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April 20, 2016

Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

Re: Equitrans, L.P.
Docket No. CP16-13-000
Equitrans Expansion Project
Responses to Data Requests issued March 31, 2016

Dear Ms. Bose:

On March 31, 2016, the Office of Energy Projects ("OEP") issued data requests to Equitrans, LP ("Equitrans") with respect to Equitrans' certificate application in Docket No. CP16-13-000. Equitrans submits herewith its responses to the March 31 data request issued. Also attached is the verification of one individual who has not previously submitted such verification; verifications for the other respondents have previously been provided. Please be advised that in addition to updating and clarifying the specific tables and figures as requested by OEP in the data requests, Equitrans has also updated certain other material in order to maintain consistency of the relevant data in those other tables and figures (Attachment General-9).

Equitrans notes that certain of the responses include attachments that contain either Critical Energy Infrastructure Information ("CEII") or specific landowner information. The attachment that includes CEII is labeled "CONTAINS CRITICAL ENERGY INFRASTRUCTURE INFORMATION – DO NOT RELEASE." The attachment that contains specific landowner information is being submitted as privileged pursuant to the Commission's regulations and is marked "PRIVILEGED AND CONFIDENTIAL – DO NOT RELEASE". Pursuant to Section 388.112 of the Regulations, Equitrans requests privileged treatment of the files containing the information and further requests that all of these files be restricted from public access.

If you have any questions about the data responses or Equitrans' request for confidential treatment, please do not hesitate to contact me at (412) 395-5540 or pdiehl@eqt.com.

Respectfully submitted,

Equitrans, L.P.

A handwritten signature in dark ink, appearing to read "Paul W. Diehl", is positioned above the printed name.

Paul W. Diehl
Counsel-Midstream

Enclosures

cc: Paul Friedman – OEP (w/enclosures)
Lavinia DiSanto - Cardno, Inc. (w/enclosures)
Doug Mooneyhan – Cardno, Inc. (w/enclosures)
Service list (w/o enclosures)

VERIFICATION

Pursuant to Rule 2005 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission ("Commission"), 18 C.F.R. § 385.2005, Doug Mace, P.E., being duly sworn, upon his oath says that he is an engineer; that he has read and is familiar with the foregoing responses to the Commission's March 31, 2016 data request in Docket No. CP16-13-000; that the contents of the responses are true and correct to the best of his knowledge, information and belief; and that he has full power and authority to prepare the responses and execute this verification.

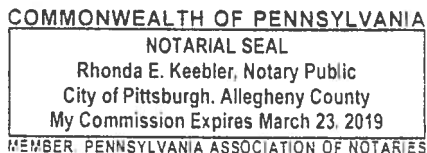


Doug Mace, P.E.
Principal Engineer

Subscribed and sworn before me this 20th day of April 2016.



Notary Public



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Federal Energy Regulatory Commission

General

1. Several questions below request changes to alignment sheets and access road maps. File a complete set of the alignment sheets and access road maps, rather than only those sheets/maps which have been revised. Denote which alignment sheets/access road maps have been revised.

Response:

Attachment General-1 consists of a complete set of alignment sheets and access road maps for the Project. All alignment sheets/access road maps have been revised except the following:

- EEP-ADAR-02 (Sheet 2 of 3)
- PA-GRPA-H316-02 (Sheet 2 of 4)
- PA-ALPA-H318-01 (Sheet 1 of 6)
- PA-ALPA-H318-02 (Sheet 2 of 6)

Respondent: Jeremy Watts
Position: Engineer III, EQT Corporation
Phone Number: 412-553-5769
Date: April 20, 2016

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General

2. Our review of Equitrans' alignment sheets identified several examples of project modifications to the FERC staff's Upland Erosion Control, Revegetation, and Maintenance Plan (Plan) and Wetland and Waterbody Construction and Mitigation Procedures (Procedures) that were not identified by Equitrans. For example, the alignment sheets depict at least two wetland crossings with a construction right-of-way larger than 75 feet (W-BB3 at MP 3.8 of H-318 and W- Z3B at MP 0.04 of H-319). Therefore, reassess the width of the construction right-of-way in uplands and wetlands, and provide a table of all proposed modifications to the FERC's Plan and Procedures. The table should include Plan and Procedure section references, a description of the proposed modification, and justification where applicable.

Response:

Table 1.4-1R is included as Attachment General-2. Table 1.4-1R identifies ATWS located within 50 feet of waterbodies and wetlands and therefore require a modification from the FERC Plan and Procedures. The table describes the proposed modification and a justification for that modification.

Several wetlands and waterbodies were removed from Table 1.4-1R because they were consistent with the exemptions allowed in the FERC procedures – V.B.2.b and VI.B.1.b. Please see the features that were removed in the table below.

Project Feature	Milepost	County	State	ATWS	ATWS Use	ATWS Length x Width a/	Wetland or Waterbody ID	Offset
								(feet)
H-316	0.82	Greene	Pennsylvania	H316 ATWS 03d	Construction Entrance	113' x 65'	W-AA4	35
H-318	2	Allegheny	Pennsylvania	H318 ATWS 04b	Additional Workspace	Irregular Shape	W-BB7	0
H-318	4.25	Washington	Pennsylvania	H318 ATWS 08	Temporary Storage Area	Irregular Shape	W-BB13	3
H-318	N/A	Washington	Pennsylvania	H318 ATWS 09	Temporary Storage Area	264' x 205'	W-BB5	0
H-318	N/A	Washington	Pennsylvania	H318 ATWS 10	Temporary Storage Area	514' x 219'	W-BB4	10
H-316	0.8	Greene	Pennsylvania	H316 ATWS 03d	Construction Entrance	113' x 66'	S-AA8	43
H-316	2.8-3.0	Greene	Pennsylvania	H316 ATWS 07	H-316 HDD Entrance Location/H-302 Hot Tap Location	Irregular Shape	S-AA16	10
Mobley	N/A	Wetzel	West Virginia	Mobley ATWS 01	Additional Workspace	Irregular Shape	S-J63	0

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Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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General

3. Provide a table listing the status of environmental surveys, by survey type (i.e., botanical, wetlands, etc.), project component, county, and state (both miles completed and percent complete).

Response:

All environmental surveys for all Project components in both WV and PA have been completed with the exception of the Rare Plant Surveys. A summary of the environmental surveys is tabulated below.

Summary of Environmental Surveys Completed to Date

Survey Activity	Project Component	Percent Completion (%)
Wetland and Waterbody Delineation	All Project features	100
Cultural Resources	All Project features	100
Summer Bat Survey	All Project features	100
Searches for Underground (Winter) Bat Habitat	All Project features	100
Assessment of Summer Bat Habitat (Roost Trees)	All Project features	100
Freshwater Mussels Survey	Tenmile Creek	100
Survey for Rare Plants	All PA Project features	33%

The large-project PNDI identified six species of plants for which DCNR is requesting surveys. Surveys will be completed in three separate outings, one in April, one in late May, and one in August. The table below identifies those species and their optimal survey time.

Plant species for which surveys have been requested on the Equitrans Expansion Project in Allegheny, Washington, and Greene counties, Pennsylvania

Common Name	Scientific Name	Optimal Survey Time	Project Portion	
			H-318	H-316/ H158-M80
Blue False-indigo	<i>Baptisia australis</i>	May to June	X	
White Trout-lily	<i>Erythronium albidum</i>	April to May	X	X
Purple Rocket	<i>Isodanthis pinnatifidus</i>	May – June	X	
Rock Skullcap	<i>Scutellaria saxatilis</i>	July – August	X	X
Snow Trillium	<i>Trillium nivale</i>	March – April	X	X
Crane-fly Orchid	<i>Tipularia discolor</i>	Spring, Fall, Winter		X

The first round of rare plant surveys commenced the week of April 4, 2016 and concluded on April 9, 2016.

Respondent: Stephanie Frazier

Position: Supervisor Permitting – Environmental, EQT Corporation

Phone Number: 412-553-5798

Date: April 20, 2016

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4. Provide a table listing all access roads which would require culverts and/or fill material. Include the waterbody/wetland ID, waterbody name (if applicable), crossing length (feet), access road ID, MP, and proposed improvement. Revise the detailed access road aerial maps to depict all improvements.

Response:

There are no new access roads associated with the Project; therefore, no new culverts and/or fill material is required. The Project will cross roads with existing culverts; however, since no enhancements to existing culverts have been proposed no permits are required for the existing crossings.

Respondent: Stephanie Frazier

Position: Supervisor Permitting – Environmental, EQT Corporation

Phone Number: 412-553-5798

Date: April 20, 2016

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5. File a public version of Equitrans' Spill Prevention, Control, and Countermeasures Plan.

Response:

A public version of Equitrans' Spill Prevention, Control, and Countermeasures Plan is included as Attachment General-5.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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General

6. Attachment General-2a (pipe storage and contractor yards) does not include H318-ATWS-09 and H318-ATWS-10 which are labeled as “ancillary site” on the alignment sheets and appear to be contractor yards. Revise the table and the alignment sheets as appropriate. In addition, yards for the H-305 and H319 pipelines are missing. Also, Table 1.3-1 includes 7.67 acres of “pipe storage yards (Pratt Compressor Station).” This storage yard was not included in the Attachment General-2a table. Resolve the apparent discrepancy.

Response:

Attachment General-2a has been updated as Attachment General-6 for this response. There is no designated yard for the H-305 because the contractor constructing the H-158 and M-80 would also construction the H-305 and will utilize the yards indicated on Attachment General-6.

The entire work space of the Pratt Compressor Station site will be used as a pipe storage yard after the compressor station is decommissioned. A note to this effect has been included in the appropriate page of Attachment General-1. Table 1.3-1 has been revised and included as Attachment 1-11.

Respondent: Abraham Jones
Position: Manager, Construction Services, EQT Corporation
Phone Number: 304-626-7959
Date: April 20, 2016

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General

7. As previously requested in our EIR dated December 29, 2015, for the H-302 Tap Site, the H-306 Tap Site, and the H-148 Tap Site provide:
- a. a plot plan for each tap site;
 - b. relevant environmental data for each tap site (such as, but not limited to soils, land use, vegetation, waterbodies, wetlands, special status species, and cultural resources). This data should be for each tap site individually; and
 - c. revised alignment sheets which depict each tap site.

Response:

- a. Please see Attachment General-7a (marked as **Critical Energy Infrastructure Information [CEII]**), which includes the plot plans for each tap site.
- b. Attachment General-7b provides relevant environmental data for each tap site. There are no waterbodies, wetlands, cultural resources, or special status species habitat within these areas.
- c. Revised alignment sheets that depict each tap site are included in Attachment General-1.

Respondent: Jeremy Watts (a) and (c)
Position: Engineer III, EQT Corporation
Phone Number: 412-553-5769
Date: April 20, 2016

Respondent: Stephanie Frazier (b)
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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General

8. Attachment General-4 states that the H-302 tap site would be located at H-316 MP 2.99; however, the alignment sheet for H-316 stops at MP 2.97. Resolve the apparent discrepancy.

Response:

The alignment sheets are correct. The H-302 tap site is located at MP 2.97. The table from Attachment General-4 has been revised and included as Attachment General-7b.

Respondent: Jeremy Watts
Position: Engineer III, EQT Corporation
Phone Number: 412-553-5769
Date: April 20, 2016

**Equitrans, L.P.
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Resource Report 1

1. In response to an agency comment, provide a discussion of how and where asphalt removed during road crossings would be disposed. Clarify if Equitrans, LP (Equitrans) would recycle used asphalt.

Response:

Asphalt removal at road crossings will be minimal. Any asphalt that is removed as part of the Project will be disposed of at an approved disposal facility or landfill. Equitrans will not recycle used asphalt.

Respondent: Abraham Jones
Position: Manager, Construction Services, EQT Corporation
Phone Number: 304-626-7959
Date: April 20, 2016

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Resource Report 1

2. Table 1.4-2 in Resource Report (RR) 1 indicated that the H-316 horizontal directional drill (HDD) crossing of the South Fork Tenmile Creek would start at milepost (MP) 2.10 and go to MP 2.83; however Table 1.4-3 (Foreign Pipelines Crossed by the Project) showed that the Peoples Natural Gas Pipeline is located at MP 2.91 and would be crossed via HDD. Clarify this apparent discrepancy.

Response:

The Peoples Natural Gas Pipeline located at MP 2.91 would be crossed by an Open Cut. Table 1-4.3 has been revised to reflect this and is included as Attachment 1-2.

Respondent: Jeremy Watts
Position: Engineer III, EQT Corporation
Phone Number: 412-553-5769
Date: April 20, 2016

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Resource Report 1

3. Revise the alignment sheets to illustrate the pipelines needed to connect to the interconnections, compressor station, and taps. Clarify if the connecting pipelines are accounted for in the total aboveground facilities impacts.

Response:

Alignment sheets have been updated to show connecting pipelines and are included in Attachment General-1. The connecting pipelines are not included as aboveground facilities impacts other than the tap locations specified in Attachment General-7b.

Respondent: Jeremy Watts
Position: Engineer III, EQT Corporation
Phone Number: 412-553-5769
Date: April 20, 2016

**Equitrans, L.P.
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Resource Report 1

4. Update Table 1.7-1 to indicate the current status of all required federal, state, and local government permit applications and approvals.

Response:

Table 1.7-1R included as Attachment 1-4 has been updated with the current status of all required federal, state, and local government permit applications and approvals.

Respondent: Stephanie Frazier

Position: Supervisor Permitting – Environmental, EQT Corporation

Phone Number: 412-553-5798

Date: April 20, 2016

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Resource Report 1

5. Provide estimated trench depths (feet) for each depth of cover scenario (e.g., forested land, agricultural land, waterbodies, wetlands, roads, railroads, etc.).

Response:

General guidelines for pipeline depth of cover based on resource area are provided below.

Resource Area	Pipeline Depth of Cover (inches)		Approximate Trench Depth (Inches)
Forested Land	36" min	24" in Consolidated Rock	60 inches
Agricultural Land	48" min	24" in Consolidated Rock	72 inches
Open Lands	36" min	24" in Consolidated Rock	60 inches
Waterbodies	48" min	24" in Consolidated Rock	72 inches
Wetlands	36" min	24" in Consolidated Rock	60 inches
Roadways	36" min in Bar Ditch	24" in Consolidated Rock	60 inches

Respondent: Abraham Jones

Position: Manager, Construction Services, EQT Corporation

Phone Number: 304-626-7959

Date: April 20, 2016

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Resource Report 1

6. Clarify why cathodic protection beds are needed only for the H-316 and H-318 pipelines. Discuss cathodic protection for the other pipeline systems (e.g., M- 80/H-158, H-305, and H-319) as applicable.

Response:

Cathodic protection beds are only needed for the H-316 and H-318 pipelines. The other pipeline systems noted will be either cathodically protected by existing impressed current systems or by magnesium anodes as noted further below.

The line M-80 will be protected by magnesium anodes within the ROW. The anodes will be installed on the M-80 side of the ROW with H-158.

H-158 will be protected by an existing impressed current system on Equitrans pipeline M-82, with the new CP system at Redhook C.S. to be used as a backup.

Cathodic protection of Line H-305 will be provided by the existing system on Equitrans pipeline H-106, with the new system to be installed on H-316 as a back-up.

Cathodic protection of Line H-319 will be provided by the existing system on Equitrans pipeline H-306.

All pipelines will have multiple Test Stations installed.

Respondent: Jeremy Watts
Position: Engineer III, EQT Corporation
Phone Number: 412-553-5769
Date: April 20, 2016

Equitrans, L.P.
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Resource Report 1

7. As previously requested, provide a list of analyses Equitrans would perform on “baseline water samples...taken at the source prior to water-up and prior to discharge” during hydrostatic testing.

Response:

In Pennsylvania, water used in new pipe is analyzed for flow, duration, suspended solids, oil and grease, iron, total residual chlorine (if chlorinated water was used), dissolved oxygen, pH.

In West Virginia, water used in new pipe is analyzed for flow, oil and grease, and suspended solids.

Respondent: Stephanie Frazier

Position: Supervisor Permitting – Environmental, EQT Corporation

Phone Number: 412-553-5798

Date: April 20, 2016

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Resource Report 1

8. Your response to our December 29, 2015 Environmental Information Request (EIR) RR1 question number 9 (filed January 22, 2016) stated that: “because there no MLVs necessary with this Project....” However the footnote in revised Table 1.3-3 (attachment 1-8) states that “MLVs are not included because these will be completely within the right-of-way and will not require additional land outside of that necessary for the pipeline.” Resolve this apparent discrepancy, and identify all main line valves (MLV) associated with the EEP.

Response:

There will be no MLVs associated with the Project, located inside or outside of the right-of-way. Table 1.3-3 has been revised and is included as Attachment 1-8.

Respondent: Jeremy Watts
Position: Engineer III, EQT Corporation
Phone Number: 412-553-5769
Date: April 20, 2016

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Resource Report 1

9. Attachment 1-30 appears to be missing from the January 22, 2016 filing. Provide attachment 1-30.

Response:

Attachment 1-30 has been provided with the current filing.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 1

10. Revise the HDD Contingency Plan to include the name and telephone number for the FERC Project Manager, Paul Friedman. Equitrans' response to RR1 No. 31 (filed January 22, 2016) stated that an updated plan was provided in attachment 1-31. However, attachment 1-31 did not contain contact information for Mr. Friedman.

Response:

Attachment 1-31, the HDD Contingency Plan, has been revised as requested and is included with the current filing.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 1

11. Revise Table 1.3-1 (filed February 5, 2016) to list the yards separately from the ATWS. Clarify that the pig launcher/receiver site planned for the Redhook Compressor Station is included with the Redhook Compressor Station entry.

Response:

Table 1.3-1 is included as Attachment 1-11 and has been revised to list yards separately from ATWS. In addition, a footnote was added to Table 1.3-1 clarifying that the pig launcher/receiver site planned for the Redhook Compressor Station is included with the Redhook Compressor Station entry.

Respondent: Abraham Jones
Position: Manager, Construction Services, EQT Corporation
Phone Number: 304-626-7959
Date: April 20, 2016

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Resource Report 1

12. Equitrans' response to RR1 No. 7 (filed February 5, 2016) stated that: "no new permanent access roads are needed for the Project." However, Table 8.1-7 (attachment 8-11) list several permanent access roads (one of which is listed as "new") and Table 1.3-1 includes 2.61 acres of operational impact due to access roads. Resolve the apparent discrepancies.

Response:

Table 8.1-7 has been revised to indicate that the Project has no new permanent access roads and is included as Attachment 8-6. Table 1.3-1 has also been revised and included as Attachment 1-11. Table 1.3-1 states that there will be 2.02 acres of operational impact due to access roads. The operational impact is not associated with new permanent access roads but existing permanent access roads that will be used during operation.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 1

13. Revise Table 1.4-1 and Table 8.1-4 (filed February 5, 2016) to provide a site-specific justification and purpose for each ATWS.

Response:

Please refer to Attachment General-2 for Table 1.4-1. Table 8.1-4R is included as Attachment 1-13. Both tables provide a site-specific justification and purpose for each ATWS.

Respondent: Abraham Jones
Position: Manager, Construction Services, EQT Corporation
Phone Number: 304-626-7959
Date: April 20, 2016

Equitrans, L.P.
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Resource Report 1

14. As previously requested, revise table 1.3-2 (filed February 5, 2016) to include the width of the foreign rights-of-way that would be used during construction (feet) and the width of the foreign right-of-way that would be used during operations (feet), once Equitrans reaches agreements with the owners of the foreign pipelines and utilities to be crossed or paralleled.

Response:

As described in Table 1.3-2, the H-318 segment of the Project will parallel the Sunoco Mariner East pipeline for 0.82 miles from MP 1.22 to MP 2.04. The estimated corridor width of the Sunoco Mariner East pipeline is 75 feet. This estimate was based on a survey of aerial imagery since that information is not publically available.

During Project construction and operation, there will be some colocation of Project H-318 pipeline corridor with the Sunoco Mariner East pipeline corridor. The acreage associated with colocation during Project construction and operation has been evaluated. During construction the H-318 construction right-of-way will overlap the Sunoco Mariner East corridor for approximately 0.42 acres. During operation the H-318 operational right-of-way will overlap the Sunoco Mariner East corridor for approximately 0.09 acres.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
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Appendix 1 – M – Landowner List

15. Revise appendix 1-M to include MP or access road for each landowner and whether survey permission was granted or denied.

Response:

Appendix 1-M (marked **Privileged & Confidential**) is included as Attachment 1-15 and has been revised to include MP or access road for each landowner and whether survey permission was granted or denied. Please note that “N/A” for the Mile Post column indicates that the landowner is not along the pipeline or impacted by other ATWS or Yards. The list was originally developed for potentially impacted landowners during the routing of the pipeline.

Respondent: Kelsey Quan
Position: Engineer II, EQT Corporation
Phone Number: 412-395-2590
Date: April 20, 2016

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Revised Alignment Sheets

16. Drawing Number PA-WAPA-H318-02 depicts a proposed “NIMC-S002 pipeline” around MP 3.8 of H-318. Clarify if this pipeline is proposed by Equitrans.

Response:

NIMC-S002 is an EQT Gathering, LLC proposed project

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
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Revised Alignment Sheets

17. Clarify why the ATWS for the Redhook Compressor Station (Redhook-ATWS-01) is not located adjacent to the Redhook Compressor Station site.

Response:

Sufficient space for ATWS at the Redhook Compressor Station does not exist. The entire area will be used for development of the compressor station. The site is bordered by multiple foreign lines at the north; and by roadways in the other directions. Topography is not conducive for ATWS southwest of the site. Accordingly, the ATWS cannot be located adjacent to the Redhook Compressor Station site. The requested ATWS is owned by Equitrans.

Respondent: Abraham Jones
Position: Manager, Construction Services, EQT Corporation
Phone Number: 304-626-7959
Date: April 20, 2016

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Revised Alignment Sheets

18. Provide an alignment sheet for the Pratt Compressor Station depicting the following: a. the location of the proposed contractor yard as listed in Table 1.3-1; b. waterbodies as listed in Table 2-A-2; c. wetlands as listed in Table 2-B-1; and d. access roads.

Response:

An alignment sheet for Pratt Compressor Station is provided in Attachment General -1.

- a. The Pratt Compressor Station site will be used as a pipe storage yard during construction of the Redhook Compressor Station. In addition, the Pratt Compressor Station site will be used as a contractor yard during the decommissioning process.
- b. Waterbodies listed in Table 2-A-2 were added to the alignment sheets.
- c. Wetlands listed in Table 2-B-1 were added to the alignment sheet.
- d. There are two existing access roads at the Pratt Compressor Station which are clearly depicted on the alignment sheet and are located entirely within the footprint of the compressor station; therefore, they are not identified as separate Project features on the alignment sheet.

Respondent: Stephanie Frazier

Position: Supervisor Permitting – Environmental, EQT Corporation

Phone Number: 412-553-5798

Date: April 20, 2016

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Revised Alignment Sheets

19. Confirm that wetlands located at H318-ATWS-09, H318-ATWS-10, and Redhook-ATWS-01 would not be affected during construction and operation of the EEP. Provide a list of BMPs (such as installation of silt fence) that would be used to prevent disturbance.

Response:

The wetlands adjacent to H-318-ATWS-09 and H-318-ATWS-10 are not included in the Project's footprint. Those ATWS are existing flat gravel sites to be used as yards and no disturbance to the site or wetlands are proposed.

At Redhook-ATWS-01, no impact is planned; wetlands and waterbodies will be protected by sediment barriers appropriate to site conditions. This includes use of silt fence or compost filter sock to protect water resources.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Revised Alignment Sheets

20. Revise the alignment sheets to include:

- a. the H-302, H-306, and H-148 tap sites;
- b. the full extent of H158-M80-ATWS-01;
- c. labels for W-AA2, H316-ATWS-01a, H316-ATWS-01b, H316-ATWS- 01c, H318-AR-05, Federal Railroad/Administration Railroad (Table 8.1-5), wetland near MP 0.0 H316;
- d. clarify why access roads H316-AR-06A and H316-AR-06B are split in Table 8.1-7 when the alignment sheet indicates this is the same access road;
- e. clarify why access roads H316-AR-05A and H316-AR-05B are split in Table 8.1-7 when the alignment sheet indicates this is the same access road. Also this road is labeled H316-AR-05 on drawing EEP-ADAR-01 and labeled H316-AR-05B on drawing PA-GRPA-316-03. Resolve the apparent discrepancies;
- f. clarify whether the label “H318-ATWS-05A” on drawing PA-WAPA- H318-01 should be removed;
- g. clarify if H318-ATWS-06B is correctly labeled on drawing PA-WAPA- H318-02;
- h. depict H318-ATWS-06D as listed in Table 8.1-4;
- i. resolve discrepancies regarding H319-ATWS-01 and H319-ATWS-02. These ATWS are reversed between the Aerial Details Ancillary Sites and Access Roads drawings and alignment sheet PA-WEWV-H319-01. In addition, on Table 8.1-4, these ATWS are labeled H319-ATWS-01a and H319-ATWS-01b. Resolve the discrepancies;
- j. resolve discrepancies regarding W-Z3B. This wetland is labeled W-Z3B on the Aerial Details Ancillary Sites and Access Roads drawings and labeled as W-Z3A and W-Z3B on alignment sheet PA-WEWV-H319-01. Resolve the discrepancies;
- k. depict waterbodies S-AA4, S-AA6, S-AA7, S-BB6, S-N2, S-A3A, W-AA5, W-AA6, W-N1, and W-Z2 provided in Table 2-A-2; and
- l. correctly label wetland W-AA9 located within H316-ATWS-06.

Response:

Revised alignment sheets are included as Attachment General-1.

- a. The revised alignment sheets include the H-302 tap site on drawing PA-GRPA-H316-04. The H-306 tap site is included on drawing PA-WEWV-H319-01 and the H-148 tap site is included on drawing PA-WAPA-H318-02.
- b. The full extent of H158-M80-ATWS-01 is now depicted on PA-GRPA-H158-01 and PA-GRPA-M80-01.

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c. W-AA2, H316-ATWS-01a, H316-ATWS-01b, H316-ATWS- 01c are depicted on drawing PA-GRPA-H316-01. H318-AR-05 is depicted on drawing PA-WAPA-H318-01. Table 8.1-5 (Attachment 8-3a) has been revised the reference to the Federal Railroad/Administration Railroad to indicate it is the Norfolk Southern Railroad, which will also be reflected in the appropriate alignment sheets.

d. Access roads H316-AR-06A and H316-AR-06B are correctly labeled in Table 8.1-7 (Attachment 8-6). Both are considered temporary existing private roads; however, the existing width of H316-AR-06A is greater than that of H316-AR-06B; therefore, the temporary ROW width for H316-AR-06B requires more build out than that of H316-AR-06A. The difference is small and hard to see at the scale of the drawings.

e. Access roads H316-AR-05A and H316-AR-05B are correctly labeled in Table 8.1-7 (Attachment 8-6). Both are considered temporary existing private roads; however, the existing width of H316-AR-05A is greater than that of H316-AR-05B; therefore, the temporary ROW width for H316-AR-05B requires more build out than that of H316-AR-05A. The difference is small and hard to see at the scale of the drawings.

f. The label for H318-ATWS-05A is correctly depicted on drawing PA-ALPA- H318-04.

g. The label for H318-ATWS-06B is correctly depicted on drawings PA-WAPA- H318-01 and PA-WAPA- H318-02.

h. Several ATWS were mislabeled and have been corrected; H318-ATWS-06D is now depicted on drawing PA-WAPA-H318-02.

i. The locations of H319-ATWS-01 and H319-ATWS-02 are now consistent between the Aerial Details Ancillary Sites and Access Roads drawings and alignment sheet PA-WEWV-H319-01. Table 8.1-4 (Attachment 1-13) has been revised with the correct ATWS labels of H319-ATWS-01 and H319-ATWS-02. Also, see Table 1.4-1 (Attachment General -2) with corrections to these features.

j. Revised alignment sheets EEP-ADAR-03 and PA-WEWV-H319-01 now depict wetland W-Z3B in the same location, resolving the discrepancy.

k. Waterbodies S-AA4 and S-N2 and wetland WN-1 are depicted on drawing PA-GRPA-H316-01. Waterbody S-BB6 is depicted on drawing PA-ALPA-H318-03. Waterbodies S-AA6 and S-AA7, and wetlands W-AA5 and W-AA6 are depicted on drawing SITE-PRATT-01. Waterbody S-A3A and wetland W-Z2 are depicted on drawing EEP-ADAR-03.

l. W-AA9 is correctly labeled and located within H316-ATWS-06 in drawing PA-GRPA-H316-03.

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Respondent: Jeremy Watts
Position: Engineer III, EQT Corporation
Phone Number: 412-553-5769
Date: April 20, 2016

Equitrans, L.P.
Equitrans Expansion Project
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Resource Report 2 – Water Use and Quality – Water Resources

1. Provide additional discussion regarding potential impacts and proposed mitigation measures due to mine pools that may be encountered during construction. Include:
 - a. depth below the ground surface for identified mine pools and typical depth for mine pools;
 - b. procedures for unanticipated discovery of mine pools; and
 - c. water use and water quality of mine pools in the Mather Mine. Clarify if water from the Mather Mine pool is used as a drinking water source.

Response:

- a) Table 6.3-2 filed on February 5, 2016 lists the range of depth as determined by surface elevation and bottom of coal mine elevation for underground mines crossed by the project features. As stated in the previous filing, only one underground mine crossed by the project is known to contain a mine pool.
- b) Along the pipelines, the excavation will be limited to 60” to 72” below the surface for the installation of the pipeline and the potential for encountering unanticipated mine pools is minimal. Table 6.3-2 lists the depth of the mines beneath proposed permanent facilities. The mine depths beneath the proposed H-302 Tap and H-148 Tap are approximately 580 feet and 230 feet, respectively. These great depths greatly minimize the potential for exposing underground mines or mine pools. No mines were identified beneath the other proposed permanent facilities.

If water is located, pumped water filter bags may be used to filter water pumped from disturbed areas prior to discharging. PADEP requires that compost filter socks be installed within 50 feet of any locations receiving surface water or where grassy area is not available.

- c) After below drainage coal mines are closed, typically the mines flood with the inflow of groundwater. During this process, acid mine drainage is released from the rock and coal surfaces by the formation of sulfuric acid in the oxidation of iron-sulfide minerals. Water within Pittsburgh coal mines is generally characterized as being acidic with elevated levels of iron, aluminum, manganese, total dissolved solids, and sulfates at concentrations that typically exceeds secondary maximum contaminant levels for drinking water. NMLRC (2004) collected one sample from a well within the Mather Mine. The exact location, construction of well, or total depth of the well is unknown. The results indicate that the concentration of iron is 0.34 mg/L, aluminum is 0.17 mg/L, manganese is 0.1 mg/L and sulfate is 368 mg/L for this one sample from the Mather Mine.

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As reported in the response filed on February 5, 2016, the identified depth of residential wells near the project area in Greene County (Mather Mine is located in Greene County), ranges from 42 to 220 feet. No public supply wells were identified within the project area. The depth of the Mather Mine beneath the EEP facilities ranges from 260 to 580 feet, so it is deeper than documented residential well depths.

Source: (NMLRC) National Mine Land Reclamation Center. 2004. WVR173 Phase IV, EPA Region III Mine Pool Project

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Phone Number: 412-553-5798
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Resource Report 2 – Water Use and Quality – Water Resources

2. As recommended by the West Virginia Department of Environmental Protection (WVDEP), clarify whether Equitrans would consider restoring waterbody crossings in West Virginia utilizing a natural stream channel design program.

Response:

One stream, an unnamed tributary of North Fork Fishing Creek, will be crossed by the pipeline. Restoration will be made in compliance with the NWP 12 conditions, the Huntington District regional conditions, and the state 401 water quality certification conditions; as well the FERC Procedures. Contours will be restored to pre-construction conditions. Accordingly, Equitrans is not considering a natural stream channel design program.

Respondent: Stephanie Frazier

Position: Supervisor Permitting – Environmental, EQT Corporation

Phone Number: 412-553-5798

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3. Provide the class of pipe that would be used for all creek crossings in a table and include MP, county/state, feature being crossed, and the minimum depth of cover.

Response:

Table 2-A-2R in Attachment 2-3 has been revised to include class of pipe and minimum depth of cover for all Project creek crossings.

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4. Provide a discussion of the best management practices (such as silt fencing) that would be utilized to avoid impacts to waterbodies during demolition at the Pratt Compressor Station.

Response:

Wetlands and waterbodies will be protected by sediment barriers appropriate to site conditions. This includes use of silt fence or compost filter sock to protect water resources near Pratt Compressor Station activities.

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5. As previously requested, identify the type of rain event, and estimate the amount of precipitation that could result in flash flood conditions. Equitrans' response to RR2 No. 10 (filed January 22, 2016) stated that: "measures taken to prevent damage to Project facilities in the 100-year flood zones during flooding and flash flooding will be addressed in the state water encroachment permits for the Project." Clarify when these permit applications would be filed with the FERC.

Response:

Rain events that can cause flash flooding vary, as well as the amount of precipitation. These depend on several factors such as the soil saturation level at the time of precipitation, rate of rainfall, rain on snow conditions, and the amount of frozen ground. Regardless of the type of rain event or amount of precipitation, the project facilities are designed to prevent damage during flooding. Chapter 105 General Permits for impacts and encroachments to streams, floodplains, and wetlands were submitted to Allegheny, Greene and Washington County Conservation Districts who have delegated authority from PADEP on October 27, 2015 and are currently under review. These are state and local permit applications not required to be submitted to FERC; however, approvals will be forwarded to FERC once received.

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6. Equitrans’ revised Table 2.2-6 (filed January 22, 2016) states that hydrostatic test water would be “released into frak tanks, and then discharged at a slow, controlled rate, approximately 35 gallons per minute.” Provide additional details such as:
- a. estimates on the number, type, and size of the “frak tanks” based on test sections provided in Table 2.2-6 and proposed ATWS required near each source;
 - b. estimated holding time for hydrostatic test water within the storage tanks; and
 - c. clarify whether biocides or other additives would be required.

Response:

- a. There will be 43 tanks each able to hold 21,000 gallons. No new ATWS are required for the tanks. Areas shown on the Alignment sheets encompass the hydro test sites.
- b. Typically the water is discharged into the 21,000 gallon tanks to allow sediment to separate from the water and to provide flexibility for completing the testing and provide proper notice to the DEP. Within a day or so the water is discharged into an approved de-watering structure. The amount of time the water may be held varies on a case by case basis to meet the regulatory requirements.
- c. No biocides or other additives are planned.

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Resource Report 2 – Water Use and Quality – Appendix 2-A – Waterbody Crossing Tables

7. Revise Table 2-A-2 to resolve the following inconsistencies:
- a. waterbody S-AA9 depicted on the alignment sheet, but not in Table 2-A-2; and
 - b. confirm that Equitrans would follow Section 401 Clean Water Act permit Condition 9 for Time of Year Restrictions (September 15-March 31) for waterbody crossings in West Virginia.

Response:

- a. Waterbody S-AA9 located within the permanent easement only. This waterbody will not be crossed by the pipeline but only extends into the permanent easement. Therefore, this waterbody will be avoided during construction and during operation maintenance and is therefore not included in Table 2-A-2R (Attachment 2-3) as a waterbody crossed by the project. Maintenance operations within the permanent easement involve vegetation management which does not extend into the stream, which means the stream will be avoided during those activities.
- b. The streams crossed by the Project in West Virginia have been revised for time of year restrictions listed in Section 401 Clean Water Act permit Condition 9 for warmwater streams (April 1-June 30). See revised Table 2-A-2 as Attachment 2-7b.

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Resource Report 2 – Water Use and Quality – Wetlands

8. Provide a discussion of wetland resources affected by the maintenance of 10- and 30-foot-wide corridors.

Response:

Wetlands located in the permanent easement include palustrine emergent and palustrine forested wetlands. As identified in Table 2-B-1R (Attachment 2-11b) the palustrine emergent wetlands located in the permanent easement that could be impacted due to the FERC maintenance regime include W-AA4, W-AA7, W-BB12, W-BB6, W-BB7, W-BB3, W-Z3A, and W-Z3B. The palustrine forested wetlands located in the permanent easement and impacted during maintenance include W-BB8, W-BB10, W-BB9, and W-BB11. General descriptions for these wetland types are included in Section 2.3.2 of Resource Report 2. Details on the specific vegetation and soils for each of these wetlands are included in the wetland report submitted to the Pennsylvania Department of Environmental Protection (PADEP), County Conservation Districts (Allegheny, Greene, and Washington, and U.S. Army Corps of Engineers (“USACE”) for permitting. Per the FERC Plan and Procedures, the portions of the permanent easement that are the maintained 10- and 30-foot corridor will be mowed periodically for access to the pipeline, and this will maintain the current palustrine emergent wetlands with low growing emergent vegetation. Maintenance will prevent the palustrine forested wetland areas to mature into forested vegetation but will allow for emergent vegetation and short shrubs.

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Resource Report 2 – Water Use and Quality – Wetlands

9. Confirm that the U.S. Army Corps of Engineers would not require a compensatory wetland mitigation plan for the EEP due to the small area of wetland impacts.

Response:

Permits are still under review by the USACE, however, mitigation is not anticipated.

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10. Previously, no wetlands were reported as being affected in West Virginia. However, revised Tables 2.3-1 and 2-B-1 (filed February 5, 2016) show wetland impacts in West Virginia. Clarify if any of the affected wetlands are state classified as unique or of exceptional value.

Response:

No wetlands in West Virginia impacted by the Project are classified as unique or of exceptional value.

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Resource Report 2 – Water Use and Quality – Wetlands

11. Revise wetland Table 2.3-1 and appendix Table 2-B-1 (filed February 5, 2016) to provide separate wetland acreage impacts for ATWS and yards for both construction and operation.

Response:

Table 2.3-1R and Table 2-B-1R have been revised to include separate lines for ATWS and yards as Attachments 2-11a and 2-11b, respectively.

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12. Revise Table 2-B-1 (filed February 5, 2016) to resolve the following inconsistencies:

- a. according to Table 2-B-1, 0.006 acres of W-AA4 and 0.06 acres of W-BB13 would be affected due to operation of the groundbed. However, these wetlands are depicted on the alignment sheet as being outside of the groundbed;
- b. according to Table 2-B-1, 0.03 acres of W-BB7 would be affected due to construction of the additional temporary workspace. However, W-BB7 is depicted on the alignment sheet outside of the ATWS;
- c. clarify that the impact acreage associated with the “pipeline route” is accounted for in the “permanent easement” acreage;
- d. Equitrans’ response to RR2 No. 32 states impacts to the wetlands W-AA5 and W-AA6 at the Pratt Compressor Station would be avoided “during construction with the use of barriers and erosion control measures.” However, Table 2-B-1 states 0.08 acres would be affected at these wetlands during operations;
- e. after alignment sheet review, confirm the impact acreages associated with wetland W-Z3A are not those of W-Z3B and vice versa; and
- f. clarify footnote “e” on whether construction or operation impact acreages are inclusive of the other.

Response:

- a. The groundbed features were updated in Table 2-B-1R (Attachment 2-11b) and the acreage for wetland impacts due to groundbed in the H-316 are now 0 and no longer included in Table 2-B-1.
- b. Table 2-B-1R (Attachment 2-11b) has been updated to eliminate W-BB7 as a potential wetland impact since H318 ATWS 04b was revised to avoid W-BB7.
- c. Yes, the permanent easement encompasses the pipeline route. The pipeline route is a linear feature for measurement of the waterbody crossings and does not have acreage associated with it in the tables. The permanent easement covers the permanent acreage impacts on a separate line in the table.
- d. Table 2-B-1R (Attachment 2-11b) identifies acres in the temporary/construction column, not the operation column.
- e. Equitrans has confirmed that wetland W-Z3A impacts are not those of W-Z3B, and vice versa.
- f. Footnote “e” will be revised in Table 2-B-1 (Attachment 2-11b) as impacts have been separated out to be temporary and permanent, and temporary impacts during construction do not include permanent operation impacts, but are in addition to and outside of operation impacts.

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Resource Report 2 – Water Use and Quality – Wetlands

13. Revise Tables 2.3-1 and 2-B-1 (filed February 5, 2016) to resolve the following inconsistencies:
- a. clarify that all project areas have been 100 percent field surveyed and provide the correct date of when access was granted (Table 2-B-1 refers to 10/21/15 and 2.3-1 refers to 10/15/15);
 - b. clarify that impact acreage associated with “workspaces” refers to the temporary construction right-of-way and ATWS outside the permanent easement; and therefore would only be affected during construction (not operation); and
 - c. regarding footnote “b” on Table 2.3-1, update tables accordingly to avoid double counting so that impact acreages are consistent between the two tables.

Response:

- a. The Project areas are 100 percent field surveyed. The date has been revised for Table 2-B-1 (Attachment 2-11b) to 10-15-15.
- b. All impact acreage associated with workspaces and ATWS are temporary during construction outside of the permanent easement and therefore would not be affected during operation.
- c. Table 2.3-1R (Attachment 2-11a) was originally a summary table to show wetland impacts by location. Now, all facilities have been identified separately on Table 2.3-1 (Attachment 2-11a) as requested. Due to the nature of the GIS files and the alignment of the project, presenting the data in these two different formats will not allow for the totals to match. Please refer to the impact acres for each wetland identified in Table 2-B-1R (Attachment 2-11b).

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Resource Report 3 – Vegetation

1. Footnote c/ in Tables 3.2-1 through 3.2-5 states that “c/ temporary workspace includes temporary workspace, temporary access roads and additional temporary workspace.” Revise Tables 3.2-1 through 3.2-5 to separate temporary impacts into impacts resulting from temporary construction right-of-way workspaces, ATWS, and temporary new access roads. In addition, revise Tables 3.2-1 through 3.2-5 to separate permanent impacts which would result from use of the permanent right- of-way easement and permanent access roads.

Response:

Attachment 3-1 includes updated Tables 3.2-1 through 3.2-5. The temporary impact area includes temporary workspace, temporary access roads and additional temporary workspaces. The permanent impact area includes permanent right-of-way, groundbeds, aboveground facilities, and permanent access roads.

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Resource Report 3 – Vegetation

2. Discuss the potential effects of forest fragmentation and loss of interior forest on special status species (i.e., document locations where core forest area may contain habitat for special status species and the potential effects of loss or fragmentation of these areas on the special status species).

Response:

In Pennsylvania Core forest is defined as forest more than about 100 feet from a non-forest edge. Forest fragmentation is defined as the division of contiguous or adjoining forest land into smaller patches. Fragmentation can be caused by urbanization, with agriculture being a primary cause of fragmentation of forest land. (Bulletin NRS-20).

Protected species potentially affected by the Project are limited to state listed plants, and rare plant surveys are currently ongoing (See response to General-3). Effects of forest fragmentation were discussed in Section 3.3.4 of Resource Report 3 filed in October 2015, as well as the Migratory Bird Conservation Plan filed on February 5, 2016.

Core forest is largely absent from the Project area, habitats are fragmented by rural residential development (roadways, utilities, houses, other development), agricultural, golf courses, etc. As such, potential effects on special status species and loss of core forest is not likely to occur.

http://www.nrs.fs.fed.us/pubs/rb/rb_nrs20.pdf

McWilliams, William H.; Cassell, Seth P.; Alerich, Carol L.; Butler, Brett J.; Hoppus, Michael L.; Horsley, Stephen B.; Lister, Andrew J.; Lister, Tonya W.; Morin, Randall S.; Perry, Charles H.; Westfall, James A.; Wharton, Eric H.; Woodall, Christopher W. 2007. Pennsylvania's Forest, 2004. Resour. Bull. NRS-20. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 86 p.

Respondent: Stephanie Frazier

Position: Supervisor Permitting – Environmental, EQT Corporation

Phone Number: 412-553-5798

Date: April 20, 2016

Equitrans, L.P.
Equitrans Expansion Project
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Resource Report 3 – Vegetation

3. Section 3.3.3 states, "...completed field surveys to date have not identified presence of bald eagles or eagle nests." Clarify whether field surveys have been specifically conducted to assess the presence of bald eagles or eagle nests in the project vicinity and whether additional bald eagle surveys would be conducted along the project corridor prior to tree clearing. Also, provide field survey protocols, schedules, and results for any bald eagle surveys that have been or will be conducted.

Response:

A desktop review and the PNDI request completed for the Project did not identify eagle species as occurring in the Project area. Based on desktop review of available eagle data for the Project area, field observations, and Project correspondence received from USFWS, PGC, and WVDNR, eagle surveys for the Project are not required. No specific eagle surveys have been completed, nor are any planned for the Project. The rare plant surveys that are currently being conducted for the Project are being performed by experienced ornithologists, and they will record any observations of eagle nests, with special attention taken to determine their presence at the major river crossings of the Monongahela River and South Fork Tenmile Creek.

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Equitrans, L.P.
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Resource Report 3 – Vegetation

4. The Migratory Bird Conservation Plan (filed February 5, 2016) stated that Equitrans would limit clearing of vegetation and right-of-way maintenance between April 1 to August 31; clarify whether “limit” is defined as “no clearing shall occur” as is provided in the FERC Plan. Alternately, describe the circumstances in which right-of-way maintenance may occur within the nesting season and detail the measures Equitrans would follow to avoid impacts on migratory birds.

Response:

The language contained in this bullet in Section 5.0 (Results and Proposed Mitigation) of the Migratory Bird Conservation Plan (Attachment 3-4) for protection of migratory birds and other wildlife has been revised as:

- *“Conducting all tree and vegetation clearing between August 2 and April 14, per the FERC’s May 2013 version of the Upland Erosion Control, Revegetation, and Maintenance Plan (FERC Plan), to avoid impacts on nesting birds; if vegetation clearing is necessary outside of this period, these activities will be coordinated and approved by USFWS”.*

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Resource Report 3 – Vegetation

5. The Migratory Bird Conservation Plan states Equitrans would conduct vegetation and tree clearing during winter months “as practicable.” Clarify whether Equitrans intends to adhere to September 1 to March 31 window for all vegetation and tree clearing activities; or detail the locations and dates in which vegetation or tree clearing would occur during the nesting season and the measures Equitrans would follow to avoid impacts on migratory birds.

Response:

Equitrans is committed to conducting vegetation and tree clearing during August 2 to April 14 during construction and operation of the Project. USFWS has not recommended any avoidance or minimization measures for Indiana bat and northern long-eared bat, and so winter clearing is not required for this Project. If practicable, during the construction phase Equitrans will conduct tree clearing in winter months to minimize impacts on migratory birds. The language for #1 of the list of USFWS recommendations that will be implemented for protection of migratory birds in the Migratory Bird Conservation Plan (Attachment 3-4) has been revised as:

“1. Conduct ground/vegetation disturbances between August 2 and April 14 – As practicable, Equitrans intends to conduct vegetation and tree clearing during the recommended period identified in the FERC Plan, or as authorized by USFWS for vegetation clearing activities conducted outside of this period, to avoid impacts to nesting and migratory birds.”

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 3 – Vegetation

6. Clarify in the Migratory Bird Conservation Plan whether construction activities (i.e., trenching, etc.) would also occur only during the winter months. If not, specify whether Equitrans would, if applicable, conduct pre-construction nest surveys (i.e., within 1 week of construction activities) in grassland/herbaceous and scrub/shrub habitats that may contain ground-nesting migratory birds during the September 1 to March 31 window.

Response:

The USFWS has not requested pre-construction nest surveys in areas that could be occupied by ground-nesting migratory birds. Refer to the response to comment 3-5 for additional information.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 3-Endangered, Threatened, and Special Concern Species

7. Provide clarification as to whether Equitrans intends to adhere to the November 15 to March 31 tree clearing window for bat species. A clarification is needed to address the discrepancy between RR3 where Equitrans proposed no tree clearing season restrictions and the mitigation measures in the Indiana and Northern Long-eared Bat Habitat Survey and Myotis Bat Conservation Plan where Equitrans proposed restricting tree clearing to the November 15 to March 31 window.

Response:

Refer to the response to comment 3-5 for additional information.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 4 – Cultural Resources

1. Document that a copies of the following survey reports were submitted to the appropriate State Historic Preservation Offices (SHPO), and file the SHPO's comments with the FERC:
 - a. Borstel, C., et al. January 2016. Cultural Resources Identification Survey, Webster Interconnect and Mobley Tap, Grant District, Wetzel County, West Virginia (Tetra Tech, Boston);
 - b. Sexton, J. January 2016. Historic Architectural Survey: Aboveground Resources Survey and Assessment of Effects, Jefferson, Morgan, and Franklin Townships, Greene County; Forward Township, Allegheny County; and Union Township, Washington County, Pennsylvania (Tetra Tech, Boston); and
 - c. Borstel, C., et al. February 2016. Phase I Archaeological Survey, Jefferson, Morgan, and Franklin Townships, Greene County; Forward Township, Allegheny County; and Union Township, Washington County, Pennsylvania (Tetra Tech, Boston).

Response:

The three reports were submitted on the dates given below. In each case, comments have been received from the pertinent SHPO. In the case of both Pennsylvania survey reports, the SHPO has requested additional information. Preparation of materials responding to those requests is currently pending.

Report	Date of Submittal to FERC	Date of Submittal to SHPO	Date of SHPO Comment
Borstel et al. January 2016: Cultural Resources Survey, Wetzel Co., WV	February 5, 2016	January 28, 2016	February 16, 2016
Sexton January 2016: Architectural Survey, Greene, Allegheny, and Washington Cos., PA	February 5, 2016	January 28, 2016	March 22, 2016
Borstel et al. February 2016: Archaeological Survey, Greene, Allegheny, and Washington Cos., PA	February 22, 2016	February 17, 2016	March 22, 2016

Correspondence documenting submittals and SHPO responses is attached:

Attachment 4-1a: EEP WV CR Rpt 012815 SHPO Transmittal.pdf
 Attachment 4-1b: EEP PA Archit Rpt 012816 SHPO Transmittal.pdf
 Attachment 4-1c: EEP PA Archaeol Rpt 021716 SHPO Trans+ProjRevForm.pdf
 Attachment 4-1d: WV SHPO comment on EEP WV 021616.pdf

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Attachment 4-1e: EEP PA Archit Rpt SHPO Response 032216.pdf

Attachment 4-1f: EEP PA Archaeol Rpt SHPO Response 032216.pdf

Respondent: Stephanie Frazier

Position: Supervisor Permitting – Environmental, EQT Corporation

Phone Number: 412-553-5798

Date: April 20, 2016

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Resource Report 4 – Cultural Resources

2. Revise the historic architectural survey report for Pennsylvania (Sexton January 2016) as follows:
 - a. indicate the dates when site file searches and on-the-ground surveys were conducted; and
 - b. provide a table listing all pipeline segments (miles and segments by MP), aboveground facilities (acres), access roads (length and width), and yards (acres inventoried) that were surveyed.

Response:

Regarding the dates of site file searches, on-the-ground surveys, and areas investigated by historic architecture survey for Pennsylvania:

- a. Dates of site file searches and surveys:
 - i. **Date of file searches:** Noted on p. 4-2 of the Pennsylvania *Historic Architecture Survey* (Sexton January 2016) as occurring several times during the period between February and November 2015. All information on previously-surveyed resources recorded by the Pennsylvania State Historic Preservation Office's online Cultural Resources Geographic Information System (CRGIS) is up to date as of November 30, 2015.
 - ii. **Date of on-the-ground surveys:** Noted on pp. 4-2 to 4-3 of the Pennsylvania *Historic Architecture Survey* (Sexton January 2016) as occurring in August and September 2015. All historic architecture resource forms in Appendices C and D of the architectural survey report are dated September 14, 2015.
- b. **Extent of survey:** Architectural survey in Pennsylvania has been completed for the entire area of potential effects (APE) associated with all pipeline segments, aboveground facilities, access roads, and yards as defined in Resource Report 1, Tables 1.2-1, 1.3-1, 1.3-3, and 1.3-4. The Pennsylvania *Historic Architecture Survey* (Sexton January 2016), page 4-1, defines the APE as extending 0.5 mile from the proposed Redhook Compressor Station and 0.25 mile from the pipeline centerline, which is sufficient to encompass all Project elements (Appendix A, Figures 2-1 and 2-2). As noted on page iii of the architectural survey report, survey in Greene County (including lines H-316, H-156/M-80, H-305, Redhook CS, and associated permanent and temporary Project elements) covered 1,544 acres, while survey in Allegheny and

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Washington counties (line H-318 and associated permanent and temporary Project elements) covered 1,458 acres.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 4 – Cultural Resources

3. Revise the archaeological survey report for Pennsylvania (Borstel et al. February 2016) to provide a table listing all pipeline segments (miles and segments by MP, survey width), aboveground facilities (acres inventoried), access roads (length and width inspected), and yards (acres inventoried) that were surveyed.

Response:

Phase I archaeological survey in Pennsylvania has been completed for the entire direct effects APE associated with all pipeline segments, aboveground facilities, access roads, and yards as defined in Resource Report 1, Tables 1.2-1, 1.3-1, 1.3-3, and 1.3-4. The direct effects APE is defined in Section 1.3 (pp. 1-7 to 1-8) of the Pennsylvania archaeology survey report and depicted in Figures 1-2 and 1-3 of that report (Borstel et al. February 2016). The two long sections of horizontal directional drilling (HDD) for the project in Pennsylvania, MP 2.11 to 2.83 of the H-316 line and MP 2.81 to 3.53 of the H-318 line, were excluded from the direct effects APE because no ground surface disturbances are anticipated in these portions of the project alignment. Survey corridors associated with the pipeline ROW were typically 300 feet wide where surface ground disturbance is planned; survey corridors associated with access roads were typically 50 feet wide. Table 3-1 of the archaeological survey report (pp. 3-3 to 3-15) lists individual survey units and associated project elements, including survey acreages. The Phase I archaeological survey covered 315 acres, which included all areas within the direct effects APE as defined in Section 1.3 of the survey report.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 5 – Socioeconomics

1. Provide occupancy rates (and source of the information) for hotels and motels in all counties crossed by the pipeline route, by weekday/weekend/season.

Response:

Tetra Tech contacted the county tourism and other offices in an attempt to compile this information. None of the county departments were able to provide this information. Below is a list of department and phone numbers that were contacted.

Equitrans contacted county offices in West Virginia and Pennsylvania via phone and email regarding occupancy trends for accommodations in each area (hotels, motels, etc.) during peak tourism seasons. In general, detailed information regarding occupancy rates is not publically available. Responses from Washington County are still pending; similar results are anticipated. The table below provides a summary of findings.

County, State	Office Contacted	Available Occupancy Rate Information
Wetzel, WV	Convention and Visitors Bureau, Sheriff Tax Office	Peak season and occupancy data information unavailable
Allegheny, PA	Treasurer's Office	Peak season and occupancy data information unavailable
Greene, PA	Tourism Promotion Agency	Peak season and occupancy data information unavailable
Washington, PA	Chamber of Commerce	Average annual occupancy rate 75%. Overnight travel climbs steadily from the beginning of the year and typically peaks in August

Respondent: Kelsey Quan
Position: Engineer II, EQT Corporation
Phone Number: 412-395-2590
Date: April 20, 2016

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Resource Report 5 – Socioeconomics

2. Estimate all project-related taxes that would be generated during construction for each affected county.

Response:

Construction of the Project would generate state and local tax revenues during the construction period. Estimates of state and local sales and use tax and state income tax are presented in table below. These estimates are for the entire construction period (2017 and 2018) and represent one-time impacts.

Estimated State and Local Tax Revenues Generated During Construction					
County/State	Sales Tax		Use Tax		State Income Tax
	State	Local	State	Local	
Allegheny, PA	\$390,543	\$65,090	\$236,328	\$39,388	\$58,536
Greene, PA	\$1,259,560	\$0	\$3,018,888	\$0	\$198,018
Washington, PA	\$158,537	\$0	\$95,935	\$0	\$23,762
Total PA	\$1,808,640	\$65,090	\$3,351,152	\$39,388	\$280,316
Wetzel, WV	\$43,890	\$0	\$272,604	\$0	\$55,019
Total WV	\$43,890	\$0	\$272,604	\$0	\$55,019

Sales and use tax is generally imposed on the retail sale, consumption, rental, or use of tangible personal property in the state in question. In-state purchases of materials and equipment are subject to sales tax. Purchases of materials and equipment outside the affected state for use in that state are typically subject to use tax. The state sales and use tax rate is 6 percent in both Pennsylvania and West Virginia. In addition, expenditures in Allegheny County, Pennsylvania are also subject to a 1 percent local sales and use tax. The other three counties do not levy local sales and use taxes.

Local project-related expenditures identified as “consumable expenditures during construction” in Table 5-1 in EQT’s February 26, 2016 response to FERC’s December 29, 2015 information request would be subject to state sales tax in Pennsylvania and West Virginia. “Consumable expenditures” in both states include materials and equipment that would be provided by the Equitrans contractor team during construction (e.g., stone rip-rap, crushed limestone, bulldozers, trackhoes/excavators, etc.) “Consumable expenditures” in Pennsylvania also include per diem spending by non-local workers temporarily relocating to the state for the duration of their employment. Estimated expenditures were distributed by county based on the share of construction activity that would take place in each county.

Specialized materials purchased out-of-state for the pipeline, compressor station, and interconnect and tap facilities are assumed to be subject to use tax. Examples of these types of materials for the

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pipeline include pipe, valves, launcher, and receiver, the majority of which would be acquired out-of-state. Estimated specialized material expenditures were distributed by county based on the project activities that would take place in each county.

Income from in-state employment on the project would be subject to state income tax. Pennsylvania has a flat state income tax rate of 3.07 percent. In West Virginia, the state income tax rate varies by tax bracket, with a top rate of 6.5 percent for incomes above \$60,000. The direct payroll for construction identified in Table 5-1 in EQT's February 26, 2016 response to FERC's December 29, 2015 information request would be subject to state income tax. Thirty-five percent and 100 percent of the direct construction payrolls for Pennsylvania and West Virginia, respectively, are assumed to be subject to state income tax, based on the share of the on-site construction workforce expected to be hired in-state.

Respondent: Kelsey Quan
Position: Engineer II, EQT Corporation
Phone Number: 412-395-2590
Date: April 20, 2016

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Resource Report 5 – Socioeconomics

3. Revise the Traffic and Transportation Management Plan (filed February 5, 2016) to include:
 - a. a summary table, organized by county and state, listing:
 - i. the number of existing roads that would be used for access;
 - ii. the total miles of existing roads that would be used for access;
 - iii. the number of existing access roads that would be improved;
 - iv. the acres of improvements for existing access roads;
 - v. the number of existing roads and total miles that would be used for permanent access;
 - vi. the number of temporary new roads that would be built during project construction;
 - vii. the miles and acres of new temporary road construction; and
 - viii. the number of new permanent roads built, miles, and acres.
 - b. traffic counts for current peak daily vehicles on all major access roads;
 - c. number of construction equipment, and times each day they would be driving on access roads;
 - d. clarify if Equitrans would require all workers to be bussed from yards to the right-of-way. If not, estimate the number of construction worker vehicle traffic on access roads, including time of day, and mitigation measures for impacts on local traffic;
 - e. confirmation that Equitrans would repair all roads damaged by construction; and
 - f. measures to ensure that construction vehicles exiting the right-of-way would not track soil and dirt onto paved roads.

Response:

- a. Attachment 5-3, the Traffic and Transportation Management Plan, has been updated to include the summary table described.
- b. Attachment 5-3, the Traffic and Transportation Management Plan, has been updated to include traffic counts for current peak daily vehicles on all major access roads.
- c. All heavy construction equipment for all site will be driven in once, remain on the construction site until its use is completed, then driven off of the construction site and back to the yards or to the next construction site where it is needed. Efforts will be made to make these trips during times

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of low traffic use on the roads so as to minimize the impact to local traffic. Attachment 5-3, the Traffic and Transportation Management Plan, has been updated to include this language.

d. Equitrans is not planning to require busses to transport workers from yards to the right-of-way. Therefore, estimates of commuting traffic for each sub-section of the Project as presented in Attachment 5-3, the Traffic and Transportation Management Plan. It is estimated that the majority of trips will be in the early morning and late afternoon/evening hours. Impacts are expected to be minor and no mitigation measures are expected to be required.

e. Equitrans will repair all roads to their pre-construction state after construction is completed on all portions of the Project. Attachment 5-3, the Traffic and Transportation Management Plan, has been updated to include this language.

f. As stated in Section 6.0 of the Traffic and Transportation Management Plan, “[t]rack-out of loose materials will be controlled using rock construction entrances on access roads that begin at a junction with paved roads; this will be done to prevent tracking of mud onto public roadways. In the event that loose material goes beyond the rock construction entrance, sweeping and/or vacuuming will be used to remove the materials. In the event that loose material goes beyond the rock construction entrance, sweeping and or vacuuming will be used to remove the materials.”

Respondent: Abraham Jones
Position: Manager, Construction Services, EQT Corporation
Phone Number: 304-626-7959
Date: April 20, 2016

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Resource Report 5 – Socioeconomics

4. Document that a copy of the Traffic and Transportation Management Plan was submitted to appropriate state and county agencies, and file their comments.

Response:

Traffic and Transportation Management Plan are not typically filed with the state and county agencies, unless there is an access point that requires a flagging plan. If a flagging plan is required Equitrans refers to the “Temporary Traffic Control Guidelines” from the Pennsylvania Department of Transportation for Pennsylvania and “Temporary Traffic Control Manual” from the West Virginia Department of Transportation for West Virginia and the contractors would prepare and submit the plan to the appropriate agencies.

Respondent: Abraham Jones

Position: Manager, Construction Services, EQT Corporation

Phone Number: 304-626-7959

Date: April 20, 2016

Equitrans, L.P.
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Resource Report 6 – Geology

1. Provide a discussion of acid producing rock and soil that may be encountered in the project area and include the following:
 - a. MP locations for all project components (pipeline, ATWS, aboveground facilities, yards, and access roads) where acid producing rock and soils may be encountered;
 - b. a discussion on the potential impact acid producing soils and rock may have on the project;
 - c. a discussion of any potential hazards to groundwater and the environment from acid producing rock and soil; and
 - d. mitigation measures that would be used to prevent any impact from acid producing rock and soils to the pipeline, groundwater, and the environment.

Response:

- a. As reported in Resource Report 6, the project area is underlain by rocks from the Pennsylvanian and Permian periods. The Project is within the Kanawha Section, Appalachian Highlands Division, Appalachian Plateaus Physiographic Province. Previously filed Table 6.1-2 reported the geologic units crossed by the pipelines and typical rock type per mile post and also for each project facility. Resource Report 7, Section 7.2.1 describes the soil orders and presence of hydric soils crossed by the project and presence of acidic shale. Table 7.3-1, Appendices 7-A and 7-B list the soil types (soil map unit) crossed by the project facilities and also the characteristics of those soils.

In the Appalachian Plateau, sulfide minerals are generally associated with coal-bearing rocks or black shales (PGS, 2005). Geologic units with rock types that may contain sulfide-bearing minerals have the potential to generate acidic drainage, but does not guarantee that acidic drainage will occur within those units.

The H-318 crosses features noted as Abandoned Mine Lands (AML) per Pennsylvania Department of Environmental Protection (PADEP) (Table 6.3-2). Abandoned Mine Lands are defined as lands and waters which were mined for coal or which were affected by such mining, wastebanks, coal processing, or other coal mining processes and abandoned or left in an inadequate reclamation status. Office of Surface Mining Reclamation and Enforcement's (OSM) tracking of AML sites notes Kelly Run as reclamation being completed; however, it is not known the extent of reclamation. These areas are not prohibited or excluded from construction and development activities under current regulations.

A subsurface geotechnical investigation was conducted at the proposed Redhook Compressor Station to obtain information about the soil and rock conditions with respect

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to the design and construction of the station. This report has been included as Attachment 6-1. No geochemical testing was performed to evaluate the potential for acid producing material within the site; however, one boring encountered a coal seam. The coal seam underlies the northern portion of the proposed site and will be disturbed during the construction of the station. The impacts and mitigation measures are discussed in the sections below.

No other site-specific investigations were performed for the identification of sub-surface materials.

- b. The potential impact from acid producing soils is expected to be minimal and mitigated by the measures described in item 1 d) below. The project will avoid excavation of rock throughout most of the proposed footprint. Previously filed Table 6.2-1 reported the potential depth to bedrock along the project route. Based on that analysis, shallow bedrock is expected to occur for a combined total length of 0.997 mile along portions of the H-158, M-80, H-316, and H-318 pipelines.

At Redhook Compressor Station, excavation for the construction of the permanent above-ground facility will encounter a coal seam. Mitigation measures can be used during construction to minimize any potential impact from the presence of this coal seam.

While no site specific investigations were performed, the potential impact from acid producing material at the other proposed permanent above-ground facilities are expected to be minor given the small size of those areas and unexpected encounters can be mitigated with the steps described below.

- c. The prevalence of acid drainage and abandoned mine lands is well documented in Pennsylvania and West Virginia by state and federal agencies and there are numerous programs dedicated to reclaiming these sites. The development of acidic drainage depends on numerous factors including rock type, geochemistry, geologic structure, changing the water table, and extent of geologic weathering. Naturally occurring acute acid drainage is uncommon in the region (PGS, 2005). It is the exposure of iron sulfides that causes a series of chemical reactions to occur. This exposure can be created by exposing the potentially acidic material to oxygen or changing the water table. Acid drainage can harm fish, aquatic insects, stunt plant growth, and leave metal residues on surface areas.
- d. There are many ways to mitigate for acid producing conditions as recommended by PADEP (2012) including the following:
 - Raise the soil pH. Limestone is applied to neutralize the acidity in soil. Lime application rates are given by PADEP as a standard to use in lieu of site-specific soil testing. Blending of soils is recommended to mix potentially acidic materials with materials that have buffering capacity.

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- Other soil amendments. Use of compost has many benefits including it can be spread as mulch to provide temporary cover/stabilization, removes solids and heavy metals from storm water runoff, and can be used as a soil amendment to improve absorption and pollutant removal characteristics. The EEP project will use compost filter socks as an E&S BMP throughout the project.
- Stabilization during and after construction. Perform immediate stabilization with the use of mats, tarps, blankets, mulching and temporary and/or permanent seeding. EEP will follow stabilization guidelines per state standards. PADEP and Penn State has identified seed mixes that are more suited to acidic conditions. EEP has included these mixes as options to use in this project in the site Erosion and Sediment Control Plan that is under review for state NPDES permitting.
- Coating of the pipeline. All gas lines will be coated to prevent corrosion.
- Return to original topographic condition. Changes in local water tables are not expected as installation of the pipeline will involve minor excavation and returning the ROW to original grade. The installation of the proposed new permanent facilities is not expected to affect the local water table.

At the Redhook facility, specific mitigation measures have been included in the project's Erosion and Sediment Control Plan. This plan includes the following:

- Segregate carbonaceous material during site excavation and dispose of at an approved facility.
- Cover with tarps any temporary stockpiles of the carbonaceous material.
- As soon as cut slope is completed, apply a 12-in thick topsoil.
- Lime, seed, and mulch the cut slope per state standards.

These measures will limit the exposure of the coal seam to oxygen or water and reduce the potential for chemical reactions to occur creating acidic drainage.

Source: OSM 2016. Office of Surface Mining Reclamation and Enforcement.
<https://amlis.osmre.gov/Map.aspx>

PADEP 2012. Erosion and Sediment Pollution Control Program Manual. Technical Guidance Number 363-2134-008.

PGS 2005. Geologic units containing potentially significant acid-producing sulfide minerals. Pennsylvania Geological Survey. 4th Ser. Open-File Report OFMI 05-01.1.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 6 – Geology

2. Several existing oil and gas wells have been identified in close proximity to the construction right-of-way. Identify measures that Equitrans would implement to mitigate hazards from existing oil and gas wells close to the right-of-way. Include:
 - a. measures to identify, flag, fence, and protect existing oil and gas wells;
 - b. measures that would be used when welding in close proximity to existing oil and gas wells; and
 - c. any specific construction methods that may be used when the pipeline would be in close proximity to existing oil and gas wells.

Response:

- a. During the stake-out of the limits of disturbance, the areas will be noted, flagged, and safety fence installed.
- b. Construction will follow Equitrans' Hot Work Safety Program. A Hot Work Assessment will be completed prior to any hot work.
- c. Methods could include Hot Work Permit Program, Soft Dig Techniques, Hydro vacuuming, installation of physical barriers between the wellhead and the workspace.

Soft digging techniques include visual verification by hand excavation of all existing Company owned or foreign facilities laying parallel to and/or within the ROW including workspaces. For the facilities determined through hand excavation to have a cover in excess of five (5) feet, a backhoe may be used to facilitate continued safe hand excavation through removal of excess overburden. Following visual confirmation the locations will be backfilled the same day and stakes will be installed to record the depth of cover observed. Cover stakes will remaining in place throughout construction.

Hydro vacuuming is a non-destructive method of digging, utilizing pressurized water and a vacuum system to quickly and safely expose underground infrastructure. Pressurize water is injected into the ground through a handheld wand. As the soil cover is liquefied, the resulting slurry is simultaneously extracted by a powerful vacuum and stored in a 14 square yard debris tank onboard the hydrovac.

For wellheads encountered within the project footprint, jersey barriers and orange construction safety fencing will be installed around the perimeter of the wellhead to provide visual cues for presence and prevent inadvertent damage by passing equipment. Installation of jersey barriers would be down in coordination with the wellhead owner.

In addition, Equitrans will conduct a daily tailgate safety meeting to identify safety hazards.

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Respondent: Abraham Jones
Position: Manager, Construction Services, EQT Corporation
Phone Number: 304-626-7959
Date: April 20, 2016

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Resource Report 6 – Geology

3. Provide the source used to determine that no active or abandoned mines are located within 0.25-mile of EEP facilities in West Virginia.

Response:

According to WVDEP (2016) records, there are no active or abandoned mines within 0.25 miles of EEP facilities in West Virginia. WVDEP sources were cited in the document filed on January 22, 2016.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 6 – Geology

4. Section 6.4.1 only identifies a source for Pennsylvania with regards to earthquakes within 100 miles of the Project (Table 6.4-2). Provide the source used for earthquakes in West Virginia.

Response:

WVDEP refers to USGS (2015) as the source for magnitude and location of earthquake epicenters. USGS (2015) was cited within Revised Table 6.4-2 filed on January 22, 2016.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 6 – Geology

5. Clarify that wells listed as “proposed but never materialized” in Table 6.3-1 are no longer proposed.

Response:

Table 6.3-1R is included as Attachment 6-5. Oil and gas wells within 0.25 mile of the Project have been updated with their latest status information from PADEP.

Respondent: Stephanie Frazier

Position: Supervisor Permitting – Environmental, EQT Corporation

Phone Number: 412-553-5798

Date: April 20, 2016

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Resource Report 6 – Geology

6. As previously requested in our EIR dated December 29, 2015 RR6 No. 2 and No. 3, provide the following:
- a. clarify that “Fenneman and Johnson 1946” was the correct source for elevation data along the EEP; and
 - b. elevation data for the H-302, H-306, and H-148 tap sites.

Response:

- a. USGS, EROS Data Center, accessed 2015, is the source for elevation data along the EEP. (<http://nationalmap.gov/elevation.html>)
- b. Elevation data was provided within Revised Table 6.1-1 filed on January 22, 2016 for H-302 Tap L/R, Hartson L/R (H-148 Tap Site), Applegate L/R, Mobley Tap (H-306 Tap Site).

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 6 – Geology

7. As previously requested, provide a list of slip-prone soils identified by the West Virginia Department of Environmental Protection (WVDEP). Equitrans' response filed January 22, 2016 stated that "WVDEP requests that all applications identify slopes of 30 degrees or greater as those have the potential for slips. There are no slopes that steep within the Project area in West Virginia." This response does not address slip-prone soils identified by the WVDEP.

Response:

Table 6.4-4 in Attachment 6-7 lists the slip-prone soils in Wetzel County that were identified by WVDEP, based on USDA NRCS data.

WVDEP, Joseph Cochran, personal communication, April 2016.

Soil Survey Staff. 2016. Soil Survey Geographic (SSURGO) Database. Natural Resource Conservation Service (NRCS), United States Department of Agriculture (USDA). <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>

Respondent: Stephanie Frazier

Position: Supervisor Permitting – Environmental, EQT Corporation

Phone Number: 412-553-5798

Date: April 20, 2016

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Resource Report 6 – Geology

8. The updated Table 6.3-2 in attachment 6-5 (filed February 5, 2016) stated that the “Project Area” was defined as either mines crossed by Project components or located within 0.9-mile of the Pratt and Redhook Compressor Facilities. Include all mines within 0.25 miles of the proposed EEP facilities in Pennsylvania.

Response:

Table 6.3-2 in Attachment 6-8 has been revised to include all mines within 0.25 miles of the proposed EEP facilities.

Respondent: Stephanie Frazier

Position: Supervisor Permitting – Environmental, EQT Corporation

Phone Number: 412-553-5798

Date: April 20, 2016

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Resource Report 7 – Soils

1. Table 7.3-1 note “d” stated that Natural Resources Conservation Service (NRCS) criteria were used with regards to soils considered to be stony or rocky. Provide the specific criteria or characteristics that would classify a soil as stony or rocky.

Response:

The NRCS classifies stony/rocky soils by using a modifying adjective (cobbly, stony, bouldery, gravelly, or shaly) in the textural description, e.g., Skidmore *gravelly* loam, Gilpin, Weikert, and Culleoka *shaly* silt loams, very steep. Strip mine soils were also included as stony/rocky soils.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 7 – Soils

2. Provide a discussion of ground heaving/frost heaving in the project area. Include typical frost depths in the area, a discussion of any hazards to the Project posed by frost heaving, and any mitigation measures that would be used.

Response:

NOAA's extreme depth of frost penetration for the project area ranges from 0.75 meters to 1.0 meters in depth. Ground heaving in areas of heavy freezing with high water tables should not affect the pipeline because the pipeline will be installed below the frost line, and weighting of the pipeline will increase stabilization.

Respondent: Jeremy Watts
Position: Engineer III, EQT Corporation
Phone Number: 412-553-5769
Date: April 20, 2016

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Resource Report 7 – Soils

3. Note “A” provided in Table 7.3-1 stated that yards and staging areas are not included in any of the “sections” in Table 7.3-1 and no specific table for yards and staging areas has been provided. Provide the following with regards to yards and staging areas:
- a. acreage of soil limitations for yards and staging areas, similar to what was provided in Table 7.3-1 for other EEP facilities;
 - b. total impacts for yards and staging areas separate from all other Project facilities; and
 - c. a table in Appendix 7-B that identifies the soil series and acreages for yards and staging areas.

Response:

Table 7.3-1R (Attachment 7-3) presents acreage of soil limitations for yards and staging areas associated with each pipeline segment. There are no contractor yards or staging areas specifically associated with above ground facilities, therefor Appendix 7-BR (Attachment 7-4) presents acreage of soil limitations for yards and staging areas associated with aboveground facilities as zero. The Pratt Compressor Station is considered a previously disturbed site and therefore does represent a new Project impact.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 7 – Soils

4. Table 7.3-1 stated that the H-306 Tap Site and the H-148 Tap Site are included with other facilities. Clarify which facilities are associated with each tap site and clarify if those impacts and facilities are included in Appendix 7-A and Appendix 7- B.

Response:

Facilities associated with each tap site are as follows:

- The H-306 Tap site is associated with the H-319 pipeline and will be located within its permanent ROW.
- The H-148 Tap site is associated with the H-318 pipeline and will be located within its permanent ROW.

The H-302 Tap site is not located within other Project facilities.

The H-306 and H-148 Tap sites are included in the “Totals” Tables of both Appendix 7-A (Attachment General-9) and Appendix 7-BR (Attachment 7-4).

Respondent: Stephanie Frazier

Position: Supervisor Permitting – Environmental, EQT Corporation

Phone Number: 412-553-5798

Date: April 20, 2016

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Resource Report 8 – Land Use, Recreation and Visual Resources

1. Clarify why the M-80 pipeline is depicted outside of the proposed permanent right-of-way on the alignment sheets.

Response:

Lines M-80 and H-158 are shown to have separate, permanent right-of-ways each 50 feet in width as opposed to one permanent ROW with multiple line rights. The permanent right-of-way of each line is shown on their respective alignment sheets. The alignment sheet for Line M-80 does not show any location where the pipeline is outside of its permanent right-of-way.

Respondent: Jeremy Watts
Position: Engineer III, EQT Corporation
Phone Number: 412-553-5769
Date: April 20, 2016

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Resource Report 8 – Land Use, Recreation and Visual Resources

2. Provide the MP for the one farm along the H-318 pipeline route in Washington County, Pennsylvania enrolled in the Pennsylvania Agricultural Land Preserve Program as well as the Forward Township Agricultural Security Area. Outline measures that would be implemented to avoid, reduce, or mitigate impacts on this farm. Explain how construction of the pipeline through the farm would not result in the loss of its county and state certifications. Provide any mitigation steps that may be necessary to maintain status in the programs.

Response:

Note that there are several Agricultural Easements along the H-318 pipeline in Allegheny County, located approximately between MPs 3.25 and 4.25.

Tetra Tech has reached out to Mr. Douglas Wolfgang, Bureau Director of the Pennsylvania Agricultural Land Preserve Program and Jonathan Burgess of the Allegheny County Agricultural Land Preserve Program for information on what impacts to certification would occur if an underground pipeline was allowed to be buried within an Agricultural Easement, and what measures may be taken before and/or after the construction so that their certification is not affected. Jonathan Burgess of the Allegheny County Agricultural Land Preserve Program should also be able to provide guidance regarding potential impacts to those enrolled in the Forward Township Agricultural Security Area. No response has been received as of this submittal. These communications will be filed with FERC when received and any requests that differ from practices described below will be considered.

The following practices will be employed by the Project to minimize the potential for accelerated erosion and sedimentation and also to protect, maintain, reclaim and restore water quality. These best management practices (BMPs) are developed based on PADEP's Erosion and Sediment Pollution Control Program Manual (March 2012). Project-specific plans are in preparation for review and approval by the PADEP.

- Minimize the extent and duration of earth disturbance to the extent practicable. Temporary stabilization will occur if the construction activity is delayed for a period of 4 days or more. Areas outside the temporary workspace will remain as vegetated (or existing condition).
- Maximize protection of existing drainage features and vegetation. All runoff from disturbed areas will flow through BMPs for sediment removal.
- Restore to pre-existing use. As stated in Resource Report 1 (1.4.1), excavated soils will be stockpiled along the right-of-way. In agricultural areas, topsoil excavated for trenching will be segregated so that it can be replaced to its previous condition.
- After a segment of pipe has been installed, the trench will be backfilled, the segregated agricultural topsoil will be returned to its original horizon, and the work area will be graded to

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match original contours. In actively cultivated areas, the pipe will be backfilled with 48 inches of cover.

Other practices that may potentially be utilized are:

- The use of timber mats throughout or in soft areas to reduce the compaction, rutting, and erosion, especially in travel lanes that will get a lot of use.
- To address compaction, compost can be mixed in during backfilling.

Respondent: Stephanie Frazier

Position: Supervisor Permitting – Environmental, EQT Corporation

Phone Number: 412-553-5798

Date: April 20, 2016

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Resource Report 8 – Land Use, Recreation and Visual Resources

3. Update Table 8.1-5 (filed January 22, 2016) to include any private road crossings. Equitrans' response to RR8 No. 5 indicated that no private roads are crossed; however, appendix 1-I from the application lists private roads. For example, at MP 0.19 of the H-316 pipeline a road name "Private Rd/Driveway" is listed.

Response:

Table 8.1-5R has been updated and is presented as Attachment 8-3a. Appendix 1-I has also been updated and included as Attachment 8-3b.

Respondent: Stephanie Frazier

Position: Supervisor Permitting – Environmental, EQT Corporation

Phone Number: 412-553-5798

Date: April 20, 2016

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Resource Report 8 – Land Use, Recreation and Visual Resources

4. Revise Table 8.2-1 (filed January 22, 2016) to list all structures within 50 feet of the proposed workspaces. For example, the shed depicted within the workspace of the H-305 pipeline (MP 0.08) on Equitrans' alignment sheet is missing from the table, as well as several structures that would be located within the Redhook Compressor Station and Webster Interconnect footprints. Resolve the apparent discrepancies.

Response:

Table 8.2-1 (filed January 22, 2016) has been updated and included as Attachment 8-4 to list all structures within 50 feet of proposed workspaces.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 8 – Land Use, Recreation and Visual Resources

5. Update Table 8.1-3R as revised in the February 5, 2016 filing, to correct the following apparent errors:
- a. the row listing the totals for the project is the same as the row listing the totals for Pennsylvania even though there are also impacts in West Virginia;
 - b. impacts for the Redhook Compressor Station and the Mobley Tap are listed as higher for operation than for construction although construction acreages should include all operation acreages; and
 - c. acreages presented do not match acreages listed in Table 1.3-1 as revised on February 5, 2016.

Response:

Revised Table 8.1-3R is included as Attachment 8-5. Please note that in Table 8.1-3R that pipelines M-80 and H-158 were treated as a single pipeline whereas for Table 1.3-1 they were counted separately, which is why the reported total land acreage required for pipeline operation differs between the two tables.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 8 – Land Use, Recreation and Visual Resources

6. Revise Table 8.1-7 (filed February 5, 2016) to:
- a. depict all of the footnotes; and
 - b. include H318-AR-03.

Response:

Revised Table 8.1-7R is included as Attachment 8-6. All footnotes are depicted and H318-AR-03 is included.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 9 – Air Quality and Noise- Air Quality

1. For permitting purposes, provide analysis whether or not any of the upstream and downstream facilities, which could be considered operating as a unit in conjunction with the proposed compressor station (e.g., the compressed gas transmission pipeline and the next proposed interconnect), should be aggregated as one stationary source, in accordance with the Pennsylvania Department of Environmental Protection's (PADEP) guidance entitled Guidance for Performing Single Stationary Source Determinations for Oil and Gas Industries, Document Number 270-0810-006, effective October 6, 2012. The guidance states that air emissions sources may be treated as a single source for permitting purposes if they meet the applicable two of three-part regulatory test. Clarify whether the aggregated facilities were taken into consideration in the emissions calculations provided in RR9 appendix 9-C, or make corrections as necessary.

Response:

Equitrans performed a detailed Source Aggregation Analysis as part of the air permit application submitted to PADEP. The following is an excerpt from the air permit application, which was included as Appendix 9-D, that outlines the requested analysis. Based on the results of this analysis, no revisions are necessary to the emissions calculations provided in Appendix 9-C as there is no source aggregation. It is important to note that facilities must meet all parts of the regulatory test to be classified as a single stationary source.

“To determine applicability of various permitting programs to the proposed Redhook Compressor Station, a single source determination must be performed for the site. According to the Department's Guidance for Performing Single Stationary Source Determinations for Oil and Gas Industries (Docket 270-0810-006), the following three factors must all be met in order for emission sources to be aggregated and considered a single facility: (1) the sources all belong to the same industrial grouping; (2) the activities are located on one or more contiguous or adjacent properties; and (3) the activities are under common control.

The proposed Redhook Station will move gas from the northern portion of the Equitrans system south to a future interconnection with Mountain Valley Pipeline LLC's (Mountain Valley) proposed pipeline, as well as to existing interconnects with Texas Eastern Transmission, LP (Texas Eastern) and Dominion Transmission, Inc. (Dominion) on the southern portion of the Equitrans system.

The nearest facilities owned or operated by Equitrans to the proposed Redhook Compressor Station in Greene County are the Jefferson Compressor Station, the Pratt Compressor Station, and the Waynesburg Compressor Station. Upon completion and commissioning of the proposed Redhook station, the existing Pratt

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Station will be abandoned and decommissioned, and the existing gas contracts from the Pratt Station will be re-routed to the Redhook Compressor Station.

The Jefferson Station receives gas from third-party producers located in West Virginia and is strategically located close to the Texas Eastern (and Dominion) gas transmission line to facilitate transport of gas production to market on the East Coast via high-pressure interstate transmission lines. This station is not currently planned to have any direct tie-ins with the proposed Redhook Station that would require coordinated operation. The Jefferson Station is located approximately 2.8 miles from the location of the proposed Redhook Station.

The Waynesburg Station handles gas to market or storage, again primarily in Western Pennsylvania, which does not come from the sources which provide gas to the Redhook Station. This station is not currently planned to have any direct tie-ins with the proposed Redhook Station, nor swap or exchange gas between stations. The Waynesburg Station is located approximately 1.6 miles from the location of the proposed Redhook Station.

The area within a 50-mile radius of the proposed Redhook Station currently contains hundreds of well sites owned/operated by numerous different companies. EQT Production (a sister subsidiary of Equitrans) currently owns and operates wells in this area that currently send gas to the Pratt Station. While some of these wells may be located near the proposed Redhook Station, none have a unique or dedicated interdependent relationship with the site, and therefore should not be considered contiguous with the site. Furthermore, the proposed Redhook Station is a transmission compressor station, not a production facility or gas processing plant. Well sites are classified under Standard Industrial Code (SIC) Industry Group 1311 - *Crude Petroleum and Natural Gas*, whereas the proposed Redhook Station will be classified under SIC Industry Group 4922 - *Natural Gas Transmission*.

As a result of the above-described analysis, Equitrans has determined that the proposed Redhook Compressor Station is a single source and should not be aggregated with any other source.”

Respondent: Regina Henry
Position: Supervisor, Environmental, EQT Corporation
Phone Number: 412-553-7848
Date: April 20, 2016

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Resource Report 9 – Air Quality and Noise- Air Quality

2. As discussed in Equitrans' response to RR9 No. 4 (filed January 22, 2016), provide Equitrans' response to the PADEP's November 25, 2015 letter.

Response:

Equitrans' response to the PADEP's November 25, 2015 letter is included as Attachment 9-2.

Respondent: Regina Henry
Position: Supervisor, Environmental, EQT Corporation
Phone Number: 412-553-7848
Date: April 20, 2016

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Resource Report 9 – Air Quality and Noise- Noise

3. Section 9.2.6 of RR9 stated that: “although the [Redhook Compressor] station is predicted to have sound levels higher than the [Franklin Township’s Zoning Ordinance] at the station’s property line, adverse impact to the community is not expected based on the non-sensitive land use of the surrounding properties. Therefore, noise mitigation measures to meet the Township’s noise criteria have not been proposed.” File documentation of communications with Franklin Township regarding this noise ordinance and whether the Township concurs with Equitrans’ assessment.

Response:

Coordination with Franklin Township occurs during the local SALDO (Subdivision and Land Development Ordinance) permitting process. The Township reviews the Project plans, including anticipated noise impacts, and will vote on whether the Project can be constructed as presented. Because of the current industrial nature of the area Equitrans does not anticipate concerns regarding noise. Due to Project timing, the SALDO permit process has not yet started.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 10 – Alternatives

1. Update figure 10.2-1 to show existing NiSource pipeline facilities as described in Table 10.2-1.

Response:

Figure 10.2-1 has been revised to show existing NiSource pipeline facilities and is included as Attachment 10-1.

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 10 – Alternatives

2. Include a discussion of the feasibility of using electric-motor-driven compressors at the proposed new Redhook Compressor Station. Include the rate of electricity required and the number of electric motors required. Compare the size of the electric transmission line necessary under the current proposal with what would be required for the electric motors.

Response:

The proposed Redhook compressor station will include two turbine driven centrifugal compressors and two reciprocating driven reciprocating compressors powered by natural gas. The natural gas is obtained directly from the pipeline. A C-1000 gas driven micro turbine with 1,500 KVA purchase power backup is proposed for site power. Several factors justify gas drivers as opposed to electric drivers. These factors include energy prices (natural gas compared to purchase power), energy reliability (on site gas as opposed to single source electric transmission) and the cost and timeline to develop purchase power infrastructure. Also, the site foot print, operational requirements, and the higher cost required to install a larger quantity of smaller capacity units, limits the total number of compressor packages to four.

The base cost for natural gas at a rate of \$1.75/mmbtu at 75% load equates to \$12.10 per 1,000 hp for the reciprocating drivers and \$14.88 per 1,000 hp for the turbine drivers. The site average is \$13.94/1,000 hp. The base cost for electric drives at an estimated negotiated rate of \$0.055/Kw-hr equates to \$45,59 per 1,000 hp, which exceeds the natural gas cost by a factor in excess of 3.0. The additional energy cost is not feasible.

The use of onsite natural gas ensures energy reliability at the facility. If there is gas to compress, there is gas to power the drivers. Primary power is generated by micro turbine with purchase power backup for redundancy. The availability of purchase power for the turbines and reciprocating engines is limited to a First Energy 138 KV transmission line located approximately 5.25 miles south west of the facility. The Electric provider can deliver a level of redundancy by feeding the line from each direction but the 5.25 mile extension to the Redhook facility will be single source. There is a potential loss of service which is not desired.

The cost of the natural gas drivers, two Caterpillar 3616 (5,350 hp each) and two Solar Taurus 70's (10,500 hp each) are approximately \$8.5 MM. The cost for two 5,500 hp and two 11,000 hp electric motors and associated inverter drives are approximately \$6.0 MM. Inverter drives are required to provide soft starting and to provide the same level of operational flexibility as the engines and turbines. However, the electric drives require a 5.25 mile, 138 KV power line extension and a 4 MVA substation for an additional estimated cost of \$12.875 MM, which brings the total electric driver cost to \$18.75 MM. The total cost for the electric drivers compared to the turbine and engine drivers is in excess of 2.2 to 1. The time to develop the power line / substation infrastructure is approximately 2+ years which will extend the timeline of the project. The Project timeline extension and additional capital cost is not feasible.

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Based on the higher energy cost of electric compared to natural gas, the reliability provided with onsite energy in the form of natural gas, and the additional cost and time to develop the 138 KV power line and 4 MVA substation infrastructure, the use of electric drives is not feasible at the Redhook Compressor station.

Respondent: Doug Mace
Position: Principal Engineer, EQT Corporation
Phone Number: 412-395-7045
Date: April 20, 2016

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Resource Report 10 – Alternatives

3. Provide a discussion regarding the feasibility of using waste heat electric generation (cogeneration) for the proposed turbines at the proposed Redhook Compressor Station. Provide the rate of electricity potentially generated on a kilowatt/month basis and compare this with the amount of electricity used by the compressor station per month. Describe the average load factor of the facility and any impediments that would prevent the operation of the compressor station continuously at 60 percent minimum load. Compare the size of the electric transmission line necessary under the current proposal with what would be required under a cogeneration system with return to the electric grid.

Response:

In light of the Commission's interest in integrating alternative environmentally-friendly measures, EEP reviewed the commercial and technical viability of installing and operating waste heat recovery facilities on its system. Waste heat-to-power (WHP) is the process of capturing heat discarded by an existing industrial process and using that heat to generate power. EEP has determined that it is not economically feasible at this time to install heat recovery systems on the proposed compressor exhaust stacks and convert the waste heat into electric power. Varying pipeline operating conditions result in fluctuating turbine loads providing an inconsistent exhaust gas source for waste heat driven secondary energy extraction processes. EEP researched the total costs associated with designing, permitting, constructing, operating and maintaining a waste heat recovery system at the proposed Redhook compressor station, and compared these costs to the value of the estimated electric power that could be generated and sold back to the local utility. The comparison resulted in waste heat recovery generating costs substantially greater than the power sales cost estimate. Accordingly, it is not economically feasible to install a waste heat recovery system at the proposed compressor station. However, even though EEP is not proposing the installation of any waste heat facilities at this time, EEP will not preclude the installation of waste heat recovery facilities on its systems as conditions may change over time.

Based on the Organic Rankine Cycle, the total amount of waste heat generation possible from the two Caterpillar 3616 (5,350 hp each) and two Solar Taurus 70's (10,500 hp each) is approximately 12.5 MVA (10,650 kW). This compares to the total load for two 5,500 and two 11,000 hp motors which is approximately 30 MVA (23,650 kW). The WHP is based on 19% conversion of the waste heat to electric power which equates to 42% of the equivalent electric driver load. The estimated cost to install the WHP facilities is approximately \$24MM based on an installed capital cost of \$2,500/kW-hr. There are additional operations and maintenance (O&M) cost of \$.012/kW-hr which equates to approximately \$500K per year. Turbine operation at 60% minimum load continuously is not assured. Due to operational variability of the turbines, the produced power does not provide the reliability needed to support the 5,500 hp motors. All power generated would be sold back to the utility. The simple payback for the project based on an estimated \$.03/kW-hr by back, excluding the additional O&M cost, is 8.5 years. WHP is not feasible at this time.

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In addition, EEP has considered the possibility of using waste heat recovery as a heat source for cold weather operations. This would be primarily for building heat. Site buildings include the compressor building, motor control center building, air systems building and office/storage building. The compressor buildings are ventilated with a heat source from one or more compressor units and do not include or require heating. The motor control center building generates substantial heat and only require cooling. The air system building generates substantial heat and requires ventilation, not heat. An office building space of approximately 160 sq. ft. will require heat, but this small amount of space does not justify the cost, operation and maintenance of waste heat recovery equipment.

Respondent: Doug Mace
Position: Principal Engineer, EQT Corporation
Phone Number: 412-395-7045
Date: April 20, 2016

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Resource Report 10 – Alternatives

4. Provide clarification for the statement that: “the Redhook Site does not require many existing pipelines to be realigned.”

Response:

The existing pipelines associated with the Redhook facility (H-106, H-138, H-148, GSF-360) cross the east side of the Proposed Redhook Station. The lines route through Redhook from the Existing Pratt Station located approximately 0.25 miles south of Redhook. M-80 and H-158 currently terminate at Pratt but will be routed north to Redhook and will parallel existing lines.

Refer to the Alignment Sheets in Attachment General -1, Sheet PA-GRPA-316-01 (Rev. 2)

Respondent: Stephanie Frazier
Position: Supervisor Permitting – Environmental, EQT Corporation
Phone Number: 412-553-5798
Date: April 20, 2016

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Resource Report 10 – Alternatives

5. Provide an update regarding each landowner's willingness to accommodate the aboveground facilities. Provide a minor route variation analysis for each residence within 10 feet of the construction work area where the landowner has not yet provided a written agreement. Identify any residences and structures that would be purchased by Equitrans in the vicinity of the aboveground facilities.

Response:

Except for the Redhook Compressor Station, all aboveground facilities are owned by Equitrans or there is no residence within 10 feet of the construction work area. Therefore no minor route variation analysis is necessary.

As described in Resource Report 10, Section 10.4.2 there are four residences at the Redhook Compressor Station Site that will be affected. Table 10-1 summarizes the current status of effects on residents. Equitrans is confident it will be able to finalize the purchase of all necessary properties at the Redhook Compressor Station site on mutually agreeable terms.

Table 10-1		
Potential Effects on Residents due to Residence Removal		
Residence No. <u>a/</u>	Potential Effects	Status as of March 2016
Proposed Redhook Compressor Station Site		
1	None – willing seller	Purchase complete
2	None – willing seller	Signed sales agreement
3	None – willing seller	Signed sales agreement
4	None – seller	Negotiating
Alternative East Compressor Station Site		
1	Unknown	None
2	Unknown	None
<u>a/</u> See Resource Report 10, Figure 10.4-1 for residence locations.		

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Table 10-2 identifies where a residence occurs within 10 feet of the construction work area at other aboveground facilities

Table 10-2		
Other Aboveground Facilities		
Facilities	Approximate Milepost	Residences within 10 Feet of Construction Work Area
Webster Interconnect	H-319, MP 0.04	Residence – Purchase complete
Mobley Tap	H-302, MP 0.60	None
Pig Launcher/Receiver (L/R) Facilities		
Applegate L/R Site	H-318, 0.00	None
Hartson L/R Site	H-318, 4.26	Residence – Purchase complete
H-302 Tap L/R Site	H-316, 2.99	None
Tap Sites		
H-302 Tap Site	H-316, 2.99	None
H-306 Tap Site	H-319, 0.00	None
H-148 Tap Site	H-318, 4.20	None

Respondent: Stephanie Frazier

Position: Supervisor Permitting – Environmental, EQT Corporation

Phone Number: 412-553-5798

Date: April 20, 2016

Attachment General-2 Table 1.4-1R (Revised April 20, 2016) ATWS Located within 50 feet of Waterbodies and Wetlands									
Project Feature	Milepost	County	State	ATWS	ATWS Use	ATWS Length x Width a/	Wetland or Waterbody ID	Offset	Justification
								(feet)	
Wetlands									
H-316	1.5	Greene	Pennsylvania	H316 ATWS 05	Laydown Area	2376' x 228'	W-AA8	0	ATWS is located in open field. Work Space to stage the pipe bending crew. Work will be done over timbermats to prevent compaction and rutting.
H-316	2	Greene	Pennsylvania	H316 ATWS 06	HDD Pullback	825' x 211'	W-AA9	0	Workspace needed for pipe stringing and pullback of the HDD section. Work will be done over timbermats to prevent compaction and rutting.
H-316	2.8-3.0	Greene	Pennsylvania	H316 ATWS 07	H-316 HDD Entrance Location/H-302 Hot Tap Location	Irregular Shape	W-M2,W-M3, W-M4, W-M5, W-M6	0 - 5	To allow adequate work space to construct the HDD activities, stage and conduct H-302 Hot Tap, and Launcher/Receiver. No impacts to wetlands are anticipated. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.
H-318	2.8	Allegheny	Pennsylvania	H318 ATWS 05c	H-318 HDD Entrance Location	Irregular Shape	W-BB13	10	HDD Entrance Area. To allow adequate work space to construct the HDD activities and groundbed installation. No impacts to wetlands are anticipated. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.
H-319	0	Wetzel	West Virginia	H319 ATWS 01	Laydown Area	Irregular Shape	W-Z3A	11	To allow adequate space to stage materials and equipment for pipeline construction as well as maintain a buffer to S-A2A. The workspace is located in open field and limits tree disturbance. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.
H-319	0.04	Wetzel	West Virginia	H319 ATWS 02	Hot Tap Workspace	Irregular Shape	W-Z3B	0	To allow adequate work space to construct the Hot Tap as well as maintain a buffer to S-A2A. Work will be done over timbermats to prevent compaction and rutting.

Attachment General-2 Table 1.4-1R (Revised April 20, 2016) ATWS Located within 50 feet of Waterbodies and Wetlands									
Project Feature	Milepost	County	State	ATWS	ATWS Use	ATWS Length x Width a/	Wetland or Waterbody ID	Offset	Justification
								(feet)	
Redhook	N/A	Greene	Pennsylvania	Redhook ATWS 01	Laydown Area	Irregular Shape	W-AA1	5	To allow adequate space to stage materials and equipment for compressor station construction. Equitrans owns this workspace, previously used as yard in other Equitrans projects. No impact to the wetland will occur. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.
Webster	N/A	Wetzel	West Virginia	Webster ATWS 01	Additional Workspace	625' x 82'	W-Z2	0	To allow adequate space to stage materials and equipment for work at the Webster Interconnect. Workspace is limited to the open area to avoid impacts on trees. Work will be done over timbermats to prevent compaction and rutting.
Waterbodies									
H-158/M-80	0.1	Greene	Pennsylvania	H-158/M-80 ATWS 01	Temporary Storage Area	Irregular Shape	S-AA1	0	Workspace is needed to allow adequate turning radius for equipment and material delivery. Stream impacts will be avoided by construction. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter; and any crossing of the stream will be done by timbermat bridge.
H-158/M-80	0.1	Greene	Pennsylvania	H-158/M-80ATWS 02	Temporary Storage Area	Irregular Shape	S-AA1	10	Workspace is needed for pipe bending and staging area. Equitrans owns this workspace, previously used in other Equitrans projects. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.
H-305	0.1	Greene	Pennsylvania	H305 ATWS 01	Laydown Area	Irregular Shape	SN-1	0	Work Space to tie into existing station. Stream impacts will be avoided by construction. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.
H-316	2.8-3.0	Greene	Pennsylvania	H316 ATWS 07	H-316 HDD Entrance Location/H-302 Hot Tap Location	Irregular Shape	S-M1	2.4	To allow adequate work space to construct the HDD activities, stage and conduct H-302 Hot Tap, and Launcher/Receiver. Stream impacts will be avoided by construction. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.

Project Feature	Milepost	County	State	ATWS	ATWS Use	ATWS Length x Width a/	Wetland or Waterbody ID	Offset	Justification
								(feet)	
H-318	1.7	Allegheny	Pennsylvania	H318 ATWS 02a, c, d	Additional Workspace	2a: 530' x 120' 2c: 130' x 50' 2d: 50' x 50'	S-BB3	10	Work Space to install the pipeline, and mitigate any slide issues if they would arise. Adequate workspace to conduct the dam and pump is limited by topography and adjacent roadways. Stream impacts within the ATWS will be avoided by construction. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.
H-318	2.7	Allegheny	Pennsylvania	H318 ATWS 05a	Laydown Area	Irregular Shape	S-BB4	0	Workspace needed to conduct conventional road bore of Bunola River Road and sufficient workspace to conduct the dam and pump. Sediment barriers such as silt fence or compost filter sock will be installed around its south perimeter.
H-318	2.8	Allegheny	Pennsylvania	H318 ATWS 05c	H-318 HDD Entrance Location	Irregular Shape	S-BB4, S-BB6	0	HDD Entrance Area. To allow adequate work space to construct the HDD activities and groundbed installation. ATWS placement is constrained by Bunola River Road, adjacent Railroad, and topography to the south. No impacts to streams are anticipated with the exception of installation of the groundbed. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter, and any crossing will be made with a timbermat bridge.
Redhook	N/A	Greene	Pennsylvania	Redhook ATWS 01	Laydown Area	Irregular Shape	S-AA1	10	To allow adequate space to stage materials and equipment for compressor station construction. Equitrans owns this workspace, previously used as yard in other Equitrans projects. No impact to the stream will occur. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.
Webster	N/A	Wetzel	West Virginia	Webster ATWS 01	Additional Workspace	625' x 82'	S-A2A, S-A3A	0	To allow adequate space to stage materials and equipment for work at the Webster Interconnect. Workspace is limited to the open area to avoid impacts on trees. Work will be done over timbermats to prevent compaction and rutting. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.

a/ Length and Width estimates are approximate; no dimensions were provided if ATWS was irregularly shaped.

SPILL PREVENTION, CONTROL, AND COUNTERMEASURES (SPCC) PLAN

PREPARED FOR:

**EQUITRANS, L.P.
EQUITRANS EXPANSION PROJECT
REDHOOK COMPRESSOR STATION**

SITUATED IN:

FRANKLIN TOWNSHIP, GREENE COUNTY, PENNSYLVANIA

APRIL 2016

Spill Prevention, Control, and Countermeasure (SPCC) Plan

Prepared for

Equitrans, LP
625 Liberty Ave
Suite 1700
Pittsburgh, Pennsylvania 15222

This document has been prepared by Tetra Tech, Inc. The material and data in this report were prepared under the supervision and direction of the undersigned.

_____, P.E.
Manager, Civil Engineering

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- Appendix A – Site-specific Information
- Appendix B – Emergency Contacts
- Appendix C – P.E. Certification
- Appendix D – Equitrans, LP Commitment
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- Appendix F – Guidelines for Spill, Release, and Event Notification and Reporting
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- Appendix H – Environmental Incident Report & Spill Report Form
- Appendix I – Record of SPCC Plan Review and Amendment
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ACRONYMS

AST	Aboveground Storage Tank
CFR	Code of Federal Regulations
FRP	Facility Response Plan
NRC	National Response Center
P.E.	Professional Engineer
PPC	Preparedness, Prevention, and Contingency
SPCC	Spill Prevention, Control, and Countermeasure
UST	Underground Storage Tank
USEPA	United States Environmental Protection Agency
PADEP	Pennsylvania Department of Environmental Protection

1.0 INTRODUCTION

This Spill Prevention, Control, and Countermeasure (SPCC) Plan is required by the United States Environmental Protection Agency (USEPA) regulations contained in Title 40 of the Code of Federal Regulations (CFR), Part 112 (40 CFR 112 — SPCC Rule). This Plan meets the requirements of the updated rule published in the July 17, 2002 Federal Register and any amendments up to the date of this Plan. This Plan generally follows the format of the SPCC Rule and each section heading provides the applicable 40 CFR 112 section denoted by the section sign §.

This Plan is for the Redhook Compressor Station, owned and operated by Equitrans, LP. The facility and its associated storage tanks are considered an onshore facility regulated under 40 CFR 112.8. The materials stored in the tanks at the site include produced fluid, used oil, new/used MEG (monoethylene glycol), new/used TEG (triethylene glycol), compressor oil, and engine oil. Compressor oil and engine oil are lubricating oils used in the compressor engines onsite. Used oil consists primarily of spent compressor and engine oils. Produced fluid is removed from the natural gas through a dehydration process and accumulates in storage tanks. Produced fluid contains hydrocarbon compounds present in natural gas liquid condensate. TEG is used as cooling compounds in the dehydration units and MEG is used as a coolant for the compressor engines. Equitrans, LP regularly removes the produced fluid from storage tanks using a vacuum truck or other water-hauling truck for offsite disposal and/or treatment.

1.1 APPLICABILITY, PLAN PREPARATION, AND IMPLEMENTATION (§112.1 AND 112.3)

The SPCC Rule is applicable to any owner or operator of a non-transportation related onshore or offshore facility engaged in drilling, producing, gathering, storing, processing, refining, transferring, distributing, using, or consuming oil and oil products; which due to its location, could reasonably be expected to discharge oil in quantities that may be harmful into or upon the navigable waters of the United States or adjoining shorelines. A facility is subject to the SPCC Rule if the total aboveground storage capacity of oil and oil products exceeds 1,320 gallons, or if the underground storage capacity exceeds 42,000 gallons, and if, because of its location, the facility could reasonably be expected to discharge oil into navigable waters of the United States. Oil-filled bulk storage containers and oil-filled operational equipment with a capacity of less than 55 gallons, permanently closed bulk storage containers, and motive power equipment are not included in the total storage capacity of the facility and are exempted from requirements under the SPCC Rule.

This Plan has been developed and certified for Equitrans, LP (Equitrans), a subsidiary company of the EQT Corporation. Site-specific information for this facility has been included in Appendix A. Emergency contact information is provided in Appendix B. The Professional Engineer certification is included in Appendix C.

1.2 SPCC PLAN MAINTENANCE (§112.3(e))

This Plan shall be maintained and shall be available, upon request, to the USEPA or a duly authorized representative for review. A copy of this Plan will be available onsite in the project mailbox, job-trailer or with the on-site coordinator and at the District Office. Equitrans shall submit copies of this Plan to the USEPA or Pennsylvania Department of Environmental Protection (PADEP) upon request.

1.3 AGENCY REQUIRED AMENDMENT OF THE SPCC PLAN (§112.4)

USEPA may require Equitrans to modify its Plan in response to a facility spill event, if the spill reaches navigable waters and meets either of the following conditions:

- Discharge of oil from a single spill event exceeding 1,000 gallons of oil; or
- Discharge of oil from two spill events within a 12-month period that are in excess of 42 gallons of oil, as defined in 40 CFR Part 112.1(b).

If a spill at the facility meets the above criteria, the following information required by 40 CFR 112.4 shall be provided to the USEPA Regional Administrator and PADEP within 60 days:

1. Name of the facility;
2. Name of person filing report;
3. Location of the facility;
4. Maximum storage or handling capacity of the facility and normal daily throughput;
5. Corrective action and countermeasures taken, including a description of equipment repairs and replacements;
6. An adequate description of the facility, including maps, flow diagrams, and topographical maps, as necessary;

7. The cause of such discharge as described in 40 CFR 112.1(b), including a failure analysis of the system or subsystem in which the failure occurred;
8. Additional preventive measures taken or contemplated to minimize the possibility of recurrence; and
9. Such other information as the Regional Administrator may reasonably require pertinent to the Plan or discharge.

Upon review, USEPA may require Equitrans to amend the Plan. Within 30 days from receipt of such notice, Equitrans would be required to submit an acceptance or appeal of the proposed amendment. If Equitrans accepts the amendment, the Plan would be revised within 30 days after receiving notice and the changes implemented within six months. If the amendment is appealed, USEPA may request additional information and then render a decision within 60 days of receiving the appeal. Equitrans would be notified of the decision so that necessary actions may be taken.

1.4 GENERAL REVIEW AND PLAN AMENDMENT (§112.5)

Equitrans will review and evaluate this Plan at least once every five years. If during this review, Equitrans identifies alternative spill prevention and control technology that may significantly reduce the likelihood of a spill event and that has been field-proven at the time of review, Equitrans may implement such technology and include it in the revised Plan. Equitrans shall also amend this Plan whenever there is a change in facility design, construction, operation, or maintenance that materially affects the potential for a release to the environment. Such amendments shall be completed as soon as possible, but no later than six months after the addition or change occurs.

Technical amendments and revisions shall be certified by a registered Professional Engineer (PE). Changes to emergency contact names and other minor changes that do not affect the potential for a spill, secondary containment, or drainage, do not require the certification of a registered P.E. The Record of SPCC Plan Review and Amendment Form should be used to keep a record of changes to the facility and SPCC Plan reviews and modifications. The form has been included as Appendix I.

1.5 QUALIFIED FACILITIES (§112.6)

The owner or operator of a qualified facility as defined below may self-certify the facility's SPCC Plan, as provided in 40 CFR 112.6. A qualified facility is one that meets the following Tier I or Tier II qualified facility criteria.

- A Tier I qualified facility meets the qualification criteria of a Tier II facility and has no individual aboveground oil storage container with a capacity greater than 5,000 gallons.
- A Tier II qualified facility is one that has had no single discharge exceeding 1,000 gallons or no two discharges each exceeding 42 gallons within any twelve-month period in the three years prior to the SPCC Plan self-certification date, or since becoming subject to this part if the facility has been in operation for less than three years (other than discharges that are the result of natural disasters, acts of war, or terrorism), and has an aggregate aboveground oil storage capacity of 10,000 U.S. gallons or less.

This facility does not meet the definition of a qualified facility; therefore, a professional engineer is required to certify this facility's Plan.

2.0 GENERAL SPCC PLAN REQUIREMENTS (§112.7)

2.1 MANAGEMENT APPROVAL (§112.7)

The required management approval and commitment is included in Appendix D.

2.2 CONFORMANCE WITH SPCC RULE (§112.7(a)(1) AND 112.7(a)(2))

This Plan is organized to present the required information in a concise and understandable format, easily understood by Equitrans' spill responders. The Plan follows the general format of the SPCC Rule and incorporates all of the applicable parts of the SPCC Rule; therefore, a cross-reference table is not required. If this Plan deviates from a specific requirement of the SPCC Rule, that portion of the Plan will provide the equivalent environmental protection including the reasons for nonconformance and a detailed description of the alternate methods used to achieve the equivalent environmental protection.

2.3 SITE CHARACTERISTICS (§112.7(a)(3))

The relative location of the facility and equipment layout is shown on Figure 1 and will be updated once the site is constructed (Redhook Compressor Station Mechanical Piping Plot Plan). The general location and drainage direction of the facility is shown on Figure 2 (Post Construction Stormwater Management Plan) and Figure 3 (USGS Project Location Map), and a photo of the site is shown on Figure 4 (Photo Log). Detailed information including location, district office, tank information, and failure predictions are included in Appendix A, Site-specific Information.

2.3.1 OIL INVENTORY (§112.7(a)(3)(i))

Bulk storage containers are defined by the SPCC Rule as any container used to store oil or oil products for the purpose of storing oil prior to use, while being used, or prior to further distribution in commerce. Typical bulk storage containers include aboveground storage tanks (AST), underground storage tanks (UST), totes, and drums. Bulk storage containers can also be mobile or portable oil containers. Specific information for the bulk storage containers at the facility, including the available secondary containment and predicted flow, are included in Appendix A. Bulk storage container locations are shown on Figure 1.

Oil-filled electrical, operating, or manufacturing equipment are not considered bulk storage containers, but are subject to the SPCC Rule. When oil-filled operating equipment is located at a facility, its location, contents, and approximate oil volume shall be shown on Figure 1 with detailed information in Appendix A. Motive equipment, including forklifts and trucks, are exempt from the SPCC Rule per USEPA fact sheet No. USEPA-550-F-06-009.

2.3.2 GENERAL DISCHARGE PREVENTION MEASURES (§112.7(a)(3)(ii))

Equitrans employs several measures to prevent discharges from bulk storage containers. The following general discharge prevention measures are employed by Equitrans to help prevent discharges from occurring.

- An Equitrans employee or contractor (qualified person) that has been properly trained shall be present during the unloading of petroleum pipeline fluids from the bulk storage containers.
- No material transfers shall be left unattended.
- The freeboard volume of each tanker truck to be filled shall be verified prior to unloading operations commencing to help prevent spills from occurring.
- Before commencing unloading of petroleum pipeline fluids from the bulk storage containers, the handbrake of the tanker truck shall be set to prevent vehicle motion. This shall continue while the transfer operations are in process.
- To facilitate transfer operations, typically the engine of the truck shall be running to operate the pump. If the engine does not have to be running to operate a pump, then the engine of the truck shall be shut-off during transfer operations.
- A qualified person shall maintain an unobstructed view of the transfer operation at all times. Frequent inspection of the truck, tank, and hoses/pipes shall be made to help verify that no leaks are present.
- Following completion of the transfer, a qualified person shall:
 - Verify that any residuals from hose disconnects are properly cleaned up. Cleanup or capture any residuals from the transfer operation.
 - Verify that the storage tank, fill line cap, and valve settings are correct.
 - Verify that tanker ports and valves are leak-free.
- Smoking or open flames are not permitted on or around the facility during transfer operations.
- Tooling that has the possibility of generating a spark or could damage the transfer equipment is not permitted.

- All spills or leaks should be reported to the Foreman and the Environmental Coordinator, regardless of quantity. Equitrans Environmental and Legal Department shall determine applicable reporting requirements.

2.3.3 DISCHARGE AND DRAINAGE CONTROLS (§112.7(a)(3)(iii))

Secondary containment for each bulk storage container is described in Appendix A. General discharge and drainage control measures designed and employed by Equitrans are described below.

Bulk Storage Containers

- Compressor Operators visually observe bulk storage containers at least monthly (non-documented visual inspections).
- Bulk storage containers are painted as needed to prevent damage by corrosion.
- Bulk storage containers are constructed of materials compatible for the intended use.
- The venting capacities of bulk storage containers are designed to be suitable for applicable loading and unloading rates.
- Pipelines passing through secondary containment structures are valved at the tank to allow shutoff of the flow in case the pipe ruptures.
- Vacuum hose or other conveyance used for loading or unloading to trucks is allowed to drain into the tank or secondary containment structure after use to verify there is no residual liquid in the hose before it is loaded back onto the truck.
- Bulk storage containers are inspected monthly and include an inspection of supports and foundations, exterior condition, piping, and secondary containment. Records are maintained at the District Office.
- Secondary containment has been provided for all bulk storage containers. Secondary containment includes double-walled tanks and is used to protect the environment by catching and containing spills.

Pipe Installations

- If regulations require, new or replaced underground pipes shall be constructed with appropriate protective wrappings or coatings and are cathodically protected if soil conditions warrant.
- Pipe supports are designed for the type of pipe and loading.
- Aboveground pipes are inspected monthly with the bulk storage container inspections.

2.3.4 SPILL RESPONSE PROCEDURES (§112.7(a)(3)(iv)-(vi))

In the event of an oil spill that results in, or has potential to cause injury to people, property, or the environment, Equitrans personnel shall immediately take prudent corrective action, refer to Appendix F – Guidelines for Spill, Release, and Event Notification and Reporting. Personnel responsible for using and maintaining the oil and petroleum storage and handling facilities are trained in the following spill response measures:

- Identifying spills and potential spill migration routes;
- Spill reporting procedures; and
- First responder containment methods and responsibilities. In the event of a spill, initial actions will include:
 1. Stopping the source of the spill;
 2. Deactivating energy sources, if safe to do so;
 3. Initiating actions to contain the spill and/or recover released materials depending on the size of the release (see below); and
 4. Initiating appropriate notification procedures.

For the purpose of establishing appropriate response procedures, this Plan classifies discharges as either "incidental" or "significant" depending on the size and characteristics of the release.

2.3.4.1 Incidental Discharges

An "incidental" discharge is defined as one that poses no significant harm (or threat) to human health and safety or to the environment and generally includes:

- Small discharge quantities(e.g., all spills shall be reported to the Foreman and Equitrans Environmental/Legal Department);
- Discharged material that is easily stopped and controlled at the time of the discharge;
- Discharge that is localized near the source;
- Discharged material not likely to reach water;
- Little risk to human health or safety; and/or
- Little risk of fire or explosion.

"Incidental" discharges can usually be cleaned up by Equitrans personnel per the following guidelines:

1. Immediately notify Equitrans personnel (contact information is included in Appendix B);
2. Under the direction of the Foreman, contain the discharge with spill response materials;
3. Place discharge debris in properly labeled waste containers;

4. The Foreman or trained employee shall complete the EQT Environmental Incident Report & Spill Report form; and
5. If the discharge involves more than 5 gallons of oil and does not meet the definition of an "incidental" discharge, the Foreman or the trained employee shall implement the spill response procedures below for a "significant" discharge.

2.3.4.2 Significant Discharges

A "significant" discharge is defined as one that cannot be safely controlled or cleaned up by facility personnel, such as when:

- The discharge is larger than 5 gallons;
- The discharge is large enough to spread beyond the immediate discharge area;
- The discharge requires special equipment or training to clean up;
- The discharged material enters water or threatens to enter water in quantities sufficient to cause a sheen;
- The discharge contaminates or threatens to contaminate soil;
- The discharged material poses a hazard to human health or safety; or
- There is a danger of fire or explosion.

In the event of a "significant" discharge, all personnel shall immediately evacuate the discharge area and move a safe distance from the discharge and immediately notify the Emergency Coordinator. If the Emergency Coordinator is not available, contact additional personnel listed on the Chain of Command contact list. The Emergency Coordinator has authority to initiate the following spill response and notification procedures:

1. Immediately notify Equitrans personnel (contact information is included in Appendix B);
2. Call for medical assistance if workers are injured;
3. Notify the Fire Department or Police Department, if needed;
4. Call the appropriate spill response and cleanup contractors;
5. Implement the spill reporting and notification requirements (see Section 2.3.5 for a contact list and phone numbers);
6. The Foreman or trained employee shall complete the EQT Environmental Incident Report & Spill Report form; and
7. Coordinate cleanup activities with spill response and cleanup contractors.

2.3.4.3 Safety

Equitrans personnel shall only respond to spills and perform cleanup to the level of their personnel protection equipment training. Stations shall have standard pre-assembled spill kits. At no time shall Equitrans personnel respond to a spill if toxic, flammable or explosive limits are present. If any other threat levels are present, a professional clean team shall be contacted.

2.3.4.4 Disposal of Recovered Materials

The disposal of recovered materials shall vary depending on the type, volume, and condition of the material and release. The disposal shall be conducted in accordance with state and federal regulations. Emergency containment actions are designed to keep oil products from reaching navigable waters, streams, and wetlands. The Foreman shall arrange for the disposal of recovered materials.

Oil containing rags, used oil filters and other oil containing articles shall be stored and disposed of properly.

2.3.4.5 Spill Response Equipment

Spill response materials, such as absorbent pads and pillows, loose particulate absorbent, gloves, shovels, etc., are available onsite as well as in the Compressor Operators' vehicles. Spill response materials shall be inspected periodically and replenished as needed.

2.3.5 SPILL REPORTING/NOTIFICATION PROCEDURES (§112.7 (a)(4) AND 112.7(a)(5))

The following agencies shall be contacted in the event of an oil, fuel or chemical spill.

Agency	Spill Size/Media	Verbal Report	Phone Number	Written Report
National Response Center (NRC)	Soil, water or drains: Spills in excess of reportable quantity or oil/fuel spills that create a water sheen	Immediately (1 hour)	(800) 424-8802	30 days

Agency	Spill Size/Media	Verbal Report	Phone Number	Written Report
USEPA — Region 3	To surface water: 1,000 gallons in a single spill or 42 gallons or greater twice within any 12-month period	Immediately to the NRC	(215) 814-5000	60 days
PADEP	Spill or accidental discharge of any pollutant to the waters of the state	Immediately (<4 hours after spill)	(412-442-4000) Southwest Regional Office	Submit report within 5 days of spill.

In general, when contacting the state and federal agencies, the following information should be available:

- Location of release (i.e., site address and appropriate building);
- Phone number of facility;
- Date and time of the release;
- Material and estimated quantity of the release (including total quantity, quantity released to water, and concentration of the material);
- Source of the release;
- Description of all affected media;
- Description of existing or potential hazards, if any;
- Personal injuries or casualties, if any;
- Resource damages, if any (dead fish, wildlife);
- Cause of the release;
- Actions being taken to stop, remove, and mitigate the effects of the release;
- Whether an evacuation may be required; and
- Name of other individuals or organizations that may have been contacted.

The instructions provided below may be used as a guide for internal and external reporting of releases of oil, petroleum products, hazardous substances, or hazardous waste, and for documenting any contacts made with the responsible agencies. The Emergency Coordinator or their designee shall make all official notifications of spills associated with Equitrans activities to the regulatory agencies.

2.3.5.1 National Response Center

A reportable release or discharge shall be reported immediately to the National Response Center (NRC) at **1-800-424-8802**. The NRC shall require the following basic information concerning the release:

- The name and telephone number of the caller;
- The name and address of the facility;
- The time and type of incident;
- The location of the spill outfall;
- The name and quantity of the material released, to the extent that this information is available;
- The extent of injuries, if any; and
- The possible hazards to human health or the environment outside the facility. The NRC will relay, if necessary, required emergency information to the USEPA and state.

