pt; font-weight: bold;">21</div> 21 of 21 sheets			

PLOTTED: 16 May 2013, 4:26pm, RParter