2.3.5.2 United States Environmental Protection Agency

If the NRC's number is not answered, a reportable release or discharge should be reported directly to USEPA, Region 3, at **1-215-814-5000**. In addition, federal regulations require that the Regional Administrator of the USEPA be notified of certain discharges of oil to navigable waters of the U.S. or adjoining shorelines. The Regional Administrator shall be notified within 60 days whenever a facility regulated under 40 CFR 112 has discharged more than 1,000 gallons of oil due to a single spill, or has twice within any 12-month period discharged oil to water in volumes of 42 gallons or greater. The notification shall include the following information:

- The name of the facility;
- The name of the owner or operator of the facility;
- The facility location;
- The date on which operations at the facility commenced;
- The maximum oil storage or handling capacity of the facility, together with the normal daily use of oil;
- A description of the facility, including topographic maps, facility plot plans, and flow diagrams;
- A complete copy of the facility's Plan, including any amendments;
- A description of the cause of the spill, including a failure analysis of the system or subsystem in which the failure occurred;

- A description of the corrective actions and countermeasures taken by the facility, including a description of any repairs to equipment;
- A discussion of any additional preventive measures taken or contemplated to reduce the possibility of a recurrence; and
- Any additional information related to the spill or the Plan that the Regional Administrator may require.

This report shall be sent to:

U.S. Environmental Protection Agency
1650 Arch Street
Philadelphia, PA 19103-2029
Attention: Environmental Cleanup Office

According to federal regulations, a complete copy of the information submitted to the Regional Administrator shall also be submitted to the authorized state agency.

2.3.5.3 Pennsylvania Department of Environmental Protection

The PADEP, Southwest Regional Office shall be notified immediately (less than 4 hours after discovering the incident) at **412-442-4000** if a spill or accidental discharge of any pollutant reaches the waters of the state, including streams, wetlands, impacts to groundwater, storm sewers, and drainage ditches.

2.4 POTENTIAL FOR EQUIPMENT FAILURE (§112.7(b))

The typical types of tank failure or accidents in which oil could be discharged from the facility are discussed in the following sections. The scenarios and estimated discharge rates address the most likely discharge from the primary containment system.

2.4.1 ABOVEGROUND STORAGE TANKS

Tank Failure or Leak: Failure of an AST could be caused by damage to a pump, pipe, or fitting; accidental puncture; or a catastrophic or natural disaster event. The total quantity that could be

released varies based on the total volume of the tank. The flow direction and expected rate of flow for the most likely discharge from an AST are provided in Figures 2 and 3 and Appendix A.

Tank Loading Releases: Spills could also occur during tank transfer operations due to overfills, leaking piping connections, vehicular accident, or human error. The total quantity that could be released varies based on the total volume of the tank. The flow direction and expected rate of flow for the most likely discharge from an AST are provided in Figures 2 and 3 and in Appendix A.

2.4.2 PORTABLE STORAGE CONTAINERS

If present, a release may occur from a storage drum due to corrosion, accidental puncture, or natural disaster event. Spills could also occur due to human error during material transfer. The total quantity that could be released varies based on the total volume of the container. The flow direction and expected rate of flow for the most likely discharge from a drum are provided in Figures 2 and 3 and in Appendix A.

2.5 SECONDARY CONTAINMENT (§112.7(c) AND 112.7(d))

Secondary containment for each bulk storage container is described in Appendix A. The bulk storage containers at the facility are double-walled tanks with adequate overfill prevention measures. The facility meets the secondary containment requirements of the SPCC Rule; therefore, the impracticality determination in 40 CFR 112.7(d) does not apply.

Since secondary containment for most separators and other flow through equipment is not practical, Equitrans has implemented a Preparedness, Prevention and Contingency (PPC) Plan to be used as an Oil Spill Contingency Plan and has declared the following written commitment of manpower, equipment, and materials (see PPC Plan in Appendix J).

Equitrans is committed to the prevention of discharges of oil to navigable waters and the environment and maintains the highest standards for spill prevention, control, and countermeasures through regular review, updating, and implementation of this Plan. Equitrans will commit the necessary manpower, equipment, and materials required to expeditiously control and remove any quantity of oil discharged that may be harmful. By the signature under "Equitrans, LP Commitment," which is located in Appendix D, Equitrans also commits to maintaining the necessary financial commitment.

2.6 INSPECTIONS, TESTING AND RECORDS (§112.7(e))

See Section 3.2.3 for a discussion of Equitrans' inspection program for the bulk storage containers. All inspection records are maintained in an electronic database for at least three (3) years.

2.7 PERSONNEL TRAINING (§112.7(f))

Equitrans personnel receive training in the safe handling of oil and in spill prevention and response procedures, as required by their assigned jobs. This training covers compressor station and pipeline specific information, including discharge prevention and response. The Emergency Coordinator is accountable for oil discharge and prevention at each applicable compressor station and/or tank battery site. Refresher training sessions are held annually. The training program addresses the correct actions to take in the event of a spill, the appropriate people to be contacted, and other pertinent information presented in this Plan. At a minimum, the following topics are discussed during the training:

- Operation and maintenance of equipment to prevent discharges;
- Discharge procedure protocols;
- Applicable state and federal rules and regulations;
- Any known discharges, failures, or malfunctions at the facility;
- Any recently developed precautionary measures;
- General facility operation; and
- Contents of the Plan.

Annual personnel briefings and discharge prevention training events shall be documented and the records kept in an electronic database for a minimum of three (3) years. In addition, basic Level-D Hazardous Materials training shall be provided for all oil handling operating personnel which covers oil discharge prevention, containment, and retrieval methods.

Equitrans also performs training to reduce the hazard posed by static electricity while transferring liquids to or from storage tanks. Static electricity generated during filling, draining, or routine pumping operations around ASTs can cause sparks, which could ignite a tank's contents, potentially causing a fire or explosion that could result in a release of oil. Personnel are trained to follow four rules to prevent static electricity sparks:

- Ground metallic equipment and other electrical conductors where flammable atmospheres can exist.

- Do not open, sample gauge, disturb, or insert anything into a tank while it is being filled or emptied.
- Minimize the delivery rate to reduce static buildup.
- Wait at least thirty (30) minutes after filling a tank before opening, sampling or inserting an object into it.

2.8 SECURITY (§112.7(g))

Per 40 CFR 112.7(g), security measures are implemented at this facility to prevent unauthorized access to oil handling, processing, and storage areas which could lead to an accidental or intentional release. Access to the oil handling, processing and storage areas onsite shall be restricted to properly trained Equitrans employees. Entrance to the facility is by authorized personnel only. Security fencing and access gates shall be used to prevent unauthorized access to the facility. Master flow and drain valves shall be equipped with locking mechanisms. Access to pumps, starter controls, electrical and mechanical equipment shall be granted for authorized use only. Loading/unloading connections and out-of-service piping connections shall be secured with locking mechanisms. Security lighting is present to prevent acts of vandalism and assist in the discovery of discharges at night.

2.9 FACILITY TANK CAR AND TANK TRUCK LOADING/UNLOADING RACK (§112.7(h))

The facility does not utilize tank truck loading and unloading racks, therefore, the requirements of §112.7(h) are not applicable to the facility.

2.10 BRITTLE FRACTURE (§112.7(i))

Since the facility does not have any field-constructed tanks, the brittle fracture requirements under 40 CFR 112.7(i) do not apply. If repairs, alterations, reconstruction, or a change in service that might affect the integrity of the tank, the tank must be evaluated for risk of failure due to brittle fracture.

2.11 CONFORMANCE WITH STATE REGULATIONS (§112.7(j))

In general, any manufacturing or commercial installation which has the potential for causing accidental pollution of air, land, or water or for causing endangerment of public health and safety through

accidental release of toxic, hazardous, or other polluting materials must develop, maintain, and implement a comprehensive pollution prevention and contingency (PPC) plan.

In regards to the Oil and Gas Program, PPC plans are required under the Clean Streams Law for approval of road spreading operations, drilling and operating oil and gas wells, and brine disposal wells. These plans are required under 25 Pa. Code Chapters 91.34 and 78.55. In addition, PPC plans are required for NPDES and Part II Water Quality Management Permits. The plan requirements are contained in the Oil and Gas Operators Manual.

In addition, regulated storage tank facilities with an aboveground storage capacity of >21,000 gallons are required to develop a Spill Prevention Response (SPR) plan which includes specific downstream notification requirements. PADEP strongly recommends consolidation of all required plans into one single document.

The PADEP Storage Tank Registration Program requires owners of regulated aboveground and underground storage tanks to register each storage tank with the DEP and pay annual registration fees. Aboveground storage tanks containing regulated substances with a storage capacity greater than 250 gallons and underground storage tanks containing regulated substances with a storage capacity greater than 111 gallons must be registered with the PADEP.

2.12 QUALIFIED OIL-FILLED OPERATIONAL EQUIPMENT (§112.7(k))

Oil-filled operational equipment is regulated by the requirements of 40 CFR 112.7(k) at the facility. The oil-filled equipment shall be described and the applicable SPCC requirements discussed in Appendix A and Figure 1.

3.0 REQUIREMENTS FOR ONSHORE FACILITIES (EXCLUDING PRODUCTION FACILITIES) (§112.8)

The following requirements are specific to onshore oil storage facilities, excluding production facilities. Natural gas compressor stations are generally not considered oil production facilities under the SPCC rule and are therefore subject to the facility specific requirements under 40 CFR part 112.8 rather than §112.9.

3.1 GENERAL REQUIREMENTS (§112.8(a))

As the facility is classified as a non-production onshore facility, this Plan has been prepared in accordance with the requirements of §112.7 and the specific requirements of §112.8. Section 2 of this plan contains information regarding the requirements of §112.7. Section 3 of this plan contains facility information associated with the requirements of §112.8.

3.2 FACILITY DRAINAGE (§112.8(b))

Drainage from secondary containment structures is controlled by manually operated valves and/or drain plugs when possible. If a secondary containment structure does not allow for the use of a drain, then a hose and a pump are used to remove drainage. The containment structure and drain plugs/valves are inspected quarterly (see Section 3.2.5 for more information on the inspections).

When stormwater accumulates in outdoor secondary containment structures, the water is inspected for evidence of hydrocarbon odor or sheen prior to removal. If contamination is not observed, the stormwater is discharged outside the containment structure via available drain plugs or valves. If contamination is evident, the source is identified and repaired and the contaminated stormwater is collected for appropriate disposal. Whenever stormwater is released from secondary containment structures, an entry shall be made in Equitrans' Containment Drainage Log, see example found in Appendix G. The completion of the Containment Drainage Log verifies that the inspection has been completed and the drain plug has been replaced. The logs are turned in monthly and kept in an electronic database and maintained for at least three (3) years.

All areas of the site were designed to convey drainage through the use of properly designed perimeter swales and a stormwater wet pond detention structure. Flow from undiked areas with potential for a discharge, such as areas where piping is located outside of containment walls or where tank truck

discharges may occur outside of loading areas, shall be directed through the site's general drainage pattern.

3.3 BULK STORAGE CONTAINER REQUIREMENTS (§112.8(c))

The following requirements are applicable to the bulk storage containers at an onshore oil storage facilities (non-production).

3.3.1 MATERIAL COMPATIBILITY (§112.8(c)(1))

It is Equitrans' policy to use bulk storage containers constructed of materials that are compatible with the materials stored in the container, under the temperatures and pressures encountered under normal operating conditions. ASTs are typically non-pressurized (atmospheric) tanks constructed of welded steel.

All oil storage tanks used are shop-built. Their design and construction are compatible with the oil they contain and the temperature and pressure conditions of storage. Double-walled tanks used at the compressor station are built to the UL 142 standard for storage tanks intended for noncorrosive, stable flammable and combustible liquids that have a specific gravity not exceeding 1.0. Steel tanks used for the storage of accumulated pipeline condensate meet API construction standards. Steel tanks are constructed of welded steel following UL-142 specifications. Information regarding container materials, construction, and contents is located in Appendix A.

3.3.2 SECONDARY CONTAINMENT (§112.8(c)(2))

The specific secondary containment for each bulk storage container is described in Appendix A. According to 40 CFR 112.8(c)(2), bulk storage containers (except flow-through process vessels and produced water containers and their associated piping and appurtenances) must be located within containment structures capable of containing the entire capacity of the largest single container with sufficient freeboard to contain precipitation. All bulk storage containers are double walled tanks.

3.3.3 SECONDARY CONTAINMENT RAINWATER DRAINAGE (§112.8(c)(3))

Secondary containment drainage line valves are kept in the closed position. The Compressor Operator inspects accumulated rainwater for signs of discharged oil before draining secondary containment dikes. Rainwater accumulated in the earthen dikes surrounding above ground storage tanks is

inspected for visual evidence of oil, oil sheen, or petroleum prior to release. Rainwater drainage is electronically documented in the *SPCC/PPC Facility Inspection Form* and Containment Drainage Log, or similar, found in Appendix G. If signs of oil are detected during inspection of accumulated water within secondary containment, the Compressor Operator notifies the Compressor Operator Supervisor. The Supervisor arranges for appropriate disposal of accumulated liquids (and contaminated soils if necessary) and arranges repairs necessary to prevent further release into secondary containment.

3.3.4 UNDERGROUND STORAGE TANKS (§112.8(c)(4)) & (§112.8(c)(5))

These requirements are not applicable to the facility as there are no underground storage tanks at EQT compressor stations.

3.3.5 INSPECTIONS, TESTS, AND RECORDS (§112.8(c)(6))

In accordance with good engineering practices, inspections of bulk storage containers are conducted monthly and consist of a walkthrough of the facility property to check for tank damage or leakage, stained or discolored soils, oil sheen on water in the secondary containment structure, and any oil spills around the compressor engines, piping, or storage tanks. Containers are inspected for signs of visible leaks from the tank's shell, gaskets, valves, and bolts. Associated piping, valves, flow lines, and loading/unloading lines are also inspected for signs of visible leaks. The general condition of the tank is assessed, including signs of corrosion, gouges, scratches, dents, and other damage. Tank foundations are assessed visually for cracks and erosion. Inspections are documented using the *SPCC/PPC Facility Inspection Form* located in Appendix G, and are in accordance with API 12R1.

Whenever storm water is released from the secondary containment, a record entry shall be placed in the Containment Drainage Log. The completion of the Containment Drainage Log verifies the inspection of the storm water and replacement of the drain plugs. Containment Drainage Logs shall be turned in quarterly with the quarterly inspection record. When a sheen is present on the storm water, the EQT Environmental Incident Report and Spill Report form shall be completed.

Completed inspection forms and drainage logs are maintained in an electronic database and maintained for at least three (3) years. The Environmental Coordinator shall certify that the required inspections and record keeping requirements of this SPCC Plan have been performed annually. Equitrans' standard business records have been reviewed and are appropriate for these required inspections.

In addition to the documented quarterly inspections, Equitrans employees also visit the facility at least monthly and perform undocumented inspections of the tank and piping. If a spill or release is observed, the spill response and reporting procedures shall be implemented.

3.3.6 INTERNAL HEATING COILS (§112.8(c)(7))

This requirement is not applicable to the facility as there are no tanks equipped with internal heating coils.

3.3.7 OVERFILL PROTECTION (§112.8(c)(8))

Equitrans trains all oil-handling personnel on proper filling procedures. Tank filling operations are visually monitored to prevent overflow. Absorbent materials are located throughout compressor stations to provide quick access if needed for emergency overfill response. Double walled tanks are equipped with liquid level gauges that are routinely inspected during the monthly SPCC site inspections.

Produced fluids tanks, which are automatically filled, include continuous level monitoring and an auto block valve on the fill line.

3.3.8 EFFLUENT TREATMENT FACILITIES (§112.8(c)(9))

Most compressor stations do not have effluent treatment facilities. Compressor stations equipped with effluent treatment facilities are permitted through the National Pollution Discharge Elimination System (NPDES) and are monitored regularly. Visual inspections of any effluent treatment facilities are conducted during the monthly site inspection.

3.3.9 DISCHARGE CORRECTION (§112.8(c)(10))

Oil container deficiencies are found during routine and monthly inspections. Any container deficiency detected during an inspection is recorded on a *SPCC/PPC Facility Inspection Form* similar to the one located in Appendix G and the Compressor Operator's supervisor is informed. Any oil accumulated in a diked area as a result of a container deficiency is removed immediately.

3.3.10 PORTABLE STORAGE CONTAINERS (§112.8(c)(11))

Mobile oil storage containers at the compressor station are kept on spill pallets designed to hold the contents of a 55 gallon drum along with any accumulated rainwater. Additionally, spill pallets are kept covered to prevent the accumulation of rainwater. Information on portable storage containers and drum storage areas can be found in Figure 1 and Appendix A.

3.3.11 ENGINEERED PREVENTION MEASURES

It is Equitrans' policy to engineer tank battery installations in accordance with good engineering practice to prevent discharges, including at least one of the following.

- The tank capacity is adequate to assure that a tank will not overfill if a pumper/gauger is delayed in making regularly-scheduled rounds.
- If more than one tank is present, overflow equalizing lines are between tanks so that a full tank can overflow to an adjacent tank.
- Venting (vacuum protection) is adequate to prevent tank collapse during a pipeline run or other transfer of liquid from the container.

Produced water stored in the tanks is generated during natural gas dehydration process at the compressor station. Equitrans removes produced water from the tank at a regular interval that is based on historical water production. Additionally, gas flowrate at the facility is monitored, and if gas flowrate changes occur, operators are dispatched to evaluate the conditions. Additionally, auto filled tanks include continuous monitoring with an auto block valve on the fill line.

3.3.12 FLOW-THROUGH PROCESS VESSELS

See Appendix A for detailed information, including the available secondary containment, on the flow-through process vessels. The flow-through process vessels and associated components would be inspected monthly along with the bulk storage container inspections. Equitrans personnel have been trained to take immediate corrective action if a leak or spill is observed and initiate the spill response and reporting procedures, as needed.

3.3.13 PRODUCED WATER CONTAINERS

See Appendix A for detailed information, including the available secondary containment, on produced water containers, if located at the facility. If located at the facility, produced water containers are expected to meet the bulk storage container requirements found in §112.8(c).

3.4 TRANSFER OPERATIONS (§112.8(d))

Equitrans has implemented the following measures to protect oil transfer operations:

- Aboveground oil pipes and valves are inspected quarterly along with the bulk storage container inspections. The inspection includes examination of the general condition of flange joints, valve glands and bodies, drip pans, pipe supports, bleeder and gauge valves, and other such items.
- Equitrans has developed a Preparedness, Prevention, and Contingency Plan to be used as an Oil Spill Contingency Plan in accordance with 40 CFR 109. The Preparedness, Prevention, and Contingency Plan was developed by Equitrans and maintained in an electronic database, see Appendix J. Appendix D includes Equitrans' written commitment of manpower equipment, and material required to expeditiously control and remove any quantity of oil discharged that might be harmful.

3.4.1 BURIED PIPING (§112.8(d)(1))

Buried piping at EQT compressor stations is equipped with a protective coating. Pipelines, including any section of buried pipeline that has become exposed, is inspected during the monthly SPCC facility inspections.

3.4.2 TERMINAL CONNECTIONS (§112.8(d)(2))

This section is not applicable as there is no transfer piping not in service at the facility. If transfer piping is put out of service or in standby for an extended period of time, it will be blind-flanged or capped/plugged.

3.4.3 PIPE SUPPORTS (§112.8(d)(1))

Piping supports for above ground piping systems are engineered to minimize abrasion and allow for normal expansion and contraction. Section 3.3.5 contains information regarding the inspection of piping, including the inspection of piping supports.

3.4.4 INSPECTION OF ABOVEGROUND VALVES, PIPING AND APPURTENANCES (§112.8(d)(4))

All aboveground valves and piping associated with transfer operations are periodically inspected by the Compressor Operator. The inspection procedure includes observing any flange joints, expansion joints, valve glands and bodies, drip pans, pipe supports, locking valves, and metal surfaces.

3.4.5 VEHICLE WARNING (§112.8(d)(5))

All vehicles operated within the bounds of EQT's compressor stations are operated by properly trained personnel. Personnel are trained to drive safely and avoid actions that will endanger aboveground piping and oil transfer operations.

4.0 SUBSTANTIAL HARM DETERMINATION (§112.20)

Conditions at this facility have been reviewed with respect to the Applicability of the Substantial Harm Criteria described in 40 CFR 112.20(e). Equitrans does not meet the substantial harm criteria, and therefore, is not required to prepare a Facility Response Plan (FRP). The "Certification of the Applicability of the Substantial Harm Criteria" form has been completed for the facility and is included as Appendix E.


5.0 LIMITATIONS

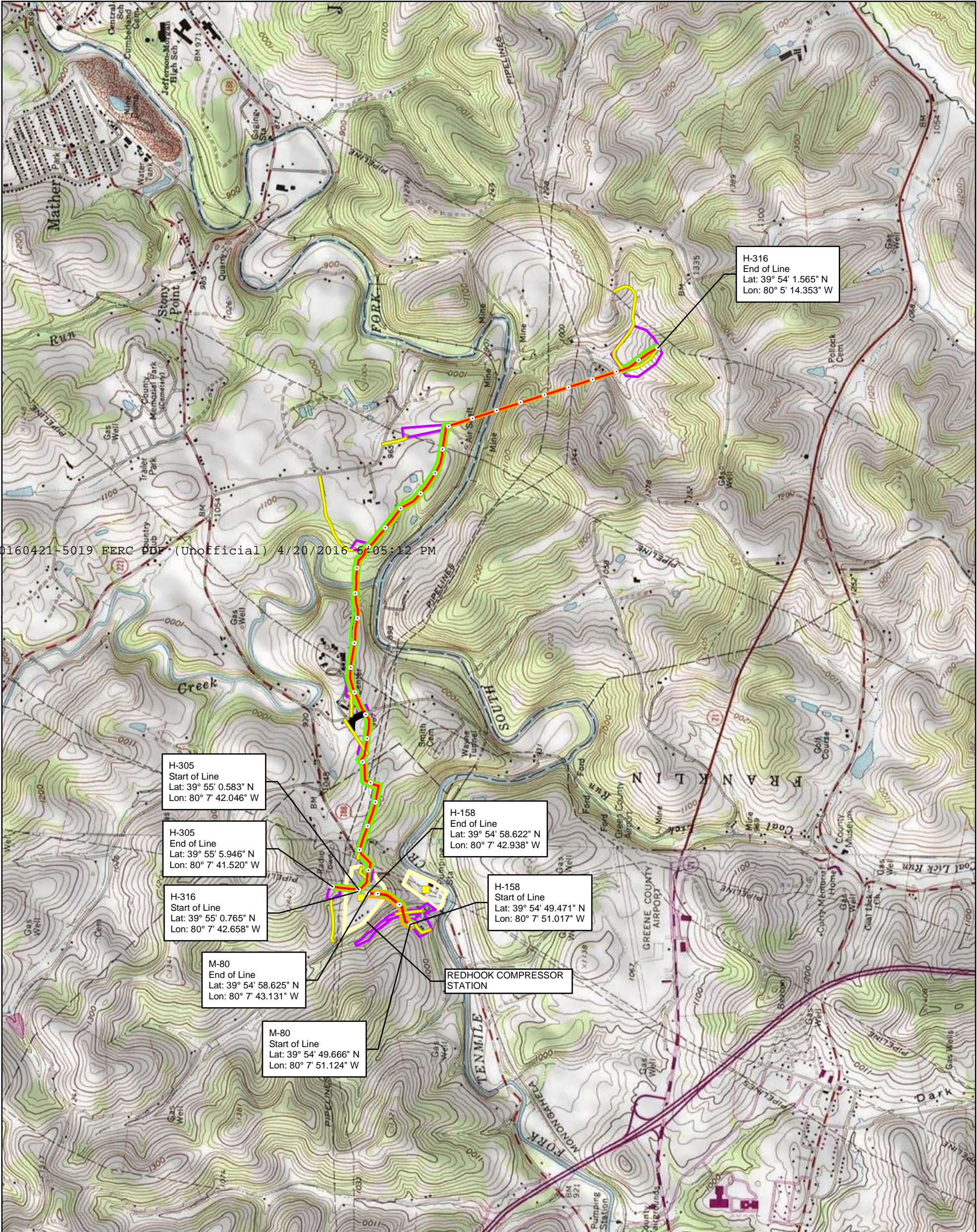
The services associated with this SPCC Plan were performed in accordance with generally accepted professional consulting principles and practices. No other representations or warranties, expressed or implied, are made. The services were performed consistent with Tetra Tech's agreement with Equitrans, LP. This Plan is intended solely for the use and information of our client unless otherwise noted. Any reliance on this Plan by a third party is at such party's sole risk.

Information contained in this Plan is based on conditions that existed at the time the Plan was prepared and is intended only for the client, purposes, locations, time frames, and project parameters indicated. The information provided is limited by the scope of work. Tetra Tech is not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services and does not warrant the accuracy of information supplied by others, or the use of segregated portions of this work product.

This Plan presents information of a technical nature; however, Tetra Tech has not designed or constructed equipment located at the facility and does not warranty its performance and/or operation. This Plan shall not be construed to offer legal opinion or representations as to the requirements of, nor the compliance with, environmental laws, rules, regulations, or policies of federal, state, or local governmental agencies.

FIGURES

Figure 1	Redhook Compressor Station Mechanical Piping Plot Plan 
Figure 2	Post Construction Stormwater Management Plan (PCS-05)
Figure 3	USGS Project Location Map
Figure 4	Photo Log <i>(TO BE INCLUDED)</i>



Equitrans Expansion Project

1:24,000

02,0004,000

Feet

Attachment #: 1-2
USGS Project Location Map
Greene County, Pennsylvania

December 2015

Data Sources: Topographic map provided by ESRI's ArcGIS
Online USA Topo Maps map service (© 2013 National
Geographic Society, i-cubed).

Legend

Milepost

Alignment Centerline

Access Road

Right-of-Way (Access Road)

Groundbed

Permanent Right-of-Way

Temporary Right-of-Way

Workspace

Permanent Site

Compressor Station Centroid

Compressor Station

Document Path: P:\GIS\EQTMapDocs\leap_pa_greeneCo_usgs_escgp.mxd

APPENDIX A

SITE-SPECIFIC INFORMATION

Spill Prevention, Control, and Countermeasures (SPCC) Plan

Equitrans, LP
625 Liberty Ave
Suite 1700
Pittsburgh, PA 15222

April 2016

APPENDIX A**SITE-SPECIFIC INFORMATION****SITE AND CONTACT INFORMATION:**

Owner:	Equitrans, LP
Site Name:	Redhook Compressor Station
Facility GPS Coordinates:	37.9175, -80.1293
Site County	Greene
Site USGS Quad Topo:	Waynesburg
District Office:	Pittsburgh
District Field Office Address:	625 Liberty Ave Suite 1700
District Field Office City and State:	Pittsburgh, PA 15222
District Field Office Location Relative to Site:	District Office is located 52 miles N of site
Facility Type:	Natural Gas Compressor Station
Aboveground Storage Capacity:	17,000 gallons
Primary Contacts:	Emergency Coordinator Dan Truman 304-627-6432 (office) 304-844-2174 (cell)
	Safety Coordinator Russel Grooms 724-579-0731
	Environmental Coordinator Dave Durofchalk 412-395-5583 (office)

SURFACE WATER INFORMATION:

Nearest Receiving Stream:	UNT #40419 to South Fork Ten Mile Creek
Distance to Nearest Receiving Stream:	250 feet
Direction to Nearest Receiving Stream:	SW

BULK STORAGE CONTAINER INFORMATION:

Tank	Tank Contents	Capacity (gal)	Secondary Containment	Predicted Flow Pathway
Waste Oil Tank	Waste Oil	4,200	Double-Walled Tank	West toward wet pond detention basin
Produced Fluids Tank	Produced Fluids	8,800	Double-Walled Tank	West toward wet pond detention basin
Compressor Oil Tank	Compressor Oil	2,000	Double-Walled Tank	West toward wet pond detention basin
Engine Oil Tank	Engine Oil	2,000	Double-Walled Tank	West toward wet pond detention basin
MEG Tank	MEG	2,000	Double-Walled Tank	West toward wet pond detention basin
MEG Maintenance Tank	MEG	2,000	Double-Walled Tank	West toward wet pond detention basin
TEG Tank	TEG	2,000	Double-Walled Tank	West toward swale and wet pond detention basin
TEG Maintenance Tank	TEG	2,000	Double-Walled Tank	West toward swale and wet pond detention basin
Total Oil Storage Capacity		17,000		
Total Non-Oil Storage Capacity		8,000		

Equipment	Turbine Oil (Gal)	Engine Oil (Gal)	Compressor Oil (Gal)	MEG/Water (Gal)	TEG (Gal)
Cat 3616 Unit #1		351	107	257	
Cat 3616 Unit #2		351	107	257	
Taurus 70 Unit #3	1,203				
Taurus 70 Unit #4	1,203				
Fuel Heater 1				816	
Fuel Heater 2				816	
Dehy					304
Equipment Totals	2,406	702	214	2,146	304

Note: Equipment volumes are static sump capacities and do not include piping/auxiliary volumes.

APPENDIX A**FAILURE PREDICTION:**

Potential Event	Maximum Discharge Volume	Maximum Discharge Rate	Containment
Catastrophic Tank Failure	Entire Tank Contents	Slow Leak to Instantaneous	Tank Secondary Containment structure and/or earthen berm
Pipe Failure	Entire Tank Contents	Slow Leak to Instantaneous	Tank Secondary Containment structure and/or earthen berm
Truck Leak	Entire Truck Volume	Slow Leak to Instantaneous	Land based spill response kit capabilities (spill kit)
Hose Leak	Entire Truck Volume	Slow Leak to Instantaneous	Land based spill response kit capabilities (spill kit)

APPENDIX B

EMERGENCY CONTACTS

Operator Information	Key Emergency Numbers
<p><u>Site Name:</u> Equitrans Expansion Project – H-316, H-305, M-80, H-158, Redhook Compressor Station</p> <p><u>Site Location:</u> Redhook Compressor Station Long: -80° 07' 52.88" Lat: 39° 55' 02.00"</p> <p>H-302 tie-in Long: -80° 04' 59.44" Lat: 39° 54' 10.91"</p> <p><u>Operator:</u> Equitrans, LP 625 Liberty Ave, Suite 1700 Pittsburgh, PA 15222</p> <p><u>Land Agent:</u> Hanna McCoy 724-873-3476</p> <p><u>Chain of Command:</u> <i>Contact the following individuals in the order listed in the event of an accidental spill or emergency on-site.</i></p> <p><u>Emergency Coordinator:</u> Dan Truman 304-627-6432 (office), 304- 844-2174 (cell)</p> <p><u>Safety Coordinator:</u> Russell Grooms 724-579-0731</p> <p><u>Environmental Coordinator:</u> Dave Durofchalk 412-395-5583 (office)</p> <p><u>Permitting Supervisor:</u> Stephanie Frazier 412-553-5798</p> <p><u>Environmental Manager of Performance and Compliance:</u> Jeannine Hammer 412-395-2553</p>	<p><u>Plan Emergency and Environmental Supervisor:</u> Dave Durofchalk 412-395-5583 (office)</p> <p><u>Safety Coordinator:</u> Russell Grooms 724-579-0731</p> <p><u>Pennsylvania Dept. of Environmental Protection:</u> See attached</p> <p><u>USCG/National Response Center (NRC):</u> 800-424-8802</p> <p><u>Greene County Emergency Management Agency:</u> 724-627-4911</p> <p><u>Closest Fire Station:</u> Waynesburg Volunteer Fire Department PO Box 392, Waynesburg, PA 15370 724-627-5426</p> <p><u>Closest Hospital:</u> Washington Health System, Greene Hospital 350 Bonar Ave, Waynesburg PA 15370 724-627-3101</p> <p><u>The PA Emergency Management Agency:</u> 800-424-7362 or 717-651-2001</p> <p><u>PA Game Commission:</u> 717-787-4250</p> <p><u>PA Fish and Boat Commission:</u> 814-445-8974</p>

PA Midstream Emergency Contacts

Response Companies, Personnel, and Regulatory Agencies

KEY PERSONNEL

- | | |
|--|-------------------------------|
| 1. Jack Mackin, Director Midstream Ops - North
175 Industry Road/ Waynesburg, PA 15370 | 412-395-3576 / 412-670-0726 c |
| 2. Dave Spencer, Manager Operations- Midstream
175 Industry Road/ Waynesburg, PA 15370 | 724-852-7319 / 412-302-1120 c |
| 3. Frank Blawas, Lead Asst. Superintendent
13251 State Route 422/ Kittanning, PA 16201 | 412-395-2684 / 412-926-3273 c |
| 4. Kevin Lewis, Lead Asst. Superintendent
4111 Finleyville-Elrama Road/ Finleyville, PA 15332 | 724-852-7330 / 724-833-3998 c |
| 5. Jeff Spencer, Asst. Superintendent
175 Industry Road/ Waynesburg, PA 15370 | 724-852-7300 / 412-303-9838 c |
| 6. Zachary Kinser, Asst. Superintendent
317 East Roy Furman Highway/ Waynesburg, PA 15370 | 724-873-3471 / 724-288-2343 c |
| 7. Bryan Cikowski, Asst. Superintendent
13251 State Route 422/ Kittanning, PA 16201 | 412-395-5527 / 412-737-7626 c |
| 8. Jeff Lawrence, Asst. Superintendent
317 East Roy Furman Highway/ Waynesburg, PA 15370 | 724-852-7306 / 724-998-0448 c |
| 9. Corey Giles, Sr. Environmental Coordinator
625 Liberty Avenue/ Pittsburgh, PA 15222 | 412-395-2673 / 724-787-3038 c |
| 10. Mark Gentilo, Sr. Safety Coordinator
175 Industry Road/ Waynesburg, PA 15370 | 724-852-7317 / 724-678-4774 c |

SUB-CONTRACTORS AVAILABLE ON A TWENTY-FOUR (24) HOUR BASIS:

- | | |
|--|------------------------|
| The Weavertown Group | 724-746-4850 / |
| 2 Dorrington Road/ Carnegie, PA 15106 | 800-746-4850 (24-hour) |
| McCutcheon Enterprises, Inc. | 724-568-3623 / |
| 250 Park Road/ Apollo, PA 15613 | 800-649-5578 (24-hour) |
| HEPACO | 412-321-6197 / |
| 2810 Preble Avenue/ Pittsburgh, PA 15233 | 800-888-7689 (24-hour) |
| Minuteman Environmental Services | 800-905-7788 (24-hour) |
| 1561 Roy Furman Hwy/ Carmichaels, PA 15320 | |
| Lewis Environmental, Inc. | 610-495-6695 / |
| 155 Railroad Plaza/ Royersford, PA 19468 | 800-258-5585 (24-hour) |

GOVERNMENT AGENCIES

For Oil Spills to Waters of the United States

- The U.S. EPA National Response Center
Phone: 800-424-8802 (24 Hours)
- U.S. EPA Region III
Phone: 215-597-9898
- State of Pennsylvania, Department of Environmental Protection
Southwest Region- 400 Waterfront Drive/ Pittsburgh, PA 15222
Phone: 412-442-4000 (24 Hours) / 800-541-2050 (24 Hours)
Northwest Region- 230 Chestnut Street/ Meadville, PA 16335
Phone: 814-332-6945 / 800-373-3398 / 800-541-2050 (24 Hours)
North Central Region- 208 West Third Street/ Williamsport, PA 17701
Phone: 570-327-3636 (24 Hours) / 800-541-2050 (24 Hours)

For Oil Spills Not Reaching Waters of the United States

- State of Pennsylvania, Department of Environmental Protection
Phone: 412-442-4000 (24 Hours) - Southwest Region
Phone: 814-332-6945 / 800-373-3398 - Northwest Region
Phone: 570-327-3636 (24 Hours) - North Central Region

Transmit the spill information outlined in the Spill Incident Report Form and complete the agency information on the same form.

For Oil Spills greater than 1,000 gallons (or greater than 42 gallons twice in a 12 month period) and reaching Waters of the U.S.

Submit the information in the Spill Incident Report for these types of spills within 60 days of the spill occurrence to:

EPA Regional Administrator, U.S. EPA Region III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

APPENDIX C

P.E. CERTIFICATION

PROFESSIONAL ENGINEER CERTIFICATION

I, _____, P.E., a Professional Engineer (P.E.) in the State of Pennsylvania, attest that:

- I am familiar with the requirements of the SPCC Rule;
- I or my agent has visited and examined the facility;
- The SPCC Plan has been prepared in accordance with good engineering practice, including consideration of applicable industry standards, and with the requirements of the SPCC Rule;
- The procedures for required inspections and testing have been established; and
- The Plan is adequate for the facility.

This certification in no way relieves the owner or operator of the facility of his/her duty to fully implement this SPCC Plan in accordance with the requirements of 40 CFR 112. This Plan is valid only to the extent that the facility owner or operator maintains, tests, and inspects equipment, containment, and other devices as prescribed in this Plan.

This engineer (nor his/her agent) did not design equipment located at the site or test for proper operation of any electrical/mechanical/safety equipment, overfill devices, vents, emergency venting, valves, corrosion control systems and any other equipment systems not specifically mentioned.

Signature of P.E.: _____

Printed Name of P.E.: _____, P.E.

Registration Number: # _____

State: **Pennsylvania**

Date: _____

Seal of Professional Engineer:

APPENDIX D

EQUITRANS, PL COMMITMENT

MANAGEMENT APPROVAL & CORPORATE COMMITMENT

Equitrans, LP is committed to the prevention of discharges of oil to navigable waters and the environment and maintains the highest standards for spill prevention, control, and countermeasures through regular review, updating, and implementation of this SPCC Plan. Equitrans will commit the necessary manpower, equipment, and materials required to expeditiously control and remove any quantity of oil discharged that may be harmful.

I hereby certify that this SPCC Plan has the full approval of Equitrans, LP management and that I have the management authority to commit the necessary resources toward spill prevention.

Printed Name of Official: _____

Title of Official: _____

Signature of Official: _____

Date: _____

APPENDIX E

**CERTIFICATION OF THE APPLICABILITY OF THE SUBSTANTIAL
HARM CRITERIA**

CERTIFICATION OF THE APPLICABILITY OF THE SUBSTANTIAL HARM CRITERIA

Facility Name: **Redhook Compressor Station**

Facility Address: **Equitrans, LP; Braden Run Road, Waynesburg, PA 15370**

1. Does the facility transfer oil over water to or from vessels and does the facility have a total oil storage capacity greater than or equal to 42,000 gallons?

YES NO ☒ X

2. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and does the facility lack secondary containment that is sufficiently large to contain the capacity of the largest aboveground oil storage tank plus sufficient freeboard to allow for precipitation within any aboveground oil storage tank area?

YES NO ☒ X

3. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance such that a discharge from the facility could cause injury to fish and wildlife and sensitive environments?

YES NO ☒ X

4. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and is the facility located at a distance (such that a discharge from the facility would shut down a public drinking water intake)?

YES NO ☒ X

5. Does the facility have a total oil storage capacity greater than or equal to 1 million gallons and has the facility experienced a reportable oil discharge in an amount greater than or equal to 10,000 gallons within the last 5 years?

YES NO ☒ X

Certification

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals responsible for obtaining this information, I believe that the submitted information is true, accurate, and complete.

Printed Name of Official: _____

Title of Official: _____

Signature of Official: _____

Date: _____

APPENDIX F

**GUIDELINES FOR SPILL, RELEASE, AND EVENT NOTIFICATION
AND REPORTING**

Guidelines for Spill, Release, and Event Notification & Reporting

November 5, 2013

PURPOSE

These guidelines set forth the procedures that the Environmental Department (Department) will use for investigating a spill or release (collectively “release”) to determine whether state and/or federal release reporting is required. These guidelines also set forth the procedures the Department will use for internally reporting a release or other event.

SUMMARY OF PROCEDURE (Specifics follow below)

1. Environmental Coordinator determines whether there has been release to the environment.
2. Environmental Coordinator provides initial notification of the release to immediate supervisor. Environmental Coordinator investigates the release.
3. Environmental Coordinator conveys information and an initial determination of reportability to his/her immediate supervisor, the Corporate Director of Environmental Affairs, and Legal-Environment.
4. Corporate Director of Environmental Affairs in consultation with Legal-Environment makes final determination of reportability (with exceptions).
5. Corporate Director of Environmental Affairs (or Legal-Environment in the absence of Director) determines need to notify the Director of Communications of a release or other event, and makes the notification, if deemed appropriate.

IMPORTANT DEFINITIONS

Waters of the State or Commonwealth: Any and all surface waters and groundwater, including natural and artificial lakes, rivers, streams, creeks, branches, brooks, ponds, springs, wells, watercourses and wetlands.

Waters of the United States: All navigable waters, and watercourses and wetlands connected to or adjacent to navigable waters. This does not include ground water unless it is hydraulically connected to navigable waters.

GUIDELINES

1. Identifying a Release

A release is the discharge of any material into the natural environment – on the ground, surface waters, ground water, or air. This includes, but is not limited to, any spills or leaks from hoses, pipes or containers, underground releases from the well bore, releases to containment, releases to springs, and seeps from torn liners.

2. Investigating a Release

Upon notification of a release, an Environmental Coordinator shall immediately alert his/her immediate supervisor that there has been a release. The Environmental Coordinator shall then proceed to the site of the release (unless his/her immediate supervisor informs him/her that that is not necessary) and obtain the following information regarding the incident:

Who: Identify the persons who witnessed or discovered the release.

What: Identify what material was released and the quantity of material released. In doing so evaluate the following:

- (1) Determine whether the material contained any hazardous chemicals or petroleum substances by reviewing the MSDS sheets for the material.
- (2) Document how the quantity of released material was determined.
- (3) Determine whether the release has stopped or is ongoing.
- (4) TAKE PHOTOS AND DOCUMENT CONDITIONS

Where: Identify where the release of material occurred and the extent of the release. In doing so, determine the following:

- (1) Was the material released to the dirt / gravel or released to a liner?
- (2) How far did the material travel?
- (3) Did the material stay within secondary containment?
- (4) Did the material stay on the site?
- (5) If the material escaped from the site:
 - a. Did the material go beyond the limit of disturbance?
 - b. Did the material leave the boundaries of the lease or property?
 - c. Did the material enter creeks, streams, surface waters or wetlands?
 - d. Did the material enter any natural drainage swales?
- (6) If the material entered into surface water or a natural drainage swale, determine how far the material traveled down the water course or the drainage swale and the conditions in the water as well as the following:
 - a. What the names of the surface waters are;
 - b. The classification of the water (high quality, etc.); and
 - c. Whether there are any public water supply intakes downstream

of the release.

When: Determine the time when the release occurred

How: Determine how the release occurred.

Why: Determine why the release occurred.

3. **Reporting and Notification Requirements**

State and federal law establishes reporting requirements for releases of certain materials into the environment. The type and quantity of material released and the scope of the release establish whether the release is reportable – which requires calling of a state and/or federal spill hotline. In addition, the release reporting requirements may differ if the material reaches the waters of the state or the waters of the United States.

If the release is not reportable, in some circumstances the local inspector should be notified of the release. The reporting and notification requirements for released materials typically present at our locations are described in the attached reporting tables.

Whether or not a release is reportable, the Environmental Coordinator or his/her immediate supervisor shall notify the Corporate Director of Environmental Affairs, Legal - Environmental (Stephanie Gallogly), and Legal - Land (Leslie Miller-Stover) of all releases.

4. **Reportable Release Notification**

1. The Environmental Coordinator shall make an initial determination as to whether the release is reportable and provide that initial determination along with all of the investigation information set forth in Section 2 above, to his/her immediate supervisor, the Corporate Director of Environmental Affairs, Land, and Legal-Environment. The Environmental Coordinator shall also provide a recommendation as to whether the local inspector should be notified of the release.

2. All final determinations of reportability shall be made by the Corporate Director Environmental Affairs after consultation with Legal-Environment. No person will report a release to any agency or local inspector without prior approval, except as follows:

- a. Virginia. All releases at well sites are reportable per regulation 4 VAC 25-150-380, Section B: Onsite Spills.

3. If the Department determines a release is reportable to a regulatory agency or should be reported to a local inspector, the Department will notify the following departments:

- 1) Drilling
- 2) Completions
- 3) Production Ops
- 4) Midstream
- 5) Land Department

5. **Internal Notification**

1. The Corporate Director of Environmental Affairs (or Legal-Environment in the absence of the Director) will notify the Director of Communications of the following releases, or other events:

- a. Releases that are reportable to a State and/or Federal agency;
- b. Releases or events that have local official involvement or interest.
- c. Releases or events that attract media attention.
- d. Releases or events that have the potential to effect water supplies or downstream water intakes.
- e. Releases or events that involve Land Department issues such as sick animals, or concerned surface owners.
- f. Releases or events that have received heightened agency interest.
- g. Releases or events that have resulted in a complaint being lodged to either an agency or to EQT.
- h. Any other instances that the Director of Safety and Environment feels are warranted.

2. The Corporate Director of Environmental Affairs (or Legal-Environment in the absence of the Director) will notify the Director of Communications as follows:

- a. Immediately upon learning of a release to Waters of the State, Commonwealth or U.S.
- b. Upon learning of a release or event that meets any of the criteria listed above.

6. **Environmental Department Release Cleanup and Follow Up**

1. All Environmental Coordinators will be responsible for ensuring that emergency responders are deployed to a site for cleanup activities. Please refer to Attachment B for a listing of available contractors by area.

2. Environmental Coordinators are responsible for coordinating with the Environmental Department and Legal-Environment regarding any sampling activities that will need to be conducted.

3. Upon completion of cleanup activities, the Environmental Coordinator is responsible for ensuring that the site has been restored to pre - release conditions. The Environmental Coordinator must document post-cleanup conditions with photos.

4. The Environmental Coordinator is responsible for completing an incident report and forwarding it to the Environmental Department for tracking. A photo log of the events must be submitted with every incident report resulting in a reportable release.

5. The Environmental Coordinator will also ensure that all disposal manifests, invoices, and other supporting documents are provided in a timely manner to verify that proper disposal was completed. This will apply whether or not EQT or an emergency response contractor is coordinating disposal.

Equipment Shut-Off Procedures

Source	Action
Manifold, transfer pumps or hose failure	Immediately close the header/manifold or appropriate valve(s). Shut off transfer pumps.
Tank overflow	Close header/manifold or appropriate valve(s).
Tank failure	Close inlet valve to the storage tanks.
Flowline rupture	Close nearest valve to the rupture site to stop the flow of oil.
Flowline leak	Immediately close the nearest valve to stop the flow of oil to the leaking section.
Explosion or fire	Immediately evacuate personnel from the area until danger is over. If possible, close all manifold valves. If the fire is small enough such that it is safe to do so, attempt to extinguish with fire extinguishers.
Equipment failure	Immediately close the nearest valve to stop the flow of oil into the leaking area.

APPENDIX G

SPCC/PPC FACILITY INSPECTION FORM

AND

CONTAINMENT DRAINAGE LOG *(TO BE ADDED IF APPLICABLE)*

SPCC/GPP FACILITY INSPECTION FORM

Facility Name/ID:		Month/Day/Year:	
Inspected By:			
		Tank(s) ID #	
		Tank(s) Contents	
		Tank(s) Size	

General Condition of Containment Area	YES	NO	N/A
1 Containment dike(s) in good condition, no evidence of erosion?			
2 Dike(s) free from trash and high vegetation?			
3 Dike drain(s) operable and secure in closed position?			
4 Is there an excavated sump within the earthen secondar containment?			

Tank(s) and Associated Equipment Condition

5 Container(s) and vicinity including shell, gaskets, valves, bolts free from visibile leaks?			
6 Associated piping, valves, flow lines, loading/unloading lines, free from visible leaks?			
7 Container(s) free from corrosion, gouges, scratches, dents or other damage?			
8 Piping, valves, flow lines related to tank(s) fee from corrosion, gouges, scratches, dents or other damage?			
9 Tank foundation(s) free from cracks and erosion?			
10 Container(s) properly labeled (name of stored material, NFPA diamond, capacity and Tanks ID #s)?			
11 If double wall Tank(s), verified no fluid in interstitial space?			
12 Is Tank(s) equipped with an alarm?			
13 Is alarm operating properly?			

Prior to Rainwater Drainage From Containment Areas

14 Is there rainwater within the containment area(s)?			
15 Is there visual evidence of oil, oil sheen, or petroleum on the rainwater? (if "yes", do not drain - notify supervisor)			
16 If no oil, oil sheen, or petroleum visible, dike(s) rainwater drained during visit (drain resecured in closed position)?			

Changes to Facility

17 Have there been any changes to the site since the last inspection (Tanks changed, added or removed)?			
---	--	--	--

Comments

Provisions for oil filled equipment

18 Are there erosion and sediment control problems on the site and/or access road that need repaired?			
---	--	--	--

Comments

 - Items in green are OK, if answer falls in white box, flag to supervisor

Problems Corrected or Mitigated:

By:		Date:	
Comments:			

APPENDIX H

ENVIRONMENTAL INCIDENT REPORT & SPILL REPORT FORM



Environmental Incident Report & Spill Report Form

CONTAINS CRITICAL ENERGY INFRASTRUCTURE INFORMATION - DO NOT RELEASE

Revision Date: 03-25-15

Privileged and Confidential

Case Number - Administrative Use ONLY

0

Please complete each required field and email to your Environmental Coordinator.

General Info.	** Some fields contain a drop down list; click in the cell and use the arrow to choose from the list in the drop down box.			
	**Classification	**Business Unit	** District (or Region)	Other
	Spill Reported By	Supervisor on Location	**Environmental Coordinator Assigned	

DATES / TIMES		Date Env. Dept. Notified	Location Info.	**Location (6-digit Well # or Location Name)		**State
		Time Env. Dept. Notified		Name of Stream, Pond, Waterway affected		County
		Date Confirmed Rep/Non		Weather		City
	Estimated Date Occurred	Time Confirmed Rep/Non		GPS COORDINATES		
				N:		W:

SPILL	Material Spilled	Quantity (in bbls)	Material Spilled	Quantity (in bbls)	Material Spilled	Quantity (in bbls)
	Total Quantity Spilled (in bbls):					
	Property Damage (if "yes" please list below) <input type="checkbox"/> Yes <input type="checkbox"/> No					
	Personal Injury (if "yes" please list below) <input type="checkbox"/> Yes <input type="checkbox"/> No					

CAUSE	CAUSE: What caused or contributed to Incident (Spill, Permit Deviation, Notice of Violation, etc); full description	
	Description Summary ****This field for Env. Dept. Use ONLY****	
What could have been done to prevent the incident?		

CLEANUP	Time Started	Estimated Completion	By Company Personnel?	If "no," by whom:
			<input type="checkbox"/> Yes <input type="checkbox"/> No	
	Materials Used for Clean-Up		Date Clean-Up Completed	Time Completed
Costs Associated with Repair/Clean-Up - Please write any comments below			Provide Dollar Amounts Here	Estimated \$\$'s

EFFECT	On Streams, Ponds, Lakes or Waterways:	<input type="checkbox"/> N/A	
	On Downstreams Local Water Supply:	<input type="checkbox"/> N/A	
	On Fish or Wildlife:	<input type="checkbox"/> N/A	
	On Public:	<input type="checkbox"/> N/A	

****Reporting field for Environmental Department use ONLY****

REPORTING	Agency		DATE	TIME		By Whom	To Whom	Report Number
	Federal	<input type="checkbox"/> N/A		<input type="checkbox"/> AM <input type="checkbox"/> PM				
	State	<input type="checkbox"/> N/A		<input type="checkbox"/> AM <input type="checkbox"/> PM				
	Local	<input type="checkbox"/> N/A		<input type="checkbox"/> AM <input type="checkbox"/> PM				

APPENDIX I

RECORD OF SPCC PLAN REVIEW AND AMMENDMENT

RECORD OF SPCC PLAN REVIEW AND AMENDMENT

All SPCC Plan review and revisions are recorded in the following log and record of review.

Log of Plan Review and Amendments

Site Name: Redhook Compressor Station

Date	Review, Technical Amendment, Or Administrative Amendment	Description of Change or Result of Review	Management Approval	P.E. Certification

Note: continue onto an additional page if necessary

SPCC PLAN REVIEW FORM

Site Name: Redhook Compressor Station

Date of Plan Review: _____ Deadline for next plan review: _____

Plan Reviewer Name & Title: _____

Is Plan Amendment necessary: Yes _____ No _____

"I have completed review and evaluation of the SPCC Plan for _____

on (Date), and will/will not (circle one) amend the Plan as a result."

(Signature of plan reviewer)

SPCC PLAN AMENDMENT FORM

Type of Plan Amendment: Technical_____ Administrative_____

****Note:** If a technical amendment is necessary, the amendment must be certified by a P.E.

Scope of Amendment:

P.E. Certification: (if required)

Signature: _____

Engineer Name: _____

Registration Number: _____

Date: _____ (SEAL)

APPENDIX J

PREPAREDNESS, PREVENTION, AND CONTINGENCY PLAN

**PREPAREDNESS, PREVENTION, AND CONTINGENCY
AND EMERGENCY ACTION PLAN**

PREPARED FOR THE

Equitrans, L.P.

**Equitrans Expansion Project
H-316, H-302, M-80, H-158 and Redhook Compressor Station**

SITUATED IN

**Franklin, Jefferson, and
Morgan Township,
Greene County
Pennsylvania**

February 2016

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Figure 1 – Project Location Map

Figure 2 – Hospital Location and Directions

Attachments

Attachment 1 – Emergency Contact Information

Attachment 2 – PADEP Standard Inspection Form

Section 1 - General Information

1.1 Objective

This Preparedness, Prevention, and Contingency (PPC) Plan, and Emergency Action Plan (EAP) has been prepared for Equitrans, LP (Equitrans) for the proposed Equitrans Expansion project, located in Franklin, Jefferson and Morgan Townships, Greene County, PA. This plan describes the procedures to be followed by employees and contractors to prepare for, prevent, control, and respond to an emergency or spill.

The proposed project consists of the installation of four pipelines, and new above ground facilities. The H-316 natural gas pipeline will be 1-30" natural gas transmission pipeline, approximately 3 miles long and will move gas from the new Redhook Compressor Station to Equitrans' existing H-302 pipeline for delivery to Texas Eastern or south on Equitrans' H-302 pipeline to MVP. Also in Greene County, the project involves the installation of three shorter pipelines, the M-80, the H-158, and the H-305 pipelines. The M-80 segment is a 6-inch pipeline that currently moves gas to the Pratt Compressor Station, but will be required to be extended to move gas to the Redhook Compressor Station once it is commissioned. The H-158 segment is a 12-inch pipeline that also currently moves gas to the Pratt Compressor Station, but will be required to be extended to move gas to the Redhook Compressor Station once it is commissioned. The H-305 segment is a new 24-inch pipeline extension, approximately 540 feet in length that will move gas from the Redhook Compressor Station to Equitrans' existing H-305 pipeline located at the existing Braden Run Interconnect with Texas Eastern. New above ground facilities for this portion of the project include the Redhook Compressor Station and the H-302 tie-in.

Construction activities will involve constructing a tie-in and compressor pad, clearing and grubbing within the right of way, trenching, pipe installation, site restoration and post-construction stormwater management. The total area within the limit of disturbance for proposed earthwork activities will be approximately 85 acres.

This PPC/EAP has been prepared in accordance with Commonwealth of Pennsylvania Department of Environmental Protection (PADEP) Division of Oil and Gas, *Oil and Gas Management Practices and Guidelines for the Development and Implementation of Environmental Emergency Response Plans. I.D.:400-2200-001*. This plan provides information and procedures in accordance with state and federal regulations regarding means to prevent and minimize hazards to human health or the environment from fires, explosions, or any unplanned sudden or non-sudden releases of toxic, hazardous or other polluting materials to air, water, or land.

For purposes of this plan the following definitions apply:

- A *spill* is defined as any unauthorized spill or leak of a hazardous material or oil.
- A *significant spill* is defined in the *Oil and Gas Management Practices and Guidelines for the Development and Implementation of Environmental Emergency Response Plans* as including but not limited to releases of oil and hazardous substances in excess of reportable quantities under Section 3111 of the Clean Water Act (40 CFR 110.10 and CFR 117.21) or Section 102 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA; 40 CFR 302.4).

- *Hazardous material* is defined as any substance or material that could adversely affect the health or safety of the public or environment.
- *A hazardous waste* is generally defined as dangerous waste that poses a substantial present or potential hazard to human health or the environment. 40 CFR §261.3 provides in-depth definitions of hazardous waste.
- *An emergency* is defined as a significant injury requiring medical treatment beyond the scope of on-site personnel training.

EMERGENCY CONTACT INFORMATION IS PROVIDED IN ATTACHMENT 1 OF THIS PLAN. FOLLOW PROPER NOTIFICATION PROTOCOL IN THE EVENT OF ANY SPILL OR EMERGENCY ON-SITE.

1.2 Site Information

Site Name: Equitrans Expansion Project – H-316, H-305, M-80, H-158, Redhook Compressor Station (Refer to **Figure 1** for project location map)

Site Address and Directions to Site: Start of the project (Redhook Compressor Station) is off of Braden Run Rd, from PADEP SWRO – take I-376W to I-79S. Take exit 14 for PA-21W and merge toward Waynesburg. Turn right onto Elm Dr. Turn right onto PA-188E. After 1.9 miles, turn left onto Braden Run Rd. The start of the project, Redhook Compressor Station, will be on the right.

The end of the project (H-302 Tie-in Launcher/Receiver) is off Crayne School Rd, from PADEP SWRO – take I-376E to I-79S. Take exit 14 for PA-21E to Carmichaels/Masontown and turn left onto PA-21E. Turn left onto Ridge Rd/Trail 5621. Turn right onto Ridge Rd. Turn left onto Baker Rd. Continue onto Crayne School Road. The end of the project, H-302 tie-in will be on the left.

1.3 Plan Availability

A copy of this plan will be available in the following locations:

- On-site in the project mailbox, job trailer, or with on-site coordinator.
- Office of the Environmental Coordinator

1.4 Plan Revisions

The PPC/EAP and all site operations will be reviewed at least once per year to assure that the plan is consistent with applicable state and federal regulations. The plan will also be revised if:

- changes in site operations occur that materially increase the potential for fires, explosions or releases of toxic or hazardous constituents or change the response necessary in an emergency,
- routine inspections determine that the plan needs to be revised,
- the plan fails to achieve the objective stated in **Section 1.1**,
- applicable PADEP or federal regulations are revised,
- the list of personnel who are responsible for implementing or maintaining this plan or emergency equipment changes, or
- as required by the PADEP.

When plan changes are required, the plan will be revised within 30 days of identifying the need for a revision. Plan changes will be implemented in a timely manner, but in no case later than 90 days. Notifications of plan changes or additions will be made to all personnel or groups listed in **Attachment 1**. The on-site copy of this plan will have appropriate changes made with dating and initialing labeled on this copy of the plan.

1.5 Plan Implementation and Organization

In the event of an emergency situation which endangers public health and safety or the environment, the provisions of this plan will be immediately implemented. The following sections shall be referenced for additional information on plan implementation and organization for the project:

- **Section 2.0** – Plan team members and associated responsibilities.
- **Section 3.0** – Pertinent site-specific information.
- **Section 4.0** – Preventative measures
- **Section 5.0** – Countermeasures
- **Section 6.0** – Incident notification information

Section 2 - Plan Team and Responsibilities**2.1 PPC/EAP Team**

The PPC/EAP Team consists of the following persons and chain of command (in order of priority):

Name/Title	24 Hours A Day
Dan Truman Equitrans, LP Emergency Coordinator	Office: 304-627-6432 Cell: 304-844-2174
Russell Grooms Equitrans, LP Safety Coordinator	Office: 724-579-0731
Dave Durofchalk Equitrans, LP Senior Environmental Coordinator	Office: 412-395-5583
Stephanie Frazier Permitting Supervisor	Office: 412-553-5798
Jeannine Hammer Equitrans, LP Environmental Manager of Performance and Compliance	Office: 412-395-2553 Cell: 412 709-9804

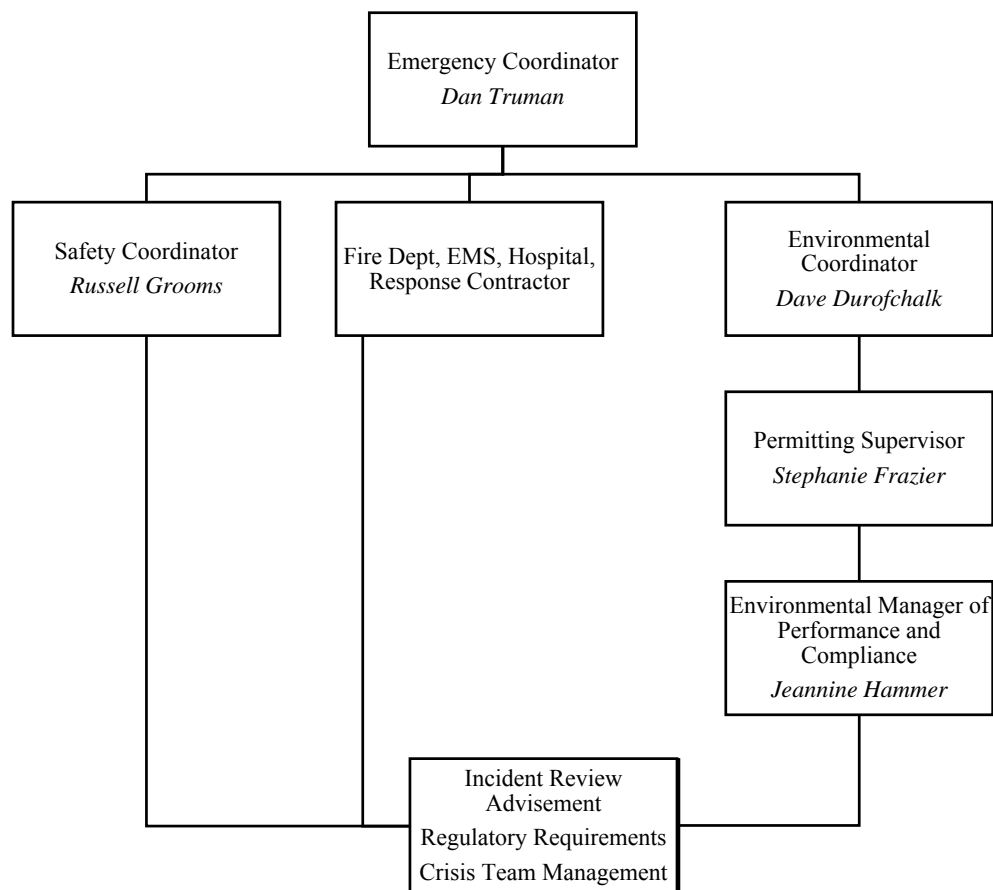
Responsibilities of the PPC Plan Team include:

- Maintain familiarity with the contents of this plan.
- Provide training so that on-site personnel are familiar with the contents of this plan.
- Perform spill prevention measures specified in **Section 4.0**.
- Maintain records of spill prevention efforts such as inspections and preventive maintenance as described in **Section 4.0**.
- Implement emergency countermeasures presented in **Section 5.0** under the direction of the emergency coordinator or designee.
- Submit a written report to the appropriate regulatory agency and within the proper timeframe of a significant spill.
- Ensure that all Equitrans field employees are familiar with the plan, and understand how to react in case of an emergency

All on-site personnel shall be made familiar with the contents of the PPC/EAP through regular training and periodic safety meetings. Proper training will help all on-site personnel to understand proper protocols in the event of an inadvertent spill or emergency.

2.2 Plan Chain of Command

The plan chain of command defines on-site emergency personnel and members of the PPC/EAP Team that shall be contacted in the event of an emergency. Team members shall be familiar with the order of priority for emergency notifications.

Figure 2.2. Plan Chain of Command

2.3 Emergency Coordinator

The emergency coordinator is responsible for implementing the plan. Should the emergency coordinator not be available on-site, he/she shall designate a member of the PPC/EAP team that is familiar with the contents of the plan to act as emergency coordinator in his/her stead.

In the event of an emergency, responsibilities of the emergency coordinator include:

- Activate any alarms and notify personnel as applicable.
- Coordinate all emergency response efforts and establish a safe area command center.
- Take all reasonable measures to ensure that fire, explosion, emission, or discharge do not occur, reoccur or spread to other materials or wastes at the installation. These measures include stopping work and operations, collecting and containing released materials and wastes, and removing or isolating containers.
- Notify appropriate emergency response agencies as specified in **Section 6.0** and listed in **Attachment 1**.
- Notify members of the PPC/EAP Team according to chain of command listed in **Section 2.1** and **Section 2.4**.

- Identify the character, exact source, amount, and extent of released material.
- Assess possible hazards to human health or the environment (including direct and indirect effects).
- Take all reasonable measures and commit resources needed to carry out the plan.
- Ensure that site operations underway during the emergency response are properly monitored and controlled.
- Ensure that cleanup residues are properly handled and disposed.

Further details concerning countermeasures and emergency contacts are contained within **Section 5.0** and **Section 6.0** of this plan.

2.4 Plan Administrator

The environmental coordinator or designee is responsible for developing and maintaining the PPC/EAP and will be referred to as the plan administrator:

Responsibilities of the plan administrator include:

- Ensure that the plan is reviewed and updated as required.
- Ensure that the plan is distributed as required.

Section 3 - Site Activity Description and Potential Pollutants

3.1 Site Activity Description

The proposed project consists of the installation of four pipelines, and new above ground facilities. The H-316 natural gas pipeline will be 1-30" natural gas transmission pipeline, approximately 3 miles long and will move gas from the new Redhook Compressor Station to Equitrans' existing H-302 pipeline for delivery to Texas Eastern or south on Equitrans' H-302 pipeline to MVP. Also in Greene County, the project involves the installation of three shorter pipelines, the M-80, the H-158, and the H-305 pipelines. The M-80 segment is a 6-inch pipeline that currently moves gas to the Pratt Compressor Station, but will be required to be extended to move gas to the Redhook Compressor Station once it is commissioned. The H-158 segment is a 12-inch pipeline that also currently moves gas to the Pratt Compressor Station, but will be required to be extended to move gas to the Redhook Compressor Station once it is commissioned. The H-305 segment is a new 24-inch pipeline extension, approximately 540 feet in length that will move gas from the Redhook Compressor Station to Equitrans' existing H-305 pipeline located at the existing Braden Run Interconnect with Texas Eastern. New above ground facilities for this portion of the project include the Redhook Compressor Station and the H-302 tie-in.

Construction activities will involve constructing a compressor pad and tie-in pad, clearing and grubbing within the right of way, trenching, pipe installation, site restoration and post-construction stormwater management. The total area within the limit of disturbance for proposed earthwork activities will be approximately 85 acres.

An erosion and sediment (E&S) control plan has been developed for the site to prevent erosion to disturbed soil surfaces and reduce sedimentation to surrounding surface and ground water.

3.2 Material and Waste Inventory

All materials stored on-site shall be properly marked and kept in US Department of Transportation approved containers. Safety Data Sheets (SDS) for materials shall be maintained on-site as necessary. Overnight equipment parking and refueling shall occur at least 100 feet from a waterbody or wetland boundary.

Waste generated on-site will be characterized, properly stored, and disposed of at an approved facility.

Table 3.2 has been included on the following pages to provide an inventory of materials typically expected to be on a construction site of this type, chemicals within these materials that are potential pollutants, and BMPs associated with each material type to mitigate risk for water resources pollution. The emergency coordinator should review **Table 3.2** prior to construction to identify potential pollutants and determine proper BMPs for each material.

Table 3.2. Potential Pollutant Sources and Best Management Practices

Material/Chemical	Potential Pollutants	Best Management Practice
Cleaning Solvents	Perchloroethylene, methylene chloride, trichloroethylene, petroleum distillates	Proper application (see manufacturer recommendations). Disposal of used containers and excess material must follow manufacturer specifications. Storage: Tightly sealed containers indoors, or within a shed or truck tool box. If product is stored outdoors, must be stored under a shelter or tarp within secondary containment.
Glue, Adhesives, Epoxy Powders	Polymers, epoxies	Disposal of used containers must follow manufacturer specifications. Proper application (see manufacturer recommendations). Storage of products: Properly sealed containers indoors, on a pallet, under shelter, tarp or inside a vehicle tool cabinet.
Concrete, Concrete Washout Water	Limestone, pH	Designated concrete washout area on ROW. Do not clean out hopper or chute on to ground or in drainage channels. Concrete washout area must be within a bermed containment area. It must be cleaned out when it reaches a 75% capacity. Recommend cleanout at 50%. All wash out areas will be in the permanent ROW.
Wood Preservatives	Stoddard solvent, petroleum distillates, arsenic, copper, chromium; creosote; pentachlorophenol	Proper application (see manufacturer recommendations). Disposal of used containers and excess material must follow manufacturer specifications. Storage: Tightly sealed containers indoors, or within a shed or truck tool box. If product is stored outdoors, must be stored under a shelter or tarp within secondary containment.
Material/Chemical	Potential	Best Management Practice

	Pollutants	
Gasoline / Diesel Fuel	Benzene, ethyl benzene, toluene, xylene, MTBE	Proper application (see manufacturer recommendations). Disposal of used containers and excess material must follow manufacturer specifications. Storage: Tightly sealed containers indoors, or within a shed or truck tool box. If product is stored outdoors, must be stored under a shelter or tarp within secondary containment. All on-site vehicles will be routinely inspected for leaks and drips.
Kerosene	Coal oil, petroleum distillates	Proper application (see manufacturer recommendations). Disposal of used containers and excess material must follow manufacturer specifications. Storage: Tightly sealed containers indoors, or within a shed or truck tool box. If product is stored outdoors, must be stored under a shelter or tarp within secondary containment.
Antifreeze/Coolant	Ethylene glycol, propylene glycol, heavy metals (copper, lead, zinc)	Proper application (see manufacturer recommendations). Disposal of used containers and excess material must follow manufacturer specifications. Storage: Tightly sealed containers indoors, or within a shed or truck tool box. If product is stored outdoors, must be stored under a shelter or tarp within secondary containment. All on-site vehicles will be routinely inspected for leaks and drips.
Detergents	Phosphorous	Proper application (see manufacturer recommendations). Disposal of used containers and excess material must follow manufacturer specifications. Storage: Tightly sealed containers indoors, or within a shed or truck tool box. If product is stored outdoors, must be stored under a shelter or tarp within secondary containment.
Material/Chemical	Potential Pollutants	Best Management Practice

Sediment	Nutrients, suspended solids, sediment	Sediment erosion and sedimentation on-site should be controlled by structural and non-structural BMPs. Structural BMPs can include but are not limited to: sediment control logs, erosion control blankets, riprap, earth berms, and silt fence. Non-structural BMPs can include but are not limited to: seed and mulch, exposure time of disturbed soils, education of on-site personnel.
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3.3 Pollution Incident History

No major pollution incidents have occurred on Equitrans sites.

3.4 Implementation Schedule for Plan Elements not Currently in Place

There are no known elements of this plan that are not currently in place. Certain projects may require additional measures depending on scope of activity. Additional items that may need to be implemented include but are not limited to:

- Erosion and sediment control plan and applicable PADEP permits
- Post-construction stormwater management plan and applicable PADEP permits
- Inadvertent release plan for boring projects
- Additional chemical and material management measures

Section 4 - Spill Prevention and Response

4.1 Pre-release Planning

The on-site coordinator must assess the materials kept on-site and note areas that may become contaminated should a spill occur. Preventative measures listed below should be considered when storing potentially hazardous chemicals or materials on-site:

- Store chemicals and materials in proper US DOT approved totes/containers
- Provide secondary containment as required
- Store potential pollutants in areas where they will not be readily transported toward sensitive water resources in the event of a spill
- Note any emergency shutoff valves on equipment or storage containers that will be used in the event of a spill

4.2 Material Compatibility

Materials must be stored in dedicated containers or totes and used only for the intended chemical storage. Storage containers should not be reused with a different chemical if there is any chance of a reaction occurring. If the reactivity between chemicals is unknown, they should not be mixed or stored in the same container until it has been verified that no harmful reaction will take place.

Thorough cleansing of chemical storage containers should be standard practice to ensure that there is no residual incompatible with the next or later materials used. Any available National Fire Protection Agency (NFPA) placards should be referenced for hazardous materials to identify potential reactivity.

4.3 Inspection and Monitoring Program

During construction employees are required to check for the following conditions: spills and leakage of fuels, lubricants or any other contaminants; visible soil contamination; malfunctioning equipment; on-site traffic accidents; storm water contamination; or any other condition which could lead to contamination of air, soil, or water. If an abnormality occurs, the employees must contact one of the designated PPC/EAP Team members listed above in **Section 2.1** of this PPC Plan.

Inspections shall occur on a daily and weekly basis as described below:

Daily Inspections: An Equitrans employee, or his/her designee, will conduct a visual inspection of the project area each day. The purpose of the inspection is to identify housekeeping and preventative maintenance needs. Issues of potential concern will be brought to the attention of the responsible person in charge immediately following the inspection. A log of any issues identified during daily inspections shall be kept on-site with the copy of the PPC/EAP and E&S Control Plan.

Weekly Inspections: An Equitrans employee, or his/her designee, shall conduct a weekly inspection of the site and log findings on the standard PADEP Inspection Form 3150-FM-BWEW0083 to record their findings. A copy of the PADEP Standard Inspection Form is included in **Attachment 2**. The standard form should be used for E&S BMP inspection, and any spills or potential pollution issues should be noted on Item 8 of the inspection form.

4.4 Preventative Maintenance

Preventative maintenance measures for the expected scope of work are listed below:

- Construction Activities
 - During construction, proper BMPs shall be utilized to prevent stormwater runoff coming into contact with potential pollutants including construction materials, fuel, and construction equipment. Equipment and material storage areas should be located in areas where the potential for contact with water resources is at a minimum. Furthermore, risk for pollution from erosion and sedimentation will be mitigated through the use of PADEP approved erosion and sediment control BMPs.
- Materials Handling
 - Materials to be stored in the project area should be located in areas that are protected from significant surface flows to prevent transmission of potential pollutants to surface waters.
 - Hazardous materials, including chemicals, fuels, and lubricating oils, shall not be stored within 100 feet of a wetland, waterbody, or designated municipal watershed area, unless the location is designated for such use by an appropriate governmental authority. This applies to storage of these materials and does not apply to normal operation or use of equipment in these areas.
 - Any potential pollutants stored on-site shall be kept covered with proper secondary containment to prevent water resources impacts.
 - Any collected stormwater within secondary containment should be inspected for signs of pollution (sheen, discoloration and other signs of chemical pollution). If no evidence of pollution is noted, collected water will be allowed to evaporate. Where possible pollution is discovered within secondary containment, collected stormwater should be properly disposed of offsite by hauling to a state approved facility.
- Equipment Cleaning and Maintenance
 - Cleaning and maintenance of equipment should take place away from water resources and within designated areas of adequate containment to prevent pollutants from entering water resources. Overnight equipment parking and refueling shall occur at least 100 feet from a waterbody or wetland boundary.
- Pipelines Carrying Contaminants
 - Testing will be conducted prior to the transport of natural gas to ensure pipeline integrity.
- Sumps/Tanks Carrying Contaminants
 - Sumps and Tanks containing potential pollutants shall be located away from existing water resources and secondary containment should be provided.

4.5 Housekeeping Program

General Site Housekeeping:

Site housekeeping practices shall be implemented to provide neat storage of materials on-site in order to reduce the potential for materials to be exposed to stormwater runoff and to ensure that debris is not left at the site upon project completion.

Workspaces shall be inspected at the end of each workday and any trash, debris, or other discarded materials should be properly disposed of in designated roll-off bins or similar container. The site should also be inspected for accumulated soils at BMPs and also at site entrance/exits. Any collected

soils should be placed at a designated area on-site and stabilized with seed and mulch upon reaching final grade. Soils deposited on roadways shall be swept using hand tools or a street sweeping machine (if permissible) and soils shall be returned to the project area. No soils should be swept into roadside ditches or storm inlets.

An inspection schedule for general housekeeping should be defined at the beginning of the project and employees should be informed of proper practices and pollution prevention concepts.

Fuel and Chemical Handling

Potentially hazardous materials such as fuel and oil for equipment and chemicals associated with the project should be properly stored on-site and secondary containment should be provided at storage locations to prevent release of harmful fluids to the environment.

Drip pans or similar methods should be provided during equipment fueling to contain leaks. Any waste occurring during refueling or maintenance should be stored in proper containers and taken off site for disposal or recycling. Overnight equipment parking and refueling shall occur at least 100 feet from a waterbody or wetland boundary.

Any major maintenance projects on equipment should be carried out at an offsite location.

Should a spill occur, contaminated soils shall be excavated and stored in lined containers for disposal. Proper reporting and record keeping procedures consistent with the applicable agency standards shall be utilized in the event of a spill. Vehicles and other equipment should be inspected regularly for leaks and required maintenance should be completed immediately. The following guidelines should be observed for fuel and chemical storage on-site:

1. Product containers should be clearly labeled, inventoried, and Safety Data Sheets (SDS) shall be kept on site.
2. Store fuel and chemicals away from construction traffic to reduce potential for accidental spills.
3. Any fuel or chemical storage tanks/drums should be kept within secondary containment.
4. Monitor storage areas regularly for leaks and check secondary containment for evidence of leaks (sheen, discoloration, etc...)

4.6 Security

While site security is not a major concern given the scope of the project, procedures should be followed at the site to prevent accidental or intentional entry that could result in a violation of Departmental regulations, or injury to persons or livestock. The following procedures should be considered in relation to site security:

- Locate equipment and materials away from any area where the public can easily gain access.
- Provide fencing as necessary or store equipment and materials inside of locked, fenced areas where possible.
- Provide locks on storage tank drain valves, fuel dispensers, etc...
- Install safety fence to deter foot traffic in active work areas.
- Provide traffic control as necessary to deter unauthorized public travel in work areas.
- Provide proper flagging and signage when needed for entering and exiting public roadways.

4.7 External Factor Planning

Severe weather events are the main external factor considered to cause a potential issue for the proposed project. In the event of extremely severe weather including but not limited to thunderstorms, tornadoes, hail storms, and/or severe snowstorms; construction activity shall cease and on-site personnel shall take proper cover until the weather event has ceased. Personnel shall monitor the weather to provide early warning of incoming severe weather.

For any precipitation event, severe or minor, there is an increased risk of pollution from accelerated erosion and sedimentation, as well as the potential for increased pollutant transport should a spill occur during a precipitation event. Proper inspection of E&S BMPs and material or chemical storage areas prior to and within 24 hours following a rain event will mitigate risks associated with stormwater runoff contacting disturbed or contaminated soils. Additional external factors may be present and should be noted by the on-site coordinator as they become evident. Employee and public safety shall be considered first priority in the event of any emergency.

4.8 Employee Training Program

The emergency coordinator is responsible for the initiation of all periodic training sessions that will include no less than the following:

- Implementation of the spill prevention and response plan
- Adopting effective “Good Housekeeping” practices
- Preventative maintenance
- Materials management BMPs
- E&S Control/Storm Water Pollution Prevention

Personnel will be trained, at least annually, in good housekeeping techniques and preventive measures to control the release of contaminants, along with other pertinent safety topics. Contractors or temporary personnel will be apprised of site operation and design features that are intended to prevent discharges or spills from occurring. New employees, who will be involved with response to any spill and/or contamination, will be trained in the applicable pollution control response methods. New employees will also be trained on the contents of the applicable PPC/EAP's and a copies will be made available to them for reference. Records are to be kept by the emergency coordinator.

Section 5 - Countermeasures

5.1 General

Employees must report immediately to the designated individuals listed in **Section 2.1** if any spill, incident/emergency or potential contamination problem has occurred.

During an emergency, operations will cease. Qualified personnel will direct response efforts with available equipment and personnel until emergency assistance arrives.

5.2 Countermeasures to be Undertaken by Facility

During construction a supply of spill response materials will be stored on-site. Personnel should be familiar with the following general conditions relative to providing countermeasure support:

- Smoking at the active construction areas will be prohibited.
- Follow housekeeping program listed in **Section 4.6**
- Refer to **Attachment 1** for local fire department and hospital emergency contact and notification information.
- Tools used for spill cleanup should be cleaned and contaminated water shall be properly disposed. Incidents should be properly documented with all pertinent information and kept on record.

In the event of an accidental spill or release of hazardous materials that may have an adverse impact to people, property, or the environment, the following procedures will be implemented:

- Notify emergency coordinator if a spill has occurred and request instructions for forward proceedings.
- The emergency coordinator will inspect the site to identify the type of materials being released and will assess the probability of environmental damage based on the location of the spill and other factors.
- Upon being notified of a spill or emergency, the chain of command personnel shall notify proper regulatory agencies as necessary.
- Take the action necessary to contain and/or mitigate possible environmental damage.
- Contain the leak and/or spill with absorbent material, diking material, (or soil, if necessary).
- Equipment from the operation will be mobilized to remove contaminated materials and place them in a suitable container for conveyance to a certified disposal site.
- Perform any testing on materials from the clean-up (needed to determine final destination of waste materials) and submit to appropriate regulatory agency.
- Complete an internal spill report for the incident. Contact a waste contractor to arrange for the removal of contaminated absorbent materials. Arrange for testing of wash water to determine how it can be safely disposed of.
- When the incident is corrected, the on-site coordinator will report the spill to the Environmental and Safety Coordinator and record this information in the daily operating logs.

Contractors Utilized for Transportation of Wastes and Waste Management Facilities

LAD Liquid Assets Disposal Inc.

226 Rankin Road

Washington, PA 15301

724-350-2760; 724-222-6080; 724-229-7034 (fax)

Ohio County/Wheeling

United States Environmental Protection Agency (USEPA) Permit #WV 0014

Tri County Waste Water Management, Inc.

1487 Toms Run Road
 Holbrook, PA 15341
 724-627-7178; 724-499-5647
 Greene County/Waynesburg
 Permit #TC-1009

5.3 Countermeasures to be Undertaken by Contractors

Equitrans has made arrangements with the following contractors to respond as necessary to significant spills:

- **McCutcheon Enterprises**
 250 Park Road
 Apollo, PA 15613-8730
 412-568-3623
- **Weavertown Environmental Group**
 2 Dornington Rd
 Carnegie, PA 15106
 724-746-4850
- **Minuteman Environmental Services**
 1561 Roy Furman Hwy
 Carmichaels, PA 15320
 800-905-7788 (24-hour)

Combined Capabilities: Mobile vacuum equipment, mobile storage tanks, remediation systems and service, transportation services, waste management Emergency Response Trailers, excavation equipment, Traffic Control.

5.4 Internal and External Communications

Employees must provide notification by telephone immediately according to the chain of command listed in **Section 2.1** and **Section 2.2** if any spill, incident/emergency or potential contamination problem has occurred. If the first person on the list is not available, the employee shall continue through the chain of command phone list until proper contact has been established.

An employee providing notification of a spill or emergency must continue going through the call list until an actual person has been contacted. Telephone messages may be left as necessary, but leaving a message does not fulfill the notification requirements of this plan.

During any shift, the emergency coordinator may be contacted either by cell phone or word of mouth but verification of the contact must be assured prior to considering the notification requirement met. During weekends and holidays, emergency coordinators should be called on their mobile phones.

In cases of fire or injury, the local fire, Emergency Management Service (EMS), and police departments should be notified before any other actions are taken.

A complete Notification List can be found in **Attachment 1** of this document.

5.5 Evacuation plan for Installation Personnel

In the event of a fire or emergency on-site, personnel will rally near the access road or at the site entrance. Once a person has been accounted for, he or she may be directed to evacuate the premises entirely by the emergency coordinator or the highest ranking person on location according to the chain of command. It is the responsibility of the emergency coordinator to account for all individuals on the site and direct emergency personnel to the last known location of any missing person.

5.6 Emergency Equipment Available for Response

Basic spill cleanup materials shall be stored in the on-site totes or kits. Absorbent booms, socks, pillows, as well as additional equipment are available on location for initial response to emergencies (hand tools, fire extinguishers, and cleaning supplies). Response Trailers are located at various geographic regions and available 24/7. In addition to spill response kits, the following items shall be available for response to an emergency:

Fire Extinguisher(s): Fully-charged fire extinguishers will be readily available on-site.

First Aid Kit(s): In the case of on-site personnel accidents or injuries, first aid kits shall be available to provide initial response to the injured person. First aid may be administered by qualified individuals on-site if extent of injuries permits. In case of more serious injuries, emergency response personnel will be notified (paramedics for transport to the local hospital). General first aid procedures should be followed until emergency medical assistance arrives.

Section 6 - Emergency Spill Control Network

6.1 Arrangements with Local Emergency Response Agencies and Hospitals

Attachment 1 lists contact information for the local and regional emergency response network available to support Equitrans in the event of a medical emergency at the site. **Figure 2** shows direction from the project site to the nearest hospital.

Washington Health System-Greene Hospital will provide or assist gaining access to all emergency medical services. This facility does have an emergency medical unit.

6.2 Content of Verbal Notification

Verbal notice of an emergency or spill to regulatory agencies, and designated company individuals should include as much of the information listed below as is known at the time of notification.

- Location and source of the release
- Chemical name or identity of any substance involved in the release and whether the substance is a hazardous substance; i.e., the Chemical Abstract Service ID number (CAS #) as listed in the material's SDS
- Estimate of the quantity of the substance released into the environment.
- Time of the release
- Date of the release
- Environmental medium or media into which the substance was released (soil, storm drain, surface waters)
- Duration of the release
- Proper precautions to take as a result of the release, including evacuation and other proposed response action
- Any known, anticipated or chronic health risks associated with the release and, if known to the informant, advice regarding medical attention necessary for individuals exposed to the substance released
- Name and telephone number of the person or persons to be contacted for further information
- Other information as required

Notification shall not be delayed in order to research missing information. As further information on the release or emergency is discovered it should be relayed to the proper designated individual.

6.3 Formal Incident Reporting

To standardize the procedures for Equitrans employees and contractors, and simplify the In-Field decision making process, all spills, leaks, releases or injuries **must be reported immediately** to the Equitrans Environmental and Safety Department. Appropriate reporting, by Equitrans to relevant Authorities will be conducted as per applicable regulations. Potential reports that may need files depending on spill character and quantity include but are not limited to:

- USEPA Report for Spills
- USEPA Reportable Quantities
- PADEP Spill Report for spills affecting streams
- PA Fish and Boat Commission
- Greene County Emergency Management

Reportable quantities for hazardous substances are set forth in 40 CFR 110 and 117. The reportable quantities for the hundreds of hazardous substances listed range from as little as one (1) pound to as

much as 5,000 pounds, depending on the substance. Oil which is released in sufficient quantity to form a film or sheen on, or discoloration of, the surface of the water or the shoreline, or which deposits a sludge beneath the water surface on the shoreline is reportable. "Oil" includes but is not limited to petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes. A "sheen" is defined as an iridescent appearance on the surface of the water.

The USEPA has defined "significant spills" to include releases within a 24-hour period of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act and Section 102 of CERCLA.

The judgment of what is a "significant" spill must be made on a case-by-case basis by the site operator.

Disclaimer: All applicable codes, standards, policies, procedures, and best management practices must be followed whether specifically addressed in this plan or not. These include, but are not limited to the Occupational Safety and Health Administration (specifically 29 CFR 1910.120 and 1910.1200), USEPA/PADEP regulations, Equitrans policies and procedures, 40 CFR, Coast Guard regulations, local Ordinances, etc.

Section 7 - References

40 CFR §261.3

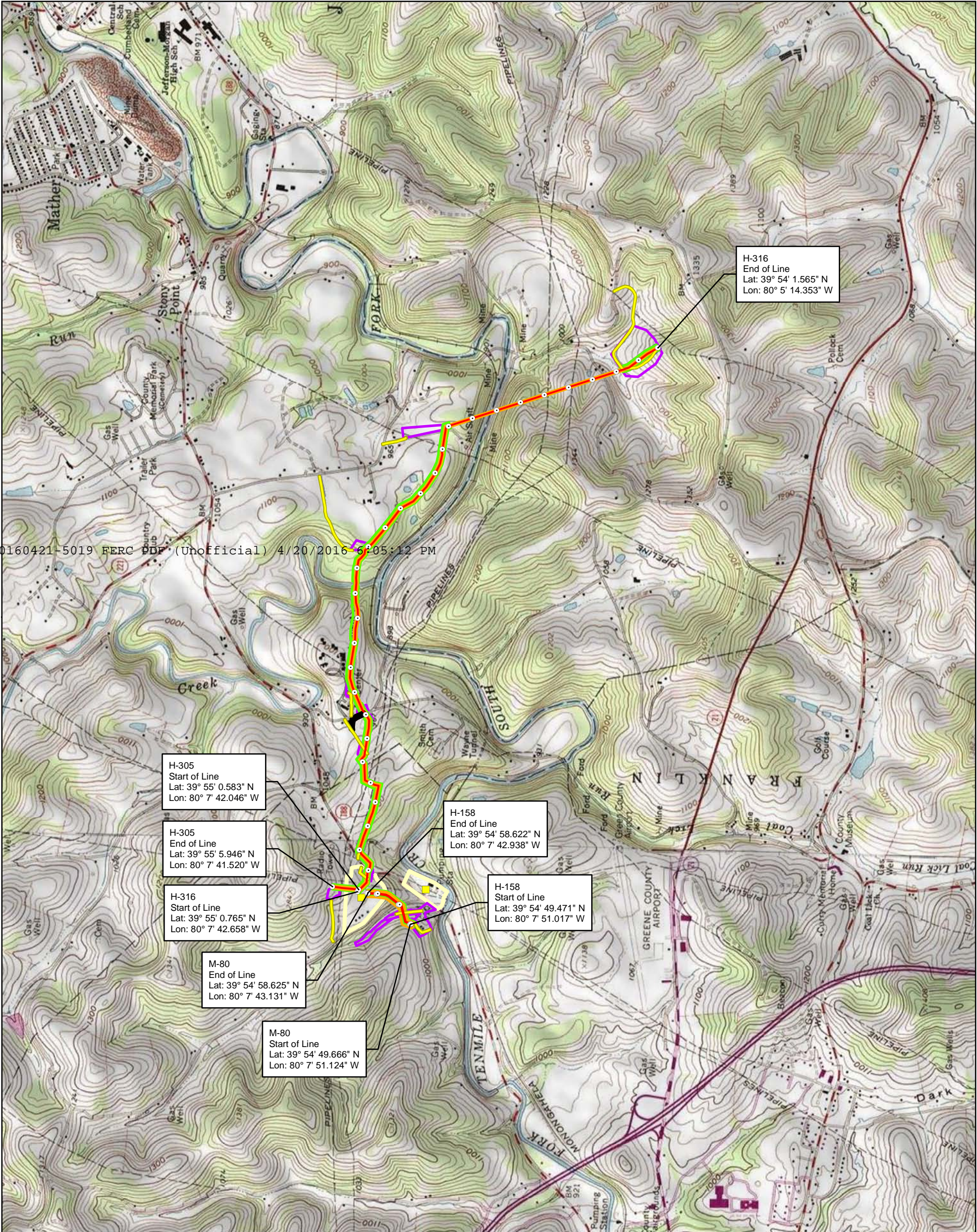
40 CFR §110.10

40 CFR §117.21

40 CFR §302.4


Guidelines for the Development and Implementation of Environmental Emergency Response Plans.
Pennsylvania Department of Environmental Protection. Document #400-2200-001. September
2001.

Figure 1 – Project Location Map



Equitrans Expansion Project		1:24,000		0 2,000 4,000 Feet	
		Legend			
Attachment #: 1-2 USGS Project Location Map Greene County, Pennsylvania		<ul style="list-style-type: none">MilepostAlignment CenterlineAccess RoadRight-of-Way (Access Road)GroundbedPermanent Right-of-WayTemporary Right-of-WayWorkspacePermanent SiteCompressor Station CentroidCompressor Station			
December 2015					
Data Sources: Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).					

Figure 2 – Hospital Location and Directions




145 Braden Run Rd, Waynesburg, PA 15370 to
Washington Health System Greene


Drive 3.5 miles, 8 min

145 Braden Run Rd


Waynesburg, PA 15370

- 


1. Head southeast on Braden Run Rd/T588 toward PA-188 E

0.2 mi
- 


2. Turn right onto PA-188 W/Jefferson Rd

2.4 mi
- 


3. Turn right onto Bill George Dr

0.1 mi
- 

4. Merge onto E High St/Main St

0.5 mi
- 

5. Turn right onto Bonar Ave/T732

 Destination will be on the left

0.3 mi

Washington Health System Greene

Bonar Avenue, Waynesburg, PA 15370

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Attachment 1 – Emergency Contact Information

EMERGENCY CONTACT INFORMATION

In the event of an emergency, the on-site coordinator shall first ensure the safety of all personnel and, if possible, contain any spill or other event to the extent practicable. Upon initial containment of a spill or neutralization of a threat to personnel health, the on-site coordinator shall follow the chain of command and contact necessary individuals listed below.

Operator Information	Key Emergency Numbers
<u>Site Name:</u> Equitrans Expansion Project – H-316, H-305, M-80, H-158, Redhook Compressor Station	<u>Plan Emergency and Environmental Supervisor:</u> Dave Durofchalk 412-395-5583 (office)
<u>Site Location:</u> Redhook Compressor Station Long: -80° 07' 52.88" Lat: 39° 55' 02.00"	<u>Safety Coordinator:</u> Russell Grooms 724-579-0731
H-302 tie-in Long: -80° 04' 59.44" Lat: 39° 54' 10.91"	<u>Pennsylvania Dept. of Environmental Protection:</u> See attached
<u>Operator:</u> Equitrans, LP 625 Liberty Ave, Suite 1700 Pittsburgh, PA 15222	<u>USCG/National Response Center (NRC):</u> 800-424-8802
<u>Land Agent:</u> Hanna McCoy 724-873-3476	<u>Greene County Emergency Management Agency:</u> 724-627-4911
<u>Chain of Command:</u> <i>Contact the following individuals in the order listed in the event of an accidental spill or emergency on-site.</i>	<u>Closest Fire Station:</u> Waynesburg Volunteer Fire Department PO Box 392, Waynesburg, PA 15370 724-627-5426
<u>Emergency Coordinator:</u> Dan Truman 304-627-6432 (office), 304-844-2174 (cell)	<u>Closest Hospital:</u> Washington Health System, Greene Hospital 350 Bonar Ave, Waynesburg PA 15370 724-627-3101
<u>Safety Coordinator:</u> Russell Grooms 724-579-0731	<u>The PA Emergency Management Agency:</u> 800-424-7362 or 717-651-2001
<u>Environmental Coordinator:</u> Dave Durofchalk 412-395-5583 (office)	<u>PA Game Commission:</u> 717-787-4250
<u>Permitting Supervisor:</u> Stephanie Frazier 412-553-5798	<u>PA Fish and Boat Commission:</u> 814-445-8974
<u>Environmental Manager of Performance and Compliance:</u> Jeannine Hammer 412-395-2553	

Attachment 2
PADEP Standard Inspection Form

Attachment General - 6
Attachment General-2aR

(Revised April 20, 2016)

Pipe Storage and Contractor Yards

Yard Name/Number	Size (Acres)	County	State	Current Land Use	Acres
H316 ATWS-08	1.82	Greene	PA	Cultivated Crops	0.18
				Deciduous Forest	0.08
				Pasture/Hay	1.56
H318-ATWS-08	2.54	Washington	PA	Developed, Low Intensity	0.35
				Developed, Medium Intensity	1.96
				Developed, Open Space	0.16
				Grassland/Herbaceous	0.08
H318-ATWS-09	1.36	Washington	PA	Deciduous Forest	1.26
				Developed, Open Space	0.11
H318-ATWS-010	2.31	Washington	PA	Developed, Low Intensity	1.21
				Developed, Medium Intensity	0.43
				Developed, Open Space	0.66
H-158/M-80 ATWS-01	3.34	Greene	PA	Deciduous Forest	0.13
				Developed, Open Space	0.85
				Pasture/Hay	2.36
H-158/M-80 ATWS-02	0.53	Greene	PA	Deciduous Forest	0.18
				Developed, Open Space	0.35
Redhook ATWS-01	1.50	Greene	PA	Deciduous Forest	0.51
				Developed, Open Space	0.99
H319 ATWS 02	0.25	Wetzel	WV	Deciduous Forest	0.13
				Developed, Open Space	0.21

Attachment General-7b

(Revised April 20, 2016)

Land Requirements and Environmental Data for Tap Sites

Tap Site	Approximate Milepost	Land Required for Construction (acres)	Land Required for Operation (acres)	Land Use		Soil Map Units		
				Type	Acres	Soil Map Unit Symbol	Soil Map Unit Name	Soil Map Unit Acreage
H-302 Tap Site	H-316, 2.97	0.112	0.001	Pasture/Hay	0.077286	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.112
				Deciduous Forest	0.034861			
H-306 Tap Site	H-319, 0.00	0.004	0.001	Developed, Open Space	0.004412	Sk	Skidmore gravelly loam	0.004
H-148 Tap Site	H-318, 4.20	0.004	0.001	Pasture/Hay	0.000002	Fa	Fairplay (marl) silt loam	0.003
				Cultivated Crops	0.000816			
				Pasture/Hay	0.003567	WeD	Westmoreland silt loam, 15 to 25 percent slopes	0.001
				Deciduous Forest	0.000025			



Equitrans Expansion Project

Docket No. CP16-13-000

Attachment General-9

Updated Resource Report Tables

(Revised April 20, 2016)

Table 1.2-1 (Revised April 20, 2016) Project Pipelines by County			
Pipeline	Approximate Milepost	County/State	Length (Miles)
H-318	0.00 to 3.03	Allegheny/PA	3.03
H-318	3.03 to 4.25	Washington/PA	1.22
H-316	0.00 to 2.98	Green/PA	2.98
H-158	0.00 to 0.24	Green/PA	0.24
M-80	0.00 to 0.24	Green/PA	0.24
H-319	0.00 to 0.04	Wetzel/WV	0.04
H-305	0.00 to 0.10	Green/PA	0.1
Total			7.85

Table 1.2-2**(Revised April 20, 2016)****Aboveground Facilities a/****Compressor Stations**

Facility	Approximate Milepost	County/State	Capacity (MMcfd)	Isometric (hp)	Suction (psig)	Discharge (psig)
Redhook Station	H-316, MP 0.00	Greene County/PA	878.5	31,300	Turbine 700 Recip 380	Station 1200
	H-158/M80, MP 0.24					

Other Facilities	Approximate Milepost	County/State
Webster Interconnect	H-319, MP 0.04	Wetzel/WV
Mobley Tap	H-302, MP 0.60	Wetzel/WV

Pig Launcher/Receiver (L/R) Facilities

Applegate L/R Site	H-318, 0.00	Allegheny/PA
Hartson L/R Site	H-318, 4.25	Washington/PA
H-302 Tap L/R Site	H-316, 2.97	Greene/PA

Tap Sites

H-302 Tap Site	H-316, 2.97	Greene/PA
H-306 Tap Site	H-319, 0.00	Wetzel/WV
H-148 Tap Site	H-318, 4.23	Washington/PA

a/ Final locations and quantities of proposed aboveground facilities and final required compressor station horsepower will be determined upon final review of capacity needs and route confirmation.

Attachment 1-11 Table 1.3-1R (Revised April 20, 2016) Land Requirements for the Project		
Facility	Land Required by Construction (acres)	Land Required for Operation (acres)a/
Pipeline	94.07	49.93
Additional Temporary Workspace (ATWS)	61.46	-
Yards	11.63	-
Access Roads	6.37	2.02
Groundbeds	1.01	1.01
Redhook Compressor Station	17.74	17.74
Webster Interconnect	2.35	0.86
Mobley Tap	0.50	0.38
Meter Stations	N/A	N/A
Pig Launcher/Receiver Facilities /a	0.59	0.59
Pipe storage yards (Pratt Compressor Station)	7.49	7.49
Mainline Valve Sites	N/A	0.00
<u>a/</u> : Does not include L/R Facility co-located at Redhook CS Site; Redhook L/R site is included in the Redhook Compressor Station acreage		

Table 1.3-2 (Revised April 20, 2016) Existing Corridors Adjacent to the Project					
Project Feature	Facility Name	Corridor Width (ft) /a	MP Begin	MP End	Distance (miles)
H-158	Equitrans, L.P. (H-148 & H-106)	75	0.16	0.24	0.08
M-80	Equitrans, L.P. (H-148 & H-106)	75	0.16	0.24	0.08
H-305	Equitrans, L.P. (H-148 & H-106)	75	0	0.1	0.1
H-316	Texas Eastern (30")	150	0.2	0.46	0.26
H-316	Texas Eastern (36")	150	0.2	0.46	0.26
H-318	Equitrans, L.P. (H-129 & GSF369)	125	0	0.8	0.8
H-318	Sunoco Mariner East	75	1.22	2.04	0.82
a/ Corridor width estimates based on USDA FSA Aerials Imagery (6/21/2013) and GoogleEarth Imagery (9/5/2013)					

Attachment 1-8 Table 1.3-3R (Revised April 20, 2016) Land Requirements for Aboveground Facilities <u>a/</u>			
Facility Name	Approximate Milepost	Land Required for Construction (acres)	Land Required for Operation (acres)
Compressor Stations			
Redhook Station	H-316, MP 0.00;	19.24	17.74
	H-158/M-80, MP 0.24		
Other Facilities			
Webster Interconnect	H-319, MP 0.04	2.32	0.86
Mobley Tap	H-302, MP 0.60	0.5	0.38
Pig Launcher/Receiver Facilities			
Applegate L/R Site	H-318, 0.00	0.40	0.40
Hartson L/R Site	H-318, 4.26	0.08	0.08
H-302 Tap L/R Site	H-316, 2.97	0.11	0.11
<u>a/</u> There are no MLVs included in the Project.			

Table 1.3-4 (Revised April 20, 2016) Land Requirements for Access Roads		
Access Road ID	Milepost	Acreage
Construction		
H158 M80 AR 01	0	0.23
H158 M80 AR 02	0.06	0.26
H305 AR 01	0.1	0.51
H316 AR 01	0.07	0.12
H316 AR 02	0.19	0.02
H316 AR 03	0.65	0.39
H316 AR 04	0.9	0.28
H316 AR 05a	1.45	0.36
H316 AR 05b	1.45	0.49
H316 AR 06a	2	0.14
H316 AR 06b	2	0.16
H316 AR 07a	2.83	1.05
H316 AR 07b	2.83	0.24
H316 AR 08	N/A	0.17
H318 AR 01	0	1.60
H318 AR 02a	0.7	0.03
H318 AR 02b	0.7	0.03
H318 AR 03	1.00, 1.10	0.47
H318 AR 04a	1.92	0.45
H318 AR 05	3.5	0.11
H318 AR 06	3.6	0.49
H318 AR 07	4.22	0.09
H318 AR 08	4.25	0.51
H319 AR 01	0.01	0.02
Webster AR 01	N/A	0.01
Webster AR 02	N/A	0.03
Webster AR 03	N/A	0.09
Operation		
H305 AR 01	0.1	0.51
H316 AR03	0.65	0.39
H316 AR 07a	2.83	1.05
H316 AR 07b	2.83	0.24
H318 AR 01	0	1.60
H318 AR 07	4.22	0.09
H319 AR 01	0.01	0.02
Webster AR 01	N/A	0.01

<p style="text-align: center;">Attachment General-2 Table 1.4-1R (Revised April 20, 2016) ATWS Located within 50 feet of Waterbodies and Wetlands</p>									
Project Feature	Milepost	County	State	ATWS	ATWS Use	ATWS Length x Width a/	Wetland or Waterbody ID	Offset	Justification
								(feet)	
Wetlands									
H-316	1.5	Greene	Pennsylvania	H316 ATWS 05	Laydown Area	2376' x 228'	W-AA8	0	ATWS is located in open field. Work Space to stage the pipe bending crew. Work will be done over timbermats to prevent compaction and rutting.
H-316	2	Greene	Pennsylvania	H316 ATWS 06	HDD Pullback	825' x 211'	W-AA9	0	Workspace needed for pipe stringing and pullback of the HDD section. Work will be done over timbermats to prevent compaction and rutting.
H-316	2.8-3.0	Greene	Pennsylvania	H316 ATWS 07	H-316 HDD Entrance Location/H-302 Hot Tap Location	Irregular Shape	W-M2,W-M3, W-M4, W-M5, W-M6	0 - 5	To allow adequate work space to construct the HDD activities, stage and conduct H-302 Hot Tap, and Launcher/Receiver. No impacts to wetlands are anticipated. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.
H-318	2.8	Allegheny	Pennsylvania	H318 ATWS 05c	H-318 HDD Entrance Location	Irregular Shape	W-BB13	10	HDD Entrance Area. To allow adequate work space to construct the HDD activities and groundbed installation. No impacts to wetlands are anticipated. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.
H-319	0	Wetzel	West Virginia	H319 ATWS 01	Laydown Area	Irregular Shape	W-Z3A	11	To allow adequate space to stage materials and equipment for pipeline construction as well as maintain a buffer to S-A2A. The workspace is located in open field and limits tree disturbance. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.
H-319	0.04	Wetzel	West Virginia	H319 ATWS 02	Hot Tap Workspace	Irregular Shape	W-Z3B	0	To allow adequate work space to construct the Hot Tap as well as maintain a buffer to S-A2A. Work will be done over timbermats to prevent compaction and rutting.
Redhook	N/A	Greene	Pennsylvania	Redhook ATWS 01	Laydown Area	Irregular Shape	W-AA1	5	To allow adequate space to stage materials and equipment for compressor station construction. Equitrans owns this workspace, previously used as yard in other Equitrans projects. No impact to the wetland will occur. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.
Webster	N/A	Wetzel	West Virginia	Webster ATWS 01	Additional Workspace	625' x 82'	W-Z2	0	To allow adequate space to stage materials and equipment for work at the Webster Interconnect. Workspace is limited to the open area to avoid impacts on trees. Work will be done over timbermats to prevent compaction and rutting.
Waterbodies									
H-158/M-80	0.1	Greene	Pennsylvania	H-158/M-80 ATWS 01	Temporary Storage Area	Irregular Shape	S-AA1	0	Workspace is needed to allow adequate turning radius for equipment and material delivery. Stream impacts will be avoided by construction. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter; and any crossing of the stream will be done by timbermat bridge.

Attachment General-2

Table 1.4-1R

(Revised April 20, 2016)

ATWS Located within 50 feet of Waterbodies and Wetlands

Project Feature	Milepost	County	State	ATWS	ATWS Use	ATWS Length x Width a/	Wetland or Waterbody ID	Offset	Justification
								(feet)	
H-158/M-80	0.1	Greene	Pennsylvania	H-158/M-80ATWS 02	Temporary Storage Area	Irregular Shape	S-AA1	10	Workspace is needed for pipe bending and staging area. Equitrans owns this workspace, previously used in other Equitrans projects. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.
H-305	0.1	Greene	Pennsylvania	H305 ATWS 01	Laydown Area	Irregular Shape	SN-1	0	Work Space to tie into existing station. Stream impacts will be avoided by construction. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.
H-316	2.8-3.0	Greene	Pennsylvania	H316 ATWS 07	H-316 HDD Entrance Location/H-302 Hot Tap Location	Irregular Shape	S-M1	2.4	To allow adequate work space to construct the HDD activities, stage and conduct H-302 Hot Tap, and Launcher/Receiver. Stream impacts will be avoided by construction. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.
H-318	1.7	Allegheny	Pennsylvania	H318 ATWS 02a, c, d	Additional Workspace	2a: 530' x 120' 2c: 130' x 50' 2d: 50' x 50'	S-BB3	10	Work Space to install the pipeline, and mitigate any slide issues if they would arise. Adequate workspace to conduct the dam and pump is limited by topography and adjacent roadways. Stream impacts within the ATWS will be avoided by construction. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.
H-318	2.7	Allegheny	Pennsylvania	H318 ATWS 05a	Laydown Area	Irregular Shape	S-BB4	0	Workspace needed to conduct conventional road bore of Bunola River Road and sufficient workspace to conduct the dam and pump. Sediment barriers such as silt fence or compost filter sock will be installed around its south perimeter.
H-318	2.8	Allegheny	Pennsylvania	H318 ATWS 05c	H-318 HDD Entrance Location	Irregular Shape	S-BB4, S-BB6	0	HDD Entrance Area. To allow adequate work space to construct the HDD activities and groundbed installation. ATWS placement is constrained by Bunola River Road, adjacent Railroad, and topography to the south. No impacts to streams are anticipated with the exception of installation of the groundbed. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter, and any crossing will be made with a timbermat bridge.
Redhook	N/A	Greene	Pennsylvania	Redhook ATWS 01	Laydown Area	Irregular Shape	S-AA1	10	To allow adequate space to stage materials and equipment for compressor station construction. Equitrans owns this workspace, previously used as yard in other Equitrans projects. No impact to the stream will occur. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.
Webster	N/A	Wetzel	West Virginia	Webster ATWS 01	Additional Workspace	625' x 82'	S-A2A, S-A3A	0	To allow adequate space to stage materials and equipment for work at the Webster Interconnect. Workspace is limited to the open area to avoid impacts on trees. Work will be done over timbermats to prevent compaction and rutting. Sediment barriers such as silt fence or compost filter sock will be installed around its perimeter.

a/ Length and Width estimates are approximate; no dimensions were provided if ATWS was irregularly shaped.

Table 1.4-2 (Revised April 20, 2016) Locations Utilizing HDD Methodology				
Pipeline	Milepost Begin	Milepost End	Length	Reason
H-318	2.81	3.52	0.71	Cross Monongahela River
H-316	2.10	2.83	0.73	Cross South Fork Tenmile Creek

Attachment 1-2 Table 1.4-3R (Revised April 20, 2016) Foreign Pipelines Crossed by the Project				
Pipeline	MP	Name/Type	Size	Crossing Method
H-316	0.01	Equitrans, L.P.	20"	Open Cut
H-316	0.12	Dominion Transmission, Inc./Gas Pipeline	24"	Open Cut
H-316	0.01	Equitrans LP	16"	Open Cut
H-316	0.06	Equitrans LP	16"	Open Cut
H-316	0.06	Equitrans LP	12"	Open Cut
H-316	0.13	Dominion Transmission, Inc./Gas Pipeline	6"	Open Cut
H-316	0.2	Peoples Natural Gas	8"	Open Cut
H-316	0.45	Texas Eastern Transmission, LP/Gas Pipeline	20"	Open Cut
H-316	0.47	Texas Eastern Transmission, LP (5)/Gas Pipeline	20"	Open Cut
H-316	0.48	Texas Eastern Transmission, LP (3)/Gas Pipeline	20"	Open Cut
H-316	0.49	Texas Eastern Transmission, LP	24"	Open Cut
H-316	0.51	Texas Eastern Transmission, LP	20"	Open Cut
H-316	0.51	Dominion Transmission, Inc.	24"	Open Cut
H-316	0.78	Equitrans, L.P.	TBD	Open Cut
H-316	1.95	Rice Midstream Partners	30"	Open Cut
H-316	2.42	Texas Eastern Transmission, LP/Gas Pipeline	20"	HDD
H-316	2.44	Texas Eastern Transmission, LP (5)/Gas Pipeline	24"	HDD
H-316	2.45	Texas Eastern Transmission, LP (3)/Gas Pipeline	20"	HDD
H-316	2.46	Texas Eastern Transmission, LP	20"	HDD
H-316	2.48	Texas Eastern Transmission, LP	20"	HDD
H-316	2.91	Peoples Natural Gas	4"	Open Cut
H-318	0.08	Peoples Natural Gas	16"	Open Cut
H-318	0.09	Equitrans LP	16"	Open Cut
H-318	0.1	Equitrans LP	16"	Open Cut
H-318	0.71	Peoples Natural Gas	3"	Bore
H-318	1.92	Peoples Natural Gas	UNK	Open Cut
H-318	2.76	Peoples Natural Gas	3"	Bore
H-318	2.84	Peoples Natural Gas	4"	HDD
H-318	3.99	Peoples Natural Gas	6"	Open Cut
H-318	4.2	Equitrans LP	20"	Open Cut

Table 1.4-4				
Residences within 50 Feet of Construction Work Area				
Feature	Milepost	Type	Distance (feet) from Construction	Status
H-158/M-80 a/	0.18	Residence	25	Negotiating Purchase
H-316	0.11	Residence	0	Purchased by EQT
a/ This residence is located on the Redhook Compressor Station site and Equitrans is currently negotiating with the landowner to purchase the property.				

Table 1.4-5			
Vertical Slopes along Pipeline			
Feature	Slope	Mileage	Percentage
H-158	15-30%	0.13	56%
	>30%	0.04	17%
M80	15-30%	0.14	57%
	>30%	0.03	14%
H-316	15-30%	1.48	50%
	>30%	0.22	7%
H-318	15-30%	1.63	38%
	>30%	0.2	5%
H-305	15-30%	0.06	54%
	>30%	0	0%
H-319	15-30%	0	0%
	>30%	0	0%

Table 1.4-6		
Construction Schedule for Major Components of the Project <u>a/</u>		
Component	Commence Construction	Complete Construction
Clearing and Grading	Dec-16	Oct-17
Pipeline Construction	Feb-17	Nov-17
Pipeline Restoration	Oct-17	Dec-17
Pipeline Hydrostatic Testing	Oct-17	Dec-17
Redhook Compressor Station Construction and Commissioning	Feb-17	Apr-18
Pratt Compressor Station Demolition	May-18	Dec-18
<u>a/</u> Anticipated in-service date of December 2017		

Attachment 1-4 Table 1.7-1R (Revised April 20, 2016) Agencies with Relevant Major Permit or Consultation Requirements							
Agency	Permit/Approval/Consultation	Points of Contact	Notified of Intent to Use Pre-Filing Process	Agency Plans to Participate in Pre-Filing Process	Consultation Initiated	Permit Application Filed	Anticipated Permit or Authorization Receipt Date
Federal							
Federal Energy Regulatory Commission (FERC)	NGA Section 7 Certificate and abandonment authorization	Division of Gas-Environment and Engineering 888 1 st Street NE Washington, DC 20426 Rich McGuire, Acting Director	4/1/2015	Yes	3/25/2015	October-15	October-16
Bureau of Indian Affairs, Eastern Regional Office	Consultation regarding which tribes may have potential interest in project area or presence of traditional cultural properties, and contact tribes as appropriate	Johnna Blackhair, Deputy Regional Director 545 Marriott Drive, Suite 700 Nashville, TN 37214	4/27/2015	Pending further consultation	4/27/2015	N/A	N/A
U.S. Department of Transportation (USDOT), Office of Safety, Energy, and the Environment	Consultation	1200 New Jersey Ave. SE Washington, D.C. 20590 Barbara McCann, Director	4/27/2015	Pending further consultation	4/27/2015	N/A	N/A
20160421-5019-FERC-BDF U.S. Army Corps of Engineers (USACE), Pittsburgh District	Section 404 Permit for impacts on waters of the U.S., including wetlands Section 10 Permit for activities affecting navigation Joint Permit Application	Pittsburgh District Corps of Engineers Federal Bldg., 20th Floor 1000 Liberty Ave. Pittsburgh, PA 15222 412-395-7152	4/27/2015	Pending further consultation	4/27/2015	October-15 April-16	October-16
USACE, Huntington District	Section 404 Permit for impacts on waters of the U.S., including wetlands	Huntington District Corps of Engineers Regulatory/Permits – Energy Resources (WV and OH) Colonel Leon F. Parrott 502 Eighth St. Huntington, WV 25701 (304) 399-5211	4/27/2015	Pending further consultation	4/27/2015	October-15	October-16
U.S. Department of Agriculture (USDA), Pennsylvania	Consultation regarding permanent conversion of important farmland	Pennsylvania NRCS State Office One Credit Union Place, Suite 340 Harrisburg, PA 17110-2993 717-237-2207 Joe Kraft, State Soil Scientist	4/27/2015	Pending further consultation	4/27/2015	N/A	N/A
U.S. Fish and Wildlife Service (USFWS), Pennsylvania Field Office	Consultation under Section 7 of ESA for potential impacts on federally protected species Consultation regarding impacts on migratory birds Consultation regarding impacts on fish and wildlife	Pennsylvania Field Office Lora Zimmerman, Project Leader 110 Radnor Rd; Suite 101 State College, PA 16801 Phone: (814) 234-4090 Ext. 2233 Fax: (814) 234-0748 Email: lora_zimmerman@fws.gov	4/27/2015	Pending further consultation	6/24/2015	N/A	February-16
State							
Pennsylvania Game Commission (PGC)	Threatened and Endangered Species Consultation	Bureau of Wildlife Habitat Management Division of Environmental Planning & Habitat Protection Tracey Librandi-Mumma 2001 Elmerton Avenue Harrisburg, PA 17110-9797 717-787-4250	4/27/2015	Pending further consultation	6/24/2015	N/A	June-15
Pennsylvania Department of Conservation and Natural Resources (PADCNR)	Threatened and Endangered Species Consultation	Conservation Science and Ecological Services Division Rachel Carson State Office Building, 6th Floor P.O. Box 8552 Harrisburg, PA 17105-8552 717-787-3444	4/27/2015	Pending further consultation	6/24/2015	N/A	October-16
Pennsylvania Fish and Boat Commission	Threatened and Endangered Species Consultation	Division of Environmental Services 450 Robinson Lane, Bellefonte 16823-9685 814-359-5115 Dave Spotts, Chief	4/27/2015	Pending further consultation	6/24/2015	N/A	January-16

Attachment 1-4
Table 1.7-1R
(Revised April 20, 2016)

Agencies with Relevant Major Permit or Consultation Requirements

Agency	Permit/Approval/Consultation	Points of Contact	Notified of Intent to Use Pre-Filing Process	Agency Plans to Participate in Pre-Filing Process	Consultation Initiated	Permit Application Filed	Anticipated Permit or Authorization Receipt Date
Pennsylvania Department of Environmental Protection (PADEP), Air Permits Division	Chapter 127 Minor Source Permit Title V or Minor Source Operating Permit	Southwest Regional Office 400 Waterfront Drive Pittsburgh, PA 15222-4745 412-442-5215 Mark Wayner, Air Quality Program Manager; Mark Gorog, Environmental Engineer Manager; and Devin Tomko, Air Quality Engineering Specialist	4/27/2015	Pending further consultation	3/10/2015	October-15	August-16
PADEP	ESCGP-2; General Permit for Earth Disturbance Associated with Oil and Gas Exploration, Production, Processing, or treatment operations or transmission facilities PAG-10 General Permit; Hydrostatic Testing of Tanks and Pipelines	Greene County Conservation District 19 South Washington Street, Waynesburg, PA 15370 Washington County Conservation District 2800 N Main St Suite 105 Washington, PA 15301 Allegheny County Conservation District 33 Terminal Way #325b, Pittsburgh, PA 15219	4/27/2015	Pending further consultation	4/27/2015	March-16 State-wide PAG-10 authorization held	October-16
PADEP, Bureau of Waterways Engineering and Wetlands	Chapter 105 Water Obstruction and Encroachment Permit; Clean Water Act Section 401 Water Quality Certification (jointly with USACE Section 404) Submerged Lands License Agreement	Greene County Conservation District 19 South Washington Street, Waynesburg, PA 15370 Washington County Conservation District 2800 N Main St Suite 105 Washington, PA 15301 Allegheny County Conservation District 33 Terminal Way #325b, Pittsburgh, PA 15219	4/27/2015	Pending further consultation	4/27/2015	October-15	October-16
Pennsylvania Department of Transportation	Highway Occupancy Permit	Engineering District 11-0 (Allegheny County) 45 Thoms Run Road Bridgeville, PA 15017 412-429-4804 John Brosnan, H.O.P. Manager Engineering District 12-0 (Washington and Greene counties) N. Gallatin Avenue Ext. PO Box 259 Uniontown, PA 15401 724-439-7310 Richard Marker, P.E., H.O.P. Manager	4/27/2015	Pending further consultation	4/27/2015	Ongoing	October-16
Pennsylvania Historical and Museum Commission, Bureau for Historic Preservation (serves as the PA State Historic Preservation Office [SHPO])	Project Review under Section 106 and PA History Code	Serena Bellew, Bureau Director / Deputy State Historic Preservation Officer 717-705-4035 sbellew@pa.gov Western Region Historic Resources Barbara Frederick 717-772-0921 bafrederic@pa.gov Archaeological Resources Kira Heinrich 717-705-0700 kiheinrich@pa.gov	4/27/2015	Pending further consultation	5/7/2015	N/A	June-16

Attachment 1-4
Table 1.7-1R
(Revised April 20, 2016)

Agencies with Relevant Major Permit or Consultation Requirements

Agency	Permit/Approval/Consultation	Points of Contact	Notified of Intent to Use Pre-Filing Process	Agency Plans to Participate in Pre-Filing Process	Consultation Initiated	Permit Application Filed	Anticipated Permit or Authorization Receipt Date
West Virginia Division of Natural Resources (WVDNR), Natural Heritage Program	Consultation	WVDNR, Office of Wildlife Resources Barbara Sargent 67 Ward Road Elkins, WV 26241 South Charleston, WV 25303 Phone: (304) 637-0245 Email: Barbara.d.sargent@wv.gov	4/27/2015	Pending further consultation	6/24/2015	N/A	June-16
WVDNR, Office of Land and Streams	Stream Activity Permit	WVDNR, Office of Land and Streams Building 74, Room 200 324 Fourth Avenue South Charleston, WV 25303 Phone: (304) 558-3225 Fax: (304) 558-6048 Email: dnr.landandstreams@wv.gov	4/27/2015	Pending further consultation	4/27/2015	June-16	July-16
West Virginia Department of Environmental Protection (WVDEP), Division of Water and Waste Management	NPDES Permit – Construction Stormwater General Permit for Oil and Gas Related Construction Activities NPDES Hydrostatic Test (Underground) Discharge Permit	WVDEP, Division of Water and Waste Management 601 57 th Street SE Charleston, WV 25304 Phone: (304) 926-0499 Ext. 1571	4/27/2015	Pending further consultation	4/27/2015	July-16	September-16
West Virginia Department of Transportation (WVDOT), Division of Highways (DOH)	Right-of-Way Use Permit/Encroachment Permit	WVDOT, Division of Highways 1 DOT Drive Moundsville, WV 26041-1605 Phone: (304) 843-4000	4/27/2015	Pending further consultation	4/27/2015	Ongoing	October-16
West Virginia Division of Culture and History	Cultural Resources Consultation	West Virginia Division of Culture and History Susan Pierce, Director, Deputy State Historic Preservation Officer 1900 Kanawha Boulevard East Charleston, WV 25305 Phone: (304) 558-0240 Ext. 158 Email: susan.m.pierce@wv.gov	4/27/2015	Pending further consultation	5/7/2015	N/A	June-16
Local							
Wetzel County Flood Plain Management	Floodplain Development Permit	Wetzel County Emergency Services Edgar Sapp, Director P.O. Box 156 New Martinsville, WV 26155 Phone: (304) 455-6960 Email: wc911@frontier.com	4/27/2015	Pending further consultation	4/27/2015	N/A - Project not in FEMA 100-yr floodplain	

Note: Consultations will occur continuously throughout the development of the Project.

Table 1.10-1							
Projects in the Vicinity of the Equitrans Expansion Project							
Project	Description	County/State	Shared Watershed (Fifth Level)	Shared Air Quality Control Region	Distance from the Project	Direction	Status
Energy Projects							
Mountain Valley Pipeline (MVP)	Mountain Valley Pipeline Project consists of the installation of approximately 301 miles of 42-inch-diameter pipeline in 17 counties in WV and VA. Installation of approximately 171,600 horsepower of compression at three compressor station sites along the route will also be required.	Wetzel County, WV Harrison County, WV Doddridge County, WV Lewis County, WV Braxton County, WV Webster County, WV Nicholas County, WV Greenbrier County, WV Fayette County, WV Summers County, WV Monroe County, WV Giles County, VA Craig County, VA Montgomery County, VA Roanoke County, VA Franklin County, VA Pittsylvania County, VA	Fishing Creek	Southwest Pennsylvania Intrastate, Parkersburg (West Virginia)-Marietta (Ohio)	Connects to the Project	S	In the pre-filing stage
Leach Xpress	The Leach Xpress project, proposed by Columbia Pipeline Group, would involve construction of about 160 miles of natural gas pipeline and compression facilities in West Virginia's northern panhandle.	Marshall County, WV	N/A	Steubenville-Weirton-Wheeling Interstate	23 Miles	W	The application has been filed with FERC.
Ohio Valley Connector Project	Natural gas pipeline system of approximately 36 miles of pipeline and two compressor stations to transport natural gas from northwestern West Virginia to southeastern Ohio for subsequent delivery to mid-continent and Gulf Coast markets.	Marshall and Wetzel Counties, WV	Fishing Creek	Steubenville-Weirton-Wheeling Interstate, Southwest Pennsylvania Intrastate	Less than 1 mile	W	Construction expected to be complete third quarter 2016.
Appalachian Connector Pipeline	Williams has proposed the Appalachian Connector pipeline project that would connect Western Marcellus and Utica natural gas supply areas in northern West Virginia with Williams' existing Transco natural gas pipeline, which stretches about 850 miles in Virginia.	N/A	N/A	N/A	N/A	N/A	The project is in the preliminary planning stages
Supply Header Project	Dominion's proposed project would include about 39 miles of new 36-inch natural gas pipeline and would modify existing compression facilities in West Virginia. The compressor station in Mockingbird Hill is approximately 7 miles west of MVP mile marker 1.	Wetzel and Harrison Counties, WV	Fishing Creek, South Fork Tenmile Creek	North Central West Virginia Intrastate, Parkersburg (West Virginia)-Marietta (Ohio)	5 miles	SW	The application has been filed with FERC.
Rover Pipeline Project	Rover Pipeline LLC, a subsidiary of Energy Transfer, has proposed to construct the Rover Pipeline Project, which would carry 3.25 billion cubic feet of natural gas per day through 710 miles of pipeline. The last few miles of the proposed pipeline cuts southeast through Marshall County, West Virginia (24-inch pipe) and Tyler and Wetzel counties (36-inch pipe) before terminating in Doddridge County.	Marshall, Wetzel, Tyler, and Doddridge Counties, WV	South Fork Tenmile Creek, Fishing Creek	81.231 Central West Virginia, 81.70 - Parkersburg (West Virginia)-Marietta (Ohio)	20 miles	W	The application has been filed with FERC
Sunrise Pipeline Project and Jefferson Expansion	The new facilities included 44.4 miles of natural gas pipeline varying from 16 to 24-inch diameter, replacement of 2.6 miles of pipeline, and retesting and uprating 4.8 miles of pipeline; one new compressor station; and ancillary facilities.	Wetzel County, WV; Greene County, PA	South Fork Tenmile Creek;	Southwest Pennsylvania Intrastate AQCR and West Virginia 2	Connects to the Project	N	Operational
			Fishing Creek				

Table 1.10-1							
Projects in the Vicinity of the Equitrans Expansion Project							
Project	Description	County/State	Shared Watershed (Fifth Level)	Shared Air Quality Control Region	Distance from the Project	Direction	Status
Applegate Gathering System	EQT Gathering, LLC is in the planning stages for an expansion of its Applegate Gathering System, which could include construction of gathering pipelines and compression.	Allegheny County, PA	Lower Monongahela River	Southwest Pennsylvania Intrastate AQCR	Connects to the Project	E	The project is in the preliminary planning stages.
Mariner East Pipeline	Sunoco Mariner East is constructing this project to deliver natural gas from Western Pennsylvania to the Marcus Hook facility, where it will be processed, stored, and distributed to various domestic and waterborne markets. The project is anticipated to have an initial capacity to transport approximately 70,000 barrels per.	Allegheny County, PA	Lower Monongahela River	Southwest Pennsylvania Intrastate AQCR	Less than1 mile	N	Operational
Mariner East 2 Pipeline	Sunoco is planning to expand the existing Mariner East pipeline to increase its capacity to 345,000 barrels per day natural gas.	Allegheny County, PA	Lower Monongahela River	Southwest Pennsylvania Intrastate AQCR	0-3 miles (route not finalized)	N	Operation expected in late 2016
Transportation Projects							
Pennsylvania Turnpike, Southern Beltway Project	Construction of a 13-mile, 4-lane highway from Route 22 to I-79.	Allegheny and Washington Counties, PA	N/A	Southwest Pennsylvania Intrastate AQCR	10 miles	W	Under construction
Murtland Ave/I-70 Interchange Improvements	PennDOT construction of a double divergent interchange at I-70 and Murtland Avenue.	Washington County, PA	N/A	Southwest Pennsylvania Intrastate AQCR	15 miles	NW	Under construction
Commercial/Residential Development							
20160421-5019 FERC PDF (Cool Valley Mixed-use Development	911-acre mixed-use development in Cecil Township with up to 2.25 million square feet of office space, retail space, and 1,400 new homes.	Washington County, PA	N/A	Southwest Pennsylvania Intrastate AQCR	20 miles	N	Permitting in process
Park Place at the Meadowlands, Phase II	Implementation of Phase II of Park Place at the Meadowlands, a mixed-use property on 44 acres in North and South Strabane townships.	Washington County, PA	N/A	Southwest Pennsylvania Intrastate AQCR	13 miles	W	Under construction
Residential Development	Planned residential community associated with The Preserves and the Courtyard at the Preserves.	Allegheny County, PA	N/A	Southwest Pennsylvania Intrastate AQCR	16 miles	NW	Development approved in 2014

Table 2.2-2 (Revised April 20, 2016)

FEMA 100-year Flood Zones Crossed by the Project

Site	Impact Description	State / County	Floodplain Waterbody	FEMA Flood Zone	Milepost	Impact (acres)	Crossing Length (feet)
H-318	Access Roads	PA / Allegheny	Perry Mill Run	AE	0	0	18
H-318	Access Roads ROW	PA / Allegheny	Perry Mill Run	AE	0	0.01	0
H-318	ATWS	PA / Allegheny	Kelly Run	A	1.7	0.20	0
H-318	Permanent Easement	PA / Allegheny	Kelly Run	A	1.7	0.17	0
H-318	Pipeline Route	PA / Allegheny	Kelly Run	A	1.7	0	147
H-318	Workspace	PA / Allegheny	Kelly Run	A	1.7	0.32	0
H-318	ATWS	PA / Allegheny	Bunola Run	A	2.7	0.02	0
H-318	Permanent Easement	PA / Allegheny	Bunola Run	A	2.7	0.002	0
H-318	Workspace	PA / Allegheny	Bunola Run	A	2.7	0.02	0
H-318	ATWS	PA / Allegheny	Bunola Run	AE	2.8	3.04	0
H-318	Permanent Easement	PA / Allegheny	Bunola Run	AE	2.8	0.69	0
H-319	Groundbed	PA / Allegheny	Bunola Run	AE	2.8	0.56	0
H-318	Pipeline Route	PA / Allegheny	Bunola Run	AE	2.8	0	607
H-318	Workspace	PA / Allegheny	Bunola Run	AE	2.8	1.00	0
H-318	Permanent Easement	PA / Allegheny	Monongahela River	AE	3	0.52	0
H-318	Pipeline Route	PA / Allegheny	Monongahela River	AE	3	0	457
H-318	Workspace	PA / Allegheny	Monongahela River	AE	3	0.52	0

Source : FEMA (2015) GIS data available for Allegheny County in Pennsylvania and Wetzel County in West Virginia; no GIS data available for Greene, Washington, and parts of Allegheny Counties)

Flood Zone A = Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies.

Flood Zone AE = Areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods.

Attachment		
Table 2.2-3 (Revised April 20, 2016)		
Summary of Waterbodies Crossed by the EEP Project (acres) <u>a/</u>		
State	Flow Type	Sum of Acres
Pennsylvania	Ephemeral	0.08
	Intermittent	0.07
	Perennial	1.41
Pennsylvania Total <u>b/</u>		1.57
West Virginia	Intermittent	0.03
	Perennial	0.15
West Virginia Total <u>b/</u>		0.18
Grand Total <u>b/</u>		1.75
<u>a/</u> Based on data from field delineation as of October 15, 2015		
<u>b/</u> Total acres account for overlapping project features to avoid double counting. Table 2-A-2 lists project features separately, and therefore cannot be summed for total impact acreage due to double counting.		

Attachment 2-11a
Table 2.3-1R (Revised April 20, 2016)

Summary of Wetlands Crossed by the Project (acres) a/

State	County	Project Feature	Impact Description	PEM Construction Impacts	PEM Operation Impacts	PFO Construction Impacts	PFO Operation Impacts
Pennsylvania	Allegheny	H-318	ATWS	0.03	0	0	0
		H-318	Permanent Easement	0	0.44	0	0.07
		H-318	Workspace	0.62	0	0.07	0
		H-318 Total		0.65	0.44	0.07	0.07
	Allegheny Total			0.65	0.44	0.07	0.07
	Greene	H-316	Access Roads ROW	<0.01	0	0	0
		H-316	ATWS	0.43	0	0	0
		H-316	Permanent Easement	0	0.15	0	0
		H-316	Workspace	0.19	0	0	0
		H-316 Total		0.62	0.15	0	0
		Pratt	Pratt Station	0.08	0	0	0
		Pratt Total		0.08	0	0	0
		Redhook	Redhook Station	0	<0.01	0	0
		Redhook Total		0	<0.01	0	0
	Greene Total			0.70	0.15	0	0
	Washington	H-318	Yard	<0.01	0	0	0
		H-318	Permanent Easement	0	0.04	0	0
		H-318	Workspace	0.05	0	0	0
		H-318 Total		0.05	0.04	0	0
	Washington Total			0.05	0.04	0	0
Pennsylvania Total <u>b/</u>				1.40	0.63	0.07	0.07
West Virginia	Wetzel	H-319	Yard	0.09	0	0	0
		H-319	Permanent Easement	0	0.04	0	0
		H-319	Workspace	0.06	0	0	0
		H-319 Total		0.15	0.04	0	0
		Webster	ATWS	0.02	0	0	0
		Webster Total		0.02	0	0	0
	Wetzel Total			0.15	0.04	0	0
West Virginia Total <u>b/</u>				0.17	0.04	0	0
Grand Total <u>b/</u>				1.56	0.67	0.07	0.07

Notes:

a/ Data are from field surveys where access was granted as of October 15, 2015. All NWI wetlands were accounted for during the field survey.

b/ Total acres account for overlapping project features to avoid double counting. Table 2-B-1 lists project features separately, and therefore cannot be summed for total impact acreage due to double counting of overlapping features.

PEM = Palustrine emergent

PFO = Palustrine forested

Attachment 2-3
Table 2-A-2R (Revised April 20 2016)
Waterbodies Crossed by Project a/

Project Feature	Waterbody ID	Milepost	Waterbody Name	Flow Type b/	Impact Type	Impact Description	ATWS / Access Road ID	State	County	Length of Crossing (feet) h/	Permanent Impacts (Acres)	Temporary Impacts (Acres)	Crossing Method i/	FERC Classification	Waterbody Width (Feet) k/	Water Use c/, d/	Fishery Type g/	TOYR f/	Class of Pipe	Depth of Cover (Feet)
H-158	S-AA1	0.1	UNT / South Fork Tenmile Creek	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	10.7	N/A	N/A	Dry Ditch	Minor	10	WWF	Warmwater	No Restriction	3	3
H-158	S-AA1	0.1	UNT / South Fork Tenmile Creek	Perennial	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.0240	N/A	Minor	10	WWF	Warmwater	No Restriction	N/A	N/A
H-158 and M-80	S-AA1	0	UNT / South Fork Tenmile Creek	Perennial	Temporary	ATWS	M80-H158-ATWS-01	Pennsylvania	Greene	N/A	0	0.0573	N/A	Minor	10	WWF	Warmwater	No Restriction	N/A	N/A
H-158 and M-80	S-AA6	0	UNT / South Fork Tenmile Creek	Perennial	Temporary	ATWS	M80-H158-ATWS-01	Pennsylvania	Greene	N/A	0	0.0010	N/A	Intermediate	16	WWF	Warmwater	No Restriction	N/A	N/A
M-80	S-AA1	0.1	UNT / South Fork Tenmile Creek	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	10.7	N/A	N/A	Dry Ditch	Minor	10	WWF	Warmwater	No Restriction	3	3
H-305	S-N1	0.1	UNT / South Fork Tenmile Creek	Intermittent	Temporary	ATWS	H305 ATWS01	Pennsylvania	Greene	N/A	N/A	0.005859	N/A	Minor	7	WWF	Warmwater	No Restriction	N/A	N/A
H-305	S-N1	0.1	UNT / South Fork Tenmile Creek	Intermittent	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	N/A	0.021341	N/A	Minor	7	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA3	0.1	UNT / South Fork Tenmile Creek	Ephemeral	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	4.4	N/A	N/A	Dry Ditch	Minor	4	WWF	Warmwater	No Restriction	2	3
H-316	S-AA3	0.1	UNT / South Fork Tenmile Creek	Ephemeral	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.0042	N/A	Minor	4	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA4	0.2	UNT / South Fork Tenmile Creek	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	5.2	N/A	N/A	Dry Ditch	Minor	5	WWF	Warmwater	No Restriction	2	3
H-316	S-AA4	0.2	UNT / South Fork Tenmile Creek	Perennial	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.0022	N/A	Minor	5	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA8	0.8	UNT / South Fork Tenmile Creek	Ephemeral	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	4.1	N/A	N/A	Dry Ditch	Minor	4	WWF	Warmwater	No Restriction	2	3
H-316	S-AA8	0.8	UNT / South Fork Tenmile Creek	Ephemeral	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.0026	N/A	Minor	4	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA10	1.1	UNT / South Fork Tenmile Creek	Intermittent	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	5.0	N/A	N/A	Dry Ditch	Minor	5	WWF	Warmwater	No Restriction	3	3
H-316	S-AA10	1.1	UNT / South Fork Tenmile Creek	Intermittent	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.0029	N/A	Minor	5	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA11	1.3	UNT / South Fork Tenmile Creek	Ephemeral	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	9.6	N/A	N/A	Dry Ditch	Minor	5	WWF	Warmwater	No Restriction	2	3
H-316	S-AA11	1.3	UNT / South Fork Tenmile Creek	Ephemeral	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.0060	N/A	Minor	6.5	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA12	1.3	Ruff Creek	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	51.5	N/A	N/A	Dry Ditch	Intermediate	60	WWF	Warmwater	No Restriction	2	3
H-316	S-AA12	1.3	Ruff Creek	Perennial	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.0372	N/A	Intermediate	60	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA13	2	UNT / South Fork Tenmile Creek	Ephemeral	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	3.2	N/A	N/A	Dry Ditch	Minor	3	WWF	Warmwater	No Restriction	2	3
H-316	S-AA13	2	UNT / South Fork Tenmile Creek	Ephemeral	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.0010	N/A	Minor	3	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA14	2.1	UNT / South Fork Tenmile Creek	Ephemeral	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	3.1	N/A	N/A	Dry Ditch	Minor	3	WWF	Warmwater	No Restriction	2	3
H-316	S-AA14	2.1	UNT / South Fork Tenmile Creek	Ephemeral	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.0021	N/A	Minor	3	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA15	2.3	South Fork Tenmile Creek	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	96.2	N/A	N/A	HDD	Intermediate	100	WWF	Warmwater	No Restriction	3	30
H-316	S-AA21	2.5	UNT / South Fork Tenmile Creek	Intermittent	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	4.3	N/A	N/A	HDD i/	Minor	4	WWF	Warmwater	No Restriction	3	215
H-316	S-AA22	2.5	UNT / South Fork Tenmile Creek	Ephemeral	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	7.1	N/A	N/A	HDD i/	Minor	7	WWF	Warmwater	No Restriction	3	215
H-316	S-AA23	2.5	UNT / South Fork Tenmile Creek	Ephemeral	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	9.2	N/A	N/A	HDD i/	Minor	9	WWF	Warmwater	No Restriction	3	220
H-316	S-AA24	2.5	UNT / South Fork Tenmile Creek	Intermittent	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	8.2	N/A	N/A	HDD i/	Minor	9	WWF	Warmwater	No Restriction	3	205
H-316	S-AA20	2.7	UNT / South Fork Tenmile Creek	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	1.8	N/A	N/A	HDD i/	Minor	1	WWF	Warmwater	No Restriction	3	205
H-316	S-AA17	2.8	UNT / South Fork Tenmile Creek	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	12.5	N/A	N/A	HDD i/	Intermediate	12	WWF	Warmwater	No Restriction	3	45
H-316	S-AA18	2.8	UNT / South Fork Tenmile Creek	Intermittent	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	2.6	N/A	N/A	HDD i/	Minor	6	WWF	Warmwater	No Restriction	3	40
H-316	S-AA16	3	UNT / South Fork Tenmile Creek	Perennial	Access Ctl	Access Roads	H316 AR 07a	Pennsylvania	Greene	6.3	N/A	N/A	N/A	Minor	5	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA16	3	UNT / South Fork Tenmile Creek	Perennial	Temporary	Access Roads ROW	H316 AR 07a	Pennsylvania	Greene	N/A	0	0.003	N/A	Minor	5	WWF	Warmwater	No Restriction	N/A	N/A
Pratt	S-AA6	0	UNT / South Fork Tenmile Creek	Perennial	Temporary	Pratt Station	N/A	Pennsylvania	Greene	N/A	0	0.0313	N/A	Intermediate	16	WWF	Warmwater	No Restriction	N/A	N/A
Pratt	S-AA7	0.1	UNT / South Fork Tenmile Creek	Ephemeral	Temporary	Pratt Station	N/A	Pennsylvania	Greene	N/A	0	0.0121	N/A	Minor	8	WWF	Warmwater	No Restriction	N/A	N/A
Redhook	S-AA2	0.1	UNT / South Fork Tenmile Creek	Ephemeral	Temporary	ATWS	Redhook ATWS 01	Pennsylvania	Greene	N/A	0	0.0057	N/A	Minor	4	WWF	Warmwater	No Restriction	N/A	N/A
Redhook	S-N2	0	UNT / South Fork Tenmile Creek	Intermittent	Permanent	Redhook Station	N/A	Pennsylvania	Greene	N/A	0.0101	0	N/A	Minor	2	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB4	0.04	Bunola Run	Perennial	Permanent	Groundbed	N/A	Pennsylvania	Allegheny	N/A	0.09	0	N/A	Intermediate	25	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB3	1.7	Kelly Run	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Allegheny	26.2	N/A	N/A	Dry Ditch	Intermediate	30	WWF	Warmwater	No Restriction	2	3
H-318	S-BB3	1.7	Kelly Run	Perennial	Temporary	Workspace	N/A	Pennsylvania	Allegheny	N/A	0	0.0232	N/A	Intermediate	30	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB4	2.8	Bunola Run	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Allegheny	26.0	N/A	N/A	Dry Ditch	Intermediate	25	WWF	Warmwater	No Restriction	2	3
H-318	S-BB4	2.8	Bunola Run	Perennial	Temporary	ATWS	H318 ATWS 05c	Pennsylvania	Allegheny	N/A	0	0.292	N/A	Intermediate	25	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB4	2.8	Bunola Run	Perennial	Temporary	ATWS	H318 ATWS 05c	Pennsylvania	Allegheny	N/A	0	0.033	N/A	Intermediate	25	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB4	2.8	Bunola Run	Perennial	Temporary	Workspace	N/A	Pennsylvania	Allegheny	N/A	0	0.016	N/A	Intermediate	25	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB6	2.8	UNT / Monongahela River	Intermittent	Temporary	ATWS	H318 ATWS 05c	Pennsylvania	Allegheny	N/A	0	0.006	N/A	Minor	10	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB2	3.8	UNT / Monongahela River	Ephemeral	Route Ctl	Pipeline Route	N/A	Pennsylvania	Washington	1.3	N/A	N/A	Dry Ditch	Minor	1	WWF	Warmwater	No Restriction	2	3
H-318	S-BB2	3.8	UNT / Monongahela River	Ephemeral	Temporary	Workspace	N/A	Pennsylvania	Washington	N/A	0	0.0007	N/A	Minor	1	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB1	4.2	Lobbs Run	Intermittent	Access Ctl	Access Roads	H318 AR 07	Pennsylvania	Washington	0.4	N/A	N/A	N/A	Minor	2	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB1	4.2	Lobbs Run	Intermittent	Route Ctl	Pipeline Route	N/A	Pennsylvania	Washington	5.8	N/A	N/A	Dry Ditch	Minor	2	WWF	Warmwater	No Restriction	2	3
H-318	S-BB1	4.2	Lobbs Run	Intermittent	Temporary	Workspace	N/A	Pennsylvania	Washington	N/A	0	0.0047	N/A	Minor	2	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB5	2.95-3.12	Monongahela River g/	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Allegheny/ Washington	915.0	N/A	N/A	HDD	Major	813	WWF	Warmwater	No Restriction	3	60
H-319	S-A2A	0.04	UNT / North Fork Fishing Creek	Perennial	Access Ctl	Access Roads	H319 AR 01	West Virginia	Wetzel	15.0	N/A	N/A	N/A	Intermediate	15	B	Warmwater	April 1-June 30	N/A	N/A
H-319	S-A2A	0.04	UNT / North Fork Fishing Creek	Perennial	Route Ctl	Pipeline Route	N/A	West Virginia	Wetzel	15.0	N/A	N/A	Dry Ditch	Intermediate	15	B	Warmwater	April 1-June 30	3	3
H-319	S-A2A	0.04	UNT / North Fork Fishing Creek	Perennial	Temporary	Access Roads ROW	H319 AR 01	West Virginia	Wetzel	N/A	0	0.0043	N/A	Intermediate	15	B	Warmwater	April 1-June 30	N/A	N/A
H-319	S-A2A	0.04	UNT / North Fork Fishing Creek	Perennial	Temporary	Workspace	N/A	West Virginia	Wetzel	N/A	0	0.0121	N/A	Intermediate	15	B	Warmwater	April 1-June 30	N/A	N/A
Mobley	S-J63	0	UNT / Mobley Run	Intermittent	Route Ctl	Lateral Tap	N/A	West Virginia	Wetzel	1.6	N/A	N/A	N/A	Minor	7	B	Warmwater	April 1-June 30	N/A	N/A
Mobley	S-J63	0	UNT / Mobley Run	Perennial	Permanent	Mobley Station	N/A	West Virginia	Wetzel	N/A	0.0031	0	N/A	Minor	7	B	Warmwater	April 1-June 30	N/A	N/A
Mobley	S-J63	0	UNT / Mobley Run	Perennial	Temporary	ATWS	Mobley ATWS01	West Virginia	Wetzel	N/A	0	0.0022	N/A	Minor	7	B	Warmwater	April 1-June 30	N/A	N/A
Mobley	S-Z1	0	UNT / Mobley Run	Perennial	Permanent	Mobley Station	N/A	West Virginia	Wetzel	N/A	0.0103	0	N/A	Intermediate	12	B	Warmwater	April 1-June 30	N/A	N/A

Attachment 2-3 Table 2-A-2R (Revised April 20 2016) Waterbodies Crossed by Project <u>a/</u>																				
Project Feature	Waterbody ID	Milepost	Waterbody Name	Flow Type <u>b/</u>	Impact Type	Impact Description	ATWS / Access Road ID	State	County	Length of Crossing (feet) <u>h/</u>	Permanent Impacts (Acres)	Temporary Impacts (Acres)	Crossing Method <u>i/</u>	FERC Classification	Waterbody Width (Feet) <u>k/</u>	Water Use <u>c/, d/</u>	Fishery Type <u>e/</u>	TOYR <u>f/</u>	Class of Pipe	Depth of Cover (Feet)
Webster	S-A2A	0.04	UNT / North Fork Fishing Creek	Perennial	Temporary	ATWS	Webster ATWS 01	West Virginia	Wetzel	N/A	0	0.0993	N/A	Intermediate	15	B	Warmwater	April 1-June 30	N/A	N/A
Webster	S-A3A	0.04	UNT / North Fork Fishing Creek	Intermittent	Temporary	Access Roads ROW	Webster AR 03	West Virginia	Wetzel	N/A	0	0.0009	N/A	Minor	8	B	Warmwater	April 1-June 30	N/A	N/A
Webster	S-A3A	0.04	UNT / North Fork Fishing Creek	Intermittent	Temporary	ATWS	Webster ATWS 01	West Virginia	Wetzel	N/A	0	0.0259	N/A	Minor	8	B	Warmwater	April 1-June 30	N/A	N/A
<p>Notes:</p> <p>UNT – Unnamed Tributary, N/A - Not Applicable</p> <p>a/ Source: Field surveyed data providing locations of the proposed route where access has been granted and where field surveys were completed as of October 21, 2015. All waterbody IDs beginning with "S" are surveyed waterbodies and represent any NHD data (USGS 2014) affected by the Project.</p> <p>b/ From Federal Register / Vol. 80, No. 124 / Monday, June 29, 2015 / Rules</p> <p>Ephemeral streams (rain-dependent streams) have flowing water only in response to precipitation events in a typical year, and are always above the water table.</p> <p>Intermittent streams (seasonal streams) are those that have both precipitation and groundwater providing part of the stream's flow, and flow continuously only during certain times of the year (e.g., during certain seasons such as the rainy season).</p> <p>c/ Pennsylvania Protected and State Water Uses: (Source: 25 Pa. Code 93)</p> <p>WWF = Warm Water Fishes</p> <p>d/ West Virginia State Water Classifications: (Source: W.Va. Code 47CSR2)</p> <p>B = Propagation and Maintenance of fish and other aquatic life</p> <p>e/ Fishery Type: (Source: WVDEP, WWVDNR, and PADEP)</p> <p>f/ TOYR - Time of Year Restriction = Any span of time within time-of-year restrictions set forth by U.S. Army Corps of Engineer's 401 Water Quality Certification for streams crossed in WV and Greene County Conservation District (No date a, b)</p> <p>g/ River crosses county line</p> <p>h/ length of crossing is for linear feature (pipeline or access road) crossing length, which is different than the waterbody width if the crossing is not exactly perpendicular to the waterbody.</p> <p>i/ The HDD crossing for South Fork Tenmile Creek also crosses the unnamed tributaries in the same bore.</p> <p>j/ Dry ditch crossing methods will either be dam and pump or flume</p> <p>k/ Waterbody width was measured in the field in the center of the survey area (not exactly at the pipeline crossing) and represents the bank full width (not the water width at the time of the survey).</p>																				

Attachment 2-11b.
Table 2-B-1R (Revised April 20, 2016)
Wetlands Crossed by Project a/

Project Feature	Wetland ID <u>b/</u>	Milepost	Wetland Classification <u>c/</u>	Impact Description	Feature ID	State	County	Length of Crossing (feet) <u>d/</u>	Operations Impacts (acres)	Temporary/Construction Impacts (acres) <u>e/</u>	Crossing Method
H-316	W-AA10	2.7	PEM	Pipeline Route	N/A	Pennsylvania	Greene	12.2	N/A	N/A	HDD <u>f/</u>
H-316	W-AA4	0.8	PEM	Permanent Easement	N/A	Pennsylvania	Greene	N/A	0.06	0	N/A
H-316	W-AA4	0.8	PEM	Pipeline Route	N/A	Pennsylvania	Greene	50.6	N/A	N/A	Open-cut
H-316	W-AA4	0.8	PEM	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.03	N/A
H-316	W-AA7	0.9	PEM	Permanent Easement	N/A	Pennsylvania	Greene	N/A	0.07	0	N/A
H-316	W-AA7	0.9	PEM	Pipeline Route	N/A	Pennsylvania	Greene	51.1	N/A	N/A	Open-cut
H-316	W-AA8	1.5	PEM	ATWS	H316 ATWS 05	Pennsylvania	Greene	N/A	0	0.02	N/A
H-316	W-AA9	2	PEM	ATWS	H316 ATWS 06	Pennsylvania	Greene	N/A	0	0.01	N/A
H-316	W-M2	3.0	PEM	Access Roads ROW	H316 AR 07a	Pennsylvania	Greene	N/A	0	0.0005	N/A
H-316	W-M3	2.9	PEM	ATWS	H316 ATWS 07	Pennsylvania	Greene	N/A	0	0.00003	N/A
H-316	W-M4	2.9	PEM	ATWS	H316 ATWS 07	Pennsylvania	Greene	N/A	0	0.39	N/A
H-316	W-M6	2.9	PEM	ATWS	H316 ATWS 07	Pennsylvania	Greene	N/A	0	0.0007	N/A
Pratt	W-AA5	0.1	PEM	Pratt Station	N/A	Pennsylvania	Greene	N/A	0	0.02	N/A
Pratt	W-AA6	0.1	PEM	Pratt Station	N/A	Pennsylvania	Greene	N/A	0	0.06	N/A
Redhook	W-N1	0	PEM	Redhook Station	N/A	Pennsylvania	Greene	N/A	0.002	0	N/A
H-318	W-BB12	1.4	PEM	Permanent Easement	N/A	Pennsylvania	Allegheny	N/A	0.00004	0	N/A
H-318	W-BB6	1.8	PEM	Permanent Easement	N/A	Pennsylvania	Allegheny	N/A	0.07	0	N/A
H-318	W-BB6	1.8	PEM	Pipeline Route	N/A	Pennsylvania	Allegheny	34.3	N/A	N/A	Open-cut
H-318	W-BB7	2	PEM	Permanent Easement	N/A	Pennsylvania	Allegheny	N/A	0.37	0	N/A
H-318	W-BB7	2	PEM	Pipeline Route	N/A	Pennsylvania	Allegheny	318.9	N/A	N/A	Open-cut
H-318	W-BB7	2	PEM	Workspace	N/A	Pennsylvania	Allegheny	N/A	0	0.18	N/A
H-318	W-BB8	2.3	PFO	Permanent Easement	N/A	Pennsylvania	Allegheny	N/A	0.03	0	N/A
H-318	W-BB10	2.4	PFO	Permanent Easement	N/A	Pennsylvania	Allegheny	N/A	0.009	0	N/A
H-318	W-BB10	2.4	PFO	Pipeline Route	N/A	Pennsylvania	Allegheny	17.8	N/A	N/A	Open-cut
H-318	W-BB9	2.4	PFO	Permanent Easement	N/A	Pennsylvania	Allegheny	N/A	0.00069	0	N/A
H-318	W-BB11	2.7	PFO	Permanent Easement	N/A	Pennsylvania	Allegheny	N/A	0.027	0	N/A
H-318	W-BB3	3.9	PEM	Permanent Easement	N/A	Pennsylvania	Washington	N/A	0.04	0	N/A
H-318	W-BB3	3.9	PEM	Pipeline Route	N/A	Pennsylvania	Washington	33.1	N/A	N/A	Open-cut
H-318	W-BB3	3.9	PEM	Workspace	N/A	Pennsylvania	Washington	N/A	0	0.01	N/A
H-318	W-BB5	0	PEM	Yard	H318 ATWS 09	Pennsylvania	Washington	N/A	0	0.0001	N/A
H-319	W-Z3A	0	PEM	Permanent Easement	N/A	West Virginia	Wetzel	N/A	0.01	0	N/A
H-319	W-Z3A	0.02	PEM	Pipeline Route	N/A	West Virginia	Wetzel	11.7	N/A	N/A	Open-cut
H-319	W-Z3A	0	PEM	Workspace	N/A	West Virginia	Wetzel	N/A	0	0.02	N/A
H-319	W-Z3B	0	PEM	Yard	H319 ATWS 02	West Virginia	Wetzel	N/A	0	0.09	N/A
H-319	W-Z3B	0	PEM	Permanent Easement	N/A	West Virginia	Wetzel	N/A	0.03	0	N/A
H-319	W-Z3B	0.01	PEM	Pipeline Route	N/A	West Virginia	Wetzel	27.3	N/A	N/A	Open-cut
Webster	W-Z2	0.04	PEM	ATWS	Webster ATWS 01	West Virginia	Wetzel	N/A	0	0.02	N/A

Notes: N/A - Not applicable

a/ Data are from field surveys where access was granted as of October 15, 2015. All NWI wetlands were accounted for during the field survey

b/ Wetland IDs starting with "W" are field surveyed wetlands. All NWI wetlands are accounted for.

c/ Cowardin wetland classification

PEM - Palustrine Emergent

PFO - Palustrine Forested

d/ Length of crossing measured for linear features only.

e/ Construction Impact acreage are exclusive of all Operational Impacts acreage.

f/ HDD crossing is included in South Fork Tenmile Creek HDD crossing.

Table 3.1-1			
Construction Timing Restrictions for Fisheries Crossed by the Project			
State	Water and Classification	In-Stream Work Window	Applicable Regulation
Pennsylvania	South Fork Tenmile Creek and Tributaries - Warmwater Fishery <u>a/</u>	No Restriction	PAFBC
	Monongahela River and Tributaries – Warmwater Fishery <u>b/</u>	No Restriction	PAFBC
<u>a/</u> Greene County Conservation District no date a.			
<u>b/</u> Greene County Conservation District no date b.			

Attachment 3-1 Table 3.2-1 (Revised April 20, 2016) Agricultural Land Crossed by the Project Facilities <u>a/</u>		
Project Facility	Acres/Miles Crossed <u>b/</u>	Percent (%) of Facility
H-316 Pipeline		
Pipe Centerline	1.32	44%
Pipeline ROW	8.26	44%
Aboveground Facilites	0.08	69%
Permanent Access Road ROW	0.94	65%
Groundbeds	0.15	34%
Pipeline Workspace	10.79	52%
ATWS	10.43	55%
Yard	1.74	96%
Temporary Access Road ROW	0.73	35%
Subtotal Acres	33.11	
H-318 Pipeline		
Pipe Centerline	1.22	29%
Pipeline ROW	7.27	28%
Aboveground Facilites	0.09	18%
Permanent Access Road ROW	0.00	0%
Groundbeds	0.00	0%
Pipeline Workspace	7.20	34%
ATWS	21.46	56%
Yard	0.00	0%
Temporary Access Road ROW	0.48	13%
Subtotal Acres	36.50	
H-158 and M-80 Pipelines		
Pipe Centerline <u>e/</u>	0.04	19%
Pipeline ROW	0.57	29%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.33	32%
ATWS	0.00	0%
Yard	2.36	71%
Temporary Access Road ROW	0.29	59%
Subtotal Acres	3.55	
H-305 Pipeline		
Pipe Centerline	0.10	100%
Pipeline ROW	0.99	100%
Permanent Access Road ROW	0.18	34%
Pipeline Workspace	0.87	95%
ATWS	0.33	33%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	2.36	
H-319 Pipeline		
Pipe Centerline	0.00	0%
Pipeline ROW	0.00	0%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.00	
Mobley Tap		
Aboveground Facilites	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Subtotal Acres	0.00	
Redhook Compressor Station		
Aboveground Facilites	13.25	62%
ATWS	0.00	0%
Yard	0.00	0%
Subtotal Acres	13.25	
Pratt Compressor Station		
Aboveground Facilites	6.25	83%
Subtotal Acres	6.25	
Webster Interconnect		
Aboveground Facilites	0.00	0%
Permanent Access Road ROW	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.00	
Grand Total Miles	2.69	
Grand Total Acres	95.03	
<u>a/</u> NLCD categories include Pasture/Hay and Cultivated Crops.		
<u>b/</u> Pipe Centerline values equal miles; all other values in the table equal acreages of expected impacts.		

Attachment 3-1 Table 3.2-2 (Revised April 20, 2016)		
Upland Deciduous Forest Crossed by the Project Facilities <u>a/</u>		
Project Facility	Acres/Miles Crossed <u>b/</u>	Percent (%) of Facility
H-316 Pipeline		
Pipe Centerline	1.45	49%
Pipeline ROW	8.91	48%
Aboveground Facilites	0.03	31%
Permanent Access Road ROW	0.39	27%
Groundbeds	0.00	0%
Pipeline Workspace	7.63	37%
ATWS	7.76	41%
Yard	0.08	4%
Temporary Access Road ROW	0.67	32%
Subtotal Acres	25.48	
H-318 Pipeline		
Pipe Centerline	2.01	47%
Pipeline ROW	12.45	48%
Aboveground Facilites	0.40	82%
Permanent Access Road ROW	0.00	0%
Groundbeds	0.00	0%
Pipeline Workspace	10.35	49%
ATWS	11.92	31%
Yard	1.26	20%
Temporary Access Road ROW	2.27	60%
Subtotal Acres	38.64	
H-158 and M-80 Pipelines		
Pipe Centerline <u>e/</u>	0.16	65%
Pipeline ROW	1.06	53%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.51	51%
ATWS	0.18	33%
Yard	0.13	4%
Temporary Access Road ROW	0.01	2%
Subtotal Acres	1.89	
H-305 Pipeline		
Pipe Centerline	0.00	0%
Pipeline ROW	0.00	0%
Permanent Access Road ROW	0.34	66%
Pipeline Workspace	0.05	5%
ATWS	0.68	67%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	1.07	
H-319 Pipeline		
Pipe Centerline	0.00	0%
Pipeline ROW	0.16	56%
Permanent Access Road ROW	0.02	100%
Pipeline Workspace	0.14	83%
ATWS	0.09	100%
Yard	0.04	17%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.44	
Mobley Tap		
Aboveground Facilites	0.00	0%
ATWS	0.04	38%
Yard	0.00	0%
Subtotal Acres	0.04	
Redhook Compressor Station		
Aboveground Facilites	4.93	23%
ATWS	0.51	34%
Yard	0.00	0%
Subtotal Acres	5.44	
Pratt Compressor Station		
Aboveground Facilites	0.26	4%
Subtotal Acres	0.26	
Webster Interconnect		
Aboveground Facilites	0.26	32%
Permanent Access Road ROW	0.00	11%
ATWS	0.53	38%
Yard	0.00	0%
Temporary Access Road ROW	0.04	42%
Subtotal Acres	0.83	
Grand Total Miles	3.61	
Grand Total Acres	72.79	
<u>a/</u> NLCD categories include Deciduous Forest		
<u>b/</u> Pipe Centerline values equal miles; all other values in the table equal acreages of expected impacts.		

Attachment 3-1		
Table 3.2-3		
(Revised April 20, 2016)		
Herbaceous Upland Crossed by the Project Facilities <u>a/</u>		
Project Facility	Acres/Miles Crossed <u>b/</u>	Percent (%) of Facility
H-316 Pipeline		
Pipe Centerline	0	0%
Pipeline ROW	0.02	0%
Aboveground Facilites	0.00	0%
Permanent Access Road ROW	0.00	0%
Groundbeds	0.00	0%
Pipeline Workspace	0.26	1%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.28	
H-318 Pipeline		
Pipe Centerline	0.20	4%
Pipeline ROW	1.13	4%
Aboveground Facilites	0.00	0%
Permantent Access Road ROW	0.00	0%
Groundbeds	0.00	0%
Pipeline Workspace	0.86	4%
ATWS	0.00	0%
Yard	0.08	1%
Temporary Access Road ROW	0.11	3%
Subtotal Acres	2.18	
H-158 and M-80 Pipelines		
Pipe Centerline <u>a/</u>	0	0%
Pipeline ROW	0.00	0%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.00	
H-305 Pipeline		
Pipe Centerline	0	0%
Pipeline ROW	0.00	0%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.00	
H-319 Pipeline		
Pipe Centerline	0	0%
Pipeline ROW	0.00	0%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.00	
Mobley Tap		
Aboveground Facilites	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Subtotal Acres	0.00	
Redhook Compressor Station		
Aboveground Facilites	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Subtotal Acres	0.00	
Pratt Compressor Station		
Aboveground Facilites	0.23	3%
Subtotal Acres	0.23	
Webster Interconnect		
Aboveground Facilites	0.00	0%
Permanent Access Road ROW	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.00	
Grand Total Miles	0.20	
Grand Total Acres	2.69	
<u>a/</u> NLCD categories include Grassland/Herbaceous.		
<u>b/</u> Pipe Centerline values equal miles; all other values in the table equal acreages of expected impacts.		

Attachment 3-1 Table 3.2-4 (Revised April 20, 2016) Wetlands Crossed by the Project Facilities <u>a/</u>		
Project Facility	Acres/Miles Crossed <u>b/</u>	Percent (%) of Facility
H-316 Pipeline		
Pipe Centerline	0.02	≤1%
Pipeline ROW	0.15	1%
Aboveground Facilites	0.00	0%
Permanent Access Road ROW	0.00	≤1%
Groundbeds	0.00	0%
Pipeline Workspace	0.03	≤1%
ATWS	0.43	2%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.61	
H-318 Pipeline		
Pipe Centerline	0.08	2%
Pipeline ROW	0.55	2%
Aboveground Facilites	0.00	0%
Permanent Access Road ROW	0.00	0%
Groundbeds	0.00	0%
Pipeline Workspace	0.19	1%
ATWS	0.03	≤1%
Yard	0.00	≤1%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.77	
H-158 and M-80 Pipelines		
Pipe Centerline <u>a/</u>	0	0%
Pipeline ROW	0.00	0%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.00	
H-305 Pipeline		
Pipe Centerline	0	0%
Pipeline ROW	0.00	0%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.00	
H-319 Pipeline		
Pipe Centerline	0.01	16%
Pipeline ROW	0.04	≤1%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.02	13%
ATWS	0.00	0%
Yard	0.09	35%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.15	
Mobley Tap		
Aboveground Facilites	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Subtotal Acres	0.00	
Redhook Compressor Station		
Aboveground Facilites	0.00	≤1%
ATWS	0.00	0%
Yard	0.00	0%
Subtotal Acres	0.00	
Pratt Compressor Station		
Aboveground Facilites	0.08	1%
Subtotal Acres	0.08	
Webster Interconnect		
Aboveground Facilites	0.00	0%
Permanent Access Road ROW	0.00	0%
ATWS	0.02	1%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.02	
Grand Total Miles	0.11	
Grand Total Acres	1.46	
<u>a/</u> Wetland impacts were calculated based on field delineated wetlands.		
<u>b/</u> Pipe Centerline values equal miles; all other values in the table equal acreages of expected impacts.		

Attachment 3-1		
Table 3.2-5		
(Revised April 20, 2016)		
Industrial, Commercial, and Residential Uses Crossed by the Project Facilities <u>a/</u>		
Project Facility	Acres/Miles Crossed <u>b/</u>	Percent (%) of Facility
H-316 Pipeline		
Pipe Centerline	0.19	6%
Pipeline ROW	1.29	7%
Aboveground Facilites	0.00	0%
Permanent Access Road ROW	0.12	8%
Groundbeds	0.30	66%
Pipeline Workspace	2.06	10%
ATWS	0.60	3%
Yard	0.00	0%
Temporary Access Road ROW	0.70	33%
Subtotal Acres	5.08	
H-318 Pipeline		
Pipe Centerline	0.68	16%
Pipeline ROW	4.01	16%
Aboveground Facilites	0.00	0%
Permanent Access Road ROW	0.00	0%
Groundbeds	0.56	100%
Pipeline Workspace	2.77	13%
ATWS	4.85	13%
Yard	4.88	79%
Temporary Access Road ROW	0.94	25%
Subtotal Acres	18.01	
H-158 and M-80 Pipelines		
Pipe Centerline <u>g/</u>	0.04	16%
Pipeline ROW	0.35	18%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.17	17%
ATWS	0.35	67%
Yard	0.85	26%
Temporary Access Road ROW	0.19	39%
Subtotal Acres	1.92	
H-305 Pipeline		
Pipe Centerline	0.00	0%
Pipeline ROW	0.00	0%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.00	
H-319 Pipeline		
Pipe Centerline	0.02	45%
Pipeline ROW	0.12	44%
Aboveground Facilites	0.004	100%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.03	17%
ATWS	0.00	0%
Yard	0.21	83%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.36	
Mobley Tap		
Aboveground Facilites	0.38	100%
ATWS	0.07	62%
Yard	0.00	0%
Subtotal Acres	0.45	
Redhook Compressor Station		
Aboveground Facilites	3.10	15%
ATWS	0.99	66%
Yard	0.00	0%
Subtotal Acres	4.09	
Pratt Compressor Station		
Aboveground Facilites	0.73	10%
Subtotal Acres	0.73	
Webster Interconnect		
Aboveground Facilites	0.56	68%
Permanent Access Road ROW	0.03	89%
ATWS	0.87	62%
Yard	0.00	0%
Temporary Access Road ROW	0.05	58%
Subtotal Acres	1.52	
Grand Total Miles	0.93	
Grand Total Acres	29.82	
<u>a/</u> NLCD categories include Developed, Open Space; Developed, Low Intensity; Developed, Medium Intensity; and, Developed, High Intensity.		
<u>b/</u> Pipe Centerline values equal miles; all other values in the table equal acreages of expected impacts.		

Table 3.4-1**Freshwater Mussels Species of Special Concern identified by Pennsylvania Fish and Boat Commission for Project Area**

Common Name	Scientific Name	Federal Status	State Status	Global Rank <u>a/</u>	State Rank <u>b/</u>	Allegheny County	Greene County	Washington County
Round pigtoe	<i>Pleurobema sintoxia</i>	-	-	G4G5	S3S4	-	X	-
Three-ridge	<i>Ambiema plicata</i>	-	-	G5	S2S3	-	X	-
Wabash pigtoe	<i>Fusconaia flava</i>	-	-	G5	S2S3	X	X	X

a/ G#G# = Range Rank (indicates range of uncertainty about the exact status of a taxon or ecosystem type); G4 = Apparently Secure (uncommon but not rare, some cause for long-term concern due to declines or other factors); G5 = Secure (common, widespread, and abundant)

b/ S#S# = Range Rank (indicates any range of uncertainty about the status of the species or ecosystem); S2 = Imperiled (rarity due to very restricted range, very few populations [often 20 or fewer], steep declines, or other factors making it very vulnerable to extirpation from the nation or state); S3 = Vulnerable (restricted range in the nation or state, relatively few populations [often 80 or fewer], recent and widespread declines, or other factors making it vulnerable to extirpation); S4 = Apparently Secure (uncommon but not rare, some cause for long-term concern due to declines or other factors)

Table 3.4-2

Plant Species of Special Concern identified by Pennsylvania Department of Conservation and Natural Resources as having the Potential to Occur in the Project Area

Common Name	Scientific Name	Federal Status	State Status	Global Rank	State Rank <u>c/</u>	Allegheny County	Greene County	Washington County
Blue false-indigo	<i>Baptisia australis</i>	-	N (proposed PT)	G5	S2	X	-	X
Cranefly orchid	<i>Tipularia discolor</i>	-	PR	G4G5	S3	-	X	X
Purple rocket	<i>Iodanthus pinnatifidus</i>	-	PE	G5	S1	X	X	X
Rock skullcap	<i>Scutellaria saxatilis</i>	-	TU (proposed PE)	G3	S1	X	X	-
Snow trillium	<i>Trillium nivale</i>	-	PR	G4	S3	X	X	X
White trout-lily	<i>Erythronium albidum</i>	-	N (proposed PR)	G5	S3	X	X	X

a/ N = No current legal status exists, but is under review for future listing PE = Pennsylvania Endangered; PR = Pennsylvania Rare TU = Tentatively Undetermined
b/ G#G# = Range Rank (indicates range of uncertainty about the exact status of a taxon or ecosystem type); G3 = Vulnerable (at moderate risk of extinction due to a restricted range, relatively few populations [often 80 or fewer], recent and widespread declines, or other factors); G4 = Apparently Secure (uncommon but not rare, some cause for long-term concern due to declines or other factors); G5 = Secure (common, widespread, and abundant)
c/ S#S# = Range Rank (indicates any range of uncertainty about the status of the species or ecosystem); S1 = Critically Imperiled (extreme rarity [often 5 or fewer populations] in the nation or state, or due to some factor(s) such as very steep declines, making it vulnerable to extirpation in the state); S2 = Imperiled (rarity due to very restricted range, very few populations [often 20 or fewer], steep declines, or other factors making it very vulnerable to extirpation from the nation or state); S3 = Vulnerable (restricted range in the nation or state, relatively few populations [often 80 or fewer], recent and widespread declines, or other factors making it vulnerable to extirpation)

Table 3.4-3

**Mammal Species of Special Concern identified by U.S. Fish and Wildlife Service
having the Potential to Occur in the Project Area**

Common Name	Scientific Name	Federal Status <u>a/</u>	State	Global Rank <u>c/</u>	State	Allegheny County	Greene County	Washington County	Wetzel County
			Status <u>b/</u>		Rank <u>d/</u>				
Indiana bat	<i>Myotis sodalis</i>	LE	PE	G2	SUB, S1N	X	X	X	X
Northern long-eared bat	<i>Myotis septentrionalis</i>	LT	-	G4	S1	X	X	X	X

a/ LE = Federally Listed as Endangered; LT = Federally Listed as Threatened

b/ PE = Pennsylvania Endangered

c/ G2 = Imperiled (at high risk of extinction globally due to very restricted range, very few populations [often 20 or fewer], steep declines, or other factors); G4 = Apparently Secure (uncommon but not rare, some cause for long-term concern due to declines or other factors)

d/ SUB = Applicable to breeding population; S#N = Applicable to non-breeding population; S1 = Critically Imperiled (extreme rarity [often 5 or fewer populations] in the nation or state, or due to some factor(s) such as very steep declines, making it vulnerable to extirpation in the state)

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Appendix 3-A	
Typical Fish Species Found in Waterbodies of the Ohio River Basin and the Permian Hills Level IV Ecoregion	
Common Name	Scientific Name
Alewife	<i>Alosa pseudoharengus</i>
Allegheny pearl dace	<i>Margariscus margarita</i>
American brook lamprey <u>a</u> /	<i>Lampetra appendix</i>
American eel	<i>Anguilla rostrata</i>
Atlantic salmon <u>b</u> /	<i>Salmo salar</i>
Banded darter	<i>Etheostoma zonale</i>
Banded killifish	<i>Fundulus diaphanus</i>
Bigeye chub	<i>Notropis amblops</i>
Bigmouth buffalo <u>c</u> /	<i>Ictiobus cyprinellus</i>
Bigmouth chub	<i>Nocomis platyrhynchus</i>
Bigmouth shiner <u>c</u> /	<i>Hybopsis dorsalis</i>
Black buffalo	<i>Ictiobus niger</i>
Black bullhead <u>c</u> /	<i>Ameiurus melas</i>
Black crappie	<i>Pomoxis nigromaculatus</i>
Black redhorse	<i>Moxostoma duquesnei</i>
Blackchin shiner <u>c</u> /	<i>Notropis heterodon</i>
Blacknose dace	<i>Rhinichthys atratulus</i>
Blacknose shiner	<i>Notropis heterolepis</i>
Blackside darter	<i>Percina maculata</i>
Bluebreast darter <u>c</u> /	<i>Etheostoma camurum</i>
Blueside shiner	<i>Lythrurus ardens</i>
Blue catfish <u>d</u> /	<i>Ictalurus furcatus</i>
Blue sucker <u>d</u> /	<i>Cycleptus elongatus</i>
Bluegill	<i>Lepomis macrochirus</i>
Bluntnose minnow	<i>Pimephales notatus</i>
Bowfin <u>c</u> /	<i>Amia calva</i>
Brassy minnow	<i>Hybognathus hankinsoni</i>
Brindled madtom <u>c</u> /	<i>Noturus miurus</i>
Brook silverside <u>a</u> /	<i>Labidesthes sicculus</i>
Brook stickleback <u>c</u> /	<i>Culaea inconstans</i>
Brook trout	<i>Salvelinus fontinalis</i>
Brown bullhead	<i>Ameiurus nebulosus</i>
Brown trout <u>b</u> /	<i>Salmo trutta</i>
Bullhead minnow <u>d</u> /	<i>Pimephales vigilax</i>
Burbot <u>c</u> /	<i>Lota lota</i>
Central mudminnow <u>c</u> /	<i>Umbra limi</i>
Central stoneroller	<i>Campostoma anomalum</i>
Chain pickerel <u>b</u> /	<i>Esox niger</i>
Channel catfish	<i>Ictalurus punctatus</i>
Channel darter <u>a</u> /	<i>Percina copelandi</i>
Channel shiner	<i>Notropis wickliffi</i>

Appendix 3-A	
Typical Fish Species Found in Waterbodies of the Ohio River Basin and the Permian Hills Level IV Ecoregion	
Common Name	Scientific Name
Common carp <u>b</u> /	<i>Cyprinus carpio</i>
Common shiner	<i>Luxilus cornutus</i>
Creek chub	<i>Semotilus atromaculatus</i>
Creek chubsucker	<i>Erimyzon oblongus</i>
Eastern mosquitofish	<i>Gambusia holbrooki</i>
Eastern sand darter <u>c</u> /	<i>Ammocrypta pellucida</i>
Emerald shiner	<i>Notropis atherinoides</i>
Fallfish <u>b</u> /	<i>Semotilus corporalis</i>
Fantail darter	<i>Etheostoma flabellare</i>
Fathead minnow	<i>Pimephales promelas</i>
Flathead catfish	<i>Pylodictis olivaris</i>
Freshwater drum	<i>Aplodinotus grunniens</i>
Ghost shiner <u>c</u> /	<i>Notropis buechanani</i>
Gilt darter <u>c</u> /	<i>Percina evides</i>
Gizzard shad	<i>Dorosoma cepedianum</i>
Gravel chub <u>c</u> /	<i>Erimystax x-punctatus</i>
Golden redhorse	<i>Moxostoma erythrurum</i>
Golden shiner	<i>Notemigonus crysoleucas</i>
Golden rainbow trout <u>b</u> /	<i>Oncorhynchus mykiss</i>
Goldeye <u>d</u> /	<i>Hiodon alosoides</i>
Goldfish <u>b</u> /	<i>Carassius auratus</i>
Grass carp <u>b</u> /	<i>Ctenopharynogodon idella</i>
Grass pickerel	<i>Esox americanus vermiculatus</i>
Green sunfish	<i>Lepomis cyanellus</i>
Greenside darter	<i>Etheostoma blennioides</i>
Highfin carpsucker <u>d</u> /	<i>Carpionodes velifer</i>
Hornyhead chub <u>c</u> /	<i>Nocomis biguttatus</i>
Iowa darter	<i>Etheostoma exile</i>
Johnny darter	<i>Etheostoma nigrum</i>
Kanawha minnow	<i>Phenacobius teretulus</i>
Lake sturgeon <u>c</u> /	<i>Acipenser fulvescens</i>
Largemouth bass	<i>Micropterus salmoides</i>
Least brook lamprey <u>c</u> /	<i>Lampetra aepyptera</i>
Logperch	<i>Percina caprodes</i>
Longear sunfish <u>c</u> /	<i>Lepomis megalotis</i>
Longhead darter <u>a</u> /	<i>Percina macrocephala</i>
Longnose dace	<i>Rhinichthys cataractae</i>
Longnose gar <u>a</u> /	<i>Lepisosteus osseus</i>
Longnose sucker <u>c</u> /	<i>Catostomus catostomus</i>
Margined madtom	<i>Noturus insignis</i>
Mimic shiner	<i>Notropis volucellus</i>

Appendix 3-A	
Typical Fish Species Found in Waterbodies of the Ohio River Basin and the Permian Hills Level IV Ecoregion	
Common Name	Scientific Name
Mooneye <u>a/</u>	<i>Hiodon tergisus</i>
Mottled sculpin	<i>Cottus bairdi</i>
Mountain brook lamprey <u>c/</u>	<i>Ichthyomyzon greeleyi</i>
Mountain madtom <u>c/</u>	<i>Noturus eleutherus</i>
Muskellunge	<i>Esox masquinongy</i>
Mummichog <u>b/</u>	<i>Fundulus heteroclitus</i>
New River shiner	<i>Notropis scabriceps</i>
Northern brook lamprey	<i>Ichthyomyzon fossor</i>
Northern hogsucker	<i>Hypentelium nigricans</i>
Northern madtom <u>c/</u>	<i>Noturus stigmosus</i>
Northern pike	<i>Esox lucius</i>
Northern redbelly dace <u>c/</u>	<i>Chrosomus eos</i>
Northern studfish	<i>Fundulus catenatus</i>
Ohio lamprey	<i>Ichthyomyzon bdellium</i>
Orange spotted sunfish	<i>Lepomis humilis</i>
Paddlefish	<i>Polyodon spathula</i>
Popeye shiner <u>d/</u>	<i>Notropis ariommus</i>
Pugnose minnow	<i>Opsopoeodus emiliae</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Quillback	<i>Carpionodes cyprinus</i>
Rainbow darter	<i>Etheostoma caeruleum</i>
Rainbow trout <u>b/</u>	<i>Oncorhynchus mykiss</i>
Redbreast sunfish	<i>Lepomis auritus</i>
Redear sunfish <u>b/</u>	<i>Lepomis microlophus</i>
Redfin shiner <u>c/</u>	<i>Lythrurus umbratilis</i>
Redside dace	<i>Clinostomus elongatus</i>
River carpsucker	<i>Carpionodes carpio</i>
River chub	<i>Nocomis micropogon</i>
River darter	<i>Percina shumardi</i>
River redhorse <u>a/</u>	<i>Moxostoma carinatum</i>
River shiner <u>c/</u>	<i>Notropis blennius</i>
Rock bass	<i>Ambloplites rupestris</i>
Rosyface shiner	<i>Notropis rubellus</i>
Rosyside dace	<i>Clinostomus funduloides</i>
Rudd minnow <u>e/</u>	<i>Scardinius erythrophthalmus</i>
Sand shiner	<i>Notropis stramineus</i>
Sauger	<i>Stizostedion canadense</i>
Sharpnose darter <u>d/</u>	<i>Percina oxyrhynchus</i>
Shorthead redhorse	<i>Moxostoma macrolepidotum</i>
Shorthead gar <u>d/</u>	<i>Lepisosteus platostomus</i>
Shovelnose sturgeon <u>d/</u>	<i>Scaphirhynchus platyrhynchus</i>

Appendix 3-A	
Typical Fish Species Found in Waterbodies of the Ohio River Basin and the Permian Hills Level IV Ecoregion	
Common Name	Scientific Name
Silver chub <u>a/</u>	<i>Macrhybopsis storeriana</i>
Silver lamprey	<i>Ichthyomyzon unicuspis</i>
Silver redhorse	<i>Moxostoma anisurum</i>
Silver shiner	<i>Notropis photogenis</i>
Silverjaw minnow	<i>Notropis buccatus</i>
Skipjack herring <u>a/</u>	<i>Alosa chrysochloris</i>
Smallmouth bass	<i>Micropterus dolomieu</i>
Smallmouth buffalo <u>a/</u>	<i>Ictiobus bubalus</i>
Smallmouth redhorse	<i>Moxostoma anisurum</i>
Southern redbelly dace <u>c/</u>	<i>Chrosomus erythrogaster</i>
Spotfin shiner	<i>Cyprinella spiloptera</i>
Spottail shiner <u>b/</u>	<i>Notropis hudsonius</i>
Spotted bass	<i>Micropterus punctulatus</i>
Spotted darter <u>c/</u>	<i>Etheostoma maculatum</i>
Spotted sucker <u>c/</u>	<i>Minytrema melanops</i>
Steelcolor shiner	<i>Cyprinella whipplei</i>
Stonecat	<i>Noturus flavus</i>
Streamline chub	<i>Erimystax dissimilis</i>
Stripeback darter	<i>Percina notogramma</i>
Striped bass	<i>Morone saxatilis</i>
Striped bass hybrid	<i>Morone chrysops</i> x <i>M. saxatilis</i>
Striped shiner	<i>Luxilus chrysocephalus</i>
Tadpole madtom <u>c/</u>	<i>Noturus gyrinus</i>
Telescope shiner	<i>Notropis telescopus</i>
Threadfin shad	<i>Dorosoma petenense</i>
Tiger muskellunge <u>b/</u>	<i>Esox lucius</i> x <i>E. masquinony</i>
Tippecanoe darter <u>c/</u>	<i>Etheostoma tippecanoe</i>
Tonguetied minnow	<i>Exoglossum laurae</i>
Torrent sucker	<i>Thoburnia rathbunae</i>
Trout perch	<i>Percopsis omiscomaycus</i>
Variegate darter	<i>Etheostoma variatum</i>
Walleye	<i>Stizostedion vitreum</i>
Warmouth <u>c/</u>	<i>Lepomis gulosus</i>
White bass	<i>Morone chrysops</i>
White catfish <u>b/</u>	<i>Ameiurus catus</i>
White crappie	<i>Pomoxis annularis</i>
White perch <u>b/</u>	<i>Morone americana</i>
White shiner	<i>Luxilus albeolus</i>
White sucker	<i>Catostomus commersoni</i>
Whitetail shiner	<i>Cyprinella galactura</i>
Yellow bullhead	<i>Ameiurus natalis</i>

Appendix 3-A	
Typical Fish Species Found in Waterbodies of the Ohio River Basin and the Permian Hills Level IV Ecoregion	
Common Name	Scientific Name
Yellow perch	<i>Perca flavescens</i>
<p>Sources:</p> <p>West Virginia Department of Environmental Protection. 2015. Fishes</p> <p>Pennsylvania Fish and Boat Commission. 2015d. Gallery of Pennsylv</p> <p><u>a</u>/ Delisted species</p> <p><u>b</u>/ Introduced species</p> <p><u>c</u>/ State or federally listed or candidate species</p> <p><u>d</u>/ Thought to be extirpated</p> <p><u>e</u>/ Invasive species</p>	

Appendix 3-B	
Wildlife Species with the Potential to Occur Along the Project Route	
Common Name	Scientific Name
Amphibians	
Allegheny mountain dusky salamander	<i>Desmognathus ochrophaeus</i>
American bullfrog	<i>Lithobates catesbeianus</i>
American toad	<i>Bufo americanus</i>
Black mountain salamander	<i>Desmognathus welteri</i>
Black-bellied salamander	<i>Desmognathus quadramaculatus</i>
Common mudpuppy	<i>Necturus maculosus</i>
Cumberland plateau salamander	<i>Plethodon kentucki</i>
Eastern American toad	<i>Anaxyrus americanus americanus</i>
Eastern hellbender	<i>Cryptobranchus alleganiensis</i>
Eastern red-backed salamander	<i>Plethodon cinereus</i>
Eastern red-spotted newt	<i>Notophthalmus viridescens viridescens</i>
Four-toed salamander	<i>Hemidactylium scutatum</i>
Fowler's toad	<i>Bufo fowleri</i>
Gray treefrog	<i>Hyla versicolor</i>
Green frog	<i>Lithobates clamitans</i>
Green salamander	<i>Aneides aeneus</i>
Jefferson salamander	<i>Ambystoma jeffersonianum</i>
Long-tailed salamander	<i>Eurycea longicauda longicauda</i>
Marbled salamander	<i>Ambystoma opacum</i>
Midland mud salamander	<i>Pseudotriton montanus diastictus</i>
Mountain chorus frog	<i>Pseudacris brachyphona</i>
Northern dusky salamander	<i>Desmognathus fuscus</i>
Northern green frog	<i>Rana clamitans melanota</i>
Northern leopard frog	<i>Rana pipiens</i>
Northern ravine salamander	<i>Plethodon electromorphus</i>
Northern red salamander	<i>Pseudotriton ruber ruber</i>
Northern slimy salamander	<i>Plethodon glutinosus</i>
Northern spring salamander	<i>Gyrinophilus porphyriticus porphyriticus</i>
Northern two-lined salamander	<i>Eurycea bislineata</i>
Pickrel frog	<i>Lithobates sylvaticus</i>
Red-spotted newt	<i>Notophthalmus viridescens</i>
Seal salamander	<i>Desmognathus monticola</i>
Small-mouthed salamander	<i>Ambystoma texanum</i>
Southern ravine salamander	<i>Plethodon richmondi</i>
Southern two-lined salamander	<i>Eurycea cirrigera</i>
Spotted salamander	<i>Ambystoma maculatum</i>
Spring peeper	<i>Pseudacris crucifer</i>
Spring salamander	<i>Gyrinophilus porphyriticus</i>
Streamside salamander	<i>Ambystoma barbouri</i>
Upland chorus frog	<i>Pseudacris feriarum</i>
Wehrle's salamander	<i>Plethodon wehrlei</i>
White-spotted slimy salamander	<i>Plethodon cylindraceus</i>
Wood frog	<i>Rana sylvatica</i>

Appendix 3-B	
Wildlife Species with the Potential to Occur Along the Project Route	
Common Name	Scientific Name
Reptiles	
Black ratsnake	<i>Elaphe obsoleta</i>
Common five-lined skink	<i>Plestiodon fasciatus</i>
Common ribbonsnake	<i>Thamnophis sauritus</i>
Common watersnake	<i>Nerodia sipedon</i>
Eastern black kingsnake	<i>Lampropeltis getula niger</i>
Eastern box turtle	<i>Terrapene carolina carolina</i>
Eastern fence lizard	<i>Sceloporus undulatus</i>
Eastern gartersnake	<i>Thamnophis sirtalis sirtalis</i>
Eastern hog-nosed snake	<i>Heterodon platirhinos</i>
Eastern milksnake	<i>Lampropeltis triangulum triangulum</i>
Eastern painted turtle	<i>Chrysemys picta picta</i>
Eastern ratsnake	<i>Pantherophis alleghaniensis</i>
Eastern smooth earthsnake	<i>Virginia valeriae</i>
Eastern wormsake	<i>Carphophis amoenus amoenus</i>
Mountain earthsnake	<i>Virginia valeriae pulchra</i>
Northern black racer	<i>Coluber constrictor constrictor</i>
Northern brownsnake	<i>Storeria dekayi</i>
Northern copperhead	<i>Agkistrodon contortrix mokasen</i>
Northern pinesnake	<i>Lampropeltis getula</i>
Northern red-bellied Snake	<i>Storeria occipitomaculata</i>
Northern ring-necked snake	<i>Diadophis punctatus edwardsii</i>
Northern rough greensnake	<i>Opheodrys aestivus</i>
Northern watersnake	<i>Nerodia sipedon sipedon</i>
Queensnake	<i>Regina septemvittata</i>
Smooth greensnake	<i>Opheodrys vernalis</i>
Snapping turtle	<i>Chelydra serpentina</i>
Timber rattlesnake	<i>Crotalus horridus</i>
Birds	
Acadian flycatcher	<i>Empidonax virescens</i>
American bittern	<i>Botaurus lentiginosus</i>
American black duck	<i>Anas rubripes</i>
American coot	<i>Fulica Americana</i>
American crow	<i>Corvus brachyrhynchos</i>
American goldfinch	<i>Spinus tristis</i>
American kestrel	<i>Falco sparverius</i>
American pipit	<i>Anthus rubescens</i>
American redstart	<i>Setophaga ruticilla</i>
American robin	<i>Turdus migratorius</i>
American tree sparrow	<i>Spizella arborea</i>
American woodcock	<i>Scolopax minor</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Baltimore oriole	<i>Icterus galbula</i>
Bank swallow	<i>Riparia riparia</i>
Barn owl	<i>Tyto alba</i>

Appendix 3-B	
Wildlife Species with the Potential to Occur Along the Project Route	
Common Name	Scientific Name
Barn swallow	<i>Hirundo rustica</i>
Barred owl	<i>Strix varia</i>
Bay-breasted warbler	<i>Setophaga castanea</i>
Belted kingfisher	<i>Megaceryle alcyon</i>
Bewick's wren	<i>Thryomanes bewickii</i>
Black vulture	<i>Coragyps atratus</i>
Black-and-white warbler	<i>Mniotilta varia</i>
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>
Blackburnian warbler	<i>Setophaga fusca</i>
Black-capped chickadee	<i>Poecile atricapillus</i>
Blackpoll warbler	<i>Setophaga striata</i>
Black-throated blue warbler	<i>Setophaga caerulescens</i>
Black-throated green warbler	<i>Setophaga virens</i>
Blue grosbeak	<i>Passerina caerulea</i>
Blue jay	<i>Cyanocitta cristata</i>
Blue-gray gnatcatcher	<i>Poliophtila caerulea</i>
Blue-headed vireo	<i>Vireo solitarius</i>
Blue-winged teal	<i>Anas discors</i>
Blue-winged warbler	<i>Vermivora cyanoptera</i>
Bobolink	<i>Dolichonyx oryzivorus</i>
Broad-winged hawk	<i>Buteo platypterus</i>
Brown creeper	<i>Certhia americana</i>
Brown thrasher	<i>Toxostoma rufum</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Bufflehead	<i>Bucephala albeola</i>
Canada goose	<i>Branta canadensis</i>
Canada warbler	<i>Cardellina canadensis</i>
Cape May warbler	<i>Setophaga tigrina</i>
Carolina chickadee	<i>Poecile carolinensis</i>
Carolina wren	<i>Thryothorus ludovicianus</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>
Cerulean warbler	<i>Setophaga cerulea</i>
Chestnut-sided warbler	<i>Setophaga pensylvanica</i>
Chimney swift	<i>Chaetura pelagica</i>
Chipping sparrow	<i>Spizella passerina</i>
Cliff swallow	<i>Petrochelidon pyrrhonota</i>
Common goldeneye	<i>Bucephala clangula</i>
Common grackle	<i>Quiscalus quiscula</i>
Common merganser	<i>Mergus merganser</i>
Common nighthawk	<i>Chordeiles minor</i>
Common raven	<i>Corvus corax</i>
Common redpoll	<i>Acanthis flammea</i>
Common yellowthroat	<i>Geothlypis trichas</i>
Cooper's hawk	<i>Accipiter cooperii</i>
Dark-eyed junco	<i>Junco hyemalis</i>

Appendix 3-B	
Wildlife Species with the Potential to Occur Along the Project Route	
Common Name	Scientific Name
Dickcissel	<i>Spiza Americana</i>
Downy woodpecker	<i>Picoides pubescens</i>
Eastern bluebird	<i>Sialia sialis</i>
Eastern kingbird	<i>Tyrannus tyrannus</i>
Eastern meadowlark	<i>Sturnella magna</i>
Eastern phoebe	<i>Sayornis phoebe</i>
Eastern screech owl	<i>Megascops asio</i>
Eastern towhee	<i>Pipilo erythrophthalmus</i>
Eastern whip-poor-will	<i>Antrostomus vociferous</i>
Eastern wood-pewee	<i>Contopus virens</i>
Evening grosbeak	<i>Coccothraustes vespertinus</i>
Field sparrow	<i>Spizella pusilla</i>
Fox sparrow	<i>Passerella iliaca</i>
Golden-crowned kinglet	<i>Regulus satrapa</i>
Golden-winged warbler	<i>Vermivora chrysoptera</i>
Grasshopper sparrow	<i>Ammodramus savannarum</i>
Gray catbird	<i>Dumetella carolinensis</i>
Gray-cheeked thrush	<i>Catharus minimus</i>
Great blue heron	<i>Ardea herodias</i>
Great crested flycatcher	<i>Myiarchus crinitus</i>
Great egret	<i>Ardea alba</i>
Great horned owl	<i>Bubo virginianus</i>
Greater scaup	<i>Aythya marila</i>
Green heron	<i>Butorides virescens</i>
Green-winged teal	<i>Anas crecca</i>
Hairy woodpecker	<i>Picoides villosus</i>
Hermit thrush	<i>Catharus guttatus</i>
Hooded merganser	<i>Lophodytes cucullatus</i>
Hooded warbler	<i>Setophaga citrine</i>
House finch	<i>Haemorhous mexicanus</i>
House wren	<i>Troglodytes aedon</i>
Indigo bunting	<i>Passerina cyanea</i>
Kentucky warbler	<i>Geothlypis formosa</i>
Killdeer	<i>Charadrius vociferous</i>
Least bittern	<i>Ixobrychus exilis</i>
Lesser scaup	<i>Aythya affinis</i>
Lincoln's sparrow	<i>Melospiza lincolnii</i>
Loggerhead shrike	<i>Lanius ludovicianus</i>
Louisiana waterthrush	<i>Parkesia motacilla</i>
Magnolia warbler	<i>Setophaga magnolia</i>
Mallard	<i>Anas platyrhynchos</i>
Mourning dove	<i>Zenaida macroura</i>
Mourning warbler	<i>Geothlypis philadelphia</i>
Nashville warbler	<i>Oreothlypis ruficapilla</i>
Northern cardinal	<i>Cardinalis cardinalis</i>

Appendix 3-B	
Wildlife Species with the Potential to Occur Along the Project Route	
Common Name	Scientific Name
Northern flicker	<i>Colaptes auratus</i>
Northern goshawk	<i>Accipiter gentilis</i>
Northern harrier	<i>Circus cyaneus</i>
Northern mockingbird	<i>Mimus ployglottos</i>
Northern parula	<i>Setophaga americana</i>
Northern pintail	<i>Anas acuta</i>
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>
Northern saw-whet owl	<i>Aegolius acadicus</i>
Northern waterthrush	<i>Parkesia noveboracensis</i>
Olive-sided flycatcher	<i>Contopus cooperi</i>
Orange-crowned warbler	<i>Oreothlypis celata</i>
Orchard oriole	<i>Icterus spurius</i>
Osprey	<i>Pandion haliaetus</i>
Ovenbird	<i>Seiurus aurocapilla</i>
Palm warbler	<i>Setophaga palmarum</i>
Pied-billed grebe	<i>Podilymbus podiceps</i>
Pileated woodpecker	<i>Dryocopus pileatus</i>
Pine siskin	<i>Spinus pinus</i>
Pine warbler	<i>Setophaga pinus</i>
Prairie warbler	<i>Setophaga discolor</i>
Prothonotary warbler	<i>Protonotaria citrea</i>
Purple finch	<i>Haemorhous purpureus</i>
Red crossbill	<i>Loxia curvirostra</i>
Red-bellied woodpecker	<i>Melanerpes carolinus</i>
Red-breasted nuthatch	<i>Sitta canadensis</i>
Red-crowned kinglet	<i>Regulus calendula</i>
Red-eyed vireo	<i>Vireo olivaceus</i>
Redhead	<i>Aythya americana</i>
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
Red-shouldered hawk	<i>Buteo lineatus</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Ring-necked duck	<i>Aythya collaris</i>
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>
Ruby-throated hummingbird	<i>Archilochus colubris</i>
Ruffed grouse	<i>Bonasa umbellus</i>
Savannah sparrow	<i>Passerculus sandwichensis</i>
Scarlet tanager	<i>Piranga olivacea</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Short-eared owl	<i>Asio flammeus</i>
Song sparrow	<i>Melospiza melodia</i>
Summer tanager	<i>Piranga rubra</i>
Swainson's thrush	<i>Catharus ustulatus</i>
Swainson's warbler	<i>Limnethlypis swainsonii</i>
Swamp sparrow	<i>Melospiza georgiana</i>

Appendix 3-B	
Wildlife Species with the Potential to Occur Along the Project Route	
Common Name	Scientific Name
Tennessee warbler	<i>Oreothlypis peregrina</i>
Tree swallow	<i>Tachycineta bicolor</i>
Tufted titmouse	<i>Baeolophus bicolor</i>
Turkey vulture	<i>Cathartes aura</i>
Veery	<i>Catharus fuscescens</i>
Vesper sparrow	<i>Pooecetes gramineus</i>
Warbling vireo	<i>Vireo gilvus</i>
White-breasted nuthatch	<i>Sitta carolinensis</i>
White-crowned sparrow	<i>Zonotrichia leucophrys</i>
White-eyed vireo	<i>Vireo griseus</i>
White-throated sparrow	<i>Zonotrichia albicollis</i>
Wild turkey	<i>Meleagris gallopavo</i>
Willow flycatcher	<i>Empidonax traillii</i>
Wilson's warbler	<i>Cardellina pusilla</i>
Winter wren	<i>Troglodytes hiemalis</i>
Wood duck	<i>Aix sponsa</i>
Wood thrush	<i>Hylocichla mustelina</i>
Worm-eating warbler	<i>Helmitheros vermivorum</i>
Yellow warbler	<i>Setophaga petechia</i>
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>
Yellow-billed cuckoo	<i>Coccyzus americanus</i>
Yellow-breasted chat	<i>Icteria virens</i>
Yellow-rumped warbler	<i>Setophaga coronate</i>
Yellow-throated vireo	<i>Vireo flavifrons</i>
Yellow-throated warbler	<i>Setophaga dominica</i>
Mammals	
Allegheny wood rat	<i>Neotoma magister</i>
American beaver	<i>Castor canadensis</i>
American black bear	<i>Ursus americanus</i>
Appalachian cottontail	<i>Sylvilagus obscurus</i>
Big brown bat	<i>Eptesicus fuscus</i>
Black bear	<i>Ursus americanus</i>
Bobcat	<i>Lynx rufus</i>
Common porcupine	<i>Erethizon dorsatum</i>
Common raccoon	<i>Procyon lotor</i>
Coyote	<i>Canis latrans</i>
Deer mouse	<i>Peromyscus maniculatus</i>
Eastern chipmunk	<i>Tamias striatus</i>
Eastern cottontail	<i>Sylvilagus floridanus</i>
Eastern cottontail	<i>Sylvilagus floridanus</i>
Eastern gray squirrel	<i>Sciurus carolinensis</i>
Eastern harvest mouse	<i>Reithrodontomys humulis</i>
Eastern mole	<i>Scalopus aquaticus</i>
Eastern pipistrelle	<i>Pipistrellus subflavus</i>
Eastern red bat	<i>Lasiurus borealis</i>

Appendix 3-B	
Wildlife Species with the Potential to Occur Along the Project Route	
Common Name	Scientific Name
Eastern small-footed bat	<i>Myotis leibii</i>
Eastern spotted skunk	<i>Spilogale putorius</i>
Evening bat	<i>Nycticeius humeralis</i>
Feral or domestic dog	<i>Canis familiaris</i>
Feral or house cat	<i>Felis catus</i>
Fisher	<i>Martes pennanti</i>
Fox squirrel	<i>Sciurus niger</i>
Golden mouse	<i>Ochrotomys nuttalli</i>
Gray bat	<i>Myotis grisescens</i>
Gray fox	<i>Urocyon cinereoargenteus</i>
Groundhog	<i>Marmota monax</i>
Hairy-tailed mole	<i>Parascalops breweri</i>
Hoary bat	<i>Lasiurus cinereus</i>
Indiana bat	<i>Myotis sodalis</i>
Least shrew	<i>Cryptotis parva</i>
Little brown bat	<i>Myotis lucifugus</i>
Long-tailed shrew	<i>Sorex dispar</i>
Long-tailed weasel	<i>Mustela frenata</i>
Masked shrew	<i>Sorex cinereus</i>
Meadow jumping mouse	<i>Zapus hudsonius</i>
Meadow vole	<i>Microtus pennsylvanicus</i>
Mink	<i>Mustela vison</i>
Mountain lion	<i>Puma concolor</i>
Muskrat	<i>Ondatra zibethicus</i>
Northern long-eared bat	<i>Myotis septentrionalis</i>
Northern short-tailed shrew	<i>Blarina brevicauda</i>
Prairie vole	<i>Microtus ochrogaster</i>
Pygmy shrew	<i>Sorex hoyi</i>
Rafinesque's big-eared bat	<i>Corynorhinus rafinesquii</i>
Red fox	<i>Vulpes vulpes</i>
Red squirrel	<i>Tamiasciurus hudsonicus</i>
River otter	<i>Lutra canadensis</i>
Rock vole	<i>Microtus chrotorrhinus</i>
Silver-haired bat	<i>Lasionycteris noctivagans</i>
Smoky shrew	<i>Sorex fumeus</i>
Snowshoe hare	<i>Lepus americanus</i>
Southeastern shrew	<i>Sorex longirostris</i>
Southern bog lemming	<i>Synaptomys cooperi</i>
Southern flying squirrel	<i>Glaucomys volans</i>
Southern red-backed vole	<i>Clethrionomys gapperi</i>
Star-nosed mole	<i>Condylura cristata</i>
Striped skunk	<i>Mephitis mephitis</i>
Tri-colored bat	<i>Perimyotis subflavus</i>
Virginia big-eared bat	<i>Corynorhinus townsendii</i>
Virginia opossum	<i>Didelphis virginiana</i>

Appendix 3-B**Wildlife Species with the Potential to Occur Along the Project Route**

Common Name	Scientific Name
Virginia white-tailed deer	<i>Odocoileus virginianus virginianus</i>
Water shrew	<i>Sorex palustris</i>
West Virginia northern flying squirrel	<i>Glaucomys sabrinus</i>
White-footed mouse	<i>Peromyscus leucopus</i>
Woodland jumping mouse	<i>Napaeozapus insignis</i>
Woodland vole	<i>Microtus pinetorum</i>

Sources:

[Marshall University. No Date. Amphibians and Reptiles in West Virginia.](#)
[West Virginia Division of Natural Resources. 2015.](#)

June 5, 2015.

Table 6.1-1 Revised April 20, 2016 Approximate Maximum and Minimum Elevations¹ for Project Routes and Features		
Facility	Minimum (feet)	Maximum (feet)
H-158/M-80	920	1051
H-305	1064	1146
H-316	876	1164
H-318	728	1238
H-319	893	896
Pratt Compressor Station	900	945
Redhook Compressor Station	1015	1095
Webster Interconnect	895	932
H-306 Tap Site	893	894
Mobley Interconnect	932	941
Applegate L/R Site	1108	1112
H-148 Tap Site /Hartson L/R Site	1056	1090
H-302 Tap L/R Site	1121	1144
Source: Fenneman and Johnson 1946. USGS EROS Data Center, 2015		
¹ All elevations above mean sea level.		

Table 6.1-2**Major Geologic Units Crossed by the Pipeline Route**

Line	Milepost	Age	Map Units	Geologic Formation/Unit	Description/Rock Type
H-158/	0.0 – 0.03	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
M-80	0.03 - 0.13	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
	0.13 - 0.24	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
H-305	0 - 0.10	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
H-316	0.0 - 0.12	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
	0.12 - 0.14	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
	0.14 - 0.72	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
	0.72 - 0.91	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
	0.91 - 1.18	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
	1.18 - 1.49	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
	1.49 - 1.67	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
	1.67 - 1.78	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
	1.78 - 2.21	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
	2.21 - 2.31	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
	2.31 - 2.93	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
	2.93 - 2.99	Permian	Pw	Washington Formation	Sandstone; Shale; Limestone; Coal
H-318	0.0 - 1.29	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
	1.29 - 1.36	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
	1.36 - 1.68	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
	1.68 - 1.74	Pennsylvanian	Pcc	Casselman Formation	Shale; Siltstone; Sandstone; Limestone; Coal
	1.74 - 2.66	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
	2.66 - 3.20	Pennsylvanian	Pcc	Casselman Formation	Shale; Siltstone; Sandstone; Limestone; Coal
	3.20 - 3.57	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
	3.57 - 3.78	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
	3.78 - 4.01	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal

Table 6.1-2**Major Geologic Units Crossed by the Pipeline Route**

Line	Milepost	Age	Map Units	Geologic Formation/Unit	Description/Rock Type
	4.01 - 4.10	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
	4.10 - 4.26	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
H-319	0.0 - 0.038	Permian and Pennsylvanian	Pd	Greene, Washington, Waynesburg	Sandstone; Siltstone; Shale; Limestone; Coal

Sources: Dicken et al. 2005; Nicholson et al. 2005.

Note: The map unit abbreviations in Table 6.1-2 each refer to the age and name of the associated geologic formation or group.

Table 6.1-3

Major Geologic Units Underlying the Project Facilities

Facility	Area (acres)	Age	Map	Geologic Formation/Unit	Description/Rock Type
			Units		
Pratt	7.67	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
Redhook Compressor Station	17.74	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
Webster Interconnect	1.37	Pennsylvanian and Permian	Pd	Greene, Washington, Waynesburg	Sandstone; Siltstone; Shale; Limestone; Coal
Mobley Tap	0.38	Pennsylvanian and Permian	Pd	Greene, Washington, Waynesburg	Sandstone; Siltstone; Shale; Limestone; Coal
Applegate L/R Site	0.14	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
Hartson L/R Site	0.11	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
H-302 Tap L/R Site	0.15	Permian	Pw	Washington Formation	Sandstone; Shale; Limestone; Coal
H-158/M-80 ATWS	5.471072	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
	1.736911	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
H-158/M-80 Access Road ROW	0.411781	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
	0.146002	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
H-305 ATWS	1.122347	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
H-305 Access Road ROW	0.514096	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
H-316 ATWS	3.264686	Permian	Pw	Washington Formation	Sandstone; Shale; Limestone; Coal
	0.695568	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
	15.732322	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
	1.247916	Permian	Pg	Greene Formation	Sandstone; Shale; Limestone; Coal
H-316 Access Road ROW	0.637475	Permian	Pw	Washington Formation	Sandstone; Shale; Limestone; Coal
	0.643904	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
	2.620782	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
H-318 ATWS	8.04264	Pennsylvanian	Pcc	Casselmann Formation	Shale; Siltstone; Sandstone; Limestone; Coal
	37.127385	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
	1.664522	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
H-318 Access Road ROW	0.163549	Pennsylvanian	Pcc	Casselmann Formation	Shale; Siltstone; Sandstone; Limestone; Coal
	2.921844	Pennsylvanian	Pm	Monongahela Group	Limestone; Shale; Sandstone; Coal
	0.491163	Permian and Pennsylvanian	PPw	Waynesburg Formation	Sandstone; Shale; Limestone; Coal
H-319 ATWS	0.417913	Permian and Pennsylvanian	Pd	Greene, Washington, Waynesburg	Sandstone; Siltstone; Shale; Limestone; Coal

Table 6.1-3**Major Geologic Units Underlying the Project Facilities**

Facility	Area (acres)	Age	Map	Geologic Formation/Unit	Description/Rock Type
			Units		
H-319 Access Road ROW	0.074012	Permian and Pennsylvanian	Pd	Greene, Washington, Waynesburg	Sandstone; Siltstone; Shale; Limestone; Coal
Mobley ATWS	0.114647	Permian and Pennsylvanian	Pd	Greene, Washington, Waynesburg	Sandstone; Siltstone; Shale; Limestone; Coal
Webster ATWS	1.545392	Permian and Pennsylvanian	Pd	Greene, Washington, Waynesburg	Sandstone; Siltstone; Shale; Limestone; Coal
Webster Access Road ROW	0.141781	Permian and Pennsylvanian	Pd	Greene, Washington, Waynesburg	Sandstone; Siltstone; Shale; Limestone; Coal

Sources: Dicken et al. 2005; Nicholson et al. 2005.

Table 6.2-1**Depth to Bedrock for Specific Locations along Project Route where Bedrock Occurs Within 5 Feet of Surface**

Line	Milepost Start	Milepost End	Length (feet)	Depth to Bedrock (inches)
H-158/M-80	0	0.03	158	38
H-305	not applicable (N/A)	not applicable (N/A)	not applicable (N/A)	not applicable (N/A)
H316	0.48	0.51	164	46
	2.14	2.18	227	38
H318	0.75	0.8	248	33
	1.02	1.09	380	33
	1.29	1.34	312	33
	1.68	1.75	359	33
	1.813	1.9	438	33
	3.21	3.31	533	38
	3.61	3.7	507	46
	3.7	3.7	12	38
	3.71	3.71	5	38
	3.8	3.81	30	38
	3.81	3.9	482	38
	3.95	4.01	306	38
	4.01	4.08	391	38
	4.08	4.2	624	38
	4.25	4.26	84	38
H-319	not applicable (N/A)	not applicable (N/A)	not applicable (N/A)	not applicable (N/A)

Source: USDA 2003.

Table 6.2-1A Depth to Bedrock for Specific Locations within ATWS and Access Road ROWs where Bedrock Occurs Within 5 Feet of Surface		
Area	Acreage	Depth to Bedrock (inches)
H-158/M-80 ATWS	1.749956	38
H-158/M-80 Access Road ROW	0.218065	38
H-305 ATWS	not applicable (N/A)	not applicable (N/A)
H-305 Access Road ROW	not applicable (N/A)	not applicable (N/A)
H-316 ATWS	1.818094	38
H-316 Access Road ROW	0.10543	38
H-318 ATWS	1.600779	33
	3.902918	38
	0.183298	46
H-318 Access Road ROW	0.18668	33
	0.331821	38
	0.216076	46
H-319 ATWS	not applicable (N/A)	not applicable (N/A)
H-319 Access Road ROW	not applicable (N/A)	not applicable (N/A)
Source: USDA 2003.		

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Table 6.3-1R

Revised April 20, 2016

Oil and Gas Wells Within 0.25 Mile of the Proposed Project

Feature	API Number	Status	County	Quadrangle	Latitude (DD)	Longitude (DD)	MP	Type	Near Feature	Distance (ft)	Direction
20160421-5019 H-158/M-80	059-25617	Active	Greene	Waynesburg	39.913336	-80.13424	0	Oil & Gas, Coal	ATWS	967	W
	059-25585	Active	Greene	Waynesburg	39.913356	-80.13418	0	Oil & Gas, Coal	ATWS	947	W
	059-26423	Proposed But Never Materialized	Greene	Waynesburg	39.913164	-80.13423	0	Oil & Gas, Coal	ATWS	975	W
	059-25585	Active	Greene	Waynesburg	39.913356	-80.13418	0	Oil & Gas, Coal	ATWS	947	W
	059-01984	Abandoned	Greene	Waynesburg	39.916693	-80.12477	end	Oil & Gas, Coal	Temporary Construction ROW	1083	E
	059-01939	PADEP Orphan List	Greene	Waynesburg	39.919241	-80.13583	end	Oil & Gas, Coal	ATWS	1263	NW
	059-02020	Abandoned	Greene	Waynesburg	39.916693	-80.12477	end	Oil & Gas, Coal	Temporary Construction ROW	1083	E
H-305	059-01984	Abandoned	Greene	Waynesburg	39.916693	-80.12477	0	Oil & Gas, Coal	Temporary Construction ROW	954	E
	059-01939	PADEP Orphan List	Greene	Waynesburg	39.919241	-80.13583	end	Oil & Gas, Coal	Access Road ROW	1044	W
	059-21800	Active	Greene	Waynesburg	39.921181	-80.13287	end	Oil & Gas, Coal	Access Road ROW	1057	N
	059-02124	Abandoned	Greene	Waynesburg	39.920476	-80.13458	end	Oil & Gas, Coal	Access Road ROW	1034	NW
	059-02020	Abandoned	Greene	Waynesburg	39.916693	-80.12477	0	Oil & Gas, Coal	Temporary Construction ROW	954	E
H-316	059-01984	Abandoned	Greene	Mather	39.916693	-80.12477	0.24	Oil & Gas, Coal	Permanent Operation ROW	0	W
	059-02020	Abandoned	Greene	Mather	39.916693	-80.12477	0.24	Oil & Gas, Coal	Permanent Operation ROW	0	W
	059-01860	PADEP Abandoned List	Greene	Mather	39.916842	-80.12333	0.31	Oil & Gas, Coal	Temporary Construction ROW	115	N
	059-02016	Active	Greene	Mather	39.916693	-80.11644	0.72	Oil & Gas, Unavailable	Temporary Construction ROW	0	W
	059-24135	Active	Greene	Mather	39.920691	-80.11135	1.01	Oil & Gas, Coal	Temporary Construction ROW	1049	N
	059-01241	Active	Greene	Mather	39.915111	-80.10769	1.21	Oil & Gas, Coal	Permanent Operation ROW	765	S
	059-22604	Plugged OG Well	Greene	Mather	39.918966	-80.10397	1.43	Oil & Gas, Coal	Access Road ROW	417	NW
	059-21048	Plugged OG Well	Greene	Mather	39.905226	-80.08899	2.66	Oil & Gas, Coal	Permanent Operation ROW	321	E
	059-24955	Active	Greene	Mather	39.900363	-80.08871	2.98	Oil & Gas, Coal	ATWS	82	SW
	059-25009	Active	Greene	Mather	39.904655	-80.08409	2.7	Oil & Gas, Coal	Access Road ROW	628	N
	059-24498	Operator Reported Not Drilled	Greene	Mather	39.903444	-80.09074	2.73	Oil & Gas, Coal	Permanent Operation ROW	309	W
	059-23780	Operator Reported Not Drilled	Greene	Mather	39.916166	-80.10208	1.57	Oil & Gas, Coal	Temporary Construction ROW	0	W
	059-21887	Active	Greene	Mather	39.963241	-80.17571	0	Oil & Gas, Coal	ATWS	575	NE

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Table 6.3-1R

Revised April 20, 2016

Oil and Gas Wells Within 0.25 Mile of the Proposed Project

Feature	API Number	Status	County	Quadrangle	Latitude (DD)	Longitude (DD)	MP	Type	Near Feature	Distance (ft)	Direction
20160421-5019-000020	059-23778	Operator Reported Not Drilled	Greene	Mather	39.922916	-80.09647	1.5	Oil & Gas, Coal	Access Road ROW	1196	N
	059-23782	Operator Reported Not Drilled	Greene	Mather	39.917888	-80.09888	1.6	Oil & Gas, Coal	Access Road ROW	563	S
	059-25243	Operator Reported Not Drilled	Greene	Mather	39.917888	-80.09888	1.6	Oil & Gas, Coal	Access Road ROW	563	S
	059-24956	Operator Reported Not Drilled	Greene	Mather	39.898599	-80.09223	end	Oil & Gas, Coal	ATWS	1256	SW
	059-23779	Operator Reported Not Drilled	Greene	Mather	39.920693	-80.09372	1.7	Oil & Gas, Coal	Access Road ROW	1132	E
	059-23781	Operator Reported Not Drilled	Greene	Mather	39.913582	-80.09899	1.8	Oil & Gas, Coal	Temporary Construction ROW	91	SW
	059-22618	Operator Reported Not Drilled	Greene	Mather	39.916007	-80.10156	1.59	Oil & Gas, Coal	Permanent Operation ROW	0	W
	059-21991	Active	Greene	Mather	39.963775	-80.17575	0	Oil & Gas, Coal	ATWS	722	NE
	059-24133	Active	Greene	Mather	39.922382	-80.09842	1.5	Oil & Gas, Coal	Access Road ROW	992	N
	059-26686	Proposed But Never Materialized	Greene	Mather	39.961486	-80.17539	0	Oil & Gas, Coal	ATWS	542	E
	003-00070	Plugged OG Well	Allegheny	Monongahela	40.22653	-79.92043	0.68	Oil & Gas, Non-Coal	Temporary Construction ROW	815	SE
	003-00209	Plugged OG Well	Allegheny	Monongahela	40.2312	-79.92096	0.65	Oil & Gas, Non-Coal	Access Road ROW	70	E
	003-00435	Plugged OG Well	Allegheny	Monongahela	40.239424	-79.91601	0	Oil & Gas, Non-Coal	Access Road ROW	198	S
	003-00733	Plugged OG Well	Allegheny	Monongahela	40.227512	-79.93577	1.6	Oil & Gas, Non-Coal	ATWS	628	SW
	003-00783	Plugged OG Well	Allegheny	Monongahela	40.236842	-79.94831	2.6	Oil & Gas, Non-Coal	ATWS	336	W
	003-01077	PADEP Plugged	Allegheny	Monongahela	40.239381	-79.9492	2.8	Oil & Gas, Non-Coal	Temporary Construction ROW	412	W
	003-20001	Active	Allegheny	Monongahela	40.226141	-79.91965	0.9	Oil & Gas, Non-Coal	Temporary Construction ROW	1059	SE
	003-20012	Active	Allegheny	Monongahela	40.224768	-79.92288	1.09	Oil & Gas, Non-Coal	Temporary Construction ROW	478	E
	003-20012	Active	Allegheny	Monongahela	40.224768	-79.92288	1.09	Oil & Gas, Non-Coal	Temporary Construction ROW	478	E
	003-20017	Active	Allegheny	Monongahela	40.243571	-79.92431	0	Oil & Gas, Non-Coal	H318_PermanentSite	1191	NW
	003-20017	Active	Allegheny	Monongahela	40.243571	-79.92431	0	Oil & Gas, Non-Coal	H318_PermanentSite	1191	NW
	003-20020	Active	Allegheny	Monongahela	40.231494	-79.92001	0.68	Oil & Gas, Non-Coal	Access Road ROW	352	E
	003-20022	Active	Allegheny	Monongahela	40.245356	-79.92034	0	Oil & Gas, Non-Coal	Access Road ROW	1223	N
	003-20023	Active	Allegheny	Monongahela	40.239585	-79.91524	0	Oil & Gas, Non-Coal	Access Road ROW	79	S
	003-20026	Active	Allegheny	Monongahela	40.241788	-79.91885	0	Oil & Gas, Non-Coal	Access Road ROW	10	W
	003-20078	Plugged OG Well	Allegheny	Monongahela	40.24014	-79.92592	0.1	Oil & Gas, Non-Coal	Temporary Construction ROW	962	W

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Table 6.3-1R

Revised April 20, 2016

Oil and Gas Wells Within 0.25 Mile of the Proposed Project

Feature	API Number	Status	County	Quadrangle	Latitude (DD)	Longitude (DD)	MP	Type	Near Feature	Distance (ft)	Direction
H-318	003-20792	Active	Allegheny	Monongahela	40.238082	-79.91912	0.2	Oil & Gas, Coal	Access Road ROW	764	S
	003-20803	Plugged OG Well	Allegheny	Monongahela	40.245493	-79.91983	0	Oil & Gas, Coal	Access Road ROW	1245	N
	003-20804	Plugged OG Well	Allegheny	Monongahela	40.24563	-79.91965	0	Oil & Gas, Coal	Access Road ROW	1290	N
	003-22051	Active	Allegheny	Monongahela	40.231044	-79.93095	1.6	Oil & Gas, Coal	ATWS	883	NE
	003-22053	Active	Allegheny	Monongahela	40.235372	-79.9483	2.48	Oil & Gas, Coal	ATWS	718	SW
	125-00465	Plugged OG Well	Washington	Glassport	40.251124	-79.97096	end	Oil & Gas, Coal	Access Road	951	SW
	125-00666	Active	Washington	Monongahela	40.249528	-79.96083	3.7	Oil & Gas, Coal	Temporary Construction ROW	546	SW
	125-00685	Active	Washington	Glassport	40.255472	-79.96669	end	Oil & Gas, Coal	ATWS	100	NW
	125-00686	Active	Washington	Glassport	40.254694	-79.96314	end	Oil & Gas, Coal	ATWS	103	NW
	125-00687	Active	Washington	Glassport	40.252944	-79.96094	3.96	Oil & Gas, Coal	Temporary Construction ROW	266	NE
	125-00688	Active	Washington	Glassport	40.254694	-79.96314	end	Oil & Gas, Coal	ATWS	962	N
	125-00689	Plugged OG Well	Washington	Glassport	40.251612	-79.96817	end	Oil & Gas, Coal	Access Road	706	S
	125-00691	Active	Washington	Glassport	40.252167	-79.96414	3.96	Oil & Gas, Coal	Temporary Construction ROW	568	W
	125-00692	Active	Washington	Glassport	40.251878	-79.95463	3.85	Oil & Gas, Coal	Temporary Construction ROW	1088	NW
	125-27645	Active	Washington	Monongahela	40.244972	-79.95768	2.93	Oil & Gas, Coal	Access Road ROW	986	S
	125-27646	Active	Washington	Monongahela	40.244944	-79.9577	2.93	Oil & Gas, Coal	Access Road ROW	996	S
	125-27647	Active	Washington	Monongahela	40.244919	-79.95771	2.93	Oil & Gas, Coal	Access Road ROW	1006	S
	125-27648	Active	Washington	Monongahela	40.244894	-79.95773	2.93	Oil & Gas, Coal	Access Road ROW	1016	S
	125-27649	Active	Washington	Monongahela	40.244869	-79.95774	2.93	Oil & Gas, Coal	Access Road ROW	1026	S
	125-27649	Active	Washington	Monongahela	40.244869	-79.95774	2.93	Oil & Gas, Coal	Access Road ROW	1026	S
H-319	103-02535	Active	Wetzel (WV)	Big Run	39.552965	-80.54354	0	Gas	ATWS	118	E
	103-02384	Active	Wetzel (WV)	Big Run	39.55554	-80.54751	end	Gas	ATWS	1210	NW
Pratt Compressor Station	059-01984	Abandoned	Greene	Waynesburg	39.916693	-80.12477	Area within 0.25 mile of Project Features	Oil & Gas, Coal	Pratt CS	1170	NE
	059-02020	Abandoned	Greene	Waynesburg	39.916693	-80.12477		Oil & Gas, Coal	Pratt CS	1170	NE
Redhook Compressor Station	059-01939	PADEP Orphan List	Greene	Waynesburg	39.916824	-80.12333		Oil & Gas, Coal	Redhook CS	1300	W
	059-01860	PADEP Abandoned List	Greene	Waynesburg	39.916842	-80.12333		Oil & Gas, Coal	Redhook CS	921	E
	059-01984	Abandoned	Greene	Waynesburg	39.916693	-80.12477		Oil & Gas, Coal	Redhook CS	515	E
	059-02020	Abandoned	Greene	Waynesburg	39.916693	-80.12477		Oil & Gas, Coal	Redhook CS	515	E

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Table 6.3-1R

Revised April 20, 2016

Oil and Gas Wells Within 0.25 Mile of the Proposed Project

Feature	API Number	Status	County	Quadrangle	Latitude (DD)	Longitude (DD)	MP	Type	Near Feature	Distance (ft)	Direction
Webster Inter-connect 20160421-5019-0002-01	103-02535	Active	Wetzel (WV)	Big Run	39.552965	-80.54354		Gas	H306 Tap	193	E
	103-02384	Active	Wetzel (WV)	Big Run	39.55554	-80.54751		Gas	Access Road ROW	1240	NW
	103-02422	Never Drilled	Wetzel (WV)	Big Run	39.549174	-80.54064		NAVL	ATWS	1191	E
	103-02524	Active	Wetzel (WV)	Big Run	39.54991	-80.54858		Gas	ATWS	1097	W
Sources: PADEP 2016; WVDEP 2016.											
No wells identified within 0.25 mi of Mobley Interconnect; Oil and Gas wells located near taps accounted for above											
PADEP = Pennsylvania Department of Environmental Protection; OG = oil/gas; NAVL = Not Available											

Table 6.3-2**(Revised April 20, 2016)****Active and Closed Coal Mines Within 0.25 miles of the Project Area**

Feature	Name	Type	Status	County	Mileposts¹	Surface Elevation Along Pipeline²	Bottom of Coal Elevation³
H-316	Gateway Mine	Underground Mine	Closed	Greene	1.03 – 1.20	960-920	650-640
	Mather Mine	Underground Mine	Closed	Greene	1.33 – 2.99	1140-900	640-560
H-302 Tap Site	Mather Mine	Underground Mine	Closed	Greene	2.99	1140	560
H-316 ATWS 05	Mather Mine	Underground Mine	Closed	Greene	1.5		
H-316 ATWS 06	Mather Mine	Underground Mine	Closed	Greene	2.1		
H-316 ATWS 07	Mather Mine	Underground Mine	Closed	Greene	2.82		
H-316 Access Road ROW 05A/B	Mather Mine	Underground Mine	Closed	Greene	1.45		
H-316 Access Road ROW 06A/B	Mather Mine	Underground Mine	Closed	Greene	2.05		
H-316 Access Road ROW 07A/B	Mather Mine	Underground Mine	Closed	Greene	2.82		
H-318	Redstone No. 1 Mine	Underground Mine	Closed	Allegheny	0.0 – 0.02	1100-1120	950*
	Wright Mine	Underground Mine	Closed	Allegheny	0		
	Howe Mine	Underground Mine	Closed	Allegheny			
	Redstone No. 2 Mine	Underground Mine	Closed	Allegheny	0.13 – 0.17	1160-1180	945*
	Williams Mine	Underground Mine	Closed	Allegheny	0.43 – 0.96	1140-1000	930-937*
	S.B. Tressler Pit	Underground Mine	Closed	Allegheny			
	Abandoned Mine Land 3808	Surface Mine	Closed	Allegheny	1.47 - 1.71		
	Abandoned Mine Land 0129-02	Surface Mine	Reclaimed	Allegheny	1.78 – 1.93		
	Mongah Mine	Underground Mine	Closed	Allegheny	0.42 – 2.67	1200-800	857-810
	GW Peterson No.1 Pit						
	Abandoned Mine Land 3808	Surface Mine	Closed	Allegheny	2.37 – 2.69		
	Abandoned Mine Land 0129	Surface Mine	Closed	Allegheny	2.37 – 2.69		
	Unknown Mine	Underground Mine	Closed	Washington	3.22 – 3.25	910-880	810
	Pitt Mine	Underground Mine	Closed	Washington	3.22 – 3.25	910-880	810
	Coal Bluff	Underground Mine	Closed	Washington	3.62 – 4.20	1220-1040	820-850
	Banner	Underground Mine	Closed	Washington			
	Cliff Mine	Underground Mine	Closed	Washington			
Applegate L/R Site	Redstone No. 1 Mine	Underground Mine	Closed	Allegheny	0	1120	950
Hartson L/R Site & H-148 Tap Site	Coal Bluff	Underground Mine	Closed	Washington	4.26	1080	850
H-318 ATWS 1A-D	Williams Mine	Underground Mine	Closed	Allegheny	0.43 - 0.77		
	Mongah Mine	Underground Mine	Closed	Allegheny	0.43 - 0.77		
H-318 ATWS 2A/B, E/F	Sylvia	Underground Mine	Closed	Allegheny	1.61 - 1.78		
	Mongah Mine	Underground Mine	Closed	Allegheny	1.61 - 1.78		
H-318 ATWS 3	Mongah Mine	Underground Mine	Closed	Allegheny	1.93		
H-318 ATWS 4A/B	Mongah Mine	Underground Mine	Closed	Allegheny	2.03 - 2.25		
H-318 ATWS 6B/C/D, 7. 8	Coal Bluff	Underground Mine	Closed	Washington	3.46 - 4.26		
H-318 Access Road 01	Redstone No. 1 Mine	Underground Mine	Closed	Allegheny	0		
	Wright Mine	Underground Mine	Closed	Allegheny	0		

Table 6.3-2**(Revised April 20, 2016)****Active and Closed Coal Mines Within 0.25 miles of the Project Area**

Feature	Name	Type	Status	County	Mileposts¹	Surface Elevation Along Pipeline²	Bottom of Coal Elevation³
H-318 Access Road 02	Williams Mine	Underground Mine	Closed	Allegheny	0.7		
	Mongah Mine	Underground Mine	Closed	Allegheny	0.7		
H-318 Access Road 03	Mongah Mine	Underground Mine	Closed	Allegheny	1		
H-318 Access Road 04A/B	Mongah Mine	Underground Mine	Closed	Allegheny	1.92		
H-318 Access Road 06	Coal Bluff	Underground Mine	Closed	Washington	3.6		
H-318 Access Road 08	Coal Bluff	Underground Mine	Closed	Washington	4.2		
H-305	None	None	None	Greene	Not applicable (N/A)		
M-80 / H-158	None	None	None	Greene	Not applicable (N/A)		
Pratt Compressor Station ⁴	None	None	None	Greene	Not applicable (N/A)		
Redhook Compressor Station ⁵	None	None	None	Greene	Not applicable (N/A)		
Webster Interconnect	None	None	None	Wetzel	Not applicable (N/A)		
H-306 Tap Site	None	None	None	Wetzel	Not applicable (N/A)		
H-319	None	None	None	Wetzel	Not applicable (N/A)		
Mobley Interconnect	None	None	None	Wetzel	Not applicable (N/A)		

Sources: PADEP 2015b, 2015c, WVDEP 2016

*Redstone Coal Seam (feet above mean sea level; PADER 1987).

¹ For access roads, the milepost where the feature first enters the Project pipeline ROW is given.² Feet above mean sea level, source estimated from USGS 7.5 Topographic Quadrangles.³ Pittsburgh Bottom of coal seam elevation (feet above mean sea level; PADER 1987).⁴ Closest mine is Gateway Mine, approximately 0.6 miles to the northwest⁵ Closest mine is the Gateway Mine, approximately 0.3 miles to the west

Table 6.4-1		
Range of Earthquake Intensities		
MMI	Potential Effects	Richter Scale Equivalent
I	People do not feel any earth movement.	<3.4
II	A few people notice movement if at rest and/or on upper floors of tall buildings.	3.5 – 4.1
III	People indoors feel movement. Hanging objects swing back and forth. People outdoors might not realize that an earthquake is occurring.	4.2
IV	People indoors feel movement. Hanging objects swing. Dishes, windows, and doors rattle. Feels like a heavy truck hitting walls. Some people outdoors may feel movement. Parked cars rock.	4.3 – 4.8
V	Almost everyone feels movement. Sleeping people are awakened. Doors swing open/close. Dishes break. Small objects move or are turned over. Trees shake. Liquids spill from open containers.	4.9 – 5.4
VI	Everyone feels movement. People have trouble walking. Objects fall from shelves. Pictures fall off walls. Furniture moves. Plaster in walls may crack. Trees and bushes shake. Damage slight in poorly-built buildings.	5.5 – 6.1
VII	People have difficulty standing. Drivers feel cars shaking. Furniture breaks. Loose bricks fall from buildings. Damage slight to moderate in well-built buildings; considerable in poorly-built buildings.	5.5 – 6.1
VIII	Drivers have trouble steering. Houses not bolted down shift on foundations. Towers and chimneys twist and fall. Well-built buildings suffer slight damage. Poorly-built structures severely damaged. Tree branches break. Hillsides crack if ground is wet. Water levels in wells change.	6.2 – 6.9

Table 6.4-1		
Range of Earthquake Intensities		
MMI	Potential Effects	Richter Scale Equivalent
IX	Well-built buildings suffer considerable damage. Houses not bolted down move off foundations. Some underground pipes broken. Ground cracks. Serious damage to reservoirs.	6.2 – 6.9
X	Most buildings and their foundations destroyed. Some bridges destroyed. Dams damaged. Large landslides occur. Water thrown on the banks of canals, rivers, lakes. Ground cracks in large areas. Railroad tracks bent slightly.	7.0 – 7.3
XI	Most buildings collapse. Some bridges destroyed. Large cracks appear in the ground. Underground pipelines destroyed. Railroad tracks badly bent.	7.4 – 7.9
XII	Almost everything is destroyed. Objects thrown into the air. Ground moves in waves or ripples. Large amounts of rock may move.	>8.0
Source: Nelson 2006.		
MMI = Modified Mercalli Intensity		

Table 6.4-2

Seismic Events within 100 Miles of the Project Route

Magnitude/Location	Date	Nearest Project Feature	Distance (mi)	Direction
M 2.6 - Jennerstown, PA	1982/02/03	H-318	46.10	E
M 3.2 - Shermansville, PA	1985/04/14	H-318	94.98	N
M 3.3 - Perryopolis, PA	1965/10/08	H-318	14.68	SE
M 5.1 - Greenville (Osgood), PA	1998/10/09	H-318	86.89	N
M 5.1 - Greenville (Osgood), PA	1998/09/25	H-318	86.57	N
M 4.1 - Littleton, WV	1824/07/15	H-319	10.42	N
M 3.1 - Morgantown, WV	1976/05/06	H-316	23.00	S
M 5.1 - Greenville (Osgood), PA	1998/10/16	H-318	86.19	N
M 5.1 - Greenville (Osgood), PA	1998/10/22	H-318	86.37	N
M 5.1 - Greenville (Osgood), PA	1998/10/23	H-318	86.29	N
M 5.1 - Greenville (Osgood), PA	1998/11/01	H-318	86.31	N
M 3.7 - Meadville, PA	1852/09/15	H-318	95.55	N
Sharon area, PA	1873/08/17	H-318	71.10	N
M 2.9 - Greenville, PA	1936/08/26	H-318	82.32	N
M 3.6 - Hancock, MD	1962/09/07	H-318	98.40	E
M 3.6 - Berkeley Spring, WV	1963/10/10	H-318	99.77	E
M 3.1 - Clarksburg, WV	1966/09/28	H-319	21.81	SE
M 3.6 - Berkeley Spring, WV	1969/05/22	H-318	98.76	E
M 3.6 - Berkeley Spring, WV	1970/05/27	H-318	97.05	E
M 2.3 - Atlantic, PA	1998/11/07	H-318	92.60	N
M 4.2 - Alliance, OH	2000/08/07	H-318	79.38	NW
M 2.8 - Nelson, OH	1988/03/31	H-318	92.55	NW
M 3.2 - Garrettsville, OH	1885/08/15	H-318	93.63	NW
M 4.2 - Alliance, OH	1927/10/29	H-318	78.89	NW
M 2.9 - Greenville, PA	1890/12/15	H-318	82.84	N
Near the Muskingum River, Ohio	1776	H-319	72.41	W
M 3.8 - In southeast Ohio, near Pomeroy	11/5/1926	H-319	88.98	W
M 4 - Near Zanesville, Ohio	6/20/1952	H-319	79.11	W
M 4.6 - In Virginia	5/2/1853	H-319	91.86	SE
M 3.3 - In southern Blair County, Pennsylvania	7/15/1938	H-318	89.79	E
M 3.0 - 2km SSW of Lowellville, Ohio	3/10/2014	H-318	60.45	N
M 3.5 - 2km ESE of Nelsonville, Ohio	11/20/2013	H-319	89.04	W
M 3.4 - 11km WSW of Sutton, West Virginia	3/31/2013	H-319	64.52	S
M 3.7 - Youngstown-Akron urban area, Ohio	12/31/2011	H-318	70.86	NW
M 3.1 - Ohio	8/31/2011	H-319	49.50	W
M 3.4 - West Virginia	4/4/2010	H-319	67.33	S
M 4.5 - Pennsylvania	9/25/1998	H-318	88.47	N
M 3.1 - Potomac-Shenandoah region	4/26/1978	H-318	96.66	E
M 3.4 - West Virginia	10/20/1974	H-319	64.43	W

M = Richter Magnitude

Earthquake Data Source: PA DCNR (2003), USGS (2015)

Table 6.4-3**Landslides within 0.25 mile of Project Components in Pennsylvania**

Project Component	Source Topo Quad	Nearest Project Feature	Distance (ft)	Direction
H-316	Mather	H-316 Temporary Construction ROW	909	N
H-316	Mather	H-316 Temporary Construction ROW	478	N
H-316	Mather	H-316 Temporary Construction ROW	467	S
H-316	Mather	H-316 Temporary Construction ROW	426	SW
H-316	Mather	H-316 Pipeline	0	W
H-316	Mather	H-316 Permanent Operation ROW	1145	E
H-316	Mather	H-316 Permanent Operation ROW	972	E
H-316	Mather	H-316 ATWS 07	0	W
H-316	Mather	H-316 ATWS 07	0	W
H-318	Monongahela	H-318 Permanent Operation ROW	896	E
H-318	Monongahela	H-318 Access Road 01	0	W

Source: USGS Landslide Inventory Open File Map (1979)

Table 6.4-4 (Revised April 20, 2016) Soil Units with Slip Potential, Wetzel County, WV			
Soil Map Unit Name	Soil Map Unit Symbol	Soil Slip Potential	Located within EEP footprint?
Gilpin-Peabody complex, 15 to 25 percent slopes	GpD	High	No
Gilpin-Peabody complex, 25 to 35 percent slopes	GpE	High	No
Gilpin-Peabody complex, 35 to 70 percent slopes	GpF	High	Yes
Gilpin-Rock outcrop complex, very steep	GrF	High	No
Vandalia silty clay loam, 15 to 25 percent slopes	VaD	High	No
Vandalia silty clay loam, 25 to 35 percent slopes	VaE	High	No
Vandalia silty clay loam, 15 to 25 percent slopes, extremely stony	VbD	High	No
Vandalia-Urban land complex, 15 to 25 percent slopes	VuD	High	No
Source: USDA NRCS, SSURGO 2.2. Directed to source by Joseph Cochran of WVDEP, April 2016			

Attachment 7-3

Table 7.3-1R

(Revised April 20, 2016)

Characteristics of Soils Affected by the Project*

Facility <u>a/</u>	County	Total Area (acres)	Slopes ≥ 15 percent <u>b/</u> (acres)	Designated Farmland <u>c/</u>		Hydric Soils <u>d/</u> (acres)	Shallow Depth to Groundwater <u>d/</u> (acres)	Stony / Rocky Soils <u>d/</u> (acres)	Poor Drainage Potential <u>d/</u> (acres)	Soils Prone to Erosion		Soils Prone to Soil Compaction <u>g/</u> (acres)	Poor Revegetation Potential <u>h/</u> (acres)
				Prime (acres)	Statewide Importance (acres)					By Water <u>e/</u> (acres)	By Wind <u>f/</u> (acres)		
H-305 Pipeline	Greene/PA	2.77	1.29	0.02	1.28	0	0	0	0	2.57	0	2.59	2.57
H-316 Pipeline	Greene/PA	62.23	8.89	8.35	11.18	0.58	0.58	0	0.58	31.82	0	25.5	51.2
H-318 Pipeline	Allegheny, Washington/PA	96.14	22.62	13.03	27.12	0.53	0.53	14.98	0.53	71.95	0	58.74	76.11
H-319 Pipeline	Wetzel/WV	0.8	0	0	0.8	0	0	0.8	0	0	0	0	0
H-158/M-80 Pipelines	Greene/PA	9.91	3.16	1.84	2.51	0	0	0	0	0.83	0	4.09	8.17
Pratt Compressor Station	Greene/PA	7.67	1.61	5.96	0.1	0.30	0.30	0	0	1.61	0	6.06	1.71
Redhook Compressor Station	Greene/PA	17.74	1.82	8.58	6.00	0	0	0	0	7.82	0	11.64	9.16
Webster Interconnect	Wetzel/WV	2.47	0.02	0	2.46	0.07	0.07	2.46	0	0.02	0	0	0.02
Mobley Tap Site (H-306)	Wetzel/WV	0.50	0	0	0.50	0.02	0.02	0.49	0	0	0	0	0
Applegate L/R Site	Allegheny/PA	0.39	0	0.39	0	0	0	0	0	0.39	0	0.39	0
Hartson L/R Site (H-148)	Washington/PA	0.11	0.11	0	0	0	0	0	0	0.11	0	0.11	0.11
H-302 Tap L/R Site	Greene/PA	0.33	0	0	0	0	0	0	0	0	0	0	0
Total Acres		201.06	39.52	38.17	51.95	1.5	1.5	18.73	1.11	117.12	0	109.12	149.05
Percent of Total Acres			20%	19%	26%	0.75%	3.80%	9%	0.55%	58%	0%	54%	74%

* The values in each row do not necessarily add up to the total acreage for each facility, because of minor rounding or mapping inconsistencies.

a/ The list of facilities includes the associated access roads, additional temporary workspaces, contractor yards, and staging areas in the acreage calculations for each facility.

However, the additional temporary workspaces, access roads, contractor yards and staging areas are also reported separately.

b/ Soils characterized by the NRCS as having representative slopes of 15 percent or greater.

c/ As designated by the NRCS.

d/ As designated by the NRCS.

e/ Based on K factor for the whole soil (Kw), the representative slope, and the nonirrigated land capability rating; a Kw rating of "moderate" was elevated to "high" when associated with steep slopes and when the Nonirrigated Capability Subclass included an "e," which indicates that erosion is a potential hazard for the soil type.

f/ Based on the Wind Erodibility Group scale; soils with a rating of 1 to 4 were ranked with a high potential for erosion due to wind.

g/ Based on 1) soils with poor drainage (somewhat poorly drained to poorly drained), 2) a high clay content (greater than 20 percent), or 3) a surface soil texture characterized as sandy clay loam or dominated by finer particles.

h/ Based on soils 1) that have a surface texture of sandy loam or coarser, 2) are somewhat excessively drained to excessively drained, 3) have slopes greater than 15 percent, or 4) have severe limitations (i.e., a Nonirrigated Capability Class of 3 or higher).

Sources: Soil Survey Staff 2015a, 2015b

Attachment 7-3
Table 7.3-1R
(Revised April 20, 2016)

Characteristics of Soils Affected by the Project* (Operation/Permanent Impact Areas)

Facility <u>a/</u>	County	Total Area (acres)	Slopes \geq 15 percent <u>b/</u> (acres)	Designated Farmland <u>c/</u>		Hydric Soils <u>d/</u> (acres)	Shallow Depth to Groundwater <u>d/</u> (acres)	Stony / Rocky Soils <u>d/</u> (acres)	Poor Drainage Potential <u>d/</u> (acres)	Soils Prone to Erosion		Soils Prone to Soil Compaction <u>g/</u> (acres)	Poor Revegetation Potential <u>h/</u> (acres)
				Prime (acres)	Statewide Importance (acres)					By Water <u>e/</u> (acres)	By Wind <u>f/</u> (acres)		
H-305 Pipeline	Greene/PA	0.61	0.28	0	0.28	0	0	0	0	0.57	0	0.57	0.61
H-316 Pipeline	Greene/PA	20.04	1.93	2.92	3.95	0.26	0.26	0.00	0.26	11.21	0	3.03	16.13
H-318 Pipeline	Allegheny, Washington/PA	26.71	4.01	4.89	7.30	0.26	0.26	4.38	0.26	20.18	0	9.45	20.79
H-319 Pipeline	Wetzel/WV	0.29	0	0	0.29	0	0	0.29	0	0	0	0	0
H-158/M-80 Pipelines	Greene/PA	1.59	0.51	0.29	0.40	0	0	0	0	0.13	0	0.65	1.31
Pratt Compressor Station	Greene/PA	7.67	1.61	5.96	0.1	0.30	0.30	0	0	1.61	0	6.06	1.71
Redhook Compressor Station	Greene/PA	17.74	1.82	8.58	6.00	0	0	0	0	7.82	0	11.64	9.16
Webster Interconnect	Wetzel/WV	0.82	0.01	0	0.81	0.02	0.02	0.81	0	0.01	0	0	0.01
Mobley Tap Site (H-306)	Wetzel/WV	0.38	0	0	0.38	0.02	0.02	0.37	0	0	0	0	0
Applegate L/R Site	Allegheny/PA	0.39	0	0.39	0	0	0	0	0	0.39	0	0.39	0
Hartson L/R Site (H-148)	Washington/PA	0.11	0.11	0	0	0	0	0	0	0.11	0	0.11	0.11
H-302 Tap L/R Site	Greene/PA	0.33	0	0	0	0	0	0	0	0	0	0	0
Total Acres		76.67	10.28	23.04	19.52	0.86	0.86	5.85	0.52	42.02	0	31.90	49.82
Percent of Total Acres			13%	30%	25%	1.12%	8.35%	8%	0.68%	55%	0%	42%	65%

* The values in each row do not necessarily add up to the total acreage for each facility, because of minor rounding or mapping inconsistencies.

a/ The list of facilities includes the associated access roads, additional temporary workspaces, contractor yards, and staging areas in the acreage calculations for each facility.

However, the additional temporary workspaces, access roads, contractor yards and staging areas are also reported separately.

b/ Soils characterized by the NRCS as having representative slopes of 15 percent or greater.

c/ As designated by the NRCS.

d/ As designated by the NRCS.

e/ Based on K factor for the whole soil (Kw), the representative slope, and the nonirrigated land capability rating; a Kw rating of "moderate" was elevated to "high" when associated with steep slopes and when the Nonirrigated Capability Subclass included an "e," which indicates that erosion is a potential hazard for the soil type.

f/ Based on the Wind Erodibility Group scale; soils with a rating of 1 to 4 were ranked with a high potential for erosion due to wind.

g/ Based on 1) soils with poor drainage (somewhat poorly drained to poorly drained), 2) a high clay content (greater than 20 percent), or 3) a surface soil texture characterized as sandy clay loam or dominated by finer particles.

h/ Based on soils 1) that have a surface texture of sandy loam or coarser, 2) are somewhat excessively drained to excessively drained, 3) have slopes greater than 15 percent, or 4) have severe limitations (i.e., a Nonirrigated Capability Class of 3 or higher).

Sources: Soil Survey Staff 2015a, 2015b

Attachment 7-3

Table 7.3-1R

(Revised April 20, 2016)

Characteristics of Soils Affected by the Project* (Construction/Temporary Impact Areas)

Facility <u>a/</u>	County	Total Area (acres)	Slopes ≥ 15 percent <u>b/</u> (acres)	Designated Farmland <u>c/</u>		Hydric Soils <u>d/</u> (acres)	Shallow Depth to Groundwater <u>d/</u> (acres)	Stony / Rocky Soils <u>d/</u> (acres)	Poor Drainage Potential <u>d/</u> (acres)	Soils Prone to Erosion		Soils Prone to Soil Compaction <u>g/</u> (acres)	Poor Revegetation Potential <u>h/</u> (acres)
				Prime (acres)	Statewide Importance (acres)					By Water <u>e/</u> (acres)	By Wind <u>f/</u> (acres)		
H-305 Pipeline	Greene/PA	2.16	1.01	0	1.00	0	0	0	0	2.00	0	2.02	2.15
H-316 Pipeline	Greene/PA	42.22	6.10	5.43	7.24	0.32	0.32	0.00	0.32	20.61	0	25.82	35.07
H-318 Pipeline	Allegheny, Washington/PA	69.43	14.41	8.14	19.81	0.27	0.27	10.61	0.27	51.77	0	21.90	56.20
H-319 Pipeline	Wetzel/WV	0.51	0	0	0.51	0	0	0.51	0	0	0	0	0
H-158/M-80 Pipelines	Greene/PA	8.32	2.65	1.55	2.11	0	0	0	0	0.70	0	3.44	6.86
Pratt Compressor Station	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Redhook Compressor Station	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Webster Interconnect	Wetzel/WV	1.65	0.01	0	1.65	0.05	0.05	1.65	0	0.01	0	0	0.01
Mobley Tap Site (H-306)	Wetzel/WV	0.12	0	0	0.12	0.00	0.00	0.12	0	0	0	0	0
Applegate L/R Site	Allegheny/PA	0	0	0	0	0	0	0	0	0	0	0	0
Hartson L/R Site (H-148)	Washington/PA	0	0	0	0	0	0	0	0	0	0	0	0
H-302 Tap L/R Site	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Total Acres		124.42	24.18	15.13	32.44	0.64	0.64	12.89	0.59	75.10	0	53.18	100.29
Percent of Total Acres			19%	12%	26%	0.52%	2.65%	10%	0.47%	60%	0%	43%	81%

* The values in each row do not necessarily add up to the total acreage for each facility, because of minor rounding or mapping inconsistencies.

a/ The list of facilities includes the associated access roads, additional temporary workspaces, contractor yards, and staging areas in the acreage calculations for each facility.

However, the additional temporary workspaces, access roads, contractor yards and staging areas are also reported separately.

b/ Soils characterized by the NRCS as having representative slopes of 15 percent or greater.

c/ As designated by the NRCS.

d/ As designated by the NRCS.

e/ Based on K factor for the whole soil (Kw), the representative slope, and the nonirrigated land capability rating; a Kw rating of "moderate" was elevated to "high" when associated with steep slopes and when the Nonirrigated Capability Subclass included an "e," which indicates that erosion is a potential hazard for the soil type.

f/ Based on the Wind Erodibility Group scale; soils with a rating of 1 to 4 were ranked with a high potential for erosion due to wind.

g/ Based on 1) soils with poor drainage (somewhat poorly drained to poorly drained), 2) a high clay content (greater than 20 percent), or 3) a surface soil texture characterized as sandy clay loam or dominated by finer particles.

h/ Based on soils 1) that have a surface texture of sandy loam or coarser, 2) are somewhat excessively drained to excessively drained, 3) have slopes greater than 15 percent, or 4) have severe limitations (i.e., a Nonirrigated Capability Class of 3 or higher).

Sources: Soil Survey Staff 2015a, 2015b

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Attachment 7-3
Table 7.3-1R
(Revised April 20, 2016)

Characteristics of Soils Affected by the Project* (Additional Temporary Work Space)

Facility <u>a</u> /	County	Total Area (acres)	Slopes \geq 15 percent <u>b</u> / (acres)	Designated Farmland <u>c</u> /		Hydric Soils <u>d</u> / (acres)	Shallow Depth to Groundwater <u>d</u> / (acres)	Stony / Rocky Soils <u>d</u> / (acres)	Poor Drainage Potential <u>d</u> / (acres)	Soils Prone to Erosion		Soils Prone to Soil Compaction <u>g</u> / (acres)	Poor Revegetation Potential <u>h</u> / (acres)
				Prime (acres)	Statewide Importance (acres)					By Water <u>e</u> / (acres)	By Wind <u>f</u> / (acres)		
H-305 Pipeline	Greene/PA	1.01	0.82	0	0.19	0	0	0	0	0.19	0	0.19	1.01
H-316 Pipeline	Greene/PA	20.43	1.42	2.21	2.85	0.02	0.02	0	0.02	6.20	0	16.82	18.23
H-318 Pipeline	Allegheny, Washington/PA	44.44	12.49	3.70	12.96	0.01	0.01	5.39	0.01	31.73	0	15.41	34.27
H-319 Pipeline	Wetzel/WV	0.34	0	0	0.34	0	0	0.34	0	0	0	0	0
H-158/M-80 Pipelines	Greene/PA	3.87	1.45	0.76	1.86	0	0	0	0	2.21	0	3.87	3.12
Pratt Compressor Station	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Redhook Compressor Station	Greene/PA	1.50	0	0	0.92	0	0	0	0	0	0	1.50	1.50
Webster Interconnect	Wetzel/WV	1.55	0.02	0	1.53	0	0	0.02	0	0.02	0	1.53	0.02
Mobley Tap Site (H-306)	Wetzel/WV	0.11	0	0	0.11	0	0	0.11	0	0	0	0.11	0
Applegate L/R Site	Allegheny/PA	0	0	0	0	0	0	0	0	0	0	0	0
Hartson L/R Site (H-148)	Washington/PA	0	0	0	0	0	0	0	0	0	0	0	0
H-302 Tap L/R Site	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Total Acres		73.25	16.20	6.67	20.76	0.03	0.03	5.86	0.03	40.35	0	39.43	58.15
Percent of Total Acres			22%	9%	28%	0.04%	0.19%	8%	0.04%	55%	0%	54%	79%

* The values in each row do not necessarily add up to the total acreage for each facility, because of minor rounding or mapping inconsistencies.

a/ The list of facilities includes the associated access roads, additional temporary workspaces, contractor yards, and staging areas in the acreage calculations for each facility.

However, the additional temporary workspaces, access roads, contractor yards and staging areas are also reported separately.

b/ Soils characterized by the NRCS as having representative slopes of 15 percent or greater.

c/ As designated by the NRCS.

d/ As designated by the NRCS.

e/ Based on K factor for the whole soil (Kw), the representative slope, and the nonirrigated land capability rating; a Kw rating of "moderate" was elevated to "high" when associated with steep slopes and when the Nonirrigated Capability Subclass included an "e," which indicates that erosion is a potential hazard for the soil type.

f/ Based on the Wind Erodibility Group scale; soils with a rating of 1 to 4 were ranked with a high potential for erosion due to wind.

g/ Based on 1) soils with poor drainage (somewhat poorly drained to poorly drained), 2) a high clay content (greater than 20 percent), or 3) a surface soil texture characterized as sandy clay loam or dominated by finer particles.

h/ Based on soils 1) that have a surface texture of sandy loam or coarser, 2) are somewhat excessively drained to excessively drained, 3) have slopes greater than 15 percent, or 4) have severe limitations (i.e., a Nonirrigated Capability Class of 3 or higher).

Sources: Soil Survey Staff 2015a, 2015b

Attachment 7-3

Table 7.3-1R

(Revised April 20, 2016)

Characteristics of Soils Affected by the Project* (Access Roads)

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Facility <u>a/</u>	County	Total Area (acres)	Slopes ≥ 15 percent <u>b/</u> (acres)	Designated Farmland <u>c/</u>		Hydric Soils <u>d/</u> (acres)	Shallow Depth to Groundwater <u>d/</u> (acres)	Stony / Rocky Soils <u>d/</u> (acres)	Poor Drainage Potential <u>d/</u> (acres)	Soils Prone to Erosion		Soils Prone to Soil Compaction <u>g/</u> (acres)	Poor Revegetation Potential <u>h/</u> (acres)
				Prime (acres)	Statewide Importance (acres)					By Water <u>e/</u> (acres)	By Wind <u>f/</u> (acres)		
H-305 Pipeline	Greene/PA	0.52	0.34	0	0	0	0	0	0	0	0	0.52	0.52
H-316 Pipeline	Greene/PA	3.43	1.21	0.68	0.82	0	0	0	0	2.34	0	2.64	2.37
H-318 Pipeline	Allegheny, Washington/PA	3.80	0.80	1.32	0.44	0	0	0.93	0	2.26	0	2.63	3.53
H-319 Pipeline	Wetzel/WV	0.02	0	0	0.02	0	0	0.02	0	0	0	0	0
H-158/M-80 Pipelines	Greene/PA	0.49	0.22	0	0.26	0	0	0	0	0.22	0	0.49	0.56
Pratt Compressor Station	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Redhook Compressor Station	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Webster Interconnect	Wetzel/WV	0.12	0	0	0.12	0	0	0.12	0	0	0	0	0
Mobley Tap Site (H-306)	Wetzel/WV	0	0	0	0	0	0	0	0	0	0	0	0
Applegate L/R Site	Allegheny/PA	0	0	0	0	0	0	0	0	0	0	0	0
Hartson L/R Site (H-148)	Washington/PA	0	0	0	0	0	0	0	0	0	0	0	0
H-302 Tap L/R Site	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Total Acres		8.38	2.57	2.00	1.66	0.00	0.00	1.07	0.00	4.82	0	6.28	6.98
Percent of Total Acres			31%	24%	20%	0.00%	0.00%	13%	0.00%	58%	0%	75%	83%

* The values in each row do not necessarily add up to the total acreage for each facility, because of minor rounding or mapping inconsistencies.

a/ The list of facilities includes the associated access roads, additional temporary workspaces, contractor yards, and staging areas in the acreage calculations for each facility.

However, the additional temporary workspaces, access roads, contractor yards and staging areas are also reported separately.

b/ Soils characterized by the NRCS as having representative slopes of 15 percent or greater.

c/ As designated by the NRCS.

d/ As designated by the NRCS.

e/ Based on K factor for the whole soil (Kw), the representative slope, and the nonirrigated land capability rating; a Kw rating of "moderate" was elevated to "high" when associated with steep slopes and when the Nonirrigated Capability Subclass included an "e," which indicates that erosion is a potential hazard for the soil type.

f/ Based on the Wind Erodibility Group scale; soils with a rating of 1 to 4 were ranked with a high potential for erosion due to wind.

g/ Based on 1) soils with poor drainage (somewhat poorly drained to poorly drained), 2) a high clay content (greater than 20 percent), or 3) a surface soil texture characterized as sandy clay loam or dominated by finer particles.

h/ Based on soils 1) that have a surface texture of sandy loam or coarser, 2) are somewhat excessively drained to excessively drained, 3) have slopes greater than 15 percent, or 4) have severe limitations (i.e., a Nonirrigated Capability Class of 3 or higher).

Sources: Soil Survey Staff 2015a, 2015b

Attachment 7-3
Table 7.3-1R
(Revised April 20, 2016)

Characteristics of Soils Affected by the Project* (Contractor Yards and Staging Areas)

Facility <u>a/</u>	County	Total Area (acres)	Slopes \geq 15 percent <u>b/</u> (acres)	Designated Farmland <u>c/</u>		Hydric Soils <u>d/</u> (acres)	Shallow Depth to Groundwater <u>d/</u> (acres)	Stony / Rocky Soils <u>d/</u> (acres)	Poor Drainage Potential <u>d/</u> (acres)	Soils Prone to Erosion		Soils Prone to Soil Compaction <u>g/</u> (acres)	Poor Revegetation Potential <u>h/</u> (acres)
				Prime (acres)	Statewide Importance (acres)					By Water <u>e/</u> (acres)	By Wind <u>f/</u> (acres)		
H-305 Pipeline	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
H-316 Pipeline	Greene/PA	1.82	0	0	1.82	0	0	0	0	0	0	1.82	1.82
H-318 Pipeline	Allegheny, Washington/PA	6.21	2.19	0.37	0.12	0	0	0	0	0.37	0	3.41	5.84
H-319 Pipeline	Wetzel/WV	0.25	0	0	0.25	0	0	0	0	0	0	0	0
H-158/M-80 Pipelines	Greene/PA	3.34	1.45	0.76	0.71	0	0	0	0	2.21	0	2.16	2.59
Pratt Compressor Station	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Redhook Compressor Station	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Webster Interconnect	Wetzel/WV	0	0	0	0	0	0	0	0	0	0	0	0
Mobley Tap Site (H-306)	Wetzel/WV	0	0	0	0	0	0	0	0	0	0	0	0
Applegate L/R Site	Allegheny/PA	0	0	0	0	0	0	0	0	0	0	0	0
Hartson L/R Site (H-148)	Washington/PA	0	0	0	0	0	0	0	0	0	0	0	0
H-302 Tap L/R Site	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Total Acres		11.62	3.64	1.13	2.90	0	0	0	0	2.58	0	7.39	10.25
Percent of Total Acres			31%	10%	25%	0%	0%	0%	0%	22%	0%	64%	88%

* The values in each row do not necessarily add up to the total acreage for each facility, because of minor rounding or mapping inconsistencies.

a/ The list of facilities includes the associated access roads, additional temporary workspaces, contractor yards, and staging areas in the acreage calculations for each facility.

However, the additional temporary workspaces, access roads, contractor yards and staging areas are also reported separately.

b/ Soils characterized by the NRCS as having representative slopes of 15 percent or greater.

c/ As designated by the NRCS.

d/ As designated by the NRCS.

e/ Based on K factor for the whole soil (Kw), the representative slope, and the nonirrigated land capability rating; a Kw rating of "moderate" was elevated to "high" when associated with steep slopes and when the Nonirrigated Capability Subclass included an "e," which indicates that erosion is a potential hazard for the soil type.

f/ Based on the Wind Erodibility Group scale; soils with a rating of 1 to 4 were ranked with a high potential for erosion due to wind.

g/ Based on 1) soils with poor drainage (somewhat poorly drained to poorly drained), 2) a high clay content (greater than 20 percent), or 3) a surface soil texture characterized as sandy clay loam or dominated by finer particles.

h/ Based on soils 1) that have a surface texture of sandy loam or coarser, 2) are somewhat excessively drained to excessively drained, 3) have slopes greater than 15 percent, or 4) have severe limitations (i.e., a Nonirrigated Capability Class of 3 or higher).

Sources: Soil Survey Staff 2015a, 2015b

Appendix 7-AR
(Revised April 20, 2016)
Soil Map Units by Milepost

Milepost Start	Milepost End	Distance Crossed (miles)	Map Unit Symbol	Map Unit Name	Slopes ≥ 15%	Prime Farmland	Farmland of Statewide Importance	Hydric Soils	Shallow Depth to Groundwater	Stony/ Rocky Soils	Poor Drainage Potential	Soils Prone to Erosion by Water	Soils Prone to Compaction	Poor Revegetation Potential
H-158/M-80 Pilelines														
0.00	0.03	0.03	CaD	Calvin silt loam, 15 to 25 percent slopes	1.57	0	0	0	0	0	0	1.57	1.57	1.57
0.03	0.06	0.03	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	1.08	0	0	0	0	0	0	0	0	1.08
0.06	0.09	0.03	Nw	Newark silt loam	0	0	2.51	0	0	0	0	0	2.51	2.51
0.09	0.13	0.04	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	1.43	0	0	0	0	0	0	0	0	1.43
0.13	0.18	0.05	DaD	Dekalb channery loam, 15 to 25 percent slopes	1.59	0	0	0	0	0	0	1.59	0	1.59
0.18	0.24	0.06	DaB	Dekalb channery loam, 3 to 8 percent slopes	0	1.71	0	0	0	0	0	1.71	0	0
H-305 Pipeline														
0.00	0.00	0.00	GdB	Glenford silt loam, 3 to 8 percent slopes	0	0.02	0	0	0	0	0	0.02	0.02	0
0.00	0.09	0.09	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	1.28	0	0	0	0	1.28	1.28	1.28
0.09	0.10	0.01	DtD	Dunmore channery silt loam, 15 to 25 percent slopes	1.29	0	0	0	0	0	0	0	1.29	1.29
H-316 Pipeline														
0.00	0.00	0.00	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0	0	0	0	0	0	0	0
0.00	0.05	0.04	GdB	Glenford silt loam, 3 to 8 percent slopes	0	1.12	0	0	0	0	0	1.12	1.12	0
0.05	0.06	0.01	DaB	Dekalb channery loam, 3 to 8 percent slopes	0	0.15	0	0	0	0	0	0.15	0	0
0.06	0.11	0.05	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.81	0	0	0	0	0	0	0.81	0	0.81
0.11	0.15	0.04	Du	Dunning silt loam	0	0	0	0.63	0.63	0	0.63	0	0.63	0.63
0.15	0.20	0.05	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	1.4	0	0	0	0	0	0	0	0	1.4
0.20	0.24	0.04	DtD	Dunmore channery silt loam, 15 to 25 percent slopes	0.43	0	0	0	0	0	0	0	0.43	0.43
0.24	0.27	0.03	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.49	0	0	0	0	0	0	0.49	0	0.49
0.27	0.48	0.22	DtD	Dunmore channery silt loam, 15 to 25 percent slopes	2.39	0	0	0	0	0	0	0	2.39	2.39
0.48	0.51	0.03	WeB	Westmoreland silt loam, 3 to 8 percent slopes	0	0.48	0	0	0	0	0	0.48	0.48	0.48
0.51	0.64	0.12	DtD	Dunmore channery silt loam, 15 to 25 percent slopes	1.3	0	0	0	0	0	0	0	1.3	1.3
0.64	0.91	0.27	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	4.34	0	0	0	0	4.34	4.34	4.34
0.91	0.97	0.06	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.98	0	0	0	0	0	0	0.98	0	0.98
0.97	1.02	0.04	UdB	Udorthents, smoothed, gently sloping	0	0	0	0	0	0	0	0	0.9	0.9
1.02	1.10	0.09	DaD	Dekalb channery loam, 15 to 25 percent slopes	1.47	0	0	0	0	0	0	1.47	0	1.47
1.10	1.20	0.10	DaB	Dekalb channery loam, 3 to 8 percent slopes	0	1.45	0	0	0	0	0	1.45	0	0
1.20	1.23	0.03	DaC	Dekalb channery loam, 8 to 15 percent slopes	0	0	0.62	0	0	0	0	0.62	0	0.62
1.23	1.27	0.04	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.65	0	0	0	0	0	0	0.65	0	0.65
1.27	1.33	0.07	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	1.97	0	0	0	0	0	0	0	0	1.97
1.33	1.34	0.01	W	Water	-	-	-	-	-	-	-	-	-	-
1.34	1.35	0.01	Nw	Newark silt loam	0	0	0.07	0	0	0	0	0	0.07	0.07
1.35	1.39	0.04	GdB	Glenford silt loam, 3 to 8 percent slopes	0	1.12	0	0	0	0	0	1.12	1.12	0
1.39	1.45	0.06	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.98	0	0	0	0	0	0	0.98	0	0.98
1.45	1.49	0.04	DaC	Dekalb channery loam, 8 to 15 percent slopes	0	0	0.83	0	0	0	0	0.83	0	0.83
1.49	1.56	0.07	DaF	Dekalb channery loam, 35 to 65 percent slopes	1.59	0	0	0	0	0	0	1.59	0	1.59
1.56	1.61	0.05	AgB	Allegheny silt loam, 3 to 8 percent slopes	0	0	0	0	0	0	0	0.45	0.45	0
1.61	1.64	0.02	AgC	Allegheny silt loam, 8 to 15 percent slopes	0	0	0.36	0	0	0	0	0.36	0.36	0.36
1.64	1.67	0.04	DaF	Dekalb channery loam, 35 to 65 percent slopes	0.91	0	0	0	0	0	0	0.91	0	0.91
1.67	1.71	0.04	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.65	0	0	0	0	0	0	0.65	0	0.65
1.71	1.74	0.03	AgC	Allegheny silt loam, 8 to 15 percent slopes	0	0	0.54	0	0	0	0	0.54	0.54	0.54
1.74	1.80	0.05	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	1.4	0	0	0	0	0	0	0	0	1.4
1.80	1.82	0.02	DaC	Dekalb channery loam, 8 to 15 percent slopes	0	0	0.41	0	0	0	0	0.41	0	0.41
1.82	1.85	0.03	DaF	Dekalb channery loam, 35 to 65 percent slopes	0.68	0	0	0	0	0	0	0.68	0	0.68
1.85	1.97	0.12	AgB	Allegheny silt loam, 3 to 8 percent slopes	0	0	0	0	0	0	0	1.07	1.07	0
1.97	2.05	0.08	DaB	Dekalb channery loam, 3 to 8 percent slopes	0	1.16	0	0	0	0	0	1.16	0	0
2.05	2.08	0.03	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.84	0	0	0	0	0	0	0	0	0.84
2.08	2.14	0.05	GdB	Glenford silt loam, 3 to 8 percent slopes	0	1.4	0	0	0	0	0	1.4	1.4	0
2.14	2.18	0.04	WeD	Westmoreland silt loam, 15 to 25 percent slopes	0	0	0	0	0	0	0	0	0	0
2.18	2.26	0.08	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	2.25	0	0	0	0	0	0	0	0	2.25

Appendix 7-AR
(Revised April 20, 2016)
Soil Map Units by Milepost

Milepost Start	Milepost End	Distance Crossed (miles)	Map Unit Symbol	Map Unit Name	Slopes ≥ 15%	Prime Farmland	Farmland of Statewide Importance	Hydric Soils	Shallow Depth to Groundwater	Stony/ Rocky Soils	Poor Drainage Potential	Soils Prone to Erosion by Water	Soils Prone to Compaction	Poor Revegetation Potential
2.26	2.28	0.02	W	Water	-	-	-	-	-	-	-	-	-	-
2.28	2.38	0.10	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	2.81	0	0	0	0	0	0	0	0	2.81
2.38	2.46	0.08	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	1.29	0	0	0	0	1.29	1.29	1.29
2.46	2.56	0.10	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	2.81	0	0	0	0	0	0	0	0	2.81
2.56	2.58	0.01	DtD	Dunmore channery silt loam, 15 to 25 percent slopes	0.11	0	0	0	0	0	0	0	0.11	0.11
2.58	2.61	0.04	BoB	Brooke silty clay loam, 3 to 8 percent slopes	0	0	0	0	0	0	0	0	0	0
2.61	2.73	0.11	DtD	Dunmore channery silt loam, 15 to 25 percent slopes	1.19	0	0	0	0	0	0	0	1.19	1.19
2.73	2.79	0.06	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	1.69	0	0	0	0	0	0	0	0	1.69
2.79	2.83	0.04	GdB	Glenford silt loam, 3 to 8 percent slopes	0	1.12	0	0	0	0	0	1.12	1.12	0
2.83	2.97	0.14	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	4.49	0	0	0	0	0	0	0	0	4.49
H-318 Pipeline														
0.00	0.07	0.07	GuB	Guernsey silt loam, 3 to 8 percent slopes	0	1.92	0	0	0	0	0	1.92	1.92	0
0.07	0.12	0.05	CuD	Culleoka-Dormont-Urban land complex, 15 to 25 percent slopes	0.7	0	0	0	0	0	0	0.7	0.7	0.7
0.12	0.22	0.10	GuC	Guernsey silt loam, 8 to 15 percent slopes	0	0	2.91	0	0	0	0	2.91	0	0
0.22	0.23	0.00	CuD	Culleoka-Dormont-Urban land complex, 15 to 25 percent slopes	0	0	0	0	0	0	0	0	0	0
0.23	0.29	0.06	GuD	Guernsey silt loam, 15 to 25 percent slopes	1.92	0	0	0	0	0	0	1.92	1.92	1.92
0.29	0.36	0.07	CuD	Culleoka-Dormont-Urban land complex, 15 to 25 percent slopes	0.98	0	0	0	0	0	0	0.98	0.98	0.98
0.36	0.61	0.25	GuC	Guernsey silt loam, 8 to 15 percent slopes	0	0	7.28	0	0	0	0	7.28	0	0
0.61	0.70	0.09	GuD	Guernsey silt loam, 15 to 25 percent slopes	2.87	0	0	0	0	0	0	2.87	2.87	2.87
0.70	0.75	0.05	GuC	Guernsey silt loam, 8 to 15 percent slopes	0	0	1.46	0	0	0	0	1.46	0	0
0.75	0.80	0.05	GSF	Gilpin, Weikert, and Culleoka shaly silt loams, very steep	1.14	0	0	0	0	1.14	0	1.14	0	1.14
0.80	0.91	0.11	GuC	Guernsey silt loam, 8 to 15 percent slopes	0	0	3.21	0	0	0	0	3.21	0	0
0.91	1.02	0.11	CuD	Culleoka-Dormont-Urban land complex, 15 to 25 percent slopes	1.53	0	0	0	0	0	0	1.53	1.53	1.53
1.02	1.09	0.07	GSF	Gilpin, Weikert, and Culleoka shaly silt loams, very steep	1.6	0	0	0	0	1.6	0	1.6	0	1.6
1.09	1.17	0.08	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	1.56	0	0	0	0	1.56	1.56	1.56
1.17	1.23	0.06	CuD	Culleoka-Dormont-Urban land complex, 15 to 25 percent slopes	0.84	0	0	0	0	0	0	0.84	0.84	0.84
1.23	1.29	0.05	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0.97	0	0	0	0	0.97	0.97	0.97
1.29	1.34	0.06	CwD	Culleoka-Westmoreland silt loams, 15 to 25 percent slopes	0.72	0	0	0	0	0	0	0.72	0.72	0.72
1.34	1.38	0.04	DoB	Dormont silt loam, 3 to 8 percent slopes	0	0.58	0	0	0	0	0	0.58	0.58	0
1.38	1.43	0.04	DoD	Dormont silt loam, 15 to 25 percent slopes	0.52	0	0	0	0	0	0	0.52	0.52	0.52
1.43	1.52	0.10	DoB	Dormont silt loam, 3 to 8 percent slopes	0	1.45	0	0	0	0	0	1.45	1.45	0
1.52	1.56	0.04	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0.78	0	0	0	0	0.78	0.78	0.78
1.56	1.61	0.05	DoD	Dormont silt loam, 15 to 25 percent slopes	0.48	0	0	0	0	0	0	0.48	0.48	0.48
1.61	1.68	0.07	DoE	Dormont silt loam, 25 to 35 percent slopes	2.04	0	0	0	0	0	0	2.04	2.04	2.04
1.68	1.75	0.07	GSF	Gilpin, Weikert, and Culleoka shaly silt loams, very steep	1.6	0	0	0	0	1.6	0	1.6	0	1.6
1.75	1.81	0.06	SmF	Strip mines, 25 to 75 percent slopes	1.23	0	0	0	0	1.23	0	1.23	1.23	1.23
1.81	1.90	0.08	CwC	Culleoka-Westmoreland silt loams, 8 to 15 percent slopes	0	0	0.88	0	0	0	0	0.88	0	0.88
1.90	2.00	0.10	RaB	Rayne silt loam, 3 to 8 percent slopes	0	2.39	0	0	0	0	0	0	2.39	2.39
2.00	2.17	0.17	AgB	Allegheny silt loam, 3 to 8 percent slopes	0	0	0	0	0	0	0	1.52	1.52	0
2.17	2.20	0.03	SmF	Strip mines, 25 to 75 percent slopes	0.62	0	0	0	0	0.62	0	0.62	0.62	0.62
2.20	2.27	0.07	RaB	Rayne silt loam, 3 to 8 percent slopes	0	1.67	0	0	0	0	0	0	1.67	1.67
2.27	2.37	0.10	SmF	Strip mines, 25 to 75 percent slopes	2.05	0	0	0	0	2.05	0	2.05	2.05	2.05
2.37	2.64	0.26	SmD	Strip mines, 8 to 25 percent slopes	0	0	0	0	0	4.06	0	0	4.06	4.06
2.64	2.68	0.04	SmF	Strip mines, 25 to 75 percent slopes	0.82	0	0	0	0	0.82	0	0.82	0.82	0.82
2.68	2.75	0.07	GQF	Gilpin-Upshur complex, very steep	1.14	0	0	0	0	0	0	1.14	1.14	1.14
2.75	2.80	0.05	RaB	Rayne silt loam, 3 to 8 percent slopes	0	1.2	0	0	0	0	0	0	1.2	1.2
2.80	2.81	0.01	GQF	Gilpin-Upshur complex, very steep	0.16	0	0	0	0	0	0	0.16	0.16	0.16
2.81	2.85	0.05	URB	Urban land-Rainsboro complex, gently sloping	0	0	0	0	0	0	0	1.83	0	0
2.85	2.89	0.04	RaB	Rayne silt loam, 3 to 8 percent slopes	0	0.96	0	0	0	0	0	0	0.96	0.96
2.89	2.95	0.06	RaA	Rainsboro silt loam, 0 to 3 percent slopes	0	0.37	0	0	0	0	0	0	0.37	0
2.95	3.12	0.17	W	Water	-	-	-	-	-	-	-	-	-	-

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Appendix 7-AR (Revised April 20, 2016) Soil Map Units by Milepost														
Milepost Start	Milepost End	Distance Crossed (miles)	Map Unit Symbol	Map Unit Name	Slopes ≥ 15%	Prime Farmland	Farmland of Statewide Importance	Hydric Soils	Shallow Depth to Groundwater	Stony/ Rocky Soils	Poor Drainage Potential	Soils Prone to Erosion by Water	Soils Prone to Compaction	Poor Revegetation Potential
3.12	3.21	0.09	Us	Udorthents, smoothed	0	0.69	0	0	0	0	0	0	0	0
3.21	3.25	0.04	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.57	0	0	0	0	0	0	0	0	0.57
3.25	3.36	0.11	CaC	Calvin silt loam, 8 to 15 percent slopes	0	0	1.87	0	0	0	0	1.87	1.87	1.87
3.36	3.49	0.13	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	1.86	0	0	0	0	0	0	0	0	1.86
3.49	3.62	0.13	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	2.53	0	0	0	0	2.53	2.53	2.53
3.62	3.65	0.03	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.43	0	0	0	0	0	0	0	0	0.43
3.65	3.71	0.06	WeB	Westmoreland silt loam, 3 to 8 percent slopes	0	1.08	0	0	0	0	0	1.08	1.08	1.08
3.71	3.73	0.02	WeC	Westmoreland silt loam, 8 to 15 percent slopes	0	0	0.48	0	0	0	0	0.48	0.48	0.48
3.73	3.76	0.03	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.43	0	0	0	0	0	0	0	0	0.43
3.76	3.77	0.01	CaC	Calvin silt loam, 8 to 15 percent slopes	0	0	0.17	0	0	0	0	0.17	0.17	0.17
3.77	3.83	0.06	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	1.17	0	0	0	0	1.17	1.17	1.17
3.83	3.83	0.00	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0	0	0	0	0	0	0	0	0	0
3.83	3.89	0.06	CaC	Calvin silt loam, 8 to 15 percent slopes	0	0	1.02	0	0	0	0	1.02	1.02	1.02
3.89	3.90	0.02	CaD	Calvin silt loam, 15 to 25 percent slopes	0.45	0	0	0	0	0	0	0.45	0.45	0.45
3.90	3.95	0.05	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0.97	0	0	0	0	0.97	0.97	0.97
3.95	4.01	0.06	CaD	Calvin silt loam, 15 to 25 percent slopes	1.36	0	0	0	0	0	0	1.36	1.36	1.36
4.01	4.08	0.07	CaB	Calvin silt loam, 3 to 8 percent slopes	0	0	0.92	0	0	0	0	0.92	0.92	0.92
4.08	4.20	0.12	CaD	Calvin silt loam, 15 to 25 percent slopes	2.73	0	0	0	0	0	0	2.73	2.73	2.73
4.20	4.25	0.05	Fa	Fairplay (marl) silt loam	0	0	0	0.54	0.54	0	0.54	0	0	0.54
4.25	4.27	0.02	WeD	Westmoreland silt loam, 15 to 25 percent slopes	0	0.81	0	0	0	0	0	0.81	0.81	0.81
H-319 Pipeline														
0.00	0.04	0.04	Sk	Skidmore gravelly loam	0	0	0.84	0	0	0.84	0	0	0	0
Sources: Soil Survey Staff 2015a, 2015b, and as designated by the NRCS. The values in each column do not necessarily add up to the total acreage for each facility, because of minor rounding or mapping inconsistencies. Soil limitations are reported in acres.														

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Appendix 7-A (Revised April 20, 2016) Soil Map Units by Milepost (Operation/Permanent Impact Areas)														
Milepost Start	Milepost End	Distance Crossed (miles)	Map Unit Symbol	Map Unit Name	Slopes ≥ 15%	Prime Farmland	Farmland of Statewide Importance	Hydric Soils	Shallow Depth to Groundwater	Stony/ Rocky Soils	Poor Drainage Potential	Soils Prone to Erosion by Water	Soils Prone to Compaction	Poor Revegetation Potential
H-158/M-80 Pilelines														
0.00	0.03	0.03	CaD	Calvin silt loam, 15 to 25 percent slopes	0.25	0	0	0	0	0	0	0.25	0.25	0.25
0.03	0.06	0.03	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.17	0	0	0	0	0	0	0	0	0.17
0.06	0.09	0.03	Nw	Newark silt loam	0	0	0.40	0	0	0	0	0	0.40	0.40
0.09	0.13	0.04	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.23	0	0	0	0	0	0	0	0	0.23
0.13	0.18	0.05	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.25	0	0	0	0	0	0	0.25	0	0.25
0.18	0.24	0.06	DaB	Dekalb channery loam, 3 to 8 percent slopes	0	0.27	0	0	0	0	0	0.27	0	0
H-305 Pipeline														
0.00	0.00	0.00	GdB	Glenford silt loam, 3 to 8 percent slopes	0	0	0	0	0	0	0	0	0	0
0.00	0.09	0.09	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0.28	0	0	0	0	0.28	0.28	0.28
0.09	0.10	0.01	DtD	Dunmore channery silt loam, 15 to 25 percent slopes	0.28	0	0	0	0	0	0	0	0.28	0.28
H-316 Pipeline														
0.00	0.00	0.00	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0	0	0	0	0	0	0	0
0.00	0.05	0.04	GdB	Glenford silt loam, 3 to 8 percent slopes	0	0.30	0	0	0	0	0	0.30	0.30	0
0.05	0.06	0.01	DaB	Dekalb channery loam, 3 to 8 percent slopes	0	0.04	0	0	0	0	0	0.04	0	0
0.06	0.11	0.05	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.22	0	0	0	0	0	0	0.22	0	0.22
0.11	0.15	0.04	Du	Dunning silt loam	0	0	0	0.17	0.17	0	0.17	0	0.17	0.17
0.15	0.20	0.05	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.38	0	0	0	0	0	0	0	0	0.38
0.20	0.24	0.04	DtD	Dunmore channery silt loam, 15 to 25 percent slopes	0.12	0	0	0	0	0	0	0	0.12	0.12
0.24	0.27	0.03	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.13	0	0	0	0	0	0	0.13	0	0.13
0.27	0.48	0.22	DtD	Dunmore channery silt loam, 15 to 25 percent slopes	0.65	0	0	0	0	0	0	0	0.65	0.65
0.48	0.51	0.03	WeB	Westmoreland silt loam, 3 to 8 percent slopes	0	0.13	0	0	0	0	0	0.13	0.13	0.13
0.51	0.64	0.12	DtD	Dunmore channery silt loam, 15 to 25 percent slopes	0.35	0	0	0	0	0	0	0	0.35	0.35
0.64	0.91	0.27	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	1.17	0	0	0	0	1.17	1.17	1.17
0.91	0.97	0.06	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.26	0	0	0	0	0	0	0.26	0	0.26
0.97	1.02	0.04	UdB	Udorthents, smoothed, gently sloping	0	0	0	0	0	0	0	0	0.24	0.24
1.02	1.10	0.09	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.40	0	0	0	0	0	0	0.40	0	0.40
1.10	1.20	0.10	DaB	Dekalb channery loam, 3 to 8 percent slopes	0	0.39	0	0	0	0	0	0.39	0	0
1.20	1.23	0.03	DaC	Dekalb channery loam, 8 to 15 percent slopes	0	0	0.17	0	0	0	0	0.17	0	0.17
1.23	1.27	0.04	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.18	0	0	0	0	0	0	0.18	0	0.18
1.27	1.33	0.07	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.53	0	0	0	0	0	0	0	0	0.53
1.33	1.34	0.01	W	Water	-	-	-	-	-	-	-	-	-	-
1.34	1.35	0.01	Nw	Newark silt loam	0	0	0.02	0	0	0	0	0	0.02	0.02
1.35	1.39	0.04	GdB	Glenford silt loam, 3 to 8 percent slopes	0	0.30	0	0	0	0	0	0.30	0.30	0
1.39	1.45	0.06	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.26	0	0	0	0	0	0	0.26	0	0.26
1.45	1.49	0.04	DaC	Dekalb channery loam, 8 to 15 percent slopes	0	0	0.22	0	0	0	0	0.22	0	0.22
1.49	1.56	0.07	DaF	Dekalb channery loam, 35 to 65 percent slopes	0.43	0	0	0	0	0	0	0.43	0	0.43
1.56	1.61	0.05	AgB	Allegheny silt loam, 3 to 8 percent slopes	0	0	0	0	0	0	0	0.12	0.12	0
1.61	1.64	0.02	AgC	Allegheny silt loam, 8 to 15 percent slopes	0	0	0.10	0	0	0	0	0.10	0.10	0.10
1.64	1.67	0.04	DaF	Dekalb channery loam, 35 to 65 percent slopes	0.25	0	0	0	0	0	0	0.25	0	0.25
1.67	1.71	0.04	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.18	0	0	0	0	0	0	0.18	0	0.18
1.71	1.74	0.03	AgC	Allegheny silt loam, 8 to 15 percent slopes	0	0	0.15	0	0	0	0	0.15	0.15	0.15
1.74	1.80	0.05	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.38	0	0	0	0	0	0	0	0	0.38
1.80	1.82	0.02	DaC	Dekalb channery loam, 8 to 15 percent slopes	0	0	0.11	0	0	0	0	0.11	0	0.11
1.82	1.85	0.03	DaF	Dekalb channery loam, 35 to 65 percent slopes	0.18	0	0	0	0	0	0	0.18	0	0.18
1.85	1.97	0.12	AgB	Allegheny silt loam, 3 to 8 percent slopes	0	0	0	0	0	0	0	0.29	0.29	0
1.97	2.05	0.08	DaB	Dekalb channery loam, 3 to 8 percent slopes	0	0.31	0	0	0	0	0	0.31	0	0
2.05	2.08	0.03	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.23	0	0	0	0	0	0	0	0	0.23
2.08	2.14	0.05	GdB	Glenford silt loam, 3 to 8 percent slopes	0	0.4	0	0	0	0	0	1.4	1.4	0
2.14	2.18	0.04	WeD	Westmoreland silt loam, 15 to 25 percent slopes	0	0	0	0	0	0	0	0	0	0
2.18	2.26	0.08	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.61	0	0	0	0	0	0	0	0	0.61

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Appendix 7-A (Revised April 20, 2016) Soil Map Units by Milepost (Operation/Permanent Impact Areas)														
Milepost Start	Milepost End	Distance Crossed (miles)	Map Unit Symbol	Map Unit Name	Slopes ≥ 15%	Prime Farmland	Farmland of Statewide Importance	Hydric Soils	Shallow Depth to Groundwater	Stony/Rocky Soils	Poor Drainage Potential	Soils Prone to Erosion by Water	Soils Prone to Compaction	Poor Revegetation Potential
2.26	2.28	0.02	W	Water	-	-	-	-	-	-	-	-	-	-
2.28	2.38	0.10	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.76	0	0	0	0	0	0	0	0	0.76
2.38	2.46	0.08	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0.35	0	0	0	0	0.35	0.35	0.35
2.46	2.56	0.10	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.76	0	0	0	0	0	0	0	0	0.76
2.56	2.58	0.02	DtF	Dunmore channery silt loam, 15 to 25 percent slopes	0.03	0	0	0	0	0	0	0	0.03	0.03
2.58	2.61	0.04	BoB	Brooke silty clay loam, 3 to 8 percent slopes	0	0	0	0	0	0	0	0	0	0
2.61	2.73	0.11	DtD	Dunmore channery silt loam, 15 to 25 percent slopes	0.32	0	0	0	0	0	0	0	0.32	0.32
2.73	2.79	0.06	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.46	0	0	0	0	0	0	0	0	0.46
2.79	2.83	0.04	GdB	Glenford silt loam, 3 to 8 percent slopes	0	0.30	0	0	0	0	0	0.30	0.30	0
2.83	2.97	0.14	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	1.21	0	0	0	0	0	0	0	0	1.21
H-318 Pipeline														
0.00	0.07	0.07	GuB	Guernsey silt loam, 3 to 8 percent slopes	0	0.48	0	0	0	0	0	0.48	0.48	0
0.07	0.12	0.05	CuD	Culleoka-Dormont-Urban land complex, 15 to 25 percent slopes	0.18	0	0	0	0	0	0	0.7	0.7	0.7
0.12	0.22	0.10	GuC	Guernsey silt loam, 8 to 15 percent slopes	0	0	0.73	0	0	0	0	0.73	0	0
0.22	0.23	0.00	CuD	Culleoka-Dormont-Urban land complex, 15 to 25 percent slopes	0	0	0	0	0	0	0	0	0	0
0.23	0.29	0.06	GuD	Guernsey silt loam, 15 to 25 percent slopes	0.48	0	0	0	0	0	0	0.48	0.48	0.48
0.29	0.36	0.07	CuD	Culleoka-Dormont-Urban land complex, 15 to 25 percent slopes	0.25	0	0	0	0	0	0	0.25	0.25	0.25
0.36	0.61	0.25	GuC	Guernsey silt loam, 8 to 15 percent slopes	0	0	1.82	0	0	0	0	1.82	0	0
0.61	0.70	0.09	GuD	Guernsey silt loam, 15 to 25 percent slopes	0.72	0	0	0	0	0	0	0.72	0.72	0.72
0.70	0.75	0.05	GuC	Guernsey silt loam, 8 to 15 percent slopes	0	0	0.37	0	0	0	0	0.37	0	0
0.75	0.80	0.05	GSF	Gilpin, Weikert, and Culleoka shaly silt loams, very steep	0.29	0	0	0	0	0.29	0	0.29	0	0.29
0.80	0.91	0.11	GuC	Guernsey silt loam, 8 to 15 percent slopes	0	0	0.80	0	0	0	0	0.80	0	0
0.91	1.02	0.11	CuD	Culleoka-Dormont-Urban land complex, 15 to 25 percent slopes	0.38	0	0	0	0	0	0	0.38	0.38	0.38
1.02	1.09	0.07	GSF	Gilpin, Weikert, and Culleoka shaly silt loams, very steep	0.4	0	0	0	0	0.4	0	0.4	0	0.4
1.09	1.17	0.08	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0.39	0	0	0	0	0.39	0.39	0.39
1.17	1.23	0.06	CuD	Culleoka-Dormont-Urban land complex, 15 to 25 percent slopes	0.21	0	0	0	0	0	0	0.21	0.21	0.21
1.23	1.29	0.05	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0.24	0	0	0	0	0.24	0.24	0.24
1.29	1.34	0.06	CwD	Culleoka-Westmoreland silt loams, 15 to 25 percent slopes	0.18	0	0	0	0	0	0	0.18	0.18	0.18
1.34	1.38	0.04	DoB	Dormont silt loam, 3 to 8 percent slopes	0	0.15	0	0	0	0	0	0.15	0.15	0
1.38	1.43	0.04	DoD	Dormont silt loam, 15 to 25 percent slopes	0.13	0	0	0	0	0	0	0.13	0.13	0.13
1.43	1.52	0.10	DoB	Dormont silt loam, 3 to 8 percent slopes	0	0.36	0	0	0	0	0	0.36	0.36	0
1.52	1.56	0.04	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0.20	0	0	0	0	0.20	0.20	0.20
1.56	1.61	0.05	DoD	Dormont silt loam, 15 to 25 percent slopes	0.12	0	0	0	0	0	0	0.12	0.12	0.12
1.61	1.68	0.07	DoE	Dormont silt loam, 25 to 35 percent slopes	0.51	0	0	0	0	0	0	0.51	0.51	0.51
1.68	1.75	0.07	GSF	Gilpin, Weikert, and Culleoka shaly silt loams, very steep	0.4	0	0	0	0	0.4	0	0.4	0	0.4
1.75	1.81	0.06	SmF	Strip mines, 25 to 75 percent slopes	0.31	0	0	0	0	0.31	0	0.31	0.31	0.31
1.81	1.90	0.08	CwC	Culleoka-Westmoreland silt loams, 8 to 15 percent slopes	0	0	0.22	0	0	0	0	0.22	0	0.22
1.90	2.00	0.10	RaB	Rayne silt loam, 3 to 8 percent slopes	0	0.60	0	0	0	0	0	0	0.60	0.60
2.00	2.17	0.17	AgB	Allegheny silt loam, 3 to 8 percent slopes	0	0	0	0	0	0	0	0.38	0.38	0
2.17	2.20	0.03	SmF	Strip mines, 25 to 75 percent slopes	0.16	0	0	0	0	0.16	0	0.16	0.16	0.16
2.20	2.27	0.07	RaB	Rayne silt loam, 3 to 8 percent slopes	0	0.42	0	0	0	0	0	0	0.42	0.42
2.27	2.37	0.10	SmF	Strip mines, 25 to 75 percent slopes	0.51	0	0	0	0	0.51	0	0.51	0.51	0.51
2.37	2.64	0.26	SmD	Strip mines, 8 to 25 percent slopes	0	0	0	0	0	1.02	0	0	1.02	1.02
2.64	2.68	0.04	SmF	Strip mines, 25 to 75 percent slopes	0.21	0	0	0	0	0.21	0	0.21	0.21	0.21
2.68	2.75	0.07	GQF	Gilpin-Upshur complex, very steep	0.29	0	0	0	0	0	0	0.29	0.29	0.29
2.75	2.80	0.05	RaB	Rayne silt loam, 3 to 8 percent slopes	0	0.3	0	0	0	0	0	0	0.3	0.3
2.80	2.81	0.01	GQF	Gilpin-Upshur complex, very steep	0.04	0	0	0	0	0	0	0.04	0.04	0.04
2.81	2.85	0.05	URB	Urban land-Rainsboro complex, gently sloping	0	0	0	0	0	0	0	0.46	0	0
2.85	2.89	0.04	RaB	Rayne silt loam, 3 to 8 percent slopes	0	0.24	0	0	0	0	0	0	0.24	0.24
2.89	2.95	0.06	RaA	Rainsboro silt loam, 0 to 3 percent slopes	0	0.09	0	0	0	0	0	0	0.09	0
2.95	3.12	0.17	W	Water	-	-	-	-	-	-	-	-	-	-

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Appendix 7-A (Revised April 20, 2016) Soil Map Units by Milepost (Operation/Permanent Impact Areas)														
Milepost Start	Milepost End	Distance Crossed (miles)	Map Unit Symbol	Map Unit Name	Slopes ≥ 15%	Prime Farmland	Farmland of Statewide Importance	Hydric Soils	Shallow Depth to Groundwater	Stony/ Rocky Soils	Poor Drainage Potential	Soils Prone to Erosion by Water	Soils Prone to Compaction	Poor Revegetation Potential
3.12	3.21	0.09	Us	Udorthents, smoothed	0	0.17	0	0	0	0	0	0	0	0
3.21	3.25	0.04	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.14	0	0	0	0	0	0	0	0	0.14
3.25	3.36	0.11	CaC	Calvin silt loam, 8 to 15 percent slopes	0	0	0.47	0	0	0	0	0.47	0.47	0.47
3.36	3.49	0.13	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.47	0	0	0	0	0	0	0	0	0.47
3.49	3.62	0.13	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0.63	0	0	0	0	0.63	0.63	0.63
3.62	3.65	0.03	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.11	0	0	0	0	0	0	0	0	0.11
3.65	3.71	0.06	WeB	Westmoreland silt loam, 3 to 8 percent slopes	0		0	0	0	0	0	0.27	1.08	1.08
3.71	3.73	0.02	WeC	Westmoreland silt loam, 8 to 15 percent slopes	0	0	0.12	0	0	0	0	0.12	0.12	0.12
3.73	3.76	0.03	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.11	0	0	0	0	0	0	0	0	0.11
3.76	3.77	0.01	CaC	Calvin silt loam, 8 to 15 percent slopes	0	0	0.04	0	0	0	0	0.04	0.04	0.04
3.77	3.83	0.06	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0.29	0	0	0	0	0.29	0.29	0.29
3.83	3.83	0.00	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0	0	0	0	0	0	0	0	0	0
3.83	3.89	0.06	CaC	Calvin silt loam, 8 to 15 percent slopes	0	0	0.26	0	0	0	0	0.26	0.26	0.26
3.89	3.90	0.02	CaD	Calvin silt loam, 15 to 25 percent slopes	0.11	0	0	0	0	0	0	0.11	0.11	0.11
3.90	3.95	0.05	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0.24	0	0	0	0	0.24	0.24	0.24
3.95	4.01	0.06	CaD	Calvin silt loam, 15 to 25 percent slopes	0.34	0	0	0	0	0	0	0.34	0.34	0.34
4.01	4.08	0.07	CaB	Calvin silt loam, 3 to 8 percent slopes	0	0	0.23	0	0	0	0	0.23	0.23	0.23
4.08	4.20	0.12	CaD	Calvin silt loam, 15 to 25 percent slopes	0.68	0	0	0	0	0	0	0.68	0.68	0.68
4.20	4.25	0.05	Fa	Fairplay (marl) silt loam	0	0	0	0.14	0.14	0	0.14	0	0	0.14
4.25	4.27	0.02	WeD	Westmoreland silt loam, 15 to 25 percent slopes	0	0.20	0	0	0	0	0	0.20	0.20	0.20
H-319 Pipeline														
0.00	0.04	0.04	Sk	Skidmore gravelly loam	0	0	0.84	0	0	0.84	0	0	0	0
Sources: Soil Survey Staff 2015a, 2015b, and as designated by the NRCS. The values in each column do not necessarily add up to the total acreage for each facility, because of minor rounding or mapping inconsistencies. Soil limitations are reported in acres.														

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Appendix 7-A (Revised April 20, 2016) Soil Map Units by Milepost (Construction/Temporary Impact Areas)														
Milepost Start	Milepost End	Distance Crossed (miles)	Map Unit Symbol	Map Unit Name	Slopes ≥ 15%	Prime Farmland	Farmland of Statewide Importance	Hydric Soils	Shallow Depth to Groundwater	Stony/Rocky Soils	Poor Drainage Potential	Soils Prone to Erosion by Water	Soils Prone to Compaction	Poor Revegetation Potential
H-158/M-80 Pilelines														
0.00	0.03	0.03	CaD	Calvin silt loam, 15 to 25 percent slopes	1.32	0	0	0	0	0	0	1.32	1.32	1.32
0.03	0.06	0.03	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.91	0	0	0	0	0	0	0	0	1.08
0.06	0.09	0.03	Nw	Newark silt loam	0	0	2.11	0	0	0	0	0	2.11	2.11
0.09	0.13	0.04	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	1.20	0	0	0	0	0	0	0	0	1.20
0.13	0.18	0.05	DaD	Dekalb channery loam, 15 to 25 percent slopes	1.34	0	0	0	0	0	0	1.34	0	1.34
0.18	0.24	0.06	DaB	Dekalb channery loam, 3 to 8 percent slopes	0	1.44	0	0	0	0	0	1.44	0	0
H-305 Pipeline														
0.00	0.00	0.00	GdB	Glenford silt loam, 3 to 8 percent slopes	0	0.02	0	0	0	0	0	0.02	0.02	0
0.00	0.09	0.09	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	1.00	0	0	0	0	1.00	1.00	1.00
0.09	0.10	0.01	DtD	Dunmore channery silt loam, 15 to 25 percent slopes	1.01	0	0	0	0	0	0	0	1.01	1.01
H-316 Pipeline														
0.00	0.00	0.00	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0	0	0	0	0	0	0	0
0.00	0.05	0.04	GdB	Glenford silt loam, 3 to 8 percent slopes	0	0.82	0	0	0	0	0	0.82	0.82	0
0.05	0.06	0.01	DaB	Dekalb channery loam, 3 to 8 percent slopes	0	0.12	0	0	0	0	0	0.12	0	0
0.06	0.11	0.05	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.59	0	0	0	0	0	0	0.59	0	0.59
0.11	0.15	0.04	Du	Dunning silt loam	0	0	0	0.46	0.46	0	0.46	0	0.46	0.46
0.15	0.20	0.05	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	1.02	0	0	0	0	0	0	0	0	1.02
0.20	0.24	0.04	DtD	Dunmore channery silt loam, 15 to 25 percent slopes	0.31	0	0	0	0	0	0	0	0.31	0.31
0.24	0.27	0.03	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.36	0	0	0	0	0	0	0.36	0	0.36
0.27	0.48	0.22	DtD	Dunmore channery silt loam, 15 to 25 percent slopes	1.74	0	0	0	0	0	0	0	1.74	1.74
0.48	0.51	0.03	WeB	Westmoreland silt loam, 3 to 8 percent slopes	0	0.35	0	0	0	0	0	0.35	0.35	0.35
0.51	0.64	0.12	DtD	Dunmore channery silt loam, 15 to 25 percent slopes	0.95	0	0	0	0	0	0	0	0.95	0.95
0.64	0.91	0.27	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	3.17	0	0	0	0	3.17	3.17	3.17
0.91	0.97	0.06	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.72	0	0	0	0	0	0	0.72	0	0.72
0.97	1.02	0.04	UdB	Udorthents, smoothed, gently sloping	0	0	0	0	0	0	0	0	0.66	0.9
1.02	1.10	0.09	DaD	Dekalb channery loam, 15 to 25 percent slopes	1.07	0	0	0	0	0	0	1.07	0	1.07
1.10	1.20	0.10	DaB	Dekalb channery loam, 3 to 8 percent slopes	0	1.06	0	0	0	0	0	1.06	0	0
1.20	1.23	0.03	DaC	Dekalb channery loam, 8 to 15 percent slopes	0	0	0.45	0	0	0	0	0.45	0	0.45
1.23	1.27	0.04	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.47	0	0	0	0	0	0	0.47	0	0.47
1.27	1.33	0.07	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	1.44	0	0	0	0	0	0	0	0	1.44
1.33	1.34	0.01	W	Water	-	-	-	-	-	-	-	-	-	-
1.34	1.35	0.01	Nw	Newark silt loam	0	0	0.05	0	0	0	0	0	0.05	0.05
1.35	1.39	0.04	GdB	Glenford silt loam, 3 to 8 percent slopes	0	0.82	0	0	0	0	0	0.82	0.82	0
1.39	1.45	0.06	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.72	0	0	0	0	0	0	0.72	0	0.72
1.45	1.49	0.04	DaC	Dekalb channery loam, 8 to 15 percent slopes	0	0	0.61	0	0	0	0	0.61	0	0.61
1.49	1.56	0.07	DaF	Dekalb channery loam, 35 to 65 percent slopes	1.16	0	0	0	0	0	0	1.16	0	1.16
1.56	1.61	0.05	AgB	Allegheny silt loam, 3 to 8 percent slopes	0	0	0	0	0	0	0	0.33	0.33	0
1.61	1.64	0.02	AgC	Allegheny silt loam, 8 to 15 percent slopes	0	0	0.26	0	0	0	0	0.26	0.26	0.26
1.64	1.67	0.04	DaF	Dekalb channery loam, 35 to 65 percent slopes	0.66	0	0	0	0	0	0	0.66	0	0.66
1.67	1.71	0.04	DaD	Dekalb channery loam, 15 to 25 percent slopes	0.47	0	0	0	0	0	0	0.47	0	0.65
1.71	1.74	0.03	AgC	Allegheny silt loam, 8 to 15 percent slopes	0	0	0.39	0	0	0	0	0.39	0.39	0.39
1.74	1.80	0.05	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	1.02	0	0	0	0	0	0	0	0	1.02
1.80	1.82	0.02	DaC	Dekalb channery loam, 8 to 15 percent slopes	0	0	0.30	0	0	0	0	0.30	0	0.30
1.82	1.85	0.03	DaF	Dekalb channery loam, 35 to 65 percent slopes	0.50	0	0	0	0	0	0	0.50	0	0.50
1.85	1.97	0.12	AgB	Allegheny silt loam, 3 to 8 percent slopes	0	0	0	0	0	0	0	0.78	0.78	0
1.97	2.05	0.08	DaB	Dekalb channery loam, 3 to 8 percent slopes	0	0.85	0	0	0	0	0	0.85	0	0
2.05	2.08	0.03	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.61	0	0	0	0	0	0	0	0	0.61
2.08	2.14	0.05	GdB	Glenford silt loam, 3 to 8 percent slopes	0	1.02	0	0	0	0	0	1.02	1.02	0
2.14	2.18	0.04	WeD	Westmoreland silt loam, 15 to 25 percent slopes	0	0	0	0	0	0	0	0	0	0
2.18	2.26	0.08	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	1.64	0	0	0	0	0	0	0	0	1.64
2.26	2.28	0.02	W	Water	-	-	-	-	-	-	-	-	-	-
2.28	2.38	0.10	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	2.05	0	0	0	0	0	0	0	0	2.05
2.38	2.46	0.08	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0.94	0	0	0	0	0.94	0.94	0.94
2.46	2.56	0.10	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	2.05	0	0	0	0	0	0	0	0	2.05
2.56	2.58	0.01	DtD	Dunmore channery silt loam, 15 to 25 percent slopes	0.08	0	0	0	0	0	0	0	0.08	0.08
2.58	2.61	0.04	BoB	Brooke silty clay loam, 3 to 8 percent slopes	0	0	0	0	0	0	0	0	0	0
2.61	2.73	0.11	DtD	Dunmore channery silt loam, 15 to 25 percent slopes	0.87	0	0	0	0	0	0	0	0.87	0.87
2.73	2.79	0.06	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	1.23	0	0	0	0	0	0	0	0	1.23
2.79	2.83	0.04	GdB	Glenford silt loam, 3 to 8 percent slopes	0	0.82	0	0	0	0	0	0.82	0.82	0
2.83	2.97	0.14	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	3.28	0	0	0	0	0	0	0	0	3.28
H-318 Pipeline														
0.00	0.07	0.07	GuB	Guernsey silt loam, 3 to 8 percent slopes	0	1.44	0	0	0	0	0	1.44	1.44	0
0.07	0.12	0.05	CuD	Culleoka-Dormont-Urban land complex, 15 to 25 percent slopes	0.53	0	0	0	0	0	0	0.53	0.53	0.53
0.12	0.22	0.10	GuC	Guernsey silt loam, 8 to 15 percent slopes	0	0	2.18	0	0	0	0	2.18	0	0
0.22	0.23	0.00	CuD	Culleoka-Dormont-Urban land complex, 15 to 25 percent slopes	0	0	0	0	0	0	0	0	0	0
0.23	0.29	0.06	GuD	Guernsey silt loam, 15 to 25 percent slopes	1.44	0	0	0	0	0	0	1.44	1.44	1.44

Appendix 7-A (Revised April 20, 2016) Soil Map Units by Milepost (Construction/Temporary Impact Areas)														
Milepost Start	Milepost End	Distance Crossed (miles)	Map Unit Symbol	Map Unit Name	Slopes ≥ 15%	Prime Farmland	Farmland of Statewide Importance	Hydric Soils	Shallow Depth to Groundwater	Stony/Rocky Soils	Poor Drainage Potential	Soils Prone to Erosion by Water	Soils Prone to Compaction	Poor Revegetation Potential
0.29	0.36	0.07	CuD	Culleoka-Dormont-Urban land complex, 15 to 25 percent slopes	0.74	0	0	0	0	0	0	0.74	0.74	0.74
0.36	0.61	0.25	GuC	Guernsey silt loam, 8 to 15 percent slopes	0	0	5.46	0	0	0	0	5.46	0	0
0.61	0.70	0.09	GuD	Guernsey silt loam, 15 to 25 percent slopes	2.15	0	0	0	0	0	0	2.15	2.15	2.15
0.70	0.75	0.05	GuC	Guernsey silt loam, 8 to 15 percent slopes	0	0	1.10	0	0	0	0	1.10	0	0
0.75	0.80	0.05	GSF	Gilpin, Weikert, and Culleoka shaly silt loams, very steep	0.86	0	0	0	0	0.86	0	0.86	0	0.86
0.80	0.91	0.11	GuC	Guernsey silt loam, 8 to 15 percent slopes	0	0	2.41	0	0	0	0	2.41	0	0
0.91	1.02	0.11	CuD	Culleoka-Dormont-Urban land complex, 15 to 25 percent slopes	1.15	0	0	0	0	0	0	1.15	1.15	1.15
1.02	1.09	0.07	GSF	Gilpin, Weikert, and Culleoka shaly silt loams, very steep	1.2	0	0	0	0	1.2	0	1.2	0	1.2
1.09	1.17	0.08	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	1.17	0	0	0	0	1.17	1.17	1.17
1.17	1.23	0.06	CuD	Culleoka-Dormont-Urban land complex, 15 to 25 percent slopes	0.63	0	0	0	0	0	0	0.63	0.63	0.63
1.23	1.29	0.05	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0.73	0	0	0	0	0.73	0.73	0.73
1.29	1.34	0.06	CwD	Culleoka-Westmoreland silt loams, 15 to 25 percent slopes	0.54	0	0	0	0	0	0	0.54	0.54	0.54
1.34	1.38	0.04	DoB	Dormont silt loam, 3 to 8 percent slopes	0	0.44	0	0	0	0	0	0.44	0.44	0
1.38	1.43	0.04	DoD	Dormont silt loam, 15 to 25 percent slopes	0.39	0	0	0	0	0	0	0.39	0.39	0.39
1.43	1.52	0.10	DoB	Dormont silt loam, 3 to 8 percent slopes	0	1.09	0	0	0	0	0	1.09	1.09	0
1.52	1.56	0.04	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0.59	0	0	0	0	0.59	0.59	0.59
1.56	1.61	0.05	DoD	Dormont silt loam, 15 to 25 percent slopes	0.36	0	0	0	0	0	0	0.36	0.36	0.36
1.61	1.68	0.07	DoE	Dormont silt loam, 25 to 35 percent slopes	1.53	0	0	0	0	0	0	1.53	1.53	1.53
1.68	1.75	0.07	GSF	Gilpin, Weikert, and Culleoka shaly silt loams, very steep	1.2	0	0	0	0	1.2	0	1.2	0	1.2
1.75	1.81	0.06	SmF	Strip mines, 25 to 75 percent slopes	0.92	0	0	0	0	0.92	0	0.92	0.92	0.92
1.81	1.90	0.08	CwC	Culleoka-Westmoreland silt loams, 8 to 15 percent slopes	0	0	0.66	0	0	0	0	0.66	0	0.66
1.90	2.00	0.10	RaB	Rayne silt loam, 3 to 8 percent slopes	0	1.79	0	0	0	0	0	0	1.79	1.79
2.00	2.17	0.17	AgB	Allegheny silt loam, 3 to 8 percent slopes	0	0	0	0	0	0	0	0.86	0.86	0
2.17	2.20	0.03	SmF	Strip mines, 25 to 75 percent slopes	0.47	0	0	0	0	0.47	0	0.47	0.47	0.47
2.20	2.27	0.07	RaB	Rayne silt loam, 3 to 8 percent slopes	0	1.25	0	0	0	0	0	0	1.25	1.25
2.27	2.37	0.10	SmF	Strip mines, 25 to 75 percent slopes	1.54	0	0	0	0	1.54	0	1.54	1.54	1.54
2.37	2.64	0.26	SmD	Strip mines, 8 to 25 percent slopes	0	0	0	0	0	3.05	0	0	3.05	3.05
2.64	2.68	0.04	SmF	Strip mines, 25 to 75 percent slopes	0.62	0	0	0	0	0.62	0	0.62	0.62	0.62
2.68	2.75	0.07	GQF	Gilpin-Upshur complex, very steep	0.86	0	0	0	0	0	0	0.86	0.86	0.86
2.75	2.80	0.05	RaB	Rayne silt loam, 3 to 8 percent slopes	0	0.9	0	0	0	0	0	0	0.9	0.9
2.80	2.81	0.01	GQF	Gilpin-Upshur complex, very steep	0.12	0	0	0	0	0	0	0.12	0.12	0.12
2.81	2.85	0.05	URB	Urban land-Rainsboro complex, gently sloping	0	0	0	0	0	0	0	1.37	0	0
2.85	2.89	0.04	RaB	Rayne silt loam, 3 to 8 percent slopes	0	0.72	0	0	0	0	0	0	0.72	0.72
2.89	2.95	0.06	RaA	Rainsboro silt loam, 0 to 3 percent slopes	0	0.28	0	0	0	0	0	0	0.28	0
2.95	3.12	0.17	W	Water	-	-	-	-	-	-	-	-	-	-
3.12	3.21	0.09	Us	Udorthents, smoothed	0	0.52	0	0	0	0	0	0	0	0
3.21	3.25	0.04	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.43	0	0	0	0	0	0	0	0	0.43
3.25	3.36	0.11	CaC	Calvin silt loam, 8 to 15 percent slopes	0	0	1.40	0	0	0	0	1.40	1.40	1.40
3.36	3.49	0.13	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	1.40	0	0	0	0	0	0	0	0	1.40
3.49	3.62	0.13	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	1.90	0	0	0	0	1.90	1.90	1.90
3.62	3.65	0.03	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.32	0	0	0	0	0	0	0	0	0.32
3.65	3.71	0.06	WeB	Westmoreland silt loam, 3 to 8 percent slopes	0	0.81	0	0	0	0	0	0.81	0.81	0.81
3.71	3.73	0.02	WeC	Westmoreland silt loam, 8 to 15 percent slopes	0	0	0.36	0	0	0	0	0.36	0.36	0.36
3.73	3.76	0.03	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.32	0	0	0	0	0	0	0	0	0.32
3.76	3.77	0.01	CaC	Calvin silt loam, 8 to 15 percent slopes	0	0	0.13	0	0	0	0	0.13	0.13	0.13
3.77	3.83	0.06	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0.88	0	0	0	0	0.88	0.88	0.88
3.83	3.83	0.00	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0	0	0	0	0	0	0	0	0	0
3.83	3.89	0.06	CaC	Calvin silt loam, 8 to 15 percent slopes	0	0	0.77	0	0	0	0	0.77	0.77	0.77
3.89	3.90	0.02	CaD	Calvin silt loam, 15 to 25 percent slopes	0.34	0	0	0	0	0	0	0.34	0.34	0.34
3.90	3.95	0.05	DoC	Dormont silt loam, 8 to 15 percent slopes	0	0	0.73	0	0	0	0	0.73	0.73	0.73
3.95	4.01	0.06	CaD	Calvin silt loam, 15 to 25 percent slopes	1.02	0	0	0	0	0	0	1.02	1.02	1.02
4.01	4.08	0.07	CaB	Calvin silt loam, 3 to 8 percent slopes	0	0	0.69	0	0	0	0	0.69	0.69	0.69
4.08	4.20	0.12	CaD	Calvin silt loam, 15 to 25 percent slopes	2.05	0	0	0	0	0	0	2.05	2.05	2.05
4.20	4.25	0.05	Fa	Fairplay (marl) silt loam	0	0	0	0.41	0.41	0	0.41	0	0	0.41
4.25	4.27	0.02	WeD	Westmoreland silt loam, 15 to 25 percent slopes	0	0.61	0	0	0	0	0	0.61	0.61	0.61
H-319 Pipeline														
0.00	0.04	0.04	Sk	Skidmore gravelly loam	0	0	0	0	0	0	0	0	0	0
Sources: Soil Survey Staff 2015a, 2015b, and as designated by the NRCS. The values in each column do not necessarily add up to the total acreage for each facility, because of minor rounding or mapping inconsistencies. Soil limitations are reported in acres.														

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Attachment 7-4 Appendix 7-BR (Revised April 20, 2016) Soil Map Units at Aboveground Facilities														
Soil Map Unit Symbol	Soil Map Unit Name	Temporary Impact		Permanent Impact		Designated Farmland	Slopes ≥ 15%	Hydric Soils	Shallow Depth to Groundwater	Stony/ Rocky Soils	Poor Drainage Potential	Soils Prone to Erosion by Water	Soils Prone to Compaction	Poor Revegetation Potential
		Acres	Percent of Site	Acres	Percent of Site									
Pratt Compressor Station														
DaD	Dekalb channery loam, 15 to 25 percent slopes	1.61	21	1.61	21	Not Prime Farmland	1.61	0	0	0	0	1.61	0	1.61
Hu	Huntington silt loam	5.96	78	5.96	78	Prime Farmland	0	0	0	0	0	0	5.96	0
Nw	Newark silt loam	0.1	1	0.1	1	Farmland of Statewide Importance	0	0	0	0	0	0	0.1	0.1
W	Water	0.01	<0.01	0.01	<0.01	-	-	-	-	-	-	-	-	-
Pratt CS Total (acres)		7.68		7.68										
Redhook Compressor Station														
DaB	Dekalb channery loam, 3 to 8 percent slopes	3.08	17	3.08	17	Farmland of Statewide Importance	0	0	0	0	0	3.08	0	0
DaD	Dekalb channery loam, 15 to 25 percent slopes	1.68	9	1.68	9	Not Prime Farmland	1.68	0	0	0	0	1.68	0	1.68
DoC	Dormont silt loam, 8 to 15 percent slopes	6	34	6	34	Farmland of Statewide Importance	0	0	0	0	0	6	6	6
DiD	Dunmore channery silt loam, 15 to 25 percent slopes	0.14	1	0.14	1	Not Prime Farmland	0.14	0	0	0	0	0	0.14	0.14
DiF	Dormont-Culleoka complex, 25 to 50 percent slopes	1.35	8	1.35	8	Not Prime Farmland	1.35	0	0	0	0	0	0	1.35
GdB	Glenford silt loam, 3 to 8 percent slopes	5.5	31	5.5	31	Prime Farmland	0	0	0	0	0	5.5	5.5	0
Redhook CS Total (acres)		17.75		17.75										
Webster Interconnect														
GpF	Gilpin-Peabody complex, 35 to 70 percent slopes	0.02	<0.01	0.02	<0.01	Not Prime Farmland	0.02	0	0	0	0	0.02	0	0.02
Sk	Skidmore gravelly loam	2.46	>99	2.46	>99	Farmland of Statewide Importance	0	0	0	2.46	0	0	0	0
Webster Interconnect Total (acres)		2.48		2.48										
Mobley Tap Site (H-306)														
Sk	Skidmore gravelly loam	0.5	100	0.5	100	Farmland of Statewide Importance	0	0	0	0.5	0	0	0	0
Mobley Tap Site (acres)		0.5		0.5										
Applegate L/R Site														
Gub	Guernsey silt loam, 3 to 8 percent slopes	0.39	100	0.39	100	Prime Farmland	0	0	0	0	0	0.39	0.39	0
Applegate L/R Site (acres)		0.39		0.39										
Hartson L/R Site (H-148)														
WeD	Westmoreland silt loam, 15 to 25 percent slopes	0.11	100	0.11	100	Not Prime Farmland	0.11	0	0	0	0	0.11	0.11	0.11
Hartson L/R Site (acres)		0.11		0.11										
H-302 Tap L/R Site														
DiF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.33	100	0.33	100	Not Prime Farmland	0.33	0	0	0	0	0	0	0.33
H-302 Tap L/R Site (acres)		0.33		0.33										
Soil limitations are reported in acres. Sources: Soil Survey Staff 2015a, 2015b, and as designated by the NRCS.														

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Attachment 7-4 Appendix 7-BR (Revised April 20, 2016) Soil Map Units of Additional Temporary Work Spaces Associated with the Aboveground Facilities														
Soil Map Unit Symbol	Soil Map Unit Name	Temporary Impact		Permanent Impact		Designated Farmland	Slopes ≥ 15%	Hydric Soils	Shallow Depth to Groundwater	Stony/ Rocky Soils	Poor Drainage Potential	Soils Prone to Erosion by Water	Soils Prone to Compaction	Poor Revegetation Potential
		Acres	Percent of Site	Acres	Percent of Site									
Pratt Compressor Station														
		0	0	0	0		0	0	0	0	0	0	0	0
Pratt CS Total (acres)		0		0										
Redhook Compressor Station														
DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.58	0.39	0.58	0.39	Not Prime Farmland	0.58	0	0	0	0	0	0.58	0.58
Nw	Newark silt loam	0.92	0.61	0.92	0.61	Farmland of Statewide Importance	0	0	0	0	0	0	0.92	0.92
Redhook CS Total (acres)		1.5		1.5										
Webster Interconnect														
GpF	Gilpin-Peabody complex, 35 to 70 percent slopes	0.02	0.01	0.02	0.01	Not Prime Farmland	0.01	0	0	0	0	0.01	0	0.01
Sk	Skidmore gravelly loam	1.53	99	1.53	99	Farmland of Statewide Importance	0	0	0	1.53	0	0	0	0
Webster Interconnect Total (acres)		1.55		1.55										
Mobley Tap Site (H-306)														
Sk	Skidmore gravelly loam	0.11	100	0.11	100	Farmland of Statewide Importance	0	0	0	0.11	0	0	0	0
Mobley Tap Site (acres)		0.11		0.11										
Applegate L/R Site														
		0	0	0	0		0	0	0	0	0	0	0	0
Applegate L/R Site (acres)		0		0										
Hartson L/R Site (H-148)														
		0	0	0	0		0	0	0	0	0	0	0	0
Hartson L/R Site (acres)		0		0										
H-302 Tap L/R Site														
		0	0	0	0		0	0	0	0	0	0	0	0
H-302 Tap L/R Site (acres)		0		0										
Soil limitations are reported in acres. Sources: Soil Survey Staff 2015a, 2015b, and as designated by the NRCS.														

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Attachment 7-4 Appendix 7-BR (Revised April 20, 2016) Soil Map Units of the Access Roads Associated with the Aboveground Facilities														
Soil Map Unit Symbol	Soil Map Unit Name	Temporary Impact		Permanent Impact		Designated Farmland	Slopes ≥ 15%	Hydric Soils	Shallow Depth to Groundwater	Stony/ Rocky Soils	Poor Drainage Potential	Soils Prone to Erosion by Water	Soils Prone to Compaction	Poor Revegetation Potential
		Acres	Percent of Site	Acres	Percent of Site									
Pratt Compressor Station														
		0	0	0	0		0	0	0	0	0	0	0	0
Pratt CS Total (acres)		0		0										
Redhook Compressor Station														
		0	0.00	0	0.00		0	0	0	0	0	0	0	0
Redhook CS Total (acres)		0		0										
Webster Interconnect														
Sk	Skidmore gravelly loam	0.12	100	0.12	100	Farmland of Statewide Importance	0	0	0	0.12	0	0	0	0
Webster Interconnect Total (acres)		0.12		0.12										
Mobley Tap Site (H-306)														
		0	0	0	0		0	0	0	0	0	0	0	0
Mobley Tap Site (acres)		0		0										
Applegate L/R Site														
		0	0	0	0		0	0	0	0	0	0	0	0
Applegate L/R Site (acres)		0		0										
Hartson L/R Site (H-148)														
		0	0	0	0		0	0	0	0	0	0	0	0
Hartson L/R Site (acres)		0		0										
H-302 Tap L/R Site														
		0	0	0	0		0	0	0	0	0	0	0	0
H-302 Tap L/R Site (acres)		0		0										
Soil limitations are reported in acres. Sources: Soil Survey Staff 2015a, 2015b, and as designated by the NRCS.														

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Attachment 7-4 Appendix 7-BR (Revised April 20, 2016) Soil Map Units of Contractor Yards and Staging Areas Associated with the Aboveground Facilities														
Soil Map Unit Symbol	Soil Map Unit Name	Temporary Impact		Permanent Impact		Designated Farmland	Slopes ≥ 15%	Hydric Soils	Shallow Depth to Groundwater	Stony/ Rocky Soils	Poor Drainage Potential	Soils Prone to Erosion by Water	Soils Prone to Compaction	Poor Revegetation Potential
		Acres	Percent of Site	Acres	Percent of Site									
Pratt Compressor Station														
		0	0	0	0		0	0	0	0	0	0	0	0
Pratt CS Total (acres)		0		0										
Redhook Compressor Station														
		0	0	0	0		0	0	0	0	0	0	0	0
Redhook CS Total (acres)		0		0										
Webster Interconnect														
		0	0	0	0		0	0	0	0	0	0	0	0
Webster Interconnect Total (acres)		0		0										
Mobley Tap Site (H-306)														
		0	0	0	0		0	0	0	0	0	0	0	0
Mobley Tap Site (acres)		0		0										
Applegate L/R Site														
		0	0	0	0		0	0	0	0	0	0	0	0
Applegate L/R Site (acres)		0		0										
Hartson L/R Site (H-148)														
		0	0	0	0		0	0	0	0	0	0	0	0
Hartson L/R Site (acres)		0		0										
H-302 Tap L/R Site														
		0	0	0	0		0	0	0	0	0	0	0	0
H-302 Tap L/R Site (acres)		0		0										
Soil limitations are reported in acres. Sources: Soil Survey Staff 2015a, 2015b, and as designated by the NRCS.														

Appendix 7-C
(Revised April 20, 2016)

Potential Contaminated Sites within 0.25 Miles of the Project*

Site Name	Site Address	*Database Listing	Potential Contaminant	Media	Distance (feet)	Proposed Mitigation Measures
Equitrans Hartson Compressor Station	4111 Finleyville Elrama Road Finleyville, PA 15332	ICIS-Air RCRA-SQG PA-EFACTS RCRAINFO E-GGRT EIS AIRS/AFS	None (in compliance with permits)	air	~100	NA
Iams SR STP (residential sewage treatment plant)	4124 Elrama Road Finleyville, PA 15332	ICIS-NPDES Non-Major	None (in compliance with permit)	groundwater	~200	NA
PA Dept. of Corrections - Waynesburg State Correctional Institution	630 Jefferson Road Waynesburg, PA 15370	ICIS-Air	None (in compliance with permit)	air	~100	NA

* Sources: Pennsylvania DEP eMapPa US EPA Envirofacts Facility Registry Service and West Virginia DEP TAGIS GIS Resources Toxic Release Inventory and Open Dump Cleanup Projects.

Table 8.1-1 (Revised April 20, 2016) Construction and Permanent Right-of-Way for Pipeline Segments			
Pipeline Segment	Pipeline Diameter	Construction Right-of-Way	Permanent Maintained Right-of-Way Required (feet)
	(inches)	Required (feet)	
M-80	6	125 <u>a/</u>	50 <u>b/</u>
H-158	12	125 <u>a/</u>	50 <u>b/</u>
H-316	30	125	50
H-318	20	100	50
H-305	24	100	50
H-319	16	100	50
a/ The M-80 and H-158 segments will require a single, collocated 125-foot-wide construction right-of-way. b/ The M-80 and H-158 segments will require a single, collocated, 50-foot-wide permanent right-of-way.			

Table 8.1-2
(Revised April 20, 2016)

Land Uses Crossed by Proposed Pipeline Sections

Facilities	County	Agricultural Land <u>a/</u>		Forest/ Woodland <u>b/</u>		Open Land <u>c/</u>		Residential Land <u>d/</u>		Industrial/ Commercial Land <u>e/</u>		Open Water <u>f/</u>		Total
		Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles
H-158 Pipeline	Greene County, PA	0.044	18.528	0.156	65.091	0.039	16.381	0.000	0.000	0.000	0.000	0.000	0.000	0.239
M80 Pipeline	Greene County, PA	0.042	17.978	0.154	65.376	0.039	16.646	0.000	0.000	0.000	0.000	0.000	0.000	0.235
H-316 Pipeline	Greene County, PA	1.321	44.416	1.468	49.355	0.166	5.586	0.019	0.643	0.000	0.000	0.000	0.000	2.975
H-318 Pipeline	Washington, PA	0.251	20.544	0.565	46.262	0.253	20.744	0.072	5.903	0.024	1.968	0.056	4.579	1.222
H-318 Pipeline	Allegheny, PA	0.971	32.029	1.444	47.606	0.510	16.811	0.019	0.622	0.000	0.000	0.089	2.932	3.033
H-305 Pipeline	Greene County, PA	0.103	100.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.103
H-319 Pipeline	Wetzel County, WV	0.000	0.000	0.026	54.504	0.021	45.496	0.000	0.000	0.000	0.000	0.000	0.000	0.047
All Pipeline	Total	2.734	34.801	3.813	48.542	1.029	13.104	0.110	1.402	0.024	0.306	0.145	1.845	7.855

Source: USGS NLCD data (Jin et al. 2013)

a/ Cultivated land (NLCD categories Pasture/Hay and Cultivated Crops);

b/ Tracts of upland or wetland forest or woodland (NLCD categories Deciduous Forest and Woody Wetlands)

c/ Non-forested lands used for open space or pasture. May include utility right-of-ways, open fields, vacant lands, herbaceous and scrub upland, non-forested wetlands, emergent wetland, scrub-shrub wetlands, golf courses, and municipal land (NLCD categories Developed/Open Space and Grassland/Herbaceous)

d/ Existing developed residential areas and planned residential developments. This may include large developments; low-, medium-, and high-density residential neighborhoods; urban/suburban residential; multi-family residences; ethnic villages; residentially zoned areas that have been developed; or short segments of the route at road crossings with homes near the route alignment (NLCD categories Developed/Low-Intensity and Developed/Medium-Intensity).

e/ Manufacturing or industrial plants, paved areas, landfills, mines, quarries, electric power or natural gas facilities, developed areas, roads, railroads and railroad yards, and commercial or retail facilities (NLCD category Developed/High-Intensity)

f/ Water crossings greater than 100 feet wide and streams visible on aerial photography but less than 100 feet in width (NLCD category Open Water)

Attachment 8-5 Table 8.1-3R (Revised April 20, 2016) Acres Affected by Construction and Operation of Facilities																
Facilities	County	State	Agricultural Land <u>a</u> /		Forest/ Woodland <u>b</u> /		Open Land <u>c</u> /		Residential Land <u>d</u> /		Industrial/ Commercial Land <u>e</u> /		Open Water <u>f</u> /		Total	
					Construction	Operation			Construction	Operation	Construction	Operation				
			Construction	Operation			Construction	Operation					Construction	Operation	Construction	Operation
Pipeline Sections																
H-158/M80 Pipeline	Greene	PA	0.81	0.34	2.35	0.98	0.63	0.24	0.00	0.00	0.00	0.00	0.00	0.00	3.79	1.56
H-316 Pipeline	Greene	PA	18.13	7.87	16.49	8.95	2.56	1.04	0.84	0.18	0.00	0.00	0.00	0.00	38.02	18.04
H-318 Pipeline	Allegheny	PA	11.32	5.69	16.95	8.92	5.74	3.06	0.17	0.11	0.00	0.00	0.54	0.54	34.72	18.32
	Washington	PA	3.15	1.58	5.84	3.54	2.23	1.37	0.49	0.45	0.15	0.15	0.33	0.33	12.20	7.41
H-305 Pipeline	Greene	PA	1.22	0.62	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.62
H-319 Pipeline	Wetzel	WV	0.00	0.00	0.30	0.16	0.10	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.28
Pipeline Totals			34.63	16.11	41.96	22.54	11.26	5.83	1.50	0.74	0.15	0.15	0.87	0.87	90.37	46.23
Temporary Access Roads	Greene	PA	0.95	0.00	0.69	0.00	0.56	0.00	0.28	0.00	0.00	0.00	0.00	0.00	2.48	0.00
	Allegheny	PA	0.20	0.00	2.15	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.59	0.00
	Washington	PA	0.27	0.00	0.12	0.00	0.71	0.00	0.11	0.00	0.00	0.00	0.00	0.00	1.21	0.00
	Wetzel	WV	0.00	0.00	0.04	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00
Permanent Access Roads	Greene	PA	1.11	1.11	0.73	0.73	0.10	0.10	0.02	0.02	0.00	0.00	0.00	0.00	1.96	1.96
	Allegheny	PA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Washington	PA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Wetzel	WV	0.00	0.00	0.02	0.02	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05
Additional Temporary Workspace (ATWS)	Greene	PA	10.66	0.00	9.13	0.00	1.66	0.00	0.20	0.00	0.00	0.00	0.00	0.00	21.65	0.00
	Allegheny	PA	18.45	0.00	7.78	0.00	4.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	30.25	0.00
	Washington	PA	3.01	0.00	4.14	0.00	0.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.98	0.00
	Wetzel	WV	0.00	0.00	0.66	0.00	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.60	0.00
Yards	Greene	PA	4.10	0.00	0.21	0.00	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.16	0.00
	Allegheny	PA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Washington	PA	0.00	0.00	1.26	0.00	1.00	0.00	3.95	0.00	0.00	0.00	0.00	0.00	6.21	0.00
	Wetzel	WV	0.00	0.00	0.04	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00
Groundbed	Greene	PA	0.15	0.15	0.00	0.00	0.30	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.45
	Allegheny	PA	0.00	0.00	0.00	0.00	0.56	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.56
Redhook Compressor Station	Greene	PA	10.87	10.87	4.55	4.55	2.32	2.32	0.00	0.00	0.00	0.00	0.00	0.00	17.74	17.74
Pratt Compressor Station Abandonment	Greene	PA	6.25	6.25	0.28	0.28	0.96	0.96	0.00	0.00	0.00	0.00	0.00	0.00	7.49	7.49
Mobley Tap	Wetzel	WV	0.00	0.00	0.00	0.00	0.38	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.38
Webster Interconnect	Wetzel	WV	0.00	0.00	0.26	0.26	0.56	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.82

Attachment 8-5

Table 8.1-3R

(Revised April 20, 2016)

Acres Affected by Construction and Operation of Facilities

Facilities	County	State	Agricultural Land <u>a/</u>		Forest/		Open Land <u>c/</u>		Residential		Industrial/		Open Water <u>f/</u>		Total	
					Woodland <u>b/</u>				Land <u>d/</u>		Commercial Land <u>e/</u>					
			Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation
Total by PA County	Greene	PA	54.26	27.23	34.45	15.49	9.95	4.96	1.33	0.20	0.00	0.00	0.00	0.00	100.00	47.87
	Allegheny	PA	29.97	5.69	26.88	8.92	10.52	3.62	0.20	0.11	0.00	0.00	0.54	0.54	68.12	18.88
	Washington	PA	6.44	1.58	11.36	3.54	4.76	1.37	4.56	0.45	0.15	0.15	0.33	0.33	27.61	7.41
Total PA	PA Counties	PA	90.68	34.50	72.70	27.94	25.24	9.95	6.09	0.75	0.15	0.15	0.87	0.87	195.72	74.16
Total WV	Wetzel	WV	0.00	0.00	1.31	0.44	2.28	1.10	0.00	0.00	0.00	0.00	0.00	0.00	3.59	1.54
Pipeline and Other Structures Total			90.68	34.50	74.01	28.38	27.52	11.05	6.09	0.75	0.15	0.15	0.87	0.87	199.32	75.70

Source: USGS NLCD data (Jin et al. 2013)

a/ Cultivated land (NLCD categories Pasture/Hay and Cultivated Crops).

b/ Tracts of upland or wetland forest or woodland (NLCD categories Deciduous Forest and Woody Wetlands).

c/ Non-forested lands used for open space or pasture. May include utility right-of-ways, open fields, vacant lands, herbaceous and scrub upland, non-forested wetlands, emergent wetland, scrub-shrub wetlands, golf courses, and municipal land (NLCD categories Developed/Open Space and Grassland/Herbaceous).

d/ Existing developed residential areas and planed residential developments. This may include large developments; low-, medium-, and high-density residential neighborhoods; urban/suburban residential; multi-family residences; ethnic villages; residentially zoned areas that have been developed; or short segments of the route at road crossings with homes near the route alignment (NLCD categories Developed/Low-Intensity and Developed/Medium-Intensity).

e/ Manufacturing or industrial plants, paved areas, landfills, mines, quarries, electric power or natural gas facilities, developed areas, roads, railroads and railroad yards, and commercial or retail facilities (NLCD category Developed/High-Intensity).

f/ Water crossings greater than 100 feet wide and streams visible on aerial photography but less than 100 feet in width (NLCD category Open Water).

Attachment 1-13

Table 8.1-4R

(Revised April 20, 2016)

Proposed Additional Temporary Workspace Areas

Pipeline Facility	ATWS Name	ATWS Acreage	ATWS Dimension/Shape	ATWS Milepost	Land Use Type	Land Use Acres	County	State	Purpose
H-158/M80	H158 M80 ATWS 01	3.34	Irregular Shape	0.00	Pasture/Hay	2.36	Greene	PA	Yard - Temporary Storage Area
					Deciduous Forest	0.13			
					Developed, Open Space	0.85			
	H158 M80 ATWS 02	0.53	Irregular Shape	0.05	Deciduous Forest	0.18			ATWS - Laydown Area
					Developed, Open Space	0.35			
H-305	H305 ATWS 01	1.01	Irregular Shape	0.07	Deciduous Forest	0.68			ATWS - Laydown Area
					Pasture/Hay	0.33			
H-316	H316 ATWS 01a	0.07	Irregular Shape	0.10	Developed, Open Space	0.01			ATWS - Proposed Construction Entrance
					Pasture/Hay	0.06			ATWS - Proposed Construction Entrance
					Developed, Open Space	0.11			ATWS - Proposed Construction Entrance
	H316 ATWS 01b	0.15	132' x 60'	0.10	Pasture/Hay	0.04			ATWS - Proposed Construction Entrance
					Developed, Open Space	0.06			ATWS - Proposed Construction Entrance
	H316 ATWS 01c	0.06	Irregular Shape	0.10	Developed, Open Space	0.06			ATWS - Laydown Area
	H316 ATWS 02	0.35	Irregular Shape	0.65	Cultivated Crops	0.22			ATWS - Construction Entrance
					Pasture/Hay	0.13			ATWS - Construction Entrance
	H316 ATWS 03a	0.02	Irregular Shape	0.80	Pasture/Hay	0.02			ATWS - Construction Entrance
	H316 ATWS 03b	0.09	Irregular Shape	0.80	Pasture/Hay	0.09			ATWS - Construction Entrance
	H316 ATWS 03c	0.06	110' x 30'	0.80	Developed, Open Space	0.06			ATWS - Additional Workspace
	H316 ATWS 03d	0.16	114' x 66'	0.80	Developed, Open Space	0.05			ATWS - Construction Entrance
					Pasture/Hay	0.11			ATWS - Laydown Area
	H316 ATWS 04	0.34	Irregular Shape	0.90	Developed, Low Intensity	0.20			ATWS - Laydown Area
					Pasture/Hay	0.15			ATWS - Laydown Area
	H316 ATWS 05	0.96	Irregular Shape	1.50	Deciduous Forest	0.26			ATWS - Laydown Area
					Grassland/Herbaceous	0.03			ATWS - HDD Pullback
					Pasture/Hay	0.67			ATWS - H-316 HDD Entrance Location/H-302 Hot Tap Location
	H316 ATWS 06	3.03	825' x 210'	2.09	Deciduous Forest	3.03			ATWS - H-316 HDD Entrance Location/H-302 Hot Tap Location
					Cultivated Crops	0.11			ATWS - Laydown Area
					Deciduous Forest	4.47			ATWS - Laydown Area
	H316 ATWS 07	13.32	Irregular Shape	2.83	Pasture/Hay	8.74			ATWS - Laydown Area
					Cultivated Crops	0.18			ATWS - Laydown Area
					Deciduous Forest	0.08			ATWS - Laydown Area
	H316 ATWS 08	1.82	350' x 250'	0.00	Pasture/Hay	1.56			ATWS - Laydown Area
					Deciduous Forest	0.08			ATWS - Laydown Area
Redhook	REDHOOK ATWS 01	1.50	Irregular Shape	N/A	Deciduous Forest	0.51			ATWS - Laydown Area
					Developed, Open Space	0.99			ATWS - Laydown Area

Attachment 1-13

Table 8.1-4R

(Revised April 20, 2016)

Proposed Additional Temporary Workspace Areas

Pipeline Facility	ATWS Name	ATWS Acreage	ATWS Dimension/Shape	ATWS Milepost	Land Use Type	Land Use Acres	County	State	Purpose
H-318	H318 ATWS 01a	9.26	1600' x 220'	0.45	Developed, Open Space	0.36	Allegheny	Attach	ATWS - Laydown Area
					Pasture/Hay	8.90			
	H318 ATWS 01b	2.21	1323' x 121'	0.45	Cultivated Crops	0.02			ATWS - Laydown Area
					Developed, Open Space	0.02			
					Pasture/Hay	2.17			
	H318 ATWS 01c	0.48	250' x 135'	0.73	Developed, Open Space	0.48			ATWS - Laydown Area
	H318 ATWS 01d	0.23	250' x 55'	0.73	Developed, Open Space	0.23			ATWS - Laydown Area
	H318 ATWS 02a	0.97	Irregular Shape	1.62	Deciduous Forest	0.72			ATWS - Additional Workspace
					Developed, Open Space	0.25			
	H318 ATWS 02c	0.08	130' x 50'	1.70	Deciduous Forest	0.07			ATWS - Additional Workspace
					Developed, Open Space	0.01			
	H318 ATWS 02d	0.06	50' x 50'	1.70	Deciduous Forest	0.05			ATWS - Additional Workspace
					Developed, Open Space	0.01			
	H318 ATWS 02e	0.73	Irregular Shape	1.74	Cultivated Crops	0.36			ATWS - Additional Workspace
					Deciduous Forest	0.23			
					Developed, Open Space	0.15			
	H318 ATWS 03	0.44	180' x 115'	1.90	Deciduous Forest	0.01			ATWS - Additional Workspace
					Developed, Open Space	0.36			
					Pasture/Hay	0.07			
	H318 ATWS 04a	7.33	Irregular Shape	2.00	Cultivated Crops	0.53			ATWS - Additional Workspace
					Deciduous Forest	3.18			
					Pasture/Hay	3.61			
	H318 ATWS 04b	4.93	Irregular Shape	2.00	Deciduous Forest	2.15			ATWS - Additional Workspace
					Pasture/Hay	2.78			
	H318 ATWS 05a	0.30	230' x 58'	2.75	Deciduous Forest	0.28			ATWS - Laydown Area
					Developed, Low Intensity	0.02			
	H318 ATWS 05b	0.09	Irregular Shape	2.80	Developed, Low Intensity	0.01			ATWS - Laydown Area
					Developed, Open Space	0.08			
	H318 ATWS 05c	3.07	Irregular Shape	2.80	Deciduous Forest	1.09			ATWS - H-318 HDD Entrance Location
					Developed, Open Space	1.98			
	H318 ATWS 06b	3.48	Irregular Shape	3.46	Deciduous Forest	2.53	Washington		ATWS - HDD Pullback
					Developed, Open Space	0.82			
					Pasture/Hay	0.12			
	H318 ATWS 06c	1.13	450' x 115'	3.74	Cultivated Crops	0.24	ATWS - HDD Pullback		
					Deciduous Forest	0.89			
	H318 ATWS 06d	3.03	950' x 150'	3.83	Cultivated Crops	2.32	ATWS - HDD Pullback		
					Deciduous Forest	0.71			

Attachment 1-13

Table 8.1-4R

(Revised April 20, 2016)

Proposed Additional Temporary Workspace Areas

Pipeline Facility	ATWS Name	ATWS Acreage	ATWS Dimension/Shape	ATWS Milepost	Land Use Type	Land Use Acres	County	State	Purpose
	H318 ATWS 07	0.35	Irregular Shape	4.25	Cultivated Crops	0.13	Washington	PA	ATWS - Additional Workspace
					Deciduous Forest	0.02			
					Pasture/Hay	0.20			
	H318 ATWS 08	2.54	Irregular Shape	4.25	Developed, Low Intensity	0.35			Yard - Temporary Storage Area
					Developed, Medium Intensity	1.96			
					Developed, Open Space	0.16			
					Grassland/Herbaceous	0.08			
	H318 ATWS 09	1.36	277' x 231'	0.00	Deciduous Forest	1.26			Yard - Temporary Storage Area
					Developed, Open Space	0.11			
	H318 ATWS 10	2.31	514' x 214'	0.00	Developed, Low Intensity	1.21			Yard - Temporary Storage Area
					Developed, Medium Intensity	0.44			
					Developed, Open Space	0.66			
H-319	H-319 ATWS 01	0.09	Irregular Shape	0.02	Deciduous Forest	0.09	Wetzel	WV	ATWS - Hot Tap Workspace
	H-319 ATWS 02	0.25	Irregular Shape	0.00	Deciduous Forest	0.04			Yard - Temporary Storage Area
					Developed, Open Space	0.21			
Mobley	Mobley ATWS 01	0.11	Irregular Shape	N/A	Deciduous Forest	0.04			ATWS - Additional Workspace
					Developed, Open Space	0.07			
Webster	Webster ATWS 01	1.40	625' x 130'	N/A	Deciduous Forest	0.53			ATWS - Additional Workspace
					Developed, Open Space	0.87			

Attachment 8-5
Table 8.1-5R2
Public Roadways and Railroads Crossed by the Project a/ b/
(Revised April 20, 2016)

Facility	County	Roadway Name	Road Surface	Milepost	Road Crossing Method	Road Jurisdiction
M-80/H-158	Greene County, PA	Strope Rd.	Rock Base	0.06	Open Cut	County
		Braden Run Road (T588)	Asphalt	0.17	Conventional Bore	Local
H-316	Greene County, PA	Jefferson Road/Pennsylvania Route 188 (PA 188)	Asphalt	0.09	Conventional Bore	State
		Private Road/Driveway	Rock Base	0.19	Open Cut	Private
		Private Road	Rock Base	0.48	Open Cut	Private
		Private Road	Rock Base	0.64	Open Cut	Private
		Prison Road	Asphalt	0.8	Open Cut	Local
		Prison Prop. Road	Rock Base	0.92	Open Cut	Private
		Prison Prop. Road	Rock Base	1.14	Open Cut	Private
		Farm Road	Dirt Base	1.72	Open Cut	Private
		Monongahela Railway	N/A	2.25	HDD	-
		Creek Road (T555)	Asphalt	2.29	HDD	Local
		Farm Road	Dirt Base	2.5	HDD	Private
		Farm Path	Dirt Base	2.58	HDD	Private
		Ankrom Road (T543)	Asphalt	2.73	HDD	Local
		Private Drive	Rock Base	2.82	HDD	Private
H-318	Allegheny County, PA	Rippel Road	Asphalt	0.7	Conventional Bore	Local
		Private Road/Driveway	Asphalt	0.97	Open Cut	Private
		Farm Road	Rock Base	1	Open Cut	Private
		Farm Road	Rock Base	1.09	Open Cut	Private
		Rippel Road	Asphalt	1.66	Conventional Bore	Local
		Raccoon Run Road	Asphalt	1.73	Conventional Bore	State
		Bunola River Road	Asphalt	2.79	Conventional Bore	State
		Conrail/CSXT Railroad	N/A	2.88	HDD	-
	Washington County, PA	Federal Railroad Administration Railroad	N/A	3.15	HDD	-
		Conrail Railroad	N/A	3.15	HDD	-
		Conrail Railroad	N/A	3.15	HDD	-
		5 th Street/Pennsylvania Route 837 (PA 837)	Asphalt	3.19	HDD	State
		Farm Path	Dirt Base	3.31	Open Cut	Private
		Private Drive	Asphalt	3.49	Open Cut	Private
		Seneca Drive	Asphalt	3.73	Open Cut	Local
		Finleyville-Elrama Road	Asphalt	4.2	Conventional Bore	State
H-319	Wetzel County, WV	Well Rd - East of Rt. 80	Rock Base	0.02	Open Cut	Private
		County Road 80	Asphalt	0.042	Conventional Bore	County

a/ H-305 does not cross any public roadways or railroads. The Mobley Tap, Redhook Compressor Station and Webster Interconnect are adjacent to but do not cross any roads.

Table 8.1-6
(Revised April 20, 2016)

Special Land Uses within 1 Mile of Project Facilities

Facility	County	Special Land Use	Description	Approximate Distance from Project Facilities
H-316/ Redhook Compression Station	Greene County, PA	Greene County Airport	Airport facility	1 mile
H-316	Greene County, PA	Youth Development Center (Closed)	Closed prison/youth development center <u>a/</u>	Less than 0.2 mile
H-316/ Redhook Compression Station	Greene County, PA	State Correctional Institute – Greene	Active prison <u>b/</u>	0.6 mile
H-316/ Redhook Compression Station	Greene County, PA	Smith Cemetery	Cemetery	0.3 mile south of H-316, 0.6 mile southeast of Redhook Compressor Station
H-316/ Redhook Compression Station	Greene County, PA	Captain Hook Cemetery	Cemetery	0.10 mile south of Redhook Compressor Station
H-316/ Redhook Compression Station	Greene County, PA	Pollock Cemetery	Cemetery	0.70 mile south of the eastern endpoint of H-316
H-318	Allegheny County, PA	Wallace Station (Railroad Station)	Active railroad station	0.9 mile
H-318	Allegheny County, PA	Bunola Marina (Private)	Active private recreational marina	0.4 mile
H-318	Allegheny County, PA	Castaway Keys Marina (Private)	Active private recreational marina with camping	0.5 mile
H-318	Allegheny County, PA	Riverview Golf Course	Active golf course	0.2 mile
H-318	Washington County, PA	James Chapel	Chapel and cemetery	0.7 mile
H-318	Washington County, PA	Pleasant View Church	Church	0.6 mile
H-318	Washington County, PA	Taylor Cemetery	Cemetery	0.6 mile
Webster Interconnect	Wetzel County, WV	Kilcoyne Cemetery	Cemetery	0.3 mile

a/ The Youth Development Center was also known as State Corrections Institute – Waynesburg (Greene County), which was closed in 2005 and ownership transferred to Basalt Trap Rock Company (State of Pennsylvania Department of Corrections 2015).

b/ The State Correctional Institute-Greene opened in November 1993 houses male offenders, and also houses a majority of the state's male capital case inmates (State of Pennsylvania Department of Corrections 2015).

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Attachment 8-8 Table 8.2-1 R Residences and Buildings within 50 feet of the Proposed Pipeline Construction Work Area <u>a/</u> (Revised April 20, 2016)									
Pipeline Segment	County	Building	UTM Coordinates (meters)		Milepost	Direction	Distance		Occupied
		Type	Easting	Northing			From Edge of Workspace	From Pipeline Centerline	
Pipeline Segment									
H-158/M-80 <u>b/</u>	Greene County, PA	Residence	-	-	0.18	West	26	81 feet	Yes
H-316	Greene County, PA	Outbuilding	-	-	0.03	Northeast	Inside temporary right-of-way	20 feet	No
H-316	Greene County, PA	Garage and Outbuilding	-	-	0.1	Inside ATWS Area	Inside ATWS Area	Inside ATWS Area	No
H-316	Greene County, PA	Outbuilding	-	-	0.95	North	Inside temporary right-of-way	20 feet	No
H-305	Greene County, PA	Outbuilding/Shed	-	-	0.8	South	Inside temporary right-of-way	37 feet	No
Aboveground Facilities									
Redhook Compressor Station	Greene County, PA	Outbuilding	574290.8418	4418948.603	N/A	Northwest Corner of Redhook Area	Inside temporary right-of-way	N/A	No
Redhook Compressor Station	Greene County, PA	Garage	574265.3578	4418915.033	N/A	Northwest Corner of Redhook Area	Inside temporary right-of-way	N/A	No
Redhook Compressor Station	Greene County, PA	Residence	574290.863	4418901.011	N/A	Northwest Corner of Redhook Area	Inside temporary right-of-way	N/A	No
Redhook Compressor Station	Greene County, PA	Residence			N/A	Northwest Corner of Redhook Area	Inside temporary right-of-way	N/A	Yes
			574310.4402	4418876.59					(will be vacated prior to construction)
Redhook Compressor Station	Greene County, PA	Residence			N/A	Northwest Corner of Redhook Area	Inside temporary right-of-way	N/A	Yes
			574321.9199	4418866.689					(will be vacated prior to construction)
Redhook Compressor Station	Greene County, PA	Outbuilding	574341.3362	4418878.518	N/A	Northwest Corner of Redhook Area	Inside temporary right-of-way	N/A	No
Redhook Compressor Station	Greene County, PA	Garage and Outbuilding	574386.9903	4418792.058	N/A	Southern Corner of Redhook Area	Inside temporary right-of-way	N/A	No
Redhook Compressor Station	Greene County, PA	Residence	574448.7136	4418765.342	N/A	Southern Corner of Redhook Area	Inside temporary right-of-way	N/A	Yes
Redhook Compressor Station	Greene County, PA	Outbuilding	574535.9012	4418923.057	N/A	Northeast Corner of Redhook Area	Inside temporary right-of-way	N/A	No
Redhook Compressor Station	Greene County, PA	Outbuilding	574547.5471	4418891.272	N/A	Northeast Corner of Redhook Area	Inside temporary right-of-way	N/A	No
Redhook Compressor Station	Greene County, PA	Outbuilding	574531.4038	4418865.84	N/A	Northeast Corner of Redhook Area	Inside temporary right-of-way	N/A	No
Redhook Compressor Station	Greene County, PA	Garage	574632.8771	4418885.648	N/A	Northeast Corner of Redhook Area	Inside temporary right-of-way	N/A	No
Redhook Compressor Station	Greene County, PA	Residence	574639.6287	4418851.855	N/A	Eastern edge of 50 ft Buffer	50	N/A	No
Webster Interconnect	Wetzel County, WV	Residence	-	-	N/A	Inside Interconnect Area	Inside temporary right-of-way	N/A	No
<u>a/</u> The H-318, H-319 pipelines, Pratt Compressor Station, and Mobley Tap do not have any structures within 50 feet of the construction workspace.									
<u>b/</u> This residence is located on the Redhook Compressor Station site and Equitrans is currently negotiating with the landowner to purchase the property.									

Attachment 1-2 Table 1.4-3R (Revised April 20, 2016) Foreign Pipelines Crossed by the Project				
Pipeline	MP	Name/Type	Size	Crossing Method
H-316	0.01	Equitrans, L.P.	20"	Open Cut
H-316	0.12	Dominion Transmission, Inc./Gas Pipeline	24"	Open Cut
H-316	0.01	Equitrans LP	16"	Open Cut
H-316	0.06	Equitrans LP	16"	Open Cut
H-316	0.06	Equitrans LP	12"	Open Cut
H-316	0.13	Dominion Transmission, Inc./Gas Pipeline	6"	Open Cut
H-316	0.2	Peoples Natural Gas	8"	Open Cut
H-316	0.45	Texas Eastern Transmission, LP/Gas Pipeline	20"	Open Cut
H-316	0.47	Texas Eastern Transmission, LP (5)/Gas Pipeline	20"	Open Cut
H-316	0.48	Texas Eastern Transmission, LP (3)/Gas Pipeline	20"	Open Cut
H-316	0.49	Texas Eastern Transmission, LP	24"	Open Cut
H-316	0.51	Texas Eastern Transmission, LP	20"	Open Cut
H-316	0.51	Dominion Transmission, Inc.	24"	Open Cut
H-316	0.78	Equitrans, L.P.	TBD	Open Cut
H-316	1.95	Rice Midstream Partners	30"	Open Cut
H-316	2.42	Texas Eastern Transmission, LP/Gas Pipeline	20"	HDD
H-316	2.44	Texas Eastern Transmission, LP (5)/Gas Pipeline	24"	HDD
H-316	2.45	Texas Eastern Transmission, LP (3)/Gas Pipeline	20"	HDD
H-316	2.46	Texas Eastern Transmission, LP	20"	HDD
H-316	2.48	Texas Eastern Transmission, LP	20"	HDD
H-316	2.91	Peoples Natural Gas	4"	Open Cut
H-318	0.08	Peoples Natural Gas	16"	Open Cut
H-318	0.09	Equitrans LP	16"	Open Cut
H-318	0.1	Equitrans LP	16"	Open Cut
H-318	0.71	Peoples Natural Gas	3"	Bore
H-318	1.92	Peoples Natural Gas	UNK	Open Cut
H-318	2.76	Peoples Natural Gas	3"	Bore
H-318	2.84	Peoples Natural Gas	4"	HDD
H-318	3.99	Peoples Natural Gas	6"	Open Cut
H-318	4.2	Equitrans LP	20"	Open Cut

Attachment 1-4
Table 1.7-1R
(Revised April 20, 2016)

Agencies with Relevant Major Permit or Consultation Requirements

Agency	Permit/Approval/Consultation	Points of Contact	Notified of Intent to Use Pre-Filing Process	Agency Plans to Participate in Pre-Filing Process	Consultation Initiated	Permit Application Filed	Anticipated Permit or Authorization Receipt Date
Federal							
Federal Energy Regulatory Commission (FERC)	NGA Section 7 Certificate and abandonment authorization	Division of Gas-Environment and Engineering 888 1 st Street NE Washington, DC 20426 Rich McGuire, Acting Director	4/1/2015	Yes	3/25/2015	October-15	October-16
Bureau of Indian Affairs, Eastern Regional Office	Consultation regarding which tribes may have potential interest in project area or presence of traditional cultural properties, and contact tribes as appropriate	Johnna Blackhair, Deputy Regional Director 545 Marriott Drive, Suite 700 Nashville, TN 37214	4/27/2015	Pending further consultation	4/27/2015	N/A	N/A
U.S. Department of Transportation (USDOT), Office of Safety, Energy, and the Environment	Consultation	1200 New Jersey Ave. SE Washington, D.C. 20590 Barbara McCann, Director	4/27/2015	Pending further consultation	4/27/2015	N/A	N/A
20160421-5019 FERC PDF U.S. Army Corps of Engineers (USACE), Pittsburgh District	Section 404 Permit for impacts on waters of the U.S., including wetlands Section 10 Permit for activities affecting navigation Joint Permit Application	Pittsburgh District Corps of Engineers Federal Bldg., 20th Floor 1000 Liberty Ave. Pittsburgh, PA 15222 412-395-7152	4/27/2015	Pending further consultation	4/27/2015	October-15 April-16	October-16
USACE, Huntington District	Section 404 Permit for impacts on waters of the U.S., including wetlands	Huntington District Corps of Engineers Regulatory/Permits – Energy Resources (WV and OH) Colonel Leon F. Parrott 502 Eighth St. Huntington, WV 25701 (304) 399-5211	4/27/2015	Pending further consultation	4/27/2015	October-15	October-16
U.S. Department of Agriculture (USDA), Pennsylvania	Consultation regarding permanent conversion of important farmland	Pennsylvania NRCS State Office One Credit Union Place, Suite 340 Harrisburg, PA 17110-2993 717-237-2207 Joe Kraft, State Soil Scientist	4/27/2015	Pending further consultation	4/27/2015	N/A	N/A
U.S. Fish and Wildlife Service (USFWS), Pennsylvania Field Office	Consultation under Section 7 of ESA for potential impacts on federally protected species Consultation regarding impacts on migratory birds Consultation regarding impacts on fish and wildlife	Pennsylvania Field Office Lora Zimmerman, Project Leader 110 Radnor Rd; Suite 101 State College, PA 16801 Phone: (814) 234-4090 Ext. 2233 Fax: (814) 234-0748 Email: lora_zimmerman@fws.gov	4/27/2015	Pending further consultation	6/24/2015	N/A	February-16
State							
Pennsylvania Game Commission (PGC)	Threatened and Endangered Species Consultation	Bureau of Wildlife Habitat Management Division of Environmental Planning & Habitat Protection Tracey Librandi-Mumma 2001 Elmerton Avenue Harrisburg, PA 17110-9797 717-787-4250	4/27/2015	Pending further consultation	6/24/2015	N/A	June-15
Pennsylvania Department of Conservation and Natural Resources (PADCNR)	Threatened and Endangered Species Consultation	Conservation Science and Ecological Services Division Rachel Carson State Office Building, 6th Floor P.O. Box 8552 Harrisburg, PA 17105-8552 717-787-3444	4/27/2015	Pending further consultation	6/24/2015	N/A	October-16
Pennsylvania Fish and Boat Commission	Threatened and Endangered Species Consultation	Division of Environmental Services 450 Robinson Lane, Bellefonte 16823-9685 814-359-5115 Dave Spotts, Chief	4/27/2015	Pending further consultation	6/24/2015	N/A	January-16

Attachment 1-4
Table 1.7-1R
(Revised April 20, 2016)

Agencies with Relevant Major Permit or Consultation Requirements

Agency	Permit/Approval/Consultation	Points of Contact	Notified of Intent to Use Pre-Filing Process	Agency Plans to Participate in Pre-Filing Process	Consultation Initiated	Permit Application Filed	Anticipated Permit or Authorization Receipt Date
Pennsylvania Department of Environmental Protection (PADEP), Air Permits Division	Chapter 127 Minor Source Permit Title V or Minor Source Operating Permit	Southwest Regional Office 400 Waterfront Drive Pittsburgh, PA 15222-4745 412-442-5215 Mark Wayner, Air Quality Program Manager; Mark Gorog, Environmental Engineer Manager; and Devin Tomko, Air Quality Engineering Specialist	4/27/2015	Pending further consultation	3/10/2015	October-15	August-16
PADEP	ESCGP-2; General Permit for Earth Disturbance Associated with Oil and Gas Exploration, Production, Processing, or treatment operations or transmission facilities PAG-10 General Permit; Hydrostatic Testing of Tanks and Pipelines	Greene County Conservation District 19 South Washington Street, Waynesburg, PA 15370 Washington County Conservation District 2800 N Main St Suite 105 Washington, PA 15301 Allegheny County Conservation District 33 Terminal Way #325b, Pittsburgh, PA 15219	4/27/2015	Pending further consultation	4/27/2015	March-16 State-wide PAG-10 authorization held	October-16
PADEP, Bureau of Waterways Engineering and Wetlands	Chapter 105 Water Obstruction and Encroachment Permit; Clean Water Act Section 401 Water Quality Certification (jointly with USACE Section 404) Submerged Lands License Agreement	Greene County Conservation District 19 South Washington Street, Waynesburg, PA 15370 Washington County Conservation District 2800 N Main St Suite 105 Washington, PA 15301 Allegheny County Conservation District 33 Terminal Way #325b, Pittsburgh, PA 15219	4/27/2015	Pending further consultation	4/27/2015	October-15	October-16
Pennsylvania Department of Transportation	Highway Occupancy Permit	Engineering District 11-0 (Allegheny County) 45 Thoms Run Road Bridgeville, PA 15017 412-429-4804 John Brosnan, H.O.P. Manager Engineering District 12-0 (Washington and Greene counties) N. Gallatin Avenue Ext. PO Box 259 Uniontown, PA 15401 724-439-7310 Richard Marker, P.E., H.O.P. Manager	4/27/2015	Pending further consultation	4/27/2015	Ongoing	October-16
Pennsylvania Historical and Museum Commission, Bureau for Historic Preservation (serves as the PA State Historic Preservation Office [SHPO])	Project Review under Section 106 and PA History Code	Serena Bellew, Bureau Director / Deputy State Historic Preservation Officer 717-705-4035 sbellew@pa.gov Western Region Historic Resources Barbara Frederick 717-772-0921 bafrederic@pa.gov Archaeological Resources Kira Heinrich 717-705-0700 kiheinrich@pa.gov	4/27/2015	Pending further consultation	5/7/2015	N/A	June-16

Attachment 1-4
Table 1.7-1R
(Revised April 20, 2016)

Agencies with Relevant Major Permit or Consultation Requirements

Agency	Permit/Approval/Consultation	Points of Contact	Notified of Intent to Use Pre-Filing Process	Agency Plans to Participate in Pre-Filing Process	Consultation Initiated	Permit Application Filed	Anticipated Permit or Authorization Receipt Date
West Virginia Division of Natural Resources (WVDNR), Natural Heritage Program	Consultation	WVDNR, Office of Wildlife Resources Barbara Sargent 67 Ward Road Elkins, WV 26241 South Charleston, WV 25303 Phone: (304) 637-0245 Email: Barbara.d.sargent@wv.gov	4/27/2015	Pending further consultation	6/24/2015	N/A	June-16
WVDNR, Office of Land and Streams	Stream Activity Permit	WVDNR, Office of Land and Streams Building 74, Room 200 324 Fourth Avenue South Charleston, WV 25303 Phone: (304) 558-3225 Fax: (304) 558-6048 Email: dnr.landandstreams@wv.gov	4/27/2015	Pending further consultation	4/27/2015	June-16	July-16
West Virginia Department of Environmental Protection (WVDEP), Division of Water and Waste Management	NPDES Permit – Construction Stormwater General Permit for Oil and Gas Related Construction Activities NPDES Hydrostatic Test (Unofficial) Discharge Permit	WVDEP, Division of Water and Waste Management 601 55 th Street SE Charleston, WV 25304 Phone: (304) 926-0499 Ext. 1571	4/27/2015	Pending further consultation	4/27/2015	July-16	September-16
West Virginia Department of Transportation (WVDOT), Division of Highways (DOH)	Right-of-Way Use Permit/Encroachment Permit	WVDOT, Division of Highways 1 DOT Drive Moundsville, WV 26041-1605 Phone: (304) 843-4000	4/27/2015	Pending further consultation	4/27/2015	Ongoing	October-16
West Virginia Division of Culture and History	Cultural Resources Consultation	West Virginia Division of Culture and History Susan Pierce, Director, Deputy State Historic Preservation Officer 1900 Kanawha Boulevard East Charleston, WV 25305 Phone: (304) 558-0240 Ext. 158 Email: susan.m.pierce@wv.gov	4/27/2015	Pending further consultation	5/7/2015	N/A	June-16
Local							
Wetzel County Flood Plain Management	Floodplain Development Permit	Wetzel County Emergency Services Edgar Sapp, Director P.O. Box 156 New Martinsville, WV 26155 Phone: (304) 455-6960 Email: wc911@frontier.com	4/27/2015	Pending further consultation	4/27/2015	N/A - Project not in FEMA 100-yr floodplain	

Note: Consultations will occur continuously throughout the development of the Project.

Attachment 1-8			
Table 1.3-3R			
(Revised April 20, 2016)			
Land Requirements for Aboveground Facilities <u>a/</u>			
Facility Name	Approximate Milepost	Land Required for Construction (acres)	Land Required for Operation (acres)
Compressor Stations			
Redhook Station	H-316, MP 0.00;	19.24	17.74
	H-158/M-80, MP 0.24		
Other Facilities			
Webster Interconnect	H-319, MP 0.04	2.32	0.86
Mobley Tap	H-302, MP 0.60	0.5	0.38
Pig Launcher/Receiver Facilities			
Applegate L/R Site	H-318, 0.00	0.40	0.40
Hartson L/R Site	H-318, 4.26	0.08	0.08
H-302 Tap L/R Site	H-316, 2.97	0.11	0.11
<u>a/</u> There are no MLVs included in the Project.			

Attachment 1-11 Table 1.3-1R (Revised April 20, 2016) Land Requirements for the Project		
Facility	Land Required by Construction (acres)	Land Required for Operation (acres)a/
Pipeline	94.07	49.93
Additional Temporary Workspace (ATWS)	61.46	-
Yards	11.63	-
Access Roads	6.37	2.02
Groundbeds	1.01	1.01
Redhook Compressor Station	17.74	17.74
Webster Interconnect	2.35	0.86
Mobley Tap	0.50	0.38
Meter Stations	N/A	N/A
Pig Launcher/Receiver Facilities /a	0.59	0.59
Pipe storage yards (Pratt Compressor Station)	7.49	7.49
Mainline Valve Sites	N/A	0.00
a/: Does not include L/R Facility co-located at Redhook CS Site; Redhook L/R site is included in the Redhook Compressor Station acreage		

Attachment 1-13

Table 8.1-4R

(Revised April 20, 2016)

Proposed Additional Temporary Workspace Areas

Pipeline Facility	ATWS Name	ATWS Acreage	ATWS Dimension/Shape	ATWS Milepost	Land Use Type	Land Use Acres	County	State	Purpose
H-158/M80	H158 M80 ATWS 01	3.34	Irregular Shape	0.00	Pasture/Hay	2.36	Greene	PA	Yard - Temporary Storage Area
					Deciduous Forest	0.13			
					Developed, Open Space	0.85			
	H158 M80 ATWS 02	0.53	Irregular Shape	0.05	Deciduous Forest	0.18			ATWS - Laydown Area
					Developed, Open Space	0.35			
H-305	H305 ATWS 01	1.01	Irregular Shape	0.07	Deciduous Forest	0.68			ATWS - Laydown Area
					Pasture/Hay	0.33			
H-316	H316 ATWS 01a	0.07	Irregular Shape	0.10	Developed, Open Space	0.01			ATWS - Proposed Construction Entrance
					Pasture/Hay	0.06			ATWS - Proposed Construction Entrance
					Developed, Open Space	0.11			ATWS - Proposed Construction Entrance
	H316 ATWS 01b	0.15	132' x 60'	0.10	Pasture/Hay	0.04			ATWS - Proposed Construction Entrance
					Developed, Open Space	0.06			ATWS - Proposed Construction Entrance
	H316 ATWS 01c	0.06	Irregular Shape	0.10	Developed, Open Space	0.06			ATWS - Laydown Area
	H316 ATWS 02	0.35	Irregular Shape	0.65	Cultivated Crops	0.22			ATWS - Construction Entrance
					Pasture/Hay	0.13			ATWS - Construction Entrance
	H316 ATWS 03a	0.02	Irregular Shape	0.80	Pasture/Hay	0.02			ATWS - Construction Entrance
	H316 ATWS 03b	0.09	Irregular Shape	0.80	Pasture/Hay	0.09			ATWS - Construction Entrance
	H316 ATWS 03c	0.06	110' x 30'	0.80	Developed, Open Space	0.06			ATWS - Additional Workspace
	H316 ATWS 03d	0.16	114' x 66'	0.80	Developed, Open Space	0.05			ATWS - Construction Entrance
					Pasture/Hay	0.11			ATWS - Laydown Area
	H316 ATWS 04	0.34	Irregular Shape	0.90	Developed, Low Intensity	0.20			ATWS - Laydown Area
					Pasture/Hay	0.15			ATWS - Laydown Area
	H316 ATWS 05	0.96	Irregular Shape	1.50	Deciduous Forest	0.26			ATWS - Laydown Area
					Grassland/Herbaceous	0.03			ATWS - HDD Pullback
					Pasture/Hay	0.67			ATWS - H-316 HDD Entrance Location/H-302 Hot Tap Location
	H316 ATWS 06	3.03	825' x 210'	2.09	Deciduous Forest	3.03			ATWS - H-316 HDD Entrance Location/H-302 Hot Tap Location
					Cultivated Crops	0.11			ATWS - Laydown Area
					Deciduous Forest	4.47			ATWS - Laydown Area
	H316 ATWS 07	13.32	Irregular Shape	2.83	Pasture/Hay	8.74			ATWS - Laydown Area
					Cultivated Crops	0.18			ATWS - Laydown Area
					Deciduous Forest	0.08			ATWS - Laydown Area
	H316 ATWS 08	1.82	350' x 250'	0.00	Pasture/Hay	1.56			ATWS - Laydown Area
					Deciduous Forest	0.08			ATWS - Laydown Area
Redhook	REDHOOK ATWS 01	1.50	Irregular Shape	N/A	Deciduous Forest	0.51			ATWS - Laydown Area
					Developed, Open Space	0.99			ATWS - Laydown Area

Attachment 1-13

Table 8.1-4R

(Revised April 20, 2016)

Proposed Additional Temporary Workspace Areas

Pipeline Facility	ATWS Name	ATWS Acreage	ATWS Dimension/Shape	ATWS Milepost	Land Use Type	Land Use Acres	County	State	Purpose
H-318	H318 ATWS 01a	9.26	1600' x 220'	0.45	Developed, Open Space	0.36	Allegheny	Attach	ATWS - Laydown Area
					Pasture/Hay	8.90			
	H318 ATWS 01b	2.21	1323' x 121'	0.45	Cultivated Crops	0.02			ATWS - Laydown Area
					Developed, Open Space	0.02			
					Pasture/Hay	2.17			
	H318 ATWS 01c	0.48	250' x 135'	0.73	Developed, Open Space	0.48			ATWS - Laydown Area
	H318 ATWS 01d	0.23	250' x 55'	0.73	Developed, Open Space	0.23			ATWS - Laydown Area
	H318 ATWS 02a	0.97	Irregular Shape	1.62	Deciduous Forest	0.72			ATWS - Additional Workspace
					Developed, Open Space	0.25			
	H318 ATWS 02c	0.08	130' x 50'	1.70	Deciduous Forest	0.07			ATWS - Additional Workspace
					Developed, Open Space	0.01			
	H318 ATWS 02d	0.06	50' x 50'	1.70	Deciduous Forest	0.05			ATWS - Additional Workspace
					Developed, Open Space	0.01			
	H318 ATWS 02e	0.73	Irregular Shape	1.74	Cultivated Crops	0.36			ATWS - Additional Workspace
					Deciduous Forest	0.23			
					Developed, Open Space	0.15			
	H318 ATWS 03	0.44	180' x 115'	1.90	Deciduous Forest	0.01			ATWS - Additional Workspace
					Developed, Open Space	0.36			
					Pasture/Hay	0.07			
	H318 ATWS 04a	7.33	Irregular Shape	2.00	Cultivated Crops	0.53			ATWS - Additional Workspace
					Deciduous Forest	3.18			
					Pasture/Hay	3.61			
	H318 ATWS 04b	4.93	Irregular Shape	2.00	Deciduous Forest	2.15			ATWS - Additional Workspace
					Pasture/Hay	2.78			
	H318 ATWS 05a	0.30	230' x 58'	2.75	Deciduous Forest	0.28			ATWS - Laydown Area
					Developed, Low Intensity	0.02			
	H318 ATWS 05b	0.09	Irregular Shape	2.80	Developed, Low Intensity	0.01			ATWS - Laydown Area
					Developed, Open Space	0.08			
	H318 ATWS 05c	3.07	Irregular Shape	2.80	Deciduous Forest	1.09			ATWS - H-318 HDD Entrance Location
					Developed, Open Space	1.98			
	H318 ATWS 06b	3.48	Irregular Shape	3.46	Deciduous Forest	2.53	Washington		ATWS - HDD Pullback
					Developed, Open Space	0.82			
					Pasture/Hay	0.12			
	H318 ATWS 06c	1.13	450' x 115'	3.74	Cultivated Crops	0.24	ATWS - HDD Pullback		
					Deciduous Forest	0.89			
	H318 ATWS 06d	3.03	950' x 150'	3.83	Cultivated Crops	2.32	ATWS - HDD Pullback		
					Deciduous Forest	0.71			

Attachment 1-13

Table 8.1-4R

(Revised April 20, 2016)

Proposed Additional Temporary Workspace Areas

Pipeline Facility	ATWS Name	ATWS Acreage	ATWS Dimension/Shape	ATWS Milepost	Land Use Type	Land Use Acres	County	State	Purpose
	H318 ATWS 07	0.35	Irregular Shape	4.25	Cultivated Crops	0.13	Washington	PA	ATWS - Additional Workspace
					Deciduous Forest	0.02			
					Pasture/Hay	0.20			
	H318 ATWS 08	2.54	Irregular Shape	4.25	Developed, Low Intensity	0.35			Yard - Temporary Storage Area
					Developed, Medium Intensity	1.96			
					Developed, Open Space	0.16			
					Grassland/Herbaceous	0.08			
	H318 ATWS 09	1.36	277' x 231'	0.00	Deciduous Forest	1.26			Yard - Temporary Storage Area
					Developed, Open Space	0.11			
	H318 ATWS 10	2.31	514' x 214'	0.00	Developed, Low Intensity	1.21			Yard - Temporary Storage Area
					Developed, Medium Intensity	0.44			
					Developed, Open Space	0.66			
H-319	H-319 ATWS 01	0.09	Irregular Shape	0.02	Deciduous Forest	0.09	Wetzel	WV	ATWS - Hot Tap Workspace
	H-319 ATWS 02	0.25	Irregular Shape	0.00	Deciduous Forest	0.04			Yard - Temporary Storage Area
					Developed, Open Space	0.21			
Mobley	Mobley ATWS 01	0.11	Irregular Shape	N/A	Deciduous Forest	0.04			ATWS - Additional Workspace
					Developed, Open Space	0.07			
Webster	Webster ATWS 01	1.40	625' x 130'	N/A	Deciduous Forest	0.53			ATWS - Additional Workspace
					Developed, Open Space	0.87			



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**ATTACHMENT 1-30
REDHOOK AND PRATT NOISE-SENSITIVE AREAS
PAGE 1 OF 2**



DATE: JANUARY 14, 2016
FILE: EEP ATTACHMENT 1-30 20160114-1

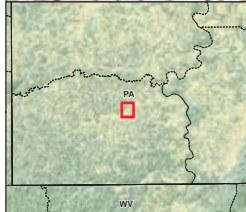
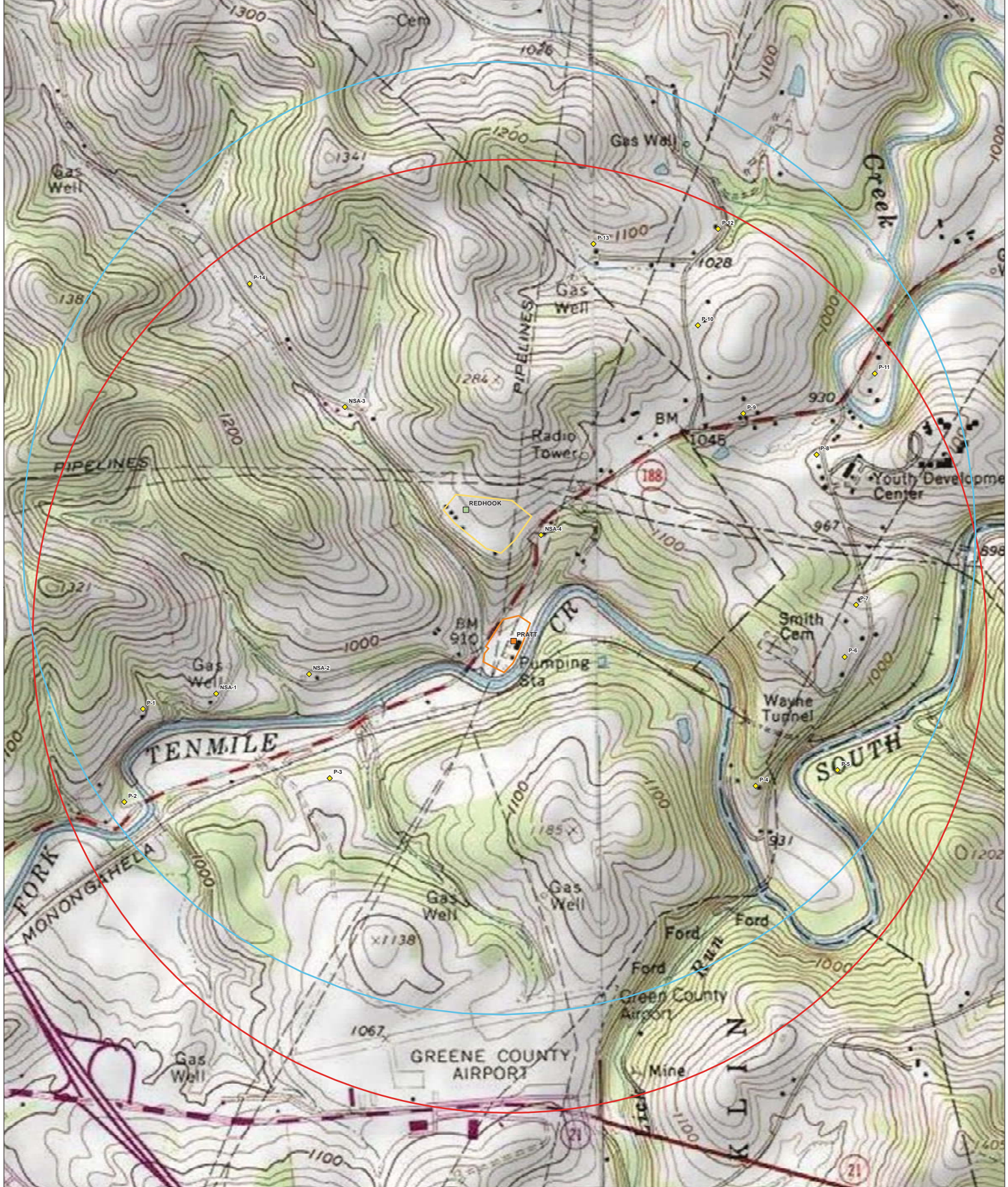


LEGEND

- Redhook
- Pratt
- ◆ Noise-sensitive Area
- Redhook Site
- Pratt Site
- Redhook One Mile Ring
- Pratt One Mile Ring

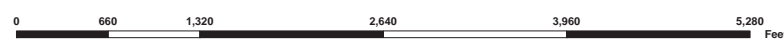
NSA POINT	DISTANCE IN FEET	
	REDHOOK SITE	PRATT SITE
NSA-1	3,236	2,078
NSA-2	2,337	1,933
NSA-3	1,996	2,833
NSA-4	954	927
P-1	3,093	3,804
P-2	4,782	4,267
P-3	10,078	2,134
P-4	3,883	3,024
P-5	4,382	3,760
P-6	1,881	1,504
P-7	3,724	1,034
P-8	3,229	1,679
P-9	2,487	1,811
P-10	2,805	1,778
P-11	4,136	4,712
P-12	3,777	4,830
P-13	2,983	4,201
P-14	3,267	4,658

Aerial Imagery: Spring 2015
Data Sources: ESRI Streaming Data



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**ATTACHMENT 1-30
REDHOOK AND PRATT NOISE-SENSITIVE AREAS
PAGE 2 OF 2**



DATE: JANUARY 14, 2016
FILE: EEP ATTACHMENT 1-30 20160114-2



LEGEND

- Redhook
- Pratt
- ◆ Noise-sensitive Area
- Redhook Site
- Pratt Site
- Redhook One Mile Ring
- Pratt One Mile Ring

NSA POINT	DISTANCE IN FEET	
	REDHOOK SITE	PRATT SITE
NSA-1	3,236	2,078
NSA-2	2,337	1,933
NSA-3	1,996	2,933
NSA-4	954	927
P-1	3,093	3,904
P-2	4,782	4,267
P-3	1,078	2,134
P-4	3,893	3,024
P-5	4,382	3,760
P-6	1,881	1,021
P-7	3,724	1,014
P-8	3,229	1,679
P-9	2,487	1,811
P-10	2,805	1,778
P-11	4,136	4,712
P-12	3,177	4,893
P-13	2,983	4,201
P-14	3,267	4,658

Aerial Imagery: Spring 2015
Data Sources: ESRI Streaming Data

HORIZONTAL DIRECTIONAL DRILLING (HDD) CONTINGENCY PLAN

EQUITRANS EXPANSION PROJECT

**ALLEGHENY, GREENE AND WASHINGTON COUNTIES,
PENNSYLVANIA**

JULY 2015

(Revised April 20, 2016)

Prepared by:
EQUITRANS
625 Liberty Avenue
Suite 1700
Pittsburgh, PA 15222-3111



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Wetzel County, West Virginia



HORIZONTAL DIRECTIONAL DRILLING (HDD) CONTINGENCY PLAN

Project Narrative:

HDD is a trenchless excavation method that is accomplished in three phases. The first phase consists of drilling a small diameter pilot hole along a designed directional path. The second phase consists of enlarging the pilot hole to a diameter suitable for installation of the pipe. The third phase consists of pulling the pipe into the enlarged hole. HDD is accomplished using a specialized horizontal drilling rig with ancillary tools and equipment. A properly executed HDD crossing will allow for the pipeline to be installed in a minimally invasive manner.

HDD is proposed for the Equitrans Expansion Project crossing the Monongahela River (H-318 pipeline) in Allegheny and Washington Counties, Pennsylvania and Ten Mile Creek (H-316 pipeline) in Greene County, Pennsylvania. The HDD crossing is the preferred method of construction intended to minimize direct impacts to surface waters.

The inadvertent release (IR) of drilling lubricant is a potential concern when the HDD is used. The HDD procedure for these crossings will utilize Bentonite for Drilling Lubricant.

Purpose:

The purpose of this Contingency Plan is to:

- Minimize the potential for an IR associated with horizontal directional drilling activities.
- Provide for the timely detection of an IR.
- Protect areas that are considered environmentally sensitive (streams, wetlands, other biological resources, cultural resources).
- Provide an organized, timely, and "minimum-impact" response in the event of an IR.
- Provide that all appropriate notifications are made to the PA Department of Environmental Protection (DEP), EQT, and other appropriate regulatory agencies, and that documentation is completed.

Preparation:

Prior to construction, sensitive cultural and biological resources will be protected by implementing the following measures:

- The drilling contractor shall review the site conditions prior to the start of work. The execution of HDD operations and actions for detecting and controlling drilling fluid seepage are the responsibility of the drilling contractor.
- Construction limits will be clearly marked.

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- Barriers (18" Fabric Filter Fence or Compost Filter Sock, as per the on-site inspector) will be erected between the bore site and nearby sensitive resources prior to drilling to prevent released material from reaching the resource.
- On-site briefings will be conducted for the workers to identify and locate sensitive resources at the site.
- Provide that all field personnel understand their responsibility for timely reporting of IR's.
- Maintaining necessary response equipment on-site and in good working order.

The primary areas of concern for IR's occur at the entrance and exit points where the drilling equipment is generally at their shallowest depths. The likelihood of an IR decreases as the depth of the pipe increases.

To minimize the potential extent of impacts from an IR, HDD operations will be continuously monitored to look for observable IR conditions or lowered pressure readings on the drilling equipment. Early detection is essential to minimizing the area of potential impact.

Training:

Prior to the start of construction, the Site Supervisor/Foreman shall ensure that the crew members receive training on the following:

- The provisions of this Contingency Plan.
- Inspection procedures for IR prevention and containment equipment materials.
- Contractor/crew obligation to immediately stop the drilling operation upon first evidence of the occurrence of an IR and to immediately report any IRs to EQT's Environmental Coordinator.
- Contractor/crew member responsibilities in the event of an IR.
- Operation of release prevention and control equipment and the location of release control materials, as necessary and appropriate.
- Protocols for communication with agency representatives who might be on site during the clean-up effort.
- Copies of this contingency plan and the contractor's site specific contingency plan will be maintained at the bore site in a visible and accessible location at all times.

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Equipment:

The Site Supervisor shall verify that:

- All equipment and vehicles are inspected and maintained daily to prevent leaks of hazardous materials.
- Spill kits and spill containment materials are available on-site at all times and that the equipment is in good working order.
- Equipment required to contain and clean up an IR is available at the bore site during drilling activities.

*Note: It is the drilling contractor's responsibility to provide any IR containment materials that are necessary to respond to the release of drill fluids. The materials listed in this contingency plan are not to be considered inclusive and may require additional equipment depending on site conditions.

Drilling Procedures:

Drilling pressures shall be closely monitored so they do not exceed those needed to penetrate the formation. Pressure levels shall be monitored randomly by the operator. Pressure levels shall be set at a minimum level to prevent IRs. During the pilot bore, maintain the drilled annulus. Cutters and reamers will be pulled back into previously drilled sections after each joint of pipe is added.

Entry and exit pits shall be enclosed by 18" Fabric Filter Fence or Compost Filter Sock and straw bales. A spill kit shall be on-site and used if an IR occurs. If accessible, a vacuum truck shall be readily available on-site prior to and during all drilling operations. Containment materials (straw, fabric filter fence, sand bags, spill kits, boom and turbidity curtain, etc.) shall be staged on-site at a location where they are readily available and easily mobilized for immediate use in the event of an IR. Filter Fence or Filter Sock will be installed between the bore site and the edge of water sources prior to drilling.

*NOTE: If the site is not able to be accessed by a vacuum truck, a pump with sufficient power to convey the released drill fluid to a containment area will be used instead. Along with the pump, an adequate amount of hose, several filter bags, straw bales, sand bags, and 18" Fabric Filter Fence (or Compost Filter Sock) will be kept on site to create a containment area on site.

Once the drill rig is in place and drilling begins, the drill operator shall stop work immediately whenever the pressure in the drill rig drops or there is a lack of returns in the entrance pit. At this time the Site Supervisor/Foreman shall be informed of the potential IR. The Site Supervisor/Foreman and the drill rig operator(s) shall work to coordinate the likely location of the IR. The location shall be recorded and notes made on the location and measures taken to address the concern. Measures will then be taken according to the type of IR (i.e. Terrestrial or Aquatic) as listed below. The Site Supervisor/Foreman will then begin notifying the appropriate parties as listed in the "Contacts" section of this document.

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Water containing mud, silt, drilling fluid, or other pollutants from equipment washing or other activities, shall not be allowed to enter a lake, flowing stream, or any other water source. The bentonite used in the drilling process shall be either disposed of at an approved disposal facility or recycled in an approved manner. Other construction materials and wastes shall be recycled, or disposed of, as appropriate.

Inadvertent Release (IR) Procedures

In the event of an IR, EQT's Project PM, Environmental Inspector, Chief (i.e. whoever is on site) is required to IMMEDIATELY notify the Project's **EQT Environmental Coordinator (Ms. Stephanie Frazier, 412-553-5798)** with the following information: What occurred; Where it occurred (Terrestrial or Aquatic); When it occurred; Who was responsible; and Quantity released.

Terrestrial IR Procedures:

- Stop work immediately.
- The bore stem will be pulled back to relieve pressure on the IR.
- Isolate the area with hay bales, sand bags, filter sock, or silt fencing to surround and contain the drilling mud per the Appendix B – Typical IR Detail Sheets.
 - o Determine the quantity (gallons) of material released
 - o Determine the distance (feet) to the nearest waterbody
 - o Determine the name of the waterbody
- Contact the appropriate parties as listed in the "Required Notifications" section at the end of this document regarding the following action:
- A mobile vacuum truck (or pump if in an inaccessible area) will be used to pump the drilling mud from the contained area and into either a return pit or (if using a pump) into a filter bag surrounded by 18" Fabric Filter Fence or Compost Filter Sock.
- Once excess drilling mud is removed, the area will be seeded and/or replanted using species similar to those in the adjacent area, or allowed to re-grow from existing vegetation.

After the IR is stabilized, document the IR from discovery through post-cleanup conditions with photographs and prepare an IR incident report describing time, place, actions taken to remediate IR, and measures implemented to prevent recurrence. The incident report will be provided to the EQT Environmental Coordinator within 24 hours of the occurrence.

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Aquatic (under water) IR Procedures:

- Stop work immediately.
- The bore stem will be pulled back to relieve pressure on the IR.
- Contact the appropriate parties as listed in the "Required Notifications" section at the end of this document regarding the following actions:
- Isolate the area with hay bales, sand bags, filter sock, or silt fencing to surround and contain the IR per the Appendix B – Typical IR Detail Sheets;
 - o Determine the quantity (gallons) of the IR
 - o Determine the quantity (gallons) that was released to the waterbody
 - o Determine the distance (feet) the material traveled down the waterbody
 - o Determine the name of the affected waterbody
- A mobile vacuum truck (or pump if in an inaccessible area) will be used to pump the drilling mud from the contained area and into either a return pit or (if using a pump) into a filter bag surrounded by 18" Fabric Filter Fence or Compost Filter Sock.
- If the IR affects an area that is vegetated, the area will be seeded and/or replanted using species similar to those in the adjacent area, or allowed to re-grow from existing vegetation.

After the IR is stabilized, document the IR from discovery through post-cleanup conditions with photographs and prepare an IR incident report describing time, place, actions taken to remediate IR, and measures implemented to prevent recurrence. The incident report will be provided to the EQT Environmental Coordinator within 24 hours of the occurrence.

Abandonment and Alternative Crossings

If the HDD fails and EQT decides to abandon the drill hole, alternative crossing methods will be considered. Any alternative crossing will require permitting approvals to be secured before action is taken. Contact the Environmental Coordinator for the Project.

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Wetzel County, West Virginia



Required Notifications:

In the event of an IR, the following parties are to be notified IMMEDIATELY:
EQT Environmental Department:

Ms. Stephanie Frazier (Primary Contact)

Environmental Permitting - Supervisor
412-553-5798 (office)
412-925-1446 (cell)

Ms. Megan Stahl

Environmental Permitting - Supervisor
412-553-7783 (office)
412-737-2587 (cell)

Mr. John Centofanti

Corporate Director - Environmental Affairs
412-395-3305 (office)
412-417-3729 (cell)

Mr. Paul Friedman

FERC Project Manager
202-502-8059 (office)

Include the following information:

- Time the spill was first identified
- Description of where the spill occurred – Township and County
- Latitude and Longitude of spill
- Size of spill and control measures in place
- Name of affected water resource (if known/applicable)
- Photographs of spill area and corrective measures – when available. (Do not wait to notify EQT until pictures are available. Photo documentation should begin immediately upon detection and continued throughout the duration of the cleanup).

The Environmental Department will contact State and/or Federal environmental agencies (if applicable) for notification requirements in the event of an IR.

References:

This Contingency Plan was adapted from the following websites:

<<http://www.blm.gov/pgdata/etc/medialib/blm/wy/information/NEPA/cfodocs/greencore.Par.0871.File.dat/PODappH.pdf>>

<http://www.csx.com/share/wwwcsx_mura/assets/File/Customers/Non-freight_Services/Property_Real_Estate/Sample_Fraction_Mitigation_Plan_for_HDD.pdf>

http://www.energy.ca.gov/sitingcases/smud/documents/applicants_files/Data_Response_Set-1Q/APPENDIX_C_FRAC_OUT_PLAN3.PDF

Attachment 2-11a

Table 2.3-1R (Revised April 20, 2016)
Summary of Wetlands Crossed by the Project (acres) a/

State	County	Project Feature	Impact Description	PEM Construction Impacts	PEM Operation Impacts	PFO Construction Impacts	PFO Operation Impacts
Pennsylvania	Allegheny	H-318	ATWS	0.03	0	0	0
		H-318	Permanent Easement	0	0.44	0	0.07
		H-318	Workspace	0.62	0	0.07	0
		H-318 Total		0.65	0.44	0.07	0.07
	Allegheny Total			0.65	0.44	0.07	0.07
	Greene	H-316	Access Roads ROW	<0.01	0	0	0
		H-316	ATWS	0.43	0	0	0
		H-316	Permanent Easement	0	0.15	0	0
		H-316	Workspace	0.19	0	0	0
		H-316 Total		0.62	0.15	0	0
		Pratt	Pratt Station	0.08	0	0	0
		Pratt Total		0.08	0	0	0
		Redhook	Redhook Station	0	<0.01	0	0
		Redhook Total		0	<0.01	0	0
	Greene Total			0.70	0.15	0	0
	Washington	H-318	Yard	<0.01	0	0	0
		H-318	Permanent Easement	0	0.04	0	0
		H-318	Workspace	0.05	0	0	0
		H-318 Total		0.05	0.04	0	0
	Washington Total			0.05	0.04	0	0
	Pennsylvania Total <u>b/</u>			1.40	0.63	0.07	0.07
West Virginia	Wetzel	H-319	Yard	0.09	0	0	0
		H-319	Permanent Easement	0	0.04	0	0
		H-319	Workspace	0.06	0	0	0
		H-319 Total		0.15	0.04	0	0
		Webster	ATWS	0.02	0	0	0
		Webster Total		0.02	0	0	0
	Wetzel Total			0.15	0.04	0	0
	West Virginia Total <u>b/</u>			0.17	0.04	0	0
Grand Total <u>b/</u>				1.56	0.67	0.07	0.07

Notes:

a/ Data are from field surveys where access was granted as of October 15, 2015. All NWI wetlands were accounted for during the field survey.

b/ Total acres account for overlapping project features to avoid double counting. Table 2-B-1 lists project features separately, and therefore cannot be summed for total impact acreage due to double counting of overlapping features.

PEM = Palustrine emergent

PFO = Palustrine forested

Attachment 2-11b.
Table 2-B-1R (Revised April 20, 2016)
Wetlands Crossed by Project a/

Project Feature	Wetland ID <u>b/</u>	Milepost	Wetland Classification <u>c/</u>	Impact Description	Feature ID	State	County	Length of Crossing (feet) <u>d/</u>	Operations Impacts (acres)	Temporary/Construction Impacts (acres) <u>e/</u>	Crossing Method
H-316	W-AA10	2.7	PEM	Pipeline Route	N/A	Pennsylvania	Greene	12.2	N/A	N/A	HDD <u>f/</u>
H-316	W-AA4	0.8	PEM	Permanent Easement	N/A	Pennsylvania	Greene	N/A	0.06	0	N/A
H-316	W-AA4	0.8	PEM	Pipeline Route	N/A	Pennsylvania	Greene	50.6	N/A	N/A	Open-cut
H-316	W-AA4	0.8	PEM	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.03	N/A
H-316	W-AA7	0.9	PEM	Permanent Easement	N/A	Pennsylvania	Greene	N/A	0.07	0	N/A
H-316	W-AA7	0.9	PEM	Pipeline Route	N/A	Pennsylvania	Greene	51.1	N/A	N/A	Open-cut
H-316	W-AA8	1.5	PEM	ATWS	H316 ATWS 05	Pennsylvania	Greene	N/A	0	0.02	N/A
H-316	W-AA9	2	PEM	ATWS	H316 ATWS 06	Pennsylvania	Greene	N/A	0	0.01	N/A
H-316	W-M2	3.0	PEM	Access Roads ROW	H316 AR 07a	Pennsylvania	Greene	N/A	0	0.0005	N/A
H-316	W-M3	2.9	PEM	ATWS	H316 ATWS 07	Pennsylvania	Greene	N/A	0	0.00003	N/A
H-316	W-M4	2.9	PEM	ATWS	H316 ATWS 07	Pennsylvania	Greene	N/A	0	0.39	N/A
H-316	W-M6	2.9	PEM	ATWS	H316 ATWS 07	Pennsylvania	Greene	N/A	0	0.0007	N/A
Pratt	W-AA5	0.1	PEM	Pratt Station	N/A	Pennsylvania	Greene	N/A	0	0.02	N/A
Pratt	W-AA6	0.1	PEM	Pratt Station	N/A	Pennsylvania	Greene	N/A	0	0.06	N/A
Redhook	W-N1	0	PEM	Redhook Station	N/A	Pennsylvania	Greene	N/A	0.002	0	N/A
H-318	W-BB12	1.4	PEM	Permanent Easement	N/A	Pennsylvania	Allegheny	N/A	0.00004	0	N/A
H-318	W-BB6	1.8	PEM	Permanent Easement	N/A	Pennsylvania	Allegheny	N/A	0.07	0	N/A
H-318	W-BB6	1.8	PEM	Pipeline Route	N/A	Pennsylvania	Allegheny	34.3	N/A	N/A	Open-cut
H-318	W-BB7	2	PEM	Permanent Easement	N/A	Pennsylvania	Allegheny	N/A	0.37	0	N/A
H-318	W-BB7	2	PEM	Pipeline Route	N/A	Pennsylvania	Allegheny	318.9	N/A	N/A	Open-cut
H-318	W-BB7	2	PEM	Workspace	N/A	Pennsylvania	Allegheny	N/A	0	0.18	N/A
H-318	W-BB8	2.3	PFO	Permanent Easement	N/A	Pennsylvania	Allegheny	N/A	0.03	0	N/A
H-318	W-BB10	2.4	PFO	Permanent Easement	N/A	Pennsylvania	Allegheny	N/A	0.009	0	N/A
H-318	W-BB10	2.4	PFO	Pipeline Route	N/A	Pennsylvania	Allegheny	17.8	N/A	N/A	Open-cut
H-318	W-BB9	2.4	PFO	Permanent Easement	N/A	Pennsylvania	Allegheny	N/A	0.00069	0	N/A
H-318	W-BB11	2.7	PFO	Permanent Easement	N/A	Pennsylvania	Allegheny	N/A	0.027	0	N/A
H-318	W-BB3	3.9	PEM	Permanent Easement	N/A	Pennsylvania	Washington	N/A	0.04	0	N/A
H-318	W-BB3	3.9	PEM	Pipeline Route	N/A	Pennsylvania	Washington	33.1	N/A	N/A	Open-cut
H-318	W-BB3	3.9	PEM	Workspace	N/A	Pennsylvania	Washington	N/A	0	0.01	N/A
H-318	W-BB5	0	PEM	Yard	H318 ATWS 09	Pennsylvania	Washington	N/A	0	0.0001	N/A
H-319	W-Z3A	0	PEM	Permanent Easement	N/A	West Virginia	Wetzel	N/A	0.01	0	N/A
H-319	W-Z3A	0.02	PEM	Pipeline Route	N/A	West Virginia	Wetzel	11.7	N/A	N/A	Open-cut
H-319	W-Z3A	0	PEM	Workspace	N/A	West Virginia	Wetzel	N/A	0	0.02	N/A
H-319	W-Z3B	0	PEM	Yard	H319 ATWS 02	West Virginia	Wetzel	N/A	0	0.09	N/A
H-319	W-Z3B	0	PEM	Permanent Easement	N/A	West Virginia	Wetzel	N/A	0.03	0	N/A
H-319	W-Z3B	0.01	PEM	Pipeline Route	N/A	West Virginia	Wetzel	27.3	N/A	N/A	Open-cut
Webster	W-Z2	0.04	PEM	ATWS	Webster ATWS 01	West Virginia	Wetzel	N/A	0	0.02	N/A

Notes: N/A - Not applicable

a/ Data are from field surveys where access was granted as of October 15, 2015. All NWI wetlands were accounted for during the field survey

b/ Wetland IDs starting with "W" are field surveyed wetlands. All NWI wetlands are accounted for.

c/ Cowardin wetland classification

PEM - Palustrine Emergent

PFO - Palustrine Forested

d/ Length of crossing measured for linear features only.

e/ Construction Impact acreage are exclusive of all Operational Impacts acreage.

f/ HDD crossing is included in South Fork Tenmile Creek HDD crossing.

Attachment 2-3 Table 2-A-2R (Revised April 20 2016) Waterbodies Crossed by Project a/																				
Project Feature	Waterbody ID	Milepost	Waterbody Name	Flow Type b/	Impact Type	Impact Description	ATWS / Access Road ID	State	County	Length of Crossing (feet) h/	Permanent Impacts (Acres)	Temporary Impacts (Acres)	Crossing Method i/	FERC Classification	Waterbody Width (Feet) k/	Water Use c/, d/	Fishery Type e/	TOYR f/	Class of Pipe	Depth of Cover (Feet)
H-158	S-AA1	0.1	UNT / South Fork Tenmile Creek	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	10.7	N/A	N/A	Dry Ditch	Minor	10	WWF	Warmwater	No Restriction	3	3
H-158	S-AA1	0.1	UNT / South Fork Tenmile Creek	Perennial	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.0240	N/A	Minor	10	WWF	Warmwater	No Restriction	N/A	N/A
H-158 and M-80	S-AA1	0	UNT / South Fork Tenmile Creek	Perennial	Temporary	ATWS	M80-H158-ATWS-01	Pennsylvania	Greene	N/A	0	0.0573	N/A	Minor	10	WWF	Warmwater	No Restriction	N/A	N/A
H-158 and M-80	S-AA6	0	UNT / South Fork Tenmile Creek	Perennial	Temporary	ATWS	M80-H158-ATWS-01	Pennsylvania	Greene	N/A	0	0.0010	N/A	Intermediate	16	WWF	Warmwater	No Restriction	N/A	N/A
M-80	S-AA1	0.1	UNT / South Fork Tenmile Creek	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	10.7	N/A	N/A	Dry Ditch	Minor	10	WWF	Warmwater	No Restriction	3	3
H-305	S-N1	0.1	UNT / South Fork Tenmile Creek	Intermittent	Temporary	ATWS	H305 ATWS01	Pennsylvania	Greene	N/A	N/A	0.005859	N/A	Minor	7	WWF	Warmwater	No Restriction	N/A	N/A
H-305	S-N1	0.1	UNT / South Fork Tenmile Creek	Intermittent	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	N/A	0.021341	N/A	Minor	7	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA3	0.1	UNT / South Fork Tenmile Creek	Ephemeral	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	4.4	N/A	N/A	Dry Ditch	Minor	4	WWF	Warmwater	No Restriction	2	3
H-316	S-AA3	0.1	UNT / South Fork Tenmile Creek	Ephemeral	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.0042	N/A	Minor	4	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA4	0.2	UNT / South Fork Tenmile Creek	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	5.2	N/A	N/A	Dry Ditch	Minor	5	WWF	Warmwater	No Restriction	2	3
H-316	S-AA4	0.2	UNT / South Fork Tenmile Creek	Perennial	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.0022	N/A	Minor	5	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA8	0.8	UNT / South Fork Tenmile Creek	Ephemeral	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	4.1	N/A	N/A	Dry Ditch	Minor	4	WWF	Warmwater	No Restriction	2	3
H-316	S-AA8	0.8	UNT / South Fork Tenmile Creek	Ephemeral	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.0026	N/A	Minor	4	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA10	1.1	UNT / South Fork Tenmile Creek	Intermittent	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	5.0	N/A	N/A	Dry Ditch	Minor	5	WWF	Warmwater	No Restriction	3	3
H-316	S-AA10	1.1	UNT / South Fork Tenmile Creek	Intermittent	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.0029	N/A	Minor	5	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA11	1.3	UNT / South Fork Tenmile Creek	Ephemeral	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	9.6	N/A	N/A	Dry Ditch	Minor	5	WWF	Warmwater	No Restriction	2	3
H-316	S-AA11	1.3	UNT / South Fork Tenmile Creek	Ephemeral	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.0060	N/A	Minor	6.5	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA12	1.3	Ruff Creek	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	51.5	N/A	N/A	Dry Ditch	Intermediate	60	WWF	Warmwater	No Restriction	2	3
H-316	S-AA12	1.3	Ruff Creek	Perennial	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.0372	N/A	Intermediate	60	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA13	2	UNT / South Fork Tenmile Creek	Ephemeral	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	3.2	N/A	N/A	Dry Ditch	Minor	3	WWF	Warmwater	No Restriction	2	3
H-316	S-AA13	2	UNT / South Fork Tenmile Creek	Ephemeral	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.0010	N/A	Minor	3	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA14	2.1	UNT / South Fork Tenmile Creek	Ephemeral	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	3.1	N/A	N/A	Dry Ditch	Minor	3	WWF	Warmwater	No Restriction	2	3
H-316	S-AA14	2.1	UNT / South Fork Tenmile Creek	Ephemeral	Temporary	Workspace	N/A	Pennsylvania	Greene	N/A	0	0.0021	N/A	Minor	3	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA15	2.3	South Fork Tenmile Creek	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	96.2	N/A	N/A	HDD	Intermediate	100	WWF	Warmwater	No Restriction	3	30
H-316	S-AA21	2.5	UNT / South Fork Tenmile Creek	Intermittent	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	4.3	N/A	N/A	HDD i/	Minor	4	WWF	Warmwater	No Restriction	3	215
H-316	S-AA22	2.5	UNT / South Fork Tenmile Creek	Ephemeral	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	7.1	N/A	N/A	HDD i/	Minor	7	WWF	Warmwater	No Restriction	3	215
H-316	S-AA23	2.5	UNT / South Fork Tenmile Creek	Ephemeral	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	9.2	N/A	N/A	HDD i/	Minor	9	WWF	Warmwater	No Restriction	3	220
H-316	S-AA24	2.5	UNT / South Fork Tenmile Creek	Intermittent	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	8.2	N/A	N/A	HDD i/	Minor	9	WWF	Warmwater	No Restriction	3	205
H-316	S-AA20	2.7	UNT / South Fork Tenmile Creek	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	1.8	N/A	N/A	HDD i/	Minor	1	WWF	Warmwater	No Restriction	3	205
H-316	S-AA17	2.8	UNT / South Fork Tenmile Creek	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	12.5	N/A	N/A	HDD i/	Intermediate	12	WWF	Warmwater	No Restriction	3	45
H-316	S-AA18	2.8	UNT / South Fork Tenmile Creek	Intermittent	Route Ctl	Pipeline Route	N/A	Pennsylvania	Greene	2.6	N/A	N/A	HDD i/	Minor	6	WWF	Warmwater	No Restriction	3	40
H-316	S-AA16	3	UNT / South Fork Tenmile Creek	Perennial	Access Ctl	Access Roads	H316 AR 07a	Pennsylvania	Greene	6.3	N/A	N/A	N/A	Minor	5	WWF	Warmwater	No Restriction	N/A	N/A
H-316	S-AA16	3	UNT / South Fork Tenmile Creek	Perennial	Temporary	Access Roads ROW	H316 AR 07a	Pennsylvania	Greene	N/A	0	0.003	N/A	Minor	5	WWF	Warmwater	No Restriction	N/A	N/A
Pratt	S-AA6	0	UNT / South Fork Tenmile Creek	Perennial	Temporary	Pratt Station	N/A	Pennsylvania	Greene	N/A	0	0.0313	N/A	Intermediate	16	WWF	Warmwater	No Restriction	N/A	N/A
Pratt	S-AA7	0.1	UNT / South Fork Tenmile Creek	Ephemeral	Temporary	Pratt Station	N/A	Pennsylvania	Greene	N/A	0	0.0121	N/A	Minor	8	WWF	Warmwater	No Restriction	N/A	N/A
Redhook	S-AA2	0.1	UNT / South Fork Tenmile Creek	Ephemeral	Temporary	ATWS	Redhook ATWS 01	Pennsylvania	Greene	N/A	0	0.0057	N/A	Minor	4	WWF	Warmwater	No Restriction	N/A	N/A
Redhook	S-N2	0	UNT / South Fork Tenmile Creek	Intermittent	Permanent	Redhook Station	N/A	Pennsylvania	Greene	N/A	0.0101	0	N/A	Minor	2	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB4	0.04	Bunola Run	Perennial	Permanent	Groundbed	N/A	Pennsylvania	Allegheny	N/A	0.09	0	N/A	Intermediate	25	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB3	1.7	Kelly Run	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Allegheny	26.2	N/A	N/A	Dry Ditch	Intermediate	30	WWF	Warmwater	No Restriction	2	3
H-318	S-BB3	1.7	Kelly Run	Perennial	Temporary	Workspace	N/A	Pennsylvania	Allegheny	N/A	0	0.0232	N/A	Intermediate	30	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB4	2.8	Bunola Run	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Allegheny	26.0	N/A	N/A	Dry Ditch	Intermediate	25	WWF	Warmwater	No Restriction	2	3
H-318	S-BB4	2.8	Bunola Run	Perennial	Temporary	ATWS	H318 ATWS 05c	Pennsylvania	Allegheny	N/A	0	0.292	N/A	Intermediate	25	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB4	2.8	Bunola Run	Perennial	Temporary	ATWS	H318 ATWS 05c	Pennsylvania	Allegheny	N/A	0	0.033	N/A	Intermediate	25	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB4	2.8	Bunola Run	Perennial	Temporary	Workspace	N/A	Pennsylvania	Allegheny	N/A	0	0.016	N/A	Intermediate	25	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB6	2.8	UNT / Monongahela River	Intermittent	Temporary	ATWS	H318 ATWS 05c	Pennsylvania	Allegheny	N/A	0	0.006	N/A	Minor	10	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB2	3.8	UNT / Monongahela River	Ephemeral	Route Ctl	Pipeline Route	N/A	Pennsylvania	Washington	1.3	N/A	N/A	Dry Ditch	Minor	1	WWF	Warmwater	No Restriction	2	3
H-318	S-BB2	3.8	UNT / Monongahela River	Ephemeral	Temporary	Workspace	N/A	Pennsylvania	Washington	N/A	0	0.0007	N/A	Minor	1	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB1	4.2	Lobbs Run	Intermittent	Access Ctl	Access Roads	H318 AR 07	Pennsylvania	Washington	0.4	N/A	N/A	N/A	Minor	2	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB1	4.2	Lobbs Run	Intermittent	Route Ctl	Pipeline Route	N/A	Pennsylvania	Washington	5.8	N/A	N/A	Dry Ditch	Minor	2	WWF	Warmwater	No Restriction	2	3
H-318	S-BB1	4.2	Lobbs Run	Intermittent	Temporary	Workspace	N/A	Pennsylvania	Washington	N/A	0	0.0047	N/A	Minor	2	WWF	Warmwater	No Restriction	N/A	N/A
H-318	S-BB5	2.95-3.12	Monongahela River g/	Perennial	Route Ctl	Pipeline Route	N/A	Pennsylvania	Allegheny/ Washington	915.0	N/A	N/A	HDD	Major	813	WWF	Warmwater	No Restriction	3	60
H-319	S-A2A	0.04	UNT / North Fork Fishing Creek	Perennial	Access Ctl	Access Roads	H319 AR 01	West Virginia	Wetzel	15.0	N/A	N/A	N/A	Intermediate	15	B	Warmwater	April 1-June 30	N/A	N/A
H-319	S-A2A	0.04	UNT / North Fork Fishing Creek	Perennial	Route Ctl	Pipeline Route	N/A	West Virginia	Wetzel	15.0	N/A	N/A	Dry Ditch	Intermediate	15	B	Warmwater	April 1-June 30	3	3
H-319	S-A2A	0.04	UNT / North Fork Fishing Creek	Perennial	Temporary	Access Roads ROW	H319 AR 01	West Virginia	Wetzel	N/A	0	0.0043	N/A	Intermediate	15	B	Warmwater	April 1-June 30	N/A	N/A
H-319	S-A2A	0.04	UNT / North Fork Fishing Creek	Perennial	Temporary	Workspace	N/A	West Virginia	Wetzel	N/A	0	0.0121	N/A	Intermediate	15	B	Warmwater	April 1-June 30	N/A	N/A
Mobley	S-J63	0	UNT / Mobley Run	Intermittent	Route Ctl	Lateral Tap	N/A	West Virginia	Wetzel	1.6	N/A	N/A	N/A	Minor	7	B	Warmwater	April 1-June 30	N/A	N/A
Mobley	S-J63	0	UNT / Mobley Run	Perennial	Permanent	Mobley Station	N/A	West Virginia	Wetzel	N/A	0.0031	0	N/A	Minor	7	B	Warmwater	April 1-June 30	N/A	N/A
Mobley	S-J63	0	UNT / Mobley Run	Perennial	Temporary	ATWS	Mobley ATWS01	West Virginia	Wetzel	N/A	0	0.0022	N/A	Minor	7	B	Warmwater	April 1-June 30	N/A	N/A
Mobley	S-Z1	0	UNT / Mobley Run	Perennial	Permanent	Mobley Station	N/A	West Virginia	Wetzel	N/A	0.0103	0	N/A	Intermediate	12	B	Warmwater	April 1-June 30	N/A	N/A

Attachment 2-3 Table 2-A-2R (Revised April 20 2016) Waterbodies Crossed by Project <u>a/</u>																				
Project Feature	Waterbody ID	Milepost	Waterbody Name	Flow Type <u>b/</u>	Impact Type	Impact Description	ATWS / Access Road ID	State	County	Length of Crossing (feet) <u>h/</u>	Permanent Impacts (Acres)	Temporary Impacts (Acres)	Crossing Method <u>i/</u>	FERC Classification	Waterbody Width (Feet) <u>k/</u>	Water Use <u>c/</u> , <u>d/</u>	Fishery Type <u>e/</u>	TOYR <u>f/</u>	Class of Pipe	Depth of Cover (Feet)
Webster	S-A2A	0.04	UNT / North Fork Fishing Creek	Perennial	Temporary	ATWS	Webster ATWS 01	West Virginia	Wetzel	N/A	0	0.0993	N/A	Intermediate	15	B	Warmwater	April 1-June 30	N/A	N/A
Webster	S-A3A	0.04	UNT / North Fork Fishing Creek	Intermittent	Temporary	Access Roads ROW	Webster AR 03	West Virginia	Wetzel	N/A	0	0.0009	N/A	Minor	8	B	Warmwater	April 1-June 30	N/A	N/A
Webster	S-A3A	0.04	UNT / North Fork Fishing Creek	Intermittent	Temporary	ATWS	Webster ATWS 01	West Virginia	Wetzel	N/A	0	0.0259	N/A	Minor	8	B	Warmwater	April 1-June 30	N/A	N/A
<div>Notes:</div> <div>UNT – Unnamed Tributary, N/A - Not Applicable</div> <div>a/ Source: Field surveyed data providing locations of the proposed route where access has been granted and where field surveys were completed as of October 21, 2015. All waterbody IDs beginning with "S" are surveyed waterbodies and represent any NHD data (USGS 2014) affected by the Project.</div> <div>b/ From Federal Register / Vol. 80, No. 124 / Monday, June 29, 2015 / Rules</div> <div>Ephemeral streams (rain-dependent streams) have flowing water only in response to precipitation events in a typical year, and are always above the water table.</div> <div>Intermittent streams (seasonal streams) are those that have both precipitation and groundwater providing part of the stream's flow, and flow continuously only during certain times of the year (e.g., during certain seasons such as the rainy season).</div> <div>c/ Pennsylvania Protected and State Water Uses: (Source: 25 Pa. Code 93)</div> <div>WWF = Warm Water Fishes</div> <div>d/ West Virginia State Water Classifications: (Source: W.Va. Code 47CSR2)</div> <div>B = Propagation and Maintenance of fish and other aquatic life</div> <div>e/ Fishery Type: (Source: WVDEP, WWVDNR, and PADEP)</div> <div>f/ TOYR - Time of Year Restriction = Any span of time within time-of-year restrictions set forth by U.S. Army Corps of Engineer's 401 Water Quality Certification for streams crossed in WV and Greene County Conservation District (No date a, b)</div> <div>g/ River crosses county line</div> <div>h/ length of crossing is for linear feature (pipeline or access road) crossing length, which is different than the waterbody width if the crossing is not exactly perpendicular to the waterbody.</div> <div>i/ The HDD crossing for South Fork Tenmile Creek also crosses the unnamed tributaries in the same bore.</div> <div>j/ Dry ditch crossing methods will either be dam and pump or flume.</div> <div>k/ Waterbody width was measured in the field in the center of the survey area (not exactly at the pipeline crossing) and represents the bank full width (not the water width at the time of the survey).</div>																				

Attachment 3-1 Table 3.2-1 (Revised April 20, 2016) Agricultural Land Crossed by the Project Facilities <u>a/</u>		
Project Facility	Acres/Miles Crossed <u>b/</u>	Percent (%) of Facility
H-316 Pipeline		
Pipe Centerline	1.32	44%
Pipeline ROW	8.26	44%
Aboveground Facilities	0.08	69%
Permanent Access Road ROW	0.94	65%
Groundbeds	0.15	34%
Pipeline Workspace	10.79	52%
ATWS	10.43	55%
Yard	1.74	96%
Temporary Access Road ROW	0.73	35%
Subtotal Acres	33.11	
H-318 Pipeline		
Pipe Centerline	1.22	29%
Pipeline ROW	7.27	28%
Aboveground Facilities	0.09	18%
Permanent Access Road ROW	0.00	0%
Groundbeds	0.00	0%
Pipeline Workspace	7.20	34%
ATWS	21.46	56%
Yard	0.00	0%
Temporary Access Road ROW	0.48	13%
Subtotal Acres	36.50	
H-158 and M-80 Pipelines		
Pipe Centerline <u>e/</u>	0.04	19%
Pipeline ROW	0.57	29%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.33	32%
ATWS	0.00	0%
Yard	2.36	71%
Temporary Access Road ROW	0.29	59%
Subtotal Acres	3.55	
H-305 Pipeline		
Pipe Centerline	0.10	100%
Pipeline ROW	0.99	100%
Permanent Access Road ROW	0.18	34%
Pipeline Workspace	0.87	95%
ATWS	0.33	33%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	2.36	
H-319 Pipeline		

Attachment 3-1		
Table 3.2-1		
(Revised April 20, 2016)		
Agricultural Land Crossed by the Project Facilities <u>a/</u>		
Project Facility	Acres/Miles Crossed <u>b/</u>	Percent (%) of Facility
Pipe Centerline	0.00	0%
Pipeline ROW	0.00	0%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.00	
Mobley Tap		
Aboveground Facilities	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Subtotal Acres	0.00	
Redhook Compressor Station		
Aboveground Facilities	13.25	62%
ATWS	0.00	0%
Yard	0.00	0%
Subtotal Acres	13.25	
Pratt Compressor Station		
Aboveground Facilities	6.25	83%
Subtotal Acres	6.25	
Webster Interconnect		
Aboveground Facilities	0.00	0%
Permanent Access Road ROW	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.00	
Grand Total Miles	2.69	
Grand Total Acres	95.03	
<u>a/</u> NLCD categories include Pasture/Hay and Cultivated Crops.		
<u>b/</u> Pipe Centerline values equal miles; all other values in the table equal acreages of expected impacts.		

Attachment 3-1		
Table 3.2-2		
(Revised April 20, 2016)		
Upland Deciduous Forest Crossed by the Project Facilities <u>a/</u>		
Project Facility	Acres/Miles Crossed <u>b/</u>	Percent (%) of Facility
H-316 Pipeline		
Pipe Centerline	1.45	49%
Pipeline ROW	8.91	48%
Aboveground Facilities	0.03	31%
Permanent Access Road ROW	0.39	27%
Groundbeds	0.00	0%
Pipeline Workspace	7.63	37%
ATWS	7.76	41%
Yard	0.08	4%
Temporary Access Road ROW	0.67	32%
Subtotal Acres	25.48	
H-318 Pipeline		
Pipe Centerline	2.01	47%
Pipeline ROW	12.45	48%
Aboveground Facilities	0.40	82%
Permanent Access Road ROW	0.00	0%
Groundbeds	0.00	0%
Pipeline Workspace	10.35	49%
ATWS	11.92	31%
Yard	1.26	20%
Temporary Access Road ROW	2.27	60%
Subtotal Acres	38.64	
H-158 and M-80 Pipelines		
Pipe Centerline <u>e/</u>	0.16	65%
Pipeline ROW	1.06	53%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.51	51%
ATWS	0.18	33%
Yard	0.13	4%
Temporary Access Road ROW	0.01	2%
Subtotal Acres	1.89	
H-305 Pipeline		
Pipe Centerline	0.00	0%
Pipeline ROW	0.00	0%
Permanent Access Road ROW	0.34	66%
Pipeline Workspace	0.05	5%
ATWS	0.68	67%

Attachment 3-1		
Table 3.2-2		
(Revised April 20, 2016)		
Upland Deciduous Forest Crossed by the Project Facilities <u>a/</u>		
Project Facility	Acres/Miles Crossed <u>b/</u>	Percent (%) of Facility
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	1.07	
H-319 Pipeline		
Pipe Centerline	0.00	0%
Pipeline ROW	0.16	56%
Permanent Access Road ROW	0.02	100%
Pipeline Workspace	0.14	83%
ATWS	0.09	100%
Yard	0.04	17%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.44	
Mobley Tap		
Aboveground Facilities	0.00	0%
ATWS	0.04	38%
Yard	0.00	0%
Subtotal Acres	0.04	
Redhook Compressor Station		
Aboveground Facilities	4.93	23%
ATWS	0.51	34%
Yard	0.00	0%
Subtotal Acres	5.44	
Pratt Compressor Station		
Aboveground Facilities	0.26	4%
Subtotal Acres	0.26	
Webster Interconnect		
Aboveground Facilities	0.26	32%
Permanent Access Road ROW	0.00	11%
ATWS	0.53	38%
Yard	0.00	0%
Temporary Access Road ROW	0.04	42%
Subtotal Acres	0.83	
Grand Total Miles	3.61	
Grand Total Acres	72.79	
<u>a/</u> NLCD categories include Deciduous Forest		
<u>b/</u> Pipe Centerline values equal miles; all other values in the table equal acreages of expected impacts.		

Attachment 3-1		
Table 3.2-3		
(Revised April 20, 2016)		
Herbaceous Upland Crossed by the Project Facilities <u>a/</u>		
Project Facility	Acres/Miles Crossed <u>b/</u>	Percent (%) of Facility
H-316 Pipeline		
Pipe Centerline	0	0%
Pipeline ROW	0.02	0%
Aboveground Facilities	0.00	0%
Permanent Access Road ROW	0.00	0%
Groundbeds	0.00	0%
Pipeline Workspace	0.26	1%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.28	
H-318 Pipeline		
Pipe Centerline	0.20	4%
Pipeline ROW	1.13	4%
Aboveground Facilities	0.00	0%
Permanent Access Road ROW	0.00	0%
Groundbeds	0.00	0%
Pipeline Workspace	0.86	4%
ATWS	0.00	0%
Yard	0.08	1%
Temporary Access Road ROW	0.11	3%
Subtotal Acres	2.18	
H-158 and M-80 Pipelines		
Pipe Centerline <u>c/</u>	0	0%
Pipeline ROW	0.00	0%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.00	
H-305 Pipeline		
Pipe Centerline	0	0%
Pipeline ROW	0.00	0%

Attachment 3-1		
Table 3.2-3		
(Revised April 20, 2016)		
Herbaceous Upland Crossed by the Project Facilities <u>a/</u>		
Project Facility	Acres/Miles Crossed <u>b/</u>	Percent (%) of Facility
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.00	
H-319 Pipeline		
Pipe Centerline	0	0%
Pipeline ROW	0.00	0%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.00	
Mobley Tap		
Aboveground Facilities	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Subtotal Acres	0.00	
Redhook Compressor Station		
Aboveground Facilities	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Subtotal Acres	0.00	
Pratt Compressor Station		
Aboveground Facilities	0.23	3%
Subtotal Acres	0.23	
Webster Interconnect		
Aboveground Facilities	0.00	0%
Permanent Access Road ROW	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.00	
Grand Total Miles	0.20	

Attachment 3-1**Table 3.2-3****(Revised April 20, 2016)****Herbaceous Upland Crossed by the Project Facilities a/**

Project Facility	Acres/Miles Crossed <u>b/</u>	Percent (%) of Facility
Grand Total Acres	2.69	

a/ NLCD categories include Grassland/Herbaceous.b/ Pipe Centerline values equal miles; all other values in the table equal acreages of expected impacts.

Attachment 3-1		
Table 3.2-4		
(Revised April 20, 2016)		
Wetlands Crossed by the Project Facilities <u>a/</u>		
Project Facility	Acres/Miles Crossed <u>b/</u>	Percent (%) of Facility
H-316 Pipeline		
Pipe Centerline	0.02	≤1%
Pipeline ROW	0.15	1%
Aboveground Facilities	0.00	0%
Permanent Access Road ROW	0.00	≤1%
Groundbeds	0.00	0%
Pipeline Workspace	0.03	≤1%
ATWS	0.43	2%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.61	
H-318 Pipeline		
Pipe Centerline	0.08	2%
Pipeline ROW	0.55	2%
Aboveground Facilities	0.00	0%
Permanent Access Road ROW	0.00	0%
Groundbeds	0.00	0%
Pipeline Workspace	0.19	1%
ATWS	0.03	≤1%
Yard	0.00	≤1%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.77	
H-158 and M-80 Pipelines		
Pipe Centerline <u>e/</u>	0	0%
Pipeline ROW	0.00	0%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.00	
H-305 Pipeline		
Pipe Centerline	0	0%
Pipeline ROW	0.00	0%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%

Attachment 3-1		
Table 3.2-4		
(Revised April 20, 2016)		
Wetlands Crossed by the Project Facilities <u>a/</u>		
Project Facility	Acres/Miles Crossed <u>b/</u>	Percent (%) of Facility
Subtotal Acres	0.00	
H-319 Pipeline		
Pipe Centerline	0.01	16%
Pipeline ROW	0.04	≤1%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.02	13%
ATWS	0.00	0%
Yard	0.09	35%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.15	
Mobley Tap		
Aboveground Facilites	0.00	0%
ATWS	0.00	0%
Yard	0.00	0%
Subtotal Acres	0.00	
Redhook Compressor Station		
Aboveground Facilites	0.00	≤1%
ATWS	0.00	0%
Yard	0.00	0%
Subtotal Acres	0.00	
Pratt Compressor Station		
Aboveground Facilites	0.08	1%
Subtotal Acres	0.08	
Webster Interconnect		
Aboveground Facilites	0.00	0%
Permanent Access Road ROW	0.00	0%
ATWS	0.02	1%
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.02	
Grand Total Miles	0.11	
Grand Total Acres	1.46	
<u>a/</u> Wetland impacts were calculated based on field delineated wetlands.		
<u>b/</u> Pipe Centerline values equal miles; all other values in the table equal acreages of expected impacts.		

Attachment 3-1 Table 3.2-5 (Revised April 20, 2016)		
Industrial, Commercial, and Residential Uses Crossed by the Project Facilities <u>a/</u>		
Project Facility	Acres/Miles Crossed <u>b/</u>	Percent (%) of Facility
H-316 Pipeline		
Pipe Centerline	0.19	6%
Pipeline ROW	1.29	7%
Aboveground Facilities	0.00	0%
Permanent Access Road ROW	0.12	8%
Groundbeds	0.30	66%
Pipeline Workspace	2.06	10%
ATWS	0.60	3%
Yard	0.00	0%
Temporary Access Road ROW	0.70	33%
Subtotal Acres	5.08	
H-318 Pipeline		
Pipe Centerline	0.68	16%
Pipeline ROW	4.01	16%
Aboveground Facilities	0.00	0%
Permanent Access Road ROW	0.00	0%
Groundbeds	0.56	100%
Pipeline Workspace	2.77	13%
ATWS	4.85	13%
Yard	4.88	79%
Temporary Access Road ROW	0.94	25%
Subtotal Acres	18.01	
H-158 and M-80 Pipelines		
Pipe Centerline <u>e/</u>	0.04	16%
Pipeline ROW	0.35	18%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.17	17%
ATWS	0.35	67%
Yard	0.85	26%
Temporary Access Road ROW	0.19	39%
Subtotal Acres	1.92	
H-305 Pipeline		
Pipe Centerline	0.00	0%
Pipeline ROW	0.00	0%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.00	0%
ATWS	0.00	0%

Attachment 3-1 Table 3.2-5 (Revised April 20, 2016)		
Industrial, Commercial, and Residential Uses Crossed by the Project Facilities <u>a/</u>		
Project Facility	Acres/Miles Crossed <u>b/</u>	Percent (%) of Facility
Yard	0.00	0%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.00	
H-319 Pipeline		
Pipe Centerline	0.02	45%
Pipeline ROW	0.12	44%
Aboveground Facilities	0.004	100%
Permanent Access Road ROW	0.00	0%
Pipeline Workspace	0.03	17%
ATWS	0.00	0%
Yard	0.21	83%
Temporary Access Road ROW	0.00	0%
Subtotal Acres	0.36	
Mobley Tap		
Aboveground Facilities	0.38	100%
ATWS	0.07	62%
Yard	0.00	0%
Subtotal Acres	0.45	
Redhook Compressor Station		
Aboveground Facilities	3.10	15%
ATWS	0.99	66%
Yard	0.00	0%
Subtotal Acres	4.09	
Pratt Compressor Station		
Aboveground Facilities	0.73	10%
Subtotal Acres	0.73	
Webster Interconnect		
Aboveground Facilities	0.56	68%
Permanent Access Road ROW	0.03	89%
ATWS	0.87	62%
Yard	0.00	0%
Temporary Access Road ROW	0.05	58%
Subtotal Acres	1.52	
Grand Total Miles	0.93	
Grand Total Acres	29.82	
<u>a/</u> NLCD categories include Developed, Open Space; Developed, Low Intensity; Developed, Medium Intensity; and, Developed, High Intensity. <u>b/</u> Pipe Centerline values equal miles; all other values in the table equal acreages of expected impacts.		



Equitrans Expansion Project

Docket No. CP16-13-000

Attachment 3-4

Migratory Bird Conservation Plan

(Revised April 20, 2016)

April 2016

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1.0 Introduction

Equitrans, L.P. (Equitrans) is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission (FERC) pursuant to Section 7(c) of the Natural Gas Act authorizing it to construct and operate the Equitrans Expansion Project (Project) located in three counties in Pennsylvania and one county in West Virginia. Equitrans plans to construct approximately 7.87 miles of pipeline (at multiple separate locations), a new compressor station, an interconnect with the proposed Mountain Valley Pipeline, and ancillary facilities. In addition, Equitrans is seeking authorization pursuant to Section 7(b) of the Natural Gas Act to abandon an existing compressor station following the construction of the new compressor station.

The Project is designed to transport natural gas from the northern portion of the Equitrans system south to the new interconnect with the Mountain Valley Pipeline, as well as to existing interconnects with Texas Eastern Transmission, LP, Dominion Transmission, Inc., and Columbia Gas Transmission, LLC. The Project will provide shippers with additional flexibility to transport natural gas produced in the central Appalachian Basin to meet the growing demand by local distribution companies, industrial users, and power generation facilities located in local, northeastern, Mid-Atlantic, and southeastern regions of the United States (U.S.). The Project also will increase system reliability, efficiency, and operational flexibility for the benefit of all Equitrans customers. The Project is designed to add up to 600,000 dekatherms per day of north-south firm capacity on the Equitrans system.

To comply with federal and state laws protecting migratory and/or threatened/endangered bird species, the Project was evaluated for potential risks to and mitigation for migratory birds via a Migratory Bird Conservation Plan (MBCP). This MBCP outlines the purpose and need for the evaluation, the applicable regulatory framework, the methods and results of the evaluation, and potential mitigation measures.

2.0 Purpose and Need

The Project is located within the Atlantic Flyway, which is a bird migration route that generally follows the Atlantic Coast of North America and the Appalachian Mountains. This route is used by birds typically because no mountains or even ridges of hills block this path over its entire extent, and the pathway contains good sources of water, food, and cover over its entire length.

Construction activities occurring during the nesting season for migratory birds (approximately April 15 to August 1) could result in direct and indirect effects on migratory birds. Some potential effects caused by Project construction may include habitat loss, fragmentation, or degradation; disruption in foraging, breeding and survival behavior; destruction or abandonment of active nests; and/or accidental injury or death of adults, offspring, or eggs. Nearly all bird species known or with the potential to occur in the Project area are protected by the Migratory Bird Treaty Act (MBTA). Furthermore, bald eagle (*Haliaeetus leucocephalus*) and other bird species legally designated as endangered, threatened, or species of concern by federal or state laws may occur in the Project area, necessitating a review of occurrence data and evaluation of mitigation measures.

This MBCP has been prepared to address:

- Migratory bird species and their associated habitat within the Project area;
- Conservation requirements for migratory bird species within the Project area; and
- Equitrans' strategies to avoid and minimize impacts on migratory birds and their associated habitats.

This MBCP also identifies Equitrans' responsibilities as required under the MBTA and other federal regulations, and their voluntary commitments to conserving migratory birds in the Project area. This MBCP has been submitted to the FERC and interested state and federal agencies for review and comment before it was finalized for implementation.

3.0 Pipeline Road Crossings

Federal bird protection laws applicable to the Project include the Endangered Species Acts (ESA), MBTA, and Bald and Gold Eagle Protection Act, which are administered by the U.S. Fish and Wildlife Service (USFWS). Birds also are covered by the Pennsylvania Endangered Species Program, which is administered by the Pennsylvania Game Commission (PGC). West Virginia does not have state legislation for designation of listed endangered, threatened, or rare species.

3.1 ENDANGERED SPECIES ACT

The federal ESA (16 U.S. Code [USC] §1531–1544) provides measures to prevent extinction of plant fish, and wildlife species identified as species of concern, threatened, or endangered. Its purpose is “to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved” and “to provide a program for the conservation of such ... species.” Section 7 of the federal ESA requires interagency consultation for activities that may impact protected species, Section 9 defines activities that are prohibited, and Section 10 establishes permits and exceptions that may be granted to the prohibitions identified in Section 9.

A Project letter received from the USFWS Pennsylvania Field Office did not identify any bird species protected by the federal ESA within the Project area.

3.2 MIGRATORY BIRD TREATY ACT

Migratory birds are those that nest in the U.S. and Canada during the summer, and then migrate south to tropical regions located in Mexico, Central and South America, and the Caribbean for the non-breeding season. Migratory birds are protected under the MBTA (16 USC §703–712), which prohibits the taking, killing, injuring, or capture of listed migratory birds or any part, nest, or egg of migratory birds which prohibits the taking of any migratory bird, or a part, nest, or eggs of any such bird; except under the terms of a valid permit issued pursuant to federal regulations. The MBTA also protects resident, non-migratory bird species in the U.S. and its territories; and provides for protection of migratory birds that may not be afforded protection under state or federal ESAs. Currently the MBTA provides for protection of over 1,000 migratory bird species (50 Code of Federal Regulations [CFR] Part 10.13). Of these, 185 species have been documented in the Project areas during some portion of the year (ebird 2015) (Table 1). A complete list of birds protected by the MBTA is available at USFWS' website (<http://www.fws.gov/birds/management/managed-species/migratory-bird-treaty-act-protected-species.php>).

The MBTA permitting process for “incidental take” of migratory birds does allow killing or injuring of migratory birds resulting from project activities (50 CFR Part 21), but it does function as a strict liability statute, and knowledge or intent is not required to be liable for take under the act. Thus, accidental take of migratory birds can be prosecuted as a criminal act.

A Project letter received from the USFWS Pennsylvania Field Office identified conservation measures for protection of migratory birds (see Section 5).

3.3 BALD AND GOLDEN EAGLE PROTECTION ACT

The Bald and Golden Eagle Protection Act (BGEPA, 16 USC §668–668d) is administered by USFWS, and provides additional protection regarding take of bald eagle or golden eagle (*Aquila chrysaetos*). “Take” is defined as “to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, or molest, or disturb.” “Disturb” is defined in 50 CFR Part 22.3 as “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.” The USFWS published the Eagle Permit Rule under the BGEPA on September 11, 2009 that authorizes limited issuance of permits to take bald and golden eagles “for the protection of...other interests in any particular locality”, where the take is compatible with the preservation of the bald eagle or the golden eagle, is associated with and not the purpose of an otherwise lawful activity, and cannot practicably be avoided (Federal Register 46836–46879).

The USFWS Information, Planning, and Conservation (IPaC) database review for the Project area reports the bald eagle as a potential year-round resident species, and this species has been identified as occurring in the Project area. A review of the USFWS Pennsylvania Field Office Pennsylvania Bald Eagle Nest Locations and Buffer Zones map (USFWS 2014) did not identify any bald eagle nests in the Project area, and a Project response letter received from USFWS did not identify bald eagle as a species of concern for the Project (USFWS 2015). No bald eagle nest sites have been identified for the West Virginia area of the Project, and completed field surveys to date have not identified presence of bald eagle nests.

3.4 UNITED STATES FISH AND WILDLIFE SERVICE BIRDS OF CONSERVATION CONCERN

As part of the 1988 amendment to the Fish and Wildlife Conservation Act (16 USC §2901-2911) the USFWS is required to identify species, subspecies, and populations of all nongame migratory birds that, without additional conservation actions, are likely to become candidates for listing under the ESA of 1973. The most recent effort by USFWS to carry out this mandate is the 2008 list of Birds of Conservation Concern (BCC) (USFWS 2008). Bird species considered for the BCC include nongame birds, gamebirds without hunting seasons, subsistence-hunted nongame birds in Alaska, and ESA candidate, proposed, and recently delisted species.

The overall goal of the BCC documentation is to accurately identify the migratory and non-migratory bird species (beyond those already listed as endangered or threatened under the federal ESA) that represent the USFWS’ highest conservation priorities. The USFWS has identified BCC species for each established Bird Conservation Regions (BCRs) to stimulate the implementation of coordinated, proactive management and conservation actions among federal, state, tribal, and private partners to prevent these species from being listed under the ESA. Additionally, the BCR lists are intended to assist federal land-managing agencies and their partners in their efforts to abide by the bird conservation principles embodied in the MBTA and Executive Order (EO) 13186 (see Section 3.5). Section 5 and Table 2 provide additional information for BCC species identified for the BCR and those that have been documented as occurring in Project area.

3.5 OTHER FEDERAL REGULATIONS AND AGREEMENTS FOR PROTECTION OF MIGRATORY BIRDS

EO 13186 (66 Federal Register 3853) directs federal agencies to identify where unintentional take is likely to have a measurable negative effect on migratory bird populations and to avoid or minimize adverse effects on migratory birds through enhanced collaboration with the USFWS. Executive Order 13186 states that

emphasis should be placed on species of concern, priority habitats, and key risk factors, and that particular focus should be given to addressing population-level impacts.

The USFWS and the FERC entered into a Memorandum of Understanding on March 30, 2011 that focuses on avoiding or minimizing adverse effects on migratory birds and strengthening migratory bird conservation through enhanced collaboration between the two agencies. This voluntary Memorandum of Understanding does not waive legal requirements under the MBTA, BGEPA, ESA, Federal Power Act, Natural Gas Act, or any other statutes and does not authorize the take of migratory birds.

3.4 PENNSYLVANIA ENDANGERED SPECIES PROGRAM

The PGC Endangered Species Program (Title 34 Statute 2167) provides for protection of state-listed threatened and endangered species. Title 34 Statute 2167 states that “it is unlawful for any person, acting either for himself or as the representative of another, to bring into or remove from this Commonwealth, or to possess, transport, capture or kill, or attempt, aid, abet or conspire to capture or kill, any wild bird or wild animal, or any part thereof, or the eggs of any wild bird, which are endangered or threatened species”.

A Project letter received from PGC indicated that although Pennsylvania Natural Diversity Inventory records of bird species of concern are located in the vicinity of the Project, the Project as described would not likely impact bird species (PGC 2015).

4.0 Analysis of Potential Risks to Birds

The USFWS has expressed concern for potential Project impacts to migratory birds, and avian mortality from habitat destruction and alternation within the Project boundaries (USFWS 2015). Equitrans has considered site-specific factors during Project design and siting to avoid and minimize risks to birds to the extent practicable. Avian abundance; quality, quantity, and type of habitat; geographic location; type and extent of bird use (e.g. breeding, foraging, migration); and landscape features are all considerations that could impact migratory birds and avian survivorship in the Project area. A brief description of Project habitats is provided in the following sub-sections, as well as an analysis of potential risks to birds focused on disturbance of habitats, and habitat conversion and fragmentation resulting from construction.

4.1 PROJECT HABITATS

National Land Cover Database (NLCD) land classes mapped along the Project route consist of agricultural land, industrial, commercial, and residential areas. Major natural vegetation land classes include forested upland, herbaceous upland, and wetlands. Industrial and commercial land includes manufacturing or industrial plants; paved areas, landfills, mines, quarries electric power, or natural gas utility facilities; developed areas, roads, railroads and railroad yards; and commercial or retail facilities. Residential areas include existing developed residential areas and planned residential developments. This may include large developments, low, medium, and high density residential neighborhoods, urban/suburban residential, multi-family residences, ethnic villages, and residentially zoned areas that have been developed or short segments of the route at road crossings with homes near the route alignment. Industrial, commercial and residential areas are not discussed further as these land classes generally provide limited suitable habitat for migratory bird species.

Project construction activities will result in both permanent conversion of vegetation to construct and operate Project facilities, as well as temporary impacts to vegetation during construction. Project construction activities, including vegetation clearing, will be conducted during migratory bird nesting seasons.

Bird species and their use of these habitats are briefly described in this section. Habitat descriptions are based on the NLCD, which are broad, and additional, more specialized habitat types are likely located

throughout the Project area. Additionally, the bird species habitat association information provided is not intended to represent an inclusive list of all migratory bird species that may utilize each habitat type, but is provided to illustrate representative bird species that may be associated with these habitats in the Project area.

Agricultural Land

Approximately 90.71 acres of agricultural land will be impacted by the Project, including 35.02 acres of permanent impacts and 55.69 acres of temporary impacts. Agricultural lands include pastureland, hay fields, and cultivated crops, and can provide habitat for species adapted to living in open areas (e.g., grasslands). Species that commonly occur in agricultural lands that have been documented in the Project area include the brown-headed cowbird (*Molothrus ater*), mourning dove (*Zenaida macroura*) and barn swallow (*Hirundo rustica*) (ebird 2015) (see Table 1). Seasonally flooded fields can serve as stopover sites for migrating waterfowl that occur in the Project area including ring-necked duck (*Aythya collaris*), lesser scaup (*Aythya affinis*), and hooded merganser (*Lophodytes cucullatus*). BCC species associated with agricultural lands that have been documented in the Project area include red-headed woodpecker (*Melanerpes erythrocephalus*) and rusty blackbird (*Euphagus carolinus*) (see Table 2).

Forested Upland

Approximately 74.67 acres of upland deciduous forest habitat will be impacted by the Project, including 29.98 acres of permanent impacts and 44.66 acres of temporary impacts. The NLCD forested upland land class includes deciduous forest, evergreen forest, and mixed deciduous-evergreen forest. Of the NLCD forested upland sub-classes, only deciduous forest is mapped within the Project area. Upland deciduous forests are dominated by trees generally greater than 15 feet tall and contain greater than 20 percent of total vegetation cover. More than 75 percent of the tree species shed foliage simultaneously in response to seasonal change. A variety of upland deciduous forest vegetation communities are present along the Project route, but the dominant type is oak-hickory forest, followed by mixed mesophytic forest.

A variety of songbirds, including migrants and resident species, utilize upland forest habitats; feeding on insects within the forest canopy. Breeding birds may use a variety of nesting sites, on the forest floor, within understory vegetation, and within the tree canopy. Other common resident species that inhabit upland forest communities that have been documented in the Project area include blue jay (*Cyanocitta cristata*) and red-bellied woodpecker (*Melanerpes carolinus*) (Table 1). Forested uplands also are important to migratory and nesting song birds including Acadian flycatcher (*Empidonax vireescens*), great crested flycatcher (*Myiarcus crinitus*), black-and-white warbler (*Mniotilta varia*), hooded warbler (*Setophaga citrina*), ovenbird (*Seiurus aurocapilla*), and scarlet tanager (*Piranga olivacea*), all of which have been documented in the Project area (ebird 2015) (Table 1). BCC species associated with upland forest habitats that have been documented in the Project area include black-capped chickadee (*Poecile atricapillus*), cerulean warbler (*Setophaga cerulea*), Kentucky warbler (*Geothlypis formosa*), Louisiana waterthrush (*Parkesia motacilla*), northern saw-whet owl (*Aegolius acadicus*), red-headed woodpecker, and wood thrush (*Hylocichla mustelina*) (Table 2).

Herbaceous Upland

Approximately 2.72 acres of upland herbaceous habitat will be impacted by the Project, including 1.37 acres of permanent impacts and 1.35 acres of temporary impacts. Herbaceous upland includes natural to semi-natural areas of open grassland that is dominated by grammanoid or herbaceous vegetation, generally greater than 80 percent of total vegetation, and is not subject to intensive management such as tilling but can be utilized for grazing. Early successional and grassland habitats provide habitat for ground-nesting birds. Natural to semi-natural grasslands support species adapted to living in open areas that are dominated by grasses and forbs. Common nesting grassland birds that have been documented in the Project area include

eastern meadowlark (*Sturnella magna*), vesper sparrow (*Pooecetes gramineus*), and grasshopper sparrow (*Ammodramus savannarum*) (Table 1). American kestrel (*Falco sparverius*) and eastern bluebird (*Sialia sialis*) also occur, and prefer these open areas and nest where suitable cavities (e.g., snags) are available.

Other bird species documented in the Project area include those that prefer edge habitats such as eastern meadowlark, killdeer (*Charadrius vociferus*) and song sparrow (*Melospiza melodia*). BCC species associated with edge habitats that have been documented in Project area include prairie warbler (*Setophaga discolor*), blue-winged warbler (*Vermivora cyanoptera*), upland sandpiper (*Bartramia longicauda*), red-headed woodpecker, and peregrine falcon (*Falco peregrinus*) (Table 2)

Wetland Habitats

Approximately 1.63 acres of wetland habitat will be impacted by the Project, including 0.82 acres of permanent impacts and 0.80 acres of temporary impacts. Wetland habitats include forested, scrub-shrub, and freshwater emergent wetlands. Forested wetlands provide a diverse plant community and provide an important source of food and shelter. Forested wetlands also provide areas for migratory stopovers, wintering, and breeding for species documented in the Project area such as wood duck (*Aix sponsa*), great blue heron (*Ardea herodias*), and swamp sparrow (*Melospiza georgiana*) (Table 1). Other migratory bird species documented in the Project area that utilize forested wetland habitats include wood thrush and Canada warbler (*Cardellina canadensis*), which are both BCC species (Table 2).

Scrub-shrub wetlands provide nesting sites for birds, and representative species documented in the Project area includes red-winged blackbird (*Agelaius phoeniceus*), swamp sparrow, great egret (*Ardea alba*), and Canada warbler.

Freshwater emergent wetlands provide breeding habitat for birds known to occur in the Project area including red-winged blackbird, great blue heron, great egret, mallard (*Anas platyrhynchos*), and pied-billed grebe (*Podilymbus podiceps*).

4.2 CONSTRUCTION-BASED DISTURBANCE

In total, Project construction will affect approximately 164.30 acres of agricultural land, forested upland, herbaceous upland, and wetland habitat; however, 97% percent (160.12 acres) of impacted habitat will occur in agricultural land and deciduous forest habitat. To the extent practicable, Project pipeline routes have been co-located with or adjacent to existing utility corridors.

The effect of the Project on bird species and their habitats will vary, and is dependent upon the specific habitat requirements for each species and the extent of these habitats occurring within the Project area. Direct effects from construction include the displacement of birds along the right-of-way and possible direct mortality of some individuals. However, it is expected that most bird species would be able to leave active construction work areas. Depending on the construction schedule and breeding season for each species, construction activities could disrupt bird courtship and other breeding behaviors, nesting, and/or foraging within and adjacent to work areas. Many bird species would relocate into similar, nearby habitats; however, if adequate or high quality habitats in the immediate area are lacking, birds could relocate to suboptimal habitats, which could contribute to increased inter- and intra-specific competition and lower reproductive success and survival. In turn, the relocation of birds to undisturbed areas could increase bird densities, which could result in reduced reproductive success of bird species that have not been displaced by construction.

Vegetation clearing also will result in permanent and temporary reduction in available habitat. The degree of effect is dependent upon habitat type affected and the rate of vegetation regeneration (in areas subject to temporary impacts) once construction activities have been completed. Impacts to forest dwelling bird

species would be greater due to longer regeneration periods of upland forest habitats subject to temporary impacts.

4.3 HABITAT CONVERSION AND FRAGMENTATION

Habitat conversion, fragmentation, or temporary modification can affect migratory birds. Migratory bird species that prefer grass, shrub, and forest edge habitats found within the existing right-of-ways may be impacted indirectly via temporary modification of habitat during and immediately after construction. Some benefits to breeding and nesting bird species could occur from the conversion of forest habitats to scrub-shrub habitats within the pipeline right-of-ways that will be maintained, and increased foraging habitat could occur if the amount of open wetlands is increased. The permanent, maintained right-of-way will provide a travel corridor for many wildlife species, such as bats or birds of prey, and may provide food, shelter, and breeding habitat for species that prefer open herbaceous or scrub-shrub early successional habitats to forested habitats.

Upland forest habitat removed within the permanent right-of-ways would directly impact forest dwelling bird species, resulting in a reduction of available habitat due to permanent conversion of this habitat type to scrub-shrub habitat within the maintained pipeline corridors.

Habitat fragmentation resulting from clearing rights-of-way during construction, may create edge effects that alter the intact community, attracting those species most adapted to edge habitats. Forest dwelling bird species would be most negatively affected in comparison to species associated with shrub or open habitats, since shrub and herbaceous upland habitats would be expected to regenerate more quickly. However, the Project does not cross intact interior forest habitat so there will be no measureable increases to forest fragmentation. The effect on species that commonly inhabit agricultural lands would be relatively minor and temporary as this habitat type is normally subject to a regular disturbance regime, and are generally replanted during the completion of Project construction activities. Overall impacts to upland herbaceous and wetland habitats and bird species that utilize these habitats is expected to be minimal due to the limited impacts to these habitat types identified for the Project.

5.0 Results and Proposed Mitigation

According to the USFWS BCC 2008 report, the Project is located within Bird Conservation Region (BCR) 28 (Appalachian Mountains), which contains 25 BCC species (Table 2). Each BCR maintains a list of BCC species, including migratory and non-migratory birds that are of conservation concern and are considered species that, without additional conservation measures, may become candidates for the ESA (USFWS 2008). None of the 25 BCC species that are associated with the Appalachian Mountains BCR crossed by the Project have been identified as species of concern by agencies having jurisdiction of these species in the Project area. Of the 25 USFWS BCC species identified for BCR 28, 18 species have been confirmed in one or more of the Project areas (Table 2). The Project does not cross any known eagle concentration areas, and no bald eagles or their nests have been documented in the Project area. Construction activities are not likely to disturb nesting bald eagles.

The primary construction activity posing the most direct and indirect impact to nesting migratory birds and their habitat is vegetation removal, particularly forested uplands. Proactive measures, such as those provided in this MBCP and Project-specific recommendations received from USFWS, will ensure migratory birds are protected during Project construction, and will minimize the risk of bird disturbance, injury, mortality, and habitat loss.

During the planning process for this Project, Equitrans considered several measures to limit effects to migratory birds, including:

- Routing Project facilities to avoid sensitive resources where possible;
- Reducing the right-of-way in sensitive resource areas;
- Co-locating Project facilities with existing pipeline or utility rights-of-way where feasible; and
- Minimizing fragmentation of habitats to the maximum extent possible.

Additional measures identified by Equitrans to be implemented during construction that will contribute to the protection of migratory birds and other wildlife includes:

- Adhering to measures outlined in the Project's Erosion and Sediment Control Plan; and
- Conducting all tree and vegetation clearing between August 2 and April 14, per the FERC's May 2013 version of the *Upland Erosion Control, Revegetation, and Maintenance Plan* (FERC Plan), to avoid impacts on nesting birds; if vegetation clearing is necessary outside of this period, these activities will be coordinated and approved by USFWS; and
- Environmental training of Equitrans personnel and inspection of construction and restoration activities.

The following are Project recommendations provided by USFWS for protection of migratory birds, and a description of how Equitrans will implement these recommendations during Project construction:

1. Conduct ground/vegetation disturbances between August 2 and April 14 – As practicable, Equitrans intends to conduct vegetation and tree clearing during the recommended period identified in the FERC Plan, or as authorized by USFWS for vegetation clearing activities conducted outside of this period, to avoid impacts to nesting and migratory birds.
2. Minimize land and vegetation clearing – Equitrans has co-located with existing utility corridors and has made use of existing access roads to the extent practicable. Equitrans also has used open or previously disturbed areas for laydown/staging/yards, further reducing impacts. Construction widths at stream and wetland crossings will be limited to 75 feet; crossings are planned for the narrowest point and perpendicular to the waterbody. Where Horizontal Directional Drill (HDD) methods are planned, vegetation clearing will be avoided, which will limit impacts on wetlands and forested land.
3. Avoid areas where birds are concentrated – The Project avoids areas where birds would concentrate, such as designated state or federal refuges, Audubon Important Bird Areas, private duck clubs, avian staging areas, rookeries, leks, roosts, and riparian areas.
4. Avoid fragmentation – Where practicable, the Project is co-located with existing utility corridors. Additionally, 20 percent of the Project occurs on agricultural lands. Where HDD is planned, the permanent right-of-way will be left intact, avoiding impacts on approximately 1.4 miles of habitat. In addition, the Project does not cross intact interior forest habitat; therefore, minimizing forest fragmentation and its associated impacts on migratory birds.
5. Minimize construction site hazards to wildlife – To minimize potential impacts on wildlife species that could result from construction equipment and vehicle activities (i.e., vehicle collisions, wildlife falling into with open trenches), Equitrans will employ specific measures, including implementing speed restrictions for construction vehicles and equipment traffic, as well as escape ramps or routes in open trenches, and constructing breaks in windrows for wildlife travel corridors.
6. Develop a habitat restoration plan – The vegetation clearing during construction and operations will be scheduled to occur between August 2 and April 14. Native vegetation will be used in developing seed mixes for temporary and permanent seed cover, and one of the key components of the native seed mixes will be inclusion of native flowering plants for the express benefit of native and

domestic pollinators (bees). Equitrans will complete restoration activities in compliance with the FERC Plan and FERC's May 2013 version of the *Wetland and Waterbody Construction and Mitigation Procedures*, as well as its state earth disturbance permits.

TABLE 1.
MIGRATORY BIRD SPECIES DOCUMENTED (X) OR POTENTIALLY OCCURRING (P) IN THE PROJECT AREA

Common Name /a	Scientific Name	Project Area Greene County	Project Area Allegheny and Washington Counties	Project Area Wetzel County
Acadian flycatcher	<i>Empidonax virescens</i>	X	P	X
Alder flycatcher	<i>Empidonax alnorum</i>	X	P	X
American black duck	<i>Anas rubripes</i>	X	P	-
American coot	<i>Fulica americana</i>	P	X	P
American crow	<i>Corvus brachyrhynchos</i>	X	X	X
American goldfinch	<i>Spinus tristis</i>	X	X	X
American kestrel	<i>Falco sparverius</i>	X	X	X
American redstart	<i>Setophaga ruticilla</i>	X	P	X
American robin	<i>Turdus migratorius</i>	X	X	X
American tree sparrow	<i>Spizella arborea</i>	X	P	X
American woodcock	<i>Scolopax minor</i>	X	P	X
Bald eagle	<i>Haliaeetus leucocephalus</i>	X	X	P
Baltimore oriole	<i>Icterus galbula</i>	X	X	X
Bank swallow	<i>Riparia riparia</i>	X	P	P
Barn swallow	<i>Hirundo rustica</i>	X	X	X
Barred owl	<i>Strix varia</i>	X	P	X
Bay-breasted warbler	<i>Setophaga castanea</i>	P	P	X
Belted kingfisher	<i>Megaceryle alcyon</i>	X	X	X
Bewick's wren	<i>Thryomanes bewickii</i>	X	P	P
Black vulture	<i>Coragyps atratus</i>	P	P	X
Black-and-white warbler	<i>Mniotilta varia</i>	X	P	X
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	X	P	X
Blackburnian warbler	<i>Setophaga fusca</i>	X	P	X
Black-capped chickadee	<i>Poecile atricapillus</i>	X	X	X
Blackpoll warbler	<i>Setophaga striata</i>	X	P	X
Black-throated blue warbler	<i>Setophaga caerulescens</i>	X	P	X
Black-throated green warbler	<i>Setophaga virens</i>	X	P	X
Blue jay	<i>Cyanocitta cristata</i>	X	X	X
Blue-gray gnatcatcher	<i>Polioptila caerulea</i>	X	P	X
Blue-headed vireo	<i>Vireo solitarius</i>	X	P	P

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Common Name /a	Scientific Name	Project Area Greene County	Project Area Allegheny and Washington Counties	Project Area Wetzel County
Blue-winged teal	<i>Anas discors</i>	X	P	X
Blue-winged warbler	<i>Vermivora cyanoptera</i>	X	P	X
Bobolink	<i>Dolichonyx oryzivorus</i>	P	P	X
Broad-winged hawk	<i>Buteo platypterus</i>	X	X	X
Brown creeper	<i>Certhia americana</i>	P	P	P
Brown thrasher	<i>Toxostoma rufum</i>	X	P	X
Brown-headed cowbird	<i>Molothrus ater</i>	X	P	X
Bufflehead	<i>Bucephala albeola</i>	P	X	X
Canada goose	<i>Branta canadensis</i>	X	X	X
Canada warbler	<i>Cardellina canadensis</i>	P	P	X
Canvasback	<i>Aythya valisineria</i>	X	X	-
Cape May warbler	<i>Setophaga tigrina</i>	-	P	X
Carolina chickadee	<i>Poecile carolinensis</i>	X	X	X
Carolina wren	<i>Thryothorus ludovicianus</i>	X	X	X
Cedar waxwing	<i>Bombycilla cedrorum</i>	X	X	X
Cerulean warbler	<i>Setophaga cerulea</i>	X	P	X
Chestnut-sided warbler	<i>Setophaga pensylvanica</i>	X	P	X
Chimney swift	<i>Chaetura pelagica</i>	X	X	X
Chipping sparrow	<i>Spizella passerina</i>	X	P	X
Cliff swallow	<i>Petrochelidon pyrrhonota</i>	P	X	P
Common goldeneye	<i>Bucephala clangula</i>	X	X	P
Common grackle	<i>Quiscalus quiscula</i>	X	X	X
Common merganser	<i>Mergus merganser</i>	X	X	P
Common nighthawk	<i>Chordeiles minor</i>	P	P	X
Common raven	<i>Corvus corax</i>	X	X	X
Common redpoll	<i>Acanthis flammea</i>	P	X	P
Common yellowthroat	<i>Geothlypis trichas</i>	X	X	X
Cooper's hawk	<i>Accipiter cooperii</i>	X	P	X
Dark-eyed junco	<i>Junco hyemalis</i>	X	X	X
Double-crested cormorant	<i>Phalacrocorax auritus</i>	P	X	P

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Common Name /a	Scientific Name	Project Area Greene County	Project Area Allegheny and Washington Counties	Project Area Wetzel County
Downy woodpecker	<i>Picoides pubescens</i>	X	P	X
Eastern bluebird	<i>Sialia sialis</i>	X	X	X
Eastern kingbird	<i>Tyrannus tyrannus</i>	X	P	X
Eastern meadowlark	<i>Sturnella magna</i>	X	P	X
Eastern phoebe	<i>Sayornis phoebe</i>	X	P	X
Eastern screech owl	<i>Megascops asio</i>	X	P	X
Eastern towhee	<i>Pipilo erythrophthalmus</i>	X	P	X
Eastern whip-poor-will	<i>Antrostomus vociferous</i>	P	P	X
Eastern wood-pewee	<i>Contopus virens</i>	X	P	X
Evening grosbeak	<i>Coccothraustes vespertinus</i>	X	-	P
Field sparrow	<i>Spizella pusilla</i>	X	P	X
Fox sparrow	<i>Passerella iliaca</i>	X	X	X
Golden-crowned kinglet	<i>Regulus satrapa</i>	X	P	X
Golden-winged warbler	<i>Vermivora chrysoptera</i>	X	P	X
Grasshopper sparrow	<i>Ammodramus savannarum</i>	X	P	-
Gray catbird	<i>Dumetella carolinensis</i>	X	P	X
Gray-cheeked thrush	<i>Catharus minimus</i>	-	P	X
Great black-backed gull	<i>Larus marinus</i>	-	X	-
Great blue heron	<i>Ardea herodias</i>	X	X	X
Great crested flycatcher	<i>Myiarchus crinitus</i>	X	P	X
Great egret	<i>Ardea alba</i>	X	X	X
Great horned owl	<i>Bubo virginianus</i>	X	P	X
Greater scaup	<i>Aythya marila</i>	P	X	-
Greater yellowlegs	<i>Tringa melanoleuca</i>	X	-	-
Green heron	<i>Butorides virescens</i>	X	P	X
Green-winged teal	<i>Anas crecca</i>	X	P	X
Hairy woodpecker	<i>Picoides villosus</i>	X	P	X
Henslow's sparrow	<i>Ammodramus henslowii</i>	P	P	P
Hermit thrush	<i>Catharus guttatus</i>	X	P	X
Herring gull	<i>Larus argentatus</i>	-	X	P

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Common Name /a	Scientific Name	Project Area Greene County	Project Area Allegheny and Washington Counties	Project Area Wetzel County
Horned grebe	<i>Podiceps auritus</i>	P	X	P
Horned lark	<i>Eremophila alpestris</i>	X	P	P
Hooded merganser	<i>Lophodytes cucullatus</i>	X	X	X
Hooded warbler	<i>Setophaga citrine</i>	X	P	X
House finch	<i>Haemorhous mexicanus</i>	X	X	X
House wren	<i>Troglodytes aedon</i>	X	P	X
Indigo bunting	<i>Passerina cyanea</i>	X	P	X
Kentucky warbler	<i>Geothlypis formosa</i>	X	X	X
Killdeer	<i>Charadrius vociferous</i>	X	X	X
Least flycatcher	<i>Empidonax minimus</i>	X	P	X
Least sandpiper	<i>Calidris minutilla</i>	X	X	-
Lesser black-backed gull	<i>Larus fuscus</i>	-	X	-
Lesser scaup	<i>Aythya affinis</i>	X	X	P
Lincoln's sparrow	<i>Melospiza lincolni</i>	P	P	X
Louisiana waterthrush	<i>Parkesia motacilla</i>	X	X	X
Magnolia warbler	<i>Setophaga magnolia</i>	X	P	X
Mallard	<i>Anas platyrhynchos</i>	X	X	X
Mourning dove	<i>Zenaida macroura</i>	X	X	X
Mourning warbler	<i>Geothlypis philadelphia</i>	P	P	X
Nashville warbler	<i>Oreothlypis ruficapilla</i>	P	P	X
Northern bobwhite	<i>Colinus virginianus</i>	X	P	X
Northern cardinal	<i>Cardinalis cardinalis</i>	X	X	X
Northern flicker	<i>Colaptes auratus</i>	X	P	X
Northern harrier	<i>Circus cyaneus</i>	X	P	X
Northern mockingbird	<i>Mimus ployglottos</i>	X	X	X
Northern parula	<i>Setophaga americana</i>	X	P	X
Northern pintail	<i>Anas acuta</i>	X	P	-
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>	X	X	X
Northern saw-whet owl	<i>Aegolius acadicus</i>	P	X	P
Northern waterthrush	<i>Parkesia noveboracensis</i>	X	P	X

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Common Name /a	Scientific Name	Project Area Greene County	Project Area Allegheny and Washington Counties	Project Area Wetzel County
Olive-sided flycatcher	<i>Contopus cooperi</i>	P	P	P
Orange-crowned warbler	<i>Oreothlypis celata</i>	-	P	X
Orchard oriole	<i>Icterus spurius</i>	X	X	X
Osprey	<i>Pandion haliaetus</i>	X	P	X
Ovenbird	<i>Seiurus aurocapilla</i>	X	P	X
Palm warbler	<i>Setophaga palmarum</i>	X	P	X
Peregrine falcon	<i>Falco peregrinus</i>	P	X	P
Philadelphia vireo	<i>Vireo philadelphicus</i>	X	P	X
Pied-billed grebe	<i>Podilymbus podiceps</i>	X	X	X
Pileated woodpecker	<i>Dryocopus pileatus</i>	X	P	X
Pine siskin	<i>Spinus pinus</i>	X	X	X
Pine warbler	<i>Setophaga pinus</i>	P	P	X
Prairie warbler	<i>Setophaga discolor</i>	X	P	X
Purple finch	<i>Haemorhous purpureus</i>	X	P	P
Red-bellied woodpecker	<i>Melanerpes carolinus</i>	X	P	X
Red-breasted merganser	<i>Mergus serrator</i>	X	X	P
Red-breasted nuthatch	<i>Sitta canadensis</i>	X	X	P
Ruby-crowned kinglet	<i>Regulus calendula</i>	X	P	X
Red-eyed vireo	<i>Vireo olivaceus</i>	X	X	X
Redhead	<i>Aythya americana</i>	X	X	P
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	X	X	P
Red-necked grebe	<i>Podiceps grisegena</i>	X	P	-
Red-shouldered hawk	<i>Buteo lineatus</i>	X	P	X
Red-tailed hawk	<i>Buteo jamaicensis</i>	X	X	X
Red-winged blackbird	<i>Agelaius phoeniceus</i>	X	X	X
Ring-billed gull	<i>Larus delawarensis</i>	X	X	P
Ring-necked duck	<i>Aythya collaris</i>	X	P	X
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	X	P	X
Ruby-throated hummingbird	<i>Archilochus colubris</i>	X	P	X
Ruddy duck	<i>Oxyura jamaicensis</i>	-	P	X

TABLE 1.
MIGRATORY BIRD SPECIES DOCUMENTED (X) OR POTENTIALLY OCCURRING (P) IN THE PROJECT AREA

Common Name /a	Scientific Name	Project Area Greene County	Project Area Allegheny and Washington Counties	Project Area Wetzel County
Ruffed grouse	<i>Bonasa umbellus</i>	X	P	X
Rusty blackbird	<i>Euphagus carolinus</i>	X	X	P
Savannah sparrow	<i>Passerculus sandwichensis</i>	X	P	X
Scarlet tanager	<i>Piranga olivacea</i>	X	X	X
Sedge wren	<i>Cistothorus platensis</i>	P	P	P
Sharp-shinned hawk	<i>Accipiter striatus</i>	X	P	X
Solitary sandpiper	<i>Tringa solitaria</i>	X	P	P
Song sparrow	<i>Melospiza melodia</i>	X	X	X
Spotted sandpiper	<i>Actitis macularius</i>	X	P	X
Summer tanager	<i>Piranga rubra</i>	X	P	X
Swainson's thrush	<i>Catharus ustulatus</i>	-	P	X
Swainson's warbler	<i>Limnothlypis swainsonii</i>	P	P	P
Swamp sparrow	<i>Melospiza georgiana</i>	X	X	X
Tennessee warbler	<i>Oreothlypis peregrina</i>	X	P	X
Tree swallow	<i>Tachycineta bicolor</i>	X	X	X
Tufted titmouse	<i>Baeolophus bicolor</i>	X	X	X
Turkey vulture	<i>Cathartes aura</i>	X	X	X
Upland sandpiper	<i>Bartramia longicauda</i>	X	P	P
Veery	<i>Catharus fuscescens</i>	X	P	X
Vesper sparrow	<i>Pooecetes gramineus</i>	X	P	P
Warbling vireo	<i>Vireo gilvus</i>	X	P	X
Whip-poor-will	<i>Caprimulgus vociferus</i>	P	P	P
White-breasted nuthatch	<i>Sitta carolinensis</i>	X	P	X
White-crowned sparrow	<i>Zonotrichia leucophrys</i>	X	X	X
White-eyed vireo	<i>Vireo griseus</i>	X	P	X
White-throated sparrow	<i>Zonotrichia albicollis</i>	X	X	X
Wild turkey	<i>Meleagris gallopavo</i>	X	P	X
Willow flycatcher	<i>Empidonax traillii</i>	X	P	X
Wilson's warbler	<i>Cardellina pusilla</i>	X	P	X
Winter wren	<i>Troglodytes hiemalis</i>	P	P	X

TABLE 1.

MIGRATORY BIRD SPECIES DOCUMENTED (X) OR POTENTIALLY OCCURRING (P) IN THE PROJECT AREA

Common Name /a	Scientific Name	Project Area Greene County	Project Area Allegheny and Washington Counties	Project Area Wetzel County
Wood duck	<i>Aix sponsa</i>	X	P	X
Wood thrush	<i>Hylocichla mustelina</i>	X	X	X
Worm-eating warbler	<i>Helminthos vermivorum</i>	X	P	X
Yellow warbler	<i>Setophaga petechia</i>	X	P	X
Yellow-bellied flycatcher	<i>Empidonax flaviventris</i>	-	P	X
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	X	X	X
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	X	P	X
Yellow-breasted chat	<i>Icteria virens</i>	X	P	X
Yellow-rumped warbler	<i>Setophaga coronata</i>	X	X	X
Yellow-throated vireo	<i>Vireo flavifrons</i>	X	P	X
Yellow-throated warbler	<i>Setophaga dominica</i>	X	P	X

a/ Bolded species are those listed as Bird of Conservation Concern by United States Fish and Wildlife Service for Bird Conservation Region 28 (Appalachian Mountains)

Sources:

ebird. 2015. View and Explore Data. Species Maps. <http://ebird.org/ebird/map/> accessed February 2 and 3, 2016.

North American Breeding Bird Survey. No date a. Breeding Birds Detected On Pennsylvania's "Jefferson" (72088) BBS Route. <https://www.pwrc.usgs.gov/bbs/RouteMap/Map.cfm#> accessed February 3, 2016.

North American Breeding Bird Survey. No date b. Breeding Birds Detected On Pennsylvania's "Jeannette" (72151) BBS Route. <https://www.pwrc.usgs.gov/bbs/RouteMap/Map.cfm#> accessed February 3, 2016.

North American Breeding Bird Survey. No date c. Breeding Birds Detected On West Virginia's "Smithfield" (90043) BBS Route. <https://www.pwrc.usgs.gov/bbs/RouteMap/Map.cfm#> accessed February 3, 2016.

TABLE 2.

United States Fish and Wildlife Service Birds of Conservation Concern for Bird Conservation Region 28 (Appalachian Mountains) Habitat, Breeding Period, and Occurrence within the Project Area

Common Name	Scientific Name	Species Preferred Habitat	Breeding Period (Breeding, Eggs, and Young)	Occurrence a/ or Habitat Present in Project Area		
				Greene County Pennsylvania	Allegheny and Washington County Pennsylvania	Wetzel, County Virginia
Bald eagle	<i>Haliaeetus leucocephalus</i>	Breeding habitat includes areas close to coastal areas, bays, rivers, lakes, reservoirs, or other large bodies of water. Nests are usually in tall trees or on pinnacles or cliffs near water.	February through June (Pennsylvania and West Virginia); Project is not located within breeding range	Confirmed c/	Confirmed d/	Possible e/
Bewick's wren	<i>Thryomanes bewickii</i>	Breeding habitat includes forest edge and open woodland, both deciduous and coniferous, with dense deciduous thickets.	Mid-April through August; Project is not located within breeding range	Confirmed f/	Possible	Possible
Black-capped chickadee	<i>Poecile atricapillus</i>	Deciduous and mixed deciduous/coniferous forest and woodland, willow thickets, cottonwood groves, old fields, and wooded suburban areas.	April through July; year round resident of Project region	Confirmed c/	Confirmed d/	Confirmed c/
Blue-winged warbler	<i>Vermivora cyanoptera</i>	Breeding habitat includes brushy hillsides, second growth, partly open areas with saplings, bogs, woodland edge and clearings, stream edges, overgrown pastures, or swamps.	May through June; Project is located within breeding range	Confirmed d/	Possible e/	Confirmed b/
Canada warbler	<i>Cardellina canadensis</i>	Breeding habitat includes moist thickets of woodland undergrowth, bogs, tall shrubbery along streams or near swamps, and deciduous second growth.	Mid-May through mid-August; Project is not located within breeding area	Possible	Possible	Confirmed g/
Cerulean warbler	<i>Setophaga cerulea</i>	Breeding habitat includes structurally mature hardwood forest in mesic or wetter areas, with a closed canopy.	Late April through late July; Project area occurs within breeding range	Confirmed d/	Possible e/	Confirmed d/
Golden-winged warbler	<i>Vermivora chrysoptera</i>	Wintering habitat includes dense thickets in coniferous or mixed woodlands, chaparral, parks and gardens, and wooded bottomlands along rivers and creeks.	May through late July; Project area occurs within breeding range	Confirmed c/	Possible e/	Confirmed g/

TABLE 2.

United States Fish and Wildlife Service Birds of Conservation Concern for Bird Conservation Region 28 (Appalachian Mountains) Habitat, Breeding Period, and Occurrence within the Project Area

Common Name	Scientific Name	Species Preferred Habitat	Breeding Period (Breeding, Eggs, and Young)	Occurrence a/ or Habitat Present in Project Area		
				Greene County Pennsylvania	Allegheny and Washington County Pennsylvania	Wetzel, County Virginia
Henslow's sparrow	<i>Ammodramus henslowii</i>	Breeding habitat includes deciduous woodland, usually in dry uplands or areas of thick undergrowth in swampy areas; woodland edge with low cover; hillside scrub; overgrown pastures; abandoned farmland; powerline ROWs; recently logged sites; bogs; and forest openings.	May through August; Project is located within breeding range	Possible e/	Possible	Possible
Kentucky warbler	<i>Geothlypis formosa</i>	Breeding habitat is deciduous forests.	Mid- to late-April through late-August; Project is located within breeding range	Confirmed d/	Confirmed c/	Confirmed d/
Loggerhead shrike	<i>Lanius ludovicianus</i>	Breeding habitat includes open areas with short vegetation, such as pastures with fence rows, old orchards, mowed roadsides, cemeteries, golf courses, agricultural fields, riparian areas, and open woodlands.	February through July; Project does not occur in breeding range	None	None	None
Louisiana waterthrush	<i>Parkesia motacilla</i>	Breeding habitat is located along gravel-bottom streams that flow through hilly, deciduous forests.	Mid-April through July; Project is located within breeding range	Confirmed b/ d/	Confirmed c/	Confirmed b/
Northern saw-whet owl	<i>Aegolius acadicus</i>	Breeding habitat occurs in various forest types. Wintering habitat is various, but contains dense vegetation for roosting.	May through July; Project is not located within breeding range	Possible	Confirmed c/	Possible
Olive-sided flycatcher	<i>Contopus cooperi</i>	Breeding habitat is within montane and northern coniferous forests, at forest edges and openings, such as meadows and ponds. Winters along forest edges and clearings having tall trees or snags.	Late-May through August; Project is not located within breeding range	Possible	Possible e/	Possible

TABLE 2.

United States Fish and Wildlife Service Birds of Conservation Concern for Bird Conservation Region 28 (Appalachian Mountains) Habitat, Breeding Period, and Occurrence within the Project Area

Common Name	Scientific Name	Species Preferred Habitat	Breeding Period (Breeding, Eggs, and Young)	Occurrence a/ or Habitat Present in Project Area		
				Greene County Pennsylvania	Allegheny and Washington County Pennsylvania	Wetzel, County Virginia
Peregrine falcon	<i>Falco peregrinus</i>	Most common in habitats containing cliffs (for nesting), that have open gulfs of air (not confined) and generally open landscapes for foraging. Nest sites are usually associated with water, such as along rivers or shorelines of coasts and lakes. Artificial habitats may include those in urban areas such as towers and buildings.	Mid-May through July (Alaskan migrants); Breeding range within Project area vicinity is patchy	Possible	Confirmed c/	Possible
Prairie warbler	<i>Setophaga discolor</i>	Breeding habitat includes a variety of shrub habitats, including regenerating forests, woodlands, and open fields.	May through July; Project is located within breeding range	Confirmed f/	Possible e/	Confirmed g/
Red crossbill	<i>Loxia curvirostra</i>	Inhabits mature conifer forests, containing large cone crops produced by spruce (<i>Picea</i> spp.), Douglas fir (<i>Pseudotsuga menziesii</i>), eastern hemlock (<i>Tsuga canadensis</i>) and western hemlock, (<i>Tsuga heterophylla</i>) or pine (<i>Pinus</i> spp.).	Opportunistic breeder, breeding throughout the annual cycle, based on food availability; Project is not located within known distribution range	None	None	None
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	Breeding habitat is located deciduous woodlands within groves of dead or dying oak (<i>Quercus</i> spp.) or beech (<i>Fagus</i> spp.), river bottoms, burned areas, recent clearings, beaver swamps, orchards, parks, farmland, grassland with scattered trees, forest edges, and roadsides.	May through early September; Project is located within breeding and wintering range	Confirmed c/	Confirmed c/	Possible e/
Rusty blackbird	<i>Euphagus carolinus</i>	During spring and fall migration, forages in agricultural fields and along swamp edges. Fall migrants frequent wooded areas, particularly for roosting, but occasionally roost on the ground in open fields.	May through July; Project is not located within breeding range	Confirmed c/	Confirmed c/	Possible e/

TABLE 2.

United States Fish and Wildlife Service Birds of Conservation Concern for Bird Conservation Region 28 (Appalachian Mountains) Habitat, Breeding Period, and Occurrence within the Project Area

Common Name	Scientific Name	Species Preferred Habitat	Breeding Period (Breeding, Eggs, and Young)	Occurrence a/ or Habitat Present in Project Area		
				Greene County Pennsylvania	Allegheny and Washington County Pennsylvania	Wetzel, County Virginia
Sedge wren	<i>Cistothorus platensis</i>	During spring and fall migration, most frequently associated with tall sedge and grass habitats within wet meadows, fallow fields, and uplands around ponds and marshes, coastal marshes, and sphagnum bogs, but occasionally inhabits mesic grasslands, salt marshes and agricultural fields.	Mid-May through late September; Project is not located within breeding range	Possible	Possible	Possible
Swainson's warbler	<i>Limnothlypis swainsonii</i>	Breeds in a variety of habitats, including bottomland hardwood forests, mixed mesophytic montane forests, and early-seral pine stands. Typically found in areas with shaded and dense understory, abundant leaf litter, and little herbaceous ground cover. Generally found in large contiguous forests of different age classes containing appropriate structure	May through early August; Project is not located within breeding range	Possible	Possible	Possible
Upland sandpiper	<i>Bartramia longicauda</i>	Grasslands; but also rarely occurs in wetlands and coastal areas	May through June; Project is located within breeding range	Confirmed f/	Possible	Possible
Whip-poor-will	<i>Caprimulgus vociferus</i>	Breeding habitat includes dry deciduous or mixed forests with little or no underbrush. In West Virginia, occurs in oak–hickory–white pine, or hardwood-hemlock forest and sparingly in northern hardwoods.	May through mid-August; Project is located within breeding range	Possible e/	Possible	Possible e/
Wood thrush	<i>Hylocichla mustelina</i>	Mature deciduous and mixed forests, most commonly with American beech (<i>Fagus grandifolia</i>), sweet gum (<i>Liquidambar styraciflua</i>), red maple (<i>Acer rubrum</i>), black gum (<i>Nyssa sylvatica</i>), eastern hemlock, flowering dogwood (<i>Cornus florida</i>), American hornbeam (<i>Caprinus caroliniana</i>), oak (<i>Quercus</i> spp.), or pine.	May through August; Project is located within breeding range	Confirmed b/ d/	Confirmed c/	Confirmed b/ d/

TABLE 2.

United States Fish and Wildlife Service Birds of Conservation Concern for Bird Conservation Region 28 (Appalachian Mountains) Habitat, Breeding Period, and Occurrence within the Project Area

Common Name	Scientific Name	Species Preferred Habitat	Breeding Period (Breeding, Eggs, and Young)	Occurrence a/ or Habitat Present in Project Area		
				Greene County Pennsylvania	Allegheny and Washington County Pennsylvania	Wetzel, County Virginia
Worm-eating warbler	<i>Helmitheros vermivorum</i>	Breeding habitat occurs in mature deciduous or mixed deciduous-coniferous forest with patches of dense understory, usually on steep hillside.	Mid-May through July; Project is located within breeding range	Confirmed d/	Possible e/	Confirmed c/
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	During spring and fall migration, associated with diverse woodlands, orchards, lowlands, coastal palm groves, and scrubland habitats	Early May through mid-July; Project is not located within breeding range	Confirmed d/	Confirmed d/	Confirmed g/

a/ Occurrence information based on field observations of species in the ebird database

b/ Single ebird database occurrence within 1,000 feet of Project area

c/ Single ebird database occurrence within 3 miles of Project area

d/ Two or more ebird database occurrences within 3 miles of Project area

e/ One or more ebird database occurrences within 10 miles of Project area

f/ Documented in North American Breeding Bird Survey of Jefferson Route located less than 3 miles east of Project area

g/ Documented in North American Breeding Bird Survey of Smithfield Route located on Project site

Sources:

Cornell Lab of Ornithology. 2016a. The Birds of North America Online. <http://bna.birds.cornell.edu/bna/species> accessed 28 January 2016.

Cornell Lab of Ornithology. 2016b. All About Birds. <https://www.allaboutbirds.org/> accessed January 29, 2016.

ebird. 2015. View and Explore Data. Species Maps. <http://ebird.org/ebird/map/> accessed January 26 and 27, 2016.

USFWS. 2008. Birds of Conservation Concern 2008. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. December. <http://www.fws.gov/migratorybirds/pdf/grants/BirdsofConservationConcern2008.pdf>; accessed May 27, 2015.

6.0 Literature Cited

ebird. 2015. View and Explore Data. Species Maps. [http:// ebird.org/ebird/map/](http://ebird.org/ebird/map/) accessed January and February 2016.

PGC. 2015. Letter dated June 30, 2015 from John Taucher (PGC Division of Environmental Planning & Habitat Protection, Bureau of Wildlife Habitat Management) to Dale Sparks (Environmental Solutions & Innovations, Inc.) titled Re: EQT – Equitrans Expansion Project (Update), Large Project Review, Greene, Allegheny, & Washington Counties, PA

USFWS. 2008. Birds of Conservation Concern 2008. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. December. <http://www.fws.gov/migratorybirds/pdf/grants/BirdsofConservationConcern2008.pdf>; accessed May 27, 2015.

USFWS. 2014. Pennsylvania Field Office, Pennsylvania Bald Eagle Nest Locations and Buffer Zones. http://www.fws.gov/northeast/pafo/bald_eagle_map.html; accessed May 31, 2015.

USFWS. 2015. Letter dated July 27, 2015 from Lora L. Zimmerman, Field Office Supervisor (Pennsylvania Field Office) to Stephanie Frasier (Equitrans) titled RE: USFWS Project #2015-0578.



January 28, 2016

Susan M. Pierce, Deputy SHPO
Attention: Review and Compliance Staff
State Historic Preservation Office
WV Division of Culture and History
1900 Kanawha Boulevard East
Charleston, WV 25305

Subject: Equitrans Expansion Project (FERC Docket No. CP16-13-000)
Report on Cultural Resources Identification Survey, Wetzel County, West Virginia
FR No. 15-570-WZ
Request for Comment Pursuant to Section 106 of the National Historic Preservation Act

Dear Ms. Pierce:

On behalf of Equitrans, LP of Pittsburgh, Pennsylvania, Tetra Tech, Inc., hereby submits two copies of a report, *Equitrans Expansion Project (FERC Docket No. CP16-13-000)—Cultural Resources Identification Survey: Webster Interconnect and Mobley Tap, Grant District, Wetzel County, West Virginia*. The report describes the results of historic architectural and archaeological survey at West Virginia elements of the proposed project. Also enclosed for your use is a digital version of the report, digital version of the West Virginia Historic Property Inventory Form for a newly-recorded architectural property (Field No. EEP-001), and a shapefile in NAD 83 showing the location of the direct effects area of potential effects (APE) and the architectural property.

Equitrans has applied to the Federal Energy Regulatory Commission (FERC) for a Certificate of Public Convenience and Necessity pursuant to Section 7(c) of the Natural Gas Act authorizing it to construct and operate the proposed project (FERC Docket No. CP16-13-000). Please review the report in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended.

Should you require additional information to complete this review, contact me at (973)-630-8358 or by e-mail at chris.borstel@tetrattech.com.

Thank you for your assistance in this matter.

Sincerely yours,

A handwritten signature in blue ink that reads 'Christopher L. Borstel'.

Christopher L. Borstel, Ph.D., RPA
Cultural Resources Specialist

Cc: J. Sexton, Tetra Tech
T. Pellerin, Tetra Tech
S. Frazier, Equitrans

Encl.



January 28, 2016

Andrea MacDonald, Deputy SHPO

Attention: Barbara Frederick, Historic Building Project Reviewer (Western Region)

Pennsylvania State Historic Preservation Office

Commonwealth Keystone Building

400 North Street

Harrisburg, PA 17120

Subject: Equitrans Expansion Project (FERC Docket No. CP16-13-000)
Report on Aboveground Resources Survey and Assessment of Effects, Greene, Allegheny,
and Washington Counties, Pennsylvania
ER No. 2015-1446-042
Request for Comment Pursuant to Section 106 of the National Historic Preservation Act

Dear Ms. MacDonald:

On behalf of Equitrans, LP of Pittsburgh, Pennsylvania, Tetra Tech, Inc., hereby submits one copy of a report, *Equitrans Expansion Project (FERC Docket No. CP16-13-000)—Historic Architectural Survey: Aboveground Resources Survey and Assessment of Effects, Jefferson, Morgan, and Franklin Townships, Greene County; Forward Township, Allegheny County; and Union Township, Washington County, Pennsylvania*. The report describes the results of historic architectural survey for the Pennsylvania elements of the proposed project. An updated Project Review Form is also included with this submittal.

Equitrans has applied to the Federal Energy Regulatory Commission (FERC) for a Certificate of Public Convenience and Necessity pursuant to Section 7(c) of the Natural Gas Act authorizing it to construct and operate the proposed project (FERC Docket No. CP16-13-000). Please review the report in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended.

To ensure accurate filing of your review, note that your agency may also have correspondence concerning this project under ER Nos. 2015-2081-042 and 2015-1694-042. The ER number employed here, 2015-1446-042, was provided on July 27, 2015, in response to our initial technical data submittal of July 8, 2015, and is the one we will be using to reference this project moving forward.

Should you require additional information to complete this review, contact me at (973)-630-8358 or by e-mail at chris.borstel@tetrattech.com.

Thank you for your assistance in this matter.

Sincerely yours,

A handwritten signature in blue ink, reading 'Christopher L. Borstel', with a long horizontal flourish extending to the right.

Christopher L. Borstel, Ph.D., RPA
Cultural Resources Specialist

Cc: J. Sexton, Tetra Tech
T. Pellerin, Tetra Tech
S. Frazier, Equitrans

Encl.

Tetra Tech, Inc.

1000 The American Road, Morris Plains, NJ 07950
Tel 973.630.8000 Fax 973.630.8025 www.tetrattech.com



PROJECT REVIEW FORM

Request to Initiate SHPO Consultation on State and Federal Undertakings

SHPO USE ONLY

DATE RECEIVED:

ER NUMBER:

REV: 5/2012

SECTION A: GENERAL PROJECT INFORMATION

Is this a new submittal? ☐ YES ☐ NO OR ☒ This is additional information for ER Number: 2015-1446-042

Project Name Equitrans Expansion Project

County Multiple

Project Address Jefferson, Morgan, and Franklin Twps, Greene Co.; Forward Twp., Allegheny

City/State/ Zip See "Project Address"

Municipality See "Project Address"

SECTION B: PRIMARY CONTACT INFORMATION

Name Christopher L. Borstel, Ph.D., RPA

Phone (973) 630-8358

Company Tetra Tech, Inc.

Fax (973) 630-8025

Street/P.O. Box 1000 The American Road

Email chris.borstel@tetrattech.com

City/State/Zip Morris Plains NJ 07950

SECTION C: PROJECT DESCRIPTION

This project is located on: ☐ Federal property ☐ State property ☐ Municipal property ☒ Private property
(check all that apply)

List all Federal and State agencies and programs (funding, permits, licenses) involved in this project	Agency Type	Agency/Program/Permit Name	Project/Permit/Tracking Number (if applicable)
	Federal	Federal Regulatory Energy Commission	Docket No. CP16-13-000

Proposed Work – Attach project description, scope of work, site plans, and/or drawings

Project includes (check all that apply): ☒ Construction ☒ Demolition ☐ Rehabilitation ☐ Disposition

Total acres of project area: 186 Total acres of earth disturbance: 315

Are there any buildings or structures within the project area? ☒ Yes ☐ No Approximate age: ca. 1839-2015

This project involves properties listed in or eligible for listing in the National Register of Historic Places, or designated as historic by a local government	Yes	No	Unsure	Name of historic property or historic districts	Monongahela River Navigation System (NRE); P&LE RR Corridor (NRE)
	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		

Please print and mail completed form and all attachments to:

PHMC
State Historic Preservation Office
400 North St.
Commonwealth Keystone Building, 2nd Floor
Harrisburg, PA 17120-0093

Attachments – Please include the following information with this form

- ☒ Map – 7.5' USGS quad showing project boundary and Area of Potential Effect
- ☒ Description/Scope – Describe the project, including any ground disturbance and previous land use
- ☒ Site Plans/Drawings – Indicate the location and age, if known, of all buildings in the project area
- ☒ Photographs – Attach prints or digital photographs showing the project site, including images of all buildings and structures keyed to a site plan

SHPO DETERMINATION (SHPO USE ONLY)

SHPO REVIEWER:

- ☐ There are NO HISTORIC PROPERTIES in the Area of Potential Effect
- ☐ The project will have NO ADVERSE EFFECTS WITH CONDITIONS (see attached)
- ☐ The project will have NO EFFECT on historic properties
- ☐ SHPO REQUESTS ADDITIONAL INFORMATION (see attached)
- ☐ The project will have NO ADVERSE EFFECTS on historic properties:



February 17, 2016

Andrea MacDonald, Deputy SHPO

Attention: Kira M. Heinrich, Archaeological Project Reviewer (Western Region)

Pennsylvania State Historic Preservation Office

Commonwealth Keystone Building

400 North Street

Harrisburg, PA 17120

Subject: Equitrans Expansion Project (FERC Docket No. CP16-13-000)
Phase I Archaeological Survey Report, Greene, Allegheny, and Washington Counties,
Pennsylvania
ER No. 2015-1446-042
Request for Comment Pursuant to Section 106 of the National Historic Preservation Act

Dear Ms. MacDonald:

On behalf of Equitrans, LP of Pittsburgh, Pennsylvania, Tetra Tech, Inc., hereby submits one copy of a report, *Equitrans Expansion Project (FERC Docket No. CP16-13-000)—Phase I Archaeological Survey: Jefferson, Morgan, & Franklin Townships, Greene County; Forward Township, Allegheny County; and Union Township, Washington County, Pennsylvania*. The report describes the results of a Phase I archaeological survey for the Pennsylvania elements of the proposed project. An updated Project Review Form is also included with this submittal. Tetra Tech also previously submitted an architectural survey report on this project for your agency's review, which was sent on January 28, 2016.

Equitrans has applied to the Federal Energy Regulatory Commission (FERC) for a Certificate of Public Convenience and Necessity pursuant to Section 7(c) of the Natural Gas Act authorizing it to construct and operate the proposed project (FERC Docket No. CP16-13-000). Please review the report in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended. We would also specifically like to request comment on the Unanticipated Discoveries Plan for this project, found in Appendix I of the report.

To ensure accurate filing of your review, note that your agency may also have correspondence concerning this project under ER Nos. 2015-2081-042 and 2015-1694-042. The ER number employed here, 2015-1446-042, was provided on July 27, 2015, in response to our initial technical data submittal of July 8, 2015, and is the one we will be using to reference this project moving forward.

Should you require additional information to complete this review, contact me at (973)-630-8358 or by e-mail at chris.borstel@tetrattech.com.

Thank you for your assistance in this matter.

Sincerely yours,

A handwritten signature in blue ink, reading 'Christopher L. Borstel'.

Christopher L. Borstel, Ph.D., RPA

Cultural Resources Specialist

Cc: S. Haugh, Tetra Tech

T. Pellerin, Tetra Tech

S. Frazier, Equitrans

Encl.

Tetra Tech, Inc.

1000 The American Road, Morris Plains, NJ 07950
Tel 973.630.8000 Fax 973.630.8025 www.tetrattech.com



PROJECT REVIEW FORM

Request to Initiate SHPO Consultation on
State and Federal Undertakings

SHPO USE ONLY

DATE RECEIVED:

ER NUMBER:

REV: 5/2012

SECTION A: GENERAL PROJECT INFORMATION

Is this a new submittal? ☐ YES ☐ NO OR ☒ This is additional information for ER Number: 2015-1446-042

Project Name Equitrans Expansion Project

County Multiple

Project Address Jefferson, Morgan, and Franklin Twps, Greene Co.; Forward Twp., Allegheny

City/State/ Zip See "Project Address"

Municipality See "Project Address"

SECTION B: PRIMARY CONTACT INFORMATION

Name Christopher L. Borstel, Ph.D., RPA

Phone (973) 630-8358

Company Tetra Tech, Inc.

Fax (973) 630-8025

Street/P.O. Box 1000 The American Road

Email chris.borstel@tetrattech.com

City/State/Zip Morris Plains NJ 07950

SECTION C: PROJECT DESCRIPTION

This project is located on:
(check all that apply) ☐ Federal property ☐ State property ☐ Municipal property ☒ Private property

List all Federal and State agencies and programs (funding, permits, licenses) involved in this project	Agency Type	Agency/Program/Permit Name	Project/Permit/Tracking Number (if applicable)
	Federal	Federal Regulatory Energy Commission	Docket No. CP16-13-000

Proposed Work – Attach project description, scope of work, site plans, and/or drawings

Project includes (check all that apply): ☒ Construction ☒ Demolition ☐ Rehabilitation ☐ Disposition

Total acres of project area: 315

Total acres of earth disturbance: 186

Are there any buildings or structures within the project area? ☒ Yes ☐ No Approximate age: ca. 1839-2015

This project involves properties listed in or eligible for listing in the National Register of Historic Places, or designated as historic by a local government

☒☐☐

Name of historic property or historic districts

Monongahela River Navigation System (NRE); P&LE RR Corridor (NRE)

Please print and mail completed form and all attachments to:

PHMC
State Historic Preservation Office
400 North St.
Commonwealth Keystone Building, 2nd Floor
Harrisburg, PA 17120-0093

Attachments – Please include the following information with this form

- ☒ Map – 7.5' USGS quad showing project boundary and Area of Potential Effect
- ☒ Description/Scope – Describe the project, including any ground disturbance and previous land use
- ☒ Site Plans/Drawings – Indicate the location and age, if known, of all buildings in the project area
- ☒ Photographs – Attach prints or digital photographs showing the project site, including images of all buildings and structures keyed to a site plan

SHPO DETERMINATION (SHPO USE ONLY)

SHPO REVIEWER:

- ☐ There are NO HISTORIC PROPERTIES in the Area of Potential Effect
- ☐ The project will have NO ADVERSE EFFECTS WITH CONDITIONS (see attached)
- ☐ The project will have NO EFFECT on historic properties
- ☐ SHPO REQUESTS ADDITIONAL INFORMATION (see attached)
- ☐ The project will have NO ADVERSE EFFECTS on historic properties:



The Culture Center
1900 Kanawha Blvd., E.
Charleston, WV 25305-0300

Randall Reid-Smith, Commissioner

Phone 304.558.0220 • www.wvculture.org
Fax 304.558.2779 • TDD 304.558.3562
EEO/AA Employer

February 16, 2016

Reid
2/29/16
B

Dr. Christopher L. Borstel, Ph.D.
Cultural Resources Specialist
Tetra Tech
1000 The American Road
Morris Plains, NJ 07950

RE: Proposed Equitrans Expansion Project; Docket No. PF15-22-000
FR#: 15-570-WZ-2

Dear Dr. Borstel:

We have reviewed the *Cultural Resources Identification Survey* report that Tetra Tech submitted for the West Virginia portion of the above-mentioned project to determine its effects to cultural resources. As required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

Archaeological Resources:

As indicated in previous correspondence, portions of the currently proposed APE were surveyed as part of the Mountain Valley Pipeline project (MVP; FR# 15-67-MILT). The current report presents the results of survey conducted within those areas not covered by MVP. The survey consisted of pedestrian reconnaissance and shovel probe excavation. Three previously identified archaeological sites (46WZ78/79, 46WZ125 and Isolate 46WZ128) are located within or within the vicinity of the current APE. All three had been determined not eligible for inclusion in the National Register of Historic Places during prior review projects. The current survey did not result in the recovery of archaeological materials or in the identification of new archaeological sites. As a result, we concur that no further archaeological investigations are necessary within the proposed APE.

Architectural Resources:

In our October 6, 2015 letter to Ms. Megan Landfried Neylon of Mountain Valley Pipeline, LLC (FR#:15-67-Multi-7) we stated our opinion that the Greeley Residence (MVP-0192), the Titus Residence (MVP-0193), the Mobley Bridge (MVP-0194/WZ-0056), and the Goodrich Residence (MVP-0198) are not eligible for or included in the National Register of Historic Places. We remain in concurrence with these determinations of eligibility.

In regards to the Mobley Run highway structure/culvert (EEP-001) addressed in the current report, it is our opinion that this particular structure is not eligible for or included in the National Register.

As also noted in our October 6, 2015 letter to Ms. Neylon, it remains our opinion the Mobley School

Dr. Borstel
February 16, 2016
15-570-WZ-2
Page 2

(MVP-0195) is eligible for inclusion in the National Register under Criteria A and C. Considering the vegetation and terrain of the area, we concur with Tetra Tech's assessment that the proposed project will have *no adverse effect* to the Mobley School.

The submitted report indicates on pages 3-3 and 3-4 that Tetra Tech did not submit photographs or additional information for two separate properties. They did not document the Kilcoyne residence located 0.49 miles east-northeast from the Webster Interconnect, along the north side of North Fork Road, because the property owner did not wish their home to be photographed. Please be advised that if you are located within the public right-of-way you have the right to photograph buildings and structures without owners' permission. Considering the vegetation and terrain of the area, however, it is our opinion the proposed project will not affect the Kilcoyne residence. We also note that Tetra Tech did not document a separate isolated outbuilding that likely exceeds fifty years of age because it no longer retains context and lacks integrity of setting and historical significance. We acknowledge and accept the submitted report as sufficient to complete our review concerning these two resources.

No further consultation is necessary regarding architectural resources; however, we ask that you contact our office if your project should change. Any changes to the proposed project may require further documentation of the Kilcoyne residence and the unnamed, isolated outbuilding.

Cemetery Resources:

As noted in our October 6, 2015 letter to Ms. Neylon, it remains our opinion the Kilcoyne Cemetery (MVP-0196/46WZ89) is not eligible for inclusion in the National Register of Historic Places. No further consultation is necessary regarding cemetery resources; however, we ask that you contact our office if your project should change.

We appreciate the opportunity to be of service. *If you have questions regarding our comments or the Section 106 process, please contact Lora A. Lamarre-DeMott, Senior Archaeologist, or Mitchell K. Schaefer, Structural Historian, at (304) 558-0240.*

Sincerely,



Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/LLD/MKS



Pennsylvania State Historic Preservation Office
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION

March 22, 2016

Christopher Borstel
Tetra Tech Inc
1000 The American Road
Morris Plains NJ 07950

RE: ER 2015-1446-042-B
Equitrans Expansion Project
Jefferson, Morgan and Franklin Townships, Greene County

Dear Mr. Borstel,

Thank you for submitting information concerning the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

Above Ground Resources

We have reviewed the information provided for the above listed project and offer the following comments. To complete our review, please provide copies of historic aerial mapping showing the right-of-way of the corridor. Historic aerials can be found at www.pennpilot.psu.edu. Upon receipt of the historic mapping we will comment on identification of historic properties and assessment of effects.

For the properties that were identified in the survey, please provide a copy of the GIS shape files as well as an Excel spreadsheet of any attribute information collected which will be used as a minimum record for historic resource data entry. Finally, please provide one unbound copy of the Abbreviated Historic Resource Survey Forms that were prepared.

For questions concerning this review, please contact Barbara Frederick at bafrederic@pa.gov or (717) 772-0921.

Sincerely,

A handwritten signature in black ink, appearing to read 'Doug McLearn'.

Douglas C. McLearn, Chief
Division of Archaeology and Protection



Pennsylvania State Historic Preservation Office

PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION

22 March 2016

Christopher Borstel
Cultural Resources Specialist
Tetra Tech
1000 The American Road
Morris Plains, NJ 07950

RE: ER 2015-1446-042-C
FERC: Phase I Archaeological Survey, Equitrans Expansion Project FERC Docket
#CP16-13-000, Allegheny and Washington Counties

Dear Mr. Borstel,

Thank you for submitting information concerning the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

This report meets our standards and specifications as outlined in Guidelines for Archaeological Investigations in Pennsylvania (BHP 2008) and the Secretary of the Interior's Guidelines for Archaeological Documentation. It is our opinion that the following archaeological sites are not eligible for the National Register of Historic Places and no further work is needed for these site areas:

36WH1707 (EEP-P2), 36GR0468 (EEP-H1), 36AL0696 (EEP-H3), 36WH1705 (EEP-H2).

It is our opinion that the portion of archaeological site 36AL0697 within the area of potential effect (APE) would not contribute to the overall site eligibility. No further work is needed within the site area. Should the APE change, and additional ground disturbance in this vicinity become necessary our office should be contacted as additional archaeological investigation may be necessary.

It is our opinion that archaeological site 36WH1706 should be avoided or undergo Phase II level evaluation for National Register eligibility.

No further archaeological work is necessary for the remainder of the project area.

Please send one bound copy and three digital copies (PDF preferred) on separate CDs of the final report for our files. For all copies, photographs must adhere to the National Register Photo Policy.

Thank you for submitting the Unanticipated Discoveries Plan in Appendix I. Please revise this plan and resubmit it under separate cover to address the following concerns:

- 1) Please include a drill bore failure plan (frac-out plan) for those areas where surface impacts are to be avoided through HDD.

- 2) Please correct section 8(a)i and 8(a)ii. These sections state that the PA SHPO will be responsible for contacting potential lineal decedents and culturally affiliated groups within one week of an unanticipated discovery. And that PA SHPO will develop and direct a final treatment plan for the discovery. Neither of these actions are the role of the SHPO office. The federal agency is responsible for the identification of decedents and affiliated groups. SHPO may participate in this activity but does not take the lead role. Further, it is the project proponent and or archaeological consultant for the project who is responsible for drafting a treatment plan and the federal agency who is responsible for ensuring that plan is undertaken. The treatment plan should be provided to the SHPO for comment.

If you need further information regarding archaeological resources, please contact Kira Heinrich at kiheinrich@pa.gov or at (717) 705-0700. If you need further information concerning above ground resources, please contact Barbara Frederick at bafrederic@pa.gov or at (717) 772-0921.

Sincerely,

A handwritten signature in black ink, appearing to read 'D. McLearn', with a long horizontal flourish extending to the right.

Douglas C. McLearn, Chief
Division of Archaeology & Protection

DCM/kmh



Equitrans Expansion Project

Docket No. CP16-13-000

Attachment 5-3

Traffic and Transportation Management Plan

Revised April 20, 2016

April 2016



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Appendix A Summary of Existing and Temporary and Permanent Access Roads

Appendix B Estimated Commuter Traffic for Webster Interconnect, Mobley Tap, Redhook
 Compressor Station, and Pratt Decommissioning

Appendix C Proposed Construction Access Roads and Existing Traffic Counts

1.0 Introduction

Equitrans, L.P. (Equitrans) has developed this Traffic and Transportation Management Plan to describe the measures Equitrans and their Contractors will take to minimize potential impacts on federal, state and local roadways during the construction of the Project. This plan outlines traffic impact minimization measures, noxious weed control measures, and dust control methods that will be used on the Project to reduce impacts during construction.

Operations and maintenance activities will be conducted with light vehicles at very few occasions that should have no impact to roadways and traffic once the project is in-service.

2.0 Traffic Impacts

Prior to construction, Equitrans will obtain applicable Federal, State/Commonwealth, and local road use and crossing permits, as required. Equitrans personnel will comply with all permit requirements and conditions to provide for public safety and minimize impacts on public roads. Copies of this *Traffic and Transportation Management Plan* and applicable road use and crossing permits will be provided to the appropriate personnel and maintained at each Contractors' field office.

Equitrans will consult with State/Commonwealth and local agencies regarding detour routes, speed/load limits, and other use limitations, conditions, or restrictions on the roads that will be utilized during construction. Before the start of construction, Equitrans will work with these agencies to obtain the most up-to-date traffic information for the roadways in the Equitrans Project area as well as ongoing road reconstruction or improvement projects in the vicinity of the pipeline route and facilities area. Where local, private roadways will be affected, Equitrans will coordinate with landowners and lessees of properties to mitigate potential impacts on those roads. Similarly, where roads on public lands will be affected, Equitrans will coordinate with the appropriate managing agency to mitigate potential impacts on roads or implement required traffic and transportation procedures. Appendix A identifies the temporary and permanent access roads planned for the Project. As discussed further in the following sections, Equitrans will place and maintain traffic control measures such as flag persons, warning signs, lights, and/or barriers as appropriate to ensure the safety of both the construction workers and the public and to minimize traffic congestion. Equitrans will maintain traffic flow and emergency vehicle access on roadways with traffic control personnel or detour signs, where necessary. Equitrans will work with local law enforcement, fire departments, and emergency medical services to coordinate access for effective emergency response during construction. Contractors will be directed to comply with local weight limitations and restrictions on area roadways.

Equitrans strives to mitigate the increase in construction-related truck traffic on local roads shared with community and school buses in suburban and more densely populated rural areas. Key components to a successful community partnership include:

- Central point of command for construction traffic route plan. Equitrans will be responsible for maintaining traffic related plans, procedures, records, and documents.
- School bus curfews. Construction vehicles can pose a concern when school buses are traveling their established routes. The community expects their children to have safe and timely travel to and from school. Equitrans will work with the governing School Districts or the School Transportation Department in the project area to identify the bus routes and times. Construction traffic will be limited during the bus route times within a published school bus route curfew time period.

- Speed enforcement. In more rural areas, law enforcement is often not staffed to handle a sudden increase in traffic. Establishing a third-party contractor to assist in monitoring the speed of the route not only keeps contractor and the public safe but lends accountability to Equitrans. Inevitably, contractors will end up off of bonded routes. Equitrans will monitor these issues in order to reduce unbonded travel that can become costly if damage occurs.

All impacts shall be within the guidelines of all applicable agencies, as well as approval from landowners. A list of state and county contacts is provided in the table below. At completion of the Project, Equitrans will restore all roads back to their original level of service or better, unless Equitrans is directed otherwise in writing by the landowner or regulatory agency. Pre-construction video will be used to document the roadway condition prior to Project usage.

County, State Requirements			
	Phone	Website	Contact Name/Position
State Agency			
West Virginia Department of Transportation (WVDOT)	(304) 558-0384	http://www.transportation.wv.gov	Wayne Kessinger, Permits Section Administrator
West Virginia County			
Wetzel	(304) 455-8217	http://www.wetzelcounty.wv.gov/	Larry Lemon, County Commissioner
State Agency			
Pennsylvania Department of Transportation (PADOT)	(717) 412-5300	http://www.penndot.pa.gov	Leslie S. Richards, Secretary
Pennsylvania County			
Allegheny	(413) 350-4005	http://www.alleghenycounty.us/	Ronald G. Florian II, Permit Supervisor
Greene	(724) 852-5210	http://www.co.greene.pa.us/	Blair Zimmerman, Chairman, Board of Commissioners
Washington	(724) 228-6811	http://www.co.washington.pa.us/	Leslie Cessna, Director of Planning

3.0 Pipeline Road Crossings

Equitrans will construct road and highway crossings in accordance with the permit requirements and the construction drawings for the crossing. No work on any such crossing shall be started before obtaining all applicable permits from the regulatory agencies. At a minimum, Equitrans will maintain single lane traffic on all roads and shall provide flagmen, road signs and all other signaling required by the governing authority to supervise the flow of traffic. Equitrans will provide barricades, warning signs, warning lights flagmen and such other protective measures required to maintain traffic and to safeguard the public at all times.

Any damage to paved or blacktop roads shall be repaired per specifications provided by the regulatory agencies. Equitrans will repair all roads to their pre-construction state after construction is completed on all portions of the Project. Road surfaces other than hard surface roads (i.e., paved, blacktop, or concrete) shall be backfilled in well-tamped 6-inch layers and shall be finished with a well-tamped surface matching the existing road. If flowable fill is used, it will be in accordance with the appropriate mix per agency specifications. For all types of crossings, additional or other limitations may be provided by the governing municipality and must prevail.

At the end of each workday, Equitrans will make passable any open-cut driveways for ingress and egress. This may be accomplished by using steel plates. Any and all steel plates used for such purposes shall be properly pinned (i.e., secured in place) and ramped on each end to allow traffic flow. The backfilling road crossings shall be performed immediately after the pipe is installed and in accordance with requirements established by the applicable permit.

4.0 Construction Traffic

An increase in traffic to local and state roads will be expected throughout the day between the hours of 6 am to 7 pm. The temporary traffic will include transportation for construction workers in light and heavy duty trucks, as well as tractor trailers hauling machinery and materials. Equitrans is not planning to require busses to transport workers from yards to the right-of-way. Appendix B provides estimates of commuting traffic to and from the Project site. It is estimated that the majority of trips will be in the early morning and late afternoon/evening hours. Impacts are expected to be minor and short term because construction spreads and personnel will be geographically dispersed and personnel will commute to and from work areas in early morning and late evening during nonpeak traffic hours. Traffic will be entering and leaving off-site locations such as laydown yards, right-of-way and additional temporary workspace for the purpose of pipeline construction, hauling material and roadway maintenance. All heavy construction equipment for all site will be driven in once, remain on the construction site until its use is completed, then driven off of the construction site and back to the yards or to the next construction site where it is needed. Efforts will be made to make these trips during times of low traffic use on the roads so as to minimize the impact to local traffic. Once the material and heavy equipment are placed on the right-of-way, construction equipment will move in a linear manner along the right-of-way as work progresses, minimizing traffic on local roads. The amount of equipment moved by hauling from site to site will be reduced due to the accessibility created by the construction right-of-way. Appendix C provides information about construction access roads and existing traffic counts.

Equitrans intends to make road improvements at areas that are not conducive to heavy hauling and large traffic volume, in addition to maintaining all bonded roads during construction, and finally returning the

roads back to their original or better level of service, meaning their original width and length, unless Equitrans is directed otherwise in writing by the landowner or state agency.

5.0 Noxious Weeds

To prevent noxious weeds from transporting along roadways, Equitrans developed the following plan:

- The prompt seeding and revegetation of areas of disturbed soils with certified weed-free seed.
- Encourage the cleaning of equipment and vehicles prior to entering or leaving each management area. (Pressure wash in a designated area only.)
- Minimize soil disturbance, where possible.
- Use weed-free mulch/straw for erosion control.
- Establish measures to minimize weed germination on newly revegetated areas in the first season prior to seed formation of the weeds in the revegetated area. Care will be taken to encourage seed formation and growth of new native plants.

6.0 Fugitive Dust Control

Dirt and gravel during construction periods in dry weather can create an inhospitable environment for neighbors and workers. Implementation of construction and restoration best management practices and operational controls will be used to mitigate fugitive dust emissions. The project earth disturbance permit will outline specific practices that control fugitive dust, including a construction sequence, use of rock construction entrances, and temporary soil stabilization methods. Operational controls are also implemented, including the use of a reduced speed limit on unpaved access roads as well as sweeping/vacuuming paved roadways when Project-related soils are tracked out onto paved surfaces.

Wet suppression, using water, is the predominate method of suppressing fugitive dust on unpaved roads and gravel pads as it causes finer materials to adhere into larger particles. Increasing the moisture content of the finer materials may be accomplished either naturally or mechanically. Moisture content of unpaved road surfaces can be naturally increased through rainfall. Moisture content can also be increased mechanically through the application of water. The amount of water required to sufficiently control fugitive dust emissions is dependent on the characteristics of materials (e.g., surface moisture content), ambient conditions (e.g., rainfall, humidity, temperature), activities occurring in the area (e.g., vehicle traffic, vehicle weight, speeds), etc.

The following actions will be taken to reduce fugitive dust from our operations:

I. Pipeline Construction Activities and Other Earth Disturbances

Fugitive dust emissions from vegetation removal, clearing and grading, cutting and filling, topsoil removal, trenching, backfilling and stockpile storage will be controlled to a great extent by following the construction sequencing and disturbing limited areas at a time. If sustained visible dust plumes occur, dust suppression can be achieved by applying water along the travel lane and disturbed land via water truck. Spoil piles left undisturbed for four or more days should be temporarily stabilized with seed and mulch to prevent wind and water erosion.

II. Unpaved Roads

Fugitive dust emissions generated by motorized equipment and miscellaneous vehicle traffic will be controlled by wet suppression as necessary. Fugitive dust emissions from active access roads

will be controlled by periodic wetting of surfaces using a water truck. During periods of high truck traffic, road surfaces will be wetted more frequently to minimize dust emissions. Watering will occur less frequently if weather conditions (e.g., rain, frozen surfaces, etc.) are adequate to suppress dust. On unpaved roads, Equitrans will limit the speed limit to reduce the potential of fugitive dust emissions. On unpaved roads, Equitrans will reduce the speed limit to reduce the potential of fugitive dust emissions.

III. Paved Roads

Fugitive dust emissions from paved roads will be controlled with a combination of water trucks, power washers, sweeping and/or vacuuming, as appropriate, to minimize the amount of fugitive dust that is generated and built up on the road surfaces.

IV. Track-out onto Roads

Trackout of loose materials will be controlled using rock construction entrances on access roads that begin at a junction with paved roads; this is done to prevent tracking of mud onto public roadways. In the event that loose material goes beyond the rock construction entrance, sweeping and or vacuuming will be used to remove the materials. In the event that loose material goes beyond the rock construction entrance, sweeping and or vacuuming will be used to remove the materials.

V. Deposition on Other Premises

Equitrans will take all appropriate actions to prevent the deposition of solid or liquid materials onto any other premises from the Project site and access roads that may cause or contribute to visible dust emissions. Preventive actions may include, but are not limited to dust control, such as wet suppression, the operation of a sweeper truck on paved roadways equipped with water suppression, and the operation of a vacuum truck.

VI. Tackifiers

Contractor may propose the use of tackifiers to reduce fugitive dust provided that the product to be utilized has been approved by the appropriate federal and state agencies where its application will occur. Contractor will detail the proposed use of any such substances in their dust control plan and provide copies of the material safety data sheets and application procedures. Typically, tackifiers used are DustFloc, RoadFloc and Kodiak Super TACKMixes.

6.1 INSPECTION, MONITORING, AND RECORD KEEPING

The construction contractor will implement the dust control measures specified in this plan. All construction personnel will be informed of the measures in this plan. Environmental inspectors will have primary responsibility for monitoring and enforcing the implementation of dust control measures by the construction contractor. The inspectors will also be responsible for ensuring that these measures are effective and proper documentation is maintained. When environmental conditions are dry, inspection of dust control measures will be conducted daily, and the environmental inspectors will be responsible for recording the following information on a daily basis:

- weather conditions, including temperature, wind speed and wind direction;
- number of water trucks in use;
- incidents where dust concentration is such that special abatement measures must be implemented;
- condition of soils (damp, crusted, unstable, other) on the right-of-way and other construction sites;

- condition of soils (damp, crusted, unstable, other) on access roads;
- condition of track-out pads;
- overall status of dust control compliance.

This information will be incorporated into the environmental inspector's daily report, and significant instances of non-compliance with the plan will be reported to the Construction Manager as soon as they are discovered.



Appendix A												
Summary of Existing and Temporary and Permanent Access Roads												
County/State	Number of Existing Roads Used For Access	Total Miles of Existing Roads Used For Access	Number of Existing Roads To Be Improved <u>a/</u>	Acres of Improvements For Existing Access Roads <u>a/</u>	Number of Existing Roads Used for Permanent Access	Miles of Existing Roads Used for Permanent Access	Number of New Temporary Road Construction	Miles of New Temporary Road Construction	Acres of New Temporary Road Construction	Number of New Permanent Road Construction	Miles of New Permanent Road Construction	Acres of New Permanent Road Construction
Allegheny, PA	3	0.95	0	0	0	0.00	3	0.18	0.52	0	0	0
Greene, PA	7	1.18	0	0	3	0.81	7	0.63	1.47	0	0	0
Washington, PA	4	0.49	0	0	0	0.00	0	0.00	0.00	0	0	0
Subtotal PA	14	2.62	0	0	3	0.81	10	0.80	1.99	0	0	0
Wetzel, WV	3	0.05	0	0	3	0.05	1	0.04	0.09	0	0	0
Subtotal WV	3	0.05	0	0	3	0.05	1	0.04	0.09	0	0	0
Total	17	2.67	0	0	6	0.85	11	0.84	2.08	0	0	0
<u>a/</u> Equitrans intends to use public roads in their existing condition. No improvements to public roads are planned as part of the Project. Roads used by the Project will be bonded and, consistent with those bonds, road maintenance and repairs will be conducted as appropriate.												

Appendix B						
Estimated Commuter Traffic for Project Pipelines, Webster Interconnect, Mobley Tap, Redhook Compressor Station, and Pratt Decommissioning						
Off-site Vehicles	2017			2018		
	Quantity	Round-Trip Length (miles)	Trips Per Day	Quantity	Round-Trip Length (miles)	Trips Per Day
Webster Interconnect Wetzel County						
Light-Duty Diesel Truck	2	2	4	N/A	N/A	N/A
Light-Duty Gasoline Truck	2	2	4	N/A	N/A	N/A
Light-Duty Gasoline Vehicle	5	2	4	N/A	N/A	N/A
Heavy Duty Diesel Vehicle	1	2	2	N/A	N/A	N/A
Mobley Tap Wetzel County						
Light-Duty Diesel Truck	N/A	N/A	N/A	2	2	4
Light-Duty Gasoline Truck	N/A	N/A	N/A	2	2	4
Light-Duty Gasoline Vehicle	N/A	N/A	N/A	5	2	4
Heavy Duty Diesel Vehicle	N/A	N/A	N/A	1	2	2
Redhook Greene County						
Light-Duty Diesel Truck	10	14	1	10	14	1
Light-Duty Gasoline Truck	12	14	1	12	14	1
Light-Duty Gasoline Vehicle	15	14	1	15	14	1
Heavy Duty Diesel Vehicle	8	14	1	8	14	1
Pratt Decomm. Greene County						
Light-Duty Diesel Truck	N/A	N/A	N/A	10	14	1
Light-Duty Gasoline Truck	N/A	N/A	N/A	12	14	1
Light-Duty Gasoline Vehicle	N/A	N/A	N/A	15	14	1
Heavy Duty Diesel Vehicle	N/A	N/A	N/A	8	14	1
H-316 Greene County						
Light-Duty Diesel Truck	5	22	8	10	22	5
Light-Duty Gasoline Truck	10	22	5	N/A	N/A	N/A

Appendix B						
Estimated Commuter Traffic for Project Pipelines, Webster Interconnect, Mobley Tap, Redhook Compressor Station, and Pratt Decommissioning						
Off-site Vehicles	2017			2018		
	Quantity	Round-Trip Length (miles)	Trips Per Day	Quantity	Round-Trip Length (miles)	Trips Per Day
Light-Duty Gasoline Vehicle	0	0	0	N/A	N/A	N/A
Heavy Duty Diesel Vehicle	15	22	5	3	22	5
Fuel Delivery	3	22	2	N/A	N/A	N/A
H-318 Allegheny County						
Light-Duty Diesel Truck	5	22	8	2	22	5
Light-Duty Gasoline Truck	15	22	10	N/A	N/A	N/A
Light-Duty Gasoline Vehicle	10	22	10	N/A	N/A	N/A
Heavy Duty Diesel Vehicle	6	22	12	2	22	5
Fuel Delivery	3	22	2	N/A	N/A	N/A
H-318 Washington County						
Light-Duty Diesel Truck	5	22	8	2	22	5
Light-Duty Gasoline Truck	15	22	10	N/A	N/A	N/A
Light-Duty Gasoline Vehicle	10	22	10	N/A	N/A	N/A
Heavy Duty Diesel Vehicle	6	22	12	2	22	5
Fuel Delivery	3	22	2	N/A	N/A	N/A

Appendix C
Proposed Construction Access Roads and Existing Traffic Counts

Jurisdiction	AADT	Year of AADT Records	Peak ADT		Route Number	Official DOT/911 Designation	Surface Type	County, State
State	1,000	2011	(4 pm)	160	CR-15	North Fork Road	Asphalt	Wetzel, WV
State	10	2011	1		CR-15/3	Mobley Run	Surface treatment	Wetzel, WV
Federal	16,866	2016	NA		I-79	I-79	NA	Greene, PA
State	8,300	2016	NA		21/188	E. Roy Furman Highway	NA	Greene, PA
State	7,172	2016	NA		188	Jefferson Road	NA	Greene, PA
County	NA	NA	NA		NA	Prison Rd	Asphalt	Greene, PA
County	NA	NA	NA		NA	Homeville RD	Asphalt	Greene, PA
County	NA	NA	NA		NA	Baker Rd	Asphalt	Greene, PA
County	NA	NA	NA		NA	Crayne School Rd	Asphalt	Greene, PA
County	NA	NA	NA		NA	Ridge Rd	Asphalt	Greene, PA
County	NA	NA	NA		NA	McNeely Rd	Asphalt	Greene, PA
County	NA	NA	NA		NA	Ankron Rd	Asphalt	Greene, PA
State	8,224	2016	NA		43	PA 43 Turnpike	NA	Washington, PA
State	3,809	2016	NA		837	PA 837	NA	Washington, PA
County	1,299	2016	NA		1006	Finley-Elrama Road	NA	Washington, PA
County	NA	NA	NA		NA	Gun Club Rd	Asphalt	Allegheny, PA
County	876	2016	NA		2001	Bunola River Road	NA	Allegheny, PA
County	133	2016	NA		2003	Church Hollow Road	NA	Allegheny, PA
County	NA	NA	NA		NA	McVicker Ln	Asphalt	Allegheny, PA
County	NA	NA	NA		NA	Ripple Rd	Asphalt	Allegheny, PA
County	148	2016	NA		2005	Raccoon Run Road North	NA	Allegheny, PA
County	NA	NA	NA		NA	Pangburn Hollow Rd	Asphalt	Allegheny, PA
County	198	2016	NA		2005	Raccoon Run Road South	NA	Allegheny, PA
NA = Not available								



October 27, 2015

Equitrans LP
625 Liberty Avenue, Suite 100
Pittsburgh, PA 15222

**Subject: Redhook Compressor Station Geotechnical Investigation
Greene County, Pennsylvania
Tetra Tech Project Number 212IC-PB-000176**

Tetra Tech, Inc. (Tetra Tech) has prepared this report for Equitrans LP (EQT) to evaluate the geotechnical conditions at the Redhook Compressor Station, Greene County, Pennsylvania (site).

1.0 SCOPE OF SERVICES

The scope of this investigation was to obtain information about geotechnical conditions and groundwater at the site and evaluate its impact on the design and construction of the compressor station. The geotechnical investigation was based upon preliminary site design mapping received on August 19, 2015. Changes in the site design after this date may not be properly addressed in this geotechnical report. The following tasks were completed as part of this investigation:

- Completion of a subsurface exploration program that consisted of seventeen standard test borings at or near the proposed pad to determine the type and distribution of subsurface materials.
- Conducting laboratory tests to determine the classification of soils, the moisture-density relationship of the soils in order to estimate the compacted density of backfills for use in preparation of the proposed pad, unconfined compressive strength of rock cores and direct shear test of compacted soil.
- Preparation of a report that documents the data collected and analyses performed with recommendations for the construction of the compressor station.

2.0 LOCATION, TOPOGRAPHY AND DRAINAGE

EQT is in the process of developing a compressor station at the site. The location of the site is shown in Figures 1 and G-1. Presently the site is residential/wooded land with access from Braden Run Road south of the site. Topographic relief of the site ranges from a minimum elevation of 1000± feet at the southeastern boundary of the site along Braden Run Road to a maximum elevation of 1096± feet adjacent to the cut embankment on the northern boundary of the site. Drainage on the pad will be directed away from the site.

Tetra Tech Inc.

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2.1 GENERAL GEOLOGY

The site lies in the Waynesburg Hill Section of the Appalachian Plateaus Physiographic Province. Bedrock underlying the site consists of Pennsylvanian/Permian Age Waynesburg Formation through the Greene Formation. Typical bedrock for these formations consists of cyclic sequences of shales, siltstones, sandstones, limestones, and coals. According to available published structural geologic information of the site, the bedrock has a gentle dip to the northeast at 80 feet per mile as noted on Figure 2. The economically important Pittsburgh Coal is present within the site at an approximate elevation of 630 feet. According to available published information there are no deep mines present within or underlying the site (Figure 3).

2.2 TEST BORINGS

The subsurface exploration for the project consisted of drilling a total of seventeen standard test borings. All borings were drilled within or around the footprint of the proposed pad or the access road. Test boring locations were located by Tetra Tech using a hand held Global Positioning System (GPS). Test boring locations were placed on CADD drawings to verify locations and elevations. Test boring locations, soil and rock elevations and groundwater elevations referenced in this report are based upon the GPS locations and CADD drawings. Test borings were completed by DLX Drilling with direct supervision by Tetra Tech personnel. The locations of the borings are shown on Figure G-1.

The test borings were advanced in soils using recommended American Society for Testing and Materials (ASTM D 1586) procedures. The Standard Penetration Test (SPT) soil samples were collected in all test borings at 3-foot, center-to-center intervals. A 2-inch O.D. Split Spoon Sampler was used to obtain the soil samples. The soil samples were visually classified and their properties evaluated. The spoon sampler was first seated for six inches to penetrate any loose soil, and then was driven an additional foot with blows from a 140-pound hammer falling 30 inches. The number of blows required to drive the sampler for each 6-inch interval was recorded. The combined number of blows for the lower 12 inches (2nd and 3rd 6-inch intervals) is designated "standard penetration resistance (N)". The penetration resistance gives an indication of the in-place relative density or consistency, which can be empirically correlated with the consistency/density and the shearing resistance of the soils being sampled. The penetration resistance values for each six (6) inches of penetration at various depths are presented on the Test Boring Logs attached to this report.

Bedrock was encountered in all test borings. Bedrock was cored continuously in all test borings, using a diamond bit with an NQ double-tube, rigid-type core barrel, which provides a 2.0-inch diameter core (ASTM D 2113). The rock core samples were visually identified in the field. The rock description, the core recovery for each interval and the Rock Quality Designation (RQD) values (expressed in percent) for each core run and lithologic unit were recorded on the test borings logs and also shown on the Geologic Cross-Sections. The RQD values reflect the quality and fracture spacing of the rock and are calculated as a summation of all unbroken core samples of 4 inches or more in length divided by the total length of each lithologic unit. The core recovery percentage and RQD values together provide a qualitative understanding of the geomechanical properties of the bedrock.



2.4 Laboratory Testing Program

The nature of data obtained from visual examination of the soil and rock samples encountered in the subsurface exploration program and the need for obtaining the appropriate geotechnical parameters for subsequent engineering analyses under the anticipated loadings dictated the general requirements for the laboratory testing program.

Soil samples were submitted to Geotechnical Testing Services in Pittsburgh, Pennsylvania for the following analysis:

Gradation Tests: The data from these tests, in conjunction with the data obtained from the liquid and plastic limits tests were used to classify the soils according to the Unified Soil Classification System (ASTM D 2487). These soil classifications are included in this report.

Atterberg Limits Tests: Liquid and plastic limits tests (ASTM D 4318) were performed on the soil samples.

Standard Proctor Compaction Test: The data from this test (ASTM D 698) is used as a basis for establishing the moisture-density relationships of on-site soils and to estimate the compacted density of soils for use in preparation of the proposed pad. The data from this test is included in this report.

Natural Moisture Content Test: The data from this test (ASTM D 2216) is used as a basis for establishing the *in situ* moisture content of soils at the site. This data can serve as an aid in determining the suitability in using on site soils for development.

Direct Shear: The data from this test (ASTM D 3080) are used to serve as a basis to determine the strength parameters of soils placed as fill. These strength parameters are then used to analyze the stability of the fill embankments on the site.

Unconfined Compressive Strength Test: The data from this test (ASTM D7012) is used as an index property to determine the compressive strength of the rock samples from the site.

3.0 EVALUATION OF SUBSURFACE CONDITIONS

The subsurface data obtained from the test borings and the results of the laboratory soil testing have been utilized to develop four generalized geologic cross-sections (A-A, B-B, C-C and D-D) shown in Figures G-3 and G-4.

3.1 SOIL CONDITIONS

Fine grained soils encountered in the test borings were classified as silty clay, sandy clay, silty to sandy clay and high plasticity clay. Consistency of these soils varied from medium stiff to hard. Granular soil encountered in the test borings was classified as silty sand, silty to clayey sand and silty to clayey gravel. Relative density of the granular soil varied from loose to very dense. Soils on the site originated from residual weathered bedrock. The soil conditions discussed in this report exist at the test boring locations; soil conditions may differ between the



test boring locations. A summary of the soil conditions encountered in the test borings is presented in Table 1.

Soil samples were collected from locations and depths that would best represent site conditions and sent for laboratory analysis. Laboratory analysis of soils is summarized in Table 2 and discussed in Section 3.4.

Soil samples are available for inspection at Tetra Tech's Canfield, Ohio office. If individual contractors wish to inspect soil samples please contact Tom Highman at 330-286-3683 to arrange for an appointment. All soil samples will remain the property of Tetra Tech for a period of at least six months from the completion date of the construction of the compressor station.

3.2 BEDROCK CONDITIONS

The test borings on the site were advanced from surface elevations of 1088.5 to 1020.4 feet. Bedrock was encountered in all of the test borings at a depth ranging from 5.0 to 18.1 feet below ground surface (bgs). Bedrock consisted of primarily of sandstone with interbedded silty shale in test borings RH-1 to RH-14 and RH-17. Bedrock in boring RH-15 consisted of sandstone overlying claystone with shale partings. Bedrock in boring RH-16 consisted of limestone overlying layers of carbonaceous shale and coal, claystone and shale and siltstone with interbedded shale. Test borings were advanced below the proposed elevation 1049.5 feet of the pad. Bedrock was located above the proposed grade of the pad near the north cut embankment in test boring RH-10 and RH-12 at elevations of 1051.9 and 1042.6 respectively. Bedrock was located above the proposed grade of the pad near the northeast portion of the pad in boring RH-05 at an elevation of 1055.6. Cobbles and boulders in the soil zone indicating weathered bedrock was present in a number of the borings as noted on the boring logs and the geologic cross sections. Due to the variability of equipment and methods used by contractors an evaluation of the rippability of the bedrock was not completed as part of this investigation. A summary of the bedrock conditions encountered in the test borings is presented in Table 1. Test boring logs are attached to this report. Generalized Geologic Cross Sections indicating rock conditions on the site are included as Figure G-3 and G-4.

Rock core samples are available for inspection at Tetra Tech's Canfield, Ohio office. If individual contractors wish to inspect rock core samples, please contact Tom Highman at 330-286-3683 to arrange for an appointment. All rock samples will remain the property of Tetra Tech for a period of at least six months from the completion date of the construction of the compressor station.

3.3 GROUNDWATER CONDITIONS

Groundwater was measured in the test borings upon completion (0-hr) and within 24 hours (24-hr) of completion of the test borings, with the exception of RH-15 which was backfilled for safety reasons upon completion. Water measured in the test borings varied from 1.1 to 23.0 feet bgs for the 0-hr measurement. Water measured in the test borings for the 24-hr measurement varied from 2.6 to 24.5 feet below ground surface. All boreholes were backfilled with bentonite chips and soil cuttings to surface prior to leaving the site. Water level measurements are included in the test boring logs attached to this report and are summarized in Table 1. Perched groundwater may be present on the site as infiltrated surface water percolates downward from upland areas, until either relatively dense or less permeable soil is encountered. Given the



topography of the site and site geology, localized perched water tables may develop intermittently based on seasonal fluctuations in precipitation.

3.4 LABORATORY ANALYSIS

Laboratory analyses were performed on representative samples to determine the index properties of the soils and included natural moisture content test, grain size distribution and plasticity (Atterberg Limits) tests, moisture-density relationships and shear strength tests. The data from these tests, when used in conjunction with the SPT data from the test borings, can be correlated to the strength of the soils. Strength testing of rock cores is used as an index property to determine the compressive strength of the rock on the site. Results of the laboratory analysis are attached to this report and summarized in Table 2 for soil samples and Table 3 for rock core.

3.4.1 Natural Moisture Content Tests

Natural moisture content test were performed on 5 soil samples from test borings RH-02 at 0.0 TO 3.0 feet, RH-03 at 0.0 to 3.0 feet, RH-10 at 6.0 to 10.5 feet, RH-12 at 0.0 to 10.0 feet and RH-16 at 0.0 to 9.4 feet to evaluate the in place water content of the soils at the time of drilling. The soil sampled show a moisture content value ranging from 9.7 to 18.3 percent.

3.4.2 Classification Tests

The gradation tests and Atterberg Limits tests are used as the basis for classifying and identifying both granular and cohesive soils. Together, they form what is commonly referred to as a classification test. Classification tests were performed on 5 soil samples from test borings RH-02 at 0.0 to 3.0 feet, RH-03 at 0.0 to 3.0 feet, RH-10 at 6.0 to 10.5 feet, RH-12 at 0.0 to 10.0 feet and RH-16 at 0.0 to 9.4 feet. Soils from RH-02 at 0.0 to 3.0 feet classified as a Clayey SAND (SC). Soils from RH-03 at 0.0 to 3.0 feet classified as Sandy Lean CLAY (CL). Soils from RH-10 at 6.0 TO 10.5 feet classified as Lean CLAY with Sand (CL). Soils from RH-12 at 0.0 to 10.0 feet classified as a Fat CLAY (CH). Soils from RH-16 at 0.0 to 9.4 feet classified as Lean CLAY with Sand (CL).

3.4.3 Moisture-Density Relationship

Two bulk samples (55 lbs.) of in place soil was obtained from test borings for Moisture – Density Relationship (Standard Proctor) compaction testing. The test results from soils obtained from RH-12 at a depth of 0.0 to 10.0 feet indicated that the maximum dry density was 101.6 pounds/cubic foot (pcf) at 21.0 percent moisture content. The test results from soils obtained from RH-16 at a depth of 0.0 to 9.4 feet indicated that the maximum dry density was 110.3 pounds/cubic foot (pcf) at 16.8 percent moisture content.

3.4.4 Direct Shear Test

One Direct Shear Test (remolded at 90% of maximum dry density per ASTM D 698) conducted on sample RH-16 (0.0 to 9.4 feet) indicated a Peak Friction Angle of 26.5 degrees and an Average Cohesion of 172.8 pounds/square foot (psf) [(1.2 pounds/square inch (psi))].



3.4.5 Unconfined Compressive Strength Testing

Laboratory testing of bedrock samples from test borings RH-04 at 21.6 to 22.6 feet, RH-10 at 25.8 to 26.6 feet and RH-12 at 15.4 to 16.2 feet was completed. Unconfined compressive strength of the sandstone varied from 6,266 to 8,640 pounds per square inch (psi).

3.5 MINING AND COAL CONDITIONS

Research of available published information indicated that surface mining or deep mining has not occurred on or beneath the site. A copy of the mine map is included as Figure 3 to this report. Test borings completed on the site did not indicate the presence of mine voids, collapsed roof rock or excessive carbonaceous materials. Intact coal noted in boring RH-16 is most likely representative of the Waynesburg A Coal seam, which is primarily surfaced mined in the local area. Test borings advanced to a depth that would penetrate the Pittsburgh Coal Seam which is deep mined in the area were beyond the original scope of this project.

If encounter acid drainage, the exposed coal seam in the proposed cut slope on the site must be sealed during construction. The exposed coal seam should be sealed by creating a 5 foot high bench excavated 10 feet into the proposed embankment. The excavation must begin at an elevation of 1 foot below the coal seam (elevation 1067.3 feet) to 3 feet above the coal seam (elevation 1072.5) as noted on Figure G-4, Sections C-C. Upon completion the excavated bench is to be backfilled with a soil:cement mixture with up to 20% neutralizing cement mixture. The soil:cement mixture should be placed in lifts 12 inches thick or less, compaction will be incidental to the placement. Carbonaceous material or coal are not to be used in the soil:cement mixture. In addition carbonaceous material excavated during site construction activities should not be placed in the fill on the site.

3.6 SLOPE STABILITY EVALUATION

Slope stability at the compressor station was evaluated based on the proposed grades for Sections C-C (cut slope) and D-D (fill slope) provided on Figure G-4. Slope stability for Section C-C was analyzed using laboratory soil tests, estimated values and published literature. Slope stability for Section D-D was evaluated using a 2H:1V proposed fill embankment condition and GSTABL (Version 7) computer program to analyze the most critical fill slopes at the southeast side of the compressor station. The maximum depth of cut at Section C-C was approximately 40 feet. However, only the upper 9 feet consisted of soil is likely to fail that overlies the bedrock. The maximum height of the fill slope relative to the base at Section D-D was approximately 30 feet. Soil strength parameters were selected based upon the site boring logs, laboratory soil tests, published soil data, and published literature. The parameters selected for the Section D-D fill slope stability evaluation are listed below. The strength properties of the existing soil were conservatively assumed to be the same as those of the compacted fill for both cut and fill slope analysis.



SOIL DESCRIPTION	SOIL TYPE NO.	COHESION (PSF)	FRICTION ANGLE, ϕ (DEGREES)	TOTAL UNIT WEIGHT (PCF)
Compacted Clay (Fill)	1	173*	26.5*	120*
Silty Gravel	2	173*	26.5*	120*
Clayey Gravel	3	1000	30	125
Brown Sandstone	4	3000	40	135

* Determined by laboratory analysis for compacted fill
On-site soils to be used as fill during site development activities

The slope stability analysis results from calculations for cut slope Section C-C (using charts) and fill slope Section D-D (using GSTABL7) are provided below. The detailed calculations to arrive at the factors of safety below are included in the Slope Stability attachment.

Compressor Station Slope Location	Slope	Factor of Safety, Circle
Section C-C North Cut Slope	2H:1V	2.6
Section D-D Southeast Fill Slope	2H:1V	1.7

The factor of safety for the north cut slope Section C-C was 2.6. The factor of safety for the southeast fill slope Section D-D was 1.7. Both of these analyses provided the factors of safety greater than generally accepted value of 1.5. The GSTABL7 output files for the southeast fill slope are included in the Slope Stability attachment.

4.0 RECOMMENDATIONS

Based on our evaluation of the data obtained during the subsurface exploration and laboratory testing program, the following recommendations are presented for the construction of the compressor station and access road at the site.

Based upon the site conditions, the maximum allowable slope for the fill and cut slope embankments are 2H:1V. Bonding benches and a rock toe with lateral drains to intercept groundwater, as shown in the "Typical Fill Embankment Bonding Benching Detail" provided on figure G-2, are necessary prior to construction of the fill embankments in order to provide global stability of the embankments on the site. General slope geometry is noted in Figure G-4. Common fill should be placed in 8-inch lifts on the embankment and compacted to a minimum of 95 percent of the maximum dry density at 5± percent of the optimum moisture content as determined by the Standard Proctor Compaction Test (ASTM D 698). The design was completed for the cut and fill embankments on the site based upon information obtained during the geotechnical subsurface investigation, laboratory analysis and preliminary design.

4.1 SITE PREPARATION AND GENERAL BACKFILL

Remove all topsoil and stockpile per recommendations in the Erosion and Sedimentation Plan (E&S Plan, Tetra Tech,). Remove upper softer residual soils or compact in-place appropriately in the areas receiving new fill. In areas where the pad is located in a cut, remove all soft soils,



carbonaceous material, trash, organic materials or other unsuitable materials and do not use for site development activities. If springs, perched water or wet zones are encountered, install drains to divert water away from the pad.

Proof-roll all the areas receiving new fill and the bottom of the excavation (if in soil) with a 12-ton roller compactor to no visible movement criteria. Proof-rolling should not be performed when the subgrade is wet or frozen. If any soft or wet zones are encountered or soil pumping is observed, over-excavate the area or sink-in riprap material of a minimum 8-inch size and compact to no movement. Riprap material should be composed of limestone or sandstone and approved by the geotechnical engineer. Upon completion of satisfactory proof-rolling, the area can be backfilled with well compacted fill. With the exception of topsoil, organic deposits, carbonaceous materials, and material greater than 4" in size, the on-site excavated materials should be suitable for use as fill on the proposed pad. Place and compact common fill in 8-inch thick loose lifts; compact each layer to 95 percent of the maximum dry density at $\pm 5\%$ of optimum moisture content as determined by the Standard Proctor Compaction test (ASTM D 698). Placing excessively wet or soft materials as fill is unacceptable. Each lift will be scarified prior to the placement of the lift above.

Care should be exercised to ensure that the fill is free from any organic-rich, carbonaceous material or trash. During site development activities, proper site drainage should be maintained to prevent surface soils from accumulating moisture and ponded water. Wet or frozen soils should be removed before additional fill is placed. All proof-rolled soils and fill surfaces should be sealed with a smooth drum roller at the completion of each day's site development activities.

Any perched water, springs or seeps encountered should be captured in lateral drains to prevent them from saturating the pad fill over time. These smaller lateral drains should consist of a 2 feet x 2 feet trench with a 4-inch minimum diameter perforated pipes backfilled with AASHTO No. 57 aggregate. The aggregate should be wrapped with 6 or 8-ounce non-woven geotextile fabric. These smaller drains should outlet outside the fill limits. Any seeps or springs observed during access road excavation should also be captured in lateral drains and discharged to a stable outlet.

Riprap should be incorporated at the toe of the fill to provide added stability and to aid in the draining of surface water or seeps. Granular materials provided at toe must be suitable and may include non-degradable, nonacid or toxic forming rock such as natural gravel, sandstone, limestone, or other durable rock that will not slake in water and is free of coal, clay, or shale.

Bench the existing slope as shown in the "Typical Fill Embankment Bonding Benching Detail" provided on G-2; this general layout applies to any slope that will receive fill where the existing grade is 6H:1V or greater. Bonding benches will be 4 feet high with a 4-inch diameter perforated HDPE pipe at the toe of every 2nd bonding bench. The pipe will have 1/4-inch perforation and surrounded by AASHTO No. 57 aggregate and enveloped by 6 or 8-ounce non-woven geotextile. Fill in the toe key with riprap ($D_{50} = 6$ inches) wrapped with 8-ounce non-woven geotextile at the soil/riprap interface.

Final seeding and mulching of all embankments completed per the Erosion and Sedimentation Control Plan developed for the site.



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October 21, 2015 – Page 9

If the subsurface conditions between the boring locations, on the pad or access road as revealed during construction, are different than the conditions encountered at the boring locations, the evaluations and recommendations provided in this report should be revisited to determine that they are appropriate for the different conditions.

4.2 INSPECTION AND TESTING

A qualified soils technician under the direct supervision of the Geotechnical Engineer should be at the site during construction to monitor site development activities per Tetra Tech's recommendations as indicated in the E&S Plans and this report. The soil technician should be on site to observe the undercut, proof-rolling of the exposed subgrade/undercut prior to placing fill and to monitor the gradation, placement and compaction of fill materials to ensure that the specified gradation and density requirements are being achieved, thus minimizing residual settlements in the fill materials. In-place nuclear densometer testing should be completed for per ASTM D 5195 or every 10,000 square feet of fill, at a minimum of one test per lift.

5.0 CLOSING

Tetra Tech appreciates the opportunity to be of continuing service to EQT. Please contact me if you have any questions or need any additional information.

Sincerely,

Tetra Tech, Inc.

A handwritten signature in blue ink that reads 'Thomas A. Highman'.

Thomas Highman, P.G.,
Project Manager

A handwritten signature in blue ink that reads 'P. S. Verma'.

P. S. Verma P.E.
Geotechnical Engineer

Enclosures

TABLES

TABLE 1
SUMMARY OF TEST BORING INFORMATION
EQT REDHOOK COMPRESSOR STATION

Boring No.	Ground Surface Elevation ⁽⁴⁾ (ft.)	Total Depth (ft.)	Soil ^{(1) (2)}				Bedrock																					Groundwater ⁽⁵⁾							
			Residual			Total Soil Sampled (ft.)	Est. Top of Rock Elev. (ft.)	Sandstone					Claystone					Limestone					Coal/Shale/Claystone					O-Hour		24-Hours					
			Thick-ness (ft.)	USCS ⁽¹⁾	Base Elev. (ft.)			Thick-ness (ft.) ⁷	Core Recovery		RQD		Base Elev. (ft.)	Thick-ness (ft.) ⁷	Core Recovery		RQD		Base Elev. (ft.)	Thick-ness (ft.) ⁷	Core Recovery		RQD		Base Elev. (ft.)	Thick-ness (ft.)	Core Recovery		RQD		Base Elev. (ft.)	Depth (ft.)	Elev. (ft.)	Depth (ft.)	Elev. (ft.)
									Length (ft.)	Percent (%)	Length (ft.)	Percent (%)			Length (ft.)	Percent (%)	Length (ft.)	Percent (%)			Length (ft.)	Percent (%)	Length (ft.)	Percent (%)			Length (ft.)	Percent (%)	Length (ft.)	Percent (%)					
RH-01	1041.0	25.0	6.1	cl	1034.9	6.1	1034.9	18.9	15.4	81	14.0	74	1016.0																		23.0	1018.0	24.5	1016.5	
RH-02	1039.4	16.7	6.2	SC	1033.2	6.2	1033.2	10.6	7.9	75	3.7	35	1022.6																		13.5	1025.9	15.6	1023.8	
RH-03	1052.0	16.5	6.5	CL	1045.5	6.5	1045.5	10.0	8.7	87	3.9	39	1035.5																		6.2	1045.8	15.6	1036.4	
RH-04	1063.1	28.1	18.1	cl	1045.0	18.1	1045.0	10.0	9.3	93	8.0	80	1035.0																		20.3	1042.8	23.1	1040.0	
RH-05	1062.9	17.8	7.3	cl	1055.6	7.3	1055.6	10.5	9.0	86	5.3	50	1045.1																		11.7	1051.2	6.9	1056.0	
RH-06	1046.2	20.0	9.3	cl/sm	1036.9	9.3	1036.9	10.7	9.0	84	5.4	50	1026.2																		10.9	1035.3	8.3	1037.9	
RH-07	1045.3	16.0	5.0	sm	1040.3	5.0	1040.3	11.0	10.9	99	4.1	37	1029.3																		13.9	1031.4	14.3	1031.0	
RH-08	1045.7	15.0	5.0	sm	1040.7	5.0	1040.7	10.0	15.4	154	3.2	32	1030.7																		14.6	1031.1	14.6	1031.1	
RH-09	1055.1	18.0	8.0	gm	1047.1	8.0	1047.1	10	9.7	97	6.2	62	1037.1																		1.1	1054.0	4.9	1050.2	
RH-10	1070.0	28.1	18.1	CL, sm-sc	1051.9	18.1	1051.9	10.0	9.5	95	8.8	88	1041.9																		16.0	1054.0	17.8	1052.2	
RH-11	1052.2	15.0	5.0	sm-sc	1047.2	5.0	1047.2	10.0	9.7	97	6.0	60	1037.2																		2.4	1049.8	3.7	1048.5	
RH-12	1052.6	20.0	10.0	CH	1042.6	10.0	1042.6	10.0	9.9	99	7.5	75	1032.6																		10.7	1041.9	8.2	1044.4	
RH-13	1050.0	15.0	5.0	sm	1045.0	5.0	1045.0	10.0	9.1	91	5.0	50	1035.0																		1.8	1048.2	4.3	1045.7	
RH-14	1039.4	20.0	10.0	gm-gc	1029.4	10.0	1029.4	10.0	9.7	97	5.4	54	1019.4																		4.7	1034.7	5.7	1033.7	
RH-15	1020.4	20.0	9.0	gm-gc	1011.4	9.0	1011.4	4.3	4.3	100	2.0	47	1007.1	6.7	6.7	100	2.9	43.0	1000.4												3.7	1016.7	NA	Backfilled	
RH-16	1088.5	32.4	15.4	CL, gm	1073.1	15.4	1073.1												0.5	0.5	100	0.5	100	1072.6	16.5	13.5	82	1.2	7	1056.1	11.3	1077.2	13.0	1075.5	
RH-17	1050.2	15.0	5.0	sm-sc	1045.2	5.0	1045.2	10.0	9.7	97	4.5	45	1035.2																		1.2	1049.0	2.6	1047.6	

(1) Note: **Bold Capital Letters** Denotes Laboratory-Determined Unified Soil Classification System (USCS)

(2) Includes topsoil if present in each boring.

(3) Not Present/Not Applicable

BF - Borings were backfilled and 24 hour water levels were not recorded.

TABLE 2
SUMMARY OF LABORATORY SOIL CLASSIFICATION
EQT REDHOOK COMPRESSOR STATION

Boring	Depth (ft)	Natural Moisture Content (%)	USCS Group Name	USCS Group Symbol	AASHTO Group Name	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	Peak Friction Angle (°)	Average Cohesion (psf/psi)
RH-02	0.0-3.0	9.7	CLAYEY SAND	SC	A-4 (1)	26	18	8	NA	NA	NA	NA
RH-03	0.0-3.0	8.0	SANDY LEAN CLAY	CL	A-6 (6)	31	19	12	NA	NA	NA	NA
RH-10	6.0-10.5	16.8	LEAN CLAY WITH SAND	CL	A-7-6 (17)	41	19	22	NA	NA	NA	NA
RH-12	0.0-10.0	18.3	FAT CLAY	CH	A-7-6 (31)	53	21	32	101.6	21.0	NA	NA
RH-16	0.0-9.4	12.3	LEAN CLAY WITH SAND	CL	A-6 (12)	38	20	18	110.3	16.8	*26.5	*172.8/1.2

NA=Not Analyzed

psi=pounds per square inch

TABLE 3
SUMMARY OF ROCK STRENGTH TESTING
EQT REDHOOK COMPRESSOR STATION

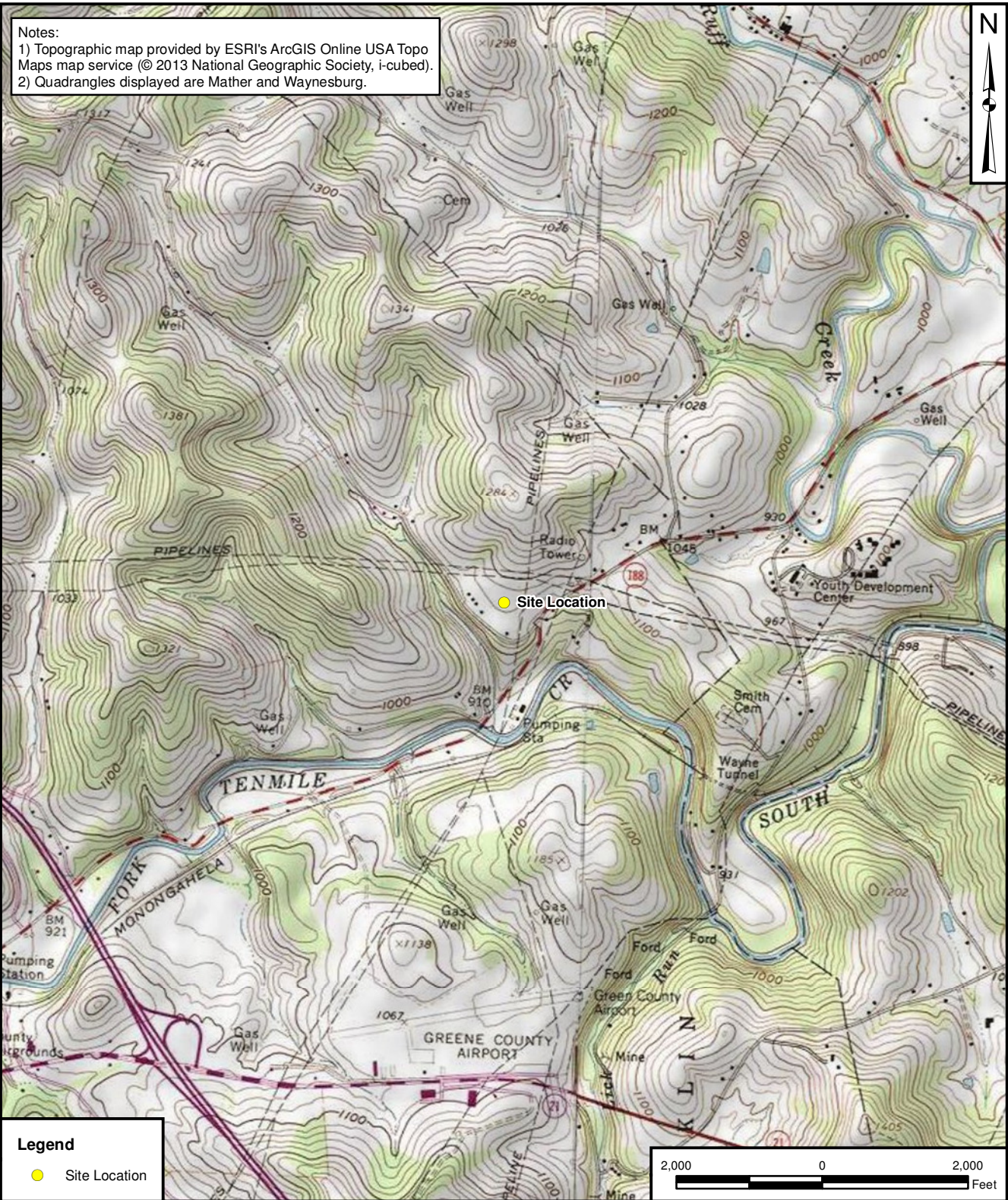
Boring	Depth (ft)	Rock Description	Unconfined Compressive Strength (psi)
RH-04	21.6-22.6	Sandstone	6,535
RH-10	25.8-26.6	Sandstone	8,640
RH-12	15.4-16.2	Sandstone	6,266


psi=pounds per square inch

FIGURES

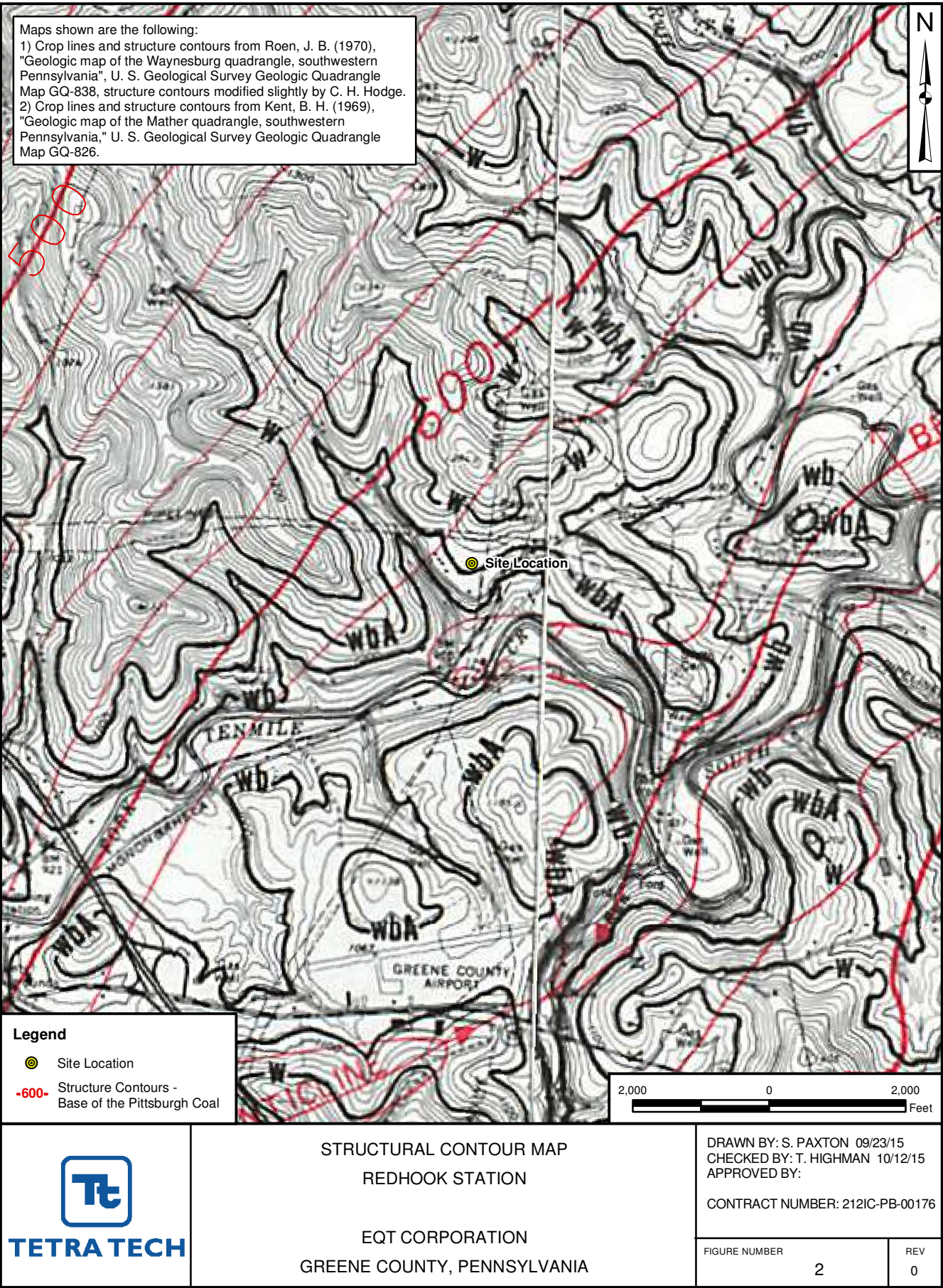
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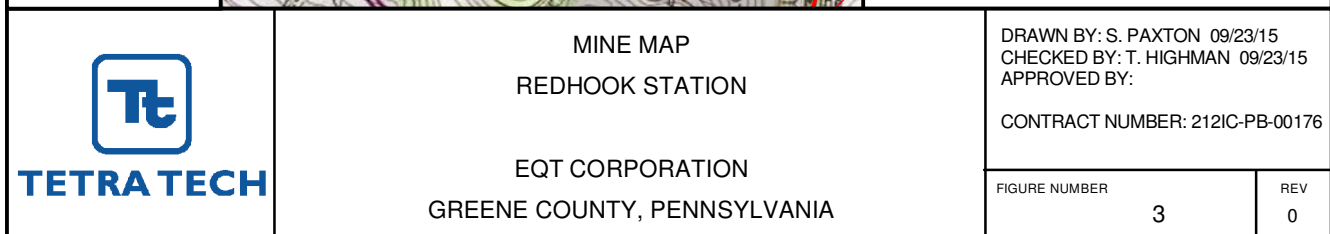
- Notes:
- 1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).
 - 2) Quadrangles displayed are Mather and Waynesburg.



 TETRA TECH	USGS PROJECT LOCATION MAP REDHOOK STATION		DRAWN BY: S. PAXTON 09/23/15 CHECKED BY: T. HIGHMAN 09/23/15 APPROVED BY:	
	EQT CORPORATION GREENE COUNTY, PENNSYLVANIA		CONTRACT NUMBER: 212IC-PB-00176	
			FIGURE NUMBER 1	REV 0

PGH P:\GIS\EQT\MAPDOCS\EEP_REDHOOK_STRUCTURAL_CONTOUR.MXD 10/12/15 SP





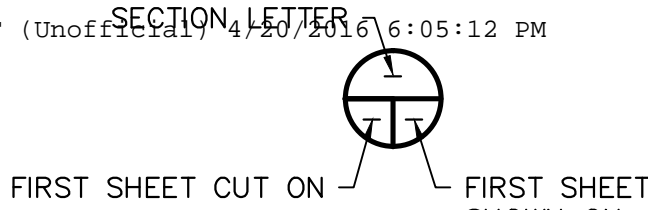
NOTES

1. SEE GEOTECHNICAL INVESTIGATION, EQT
REDHOOK GREENE COUNTY, PENNSYLVANIA,
FOR ADDITIONAL INFORMATION INCLUDING BORE
LOGS.

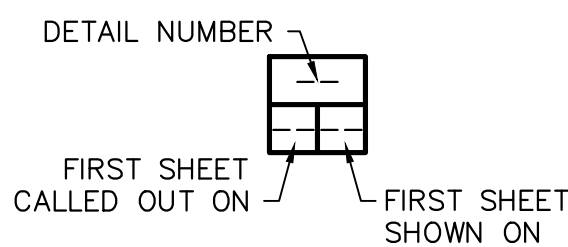
LEGEND

- 1160 EXISTING 10' CONTOUR
EXISTING 2' CONTOUR
EXISTING TREE LINE
EXISTING ROAD
EXISTING STREAM
EXISTING BUILDING
X EXISTING FENCE
1160 PROPOSED 10' CONTOUR
PROPOSED 2' CONTOUR
PROPERTY LINE
TEST BORING
EXISTING WETLAND

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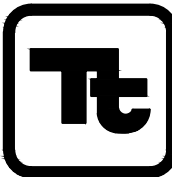
SECTION INDICATOR



DETAIL INDICATOR

NOTE:

THE DEPTH AND THICKNESS OF GEOLOGIC CONDITIONS ON THIS GEOLOGIC CROSS SECTION ARE GENERALIZED FROM THE TEST BORING INFORMATION. INFORMATION ON SUBSURFACE CONDITIONS EXISTS ONLY AT THE TEST BORING LOCATION AND SUBSURFACE CONDITIONS MAY DIFFER BETWEEN THE TEST BORING LOCATIONS.



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MARK	DATE	DESCRIPTION	BY

EQT
GREENE COUNTY, PENNSYLVANIA

REDHOOK COMPRESSOR STATION
BORING LOCATION PLAN

SCALE: AS NOTED

DATE: 09/14/15
PROJECT NO.: 212C-PB-00176
DESIGNED BY: -
DRAWN BY: JWK
CHECKED BY: TH
SHEET: 1 OF -
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TERMINOLOGY FOR ROCK DESCRIPTION

HARDNESS OF ROCK	
HARDNESS	FIELD TEST
VERY HARD	MANY BLOWS WITH GEOLOGIC HAMMER REQUIRED TO BREAK INTACT SPECIMEN DOES NOT LEAVE A GROOVE ON THE ROCK SURFACE WHEN SCRATCHED WITH KNIFE.
HARD	HAND HELD SPECIMEN BREAKS WITH HAMMER END OF PICK UNDER MORE THAN ONE BLOW. LEAVES A FAINT GROOVE WHEN SCRATCHED WITH KNIFE.
MEDIUM HARD	CAN JUST BE SCRAPED OR PEELED WITH KNIFE.
SOFT	LEAVES A DEEP GROOVE WITH BROKEN EDGE.
VERY SOFT	CAN BE SCRATCHED WITH FINGERNAIL.

WEATHERING CLASSIFICATION OF ROCK	
GRADE	DIAGNOSTIC FEATURES
FRESH	NO VISIBLE SIGN OF DECOMPOSITION OR;
SLIGHTLY WEATHERED	SLIGHT DISCOLORATION INWARDS FROM OPEN FRACTURES, OTHERWISE SIMILAR TO FRESH
MODERATELY WEATHERED	DISCOLORATION THROUGHOUT. WEAKER MINERALS SUCH AS FELDSPAR DECOMPOSED. STRENGTH SOMEWHAT LESS THAN FRESH ROCK BUT CORES CANNOT BE BROKEN BY HAND OR SCRAPED BY KNIFE. TEXTURED PRESERVED.
HIGHLY WEATHERED	MOST MINERALS SOMEWHAT DECOMPOSED. SPECIMENS CAN BE BROKEN BY HAND WITH EFFORT OR SHAVED WITH KNIFE. CORE STONES PRESENT IN ROCK MASS. TEXTURE BECOMING INDISTINCT BUT FABRIC PRESERVED.
COMPLETELY RESIDUAL SOIL	MINERALS DECOMPOSED TO SOIL BUT FABRIC ADVANCED STATE OF DECOMPOSITION RESULTING IN PLASTIC SOILS. ROCK FABRIC AND STRUCTURE COMPLETELY DESTROYED. LARGE VOLUME CHANGE.

TERMINOLOGY FOR SOIL DESCRIPTION

CONSISTENCY OF COHESIVE SOILS		
CONSISTENCY	BLOWS/FT	UNCONFINED COMPRESSIVE STRENGTH T.S.F.
VERY SOFT	<2	<0.25
SOFT	2–4	0.25–0.50
MEDIUM STIFF	4–8	0.50–1.0
STIFF	8–15	1–2
VERY STIFF	15–30	2–4
HARD	>30	>4

DENSITY OF GRANULAR SOILS	
DESIGNATION	BLOWS/FT
VERY LOOSE	0–4
LOOSE	5–10
MEDIUM DENSE	11–30
DENSE	31–50
VERY DENSE	>50

RECOMMENDATIONS FOR SITE DEVELOPMENT

PROOF-ROLL ALL AREAS RECEIVING NEW FILL AND THE BOTTOM OF THE EXCAVATION (IF IN SOIL) WITH A 12-TON ROLLER COMPACTOR TO NO VISIBLE MOVEMENT CRITERIA. PROOF-ROLLING SHOULD NOT BE PERFORMED WHEN THE SUBGRADE IS WET OR FROZEN. IF ANY SOFT OR WET ZONES ARE ENCOUNTERED OR SOIL PUMPING IS OBSERVED, OVER-EXCAVATE THE AREA OR SINK-IN RIPRAP MATERIAL OF A MINIMUM 8 INCH SIZE AND COMPACT TO NO MOVEMENT. RIPRAP MATERIAL SHOULD BE COMPOSED OF LIMESTONE OR SANDSTONE AND APPROVED BY THE GEOTECHNICAL ENGINEER. UPON COMPLETION OF SATISFACTORY PROOF-ROLLING, THE AREA CAN BE BACKFILLED WITH WELL-COMPACTED FILL. WITH THE EXCEPTION OF TOPSOIL, ORGANIC DEPOSITS, CARBONACEOUS MATERIALS, AND MATERIAL GREATER THAN 4" IN DIAMETER, THE ON-SITE EXCAVATED MATERIALS SHOULD BE SUITABLE FOR USE AS FILL ON THE PROPOSED PAD.

PROVIDE BONDING BENCHES PRIOR TO THE PLACEMENT OF BACKFILL ON EXISTING SLOPES PER DETAIL 2. COMMON FILL FROM THE SITE IS ACCEPTABLE FOR PLACEMENT ABOVE THE TOE KEY. PLACE AND COMPACT COMMON FILL IN 8-INCH THICK LOOSE HORIZONTAL LIFTS; COMPACT EACH LAYER TO 95 PERCENT OF THE MAXIMUM DRY DENSITY AT ± 5% OF THE OPTIMUM MOISTURE CONTENT AS DETERMINED BY THE STANDARD PROCTOR COMPACTION TEST (ASTM: D 698). IF ON-SITE SOILS HAVE HIGH MOISTURE CONTENTS, THE BACKFILL MAY NEED DRYING PRIOR TO PLACEMENT, UNLESS APPROVED BY TETRA TECH'S GEOTECHNICAL ENGINEER OR EQT'S QUALIFIED REPRESENTATIVE (THE ENGINEER). PLACING EXCESSIVELY WET OR SOFT MATERIALS AS FILL IS UNACCEPTABLE. EACH LIFT WILL BE SCARIFIED PRIOR TO THE PLACEMENT OF THE LIFT ABOVE.

CARE SHOULD BE EXERCISED TO ENSURE THAT THE FILL IS FREE FROM ANY ORGANIC-RICH, CARBONACEOUS MATERIAL OR TRASH. DURING SITE DEVELOPMENT ACTIVITIES, PROPER SITE DRAINAGE SHOULD BE MAINTAINED TO PREVENT SURFACE SOILS FROM ACCUMULATING MOISTURE AND PONDED WATER. WET OR FROZEN SOILS SHOULD BE REMOVED BEFORE ADDITIONAL FILL IS PLACED. ALL PROOF-ROLLED SOILS AND FILL SURFACES SHOULD BE SEALED WITH A SMOOTH DRUM ROLLER AT THE COMPLETION OF EACH DAY'S SITE DEVELOPMENT ACTIVITIES. IF ANY PERCHED WATER, SPRINGS OR SEEPS ARE ENCOUNTERED, INSTALL 4" DIAMETER UNDERDRAIN AS NOTED IN DETAIL 1.

A QUALIFIED SOILS TECHNICIAN UNDER THE DIRECT SUPERVISION OF THE ENGINEER SHOULD BE AT THE SITE DURING CONSTRUCTION TO MONITOR SITE DEVELOPMENT ACTIVITIES PER TETRA TECH'S RECOMMENDATIONS INDICATED IN THE GEOTECHNICAL REPORT. THE SOIL TECHNICIAN SHOULD BE ON SITE TO OBSERVE THE UNDERCUT, PROOF-ROLLING OF THE EXPOSED SUBGRADE/UNDERCUT PRIOR TO PLACING FILL AND TO MONITOR THE GRADATION, PLACEMENT AND COMPACTION OF FILL MATERIALS TO ENSURE THAT THE SPECIFIED GRADATION AND DENSITY REQUIREMENTS ARE BEING ACHIEVED. IN-PLACE NUCLEAR DENSOMETER TESTING SHOULD BE COMPLETED FOR EACH LIFT PER ASTM D 5195 OR EVERY 10,000 SQUARE FEET OF FILL, AT A MINIMUM OF ONE TEST PER LIFT.

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BEDDING AND DISCONTINUITY SPACING OF ROCK

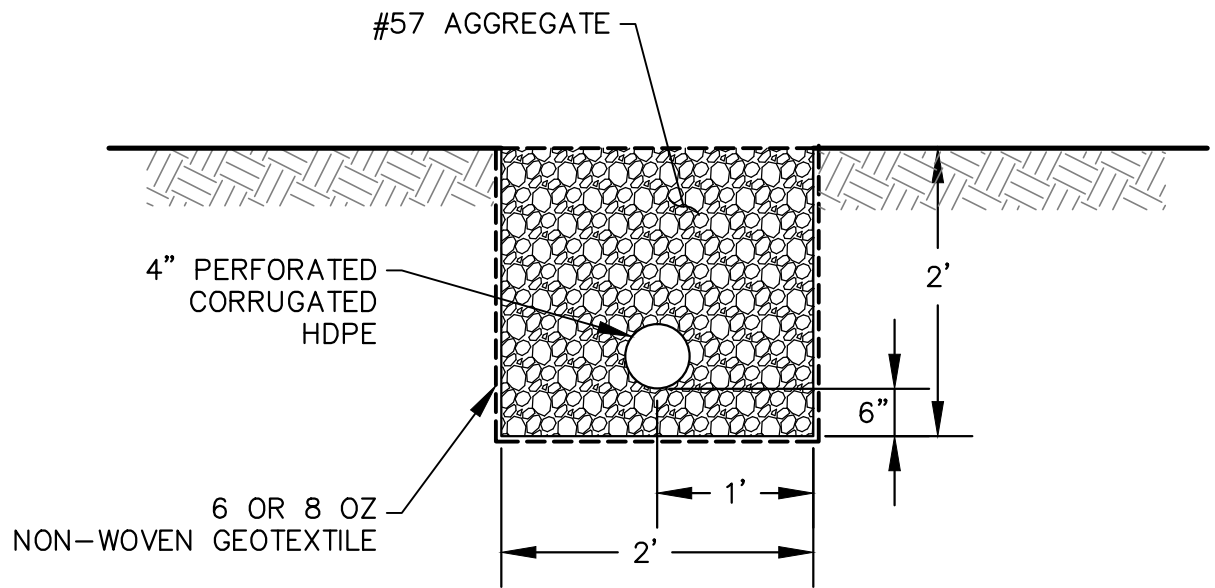
DETAILED DESCRIPTION			GENERAL DESCRIPTION	
DESCRIPTION FOR STRUCTURAL FEATURES: BEDDING OR FOLIATION	SPACING	DESCRIPTION FOR JOINTS, FAULTS OR OTHER FRACTURES	DEGREE OF BROKENNESS	
			SPACING	
VERY THICKLY (BEDDED, FOLIATED, OR BANDED)	>6'	VERY WIDELY (FRACTURED OR JOINTED)	>6'	MASSIVE
THICKLY	2'–6'	WIDELY	3"–6"	SLIGHTLY BROKEN
MEDIUM	8"–24"	MEDIUM		
THINLY	2 1/2"–8"	CLOSELY	1"–3"	BROKEN
VERY THINLY	3/4"–2 1/2"	VERY CLOSELY	<1"	VERY BROKEN
INTENSELY LAMINATED	1/4"–3/4"	EXTREMELY CLOSE		
VERY INTENSELY LAMINATED	<1/4"			

ENGINEERING CLASSIFICATION FOR USE IN SITU ROCK QUALITY

RQD %	ROCK MASS QUALITY
90–100	EXCELLENT
75–90	GOOD
50–75	FAIR
25–50	POOR
0–25	VERY POOR

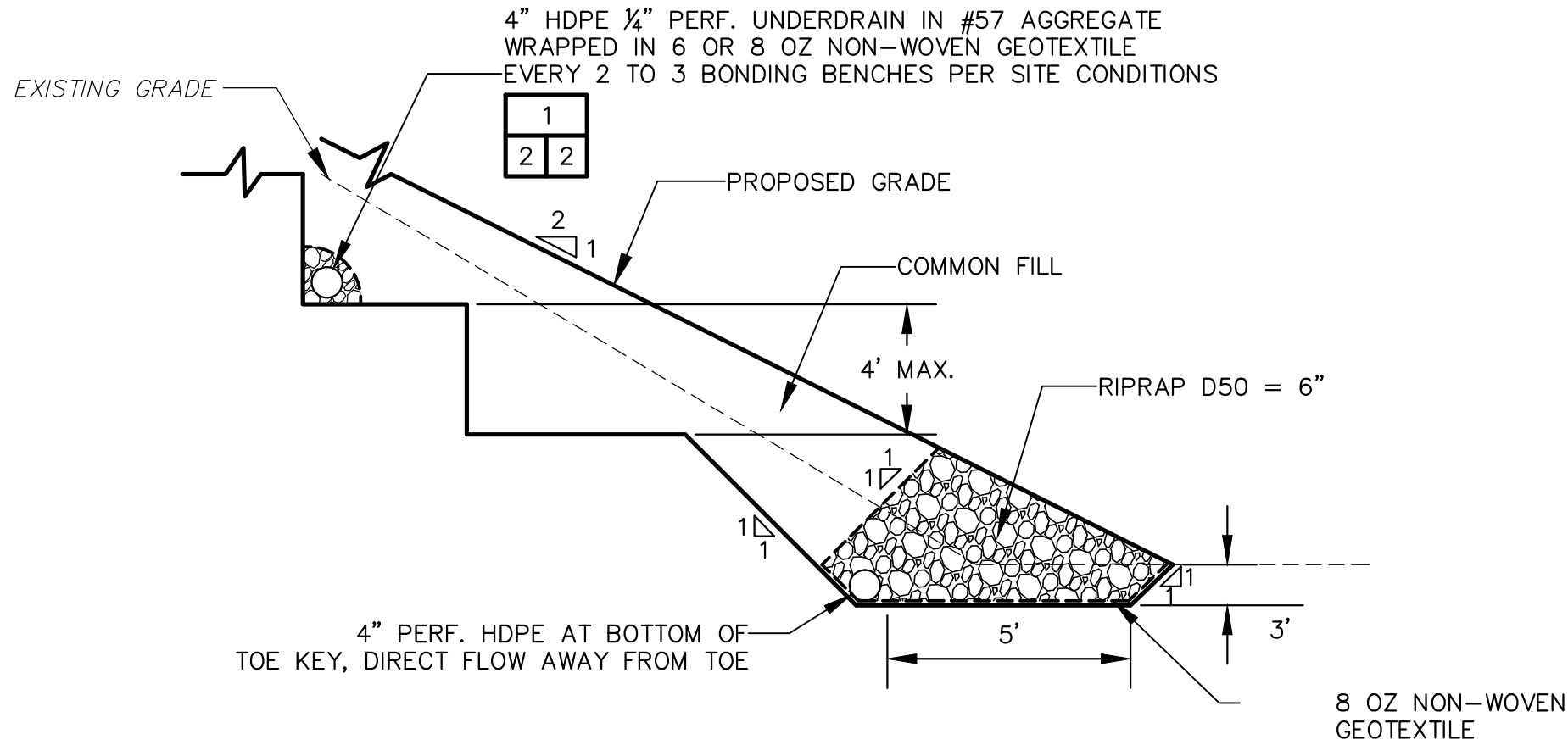
NOTE:

THE DEPTH AND THICKNESS OF GEOLOGIC CONDITIONS ON THIS GEOLOGIC CROSS SECTION ARE GENERALIZED FROM THE TEST BORING INFORMATION. INFORMATION ON SUBSURFACE CONDITIONS EXISTS ONLY AT THE TEST BORING LOCATION AND SUBSURFACE CONDITIONS MAY DIFFER BETWEEN THE TEST BORING LOCATIONS.



4" HDPE LATERAL UNDERDRAIN DETAIL

NOT TO SCALE



TYPICAL FILL EMBANKMENT BONDING BENCH DETAIL

NOT TO SCALE



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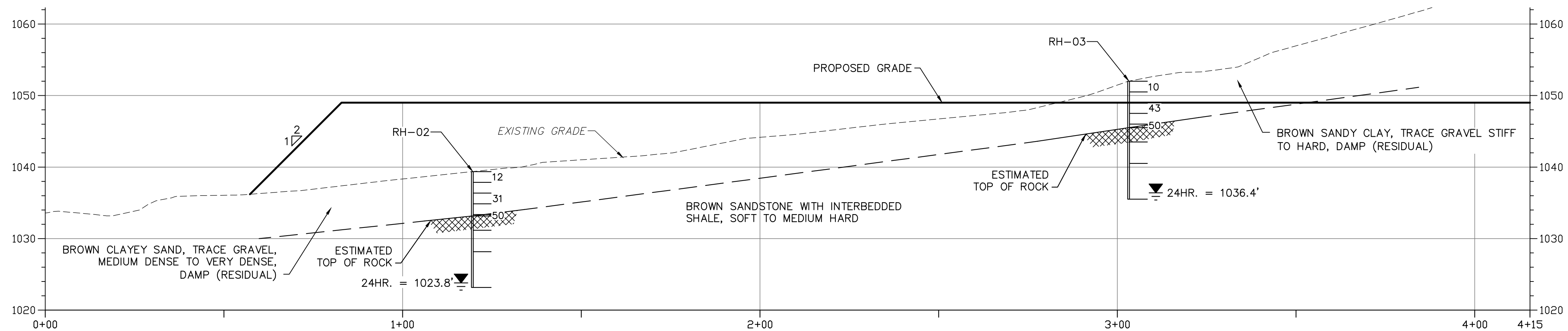
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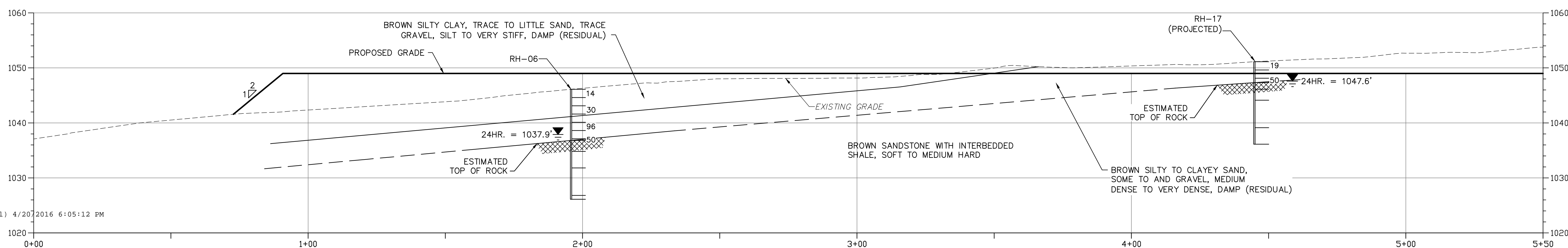
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GEOTECHNICAL NOTES AND DETAILS

SCALE: AS NOTED

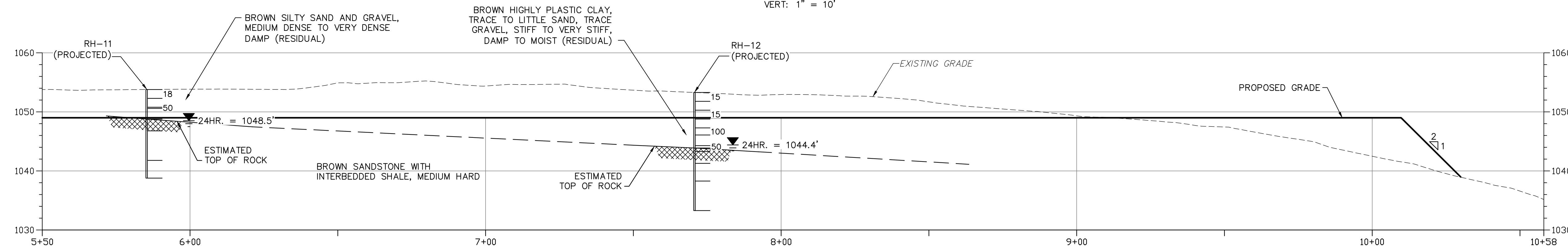
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DRAWN BY:	JWK
CHECKED BY:	TH
SHEET:	2 OF 4
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SECTION A-A
SCALE: HORIZ: 1" = 20'
VERT: 1" = 10'



SECTION B-B
SCALE: HORIZ: 1" = 20'
VERT: 1" = 10'



SECTION B-B
SCALE: HORIZ: 1" = 20'
VERT: 1" = 10'

NOTE:
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▽ OHR = WATER LEVEL AT BORING COMPLETION
▼ 24HR = WATER LEVEL 24 HOURS AFTER BORING COMPLETION

0 20 40
HORIZONTAL SCALE: 1" = 20'
0 10 20
VERTICAL SCALE: 1" = 10'



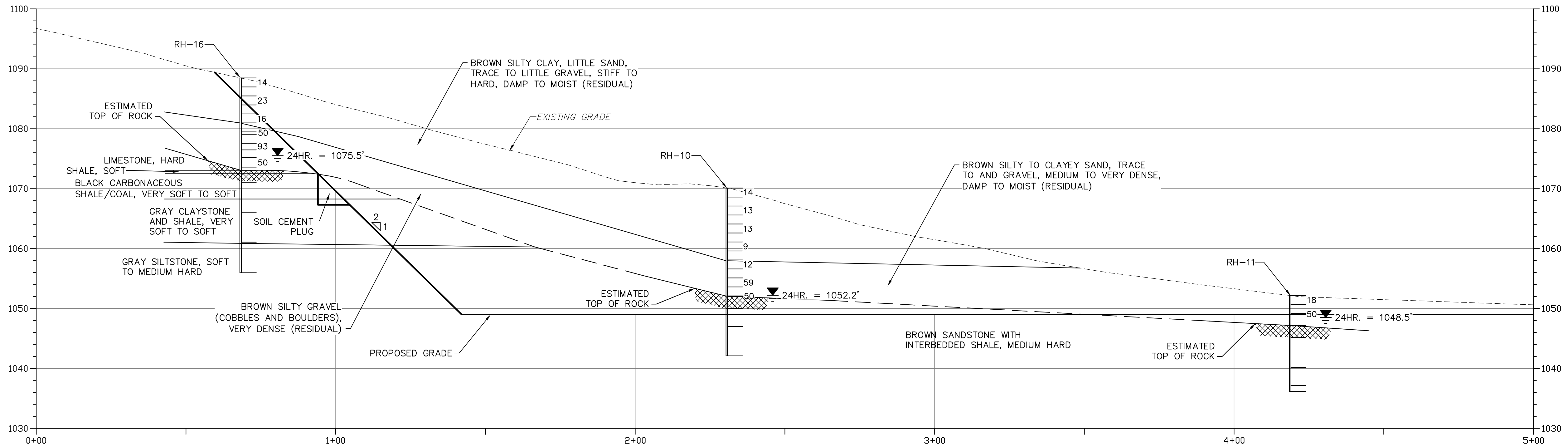
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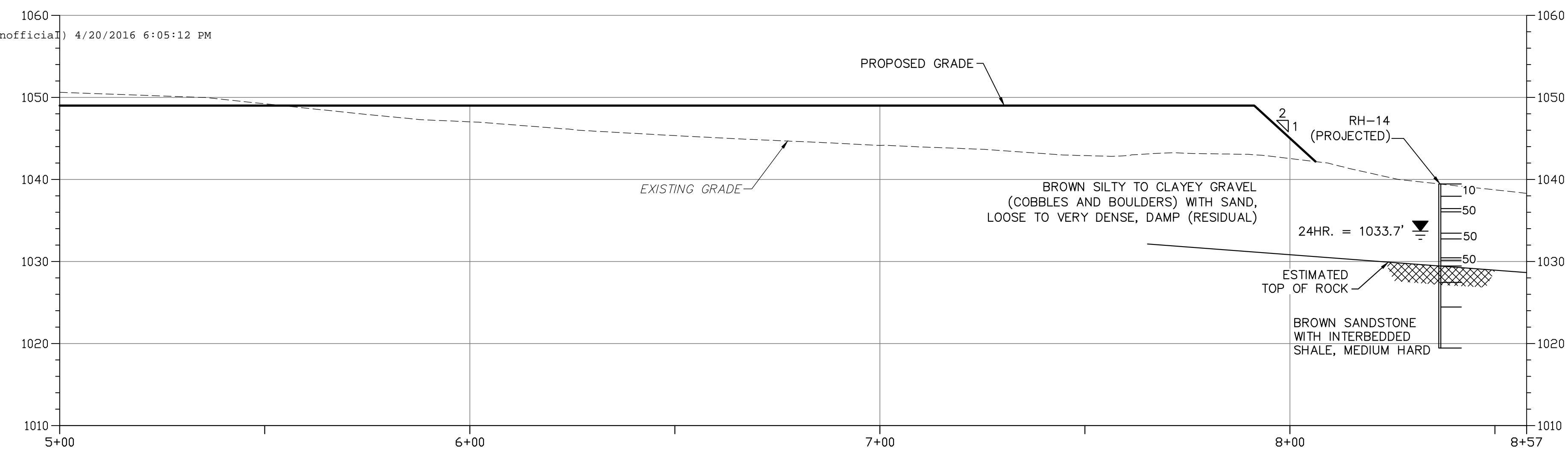
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REDHOOK COMPRESSOR STATION
GENERALIZED GEOLOGIC CROSS SECTIONS
SCALE: AS NOTED

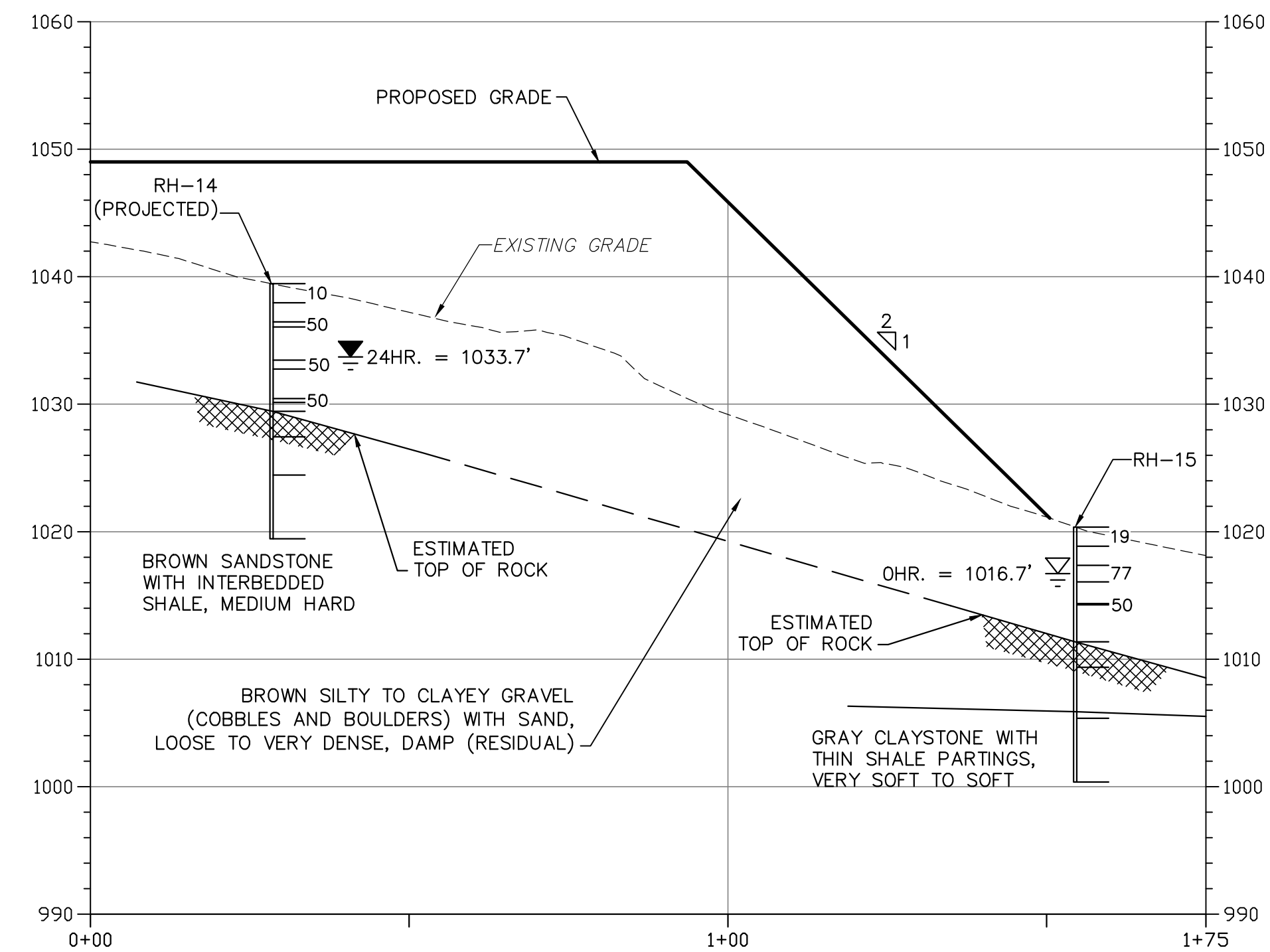
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SECTION C-C
SCALE: HORIZ: 1" = 20'
VERT: 1" = 10'



SECTION C-C
SCALE: HORIZ: 1" = 20'
VERT: 1" = 10'



SECTION D-D
SCALE: HORIZ: 1" = 20'
VERT: 1" = 10'

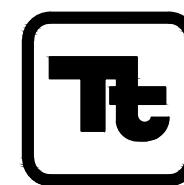
0 20 40
HORIZONTAL SCALE: 1" = 20'

0 10 20
VERTICAL SCALE: 1" = 10'

▽ OHR = WATER LEVEL AT BORING COMPLETION
▼ 24HR = WATER LEVEL 24 HOURS AFTER BORING COMPLETION

NOTE:

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REDHOOK COMPRESSOR STATION
GENERALIZED GEOLOGIC CROSS SECTIONS
SCALE: AS NOTED

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SUMMARY OF TEST BORING INFORMATION AND BORING LOGS

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TETRA TECH

Boring Number: RH-01

Sheet: 1 of 1

Project: EQT Redhook
Drilling Method: 2" Split Spoon, Hollow Stem Auger, NQ Core
Drilling Contractor: DLZ
Start: 8/25/15
Finish: 8/25/15
Geologist: D.Beebout

Project Number: 212IC-PB-00176
Northing: 39.91722
Easting: -80.13080
Location:
Ground Surface Elevation (ft msl): 1041.0
Water Level 0HR (ft): 23.0
Water Level 24HR (ft): 24.5

Depth Below Surface (ft)	Sample Type Core Run	Recovery (ft)	RQD (%)	Standard Penetration Test	USCS Symbol	Sample Description
0	S-1	1.2		4-7-6		0.0-0.2 Topsoil
1						
2	S-2	0.2		50/2	cl	0.2-6.1' Brown silty clay and sand, trace to some gravel, stiff to hard, damp. (residual)
3						
4	S-3	0.1		50/1		(Residual - Weathered Bedrock)
5						TOR @ 6.1'
6	R-1	0.7	18			6.1-25.0' Brown sandstone with interbedded shale, coarse grained, medium hard, moderately weathered to fresh, intensely laminated to thinly bedded, very closely to widely fractured. (RQD 74%)
7	R-2	4.7	94			* 10.0-25.0' Massive fresh sandstone widely fractured.
8						
9	R-3	5.0	90			
10						
11	R-4	5.0	80			
12						
13						Bottom of boring @ 25.0'
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

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Canfield, Ohio 44406



TETRA TECH

Boring Number: RH-02

Sheet: 1 of 1

Project: EQT Redhook
Drilling Method: 2" Split Spoon, Hollow Stem Auger, NQ Core
Drilling Contractor: DLZ
Start: 8/26/15
Finish: 8/26/15
Geologist: D.Beebout

Project Number: 212IC-PB-00176
Northing: 39.91674
Easting: -80.13063
Location:
Ground Surface Elevation (ft msl): 1039.4
Water Level 0HR (ft): 13.5
Water Level 24HR (ft): 15.6

Depth Below Surface (ft)	Sample Type Core Run	Recovery (ft)	RQD (%)	Standard Penetration Test	USCS Symbol	Sample Description
0						0.0-0.2 Topsoil
1	S-1	0.8		9-5-7		0.2-6.2' Brown clayey sand, trace gravel, medium dense to very dense, damp. - Lab Testing: 0.0-3.0' (SC) - Natural Moisture Content = 9.7% (Residual - Weathered Bedrock) TOR @ 6.2'
2						
3					SC	
4	S-2	1.0		8-15-16		
5						
6	S-3	0.2		50/2		6.1-16.7' Brown sandstone with interbedded shale, soft to medium hard, highly weathered to fresh, intensely laminated to thinly bedded, very closely to closely fractured. (RQD 35%) Bottom of boring @ 16.7'
7	R-1	2.0	55			
8						
9						
10	R-2	0.9	0			
11						
12						
13						
14	R-3	5.0	52			
15						
16						

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Canfield, Ohio 44406



TETRA TECH

Boring Number: RH-03

Sheet: 1 of 1

Project: EQT Redhook
Drilling Method: 2" Split Spoon, Hollow Stem Auger, NQ Core
Drilling Contractor: DLZ
Start: 8/25/15
Finish: 8/25/15
Geologist: D.Beebout

Project Number: 212IC-PB-00176
Northing: 39.91705
Easting: -80.13023
Location:
Ground Surface Elevation (ft msl): 1052.0
Water Level 0HR (ft): 6.2
Water Level 24HR (ft): 15.6

Depth Below Surface (ft)	Sample Type Core Run	Recovery (ft)	RQD (%)	Standard Penetration Test	USCS Symbol	Sample Description
0						0.0-0.2 Topsoil
1	S-1	0.5		5-5-5		0.2-6.5' Brown sandy lean clay, trace gravel, stiff to hard, damp.
2						- Lab Testing: 0.0-3.0' (CL) - Natural Moisture Content = 8.0%
3						(Residual weathered bedrock)
4	S-2	0.9		7-14-29	CL	TOR @ 6.5'
5						
6	S-3	0.5		50-50/0		
7	R-1	1.7	0			6.5-16.5' Brown sandstone, medium hard, moderately weathered to fresh, thinly to medium bedded, very closely to widely fractured.
8						*Iron nodules and staining throughout
9						(RQD 39%)
10	R-2	3.0	30			
11						
12						Bottom of boring @ 16.5'
13						
14	R-3	4.1	60			
15						
16						

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TETRA TECH

Boring Number: RH-04

Sheet: 1 of 1

Project: EQT Redhook
Drilling Method: 2" Split Spoon, Hollow Stem Auger, NQ Core
Drilling Contractor: DLZ
Start: 9/1/15
Finish: 9/1/15
Geologist: D.Beebout

Project Number: 212IC-PB-00176
Northing: 39.91706
Easting: -80.12942
Location:
Ground Surface Elevation (ft msl): 1063.1
Water Level 0HR (ft): 20.3
Water Level 24HR (ft): 23.1

Depth Below Surface (ft)	Sample Type Core Run	Recovery (ft)	RQD (%)	Standard Penetration Test	USCS Symbol	Sample Description
0	S-1	0.9		4-7-7	cl	0.0-0.3 Topsoil
1						0.3-12.0' Brown silty clay, trace sand to little sand, trace gravel, stiff to very stiff, damp to moist. (Residual) *3.0-7.5' mottled brown gray color
2						
3	S-2	0.8		7-10-6		
4						
5						
6	S-3	1.1		5-7-8		
7						
8						
9	S-4	0.8		4-9-9		
10						
11						
12	S-5	1.1		10-50-50/2	cl	12.0-18.1' Brown silty clay and sand, little clay, trace gravel, hard, damp. (Residual weathered bedrock) TOR @ 18.1'
13						
14						
15	S-6	0.8		27-50/.3		
16						
17						
18	S-7	0.1		50/.1		18.1-28.1' Brown gray sandstone with interbedded silty shale, medium grained, medium hard, moderately weathered to fresh, thinly to medium bedded, closely to widely fractured. - Lab Testing: 21.6-22.6' - Unconfined Compressive Strength = 6,535 psi (RQD 80%) Bottom of boring @ 28.1'
19	R-1	2.0	65			
20						
21	R-2	2.4	92			
22						
23						
24						
25	R-3	4.9	90			
26						
27						
28						

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TETRA TECH

Boring Number: RH-05

Sheet: 1 of 1

Project: EQT Redhook
Drilling Method: 2" Split Spoon, Hollow Stem Auger, NQ Core
Drilling Contractor: DLZ
Start: 8/25/15
Finish: 8/25/15
Geologist: D.Beebout

Project Number: 212IC-PB-00176
Northing: 39.91682
Easting: -80.12971
Location:
Ground Surface Elevation (ft msl): 1062.9
Water Level 0HR (ft): 11.7
Water Level 24HR (ft):6.9

Depth Below Surface (ft)	Sample Type Core Run	Recovery (ft)	RQD (%)	Standard Penetration Test	USCS Symbol	Sample Description
0						0.0-0.2 Topsoil
1	S-1	0.6		5-8-9		0.3-7.3' Brown silty to sandy clay, trace gravel, very stiff to hard, damp. (Residual - Weathered Bedrock) TOR @ 7.3'
2						
3						
4	S-2	0.9		7-12-13	cl	
5						
6						
7	S-3	1.1		5-14-50/.3		
8	R-1	1.8	20			7.3-17.8' Brown sandstone with interbedded shale, soft to medium hard, completely to moderately weathered, thinly to medium bedded, very closely to medium fractured - Brown iron staining (RQD 50%) Bottom of boring at 17.8'
9						
10	R-2	1.5	0			
11						
12						
13						
14	R-3	4.7	78			
15						
16						
17	R-4	1.0	100			

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TETRA TECH

Boring Number: RH-06

Sheet: 1 of 1

Project: EQT Redhook
Drilling Method: 2" Split Spoon, Hollow Stem Auger, NQ Core
Drilling Contractor: DLZ
Start: 8/25/15
Finish: 8/25/15
Geologist: D.Beebout

Project Number: 212IC-PB-00176
Northing: 39.91647
Easting: -80.13026
Location:
Ground Surface Elevation (ft msl): 1046.2
Water Level 0HR (ft): 10.9
Water Level 24HR (ft): 8.3

Depth Below Surface (ft)	Sample Type Core Run	Recovery (ft)	RQD (%)	Standard Penetration Test	USCS Symbol	Sample Description
0						0.0-0.2 Topsoil
1	S-1	0.3		4-5-9	cl	0.3-6.0' Brown silty clay, trace to little sand, trace gravel, stiff to very stiff, damp. (Residual)
2						
3						
4	S-2	0.8		7-10-20		
5						
6					sm-sc	6.0-9.3' Brown silty to clayey sand, some gravel, very dense, damp. (residual - weathered bedrock) TOR @ 9.3'
7	S-3	1.3		19-46-50		
8						
9	S-4	0.3		50/3		
10	R-1	0.7	0			9.3-20.0' Brown sandstone, medium hard, moderately weathered to fresh, very thinly to thinly bedded, very closely to medium fractured - Iron nodules (RQD 50%) Bottom of boring @ 20.0'
11						
12						
13	R-2	2.6	53			
14						
15						
16						
17	R-3	5.0	67			
18						
19						
20	R-4	0.7	100			

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TETRA TECH

Boring Number: RH-07

Sheet: 1 of 1

Project: EQT Redhook
Drilling Method: 2" Split Spoon, Hollow Stem Auger, NQ Core
Drilling Contractor: DLZ
Start: 8/26/15
Finish: 8/26/15
Geologist: D.Beebout

Project Number: 212IC-PB-00176
Northing: 39.91610
Easting: -80.12964
Location:
Ground Surface Elevation (ft msl): 1045.3
Water Level 0HR (ft): 13.9
Water Level 24HR (ft): 14.3

Depth Below Surface (ft)	Sample Type Core Run	Recovery (ft)	RQD (%)	Standard Penetration Test	USCS Symbol	Sample Description
0	S-1	0.3		3-50/.1	sm	0.0-0.2 Topsoil
1						0.2-5.0' Brown silty sand, little clay, trace to some gravel (weathered sandstone fragments), very dense, damp. (Residual - weathered bedrock) TOR @ 5.0'
2						
3	S-2	0.4		50/.4		
4						
5						
6	R-1	2.0	55			5.0-16.0' Brown sandstone with interbedded shale, soft to medium hard, highly weathered to fresh, indiscernible to thinly bedded, very closely to closely fractured. (RQD 37%)
7						Bottom of boring at 16.0'
8						
9	R-2	0.9	0			
10						
11						
12						
13	R-3	5.0	52			
14						
15						
16	R-4	1.0	40			

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TETRA TECH

Boring Number: RH-08

Sheet: 1 of 1

Project: EQT Redhook
Drilling Method: 2" Split Spoon, Hollow Stem Auger, NQ Core
Drilling Contractor: DLZ
Start: 8/26/15
Finish: 8/26/15
Geologist: D.Beebout

Project Number: 212IC-PB-00176
Northing: -39.91586
Easting: -80.12925
Location:
Ground Surface Elevation (ft msl): 1045.7
Water Level 0HR (ft): 14.6
Water Level 24HR (ft): 14.6

Depth Below Surface (ft)	Sample Type Core Run	Recovery (ft)	RQD (%)	Standard Penetration Test	USCS Symbol	Sample Description
0						0.0-0.1 Topsoil
1	S-1	1.0		16-32-36		0.1-5.0' Brown silty sand and gravel (weathered bedrock), little clay, trace to some gravel, very dense, damp. (Residual - weathered bedrock) TOR @ 5.0'
2					sm	
3	S-2	0.5		46-50/.2		
4						
5						5.0-15.0' Brown sandstone with interbedded shale, soft to medium hard, highly weathered to fresh, thinly to medium bedded, very closely to closely fractured. (RQD 32%) Bottom of boring at 15.0'
6	R-1	1.8	20			
7						
8						
9	R-2	3.7	32			
10						
11						
12						
13	R-3	3.7	32			
14						
15						

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TETRA TECH

Boring Number: RH-09

Sheet: 1 of 1

Project: EQT Redhook
Drilling Method: 2" Split Spoon, Hollow Stem Auger, NQ Core
Drilling Contractor: DLZ
Start: 8/27/15
Finish: 8/27/15
Geologist: D.Beebout

Project Number: 212IC-PB-00176
Northing: 39.91665
Easting: -80.12899
Location:
Ground Surface Elevation (ft msl): 1055.1
Water Level 0HR (ft): 1.1
Water Level 24HR (ft): 4.9

Depth Below Surface (ft)	Sample Type Core Run	Recovery (ft)	RQD (%)	Standard Penetration Test	USCS Symbol	Sample Description
0						0.0-0.2 Topsoil
1	S-1	1.2		3-10-8		
2						0.2-8.0' Brown silty gravel with sand, medium dense to very dense, damp to moist.
3	S-2	0.6		11-50/.4		(Residual - Weathered Bedrock)
4					gm	TOR @ 8.0'
5						
6	S-3	0.2		50/2		
7						
8						
9	R-1	1.8	50			8.0-18.0' Brown sandstone with interbedded shale, soft to medium hard, slightly weathered to fresh, intensely laminated to very thinly bedded, extremely close to widely fractured.
10						(RQD 62%)
11	R-2	2.9	50			Bottom of boring at 18.0'
12						
13						
14						
15	R-3	5.0	74			
16						
17						
18						

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TETRA TECH

Boring Number: RH-10

Sheet: 1 of 1

Project: EQT Redhook
Drilling Method: 2" Split Spoon, Hollow Stem Auger, NQ Core
Drilling Contractor: DLZ
Start: 9/1/15
Finish: 9/1/15
Geologist: D.Beebout

Project Number: 212IC-PB-00176
Northing: 39.91701
Easting: -80.12887
Location:
Ground Surface Elevation (ft msl): 1070.0
Water Level 0HR (ft): 16.0
Water Level 24HR (ft): 17.8

Depth Below Surface (ft)	Sample Type Core Run	Recovery (ft)	RQD (%)	Standard Penetration Test	USCS Symbol	Sample Description
0						0.0-0.3 Topsoil
1	S-1	0.9		4-7-7		
2						0.3-12.0' Brown lean clay with sand, trace gravel, very stiff, damp to moist.
3						
4	S-2	0.9		7-6-7		*mottled coloring gray and brown 9.0-13.5'
5						- Lab Analysis: 6.0-10.5' CL
6					CL	- Natural Moisture Content = 16.8%
7	S-3	0.8		3-5-8		(Residual)
8						
9						
10	S-4	1.0		3-4-5		
11						
12						
13	S-5	1.2		2-3-9		12.0-18.1' Brown silty to clayey sand, trace gravel (weathered sandstone), medium dense to very dense, damp.
14						(Residual - weathered bedrock)
15					sm-sc	
16	S-6	1.3		14-32-27		TOR @ 18.1'
17						
18	S-7	0.1		50/2		
19	R-1	1.8	65			18.1-28.1' Brown gray sandstone, medium hard, moderately weathered to fresh, thinly to medium bedded, close to widely fractured.
20						
21	R-2	2.8	87			- Lab Testing: 25.8-26.6'
22						- Unconfined Compressive Strength = 8,640 psi
23						(RQD 88%)
24						
25	R-3	4.9	98			Bottom of boring at 28.1'
26						
27						
28						

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TETRA TECH

Boring Number: RH-11

Sheet: 1 of 1

Project: EQT Redhook
Drilling Method: 2" Split Spoon, Hollow Stem Auger, NQ Core
Drilling Contractor: DLZ
Start: 8/31/15
Finish: 9/1/15
Geologist: D.Beebout

Project Number: 212IC-PB-00176
Northing: 39.91648
Easting: -80.12856
Location:
Ground Surface Elevation (ft msl): 1052.2
Water Level 0HR (ft): 2.4
Water Level 24HR (ft): 3.7

Depth Below Surface (ft)	Sample Type Core Run	Recovery (ft)	RQD (%)	Standard Penetration Test	USCS Symbol	Sample Description
0						0.0-0.1 Topsoil
1	S-1	1.2		4-7-11		0.1-5.0' Brown silty to clayey sand and gravel (cobbles and boulders), little clay, medium to very dense, damp.
2						(Residual - Weathered Bedrock)
3	S-2	0.2		50/2	sm-sc	Auger Refusal @ 5.0' TOR @ 5.0'
4						
5						
6	R-1	1.7	35			5.0-15.0' Brown gray sandstone with interbedded shale, medium hard, slightly weathered to fresh, thinly bedded, extremely close to medium fractured.
7						(RQD 60%)
8						Bottom of boring at 15.0'
9						
10	R-2	5.0	66			
11						
12						
13	R-3	3.0	70			
14						
15						

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TETRA TECH

Boring Number: RH-12

Sheet: 1 of 1

Project: EQT Redhook
Drilling Method: 2" Split Spoon, Hollow Stem Auger, NQ Core
Drilling Contractor: DLZ
Start: 9/2/15
Finish: 9/2/15
Geologist: D.Beebout

Project Number: 212IC-PB-00176
Northing: -39.91624
Easting: -80.12843
Location:
Ground Surface Elevation (ft msl): 1052.6
Water Level 0HR (ft): 10.7
Water Level 24HR (ft): 8.2

Depth Below Surface (ft)	Sample Type Core Run	Recovery (ft)	RQD (%)	Standard Penetration Test	USCS Symbol	Sample Description
0						0.0-0.3 Topsoil
1	S-1	1.1		6-7-8		
2						0.3-10.0' Brown highly plastic clay, trace to little sand, trace gravel, stiff to very stiff, damp to moist.
3						- Lab Analysis: 0.0-10.0' CH
4	S-2	0.9		9-8-7		- Natural Moisture Content = 18.3%
5						- Standard Proctor Maximum Dry Density = 101.6 pcf @ 21.0% Moisture Content
6					CH	(Residual - Weathered Bedrock)
7	S-3	1.0		35-50-50/2		Auger Refusal @ 10.0'
8						TOR @ 10.0'
9	S-4	0.4		50/4		
10						
11	R-1	1.9	60			10.0-20.0' Brown gray sandstone with interbedded shale, medium hard, moderately weathered to fresh, intensely laminated to medium bedded, very closely to medium fractured.
12						- Lab Testing: 15.4-16.2'
13	R-2	3.0	70			- Unconfined Compressive Strength = 6,266 psi
14						(RQD 75%)
15						Bottom of boring at 20.0'
16						
17	R-3	5.0	84			
18						
19						
20						

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TETRA TECH

Boring Number: RH-13

Sheet: 1 of 1

Project: EQT Redhook
Drilling Method: 2" Split Spoon, Hollow Stem Auger, NQ Core
Drilling Contractor: DLZ
Start: 8/27/15
Finish: 8/27/15
Geologist: D.Beebout

Project Number: 212IC-PB-00176
Northing: -39.91628
Easting: -80.12881
Location:
Ground Surface Elevation (ft msl): 1050.0
Water Level 0HR (ft): 1.8
Water Level 24HR (ft):4.3

Depth Below Surface (ft)	Sample Type Core Run	Recovery (ft)	RQD (%)	Standard Penetration Test	USCS Symbol	Sample Description
0						0.0-0.1 Topsoil
1	S-1	0.9		11-12-50/3		0.1-5.0' Brown silty sand and gravel (weathered sandstone bedrock), little clay, very dense, damp.
2						(Residual-weathered bedrock)
3	S-2	0.2		50/2	sm	Auger Refusal @ 5.0' TOR @ 5.0'
4						
5						
6	R-1	1.2	20			5.0-15.0' Brown sandstone with interbedded shale, soft to medium hard, highly weathered to fresh, medium bedded, extremely close to closely fractured.
7						(RQD 50%)
8						Bottom of boring at 15.0'
9	R-2	3.0	57			
10						
11						
12						
13	R-3	4.9	58			
14						
15						

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TETRA TECH

Boring Number: RH-14
Sheet: 1 of 1

Project: EQT Redhook
Drilling Method: 2" Split Spoon, Hollow Stem Auger, NQ Core
Drilling Contractor: DLZ
Start: 9/2/15
Finish: 9/2/15
Geologist: D.Beebout

Project Number: 212IC-PB-00176
Northing: 39.91624
Easting: -80.12795
Location:
Ground Surface Elevation (ft msl): 1039.4
Water Level 0HR (ft): 4.7
Water Level 24HR (ft): 5.7

Depth Below Surface (ft)	Sample Type Core Run	Recovery (ft)	RQD (%)	Standard Penetration Test	USCS Symbol	Sample Description
0						0.0-0.1 Topsoil
1	S-1	0.8		4-7-3		0.1-10.0' Brown silty to clayey gravel with sand (sandstone fragments), loose to very dense, damp. - Cobbles and boulders throughout (Residual - Weathered Bedrock) Auger refusal at 10.0' TOR @ 10.0'
2						
3	S-2	0.4		50/.4		
4						
5					gm-gc	
6	S-3	0.7		22-50/.2		
7						
8						
9	S-4	0.3		50/.3		
10						
11	R-1	1.7	45			10.0-20.0' Brown gray sandstone with interbedded shale, medium hard, moderately weathered to fresh, intensely laminated to thinly bedded, very closely to closely fractured. (RQD 54%) Bottom of boring at 20.0'
12						
13	R-2	3.0	40			
14						
15						
16						
17	R-3	5.0	66			
18						
19						
20						

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TETRA TECH

Boring Number: RH-15
Sheet: 1 of 1

Project: EQT Redhook
Drilling Method: 2" Split Spoon, Hollow Stem Auger, NQ Core
Drilling Contractor: DLZ
Start: 9/2/15
Finish: 9/2/15
Geologist: D.Beebout

Project Number: 212IC-PB-00176
Northing: 39.91599
Easting: -80.12770
Location:
Ground Surface Elevation (ft msl): 1020.4
Water Level 0HR (ft): 3.7
Water Level 24HR (ft): Backfilled

Depth Below Surface (ft)	Sample Type Core Run	Recovery (ft)	RQD (%)	Standard Penetration Test	USCS Symbol	Sample Description
0						0.0-0.2 Topsoil 0.1-9.0' Brown silty to clayey gravel with sand, medium dense to very dense, damp. - Cobbles and boulders throughout (Residual - Weathered Bedrock) TOR @ 9.0'
1	S-1	1.1		10-12-7	gm-gc	
2						
3						
4	S-2	0.9		14-22-50/.3		
5						
6	S-3	0.1		50/.1		
7						9.0-13.3' Brown sandstone with interbedded shale, medium hard, moderately to slightly weathered, intensely laminated to thinly bedded, extremely close to closely spaced fractures. (RQD 47%)
8						
9						
10	R-1	1.9	50			
11						
12						
13	R-2	4.0	25			13.3-20.0' Gray claystone with shale partings, very soft to soft, highly to moderately weathered, indiscernible bedding to very intensely laminated, closely fractured. (RQD 43%) Bottom of the boring at 20.0'
14						
15						
16						
17						
18	R-3	5.0	58			
19						
20						

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TETRA TECH

Boring Number: RH-16

Sheet: 1 of 2

Project: EQT Redhook
Drilling Method: 2" Split Spoon, Hollow Stem Auger, NQ Core
Drilling Contractor: DLZ
Start: 9/1/15
Finish: 9/2/15
Geologist: D.Beebout

Project Number: 212IC-PB-00176
Northing: 39.91749
Easting: -80.12897
Location:
Ground Surface Elevation (ft msl): 1088.5
Water Level 0HR (ft): 11.3
Water Level 24HR (ft): 13.0

Depth Below Surface (ft)	Sample Type Core Run	Recovery (ft)	RQD (%)	Standard Penetration Test	USCS Symbol	Sample Description
0						0.0-0.3 Topsoil
1	S-1	1.0		4-5-9		0.3-9.0' Brown silty clay, little sand, trace to little gravel, stiff to hard, damp to moist. - Lab Analysis: 0.0-9.4' CL - Natural Moisture Content = 12.3% - Max Dry Density = 110.3 pcf @ 16.8% Optimum Moisture Content (Residual)
2						
3						
4	S-2	1.1		5-10-13		
5						
6						
7	S-3	0.9		4-7-9	CL	
8						
9	S-4	0.4		50/4		9.0-15.4' Brown silty gravel (COBBLES AND BOULDERS) with sand, very dense, damp (Residual - Weathered Bedrock) TOR @ 15.4'
10	R-1	1.5	1.5			
11						
12						
13	S-5	0.3		46-43-50/3	gm	
14						
15	S-6	0.0		50/4		15.4-15.9' Limestone, Hard, slightly weathered to fresh, very intensely laminated, closely fractured. (RQD 100%)
16	R-2	0.7	40			
17						
18	R-3	5.0	0			
19						
20						15.9-17.0' Shale, soft, moderately weathered, indiscernible bedding, extremely close fractures. (RQD 0%)

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TETRA TECH

Boring Number: RH-16

Sheet: 2 of 2

Project: EQT Redhook
Drilling Method: 2" Split Spoon, Hollow Stem Auger, NQ Core
Drilling Contractor: DLZ
Start: 9/1/15
Finish: 9/2/15
Geologist: D.Beebout

Project Number: 212IC-PB-00176
Northing: 39.91749
Easting: -80.12897
Location:
Ground Surface Elevation (ft msl): 1088.5
Water Level 0HR (ft): 11.3
Water Level 24HR (ft): 13.0

Depth Below Surface (ft)	Sample Type Core Run	Recovery (ft)	RQD (%)	Standard Penetration Test	USCS Symbol	Sample Description
20	R-3	5.0	0			17.0-20.2' Black carbonaceous shale and coal, very soft to soft, moderately weathered, extremely close to very closely spaced fractures. (RQD 0%)
21						
22						
23	R-4	3.3	0			20.2-27.6' Gray highly weathered claystone and shale, very soft to soft, indiscernible bedding, extremely close to very closely spaced fractures. (RQD 0%)
24						
25						
26	R-5	5.0	24			27.6-32.4' Gray siltstone with interbedded sandy shale, soft to medium hard, moderately weathered to very intensely laminated, extremely close to closely spaced fractures. (RQD 25%) Bottom of boring at 32.4'
27						
28						
29						
30						
31						
32						

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TETRA TECH

Boring Number: RH-17

Sheet: 1 of 1

Project: EQT Redhook
Drilling Method: 2" Split Spoon, Hollow Stem Auger, NQ Core
Drilling Contractor: DLZ
Start: 8/26/15
Finish: 8/27/15
Geologist: D.Beebout

Project Number: 212IC-PB-00176
Northing: 39.91648
Easting: -80.12917
Location:
Ground Surface Elevation (ft msl): 1050.2
Water Level 0HR (ft): 1.2
Water Level 24HR (ft): 2.6

Depth Below Surface (ft)	Sample Type Core Run	Recovery (ft)	RQD (%)	Standard Penetration Test	USCS Symbol	Sample Description
0						0.0-0.1 Topsoil
1	S-1	0.9		7-10-9		0.1-5.0' Brown silty to clayey sand and gravel, medium dense to very dense, damp.
2						(Residual weathered bedrock)
3	S-2	0.7		7-50/.3	sm-sc	Auger Refusal @ 5.0' TOR at 5.0'
4						
5						
6	R-1	1.8	30			5.0-15.0' Brown sandstone with interbedded shale, soft to medium hard, highly to slightly weathered, v thinly bedded to thinly bedded, extremely close to closely spaced fractures,
7						RQD = 45%
8						
9	R-2	4.9	34			
10						Bottom of boring at 15.0'
11						
12						
13	R-3	3.0	73			
14						
15						

LABORATORY ANALYSIS

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422

Client

Tetra Tech Inc.

Client Project

EQT RedHook

Project No.

36199

Boring

RH-02

Depth

0.0'-3.0'

Sample

S: 1,2

Lab Sample

36199001

Sample Color:

YELLOWISH BROWN

USCS Group Name:

CLAYEY SAND

USCS Group Symbol:

SC

USDA:

SANDY LOAM

AASHTO:

A-4 (1)

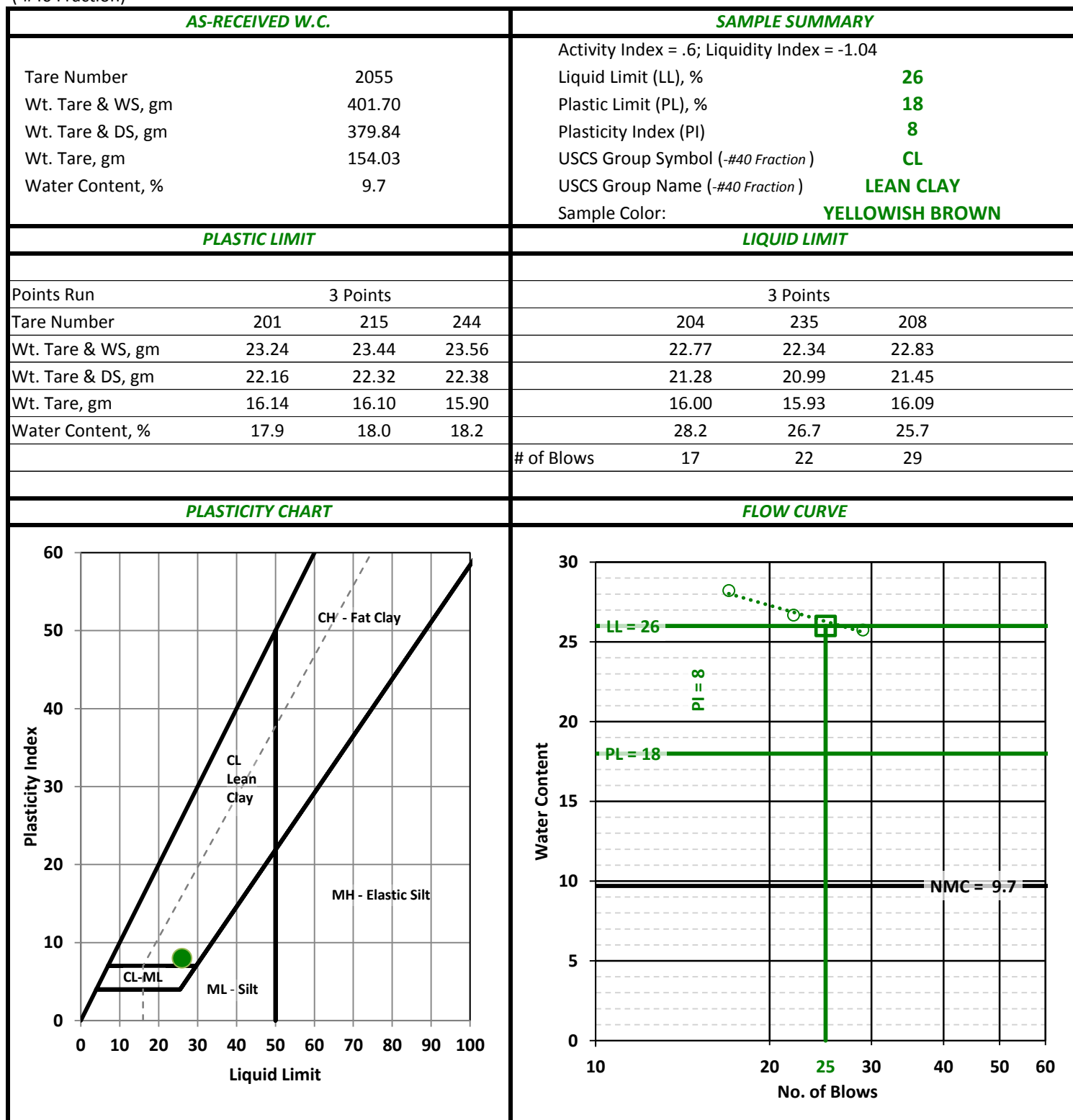
MECHANICAL SIEVE									
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications	
Total Sample Wet Wt, gm (-3")			541	3"	75	0	0.0%	100.0%	
Sample Split on Sieve			No. 4	2-1/2"	63	0	0.0%	100.0%	
Coarse Washed Dry Sample, gm			3	2"	50	0	0.0%	100.0%	
Wet Wt Passing Split, gm			538	1-1/2"	37.5	0	0.0%	100.0%	
Dry Wt. Passing Split, gm			490	1"	25	0	0.0%	100.0%	
Total Sample Dry Wt, gm			493	3/4"	19	0	0.0%	100.0%	
Split Sample - Passing No. 4				1/2"	12.5	0	0.0%	100.0%	
Tare No.			2055	3/8"	9.5	0	0.0%	100.0%	
Tare + WS., gm			401.7	No. 4	4.75	3.14	0.6%	99.4%	
Tare + DS., gm			379.84	No. 10	2	1.51	0.7%	98.7%	
Tare, gm			154.03	No. 20	0.85	5.39	2.4%	96.3%	
Water Content of Split Sample			9.7%	No. 40	0.425	13.01	5.7%	90.6%	
Wt. of DS., gm			225.81	No. 60	0.25	26.26	11.6%	79.0%	
				No. 140	0.106	60.99	26.8%	52.2%	
Wt. of + #200 Sample, gm			117.93	No. 200	0.075	10.77	4.7%	47.5%	
HYDROMETER (-#200)									
Tare No.		549	Wt. Dispers., gm		5		Specific Gravity		2.7
Wt. Tare + DS., gm		222.92	Wt. Dry Soil, gm (-#200)		21.84				Assumed
Wt. Tare, gm		196.08	#10 Dispersed 1min in Hamilton Beach Mixer				a Factor		0.9889
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)	
2	25	20.5	5.2	19.8	0.0134	89.7	0.0330	42.6%	
5	23	20.6	5.1	17.9	0.0134	81.1	0.0211	38.5%	
15	20.5	20.6	5.1	15.4	0.0134	69.7	0.0124	33.1%	
30	18.5	20.7	5.1	13.4	0.0134	60.7	0.0089	28.8%	
60	16.5	20.9	5.0	11.5	0.0133	52.1	0.0063	24.7%	
250	13	21.4	4.9	8.1	0.0133	36.7	0.0031	17.4%	
1440	9.5	21.3	4.9	4.6	0.0133	20.8	0.0013	9.9%	
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & + #4)	0.6	Silt=25.1% Clay=22.3%				Gravel	1.3	0	
Coarse=0; Fine=0.6		D60, mm	NA	Sand	53.7				54.4
% Sand (-#4 & + #200)		D30, mm	NA			Silt	31.6	32.0	
Coarse=0.7; Medium=8.1; Fine=43.1		D10, mm	NA	Clay	13.4				13.6
% Fines (-#200)		Cc	NA						
% Plus #200 (-3")		Cu	NA						
USCS Description				2	98.7				
CLAYEY SAND									
USCS Group Symbol		Atterberg Limits Group Symbol		0.05	45.0				
SC		CL - LEAN CLAY							
Auxiliary Information		Wt Ret, gm	% Retained	% Finer	0.002	13.4			
12" Sieve - 300 mm		0	0.0	100.0					
6" Sieve - 150 mm		0	0.0	100.0					
3" Sieve - 75 mm		0	0.0	100.0					
USDA Classification									
SANDY LOAM									

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS **ASTM D 4318**

Client Tetra Tech Inc.
 Client Project EQT RedHook
 Project No. 36199

Boring RH-02
 Depth 0.0'-3.0'
 Sample S: 1,2
 Lab Sample 36199001

Soil Description: YELLOWISH BROWN LEAN CLAY
 (-#40 Fraction)



Input Validation: Yes

Reviewed By: SVG

Date Tested: 9/4/2015

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422

Client

Tetra Tech Inc.

Client Project

EQT RedHook

Project No.

36199

Boring

RH-02

Depth

0.0'-3.0'

Sample

S: 1,2

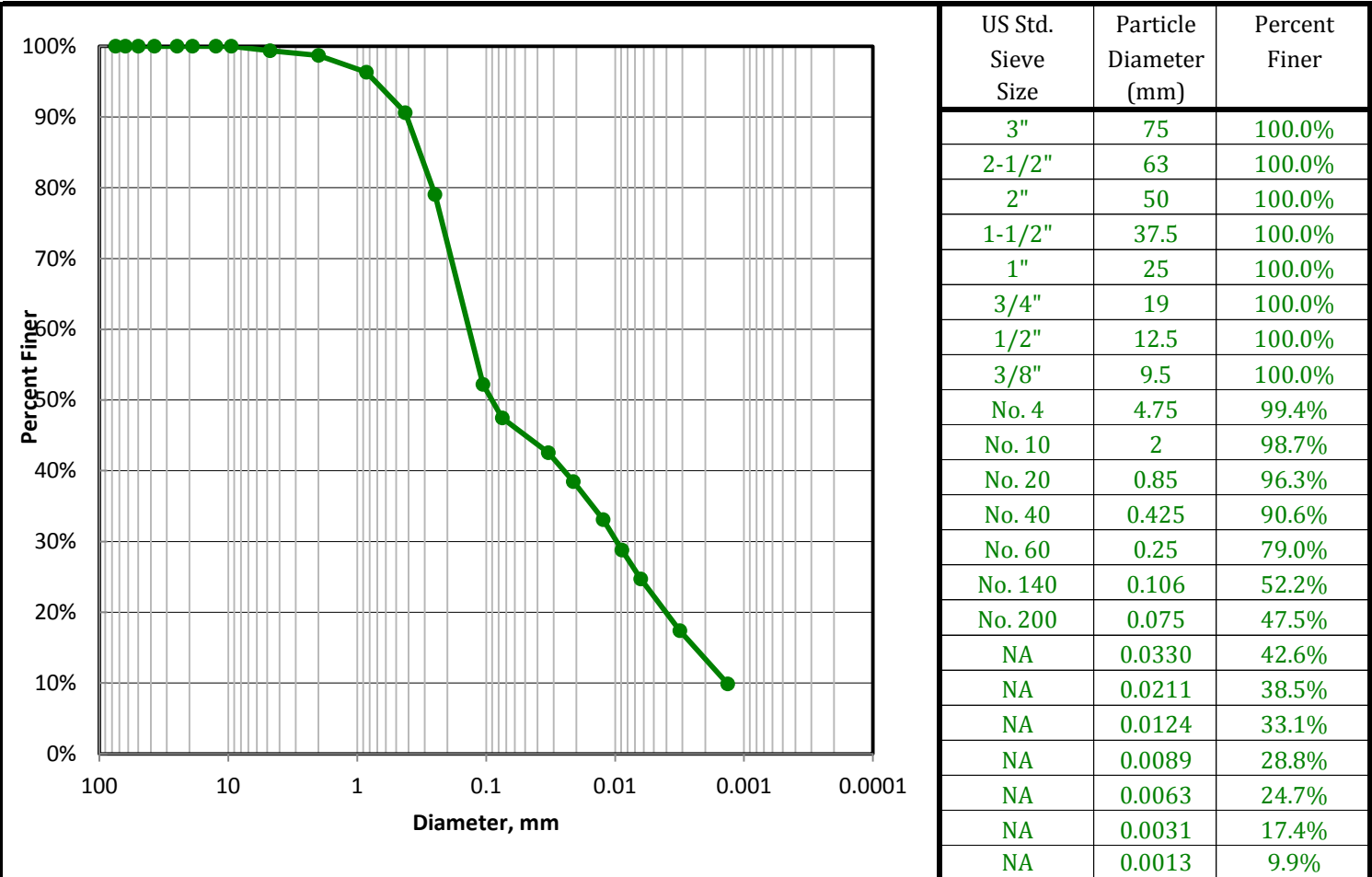
Lab Sample

36199001

Sample Color: **YELLOWISH BROWN**
USCS Group Name: **CLAYEY SAND**
USCS Group Symbol: **SC**

USDA: **SANDY LOAM**

AASHTO: **A-4 (1)**



USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & + #4)		0.6	Silt=25.1% Clay=22.3%						
Coarse=0; Fine=0.6			D60, mm			NA	Gravel	1.3	0
% Sand (-#4 & + #200)		51.9	D30, mm			NA			
Coarse=0.7; Medium=8.1; Fine=43.1			D10, mm			NA			
% Fines (-#200)		47.5	Cc			NA			
% Plus #200 (-3")		52.5	Cu			NA			
USCS Description				100	100				
CLAYEY SAND				2	98.7	Sand	53.7	54.4	
USCS Group Symbol		Atterberg Limits Group Symbol		0.05	45.0				
SC		CL - LEAN CLAY				Silt	31.6	32.0	
Auxiliary Information		Wt Ret, gm	% Retained	0.002	13.4				
12" Sieve - 300 mm		0	0.0			Clay	13.4	13.6	
6" Sieve - 150 mm		0	0.0	USDA Classification					
3" Sieve - 75 mm		0	0.0	SANDY LOAM					

USDA CLASSIFICATION CHART

Client Tetra Tech Inc.
Client Project EQT RedHook
Project No. 36199

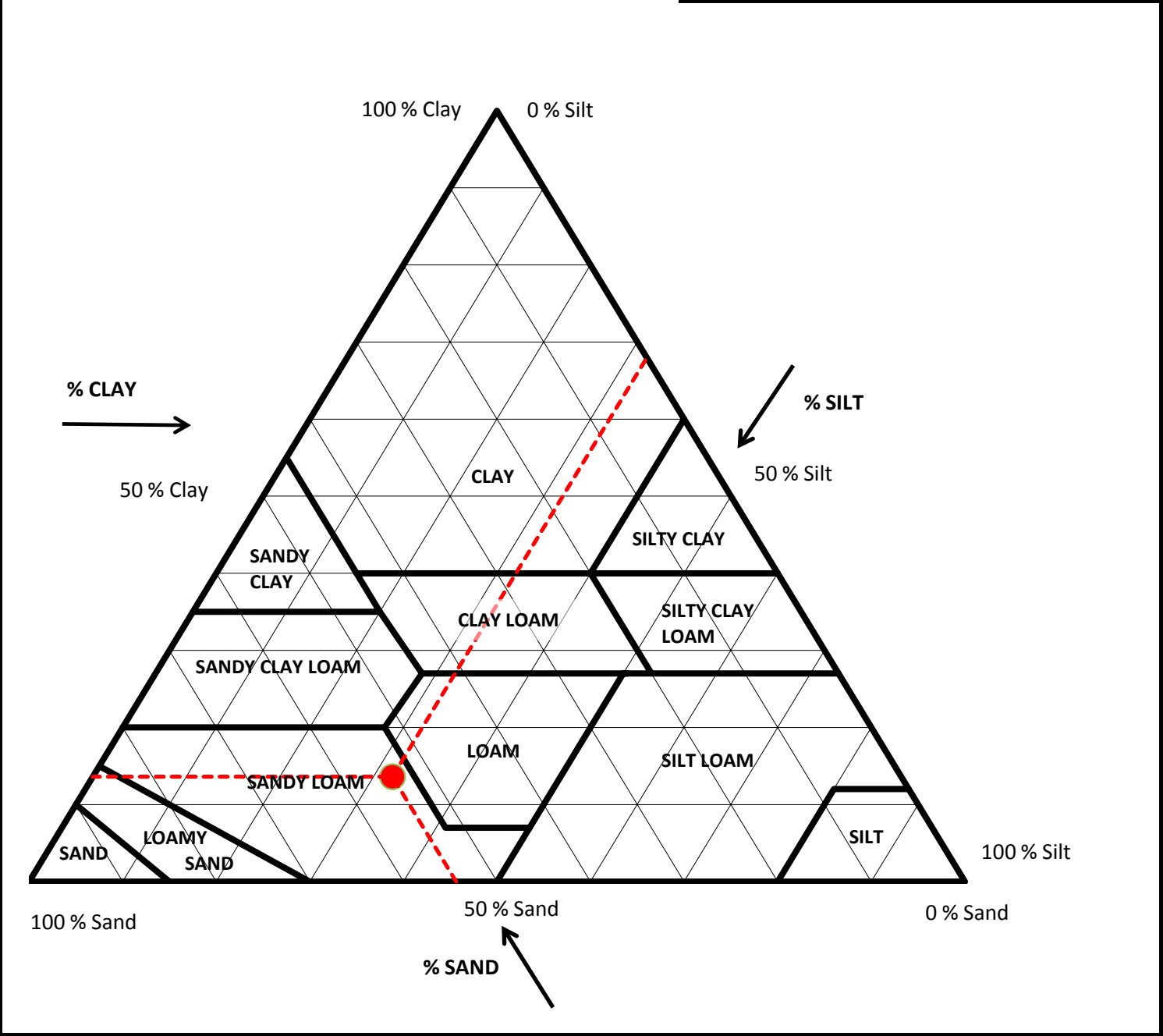
Boring RH-02
Depth 0.0'-3.0'
Sample S: 1,2
Lab Sample 36199001

Sample Color: **YELLOWISH BROWN**
USCS Group Name: **CLAYEY SAND**
USCS Group Symbol: **SC**

USDA: **SANDY LOAM**

AASHTO: **A-4 (1)**

Corrected for 0% gravel		Sand Subsizes Corrected Percentages	
Percent Gravel, %	0.0	Very Coarse Sand; 2-1	1.9
Percent Sand, %	54.4	Coarse Sand; 1-0.5	4.9
Percent Silt, %	32.0	Medium Sand; 0.5-0.25	13.1
Percent Clay, %	13.6	Fine Sand; 0.25-0.1	28.0
		Very Fine Sand; 0.1-0.05	6.4
		Total	54.4



PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422

Client

Tetra Tech Inc.

Client Project

EQT RedHook

Project No.

36199

Boring

RH-03

Depth

0.0'-3.0'

Sample

S: 1,2

Lab Sample

36199002

Sample Color:

YELLOWISH BROWN

USCS Group Name:

SANDY LEAN CLAY

USCS Group Symbol:

CL

USDA:

LOAM

AASHTO:

A-6 (6)

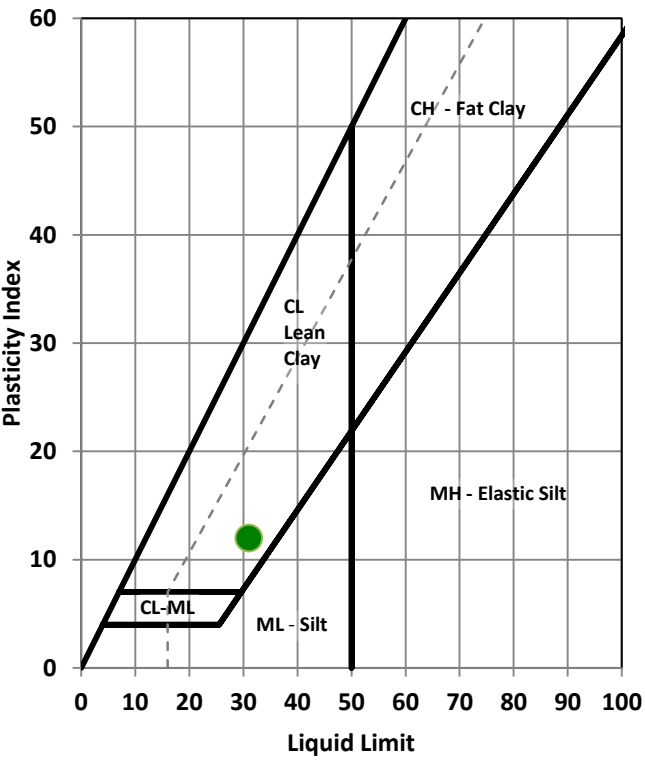
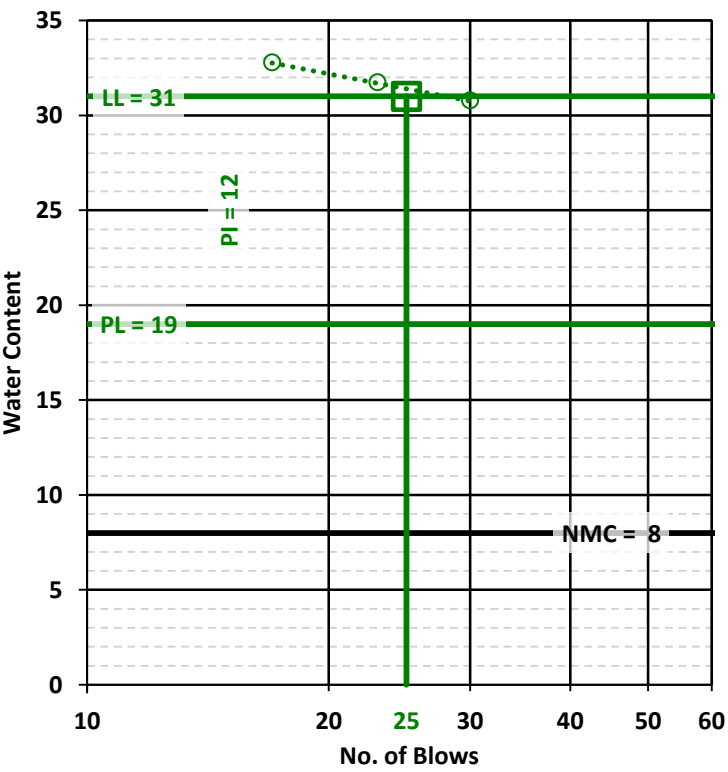
MECHANICAL SIEVE									
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications	
Total Sample Wet Wt, gm (-3")			438	3"	75	0	0.0%	100.0%	
Sample Split on Sieve			No. 4	2-1/2"	63	0	0.0%	100.0%	
Coarse Washed Dry Sample, gm			1	2"	50	0	0.0%	100.0%	
Wet Wt Passing Split, gm			437	1-1/2"	37.5	0	0.0%	100.0%	
Dry Wt. Passing Split, gm			404	1"	25	0	0.0%	100.0%	
Total Sample Dry Wt, gm			405	3/4"	19	0	0.0%	100.0%	
Split Sample - Passing No. 4				1/2"	12.5	0	0.0%	100.0%	
Tare No.			2078	3/8"	9.5	0	0.0%	100.0%	
Tare + WS., gm			356.64	No. 4	4.75	0.7	0.2%	99.8%	
Tare + DS., gm			341.55	No. 10	2	1.26	0.7%	99.2%	
Tare, gm			153.19	No. 20	0.85	2.27	1.2%	98.0%	
Water Content of Split Sample			8.0%	No. 40	0.425	2.71	1.4%	96.5%	
Wt. of DS., gm			188.36	No. 60	0.25	4.73	2.5%	94.0%	
				No. 140	0.106	34.58	18.3%	75.7%	
Wt. of + #200 Sample, gm			57.12	No. 200	0.075	11.57	6.1%	69.6%	
HYDROMETER (-#200)									
Tare No.		1012	Wt. Dispers., gm		5		Specific Gravity		2.7
Wt. Tare + DS., gm		231	Wt. Dry Soil, gm (-#200)		33.82				Assumed
Wt. Tare, gm		192.18	#10 Dispersed 1min in Hamilton Beach Mixer				a Factor		0.9889
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)	
2	36	20.6	5.1	30.9	0.0134	90.4	0.0304	62.8%	
5	33.5	20.6	5.1	28.4	0.0134	83.0	0.0196	57.8%	
15	29	20.7	5.1	23.9	0.0134	69.9	0.0117	48.6%	
30	26	20.7	5.1	20.9	0.0134	61.1	0.0084	42.5%	
60	22.5	20.9	5.0	17.5	0.0133	51.2	0.0061	35.6%	
250	18	21.5	4.8	13.2	0.0132	38.6	0.0030	26.8%	
1440	13.5	21.3	4.9	8.6	0.0133	25.1	0.0013	17.5%	
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & + #4)	0.2	Silt=36.4% Clay=33.1%				Gravel	0.8	0	
Coarse=0; Fine=0.2		D60, mm	NA	Sand	32.6				32.9
% Sand (-#4 & + #200)		D30, mm	NA			Silt	44.4	44.7	
Coarse=0.7; Medium=2.6; Fine=27		D10, mm	NA	Clay	22.2				22.4
% Fines (-#200)		Cc	NA			USDA Classification			
% Plus #200 (-3")		Cu	NA	LOAM					
USCS Description				2	99.2				
SANDY LEAN CLAY									
USCS Group Symbol		Atterberg Limits Group Symbol		0.05	66.5				
CL		CL - LEAN CLAY							
Auxiliary Information		Wt Ret, gm	% Retained	% Finer	0.002	22.2			
12" Sieve - 300 mm		0	0.0	100.0					
6" Sieve - 150 mm		0	0.0	100.0					
3" Sieve - 75 mm		0	0.0	100.0					

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS **ASTM D 4318**

Client Tetra Tech Inc.
 Client Project EQT RedHook
 Project No. 36199

Boring RH-03
 Depth 0.0'-3.0'
 Sample S: 1,2
 Lab Sample 36199002

Soil Description: YELLOWISH BROWN LEAN CLAY
 (-#40 Fraction)

AS-RECEIVED W.C.				SAMPLE SUMMARY			
Tare Number 2078				Activity Index = .54; Liquidity Index = -.92			
Wt. Tare & WS, gm 356.64				Liquid Limit (LL), % 31			
Wt. Tare & DS, gm 341.55				Plastic Limit (PL), % 19			
Wt. Tare, gm 153.19				Plasticity Index (PI) 12			
Water Content, % 8.0				USCS Group Symbol (-#40 Fraction) CL			
				USCS Group Name (-#40 Fraction) LEAN CLAY			
				Sample Color: YELLOWISH BROWN			
PLASTIC LIMIT				LIQUID LIMIT			
Points Run 3 Points				3 Points			
Tare Number	205	216	253		265	255	234
Wt. Tare & WS, gm	22.71	22.61	22.79		22.56	22.80	24.01
Wt. Tare & DS, gm	21.67	21.54	21.74		20.93	21.13	22.15
Wt. Tare, gm	16.22	15.74	16.05		15.96	15.87	16.11
Water Content, %	19.1	18.4	18.5		32.8	31.7	30.8
				# of Blows	17	23	30
PLASTICITY CHART				FLOW CURVE			
							

Input Validation: Yes

Reviewed By: SVG

Date Tested: 9/4/2015

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422

Client

Tetra Tech Inc.

Client Project

EQT RedHook

Project No.

36199

Boring

RH-03

Depth

0.0'-3.0'

Sample

S: 1,2

Lab Sample

36199002

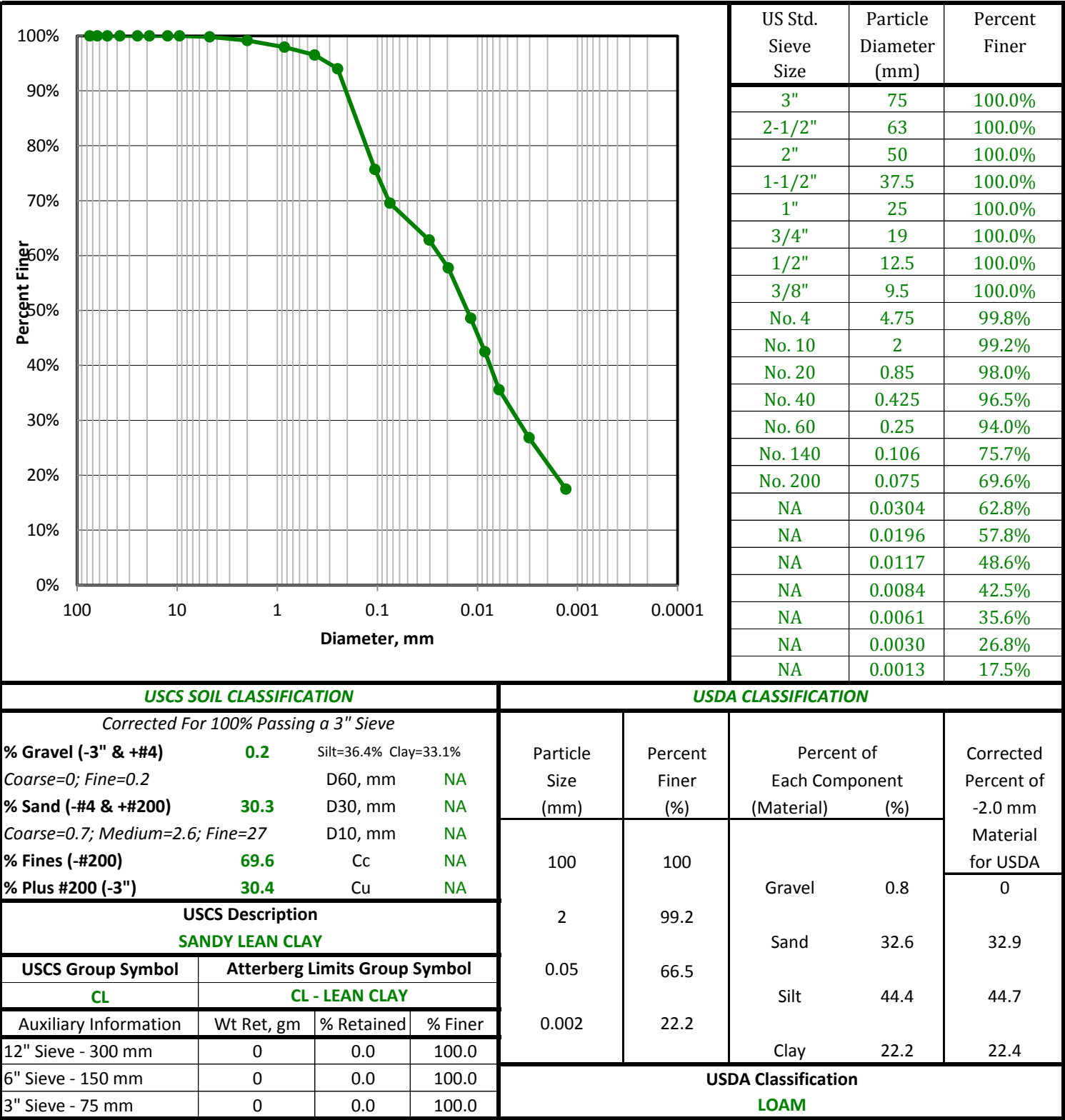
Sample Color:YELLOWISH BROWN

USCS Group Name:SANDY LEAN CLAY

USCS Group Symbol:CL

USDA:LOAM

AASHTO:A-6 (6)



USDA CLASSIFICATION CHART

Client Tetra Tech Inc.
Client Project EQT RedHook
Project No. 36199

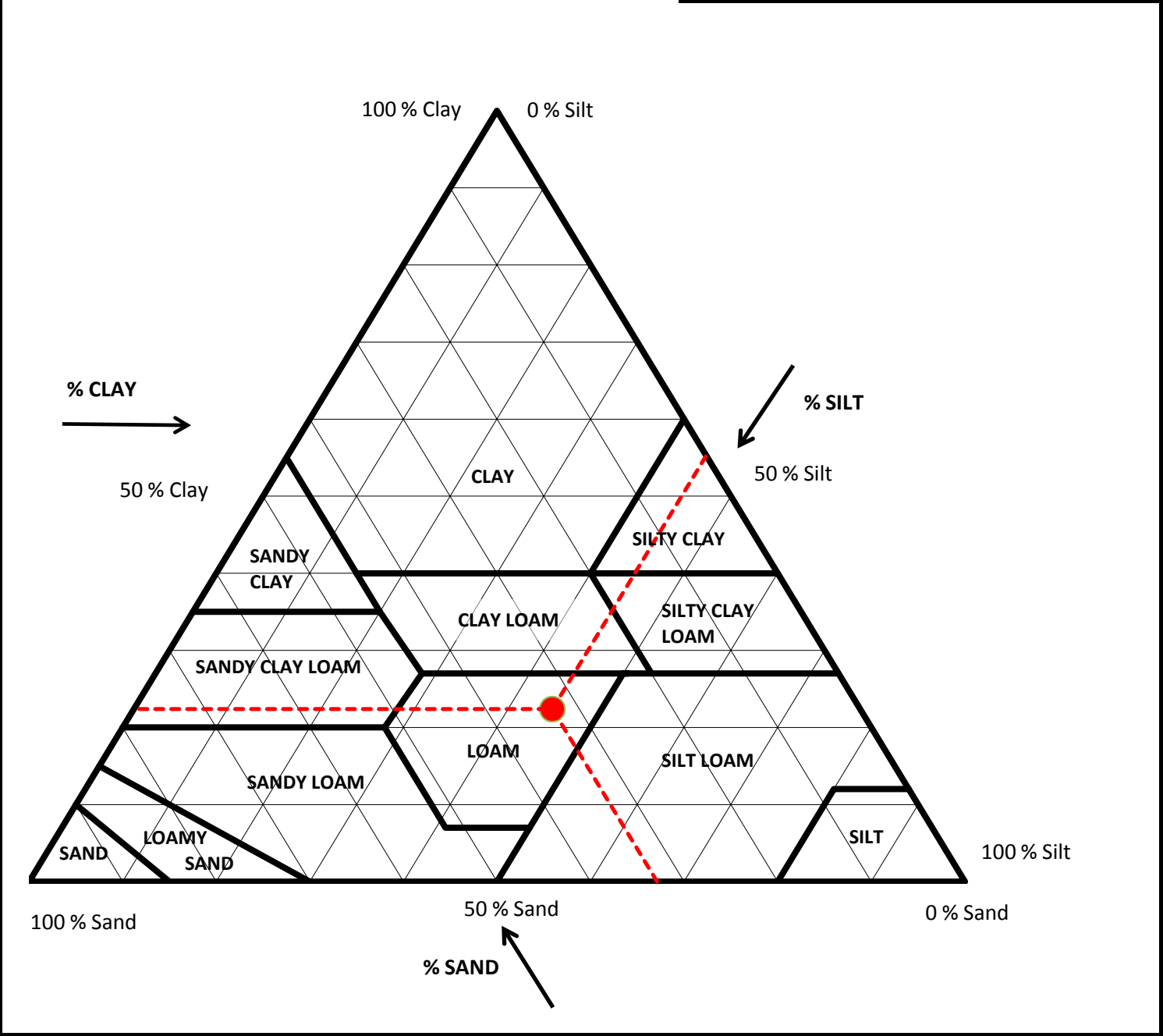
Boring RH-03
Depth 0.0'-3.0'
Sample S: 1,2
Lab Sample 36199002

Sample Color: **YELLOWISH BROWN**
USCS Group Name: **SANDY LEAN CLAY**
USCS Group Symbol: **CL**

USDA: **LOAM**

AASHTO: **A-6 (6)**

Corrected for 0% gravel		Sand Subsizes	
		Corrected Percentages	
Percent Gravel, %	0.0	Very Coarse Sand; 2-1	1.0
Percent Sand, %	32.9	Coarse Sand; 1-0.5	1.3
Percent Silt, %	44.7	Medium Sand; 0.5-0.25	2.9
Percent Clay, %	22.4	Fine Sand; 0.25-0.1	19.5
		Very Fine Sand; 0.1-0.05	8.2
		Total	32.9



PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422

Client

Tetra Tech Inc.

Client Project

EQT RedHook

Project No.

36199

Boring

RH-10

Depth

6.0'-10.5'

Sample

S: 3,4

Lab Sample

36199003

Sample Color:

YELLOWISH BROWN

USCS Group Name:

LEAN CLAY WITH SAND

USCS Group Symbol:

CL

USDA:

SILTY CLAY

AASHTO:

A-7-6 (17)

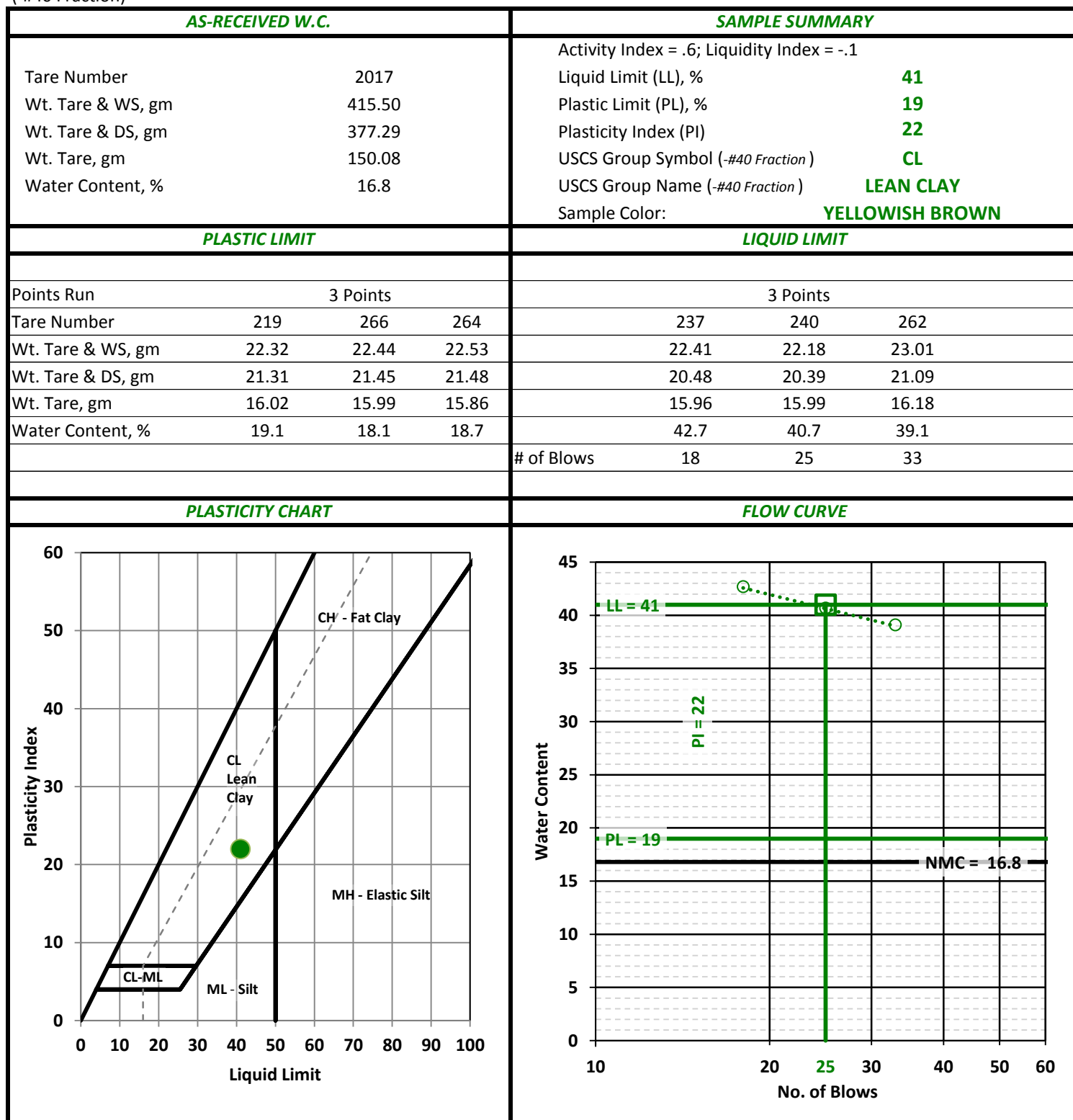
MECHANICAL SIEVE								
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications
Total Sample Wet Wt, gm (-3")			532	3"	75	0	0.0%	100.0%
Sample Split on Sieve			No. 4	2-1/2"	63	0	0.0%	100.0%
Coarse Washed Dry Sample, gm			36	2"	50	0	0.0%	100.0%
Wet Wt Passing Split, gm			496	1-1/2"	37.5	0	0.0%	100.0%
Dry Wt. Passing Split, gm			424	1"	25	0	0.0%	100.0%
Total Sample Dry Wt, gm			461	3/4"	19	0	0.0%	100.0%
Split Sample - Passing No. 4				1/2"	12.5	2.87	0.6%	99.4%
Tare No.			2017	3/8"	9.5	5.25	1.1%	98.2%
Tare + WS., gm			415.5	No. 4	4.75	28.22	6.1%	92.1%
Tare + DS., gm			377.29	No. 10	2	7.44	3.0%	89.1%
Tare, gm			150.08	No. 20	0.85	9.23	3.7%	85.4%
Water Content of Split Sample			16.8%	No. 40	0.425	5.71	2.3%	83.0%
Wt. of DS., gm			227.21	No. 60	0.25	2.79	1.1%	81.9%
				No. 140	0.106	3.11	1.3%	80.6%
Wt. of + #200 Sample, gm			29.75	No. 200	0.075	1.47	0.6%	80.1%
HYDROMETER (-#200)								
Tare No.			1016	Wt. Dispers., gm		5	Specific Gravity	
Wt. Tare + DS., gm			233.51	Wt. Dry Soil, gm (-#200)		35.44	Assumed	
Wt. Tare, gm			193.07	#10 Dispersed 1min in Hamilton Beach Mixer				a Factor
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)
2	39	20.9	5.0	34.0	0.0133	94.9	0.0295	75.9%
5	37	20.9	5.0	32.0	0.0133	89.3	0.0190	71.5%
15	33.5	20.9	5.0	28.5	0.0133	79.5	0.0113	63.7%
30	31.5	20.9	5.0	26.5	0.0133	73.9	0.0081	59.2%
60	28.5	21	5.0	23.5	0.0133	65.6	0.0058	52.5%
250	23.5	21.5	4.8	18.7	0.0132	52.2	0.0029	41.8%
1440	18.5	21.3	4.9	13.6	0.0133	37.9	0.0013	30.4%
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION				
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA
% Gravel (-3" & + #4)	7.9	Silt=29.9% Clay=50.1%						
Coarse=0; Fine=7.9		D60, mm	NA			Gravel	10.9	0
% Sand (-#4 & + #200)	12.1	D30, mm	NA					
Coarse=3; Medium=6.1; Fine=3		D10, mm	NA					
% Fines (-#200)	80.1	Cc	NA	100	100			
% Plus #200 (-3")	19.9	Cu	NA	2	89.1	Sand	10.8	12.2
USCS Description				0.05	78.3	Silt	41.7	46.8
LEAN CLAY WITH SAND				0.002	36.5	Clay	36.5	41.0
USCS Group Symbol		Atterberg Limits Group Symbol						
CL		CL - LEAN CLAY						
Auxiliary Information		Wt Ret, gm	% Retained					
12" Sieve - 300 mm		0	0.0	USDA Classification				
6" Sieve - 150 mm		0	0.0	SILTY CLAY				
3" Sieve - 75 mm		0	0.0					

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS **ASTM D 4318**

Client Tetra Tech Inc.
 Client Project EQT RedHook
 Project No. 36199

Boring RH-10
 Depth 6.0'-10.5'
 Sample S: 3,4
 Lab Sample 36199003

Soil Description: YELLOWISH BROWN LEAN CLAY
 (-#40 Fraction)



Input Validation: Yes

Reviewed By: SVG

Date Tested: 9/4/2015

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422

Client

Tetra Tech Inc.

Client Project

EQT RedHook

Project No.

36199

Boring

RH-10

Depth

6.0'-10.5'

Sample

S: 3,4

Lab Sample

36199003

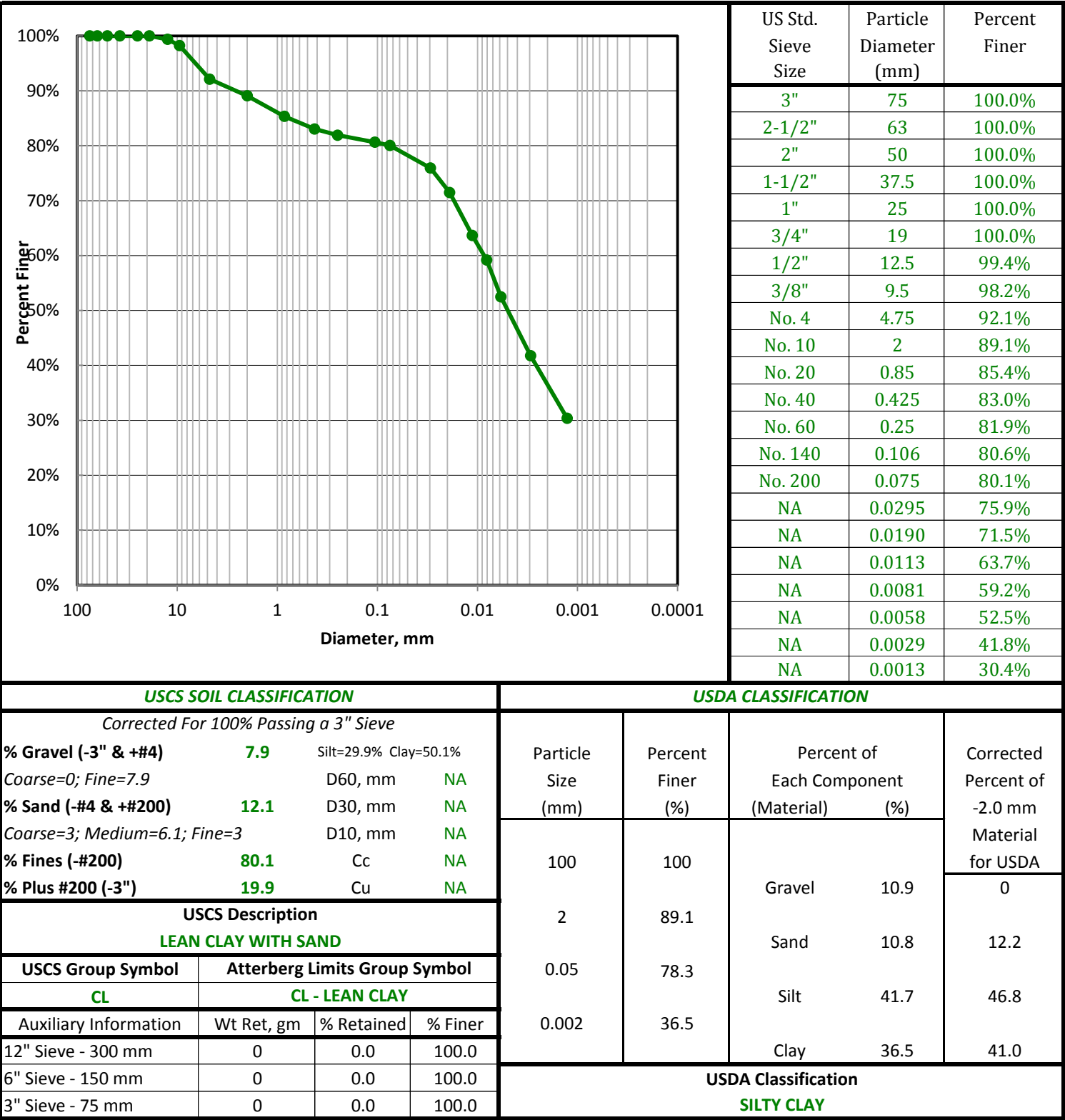
Sample Color:YELLOWISH BROWN

USCS Group Name:LEAN CLAY WITH SAND

USCS Group Symbol:CL

USDA: SILTY CLAY

AASHTO: A-7-6 (17)



USDA CLASSIFICATION CHART

Client Tetra Tech Inc.
Client Project EQT RedHook
Project No. 36199

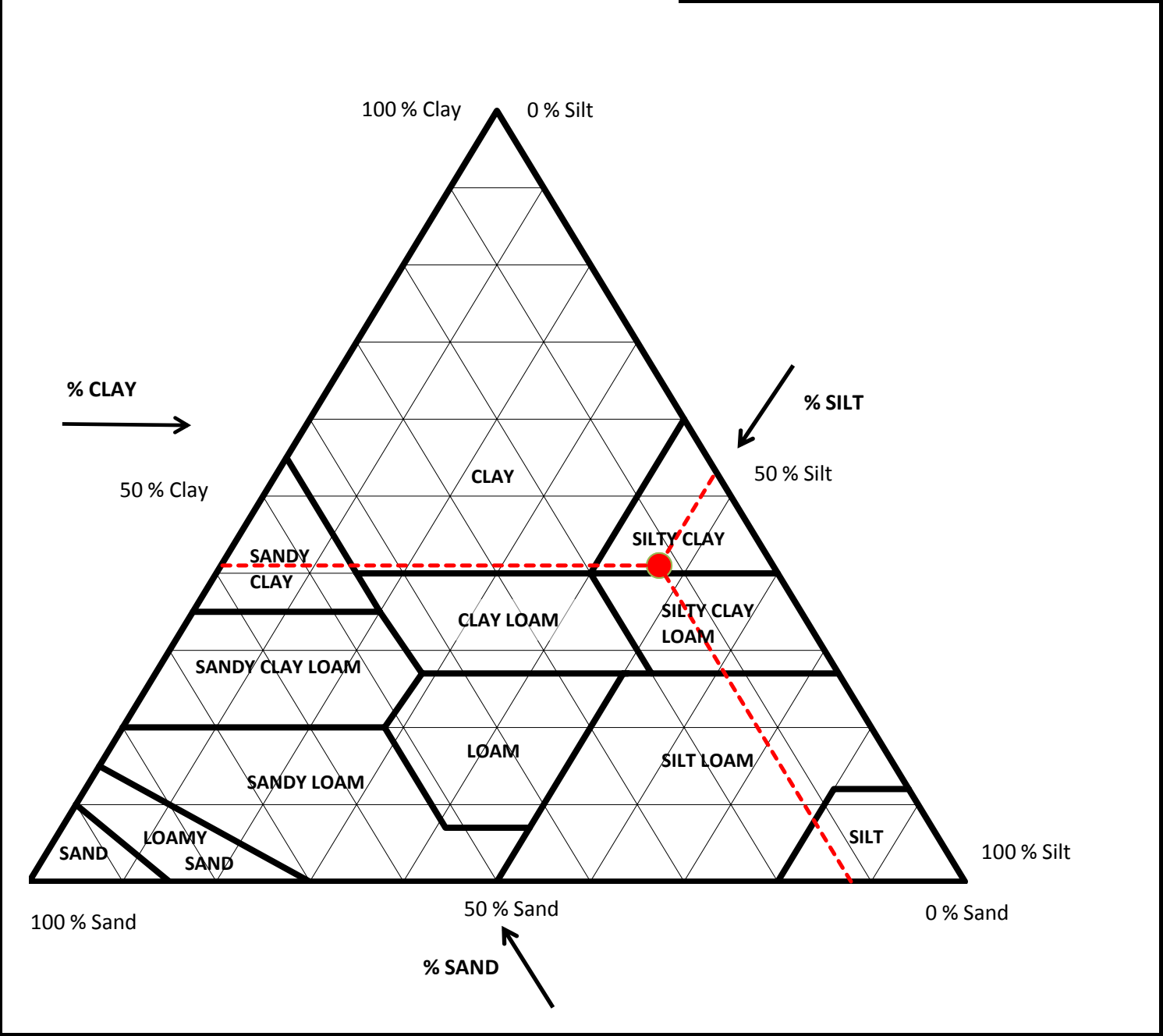
Boring RH-10
Depth 6.0'-10.5'
Sample S: 3,4
Lab Sample 36199003

Sample Color: **YELLOWISH BROWN**
USCS Group Name: **LEAN CLAY WITH SAND**
USCS Group Symbol: **CL**

USDA: **SILTY CLAY**

AASHTO: **A-7-6 (17)**

Corrected for 0% gravel		Sand Subsizes	
		Corrected Percentages	
Percent Gravel, %	0.0	Very Coarse Sand; 2-1	3.4
Percent Sand, %	12.2	Coarse Sand; 1-0.5	2.8
Percent Silt, %	46.8	Medium Sand; 0.5-0.25	1.9
Percent Clay, %	41.0	Fine Sand; 0.25-0.1	1.5
		Very Fine Sand; 0.1-0.05	2.6
		Total	12.2



PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422

Client

Tetra Tech Inc.

Client Project

EQT RedHook

Project No.

36199

Boring

RH-12

Depth

0.0'-10.0'

Sample

Bulk

Lab Sample

36199004

Sample Color:

OLIVE BROWN

USCS Group Name:

FAT CLAY

USCS Group Symbol:

CH

USDA:

SILTY CLAY

AASHTO:

A-7-6 (31)

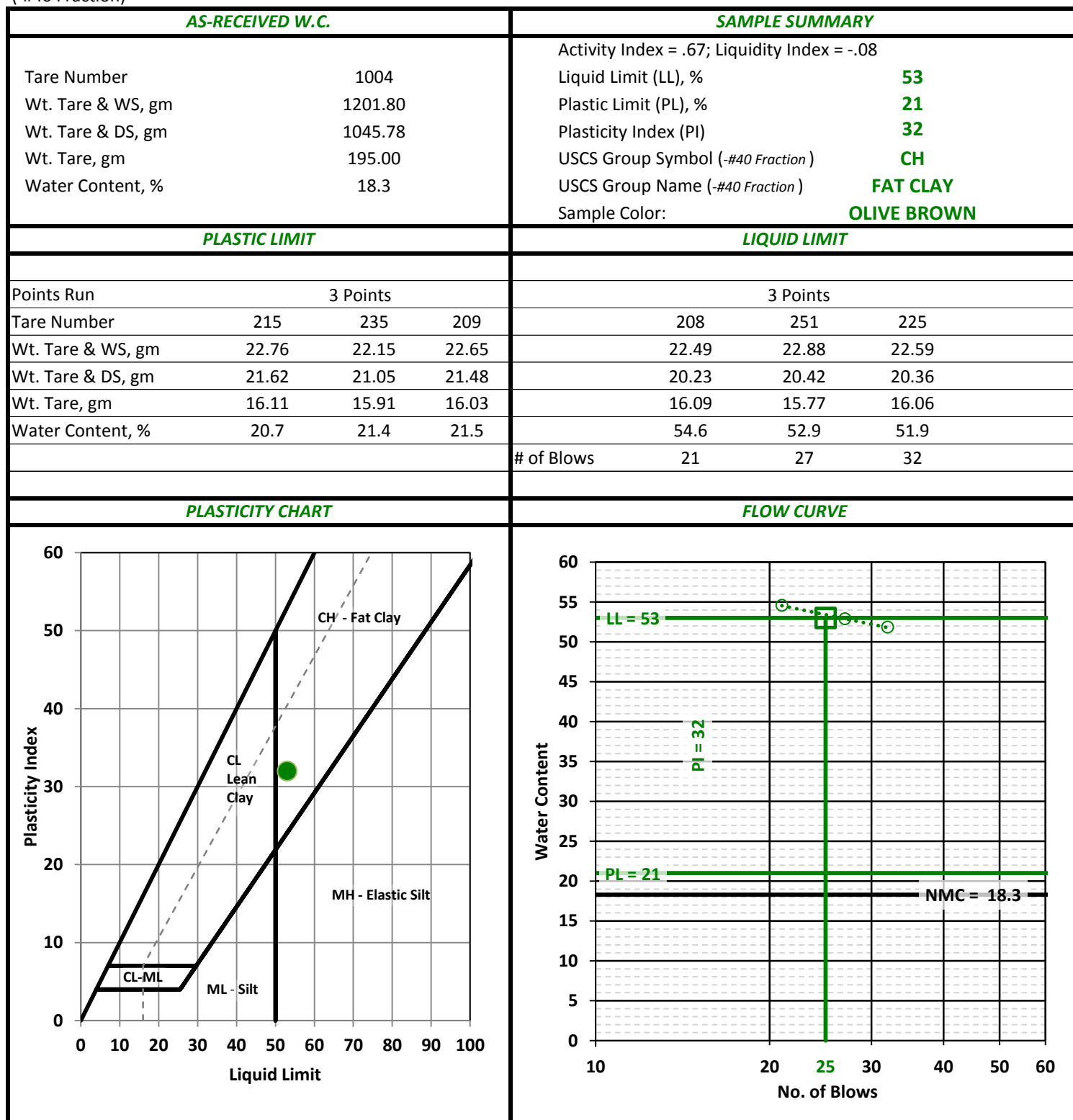
MECHANICAL SIEVE									
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications	
Total Sample Wet Wt, gm (-3")			25407	3"	75	0	0.0%	100.0%	
Sample Split on Sieve			3/4"	2-1/2"	63	0	0.0%	100.0%	
Coarse Washed Dry Sample, gm			0	2"	50	0	0.0%	100.0%	
Wet Wt Passing Split, gm			25407	1-1/2"	37.5	0	0.0%	100.0%	
Dry Wt. Passing Split, gm			21470	1"	25	0	0.0%	100.0%	
Total Sample Dry Wt, gm			21470	3/4"	19	0	0.0%	100.0%	
Split Sample - Passing 3/4"				1/2"	12.5	6.71	0.8%	99.2%	
Tare No.			1004	3/8"	9.5	2.52	0.3%	98.9%	
Tare + WS., gm			1201.8	No. 4	4.75	5.96	0.7%	98.2%	
Tare + DS., gm			1045.78	No. 10	2	7.89	0.9%	97.3%	
Tare, gm			195	No. 20	0.85	14.6	1.7%	95.6%	
Water Content of Split Sample			18.3%	No. 40	0.425	12.86	1.5%	94.1%	
Wt. of DS., gm			850.78	No. 60	0.25	10.49	1.2%	92.8%	
				No. 140	0.106	17.08	2.0%	90.8%	
Wt. of + #200 Sample, gm			85.91	No. 200	0.075	7.8	0.9%	89.9%	
HYDROMETER (-#200)									
Tare No.		555	Wt. Dispers., gm		5	Specific Gravity		2.7	
Wt. Tare + DS., gm		242.8	Wt. Dry Soil, gm (-#200)		42.2			Assumed	
Wt. Tare, gm		195.6	#10 Dispersed 1min in Hamilton Beach Mixer				a Factor		0.9889
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)	
2	45.5	22.3	4.6	40.9	0.0131	95.8	0.0274	86.2%	
5	43.5	22.3	4.6	38.9	0.0131	91.2	0.0177	82.0%	
15	40	22.3	4.6	35.4	0.0131	83.0	0.0105	74.6%	
30	37	22.4	4.5	32.5	0.0131	76.2	0.0076	68.5%	
60	34.5	22.6	4.5	30.0	0.0131	70.3	0.0055	63.2%	
250	29	23.2	4.3	24.7	0.0130	57.9	0.0028	52.0%	
1440	24	21.9	4.7	19.3	0.0132	45.2	0.0012	40.7%	
USCS SOIL CLASSIFICATION					USDA CLASSIFICATION				
Corrected For 100% Passing a 3" Sieve					Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA
% Gravel (-3" & + #4)	1.8	Silt=28.1% Clay=61.7%		Gravel			2.7		
Coarse=0; Fine=1.8		D60, mm	NA		Sand	8.9			
% Sand (-#4 & + #200)		D30, mm	NA	Silt			40.9		
Coarse=0.9; Medium=3.2; Fine=4.2		D10, mm	NA		Clay	47.5			
% Fines (-#200)		Cc	NA	USDA Classification					
% Plus #200 (-3")		Cu	NA		SILTY CLAY				
USCS Description				2		97.3	Sand	8.9	9.1
FAT CLAY									
USCS Group Symbol		Atterberg Limits Group Symbol		0.05	88.4	Silt	40.9	42.0	
CH		CH - FAT CLAY							
Auxiliary Information		Wt Ret, gm	% Retained	0.002	47.5	Clay	47.5	48.8	
12" Sieve - 300 mm		0	0.0						100.0
6" Sieve - 150 mm		0	0.0	100.0					
3" Sieve - 75 mm		0	0.0	100.0					

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS **ASTM D 4318**

Client Tetra Tech Inc.
 Client Project EQT RedHook
 Project No. 36199

Boring RH-12
 Depth 0.0'-10.0'
 Sample Bulk
 Lab Sample 36199004

Soil Description: OLIVE BROWN FAT CLAY
 (-#40 Fraction)



Input Validation: Yes

Reviewed By: SVG

Date Tested: 9/9/2015

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422

Client

Tetra Tech Inc.

Client Project

EQT RedHook

Project No.

36199

Boring

RH-12

Depth

0.0'-10.0'

Sample

Bulk

Lab Sample

36199004

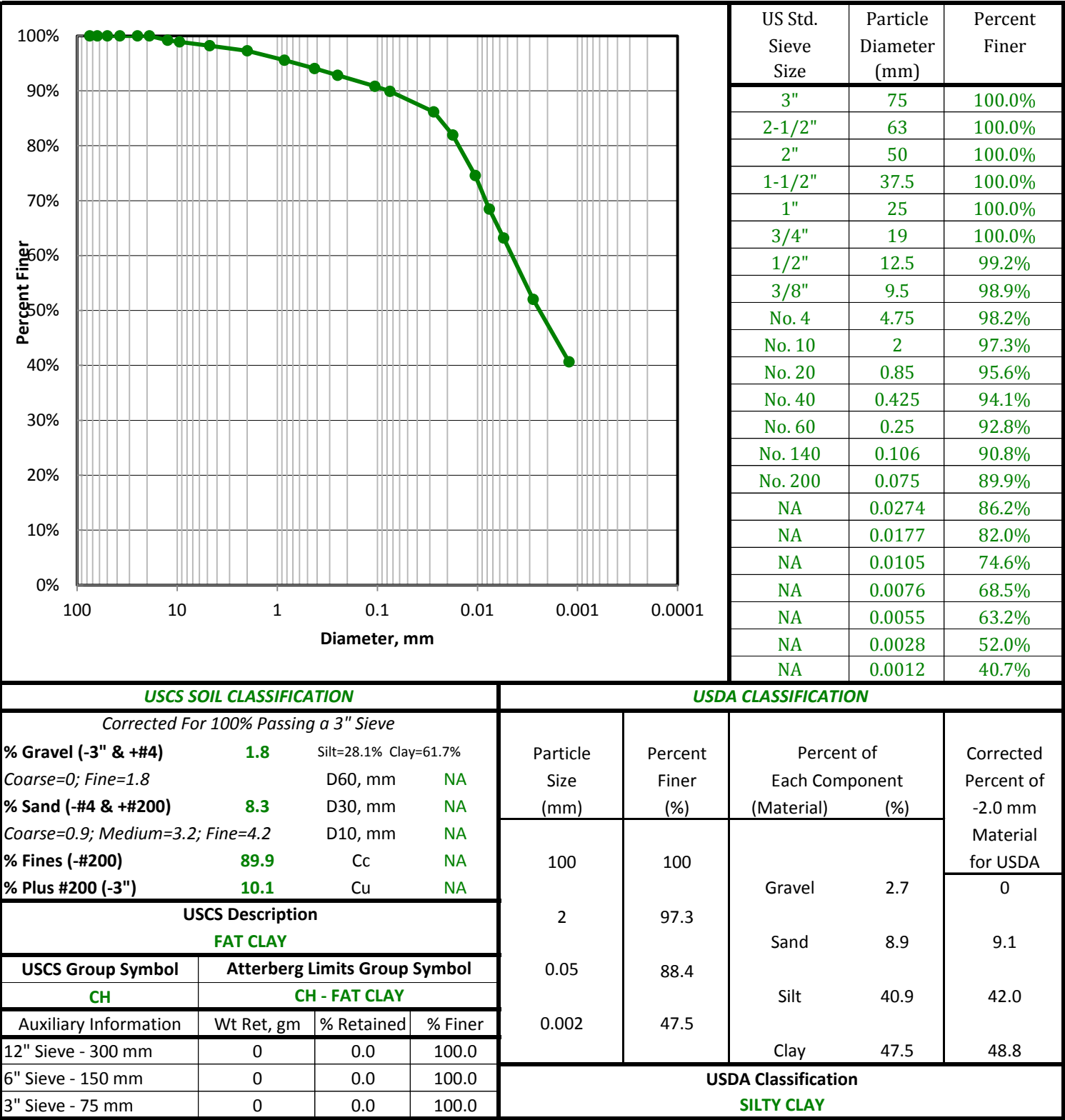
Sample Color:OLIVE BROWN

USCS Group Name:FAT CLAY

USCS Group Symbol:CH

USDA: SILTY CLAY

AASHTO: A-7-6 (31)



USDA CLASSIFICATION CHART

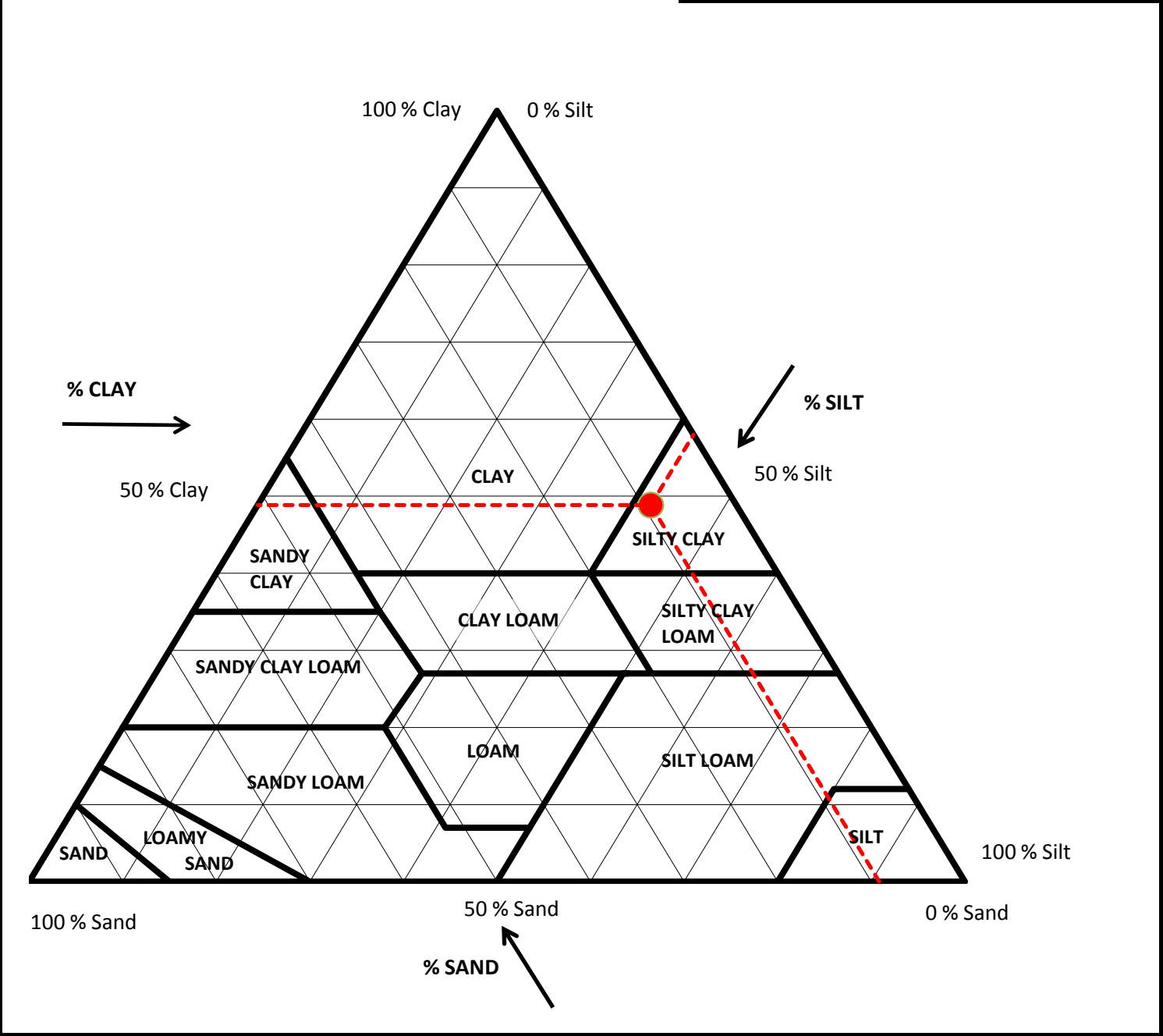
Client Tetra Tech Inc.
Client Project EQT RedHook
Project No. 36199

Boring RH-12
Depth 0.0'-10.0'
Sample Bulk
Lab Sample 36199004

Sample Color: **OLIVE BROWN**
USCS Group Name: **FAT CLAY**
USCS Group Symbol: **CH**

USDA: **SILTY CLAY** AASHTO: **A-7-6 (31)**

Corrected for 0% gravel		Sand Subsizes Corrected Percentages	
Percent Gravel, %	0.0	Very Coarse Sand; 2-1	1.4
Percent Sand, %	9.1	Coarse Sand; 1-0.5	1.5
Percent Silt, %	42.0	Medium Sand; 0.5-0.25	1.6
Percent Clay, %	48.8	Fine Sand; 0.25-0.1	2.2
		Very Fine Sand; 0.1-0.05	2.3
		Total	9.1



PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422

Client

Tetra Tech Inc.

Client Project

EQT RedHook

Project No.

36199

Boring

RH-16

Depth

0.0'-9.4'

Sample

Bulk

Lab Sample

36199008

Sample Color:

YELLOWISH BROWN

USCS Group Name:

LEAN CLAY WITH SAND

USCS Group Symbol:

CL

USDA:

CLAY LOAM

AASHTO:

A-6 (12)

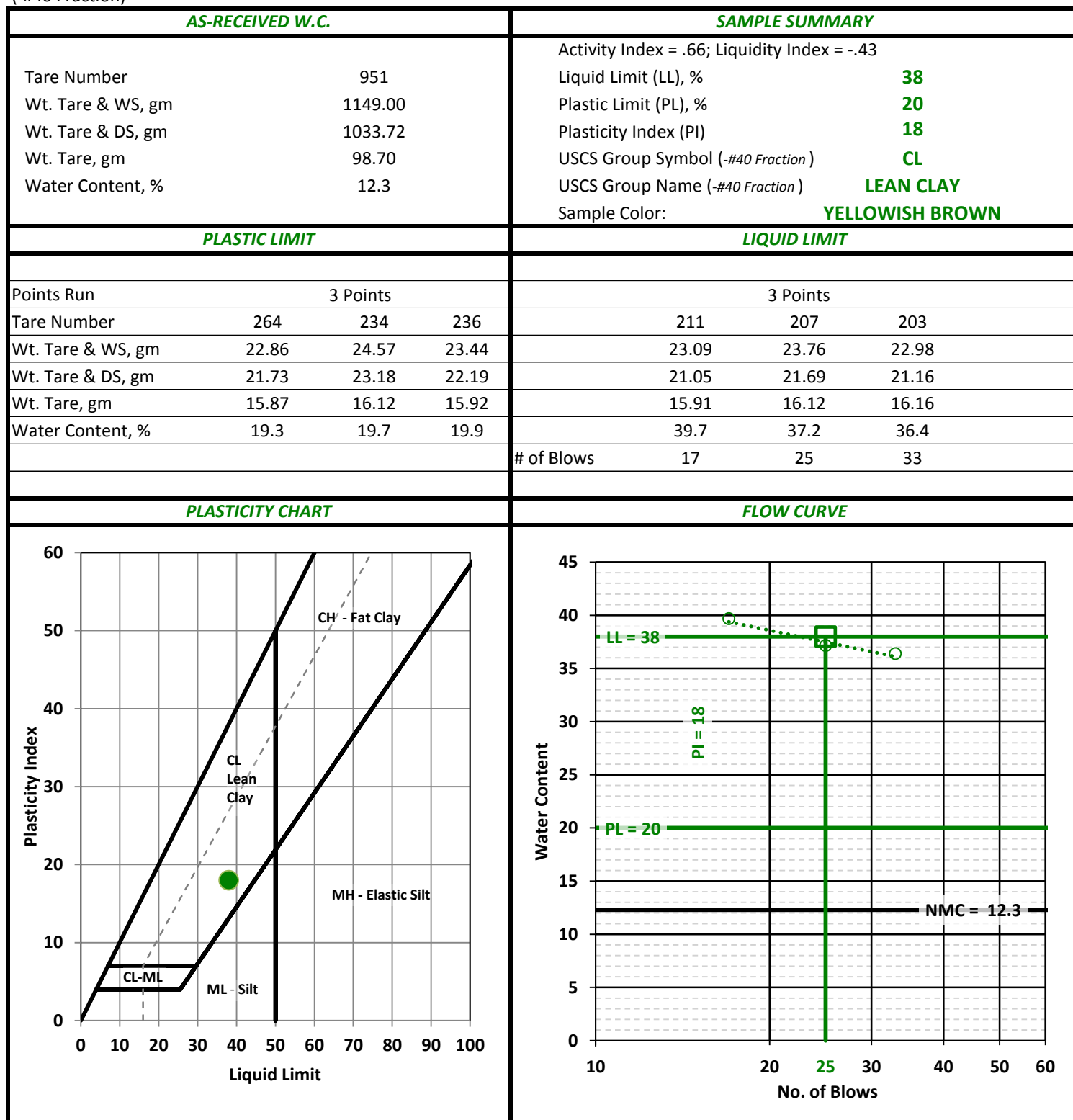
MECHANICAL SIEVE									
Total Sample			Sieve Size	Nominal Opening, mm	Dry Wt, gm	Split Normalized		Project Specifications	
Total Sample Wet Wt, gm (-3")			26733	3"	75	0	0.0%	100.0%	
Sample Split on Sieve			3/4"	2-1/2"	63	0	0.0%	100.0%	
Coarse Washed Dry Sample, gm			0	2"	50	0	0.0%	100.0%	
Wet Wt Passing Split, gm			26733	1-1/2"	37.5	0	0.0%	100.0%	
Dry Wt. Passing Split, gm			23799	1"	25	0	0.0%	100.0%	
Total Sample Dry Wt, gm			23799	3/4"	19	0	0.0%	100.0%	
Split Sample - Passing 3/4"				1/2"	12.5	3.2	0.3%	99.7%	
Tare No.			951	3/8"	9.5	3.83	0.4%	99.2%	
Tare + WS., gm			1149	No. 4	4.75	28.29	3.0%	96.2%	
Tare + DS., gm			1033.72	No. 10	2	58.7	6.3%	89.9%	
Tare, gm			98.7	No. 20	0.85	44.14	4.7%	85.2%	
Water Content of Split Sample			12.3%	No. 40	0.425	20.42	2.2%	83.0%	
Wt. of DS., gm			935.02	No. 60	0.25	12.56	1.3%	81.7%	
				No. 140	0.106	37.15	4.0%	77.7%	
Wt. of + #200 Sample, gm			237.05	No. 200	0.075	28.76	3.1%	74.6%	
HYDROMETER (-#200)									
Tare No.		Q58	Wt. Dispers., gm		5	Specific Gravity		2.7	
Wt. Tare + DS., gm		233.71	Wt. Dry Soil, gm (-#200)		34.92			Assumed	
Wt. Tare, gm		193.79	#10 Dispersed 1min in Hamilton Beach Mixer				a Factor		0.9889
Elapsed Time (min.)	R Measured	Temp °C	Composite Correction	R Corrected	K Factor	Percent Finer (%)	Particle Diameter (mm)	Adjusted % Finer (%)	
2	35.5	22.3	4.6	30.9	0.0131	87.5	0.0299	65.3%	
5	32.5	22.3	4.6	27.9	0.0131	79.0	0.0193	59.0%	
15	28.5	22.3	4.6	23.9	0.0131	67.7	0.0115	50.5%	
30	25.5	22.4	4.5	21.0	0.0131	59.5	0.0083	44.4%	
60	23.5	22.5	4.5	19.0	0.0131	53.8	0.0059	40.2%	
250	19	23.1	4.3	14.7	0.0130	41.6	0.0030	31.1%	
1440	15.5	21.8	4.7	10.8	0.0132	30.6	0.0013	22.8%	
USCS SOIL CLASSIFICATION				USDA CLASSIFICATION					
Corrected For 100% Passing a 3" Sieve				Particle Size (mm)	Percent Finer (%)	Percent of Each Component (Material) (%)		Corrected Percent of -2.0 mm Material for USDA	
% Gravel (-3" & + #4)	3.8	Silt=36.6% Clay=37.9%				Gravel	10.1	0	
Coarse=0; Fine=3.8		D60, mm	NA	Sand	19.4				21.6
% Sand (-#4 & + #200)		D30, mm	NA			Silt	43.4	48.2	
Coarse=6.3; Medium=6.9; Fine=8.4		D10, mm	NA	Clay	27.2				30.2
% Fines (-#200)		Cc	NA						
% Plus #200 (-3")		Cu	NA						
USCS Description				2	89.9				
LEAN CLAY WITH SAND				0.05	70.5				
USCS Group Symbol		Atterberg Limits Group Symbol							
CL		CL - LEAN CLAY		0.002	27.2				
Auxiliary Information		Wt Ret, gm	% Retained						
12" Sieve - 300 mm		0	0.0	100.0		USDA Classification			
6" Sieve - 150 mm		0	0.0	100.0		CLAY LOAM			
3" Sieve - 75 mm		0	0.0	100.0					

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS **ASTM D 4318**

Client Tetra Tech Inc.
 Client Project EQT RedHook
 Project No. 36199

Boring RH-16
 Depth 0.0'-9.4'
 Sample Bulk
 Lab Sample 36199008

Soil Description: YELLOWISH BROWN LEAN CLAY
 (-#40 Fraction)



Input Validation: Yes

Reviewed By: SVG

Date Tested: 9/9/2015

PARTICLE-SIZE ANALYSIS OF SOILS - ASTM D422

Client

Tetra Tech Inc.

Boring

RH-16

Client Project

EQT RedHook

Depth

0.0'-9.4'

Project No.

36199

Sample

Bulk

Lab Sample

36199008

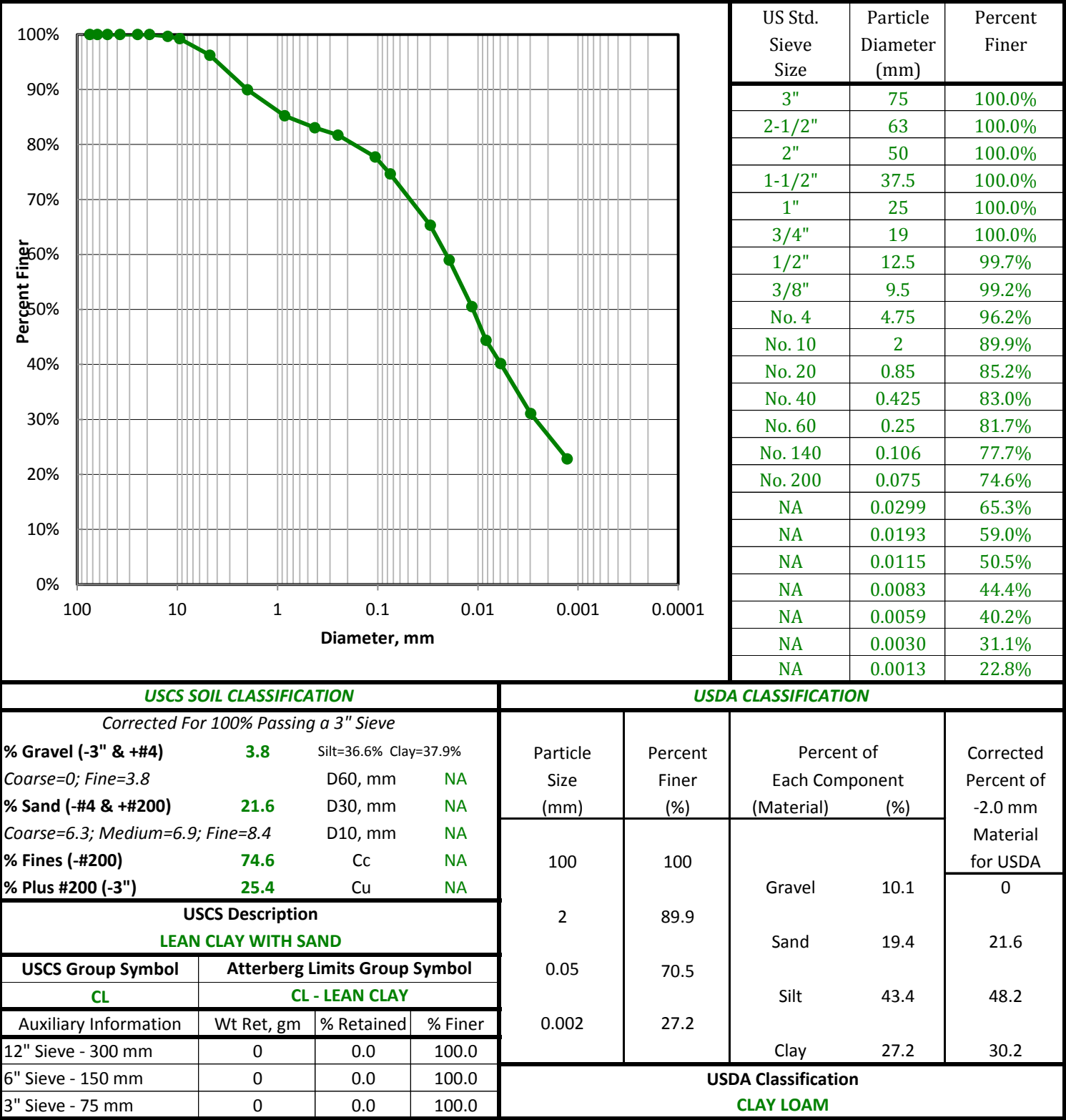
Sample Color:YELLOWISH BROWN

USCS Group Name:LEAN CLAY WITH SAND

USCS Group Symbol:CL

USDA:CLAY LOAM

AASHTO:A-6 (12)



USDA CLASSIFICATION CHART

Client Tetra Tech Inc.
Client Project EQT RedHook
Project No. 36199

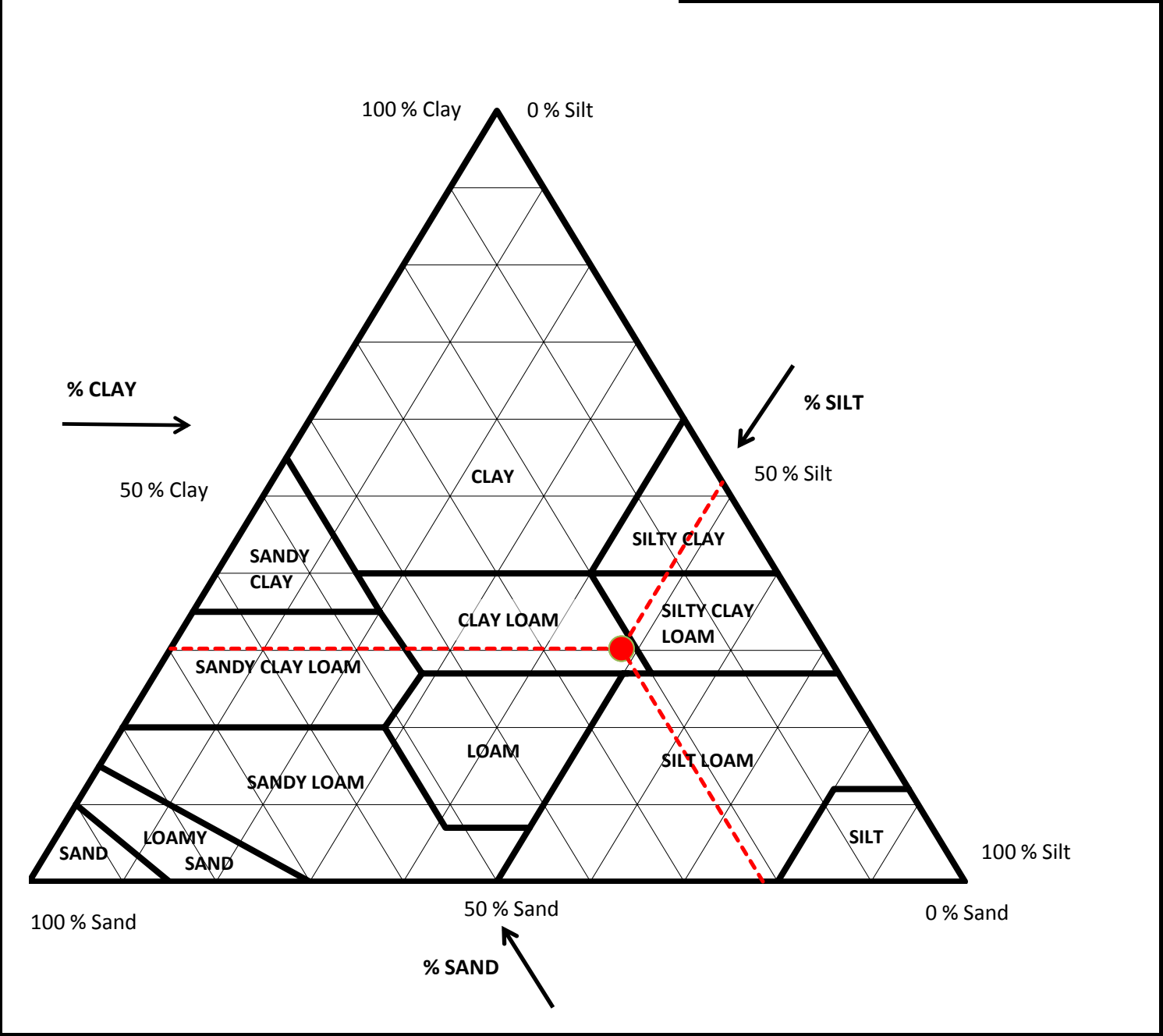
Boring RH-16
Depth 0.0'-9.4'
Sample Bulk
Lab Sample 36199008

Sample Color: **YELLOWISH BROWN**
USCS Group Name: **LEAN CLAY WITH SAND**
USCS Group Symbol: **CL**

USDA: **CLAY LOAM**

AASHTO: **A-6 (12)**

Corrected for 0% gravel		Sand Subsizes	
		Corrected Percentages	
Percent Gravel, %	0.0	Very Coarse Sand; 2-1	4.3
Percent Sand, %	21.6	Coarse Sand; 1-0.5	2.9
Percent Silt, %	48.2	Medium Sand; 0.5-0.25	2.1
Percent Clay, %	30.2	Fine Sand; 0.25-0.1	5.0
		Very Fine Sand; 0.1-0.05	7.4
		Total	21.6

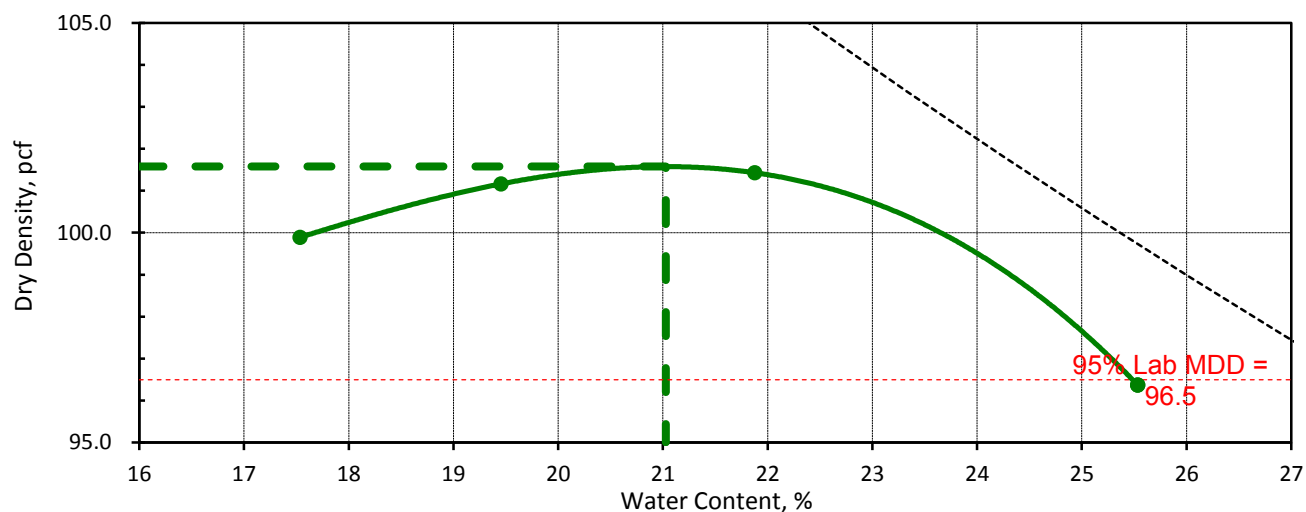


LABORATORY COMPACTION CHARACTERISTICS OF SOIL

Client	Tetra Tech Inc.	Boring	RH-12
Client Project	EQT RedHook	Depth	0.0'-10.0'
Project No.	36199	Sample	Bulk
		Lab Sample No.	36199004
Visual Description: OLIVE BROWN FAT CLAY			

WET DENSITY					TEST PARAMETERS	
Mold ID	C	C	C	C	Test Method	ASTM D698
Compaction Point #	1	2	3	4	Compaction Energy	Standard
Wt. Mold & WS, gm.	5991	6043	6085	6045	Test Procedure	B
Wt. Mold, gm.	4215	4215	4215	4215	Mold Diameter, in	4
Wt. WS, gm.	1776	1828	1870	1830	Compacted Layers	3
Mold Volume, cc	944	944	944	944	Blows Per Layer	25
Wet Density, gm./cc	1.88	1.94	1.98	1.94	Rammer Weight / Fall	5.5 lbs / 12 in.
Wet Density, pcf	117.4	120.8	123.6	121.0	Size of Material Used	-3/8" Sieve
					Use: <5% Retained on 3/8"	
WATER CONTENT					OVERSIZE PARTICLE CORRECTION	
Tare Number	542	B08	544	511	No Corrections Needed	
Wt. Tare & WS, gm.	952.8	734.9	1096.3	1062.4		
Wt. Tare & DS, gm.	840	628.8	934.5	867.3	Percent of Oversize Rock (+3/8" Sieve) = <5% (Based on As-received Screening & Soaking)	
Wt. Tare, gm.	196.7	83.4	194.9	103.2		
Water Content, %	17.5	19.5	21.9	25.5	W.C. of Finer Material, % (-3/8" Sieve) = NA	
DRY DENSITY vs. WATER CONTENT					SAMPLE SUMMARY	
LABORATORY TEST VALUES						
Water Content, %	17.5	19.5	21.9	25.5	Lab Optimum Water Content, %	21.0
Dry Density, pcf	99.9	101.2	101.4	96.4	Lab Maximum Dry Density, pcf	101.6

Note: Maximum Density and Optimum Water Content reported from estimated best fit smooth curve!



Note: Compacted using manual hammer.

Input Validation: BLS

Reviewed By: AJD

Date Tested: 09/11/15

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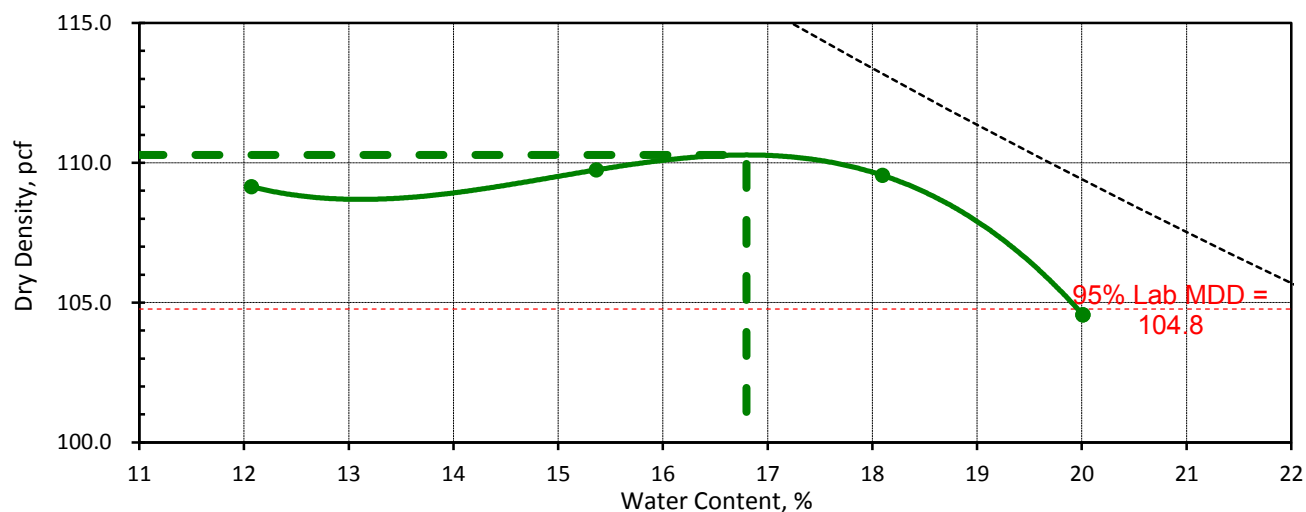
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LABORATORY COMPACTION CHARACTERISTICS OF SOIL

Client	Tetra Tech Inc.	Boring	RH-16
Client Project	EQT RedHook	Depth	0.0'-9.4'
Project No.	36199	Sample	Bulk
		Lab Sample No.	36199008
Visual Description: YELLOWISH BROWN LEAN CLAY WITH SAND			

WET DENSITY					TEST PARAMETERS	
Mold ID	D	D	D	D	Test Method	ASTM D698
Compaction Point #	1	2	3	4	Compaction Energy	Standard
Wt. Mold & WS, gm.	6069	6134	6176	6117	Test Procedure	B
Wt. Mold, gm.	4214	4214	4214	4214	Mold Diameter, in	4
Wt. WS, gm.	1855	1920	1962	1903	Compacted Layers	3
Mold Volume, cc	946	946	946	946	Blows Per Layer	25
Wet Density, gm./cc	1.96	2.03	2.07	2.01	Rammer Weight / Fall	5.5 lbs / 12 in.
Wet Density, pcf	122.3	126.6	129.4	125.5	Size of Material Used	-3/8" Sieve
					Use: <5% Retained on 3/8"	
WATER CONTENT					OVERSIZE PARTICLE CORRECTION	
Tare Number	53	462	31	460	No Corrections Needed	
Wt. Tare & WS, gm.	789.7	810.3	929.6	1033.2		
Wt. Tare & DS, gm.	713.8	713.8	800.1	875.2	Percent of Oversize Rock (+3/8" Sieve) = <5% (Based on As-received Screening & Soaking)	
Wt. Tare, gm.	85	85.7	84.5	85.6		
Water Content, %	12.1	15.4	18.1	20.0	W.C. of Finer Material, % (-3/8" Sieve) = NA	
DRY DENSITY vs. WATER CONTENT					SAMPLE SUMMARY	
LABORATORY TEST VALUES						
Water Content, %	12.1	15.4	18.1	20.0	Lab Optimum Water Content, %	16.8
Dry Density, pcf	109.1	109.7	109.6	104.6	Lab Maximum Dry Density, pcf	110.3

Note: Maximum Density and Optimum Water Content reported from estimated best fit smooth curve!



Note: Compacted using manual hammer.

Input Validation: BLS

Reviewed By: SVG

Date Tested: 09/16/15

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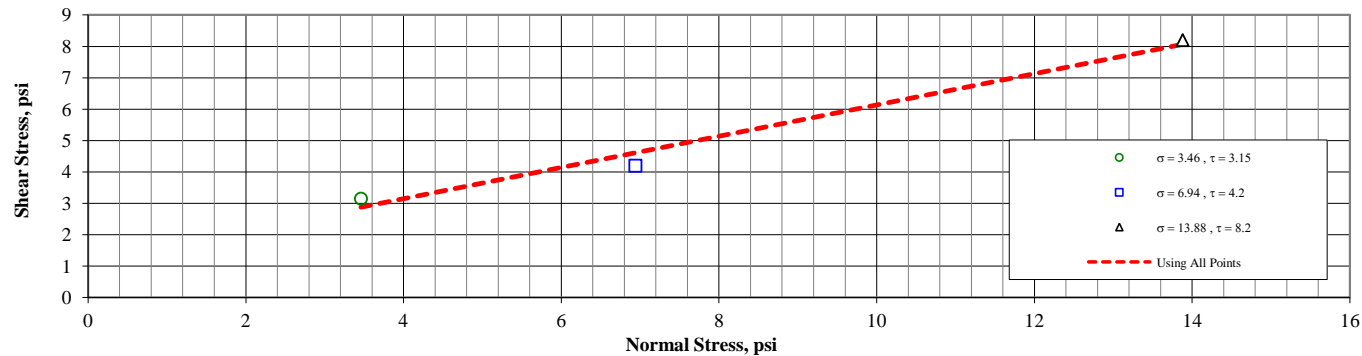
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DIRECT SHEAR TEST OF SOILS UNDER CONSOLIDATED DRAINED CONDITIONS

Client	Tetra Tech Inc.	Boring	RH-16
Client Project	EQT RedHook	Depth	0.0'-9.4'
Project No.	36199	Sample	Bulk
		Lab No.	36199008
Visual Description	Olive Brown Fat Clay		
Sample Condition	Remolded (-#8)		

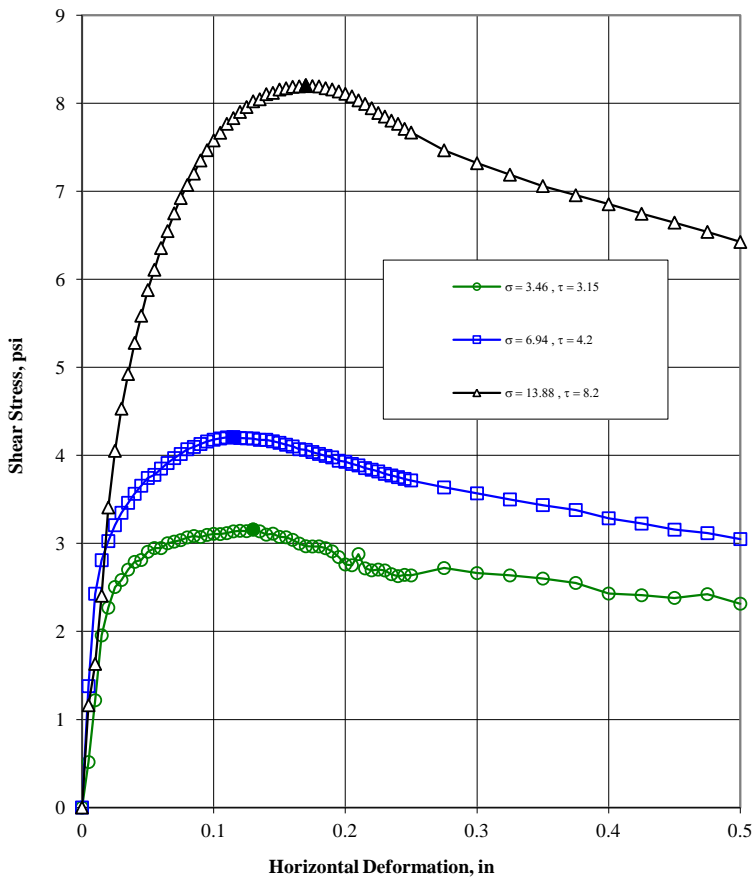
NORMAL STRESS vs. SHEAR STRESS

$\phi = 26.5^\circ$ $c = 1.2 \text{ psi}$

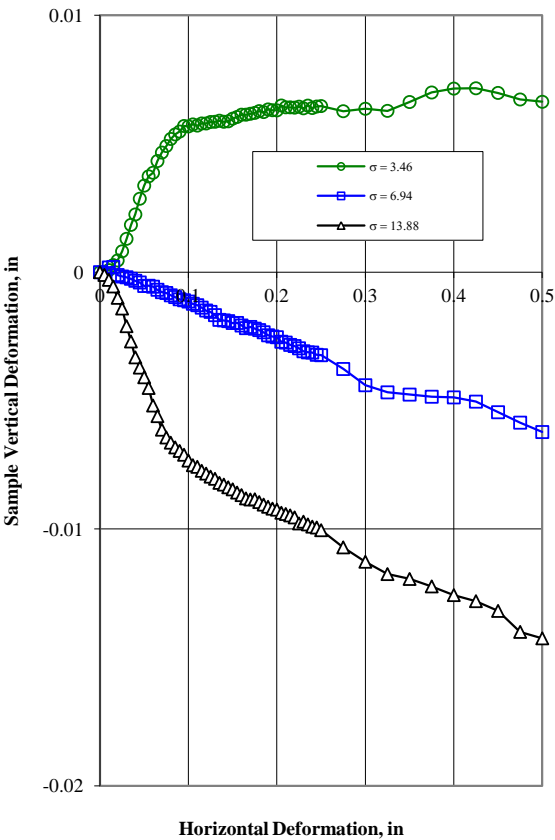


Note: The Friction Angle and Cohesion using other combinations of test points may yield a higher or lower value than the one reported above.

HORIZONTAL DEFORMATION vs. SHEAR STRESS



HORIZONTAL DEFORMATION vs. SAMPLE HEIGHT

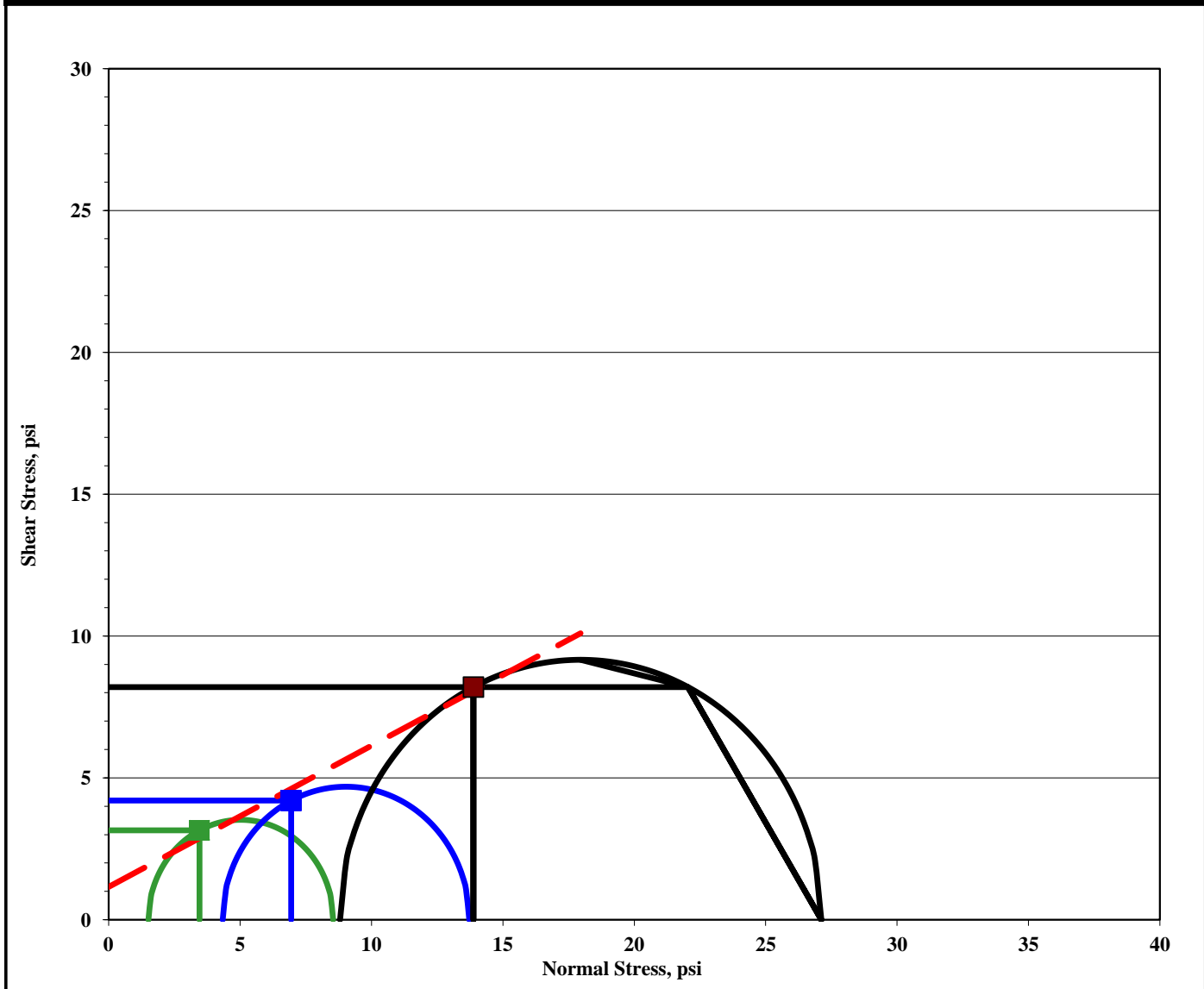


Note: The calculations performed and the parameters presented herein are for preliminary purposes only. GTS only accepts responsibility for the raw data obtained from the direct shear tests. This data may be interpreted differently by others. It is the responsibility of the user to determine the appropriateness and accuracy of the computed values.

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Boring:	RH-16
Depth:	0.0'-9.4'
Sample:	Bulk
Lab Sample ID	36199008

Average Friction Angle, ϕ , deg.	26.5		Using All Points
Average Cohesion, c , psi	1.2		Using All Points
Sample Condition	Remolded (-#8)		
Normal Stress, psi	3.46	6.94	13.88
Shear Stress at Failure, psi	3.15	4.20	8.20
Mohr's Circle Radius, psi	3.5	4.7	9.2
Mohr's Circle Origin, psi	5.0	9.0	18.0
(Origin - Normal Stress), psi	1.6	2.1	4.1
Minor Principal Stress σ_3 , psi	1.5	4.3	8.8
Major Principal Stress σ_1 , psi	8.5	13.7	27.1
Principal Stress Difference, $\sigma_1 - \sigma_3$, psi	7.0	9.4	18.3
Normal Stress Pole Coordinate, X, psi	6.6	11.1	22.0
Shear Stress Pole Coordinate, Y, psi	3.2	4.2	8.2
Assumed Failure Plane, deg	0 - Horizontal	0 - Horizontal	0 - Horizontal
Major Principal Failure Plane Angle, deg	58.2	58.2	58.2
Minor Principal Failure Plane Angle, deg	31.8	31.8	31.8
Maximum Shear Stress, psi	3.5	4.7	9.2
Maximum Shear Failure Plane Angle, deg	13.2	13.2	13.2
Initial Water Content, %	21.0%	21.0%	21.0%
Initial Dry Density, pcf	101.4	101.3	101.3



DIRECT SHEAR TEST OF SOILS UNDER CONSOLIDATED DRAINED CONDITIONS - ASTM D 3080

Client: Tetra Tech Inc. (Unofficial)
 Client Project: EQT RedHook
 Project No.: 36199
 Boring: RH-16
 Depth: 0.0'-9.4'
 Sample: Bulk
 Lab No.: 36199008

Visual Description: Olive Brown Fat Clay
 Sample Condition: Remolded (-#8)

SAMPLE CONDITIONS									
Test No.	1			2			3		
	Initial	After Consol.	Final	Initial	After Consol.	Final	Initial	After Consol.	Final
Tare I.D.	t100	-	w109	t100	-	w21	t100	-	w77
Wt. Wet Soil & Tare, gm	193.81	-	179.29	193.81	-	178.66	193.81	-	177.39
Wt. Dry Soil & Tare, gm	174.61	-	142.76	174.61	-	143.56	174.61	-	143.85
Wt. Tare, gm	83.24	-	8.46	83.24	-	8.48	83.24	-	8.36
Water Content, %	21.0%	-	27.2%	21.0%	-	26.0%	21.0%	-	24.8%
Wt. of Wet Soil & Mold, gr	446.82	-	-	473.9	-	-	450.83	-	-
Wt. of Mold, gm	288.58	-	-	315.92	-	-	292.74	-	-
Wt. of Wet Soil, gm	158.24	-	-	157.98	-	-	158.09	-	-
Sample Height, in	1	1.0337	1.0403	1	0.9999	0.9937	1	0.9875	0.9733
Sample Diameter, in	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Sample Area, in^2	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
Sample Volume, cc	80.44	83.15	83.68	80.44	80.43	79.93	80.44	79.44	78.29
Wet Density, pcf	122.8	NA	124.0	122.6	NA	128.4	122.6	NA	129.9
Dry Density, pcf	101.4	NA	97.5	101.3	NA	101.9	101.3	NA	104.1

DEFORMATION RATE CALCULATIONS									
t ₉₀ , min. (Sqrt. Method)	30.58			0.87			0.98		
Equivalent t ₅₀ , min. (Sqrt.)	7.15			0.20			0.23		
t ₅₀ , min. (Log Method)	0.29			0.65			0.31		
Selected t ₅₀ , min. (Max.)	7.15			0.65			0.31		
Calc. Disp. Rate, in./min.	0.0004			0.0035			0.0110		

TEST DATA AND SUMMARY									
Test No.	1			2			3		
Normal Stress, psi	3.47			6.94			13.89		
Shear Stress at Failure, psi	3.2 Peak			4.2 Peak			8.2 Peak		
Shear Disp. at Failure, in	0.130			0.115			0.170		
Displacement Rate, in/min	0.0020			0.0020			0.0020		

Horizontal Displacement in	Shear Force lb.	Shear Stress psi	Vertical Deformation in	Shear Force lb.	Shear Stress psi	Vertical Deformation in	Shear Force lb.	Shear Stress psi	Vertical Deformation in
0	0.0	0.0	0.000	0.0	0.0	0.000	0.0	0.0	0.000
0.005	2.5	0.5	0.000	6.8	1.4	0.000	5.7	1.2	0.000
0.010	6.0	1.2	0.000	11.9	2.4	0.000	8.0	1.6	0.000
0.015	9.6	2.0	0.000	13.8	2.8	0.000	11.8	2.4	-0.001
0.020	11.1	2.3	0.000	14.9	3.0	0.000	16.7	3.4	-0.001
0.025	12.3	2.5	0.001	15.7	3.2	0.000	19.9	4.1	-0.001
0.030	12.7	2.6	0.001	16.4	3.3	0.000	22.2	4.5	-0.002
0.035	13.3	2.7	0.002	17.0	3.5	0.000	24.2	4.9	-0.003
0.040	13.7	2.8	0.002	17.5	3.6	0.000	25.9	5.3	-0.003
0.045	13.8	2.8	0.003	17.9	3.7	0.000	27.4	5.6	-0.004
0.050	14.3	2.9	0.003	18.4	3.7	-0.001	28.9	5.9	-0.004
0.055	14.5	2.9	0.004	18.5	3.8	-0.001	30.0	6.1	-0.005
0.060	14.5	2.9	0.004	18.9	3.9	-0.001	31.2	6.4	-0.005
0.065	14.7	3.0	0.004	19.2	3.9	-0.001	32.1	6.5	-0.006
0.070	14.8	3.0	0.005	19.5	4.0	-0.001	33.1	6.8	-0.006
0.075	14.9	3.0	0.005	19.7	4.0	-0.001	34.0	6.9	-0.006
0.080	15.1	3.1	0.005	20.0	4.1	-0.001	34.7	7.1	-0.007
0.085	15.1	3.1	0.005	20.1	4.1	-0.001	35.4	7.2	-0.007
0.090	15.1	3.1	0.005	20.3	4.1	-0.001	36.1	7.4	-0.007

Horizontal Displacement in	Shear Force lb.	Shear Stress psi	Vertical Deformation in	Shear Force lb.	Shear Stress psi	Vertical Deformation in	Shear Force lb.	Shear Stress psi	Vertical Deformation in
0.095	15.2	3.1	0.006	20.4	4.2	-0.001	36.7	7.5	-0.007
0.100	15.3	3.1	0.006	20.5	4.2	-0.001	37.2	7.6	-0.007
0.105	15.2	3.1	0.006	20.6	4.2	-0.001	37.6	7.7	-0.008
0.110	15.3	3.1	0.006	20.6	4.2	-0.001	38.1	7.8	-0.008
0.115	15.4	3.1	0.006	20.7	4.2	-0.001	38.4	7.8	-0.008
0.120	15.4	3.1	0.006	20.6	4.2	-0.001	38.8	7.9	-0.008
0.125	15.4	3.1	0.006	20.6	4.2	-0.002	39.1	8.0	-0.008
0.130	15.5	3.2	0.006	20.6	4.2	-0.002	39.4	8.0	-0.008
0.135	15.4	3.1	0.006	20.5	4.2	-0.002	39.5	8.0	-0.008
0.140	15.2	3.1	0.006	20.5	4.2	-0.002	39.8	8.1	-0.008
0.145	15.3	3.1	0.006	20.4	4.2	-0.002	39.9	8.1	-0.008
0.150	15.1	3.1	0.006	20.3	4.1	-0.002	40.0	8.2	-0.008
0.155	15.1	3.1	0.006	20.2	4.1	-0.002	40.1	8.2	-0.009
0.160	14.9	3.0	0.006	20.1	4.1	-0.002	40.2	8.2	-0.009
0.165	14.7	3.0	0.006	20.0	4.1	-0.002	40.2	8.2	-0.009
0.170	14.6	3.0	0.006	19.9	4.1	-0.002	40.3	8.2	-0.009
0.175	14.6	3.0	0.006	19.8	4.0	-0.002	40.2	8.2	-0.009
0.180	14.6	3.0	0.006	19.7	4.0	-0.002	40.2	8.2	-0.009
0.185	14.5	2.9	0.006	19.6	4.0	-0.002	40.1	8.2	-0.009
0.190	14.3	2.9	0.006	19.5	4.0	-0.002	40.0	8.2	-0.009
0.195	14.0	2.8	0.006	19.3	3.9	-0.003	39.9	8.1	-0.009
0.200	13.6	2.8	0.006	19.3	3.9	-0.003	39.8	8.1	-0.009
0.205	13.5	2.8	0.006	19.2	3.9	-0.003	39.7	8.1	-0.009
0.210	14.1	2.9	0.006	19.1	3.9	-0.003	39.4	8.0	-0.009
0.215	13.3	2.7	0.006	18.9	3.9	-0.003	39.2	8.0	-0.009
0.220	13.2	2.7	0.006	18.8	3.8	-0.003	39.0	7.9	-0.010
0.225	13.3	2.7	0.006	18.7	3.8	-0.003	38.7	7.9	-0.010
0.230	13.2	2.7	0.006	18.6	3.8	-0.003	38.5	7.9	-0.010
0.235	13.0	2.7	0.006	18.5	3.8	-0.003	38.3	7.8	-0.010
0.240	12.9	2.6	0.006	18.4	3.8	-0.003	38.1	7.8	-0.010
0.245	13.0	2.6	0.006	18.3	3.7	-0.003	37.8	7.7	-0.010
0.250	12.9	2.6	0.006	18.2	3.7	-0.003	37.6	7.7	-0.010
0.275	13.4	2.7	0.006	17.8	3.6	-0.004	36.7	7.5	-0.011
0.300	13.1	2.7	0.006	17.5	3.6	-0.004	35.9	7.3	-0.011
0.325	12.9	2.6	0.006	17.2	3.5	-0.005	35.3	7.2	-0.012
0.350	12.8	2.6	0.007	16.9	3.4	-0.005	34.7	7.1	-0.012
0.375	12.5	2.6	0.007	16.6	3.4	-0.005	34.1	7.0	-0.012
0.400	11.9	2.4	0.007	16.1	3.3	-0.005	33.6	6.9	-0.013
0.425	11.8	2.4	0.007	15.8	3.2	-0.005	33.1	6.7	-0.013
0.450	11.7	2.4	0.007	15.5	3.2	-0.005	32.6	6.6	-0.013
0.475	11.9	2.4	0.007	15.3	3.1	-0.006	32.1	6.5	-0.014
0.500	11.4	2.3	0.007	15.0	3.0	-0.006	31.5	6.4	-0.014

Input Validation: ALO

Reviewed By:

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ONE DIMENSIONAL CONSOLIDATION TEST

Client Tetra Tech Inc.
 Client Project EQT RedHook
 Project No. 36199

Boring RH-16
 Depth 0.0'-9.4'
 Sample Bulk
 Lab ID# 36199008

Final Test Load, psi 3.47

Description Olive Brown Fat Clay
 Test Conditions: Remolded (-#8)

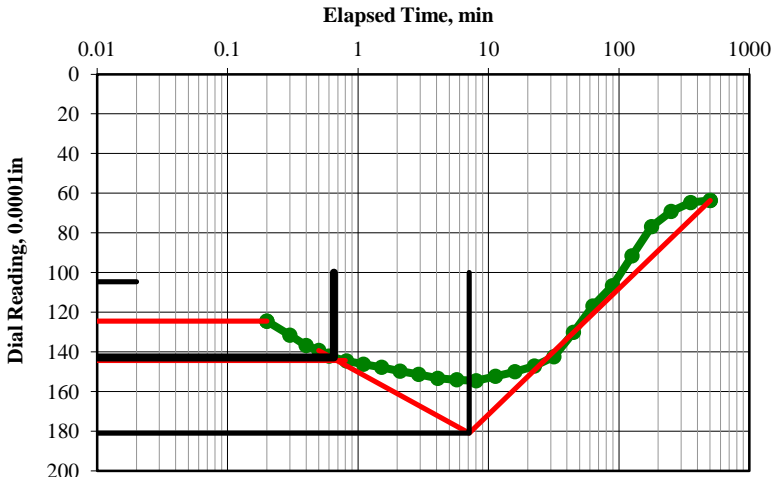
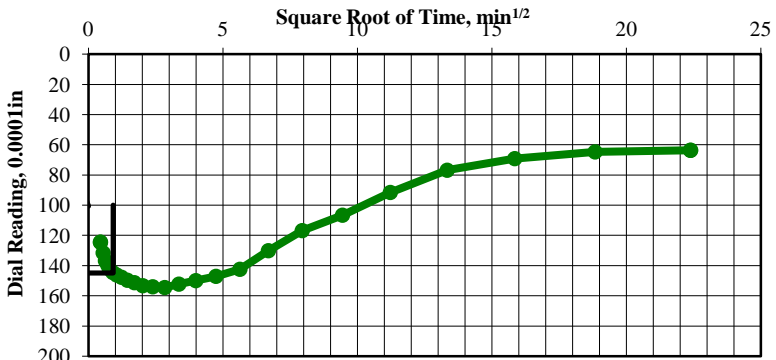
Increment Start Date and Time: 10/01/15				Machine Deflection	
Elapsed Time (min)				Applied Deflection Correction to Sample Height, 0.0001in 27	
Sqrt Time (min ^{1/2})				*Correction is applied to all dial readings.	
Dial Reading (0.0001in)				Log of Elapsed Time vs. Dial Reading	
Sample Height (in)				Elapsed Time, min	
0 0 0 1.0000				Dial Reading, 0.0001in	
Corrections* 27 0.00268				Dial Reading, 0.0001in	
Adjusted Sample Height				Dial Reading, 0.0001in	
0.20 0.45 -30.7 1.0057				Dial Reading, 0.0001in	
0.30 0.55 -0.5 1.0027				Dial Reading, 0.0001in	
0.40 0.63 4.5 1.0022				Dial Reading, 0.0001in	
0.50 0.71 5.2 1.0022				Dial Reading, 0.0001in	
0.60 0.77 5.9 1.0021				Dial Reading, 0.0001in	
0.82 0.90 8.0 1.0019				Dial Reading, 0.0001in	
1.12 1.06 7.0 1.0020				Dial Reading, 0.0001in	
1.52 1.23 7.2 1.0020				Dial Reading, 0.0001in	
2.10 1.45 7.6 1.0019				Dial Reading, 0.0001in	
2.92 1.71 7.8 1.0019				Dial Reading, 0.0001in	
4.08 2.02 7.4 1.0019				Dial Reading, 0.0001in	
5.73 2.39 3.8 1.0023				Dial Reading, 0.0001in	
8.05 2.84 -1.4 1.0028				Dial Reading, 0.0001in	
11.33 3.37 -12.3 1.0039				Dial Reading, 0.0001in	
15.97 4.00 -25.5 1.0052				Dial Reading, 0.0001in	
22.50 4.74 -36.7 1.0063				Dial Reading, 0.0001in	
31.75 5.63 -60.3 1.0087				Dial Reading, 0.0001in	
44.80 6.69 -84.1 1.0111				Dial Reading, 0.0001in	
63.23 7.95 -113.2 1.0140				Dial Reading, 0.0001in	
89.27 9.45 -145.7 1.0173				Dial Reading, 0.0001in	
126.03 11.23 -188.1 1.0215				Dial Reading, 0.0001in	
177.97 13.34 -226.4 1.0253				Dial Reading, 0.0001in	
251.33 15.85 -275.9 1.0303				Dial Reading, 0.0001in	
354.95 18.84 -300.7 1.0328				Dial Reading, 0.0001in	
501.32 22.39 -310.2 1.0337				Dial Reading, 0.0001in	
Sqrt. of Elapsed Time vs Dial Reading				Log of Elapsed Time vs Dial Reading	
Specimen Swelled				Load Summary	
				Initial Sample Height, in 1.0000	
				Final Sample Height, in 1.0337	
				Incremental Strain, % -3.37%	
				Loading Duration, min 501	

ONE DIMENSIONAL CONSOLIDATION TEST

Client Tetra Tech Inc.
 Client Project EQT RedHook
 Project No. 36199
 Description Olive Brown Fat Clay
 Test Conditions: Remolded (-#8)

Boring RH-16
 Depth 0.0'-9.4'
 Sample Bulk
 Lab ID# 36199008

Final Test Load, psi 6.94

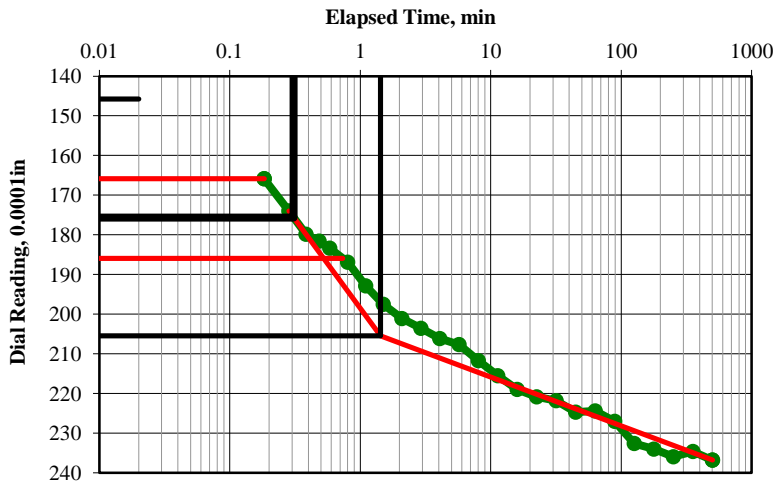
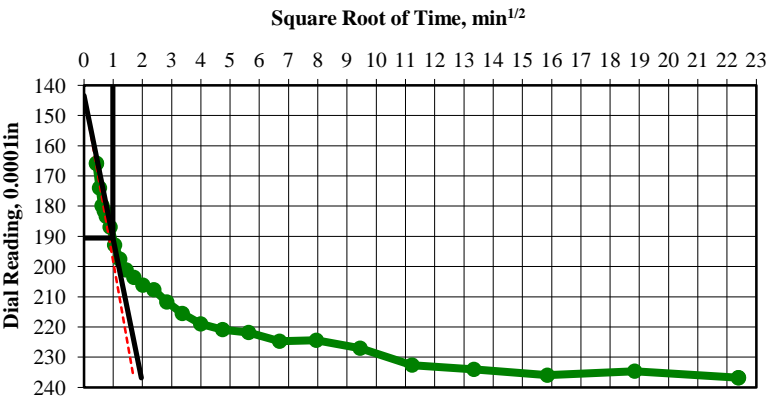
Increment Start Date: 10/01/15				Machine Deflection	
Elapsed Time (min)	Sqrt Time (min ^{1/2})	Dial Reading (0.0001in)	Sample Height (in)	Applied Deflection Correction to Sample Height, 0.0001in 63	
				*Correction is applied to all dial readings.	
				Log of Elapsed Time vs. Dial Reading	
					
Corrections* 63 0.006303 Adjusted Sample Height					
0.20	0.45	124.5	0.9939	Square Root of Elapsed Time vs. Dial Reading	
0.30	0.55	131.6	0.9931		
0.40	0.63	136.8	0.9926		
0.50	0.71	139.3	0.9924		
0.60	0.77	142.1	0.9921	Load Summary	
0.82	0.90	144.6	0.9918		
1.10	1.05	146.2	0.9917	Initial Sample Height, in 1.0000 Final Sample Height, in 0.9999 Incremental Strain, % 0.01% Loading Duration, min 501	
1.52	1.23	147.8	0.9915		
2.10	1.45	149.7	0.9913	Specimen Swelled	
2.92	1.71	151.3	0.9912		
4.08	2.02	153.3	0.9910	Date 10/1/2015	
5.72	2.39	154.0	0.9909		
8.05	2.84	154.6	0.9908	COPYRIGHT © 2002 GEOTECHNICAL TESTING SERVICES 1-800-853-7309	
11.32	3.36	152.3	0.9911		
15.95	3.99	150.0	0.9913		
22.50	4.74	147.1	0.9916		
31.73	5.63	142.5	0.9921		
44.78	6.69	130.1	0.9933		
63.22	7.95	116.9	0.9946		
89.25	9.45	106.6	0.9956		
126.02	11.23	91.6	0.9971		
177.97	13.34	76.9	0.9986		
251.33	15.85	69.2	0.9994		
354.95	18.84	64.7	0.9998		
501.32	22.39	63.6	0.9999		
Sqrt. of Elapsed Time vs Dial Reading			Log of Elapsed Time vs Dial Reading		

ONE DIMENSIONAL CONSOLIDATION TEST

Client Tetra Tech Inc.
 Client Project EQT RedHook
 Project No. 36199
 Description Olive Brown Fat Clay
 Test Conditions: Remolded (-#8)

Boring RH-16
 Depth 0.0'-9.4'
 Sample Bulk
 Lab ID# 36199008

Final Test Load, psi 13.89

Increment Start Date: 10/01/15				Machine Deflection	
Elapsed Time Time (min)				Applied Deflection Correction to Sample Height, 0.0001in 112	
Sqrt Time (min^{1/2})				*Correction is applied to all dial readings.	
Dial Reading (0.0001in)				Log of Elapsed Time vs. Dial Reading	
Sample Height (in)					
0 0 0 1.0000					
Corrections*		112	0.011208	Square Root of Elapsed Time vs. Dial Reading	
Adjusted Sample Height					
					
0.18	0.43	165.9	0.9946	Load Summary	
0.28	0.53	174.0	0.9938		
0.38	0.62	179.9	0.9932	Initial Sample Height, in 1.0000	
0.48	0.70	181.6	0.9930		
0.58	0.76	183.4	0.9929	Final Sample Height, in 0.9875	
0.80	0.89	186.9	0.9925		
1.10	1.05	192.9	0.9919	Incremental Strain, % 1.25%	
1.50	1.22	197.5	0.9915		
2.08	1.44	201.1	0.9911	Loading Duration, min 501	
2.92	1.71	203.6	0.9909		
4.07	2.02	206.2	0.9906	Average Sample Height, in 0.9938	
5.72	2.39	207.7	0.9904		
8.03	2.83	211.7	0.9900	Average Drainage Height, in 0.4969	
11.32	3.36	215.5	0.9897		
15.95	3.99	219.0	0.9893	T (Time Factor for T90) 0.848	
22.50	4.74	220.9	0.9891		
31.73	5.63	221.8	0.9890	T (Time Factor for T50) 0.197	
44.78	6.69	224.7	0.9887		
63.22	7.95	224.4	0.9888	Coef. of Consol., C _v , in ² /min 0.214	
89.25	9.45	227.0	0.9885		
126.02	11.23	232.6	0.9879	Coef. of Consol., C _v , in ² /min 0.157	
177.95	13.34	234.0	0.9878		
251.32	15.85	236.0	0.9876	Height at: D90 = 0.9697, D100 = 0.9692	
354.93	18.84	234.6	0.9877		
501.32	22.39	236.8	0.9875	Height at: D50 = 0.9712, D100 = 0.9682	
Sqrt. of Elapsed Time vs Dial Reading				Log of Elapsed Time vs Dial Reading	
T0 = 0 min.		D0 = 143.4 div.		T0 = 0 min.	
T90 = 0.98 min		D90 = 190.6 div.		D0 = 145.8 div.	
T100 = NA min		D100 = 195.8 div.		T50 = 0.31 min.	
Height at: D90 = 0.9697, D100 = 0.9692				D50 = 175.6 div.	
Average Sample Height, in		0.9938		T100 = 1.43 min.	
Average Drainage Height, in		0.4969		D100 = 205.5 div.	
T (Time Factor for T90)		0.848		Height at: D50 = 0.9712, D100 = 0.9682	
Coef. of Consol., C _v , in ² /min		0.214		Initial Sample Height, in 1.0000	
				Final Sample Height, in 0.9875	
				Incremental Strain, % 1.25%	
				Loading Duration, min 501	

Date 10/1/2015

AFTER TEST PHOTO'S

Client Tetra Tech Inc.
Client Project EQT RedHook
Project No. 36199

Visual Description Olive Brown Fat Clay
Sample Condition Remolded (-#8)

Boring RH-16
Depth 0.0'-9.4'
Sample Bulk
Lab No. 36199008

TEST 1

TEST 2

TEST 3



Unconfined Compressive Strength of Intact Rock Core Specimens
ASTM D 7012(D 2938 C) / D 4543

Client Tetra Tech Inc.
 Client Project EQT RedHook
 Project Number 36199

Boring RH-04
 Depth 21.6'-22.6'
 Sample Rock Core
 Lab ID number 36199005

Description: Gray Sandstone
 As-Received Condition Useable L/D > 2
 Sample Preparation: Diamond saw blade cut, surface ground flat

ASTM D 4543; Section 4.2 & 5.6	
Length, in	4.239
Mid Height Diameter #1, in	1.982
Mid Height Diameter #2, in	1.984
Average Mid. Height Diameter, in.	1.98
Sample Area, in ²	3.09
L/D Ratio (2.0-2.5)	2.14

ASTM D 4543; Section 9.1.1 S1 Straightness of Specimen Length	
Maximum Gap, in	<0.02 <i>Tolerance (<0.02 in)</i>

ASTM D 4543; Section 9.2.1 FP-1 (Flatness and Parallelism)				
~Distance along Diameter	Reading, 0.0001"			
	End 1 D1	End 1 D2	End 2 D1	End 2 D2
-0.875	-5	4	-8	-3
-0.75	-4	3	-5	-3
-0.625	-2	3	-6	-3
-0.5	-1	3	-5	-2
-0.375	-1	2	-4	-1
-0.25	0	2	-5	0
-0.125	1	2	-3	0
0	0	0	0	0
0.125	4	1	1	1
0.25	5	1	2	2
0.375	3	1	3	1
0.5	7	1	4	1
0.625	9	2	3	2
0.75	9	3	6	0
0.875	11	3	4	1
1	12	4	6	3
Flatness Pass/Fail	Pass	Pass	Pass	Pass
End Parallelism Angles				
Angular difference between End 1 and End 2 - D1			0.01	<0.25* Pass
Angular difference between End 1 and End 2 - D2			0.02	<0.25* Pass

ASTM D 4543; Section 9.3.2 P-2 (End Perpendicularity)			
	Top	Bottom	
Maximum Gap, in	0.004	0.004	
Angle, *	0.05	0.05	
Angle Error (<0.25*)	<0.25* Pass	<0.25* Pass	

Test Parameters	
Test Temperature	Room
Moisture Condition	As-Received
Sample Weight, gms	525.8
Sample Volume, cc	215
Wet Density, pcf	153
Time to Failure, min	2.50
Loading Rate, psi / sec	50
Load Application in Relation to Lithology:	Unable to Determine
Peak Load, lbs	20,182
Unconfined Compressive Strength, psi	6,535



Unconfined Compressive Strength of Intact Rock Core Specimens
ASTM D 7012(D 2938 C) / D 4543

Client Tetra Tech Inc.
 Client Project EQT RedHook
 Project Number 36199

Boring RH-10
 Depth 25.8'-26.6'
 Sample Rock Core
 Lab ID number 36199006

Description: Brown Sandstone
 As-Received Condition Useable L/D > 2
 Sample Preparation: Diamond saw blade cut, surface ground flat

ASTM D 4543; Section 4.2 & 5.6	
Length, in	4.167
Mid Height Diameter #1, in	1.975
Mid Height Diameter #2, in	1.976
Average Mid. Height Diameter, in.	1.98
Sample Area, in ²	3.07
L/D Ratio (2.0-2.5)	2.11

ASTM D 4543; Section 9.1.1 S1 Straightness of Specimen Length	
Maximum Gap, in	<0.02 <i>Tolerance (<0.02 in)</i>

ASTM D 4543; Section 9.2.1 FP-1 (Flatness and Parallelism)				
~Distance along Diameter	Reading, 0.0001"			
	End 1 D1	End 1 D2	End 2 D1	End 2 D2
-0.875	1	-8	2	-5
-0.75	-2	-15	2	-6
-0.625	-4	3	2	-5
-0.5	6	-10	1	-5
-0.375	-2	3	2	-4
-0.25	-2	-6	1	-3
-0.125	7	-5	1	-2
0	0	0	0	0
0.125	9	8	1	3
0.25	11	5	0	6
0.375	4	8	0	3
0.5	11	6	0	4
0.625	13	14	0	6
0.75	5	11	0	5
0.875	5	15	0	7
1	10	17	0	6
Flatness Pass/Fail	Pass	Pass	Pass	Pass
End Parallelism Angles				
Angular difference between End 1 and End 2 - D1			0.04	<0.25* Pass
Angular difference between End 1 and End 2 - D2			0.04	<0.25* Pass

ASTM D 4543; Section 9.3.2 P-2 (End Perpendicularity)			
	Top	Bottom	
Maximum Gap, in	0.004	0.004	
Angle, *	0.05	0.05	
Angle Error (<0.25*)	<0.25* Pass	<0.25* Pass	

Test Parameters	
Test Temperature	Room
Moisture Condition	As-Received
Sample Weight, gms	523.7
Sample Volume, cc	209
Wet Density, pcf	156
Time to Failure, min	2.83
Loading Rate, psi / sec	50
Load Application in Relation to Lithology:	Angle
Peak Load, lbs	26,482
Unconfined Compressive Strength, psi	8,640



Unconfined Compressive Strength of Intact Rock Core Specimens
ASTM D 7012(D 2938 C) / D 4543

Client Tetra Tech Inc.
 Client Project EQT RedHook
 Project Number 36199

Boring RH-12
 Depth 15.4'-16.2'
 Sample Rock Core
 Lab ID number 36199007

Description: Brown Sandstone
 As-Received Condition Useable L/D > 2
 Sample Preparation: Diamond saw blade cut, surface ground flat

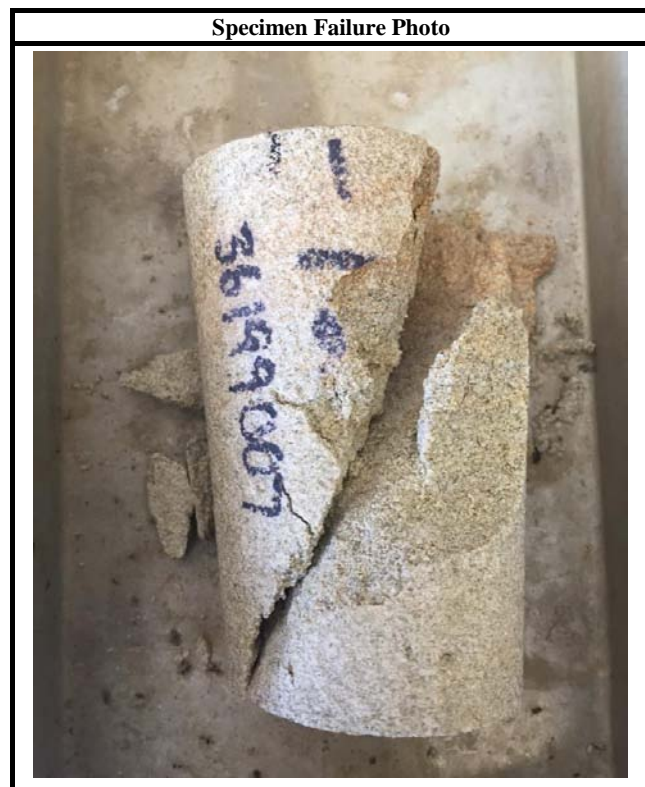
ASTM D 4543; Section 4.2 & 5.6	
Length, in	4.200
Mid Height Diameter #1, in	1.976
Mid Height Diameter #2, in	1.977
Average Mid. Height Diameter, in.	1.98
Sample Area, in ²	3.07
L/D Ratio (2.0-2.5)	2.12

ASTM D 4543; Section 9.1.1 S1 Straightness of Specimen Length	
Maximum Gap, in	<0.02 <i>Tolerance (<0.02 in)</i>

ASTM D 4543; Section 9.2.1 FP-1 (Flatness and Parallelism)				
~Distance along Diameter	Reading, 0.0001"			
	End 1 D1	End 1 D2	End 2 D1	End 2 D2
-0.875	-5	-3	-5	-9
-0.75	-2	-3	-3	-10
-0.625	-3	3	-5	0
-0.5	-2	-2	-2	-7
-0.375	-3	-6	-5	0
-0.25	0	-4	-7	-3
-0.125	1	-2	-1	-2
0	0	0	0	0
0.125	1	2	6	-1
0.25	-1	6	6	1
0.375	2	1	9	4
0.5	-1	6	10	6
0.625	0	6	10	10
0.75	0	4	7	12
0.875	0	6	8	18
1	0	10	8	13
Flatness Pass/Fail	Pass	Pass	Pass	Pass
End Parallelism Angles				
Angular difference between End 1 and End 2 - D1			0.04	<0.25* Pass
Angular difference between End 1 and End 2 - D2			0.04	<0.25* Pass

ASTM D 4543; Section 9.3.2 P-2 (End Perpendicularity)			
	Top	Bottom	
Maximum Gap, in	0.004	0.004	
Angle, *	0.05	0.05	
Angle Error (<0.25*)	<0.25* Pass	<0.25* Pass	

Test Parameters	
Test Temperature	Room
Moisture Condition	As-Received
Sample Weight, gms	491.4
Sample Volume, cc	211
Wet Density, pcf	145
Time to Failure, min	2.33
Loading Rate, psi / sec	50
Load Application in Relation to Lithology:	Unable to Determine
Peak Load, lbs	19,226
Unconfined Compressive Strength, psi	6,266



STABILITY ANALYSIS

Reference: Wilun, Z. and Starzewski, K., Soil Mechanics in Foundation Engineering, Volume 1: Properties of Soils and Site Investigations, John Wiley and Sons, New York, 1972

MECHANICAL PROPERTIES OF SOILS

Table 5.7. Typical values of strength parameters ϕ and c in kN/m^2 (after Polish Code PN-59/B-03020, 1959)

Type of soil			Density index of cohesionless soils			
			<i>DENSE</i> $I_D = 1.0$ (3-4)	<i>M. DENSE</i> $I_D = 0.67$ (10-20)	<i>LOOSE</i> $I_D = 0.33$ (4-10)	0
cohesionless	inorganic	gravels, tills, hogbins, etc.	ϕ'	45°-40°	40°-37°	37°-35°
		sands: coarse and medium	ϕ'	40°-38°	38°-35°	35°-32°
		sands: fine and silty	ϕ'	37°-35°	35°-32°	32°-28°
	organic	sands, organic	ϕ'	30°-25°	25°-22°	22°-18°
cohesive	inorganic	slightly clayey sands, sandy silts, silts $J < 10\%$	Consistency of cohesive soils			
			hard or very stiff ($w < w_s$)	stiff ($w < w_s$)	(m. stiff) firm ($w < w_s$)	soft to very soft ($w > w_s$)
			$w = w_s$	$I_c = 1.0$	0.75	0.50
						0.0
			ϕ'	28°-24°	24°-22°	22°-19°
	inorganic	clayey sands, clayey sandy silts, clayey silts, $J = 10-20\%$	c'	40°-30	30-20	20-15
			ϕ_u	25°-20°	20°-16°	16°-10°
			ϕ'	26°-22°	22°-19°	19°-15°
			c'	50-40	40-30	30-20
			ϕ_u	20°-16°	16°-12°	12°-7°
	inorganic	sand-clays, sand-silt-clays, silt-clays $J = 20-30\%$	ϕ'	23°-20°	20°-17°	17°-12°
			c'	60-50	50-40	40-30
			ϕ_u	15°-12°	12°-9°	9°-5°
			ϕ'	19°-17°	17°-14°	14°-5°
			c'	80-60	60-50	50-40
organic	organic	sandy clays, clays, silty clays $J > 30\%$	ϕ_u	10°-8°	8°-5°	5°-2°
						2°-0°
organic	organic	organic silts, peats, etc.	all strength parameters to be determined from laboratory tests			

* For approximate conversion from kN/m^2 to lb/ft^2 multiply by 21 and to kgf/cm^2 by 0.01.

For computation of safe bearing capacity undrained cohesive resistance c_u can be taken as equal to c' —this assumption is on the safe side.

J = clay fraction

c' = effective cohesion

ϕ' = effective friction angle

c_u = undrained cohesion

ϕ_u = undrained friction angle

w_s = shrinkage limit

w = natural water content

I_c = consistency index

$= (w_L - w)/(w_L - w_p)$

I_D = density index

Method 1*

$$c = 50 \frac{kN}{m^2} = 1044 \frac{lb_f}{ft^2}; \phi = 20^\circ; H = 9 ft; \gamma = 125 \frac{lb_f}{ft^3}$$

$$\frac{c}{\gamma H \tan \phi} = \frac{1044 \frac{lb_f}{ft^2}}{\left(125 \frac{lb_f}{ft^3}\right)(9 ft) \tan(20^\circ)} = 2.55$$

$$\frac{c}{\gamma H F} \cong 0.124$$

$$F = \frac{c}{\gamma H (0.124)} = 7.5$$

Method 2 (Conservative)**

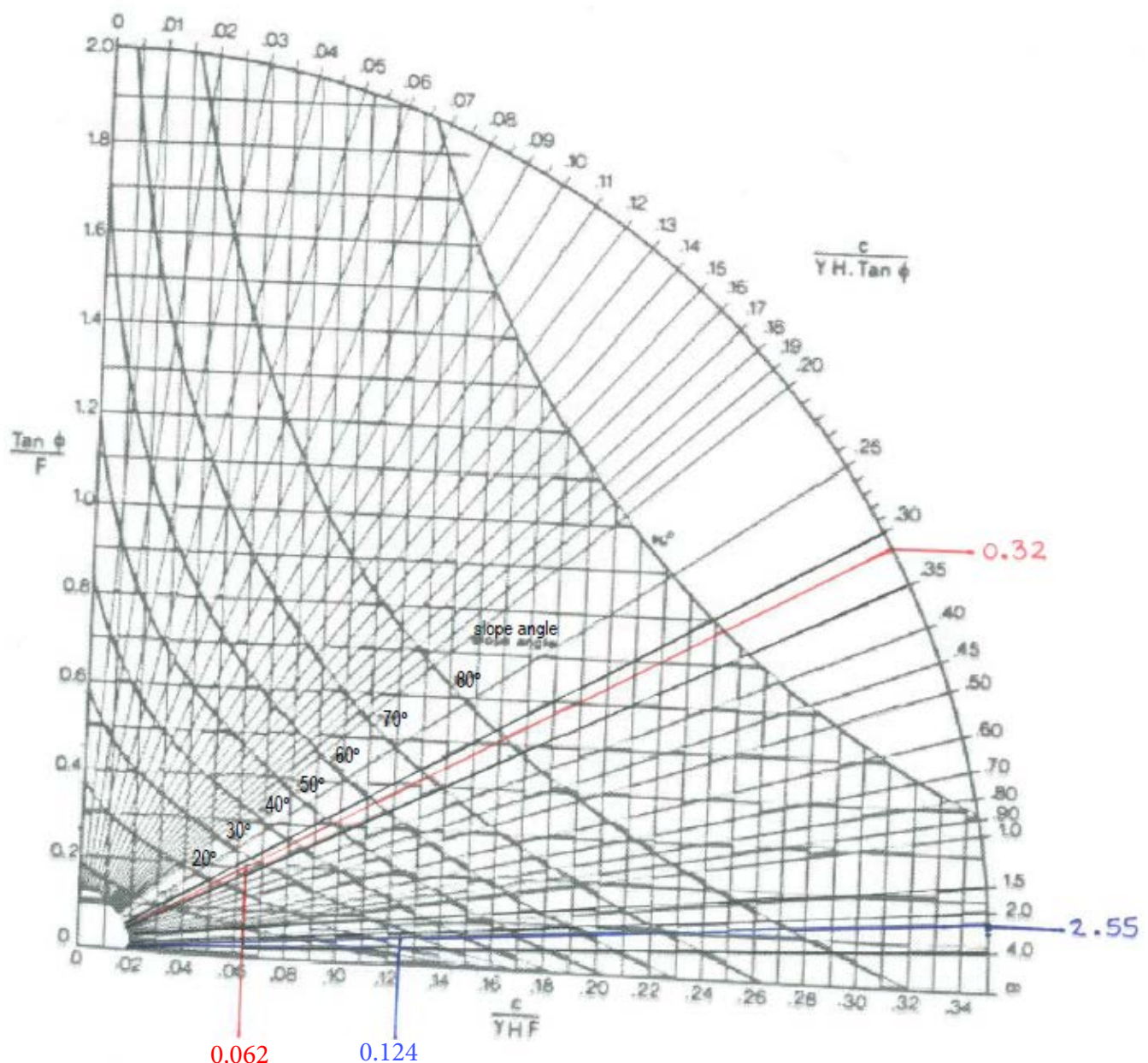
$$c = 173 \frac{lb_f}{ft^2}; \phi = 26.5^\circ; H = 9 ft; \gamma = 120 \frac{lb_f}{ft^3}$$

$$\frac{c}{\gamma H \tan \phi} = \frac{173 \frac{lb_f}{ft^2}}{\left(120 \frac{lb_f}{ft^3}\right)(9 ft) \tan(26.5^\circ)} = 0.32$$

$$\frac{c}{\gamma H F} \cong 0.062$$

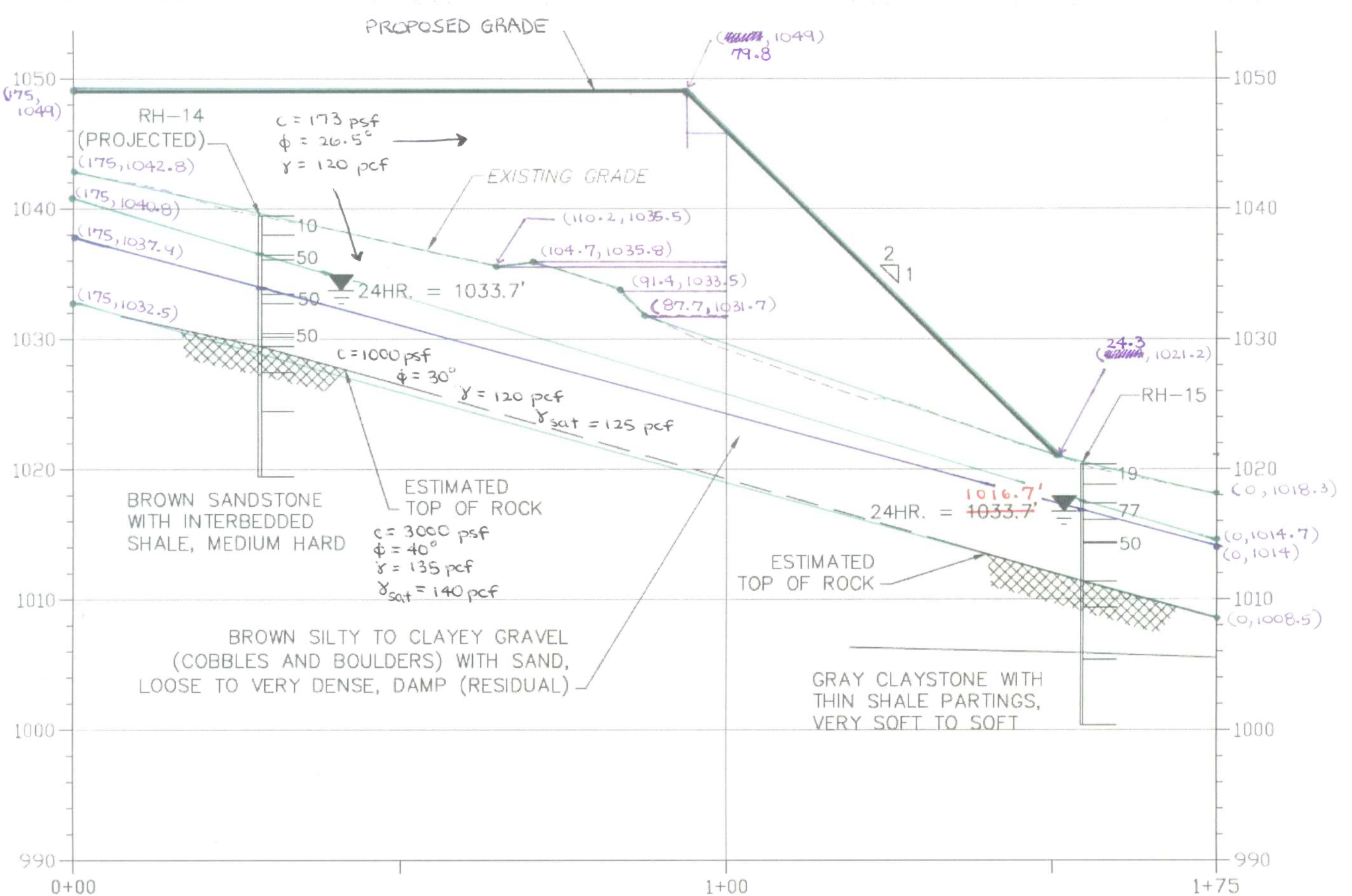
$$F = \frac{c}{\gamma H (0.062)} = 2.6$$

CIRCULAR FAILURE CHART NUMBER 1



* Method 1 employs values derived from the previous sheet using SPT N-Values and Lab Results

** Method 2 employs the properties of the fill used for Section D-D



*** GSTABL7 ***

** GSTABL7 by Dr. Garry H. Gregory, Ph.D., P.E., D.GE **

** Original Version 1.0, January 1996; Current Ver. 2.005.2, Jan. 2011 **

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SLOPE STABILITY ANALYSIS SYSTEM

Modified Bishop, Simplified Janbu, or GLE Method of Slices.

(Includes Spencer & Morgenstern-Price Type Analysis)

Including Pier/Pile, Reinforcement, Soil Nail, Tieback,

Nonlinear Undrained Shear Strength, Curved Phi Envelope,

Anisotropic Soil, Fiber-Reinforced Soil, Boundary Loads, Water

Surfaces, Pseudo-Static & Newmark Earthquake, and Applied Forces.

Analysis Run Date: 10/7/2015

Time of Run: 03:57PM

Run By: Gregory Healy

Input Data Filename: C:\Users\Greg.Healy\Documents\Verma.Pete\Redhook Compressor

Station Section D-D Slope Stability Analysis.in

Output Filename: C:\Users\Greg.Healy\Documents\Verma.Pete\Redhook Compressor

Station Section D-D Slope Stability Analysis.OUT

Unit System: English

Plotted Output Filename: C:\Users\Greg.Healy\Documents\Verma.Pete\Redhook Compressor

Station Section D-D Slope Stability Analysis.PLT

PROBLEM DESCRIPTION: Redhook Compressor Station

Section D-D Slope Stability Analysis

BOUNDARY COORDINATES

3 Top Boundaries

10 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	1018.30	24.30	1021.20	2
2	24.30	1021.20	79.80	1049.00	1
3	79.80	1049.00	175.00	1049.00	1
4	24.30	1021.20	87.70	1031.70	2
5	87.70	1031.70	91.40	1033.50	2
6	91.40	1033.50	104.70	1035.80	2
7	104.70	1035.80	110.20	1035.50	2
8	110.20	1035.50	175.00	1042.80	2
9	0.00	1014.70	175.00	1040.80	3
10	0.00	1008.50	175.00	1032.50	4

User Specified Y-Origin = 990.00(ft)

Default X-Plus Value = 0.00(ft)

Default Y-Plus Value = 0.00(ft)

ISOTROPIC SOIL PARAMETERS

4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param. (psf)	Pressure Constant (psf)	Piez. Surface No.
1	120.0	125.0	173.0	26.5	0.00	0.0	1
2	120.0	125.0	173.0	26.5	0.00	0.0	1
3	120.0	125.0	1000.0	30.0	0.00	0.0	1
4	135.0	140.0	3000.0	40.0	0.00	0.0	1

1 PIEZOMETRIC SURFACE(S) SPECIFIED

Unit Weight of Water = 62.40 (pcf)

Piezometric Surface No. 1 Specified by 2 Coordinate Points

Pore Pressure Inclination Factor = 0.50

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	1014.00
2	175.00	1037.90

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

100 Trial Surfaces Have Been Generated.

5 Surface(s) Initiate(s) From Each Of 20 Points Equally Spaced Along The Ground Surface Between X = 0.00(ft)

and X = 50.00(ft)

Each Surface Terminates Between X = 79.80(ft)

and X = 152.00(ft)
 Unless Further Limitations Were Imposed, The Minimum Elevation
 At Which A Surface Extends Is Y = 1009.00(ft)
 5.00(ft) Line Segments Define Each Trial Failure Surface.
 Following Are Displayed The Ten Most Critical Of The Trial

Failure Surfaces Evaluated. They Are
 Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Total Number of Trial Surfaces Attempted = 100

Number of Trial Surfaces With Valid FS = 100

Statistical Data On All Valid FS Values:

FS Max = 14.609 FS Min = 1.748 FS Ave = 4.915

Standard Deviation = 2.777 Coefficient of Variation = 56.50 %

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.684	1021.127
2	28.683	1021.246
3	33.667	1021.641
4	38.622	1022.312
5	43.532	1023.255
6	48.383	1024.469
7	53.159	1025.948
8	57.846	1027.690
9	62.429	1029.688
10	66.895	1031.937
11	71.230	1034.429
12	75.420	1037.157
13	79.453	1040.112
14	83.316	1043.286
15	86.998	1046.669
16	89.270	1049.000

Circle Center At X = 24.064 ; Y = 1111.331 ; and Radius = 90.205

Factor of Safety

*** 1.748 ***

Individual data on the 18 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force		Tie Force		Earthquake Force		Surcharge Load (lbs)
			Top (lbs)	Bot (lbs)	Norm (lbs)	Tan (lbs)	Hor (lbs)	Ver (lbs)	
1	0.6	2.2	0.0	0.0	0.	0.	0.0	0.0	0.0
2	4.4	580.7	0.0	0.0	0.	0.	0.0	0.0	0.0
3	5.0	1914.1	0.0	0.0	0.	0.	0.0	0.0	0.0
4	5.0	3066.0	0.0	0.0	0.	0.	0.0	0.0	0.0
5	4.9	4018.6	0.0	0.0	0.	0.	0.0	0.0	0.0
6	4.9	4765.0	0.0	0.0	0.	0.	0.0	0.0	0.0
7	4.8	5301.8	0.0	0.0	0.	0.	0.0	0.0	0.0
8	0.2	175.1	0.0	0.0	0.	0.	0.0	0.0	0.0
9	4.5	5454.7	0.0	0.0	0.	0.	0.0	0.0	0.0
10	4.6	5754.0	0.0	0.0	0.	0.	0.0	0.0	0.0
11	4.5	5683.1	0.0	0.0	0.	0.	0.0	0.0	0.0
12	4.3	5429.8	0.0	0.0	0.	0.	0.0	0.0	0.0
13	4.2	5010.0	0.0	0.0	0.	0.	0.0	0.0	0.0
14	4.0	4443.6	0.0	0.0	0.	0.	0.0	0.0	0.0
15	0.3	360.6	0.0	0.0	0.	0.	0.0	0.0	0.0
16	3.5	3020.5	0.0	0.0	0.	0.	0.0	0.0	0.0
17	3.7	1777.3	0.0	0.0	0.	0.	0.0	0.0	0.0
18	2.3	317.7	0.0	0.0	0.	0.	0.0	0.0	0.0

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	15.789	1020.184
2	20.764	1019.683
3	25.761	1019.500
4	30.759	1019.635
5	35.739	1020.088
6	40.679	1020.858

7	45.560	1021.941
8	50.363	1023.332
9	55.067	1025.026
10	59.654	1027.017
11	64.104	1029.295
12	68.401	1031.852
13	72.526	1034.678
14	76.463	1037.761
15	80.195	1041.088
16	83.708	1044.646
17	86.987	1048.420
18	87.429	1049.000

Circle Center At X = 26.147 ; Y = 1097.893 ; and Radius = 78.396

Factor of Safety

*** 1.751 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	21.053	1020.812
2	26.052	1020.851
3	31.043	1021.152
4	36.012	1021.714
5	40.943	1022.537
6	45.825	1023.618
7	50.644	1024.954
8	55.385	1026.541
9	60.037	1028.375
10	64.585	1030.450
11	69.019	1032.762
12	73.325	1035.304
13	77.491	1038.068
14	81.507	1041.047
15	85.360	1044.233
16	89.041	1047.617
17	90.395	1049.000

Circle Center At X = 22.824 ; Y = 1115.946 ; and Radius = 95.150

Factor of Safety

*** 1.767 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	28.947	1023.528
2	33.904	1022.870
3	38.900	1022.672
4	43.893	1022.937
5	48.840	1023.663
6	53.699	1024.842
7	58.428	1026.465
8	62.987	1028.518
9	67.337	1030.984
10	71.440	1033.841
11	75.262	1037.065
12	78.770	1040.628
13	81.933	1044.500
14	84.725	1048.648
15	84.918	1049.000

Circle Center At X = 38.534 ; Y = 1076.727 ; and Radius = 54.056

Factor of Safety

*** 1.770 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	28.947	1023.528
2	33.929	1023.102
3	38.929	1023.064
4	43.917	1023.412
5	48.863	1024.147

6	53.737	1025.262
7	58.510	1026.751
8	63.153	1028.606
9	67.639	1030.814
10	71.940	1033.364
11	76.031	1036.239
12	79.886	1039.422
13	83.484	1042.895
14	86.801	1046.636
15	88.591	1049.000

Circle Center At X = 36.926 ; Y = 1087.528 ; and Radius = 64.496

Factor of Safety

*** 1.773 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.211	1026.164
2	39.203	1025.892
3	44.200	1026.081
4	49.157	1026.730
5	54.034	1027.835
6	58.788	1029.384
7	63.378	1031.366
8	67.766	1033.762
9	71.915	1036.553
10	75.788	1039.716
11	79.352	1043.222
12	82.579	1047.042
13	83.944	1049.000

Circle Center At X = 39.654 ; Y = 1080.020 ; and Radius = 54.130

Factor of Safety

*** 1.833 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	26.316	1022.210
2	31.262	1022.938
3	36.184	1023.819
4	41.076	1024.852
5	45.934	1026.035
6	50.754	1027.367
7	55.529	1028.848
8	60.257	1030.476
9	64.932	1032.249
10	69.550	1034.165
11	74.107	1036.224
12	78.598	1038.422
13	83.019	1040.757
14	87.365	1043.228
15	91.634	1045.832
16	95.820	1048.567
17	96.439	1049.000

Circle Center At X = 5.212 ; Y = 1182.678 ; and Radius = 161.851

Factor of Safety

*** 1.938 ***

Failure Surface Specified By 22 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	0.000	1018.300
2	4.989	1017.972
3	9.987	1017.837
4	14.987	1017.896
5	19.981	1018.148
6	24.961	1018.593
7	29.920	1019.231
8	34.851	1020.060
9	39.746	1021.079

10	44.598	1022.286
11	49.400	1023.680
12	54.144	1025.260
13	58.823	1027.021
14	63.431	1028.962
15	67.960	1031.080
16	72.404	1033.371
17	76.756	1035.833
18	81.010	1038.461
19	85.159	1041.252
20	89.196	1044.201
21	93.117	1047.304
22	95.096	1049.000

Circle Center At X = 10.985 ; Y = 1146.908 ; and Radius = 129.076

Factor of Safety

*** 1.939 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.211	1026.164
2	39.171	1026.795
3	44.091	1027.684
4	48.958	1028.828
5	53.759	1030.224
6	58.481	1031.870
7	63.110	1033.759
8	67.635	1035.887
9	72.042	1038.248
10	76.320	1040.836
11	80.458	1043.644
12	84.443	1046.663
13	87.214	1049.000

Circle Center At X = 24.606 ; Y = 1121.496 ; and Radius = 95.815

Factor of Safety

*** 1.962 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	39.474	1028.801
2	44.273	1027.399
3	49.223	1026.694
4	54.223	1026.700
5	59.172	1027.416
6	63.968	1028.829
7	68.515	1030.909
8	72.720	1033.614
9	76.498	1036.889
10	79.772	1040.668
11	82.475	1044.874
12	84.361	1049.000

Circle Center At X = 51.683 ; Y = 1061.642 ; and Radius = 35.038

Factor of Safety

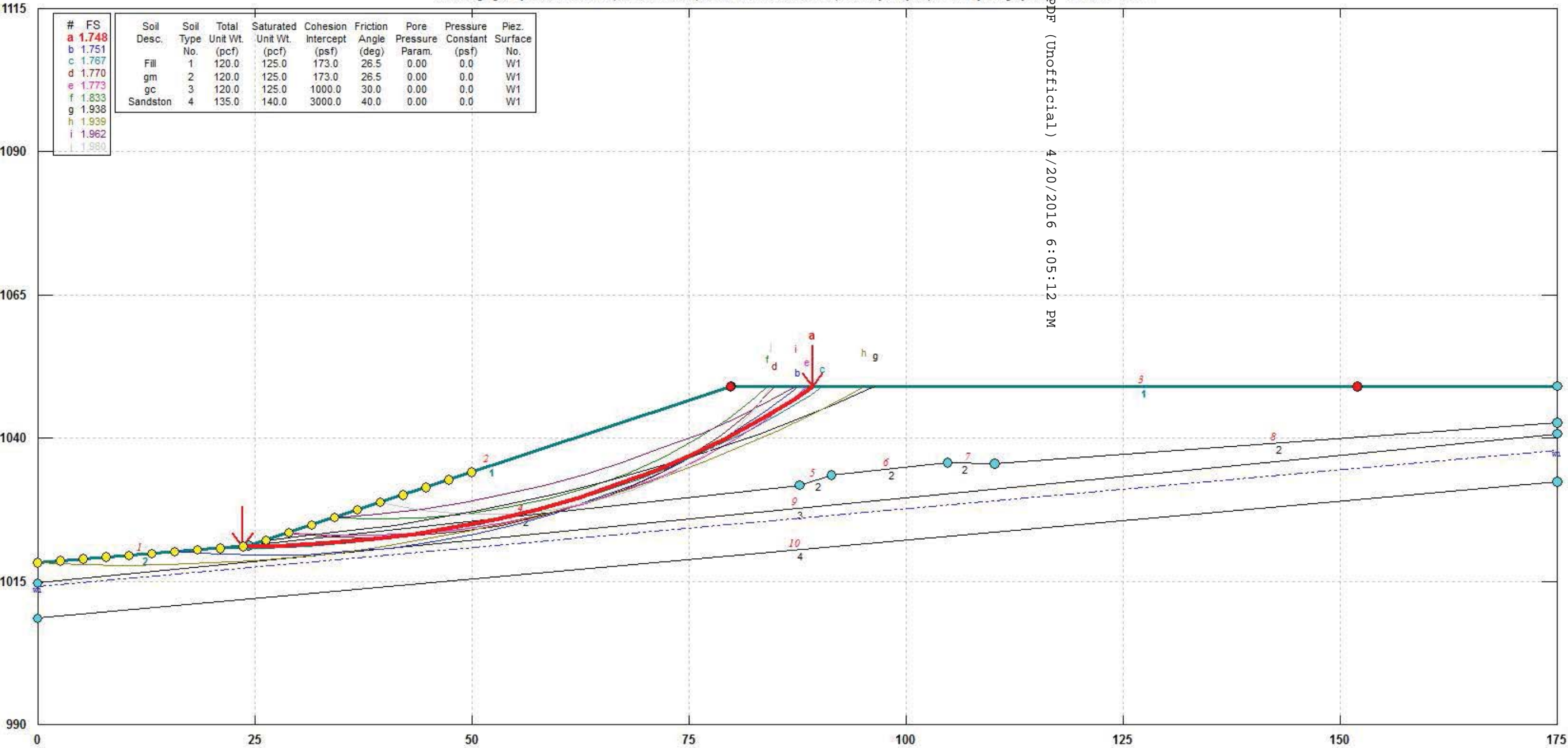
*** 1.980 ***

**** END OF GSTABL7 OUTPUT ****

Redhook Compressor Station Section D-D Slope Stability Analysis

c:\users\greg.healy\documents\verma.petel\redhook compressor station section d-d slope stability analysis.pl2 Run By: Gregory Healy 10/7/2015 03:57PM

20160421-5019 PERC PDF (Unofficial) 4/20/2016 6:05:12 PM



GSTABL7 v.2 FSmin=1.748

Safety Factors Are Calculated By The Modified Bishop Method

Attachment 6-5

Table 6.3-1R

Revised April 20, 2016

Oil and Gas Wells Within 0.25 Mile of the Proposed Project

Feature	API Number	Status	County	Quadrangle	Latitude (DD)	Longitude (DD)	MP	Type	Near Feature	Distance (ft)	Direction
H-158/M-80	059-25617	Active	Greene	Waynesburg	39.913336	-80.13424	0	Oil & Gas, Coal	ATWS	967	W
	059-25585	Active	Greene	Waynesburg	39.913356	-80.13418	0	Oil & Gas, Coal	ATWS	947	W
	059-26423	Proposed But Never Materialized	Greene	Waynesburg	39.913164	-80.13423	0	Oil & Gas, Coal	ATWS	975	W
	059-25585	Active	Greene	Waynesburg	39.913356	-80.13418	0	Oil & Gas, Coal	ATWS	947	W
	059-01984	Abandoned	Greene	Waynesburg	39.916693	-80.12477	end	Oil & Gas, Coal	Temporary Construction ROW	1083	E
	059-01939	PADEP Orphan List	Greene	Waynesburg	39.919241	-80.13583	end	Oil & Gas, Coal	ATWS	1263	NW
	059-02020	Abandoned	Greene	Waynesburg	39.916693	-80.12477	end	Oil & Gas, Coal	Temporary Construction ROW	1083	E
H-305	059-01984	Abandoned	Greene	Waynesburg	39.916693	-80.12477	0	Oil & Gas, Coal	Temporary Construction ROW	954	E
	059-01939	PADEP Orphan List	Greene	Waynesburg	39.919241	-80.13583	end	Oil & Gas, Coal	Access Road ROW	1044	W
	059-21800	Active	Greene	Waynesburg	39.921181	-80.13287	end	Oil & Gas, Coal	Access Road ROW	1057	N
	059-02124	DEP Abandoned	Greene	Waynesburg	39.920476	-80.13458	end	Oil & Gas, Coal	Access Road ROW	1034	NW
	059-02020	Abandoned	Greene	Waynesburg	39.916693	-80.12477	0	Oil & Gas, Coal	Temporary Construction ROW	954	E
H-316	059-01984	Abandoned	Greene	Mather	39.916693	-80.12477	0.24	Oil & Gas, Coal	Permanent Operation ROW	0	W
	059-02020	Abandoned	Greene	Mather	39.916693	-80.12477	0.24	Oil & Gas, Coal	Permanent Operation ROW	0	W
	059-01860	PADEP Abandoned List	Greene	Mather	39.916842	-80.12333	0.31	Oil & Gas, Coal	Temporary Construction ROW	115	N
	059-02016	Active	Greene	Mather	39.916693	-80.11644	0.72	Oil & Gas, Unavailable	Temporary Construction ROW	0	W
	059-24135	Active	Greene	Mather	39.920691	-80.11135	1.01	Oil & Gas, Coal	Temporary Construction ROW	1049	N
	059-01241	Active	Greene	Mather	39.915111	-80.10769	1.21	Oil & Gas, Coal	Permanent Operation ROW	765	S
	059-22604	Plugged OG Well	Greene	Mather	39.918966	-80.10397	1.43	Oil & Gas, Coal	Access Road ROW	417	NW
	059-21048	Plugged OG Well	Greene	Mather	39.905226	-80.08899	2.66	Oil & Gas, Coal	Permanent Operation ROW	321	E
	059-24955	Active	Greene	Mather	39.900363	-80.08871	2.98	Oil & Gas, Coal	ATWS	82	SW
	059-25009	Active	Greene	Mather	39.904655	-80.08409	2.7	Oil & Gas, Coal	Access Road ROW	628	N
	059-24498	Operator Reported Not Drilled	Greene	Mather	39.903444	-80.09074	2.73	Oil & Gas, Coal	Permanent Operation ROW	309	W
	059-23780	Operator Reported Not Drilled	Greene	Mather	39.916166	-80.10208	1.57	Oil & Gas, Coal	Temporary Construction ROW	0	W
	059-21887	Active	Greene	Mather	39.963241	-80.17571	0	Oil & Gas, Coal	ATWS	575	NE
	059-23778	Operator Reported Not Drilled	Greene	Mather	39.922916	-80.09647	1.5	Oil & Gas, Coal	Access Road ROW	1196	N

Table 6.3-1R
Revised April 20, 2016

Oil and Gas Wells Within 0.25 Mile of the Proposed Project

Feature	API Number	Status	County	Quadrangle	Latitude (DD)	Longitude (DD)	MP	Type	Near Feature	Distance (ft)	Direction
	059-23782	Operator Reported Not Drilled	Greene	Mather	39.917888	-80.09888	1.6	Oil & Gas, Coal	Access Road ROW	563	S
	059-25243	Operator Reported Not Drilled	Greene	Mather	39.917888	-80.09888	1.6	Oil & Gas, Coal	Access Road ROW	563	S
	059-24956	Operator Reported Not Drilled	Greene	Mather	39.898599	-80.09223	end	Oil & Gas, Coal	ATWS	1256	SW
	059-23779	Operator Reported Not Drilled	Greene	Mather	39.920693	-80.09372	1.7	Oil & Gas, Coal	Access Road ROW	1132	E
	059-23781	Operator Reported Not Drilled	Greene	Mather	39.913582	-80.09899	1.8	Oil & Gas, Coal	Temporary Construction ROW	91	SW
	059-22618	Operator Reported Not Drilled	Greene	Mather	39.916007	-80.10156	1.59	Oil & Gas, Coal	Permanent Operation ROW	0	W
	059-21991	Active	Greene	Mather	39.963775	-80.17575	0	Oil & Gas, Coal	ATWS	722	NE
	059-24133	Active	Greene	Mather	39.922382	-80.09842	1.5	Oil & Gas, Coal	Access Road ROW	992	N
	059-26686	Proposed But Never Materialized	Greene	Mather	39.961486	-80.17539	0	Oil & Gas, Coal	ATWS	542	E
H-318	003-00070	Plugged OG Well	Allegheny	Monongahela	40.22653	-79.92043	0.68	Oil & Gas, Non-Coal	Temporary Construction ROW	815	SE
	003-00209	Plugged OG Well	Allegheny	Monongahela	40.2312	-79.92096	0.65	Oil & Gas, Non-Coal	Access Road ROW	70	E
	003-00435	Plugged OG Well	Allegheny	Monongahela	40.239424	-79.91601	0	Oil & Gas, Non-Coal	Access Road ROW	198	S
	003-00733	Plugged OG Well	Allegheny	Monongahela	40.227512	-79.93577	1.6	Oil & Gas, Non-Coal	ATWS	628	SW
	003-00783	Plugged OG Well	Allegheny	Monongahela	40.236842	-79.94831	2.6	Oil & Gas, Non-Coal	ATWS	336	W
	003-01077	PADEP Plugged	Allegheny	Monongahela	40.239381	-79.9492	2.8	Oil & Gas, Non-Coal	Temporary Construction ROW	412	W
	003-20001	Active	Allegheny	Monongahela	40.226141	-79.91965	0.9	Oil & Gas, Non-Coal	Temporary Construction ROW	1059	SE
	003-20012	Active	Allegheny	Monongahela	40.224768	-79.92288	1.09	Oil & Gas, Non-Coal	Temporary Construction ROW	478	E
	003-20012	Active	Allegheny	Monongahela	40.224768	-79.92288	1.09	Oil & Gas, Non-Coal	Temporary Construction ROW	478	E
	003-20017	Active	Allegheny	Monongahela	40.243571	-79.92431	0	Oil & Gas, Non-Coal	H318_PermanentSite	1191	NW
	003-20017	Active	Allegheny	Monongahela	40.243571	-79.92431	0	Oil & Gas, Non-Coal	H318_PermanentSite	1191	NW
	003-20020	Active	Allegheny	Monongahela	40.231494	-79.92001	0.68	Oil & Gas, Non-Coal	Access Road ROW	352	E
	003-20022	Active	Allegheny	Monongahela	40.245356	-79.92034	0	Oil & Gas, Non-Coal	Access Road ROW	1223	N
	003-20023	Active	Allegheny	Monongahela	40.239585	-79.91524	0	Oil & Gas, Non-Coal	Access Road ROW	79	S
	003-20026	Active	Allegheny	Monongahela	40.241788	-79.91885	0	Oil & Gas, Non-Coal	Access Road ROW	10	W
	003-20078	Plugged OG Well	Allegheny	Monongahela	40.24014	-79.92592	0.1	Oil & Gas, Non-Coal	Temporary Construction ROW	962	W
	003-20792	Active	Allegheny	Monongahela	40.238082	-79.91912	0.2	Oil & Gas, Coal	Access Road ROW	764	S
	003-20803	Plugged OG Well	Allegheny	Monongahela	40.245493	-79.91983	0	Oil & Gas, Coal	Access Road ROW	1245	N
	003-20804	Plugged OG Well	Allegheny	Monongahela	40.24563	-79.91965	0	Oil & Gas, Coal	Access Road ROW	1290	N

Table 6.3-1R
Revised April 20, 2016

Oil and Gas Wells Within 0.25 Mile of the Proposed Project

Feature	API Number	Status	County	Quadrangle	Latitude (DD)	Longitude (DD)	MP	Type	Near Feature	Distance (ft)	Direction
	003-22051	Active	Allegheny	Monongahela	40.231044	-79.93095	1.6	Oil & Gas, Coal	ATWS	883	NE
	003-22053	Active	Allegheny	Monongahela	40.235372	-79.9483	2.48	Oil & Gas, Coal	ATWS	718	SW
	125-00465	Plugged OG Well	Washington	Glassport	40.251124	-79.97096	end	Oil & Gas, Coal	Access Road	951	SW
	125-00666	Active	Washington	Monongahela	40.249528	-79.96083	3.7	Oil & Gas, Coal	Temporary Construction ROW	546	SW
	125-00685	Active	Washington	Glassport	40.255472	-79.96669	end	Oil & Gas, Coal	ATWS	100	NW
	125-00686	Active	Washington	Glassport	40.254694	-79.96314	end	Oil & Gas, Coal	ATWS	103	NW
	125-00687	Active	Washington	Glassport	40.252944	-79.96094	3.96	Oil & Gas, Coal	Temporary Construction ROW	266	NE
	125-00688	Active	Washington	Glassport	40.254694	-79.96314	end	Oil & Gas, Coal	ATWS	962	N
	125-00689	Plugged OG Well	Washington	Glassport	40.251612	-79.96817	end	Oil & Gas, Coal	Access Road	706	S
	125-00691	Active	Washington	Glassport	40.252167	-79.96414	3.96	Oil & Gas, Coal	Temporary Construction ROW	568	W
	125-00692	Active	Washington	Glassport	40.251878	-79.95463	3.85	Oil & Gas, Coal	Temporary Construction ROW	1088	NW
	125-27645	Active	Washington	Monongahela	40.244972	-79.95768	2.93	Oil & Gas, Coal	Access Road ROW	986	S
	125-27646	Active	Washington	Monongahela	40.244944	-79.9577	2.93	Oil & Gas, Coal	Access Road ROW	996	S
	125-27647	Active	Washington	Monongahela	40.244919	-79.95771	2.93	Oil & Gas, Coal	Access Road ROW	1006	S
	125-27648	Active	Washington	Monongahela	40.244894	-79.95773	2.93	Oil & Gas, Coal	Access Road ROW	1016	S
	125-27649	Active	Washington	Monongahela	40.244869	-79.95774	2.93	Oil & Gas, Coal	Access Road ROW	1026	S
	125-27649	Active	Washington	Monongahela	40.244869	-79.95774	2.93	Oil & Gas, Coal	Access Road ROW	1026	S
H-319	103-02535	Active	Wetzel (WV)	Big Run	39.552965	-80.54354	0	Gas	ATWS	118	E
	103-02384	Active	Wetzel (WV)	Big Run	39.55554	-80.54751	end	Gas	ATWS	1210	NW
Pratt Compressor Station	059-01984	Abandoned	Greene	Waynesburg	39.916693	-80.12477	Area within 0.25 mile of Project Features	Oil & Gas, Coal	Pratt CS	1170	NE
	059-02020	Abandoned	Greene	Waynesburg	39.916693	-80.12477		Oil & Gas, Coal	Pratt CS	1170	NE
Redhook Compressor Station	059-01939	PADEP Orphan List	Greene	Waynesburg	39.916824	-80.12333		Oil & Gas, Coal	Redhook CS	1300	W
	059-01860	PADEP Abandoned List	Greene	Waynesburg	39.916842	-80.12333		Oil & Gas, Coal	Redhook CS	921	E
	059-01984	Abandoned	Greene	Waynesburg	39.916693	-80.12477		Oil & Gas, Coal	Redhook CS	515	E
	059-02020	Abandoned	Greene	Waynesburg	39.916693	-80.12477		Oil & Gas, Coal	Redhook CS	515	E
Webster Inter-connect	103-02535	Active	Wetzel (WV)	Big Run	39.552965	-80.54354		Gas	H306 Tap	193	E
	103-02384	Active	Wetzel (WV)	Big Run	39.55554	-80.54751		Gas	Access Road ROW	1240	NW
	103-02422	Never Drilled	Wetzel (WV)	Big Run	39.549174	-80.54064		NAVL	ATWS	1191	E
	103-02524	Active	Wetzel (WV)	Big Run	39.54991	-80.54858		Gas	ATWS	1097	W

Sources: PADEP 2016; WVDEP 2016.

No wells identified within 0.25 mi of Mobley Interconnect; Oil and Gas wells located near taps accounted for above

PADEP = Pennsylvania Department of Environmental Protection; OG = oil/gas; NAVL = Not Available

Attachment 6-7**Table 6.4-4****Soil Units with Slip Potential, Wetzel County, WV**

Soil Map Unit Name	Soil Map Unit Symbol	Soil Slip Potential	Located within EEP footprint?
Gilpin-Peabody complex, 15 to 25 percent slopes	GpD	High	No
Gilpin-Peabody complex, 25 to 35 percent slopes	GpE	High	No
Gilpin-Peabody complex, 35 to 70 percent slopes	GpF	High	Yes
Gilpin-Rock outcrop complex, very steep	GrF	High	No
Vandalia silty clay loam, 15 to 25 percent slopes	VaD	High	No
Vandalia silty clay loam, 25 to 35 percent slopes	VaE	High	No
Vandalia silty clay loam, 15 to 25 percent slopes, extremely stony	VbD	High	No
Vandalia-Urban land complex, 15 to 25 percent slopes	VuD	High	No
Source: USDA NRCS, SSURGO 2.2. Directed to source by Joseph Cochran of WVDEP, April 2016			

Attachment 6-8 Table 6.3-2R (Revised April 20, 2016) Active and Closed Coal Mines Within 0.25 miles of the Project Area							
Feature	Name	Type	Status	County	Mileposts ¹	Surface Elevation Along Pipeline ²	Bottom of Coal Elevation ³
H-316	Gateway Mine	Underground Mine	Closed	Greene	1.03 – 1.20	960-920	650-640
	Mather Mine	Underground Mine	Closed	Greene	1.33 – 2.99	1140-900	640-560
H-302 Tap Site & L/R	Mather Mine	Underground Mine	Closed	Greene	2.99	1140	560
H-316 ATWS 05	Mather Mine	Underground Mine	Closed	Greene	1.5		
H-316 ATWS 06	Mather Mine	Underground Mine	Closed	Greene	2.1		
H-316 ATWS 07	Mather Mine	Underground Mine	Closed	Greene	2.82		
H-316 Access Road ROW 05A/B	Mather Mine	Underground Mine	Closed	Greene	1.45		
H-316 Access Road ROW 06A/B	Mather Mine	Underground Mine	Closed	Greene	2.05		
H-316 Access Road ROW 07A/B	Mather Mine	Underground Mine	Closed	Greene	2.82		
H-318	Redstone No. 1 Mine	Underground Mine	Closed	Allegheny	0.0 – 0.02	1100-1120	950*
	Wright Mine	Underground Mine	Closed	Allegheny	0		
	Howe Mine	Underground Mine	Closed	Allegheny			
	Redstone No. 2 Mine	Underground Mine	Closed	Allegheny	0.13 – 0.17	1160-1180	945*
	Williams Mine	Underground Mine	Closed	Allegheny	0.43 – 0.96	1140-1000	930-937*
	S.B. Tressler Pit	Underground Mine	Closed	Allegheny			
	Abandoned Mine Land 3808	Surface Mine	Closed	Allegheny	1.47 - 1.71		
	Abandoned Mine Land 0129-02	Surface Mine	Reclaimed	Allegheny	1.78 – 1.93		
	Mongah Mine	Underground Mine	Closed	Allegheny	0.42 – 2.67	1200-800	857-810
	GW Peterson No.1 Pit						
	Abandoned Mine Land 3808	Surface Mine	Closed	Allegheny	2.37 – 2.69		
	Abandoned Mine Land 0129	Surface Mine	Closed	Allegheny	2.37 – 2.69		
	Unknown Mine	Underground Mine	Closed	Washington	3.22 – 3.25	910-880	810
	Pitt Mine	Underground Mine	Closed	Washington	3.22 – 3.25	910-880	810
	Coal Bluff	Underground Mine	Closed	Washington	3.62 – 4.20	1220-1040	820-850
	Banner	Underground Mine	Closed	Washington			
	Cliff Mine	Underground Mine	Closed	Washington			
Applegate L/R Site	Redstone No. 1 Mine	Underground Mine	Closed	Allegheny	0	1120	950
Hartson L/R Site & H-148 Tap Site	Coal Bluff	Underground Mine	Closed	Washington	4.26	1080	850
H-318 ATWS 1A-D	Williams Mine	Underground Mine	Closed	Allegheny	0.43 - 0.77		
	Mongah Mine	Underground Mine	Closed	Allegheny	0.43 - 0.77		
H-318 ATWS 2A/B, E/F	Sylvia	Underground Mine	Closed	Allegheny	1.61 - 1.78		
	Mongah Mine	Underground Mine	Closed	Allegheny	1.61 - 1.78		
H-318 ATWS 3	Mongah Mine	Underground Mine	Closed	Allegheny	1.93		
H-318 ATWS 4A/B	Mongah Mine	Underground Mine	Closed	Allegheny	2.03 - 2.25		
H-318 ATWS 6B/C/D, 7, 8	Coal Bluff	Underground Mine	Closed	Washington	3.46 - 4.26		
H-318 Access Road 01	Redstone No. 1 Mine	Underground Mine	Closed	Allegheny	0		
	Wright Mine	Underground Mine	Closed	Allegheny	0		
H-318 Access Road 02	Williams Mine	Underground Mine	Closed	Allegheny	0.7		
	Mongah Mine	Underground Mine	Closed	Allegheny	0.7		
H-318 Access Road 03	Mongah Mine	Underground Mine	Closed	Allegheny	1		
H-318 Access Road	Mongah Mine	Underground Mine	Closed	Allegheny	1.92		
H-318 Access Road 06	Coal Bluff	Underground Mine	Closed	Washington	3.6		
H-318 Access Road 08	Coal Bluff	Underground Mine	Closed	Washington	4.2		
H-305	None	None	None	Greene	Not applicable (N/A)		
M-80 / H-158	None	None	None	Greene	Not applicable (N/A)		

Attachment 6-8**Table 6.3-2R****(Revised April 20, 2016)****Active and Closed Coal Mines Within 0.25 miles of the Project Area**

Feature	Name	Type	Status	County	Mileposts¹	Surface Elevation Along Pipeline²	Bottom of Coal Elevation³
Pratt Compressor Station ⁴	None	None	None	Greene	Not applicable (N/A)		
Redhook Compressor Station ⁵	None	None	None	Greene	Not applicable (N/A)		
Webster Interconnect	None	None	None	Wetzel	Not applicable (N/A)		
H-319	None	None	None	Wetzel	Not applicable (N/A)		
Mobley Tap	None	None	None	Wetzel	Not applicable (N/A)		

Sources: PADEP 2015b, 2015c, WVDEP 2016

*Redstone Coal Seam (feet above mean sea level; PADER 1987).

¹ For access roads, the milepost where the feature first enters the Project pipeline ROW is given.² Feet above mean sea level, source estimated from USGS 7.5 Topographic Quadrangles.³ Pittsburgh Bottom of coal seam elevation (feet above mean sea level; PADER 1987).⁴ Closest mine is Gateway Mine, approximately 0.6 miles to the northwest⁵ Closest mine is the Gateway Mine, approximately 0.3 miles to the west

Attachment 7-3

Table 7.3-1R

(Revised April 20, 2016)

Characteristics of Soils Affected by the Project*

Facility <u>a/</u>	County	Total Area (acres)	Slopes ≥ 15 percent <u>b/</u> (acres)	Designated Farmland <u>c/</u>		Hydric Soils <u>d/</u> (acres)	Shallow Depth to Groundwater <u>d/</u> (acres)	Stony / Rocky Soils <u>d/</u> (acres)	Poor Drainage Potential <u>d/</u> (acres)	Soils Prone to Erosion		Soils Prone to Soil Compaction <u>g/</u> (acres)	Poor Revegetation Potential <u>h/</u> (acres)
				Prime (acres)	Statewide Importance (acres)					By Water <u>e/</u> (acres)	By Wind <u>f/</u> (acres)		
H-305 Pipeline	Greene/PA	2.77	1.29	0.02	1.28	0	0	0	0	2.57	0	2.59	2.57
H-316 Pipeline	Greene/PA	62.23	8.89	8.35	11.18	0.58	0.58	0	0.58	31.82	0	25.5	51.2
H-318 Pipeline	Allegheny, Washington/PA	96.14	22.62	13.03	27.12	0.53	0.53	14.98	0.53	71.95	0	58.74	76.11
H-319 Pipeline	Wetzel/WV	0.8	0	0	0.8	0	0	0.8	0	0	0	0	0
H-158/M-80 Pipelines	Greene/PA	9.91	3.16	1.84	2.51	0	0	0	0	0.83	0	4.09	8.17
Pratt Compressor Station	Greene/PA	7.67	1.61	5.96	0.1	0.30	0.30	0	0	1.61	0	6.06	1.71
Redhook Compressor Station	Greene/PA	17.74	1.82	8.58	6.00	0	0	0	0	7.82	0	11.64	9.16
Webster Interconnect	Wetzel/WV	2.47	0.02	0	2.46	0.07	0.07	2.46	0	0.02	0	0	0.02
Mobley Tap Site (H-306)	Wetzel/WV	0.50	0	0	0.50	0.02	0.02	0.49	0	0	0	0	0
Applegate L/R Site	Allegheny/PA	0.39	0	0.39	0	0	0	0	0	0.39	0	0.39	0
Hartson L/R Site (H-148)	Washington/PA	0.11	0.11	0	0	0	0	0	0	0.11	0	0.11	0.11
H-302 Tap L/R Site	Greene/PA	0.33	0	0	0	0	0	0	0	0	0	0	0
Total Acres		201.06	39.52	38.17	51.95	1.5	1.5	18.73	1.11	117.12	0	109.12	149.05
Percent of Total Acres			20%	19%	26%	0.75%	3.80%	9%	0.55%	58%	0%	54%	74%

* The values in each row do not necessarily add up to the total acreage for each facility, because of minor rounding or mapping inconsistencies.

a/ The list of facilities includes the associated access roads, additional temporary workspaces, contractor yards, and staging areas in the acreage calculations for each facility.

However, the additional temporary workspaces, access roads, contractor yards and staging areas are also reported separately.

b/ Soils characterized by the NRCS as having representative slopes of 15 percent or greater.

c/ As designated by the NRCS.

d/ As designated by the NRCS.

e/ Based on K factor for the whole soil (Kw), the representative slope, and the nonirrigated land capability rating; a Kw rating of "moderate" was elevated to "high" when associated with steep slopes and when the Nonirrigated Capability Subclass included an "e," which indicates that erosion is a potential hazard for the soil type.

f/ Based on the Wind Erodibility Group scale; soils with a rating of 1 to 4 were ranked with a high potential for erosion due to wind.

g/ Based on 1) soils with poor drainage (somewhat poorly drained to poorly drained), 2) a high clay content (greater than 20 percent), or 3) a surface soil texture characterized as sandy clay loam or dominated by finer particles.

h/ Based on soils 1) that have a surface texture of sandy loam or coarser, 2) are somewhat excessively drained to excessively drained, 3) have slopes greater than 15 percent, or 4) have severe limitations (i.e., a Nonirrigated Capability Class of 3 or higher).

Sources: Soil Survey Staff 2015a, 2015b

Attachment 7-3

Table 7.3-1R

(Revised April 20, 2016)

Characteristics of Soils Affected by the Project* (Operation/Permanent Impact Areas)

Facility <u>a/</u>	County	Total Area (acres)	Slopes ≥ 15 percent <u>b/</u> (acres)	Designated Farmland <u>c/</u>		Hydric Soils <u>d/</u> (acres)	Shallow Depth to Groundwater <u>d/</u> (acres)	Stony / Rocky Soils <u>d/</u> (acres)	Poor Drainage Potential <u>d/</u> (acres)	Soils Prone to Erosion		Soils Prone to Soil Compaction <u>g/</u> (acres)	Poor Revegetation Potential <u>h/</u> (acres)
				Prime (acres)	Statewide Importance (acres)					By Water <u>e/</u> (acres)	By Wind <u>f/</u> (acres)		
H-305 Pipeline	Greene/PA	0.61	0.28	0	0.28	0	0	0	0	0.57	0	0.57	0.61
H-316 Pipeline	Greene/PA	20.04	1.93	2.92	3.95	0.26	0.26	0.00	0.26	11.21	0	3.03	16.13
H-318 Pipeline	Allegheny, Washington/PA	26.71	4.01	4.89	7.30	0.26	0.26	4.38	0.26	20.18	0	9.45	20.79
H-319 Pipeline	Wetzel/WV	0.29	0	0	0.29	0	0	0.29	0	0	0	0	0
H-158/M-80 Pipelines	Greene/PA	1.59	0.51	0.29	0.40	0	0	0	0	0.13	0	0.65	1.31
Pratt Compressor Station	Greene/PA	7.67	1.61	5.96	0.1	0.30	0.30	0	0	1.61	0	6.06	1.71
Redhook Compressor Station	Greene/PA	17.74	1.82	8.58	6.00	0	0	0	0	7.82	0	11.64	9.16
Webster Interconnect	Wetzel/WV	0.82	0.01	0	0.81	0.02	0.02	0.81	0	0.01	0	0	0.01
Mobley Tap Site (H-306)	Wetzel/WV	0.38	0	0	0.38	0.02	0.02	0.37	0	0	0	0	0
Applegate L/R Site	Allegheny/PA	0.39	0	0.39	0	0	0	0	0	0.39	0	0.39	0
Hartson L/R Site (H-148)	Washington/PA	0.11	0.11	0	0	0	0	0	0	0.11	0	0.11	0.11
H-302 Tap L/R Site	Greene/PA	0.33	0	0	0	0	0	0	0	0	0	0	0
Total Acres		76.67	10.28	23.04	19.52	0.86	0.86	5.85	0.52	42.02	0	31.90	49.82
Percent of Total Acres			13%	30%	25%	1.12%	8.35%	8%	0.68%	55%	0%	42%	65%

* The values in each row do not necessarily add up to the total acreage for each facility, because of minor rounding or mapping inconsistencies.

a/ The list of facilities includes the associated access roads, additional temporary workspaces, contractor yards, and staging areas in the acreage calculations for each facility.

However, the additional temporary workspaces, access roads, contractor yards and staging areas are also reported separately.

b/ Soils characterized by the NRCS as having representative slopes of 15 percent or greater.

c/ As designated by the NRCS.

d/ As designated by the NRCS.

e/ Based on K factor for the whole soil (Kw), the representative slope, and the nonirrigated land capability rating; a Kw rating of "moderate" was elevated to "high" when associated with steep slopes and when the Nonirrigated Capability Subclass included an "e," which indicates that erosion is a potential hazard for the soil type.

f/ Based on the Wind Erodibility Group scale; soils with a rating of 1 to 4 were ranked with a high potential for erosion due to wind.

g/ Based on 1) soils with poor drainage (somewhat poorly drained to poorly drained), 2) a high clay content (greater than 20 percent), or 3) a surface soil texture characterized as sandy clay loam or dominated by finer particles.

h/ Based on soils 1) that have a surface texture of sandy loam or coarser, 2) are somewhat excessively drained to excessively drained, 3) have slopes greater than 15 percent, or 4) have severe limitations (i.e., a Nonirrigated Capability Class of 3 or higher).

Sources: Soil Survey Staff 2015a, 2015b

Attachment 7-3

Table 7.3-1R

(Revised April 20, 2016)

Characteristics of Soils Affected by the Project* (Construction/Temporary Impact Areas)

Facility <u>a/</u>	County	Total Area (acres)	Slopes ≥ 15 percent <u>b/</u> (acres)	Designated Farmland <u>c/</u>		Hydric Soils <u>d/</u> (acres)	Shallow Depth to Groundwater <u>d/</u> (acres)	Stony / Rocky Soils <u>d/</u> (acres)	Poor Drainage Potential <u>d/</u> (acres)	Soils Prone to Erosion		Soils Prone to Soil Compaction <u>g/</u> (acres)	Poor Revegetation Potential <u>h/</u> (acres)
				Prime (acres)	Statewide Importance (acres)					By Water <u>e/</u> (acres)	By Wind <u>f/</u> (acres)		
H-305 Pipeline	Greene/PA	2.16	1.01	0	1.00	0	0	0	0	2.00	0	2.02	2.15
H-316 Pipeline	Greene/PA	42.22	6.10	5.43	7.24	0.32	0.32	0.00	0.32	20.61	0	25.82	35.07
H-318 Pipeline	Allegheny, Washington/PA	69.43	14.41	8.14	19.81	0.27	0.27	10.61	0.27	51.77	0	21.90	56.20
H-319 Pipeline	Wetzel/WV	0.51	0	0	0.51	0	0	0.51	0	0	0	0	0
H-158/M-80 Pipelines	Greene/PA	8.32	2.65	1.55	2.11	0	0	0	0	0.70	0	3.44	6.86
Pratt Compressor Station	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Redhook Compressor Station	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Webster Interconnect	Wetzel/WV	1.65	0.01	0	1.65	0.05	0.05	1.65	0	0.01	0	0	0.01
Mobley Tap Site (H-306)	Wetzel/WV	0.12	0	0	0.12	0.00	0.00	0.12	0	0	0	0	0
Applegate L/R Site	Allegheny/PA	0	0	0	0	0	0	0	0	0	0	0	0
Hartson L/R Site (H-148)	Washington/PA	0	0	0	0	0	0	0	0	0	0	0	0
H-302 Tap L/R Site	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Total Acres		124.42	24.18	15.13	32.44	0.64	0.64	12.89	0.59	75.10	0	53.18	100.29
Percent of Total Acres			19%	12%	26%	0.52%	2.65%	10%	0.47%	60%	0%	43%	81%

* The values in each row do not necessarily add up to the total acreage for each facility, because of minor rounding or mapping inconsistencies.

a/ The list of facilities includes the associated access roads, additional temporary workspaces, contractor yards, and staging areas in the acreage calculations for each facility.

However, the additional temporary workspaces, access roads, contractor yards and staging areas are also reported separately.

b/ Soils characterized by the NRCS as having representative slopes of 15 percent or greater.

c/ As designated by the NRCS.

d/ As designated by the NRCS.

e/ Based on K factor for the whole soil (Kw), the representative slope, and the nonirrigated land capability rating; a Kw rating of "moderate" was elevated to "high" when associated with steep slopes and when the Nonirrigated Capability Subclass included an "e," which indicates that erosion is a potential hazard for the soil type.

f/ Based on the Wind Erodibility Group scale; soils with a rating of 1 to 4 were ranked with a high potential for erosion due to wind.

g/ Based on 1) soils with poor drainage (somewhat poorly drained to poorly drained), 2) a high clay content (greater than 20 percent), or 3) a surface soil texture characterized as sandy clay loam or dominated by finer particles.

h/ Based on soils 1) that have a surface texture of sandy loam or coarser, 2) are somewhat excessively drained to excessively drained, 3) have slopes greater than 15 percent, or 4) have severe limitations (i.e., a Nonirrigated Capability Class of 3 or higher).

Sources: Soil Survey Staff 2015a, 2015b

Attachment 7-3
Table 7.3-1R
(Revised April 20, 2016)

Characteristics of Soils Affected by the Project* (Additional Temporary Work Space)

Facility <u>a/</u>	County	Total Area (acres)	Slopes ≥ 15 percent <u>b/</u> (acres)	Designated Farmland <u>c/</u>		Hydric Soils <u>d/</u> (acres)	Shallow Depth to Groundwater <u>d/</u> (acres)	Stony / Rocky Soils <u>d/</u> (acres)	Poor Drainage Potential <u>d/</u> (acres)	Soils Prone to Erosion		Soils Prone to Soil Compaction <u>g/</u> (acres)	Poor Revegetation Potential <u>h/</u> (acres)
				Prime (acres)	Statewide Importance (acres)					By Water <u>e/</u> (acres)	By Wind <u>f/</u> (acres)		
H-305 Pipeline	Greene/PA	1.01	0.82	0	0.19	0	0	0	0	0.19	0	0.19	1.01
H-316 Pipeline	Greene/PA	20.43	1.42	2.21	2.85	0.02	0.02	0	0.02	6.20	0	16.82	18.23
H-318 Pipeline	Allegheny, Washington/PA	44.44	12.49	3.70	12.96	0.01	0.01	5.39	0.01	31.73	0	15.41	34.27
H-319 Pipeline	Wetzel/WV	0.34	0	0	0.34	0	0	0.34	0	0	0	0	0
H-158/M-80 Pipelines	Greene/PA	3.87	1.45	0.76	1.86	0	0	0	0	2.21	0	3.87	3.12
Pratt Compressor Station	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Redhook Compressor Station	Greene/PA	1.50	0	0	0.92	0	0	0	0	0	0	1.50	1.50
Webster Interconnect	Wetzel/WV	1.55	0.02	0	1.53	0	0	0.02	0	0.02	0	1.53	0.02
Mobley Tap Site (H-306)	Wetzel/WV	0.11	0	0	0.11	0	0	0.11	0	0	0	0.11	0
Applegate L/R Site	Allegheny/PA	0	0	0	0	0	0	0	0	0	0	0	0
Hartson L/R Site (H-148)	Washington/PA	0	0	0	0	0	0	0	0	0	0	0	0
H-302 Tap L/R Site	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Total Acres		73.25	16.20	6.67	20.76	0.03	0.03	5.86	0.03	40.35	0	39.43	58.15
Percent of Total Acres			22%	9%	28%	0.04%	0.19%	8%	0.04%	55%	0%	54%	79%

* The values in each row do not necessarily add up to the total acreage for each facility, because of minor rounding or mapping inconsistencies.

a/ The list of facilities includes the associated access roads, additional temporary workspaces, contractor yards, and staging areas in the acreage calculations for each facility.

However, the additional temporary workspaces, access roads, contractor yards and staging areas are also reported separately.

b/ Soils characterized by the NRCS as having representative slopes of 15 percent or greater.

c/ As designated by the NRCS.

d/ As designated by the NRCS.

e/ Based on K factor for the whole soil (Kw), the representative slope, and the nonirrigated land capability rating; a Kw rating of "moderate" was elevated to "high" when associated with steep slopes and when the Nonirrigated Capability Subclass included an "e," which indicates that erosion is a potential hazard for the soil type.

f/ Based on the Wind Erodibility Group scale; soils with a rating of 1 to 4 were ranked with a high potential for erosion due to wind.

g/ Based on 1) soils with poor drainage (somewhat poorly drained to poorly drained), 2) a high clay content (greater than 20 percent), or 3) a surface soil texture characterized as sandy clay loam or dominated by finer particles.

h/ Based on soils 1) that have a surface texture of sandy loam or coarser, 2) are somewhat excessively drained to excessively drained, 3) have slopes greater than 15 percent, or 4) have severe limitations (i.e., a Nonirrigated Capability Class of 3 or higher).

Sources: Soil Survey Staff 2015a, 2015b

Attachment 7-3

Table 7.3-1R

(Revised April 20, 2016)

Characteristics of Soils Affected by the Project* (Access Roads)

Facility <u>a/</u>	County	Total Area (acres)	Slopes ≥ 15 percent <u>b/</u> (acres)	Designated Farmland <u>c/</u>		Hydric Soils <u>d/</u> (acres)	Shallow Depth to Groundwater <u>d/</u> (acres)	Stony / Rocky Soils <u>d/</u> (acres)	Poor Drainage Potential <u>d/</u> (acres)	Soils Prone to Erosion		Soils Prone to Soil Compaction <u>g/</u> (acres)	Poor Revegetation Potential <u>h/</u> (acres)
				Prime (acres)	Statewide Importance (acres)					By Water <u>e/</u> (acres)	By Wind <u>f/</u> (acres)		
H-305 Pipeline	Greene/PA	0.52	0.34	0	0	0	0	0	0	0	0	0.52	0.52
H-316 Pipeline	Greene/PA	3.43	1.21	0.68	0.82	0	0	0	0	2.34	0	2.64	2.37
H-318 Pipeline	Allegheny, Washington/PA	3.80	0.80	1.32	0.44	0	0	0.93	0	2.26	0	2.63	3.53
H-319 Pipeline	Wetzel/WV	0.02	0	0	0.02	0	0	0.02	0	0	0	0	0
H-158/M-80 Pipelines	Greene/PA	0.49	0.22	0	0.26	0	0	0	0	0.22	0	0.49	0.56
Pratt Compressor Station	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Redhook Compressor Station	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Webster Interconnect	Wetzel/WV	0.12	0	0	0.12	0	0	0.12	0	0	0	0	0
Mobley Tap Site (H-306)	Wetzel/WV	0	0	0	0	0	0	0	0	0	0	0	0
Applegate L/R Site	Allegheny/PA	0	0	0	0	0	0	0	0	0	0	0	0
Hartson L/R Site (H-148)	Washington/PA	0	0	0	0	0	0	0	0	0	0	0	0
H-302 Tap L/R Site	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Total Acres		8.38	2.57	2.00	1.66	0.00	0.00	1.07	0.00	4.82	0	6.28	6.98
Percent of Total Acres			31%	24%	20%	0.00%	0.00%	13%	0.00%	58%	0%	75%	83%

* The values in each row do not necessarily add up to the total acreage for each facility, because of minor rounding or mapping inconsistencies.

a/ The list of facilities includes the associated access roads, additional temporary workspaces, contractor yards, and staging areas in the acreage calculations for each facility.

However, the additional temporary workspaces, access roads, contractor yards and staging areas are also reported separately.

b/ Soils characterized by the NRCS as having representative slopes of 15 percent or greater.

c/ As designated by the NRCS.

d/ As designated by the NRCS.

e/ Based on K factor for the whole soil (Kw), the representative slope, and the nonirrigated land capability rating; a Kw rating of "moderate" was elevated to "high" when associated with steep slopes and when the Nonirrigated Capability Subclass included an "e," which indicates that erosion is a potential hazard for the soil type.

f/ Based on the Wind Erodibility Group scale; soils with a rating of 1 to 4 were ranked with a high potential for erosion due to wind.

g/ Based on 1) soils with poor drainage (somewhat poorly drained to poorly drained), 2) a high clay content (greater than 20 percent), or 3) a surface soil texture characterized as sandy clay loam or dominated by finer particles.

h/ Based on soils 1) that have a surface texture of sandy loam or coarser, 2) are somewhat excessively drained to excessively drained, 3) have slopes greater than 15 percent, or 4) have severe limitations (i.e., a Nonirrigated Capability Class of 3 or higher).

Sources: Soil Survey Staff 2015a, 2015b

Attachment 7-3

Table 7.3-1R

(Revised April 20, 2016)

Characteristics of Soils Affected by the Project* (Contractor Yards and Staging Areas)

Facility <u>a/</u>	County	Total Area (acres)	Slopes \geq 15 percent <u>b/</u> (acres)	Designated Farmland <u>c/</u>		Hydric Soils <u>d/</u> (acres)	Shallow Depth to Groundwater <u>d/</u> (acres)	Stony / Rocky Soils <u>d/</u> (acres)	Poor Drainage Potential <u>d/</u> (acres)	Soils Prone to Erosion		Soils Prone to Soil Compaction <u>g/</u> (acres)	Poor Revegetation Potential <u>h/</u> (acres)
				Prime (acres)	Statewide Importance (acres)					By Water <u>e/</u> (acres)	By Wind <u>f/</u> (acres)		
H-305 Pipeline	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
H-316 Pipeline	Greene/PA	1.82	0	0	1.82	0	0	0	0	0	0	1.82	1.82
H-318 Pipeline	Allegheny, Washington/PA	6.21	2.19	0.37	0.12	0	0	0	0	0.37	0	3.41	5.84
H-319 Pipeline	Wetzel/WV	0.25	0	0	0.25	0	0	0	0	0	0	0	0
H-158/M-80 Pipelines	Greene/PA	3.34	1.45	0.76	0.71	0	0	0	0	2.21	0	2.16	2.59
Pratt Compressor Station	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Redhook Compressor Station	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Webster Interconnect	Wetzel/WV	0	0	0	0	0	0	0	0	0	0	0	0
Mobley Tap Site (H-306)	Wetzel/WV	0	0	0	0	0	0	0	0	0	0	0	0
Applegate L/R Site	Allegheny/PA	0	0	0	0	0	0	0	0	0	0	0	0
Hartson L/R Site (H-148)	Washington/PA	0	0	0	0	0	0	0	0	0	0	0	0
H-302 Tap L/R Site	Greene/PA	0	0	0	0	0	0	0	0	0	0	0	0
Total Acres		11.62	3.64	1.13	2.90	0	0	0	0	2.58	0	7.39	10.25
Percent of Total Acres			31%	10%	25%	0%	0%	0%	0%	22%	0%	64%	88%

* The values in each row do not necessarily add up to the total acreage for each facility, because of minor rounding or mapping inconsistencies.

a/ The list of facilities includes the associated access roads, additional temporary workspaces, contractor yards, and staging areas in the acreage calculations for each facility.

However, the additional temporary workspaces, access roads, contractor yards and staging areas are also reported separately.

b/ Soils characterized by the NRCS as having representative slopes of 15 percent or greater.

c/ As designated by the NRCS.

d/ As designated by the NRCS.

e/ Based on K factor for the whole soil (Kw), the representative slope, and the nonirrigated land capability rating; a Kw rating of "moderate" was elevated to "high" when associated with steep slopes and when the Nonirrigated Capability Subclass included an "e," which indicates that erosion is a potential hazard for the soil type.

f/ Based on the Wind Erodibility Group scale; soils with a rating of 1 to 4 were ranked with a high potential for erosion due to wind.

g/ Based on 1) soils with poor drainage (somewhat poorly drained to poorly drained), 2) a high clay content (greater than 20 percent), or 3) a surface soil texture characterized as sandy clay loam or dominated by finer particles.

h/ Based on soils 1) that have a surface texture of sandy loam or coarser, 2) are somewhat excessively drained to excessively drained, 3) have slopes greater than 15 percent, or 4) have severe limitations (i.e., a Nonirrigated Capability Class of 3 or higher).

Sources: Soil Survey Staff 2015a, 2015b

Attachment 7-4
Appendix 7-BR
(Revised April 20, 2016)
Soil Map Units at Aboveground Facilities

Soil Map Units at Aboveground Facilities														
Soil Map Unit Symbo	Soil Map Unit Name	Temporary Impact		Permanent Impact		Designated Farmland	Slopes ≥ 15%	Hydric Soils	Shallow Depth to Groundwater	Stony/ Rocky Soils	Poor Drainage Potential	Soils Prone to Erosion by Water	Soils Prone to Compaction	Poor Revegetation Potential
		Acres	Percent of Site	Acres	Percent of Site									
Pratt Compressor Station														
DaD	Dekalb channery loam, 15 to 25 percent slopes	1.61	21	1.61	21	Not Prime Farmland	1.61	0	0	0	0	1.61	0	1.61
Hu	Huntington silt loam	5.96	78	5.96	78	Prime Farmland	0	0	0	0	0	0	5.96	0
Nw	Newark silt loam	0.1	1	0.1	1	Farmland of Statewide Importance	0	0	0	0	0	0	0.1	0.1
W	Water	0.01	<0.01	0.01	<0.01	-	-	-	-	-	-	-	-	-
Pratt CS Total (acres)		7.68		7.68										
Redhook Compressor Station														
DaB	Dekalb channery loam, 3 to 8 percent slopes	3.08	17	3.08	17	Farmland of Statewide Importance	0	0	0	0	0	3.08	0	0
DaD	Dekalb channery loam, 15 to 25 percent slopes	1.68	9	1.68	9	Not Prime Farmland	1.68	0	0	0	0	1.68	0	1.68
DoC	Dormont silt loam, 8 to 15 percent slopes	6	34	6	34	Farmland of Statewide Importance	0	0	0	0	0	6	6	6
DiD	Dunmore channery silt loam, 15 to 25 percent slopes	0.14	1	0.14	1	Not Prime Farmland	0.14	0	0	0	0	0	0.14	0.14
DiF	Dormont-Culleoka complex, 25 to 50 percent slopes	1.35	8	1.35	8	Not Prime Farmland	1.35	0	0	0	0	0	0	1.35
GdB	Glenford silt loam, 3 to 8 percent slopes	5.5	31	5.5	31	Prime Farmland	0	0	0	0	0	5.5	5.5	0
Redhook CS Total (acres)		17.75		17.75										
Webster Interconnect														
GpF	Gilpin-Peabody complex, 35 to 70 percent slopes	0.02	<0.01	0.02	<0.01	Not Prime Farmland	0.02	0	0	0	0	0.02	0	0.02
Sk	Skidmore gravelly loam	2.46	>99	2.46	>99	Farmland of Statewide Importance	0	0	0	2.46	0	0	0	0
Webster Interconnect Total (acres)		2.48		2.48										
Mobley Tap Site (H-306)														
Sk	Skidmore gravelly loam	0.5	100	0.5	100	Farmland of Statewide Importance	0	0	0	0.5	0	0	0	0
Mobley Tap Site (acres)		0.5		0.5										
Applegate L/R Site														
Gub	Guernsey silt loam, 3 to 8 percent slopes	0.39	100	0.39	100	Prime Farmland	0	0	0	0	0	0.39	0.39	0
Applegate L/R Site (acres)		0.39		0.39										
Hartson L/R Site (H-148)														
WeD	Westmoreland silt loam, 15 to 25 percent slopes	0.11	100	0.11	100	Not Prime Farmland	0.11	0	0	0	0	0.11	0.11	0.11
Hartson L/R Site (acres)		0.11		0.11										
H-302 Tap L/R Site														
DiF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.33	100	0.33	100	Not Prime Farmland	0.33	0	0	0	0	0	0	0.33
H-302 Tap L/R Site (acres)		0.33		0.33										
Soil limitations are reported in acres.														
Sources: Soil Survey Staff 2015a, 2015b, and as designated by the NRCS.														

Attachment 7-4
Appendix 7-BR
(Revised April 20, 2016)

Soil Map Units of Additional Temporary Work Spaces Associated with the Aboveground Facilities

Soil Map Unit Symbol	Soil Map Unit Name	Temporary Impact		Permanent Impact		Designated Farmland	Slopes ≥ 15%	Hydric Soils	Shallow Depth to Groundwater	Stony/ Rocky Soils	Poor Drainage Potential	Soils Prone to Erosion by Water	Soils Prone to Compaction	Poor Revegetation Potential
		Acres	Percent of Site	Acres	Percent of Site									
Pratt Compressor Station														
		0	0	0	0		0	0	0	0	0	0	0	0
	Pratt CS Total (acres)	0		0										
Redhook Compressor Station														
DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.58	0.39	0.58	0.39	Not Prime Farmland	0.58	0	0	0	0	0	0.58	0.58
Nw	Newark silt loam	0.92	0.61	0.92	0.61	Farmland of Statewide Importance	0	0	0	0	0	0	0.92	0.92
	Redhook CS Total (acres)	1.5		1.5										
Webster Interconnect														
GpF	Gilpin-Peabody complex, 35 to 70 percent slopes	0.02	0.01	0.02	0.01	Not Prime Farmland	0.01	0	0	0	0	0.01	0	0.01
Sk	Skidmore gravelly loam	1.53	99	1.53	99	Farmland of Statewide Importance	0	0	0	1.53	0	0	0	0
	Webster Interconnect Total (acres)	1.55		1.55										
Mobley Tap Site (H-306)														
Sk	Skidmore gravelly loam	0.11	100	0.11	100	Farmland of Statewide Importance	0	0	0	0.11	0	0	0	0
	Mobley Tap Site (acres)	0.11		0.11										
Applegate L/R Site														
		0	0	0	0		0	0	0	0	0	0	0	0
	Applegate L/R Site (acres)	0		0										
Hartson L/R Site (H-148)														
		0	0	0	0		0	0	0	0	0	0	0	0
	Hartson L/R Site (acres)	0		0										
H-302 Tap L/R Site														
		0	0	0	0		0	0	0	0	0	0	0	0
	H-302 Tap L/R Site (acres)	0		0										

Soil limitations are reported in acres.

Sources: Soil Survey Staff 2015a, 2015b, and as designated by the NRCS.

Attachment 7-4

Appendix 7-BR

(Revised April 20, 2016)

Soil Map Units of the Access Roads Associated with the Aboveground Facilities

Soil Map Unit Symbol	Soil Map Unit Name	Temporary Impact		Permanent Impact		Designated Farmland	Slopes ≥ 15%	Hydric Soils	Shallow Depth to Groundwater	Stony/ Rocky Soils	Poor Drainage Potential	Soils Prone to Erosion by Water	Soils Prone to Compaction	Poor Revegetation Potential
		Acres	Percent of Site	Acres	Percent of Site									
Pratt Compressor Station														
		0	0	0	0		0	0	0	0	0	0	0	0
	Pratt CS Total (acres)	0		0										
Redhook Compressor Station														
		0	0.00	0	0.00		0	0	0	0	0	0	0	0
	Redhook CS Total (acres)	0		0										
Webster Interconnect														
Sk	Skidmore gravelly loam	0.12	100	0.12	100	Farmland of Statewide Importance	0	0	0	0.12	0	0	0	0
	Webster Interconnect Total (acres)	0.12		0.12										
Mobley Tap Site (H-306)														
		0	0	0	0		0	0	0	0	0	0	0	0
	Mobley Tap Site (acres)	0		0										
Applegate L/R Site														
		0	0	0	0		0	0	0	0	0	0	0	0
	Applegate L/R Site (acres)	0		0										
Hartson L/R Site (H-148)														
		0	0	0	0		0	0	0	0	0	0	0	0
	Hartson L/R Site (acres)	0		0										
H-302 Tap L/R Site														
		0	0	0	0		0	0	0	0	0	0	0	0
	H-302 Tap L/R Site (acres)	0		0										

Soil limitations are reported in acres.

Sources: Soil Survey Staff 2015a, 2015b, and as designated by the NRCS.

Attachment 7-4
Appendix 7-BR
(Revised April 20, 2016)

Soil Map Units of Contractor Yards and Staging Areas Associated with the Aboveground Facilities

Soil Map Unit Symbol	Soil Map Unit Name	Temporary Impact		Permanent Impact		Designated Farmland	Slopes ≥ 15%	Hydric Soils	Shallow Depth to Groundwater	Stony/ Rocky Soils	Poor Drainage Potential	Soils Prone to Erosion by Water	Soils Prone to Compaction	Poor Revegetation Potential
		Acres	Percent of Site	Acres	Percent of Site									
Pratt Compressor Station														
		0	0	0	0		0	0	0	0	0	0	0	0
	Pratt CS Total (acres)	0		0										
Redhook Compressor Station														
		0	0	0	0		0	0	0	0	0	0	0	0
	Redhook CS Total (acres)	0		0										
Webster Interconnect														
		0	0	0	0		0	0	0	0	0	0	0	0
	Webster Interconnect Total (acres)	0		0										
Mobley Tap Site (H-306)														
		0	0	0	0		0	0	0	0	0	0	0	0
	Mobley Tap Site (acres)	0		0										
Applegate L/R Site														
		0	0	0	0		0	0	0	0	0	0	0	0
	Applegate L/R Site (acres)	0		0										
Hartson L/R Site (H-148)														
		0	0	0	0		0	0	0	0	0	0	0	0
	Hartson L/R Site (acres)	0		0										
H-302 Tap L/R Site														
		0	0	0	0		0	0	0	0	0	0	0	0
	H-302 Tap L/R Site (acres)	0		0										

Soil limitations are reported in acres.

Sources: Soil Survey Staff 2015a, 2015b, and as designated by the NRCS.

Attachment 8-3a

Table 8.1-5R2

(Revised April 20, 2016)

Public Roadways and Railroads Crossed by the Project a/ b/

Facility	County	Roadway Name	Road Surface	Milepost	Road Crossing Method	Road Jurisdiction
M-80/H-158	Greene County, PA	Strope Rd.	Rock Base	0.04	Open Cut	County
		Braden Run Road (T588)	Asphalt	0.15	Conventional Bore	Local
H-316	Greene County, PA	Jefferson Road/Pennsylvania Route 188 (PA 188)	Asphalt	0.09	Conventional Bore	State
		Private Road/Driveway	Rock Base	0.19	Open Cut	Private
		Private Road	Rock Base	0.45	Open Cut	Private
		Private Road	Rock Base	0.63	Open Cut	Private
		Prison Road	Asphalt	0.8	Open Cut	Local
		Prison Prop. Road	Rock Base	0.92	Open Cut	Private
		Prison Prop. Road	Rock Base	1.14	Open Cut	Private
		Farm Road	Dirt Base	1.72	Open Cut	Private
		Monongahela Railway	N/A	2.25	HDD	-
		Creek Road (T555)	Asphalt	2.29	HDD	Local
		Farm Road	Dirt Base	2.5	HDD	Private
		Farm Path	Dirt Base	2.58	HDD	Private
		Ankrom Road (T543)	Asphalt	2.75	HDD	Local
		Private Drive	Rock Base	2.82	HDD	Private
H-318	Allegheny County, PA	Rippel Road	Asphalt	0.7	Conventional Bore	Local
		Private Road/Driveway	Asphalt	0.93	Open Cut	Private
		Farm Road	Rock Base	0.96	Open Cut	Private
		Farm Road	Rock Base	1.07	Open Cut	Private
		Rippel Road	Asphalt	1.63	Conventional Bore	Local
		Raccoon Run Road	Asphalt	1.7	Conventional Bore	State
		Bunola River Road	Asphalt	2.76	Conventional Bore	State
	Washington County, PA	Conrail/CSXT Railroad	N/A	2.85	HDD	-
		Norfolk Southern Railroad	N/A	3.09	HDD	-
		Conrail Railroad	N/A	3.1	HDD	-
		Conrail Railroad	N/A	3.14	HDD	-
		5 th Street/Pennsylvania Route 837 (PA 837)	Asphalt	3.15	HDD	State
		Farm Path	Dirt Base	3.29	Open Cut	Private
		Private Drive	Asphalt	3.47	Open Cut	Private
		Seneca Drive	Asphalt	3.7	Open Cut	Local
		Finleyville-Elrama Road	Asphalt	4.16	Conventional Bore	State
H-319	Wetzel County, WV	Well Rd - East of Rt. 80	Rock Base	0.01	Open Cut	Private
		County Road 80	Asphalt	0.03	Conventional Bore	County

a/ H-305 does not cross any public roadways or railroads. The Mobley Tap, Redhook Compressor Station and Webster Interconnect are adjacent to but do not cross any roads.

Attachment 8-3b (Revised April 20, 2016) Appendix 1-I Road and Railroad Crossing Locations					
H-158/M80					
Milepost	Crossing	Name	County	Road Material	Type of Crossing
0.04	Road	Strope Rd	Greene, PA	Rock Base	Open Cut
0.15	Road	Braden Run Rd (T588)	Greene, PA	Asphalt	Conv. Bore
H-316					
Milepost	Crossing	Name	County	Road Material	Type of Crossing
0.09	Road	Jefferson Road/Pennsylvania Route 188 (PA 188)	Greene, PA	Asphalt	Conv. Bore
0.19	Road	Private Road/Driveway	Greene, PA	Rock Base	Open Cut
0.45	Road	Private Road	Greene, PA	Rock Base	Open Cut
0.63	Road	Private Road	Greene, PA	Rock Base	Open Cut
0.80	Road	Prison Road	Greene, PA	Asphalt	Open Cut
0.92	Road	Prison Prop. Road	Greene, PA	Rock Base	Open Cut
1.14	Road	Prison Prop. Road	Greene, PA	Rock Base	Open Cut
1.72	Road	Farm Road	Greene, PA	Dirt Base	Open Cut
2.25	Railroad	Monongahela Railway	Greene, PA	N/A	HDD
2.29	Road	Creek Rd (T555)	Greene, PA	Rock Base	HDD
2.50	Road	Farm Road	Greene, PA	Dirt Base	HDD
2.58	Road	Farm Path	Greene, PA	Dirt Base	HDD
2.75	Road	Ankrom Rd (T543)	Greene, PA	Asphalt	HDD
2.82	Well Road	Private Drive	Greene, PA	Rock Base	HDD
H-318					
Milepost	Crossing	Name	County	Road Material	Type of Crossing
0.70	Road	Rippel Rd	Allegheny, PA	Asphalt	Conventional Bore
0.93	Road	Private Rd/Driveway	Allegheny, PA	Asphalt	Open Cut
0.96	Road	Farm Road	Allegheny, PA	Rock Base	Open Cut
1.07	Road	Farm Road	Allegheny, PA	Rock Base	Open Cut
1.63	Road	Rippel Rd	Allegheny, PA	Asphalt	Conventional Bore
1.70	Road	Raccoon Run Rd	Allegheny, PA	Asphalt	Conventional Bore
2.76	Road	Bunola River Rd	Allegheny, PA	Asphalt	Conventional Bore
2.85	Railroad	Conrail/CSXT RR	Allegheny, PA	N/A	HDD
3.09	Railroad	Norfolk Southern Railroad	Washington, PA	N/A	HDD
3.10	Railroad	Conrail Railroad	Washington, PA	N/A	HDD
3.14	Railroad	Conrail Railroad	Washington, PA	N/A	HDD
3.15	Road	5 th Street/Pennsylvania Route 837	Washington, PA	Asphalt	HDD
3.29	Road	Farm Path	Washington, PA	Dirt Base	Open Cut
3.47	Driveway	Private Drive	Washington, PA	Asphalt	Open Cut
3.70	Road	Seneca Drive	Washington, PA	Asphalt	Open Cut
4.16	Road	Finleyville-Elrama Road	Washington, PA	Asphalt	Conventional Bore
H-319					
0.01	Road	Well Rd - East of Rt. 80	Wetzel County, WV	Rock Base	Open Cut
0.03	Road	County Road 80	Wetzel County, WV	Asphalt	Conventional Bore

Pipeline Segment	County	Building	UTM Coordinates (meters)		Milepost	Direction	Distance		Occupied
		Type	Easting	Northing			From Edge of Workspace	From Pipeline Centerline	
Pipeline Segment									
H-158/M-80 <u>b/</u>	Greene County, PA	Residence	-	-	0.18	West	26	81 feet	Yes
H-316	Greene County, PA	Outbuilding	-	-	0.03	Northeast	Inside temporary right-of-way	20 feet	No
H-316	Greene County, PA	Garage and Outbuilding	-	-	0.1	Inside ATWS Area	Inside ATWS Area	Inside ATWS Area	No
H-316	Greene County, PA	Outbuilding	-	-	0.95	North	Inside temporary right-of-way	20 feet	No
H-305	Greene County, PA	Outbuilding/Shed	-	-	0.8	South	Inside temporary right-of-way	37 feet	No
Aboveground Facilities									
Redhook Compressor Station	Greene County, PA	Outbuilding	574291	4418949	N/A	Northwest Corner of Redhook Area	Inside temporary right-of-way	N/A	No
Redhook Compressor Station	Greene County, PA	Garage	574265	4418915	N/A	Northwest Corner of Redhook Area	Inside temporary right-of-way	N/A	No
Redhook Compressor Station	Greene County, PA	Residence	574291	4418901	N/A	Northwest Corner of Redhook Area	Inside temporary right-of-way	N/A	No
Redhook Compressor Station	Greene County, PA	Residence	574310	4418877	N/A	Northwest Corner of Redhook Area	Inside temporary right-of-way	N/A	Yes (will be vacated prior to construction)
Redhook Compressor Station	Greene County, PA	Residence	574322	4418867	N/A	Northwest Corner of Redhook Area	Inside temporary right-of-way	N/A	Yes (will be vacated prior to construction)
Redhook Compressor Station	Greene County, PA	Outbuilding	574341	4418879	N/A	Northwest Corner of Redhook Area	Inside temporary right-of-way	N/A	No
Redhook Compressor Station	Greene County, PA	Garage and Outbuilding	574387	4418792	N/A	Southern Corner of Redhook Area	Inside temporary right-of-way	N/A	No
Redhook Compressor Station	Greene County, PA	Residence	574449	4418765	N/A	Southern Corner of Redhook Area	Inside temporary right-of-way	N/A	Yes
Redhook Compressor Station	Greene County, PA	Outbuilding	574536	4418923	N/A	Northeast Corner of Redhook Area	Inside temporary right-of-way	N/A	No
Redhook Compressor Station	Greene County, PA	Outbuilding	574548	4418891	N/A	Northeast Corner of Redhook Area	Inside temporary right-of-way	N/A	No
Redhook Compressor Station	Greene County, PA	Outbuilding	574531	4418866	N/A	Northeast Corner of Redhook Area	Inside temporary right-of-way	N/A	No
Redhook Compressor Station	Greene County, PA	Garage	574633	4418886	N/A	Northeast Corner of Redhook Area	Inside temporary right-of-way	N/A	No
Redhook Compressor Station	Greene County, PA	Residence	574640	4418852	N/A	Eastern edge of 50-ft Buffer	50	N/A	No
Webster Interconnect	Wetzel County, WV	Residence	-	-	N/A	Inside Interconnect Area	Inside temporary right-of-way	N/A	No

a/ The H-318, H-319 pipelines, Pratt Compressor Station, and Mobley Tap do not have any structures within 50 feet of the construction workspace.

b/ This residence is located on the Redhook Compressor Station site and Equitrans is currently negotiating with the landowner to purchase the property.

Facilities	County	State	Agricultural Land <u>a/</u>		Forest/ Woodland <u>b/</u>		Open Land <u>c/</u>		Residential Land <u>d/</u>		Industrial/ Commercial Land <u>e/</u>		Open Water <u>f/</u>		Total	
			Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation	Construction	Operation
Total by PA County	Greene	PA	54.26	27.23	34.45	15.49	9.95	4.96	1.33	0.20	0.00	0.00	0.00	0.00	100.00	47.87
	Allegheny	PA	29.97	5.69	26.88	8.92	10.52	3.62	0.20	0.11	0.00	0.00	0.54	0.54	68.12	18.88
	Washington	PA	6.44	1.58	11.36	3.54	4.76	1.37	4.56	0.45	0.15	0.15	0.33	0.33	27.61	7.41
Total PA	PA Counties	PA	90.68	34.50	72.70	27.94	25.24	9.95	6.09	0.75	0.15	0.15	0.87	0.87	195.72	74.16
Total WV	Wetzel	WV	0.00	0.00	1.31	0.44	2.28	1.10	0.00	0.00	0.00	0.00	0.00	0.00	3.59	1.54
Pipeline and Other Structures Total			90.68	34.50	74.01	28.38	27.52	11.05	6.09	0.75	0.15	0.15	0.87	0.87	199.32	75.70

Source: USGS NLCD data (Jin et al. 2013)

a/ Cultivated land (NLCD categories Pasture/Hay and Cultivated Crops).

b/ Tracts of upland or wetland forest or woodland (NLCD categories Deciduous Forest and Woody Wetlands).

c/ Non-forested lands used for open space or pasture. May include utility right-of-ways, open fields, vacant lands, herbaceous and scrub upland, non-forested wetlands, emergent wetland, scrub-shrub wetlands, golf courses, and municipal land (NLCD categories Developed/Open Space and Grassland/Herbaceous).

d/ Existing developed residential areas and planned residential developments. This may include large developments; low-, medium-, and high-density residential neighborhoods; urban/suburban residential; multi-family residences; ethnic villages; residentially zoned areas that have been developed; or short segments of the route at road crossings with homes near the route alignment (NLCD categories Developed/Low-Intensity and Developed/Medium-Intensity).

e/ Manufacturing or industrial plants, paved areas, landfills, mines, quarries, electric power or natural gas facilities, developed areas, roads, railroads and railroad yards, and commercial or retail facilities (NLCD category Developed/High-Intensity).

f/ Water crossings greater than 100 feet wide and streams visible on aerial photography but less than 100 feet in width (NLCD category Open Water).

Attachment 8-6 Table 8.1-7R (Revised April 20, 2016) Details for Temporary and Permanent Access Roads																	
Route	Name of Access Road	Milepost at ROW Connection	County and State	Ownership	Temporary / Permanent	Existing / New	Existing / Proposed Surface Type	Proposed Modifications	Length of Road (feet)	Width of Road (feet)	Width During Construction (feet)	ROW Width (feet)	Temporary Impact	Permanent Impact	Acres	Land Use	Justification for Permanent Access Roads
H158	H158 M80 AR 01	0.00	Greene County, PA	Private	Temporary	Existing	Gravel	Add stone and widen	413	15	25	25	-	None	0.23	Pasture/Hay	-
H158/M80	H158 M80 AR 02	0.05	Green County, PA	Private	Temporary	New	Gravel	Add stone and widen	559	10	25	25	-	None	0.01	Deciduous Forest	-
															0.19	Developed, Open Space	
															0.06	Pasture/Hay	
H305	H305 AR 01	0.10	Green County, PA	Private	Permanent	Existing	Gravel	Add stone and widen	907	20	25	25	-	None	0.34	Deciduous Forest	Permanent road to H305 Receiver Site
															0.18	Pasture/Hay	
H316	H316 AR 01	0.05	Green County, PA	Private	Temporary	New	Grass / Gravel	Add stone for construction entrance	313	0	20	25	-	None	0.06	Developed, Open Space	-
															0.07	Pasture/Hay	
H316	H316 AR 02	0.20	Green County, PA	Private	Temporary	New	Gravel	Add stone when needed	159	10	20	25	-	None	0.02	Developed, Open Space	-
H316	H316 AR 03	0.65	Green County, PA	Private	Permanent	Existing	Grass / Gravel	Add stone and widen	783	15	25	25	-	10' of stone	0.15	Cultivated Crops	Permanent road to rectifier site.
															0.02	Developed, Low Intensity	
															0.06	Developed, Open Space	
															0.16	Pasture/Hay	
H316	H316 AR 04	0.90	Green County, PA	Private	Temporary	Existing	Paved / Gravel/ Grass	ROW will be built for pipe installation.	522	15	20	25	None	None	0.28	Developed, Low Intensity	-
															0.00	Developed, Open Space	
H316	H316 AR 05a	1.45	Green County, PA	Private	Temporary	Existing	Grass / Dirt	ROW will be built for pipe installation.	782	10	25	20	None	None	0.21	Developed, Open Space	-
															0.15	Pasture/Hay	
H316	H316 AR 05b	1.45	Green County, PA	Private	Temporary	New	Grass / Dirt	ROW will be built for pipe installation.	1,066	0	25	20	None	None	0.48	Deciduous Forest	-
															0.00	Grassland/Herbaceous	
															0.01	Pasture/Hay	
H316	H316 AR 06a	2.00	Green County, PA	Private	Temporary	Existing	Grass / Gravel /Dirt	Add stone and widen	242	10	25	25	None	None	0.02	Deciduous Forest	-
															0.06	Developed, Open Space	
															0.05	Pasture/Hay	
H316	H316 AR 06b	2.00	Green County, PA	Private	Temporary	New	Grass / Gravel /Dirt	Add stone and widen	281	0	25	25	None	None	0.08	Deciduous Forest	-
															0.01	Developed, Open Space	
															0.07	Pasture/Hay	
H316	H316 AR 07a	2.80	Green County, PA	Private	Permanent	Existing	Grass / Gravel	Add stone and widen	2,579	15	25	20	None	10' of stone	0.39	Deciduous Forest	Permanent road to receiver Site.
															0.04	Developed, Open Space	
															0.62	Pasture/Hay	
H316	H316 AR 07b	2.80	Green County, PA	Private	Temporary	New	Grass / Gravel	Add stone and widen	607	15	25	20	None	10' of stone	0.13	Deciduous Forest	Permanent road to receiver Site.
															0.16	Pasture/Hay	
H316	H316 AR 08	N/A	Greene County, PA	Private	Temporary	New	Gravel	Add stone when needed	322	0	25	25	None	None	0.11	Cultivated Crops	-
															0.06	Pasture/Hay	
H318	H318 AR 01	0.00	Allegheny County, PA	Private	Temporary	Existing	Gravel	Add stone when needed	2,785	15	25	25	None	None	1.58	Deciduous Forest	-
															0.02	Developed, Open Space	
H318	H318 AR 02a	0.70	Allegheny County, PA	Private	Temporary	New	Grass / Gravel	Add stone when needed	92	0	25	25	None	None	0.01	Developed, Open Space	-
															0.03	Pasture/Hay	
H318	H318 AR 02b	0.70	Allegheny County, PA	Private	Temporary	New	Grass / Gravel	Add stone when needed	69	0	25	25	None	None	0.03	Developed, Open Space	-
H318	H318 AR 03	1, 1.1	Allegheny County, PA	Private	Temporary	Existing	Paved	Add stone when needed	1,019	15	25	25	None	None	0.30	Deciduous Forest	-
															0.18	Developed, Open Space	
H318	H318 AR 04a	1.90	Washington County, PA	Private	Temporary	New	Wooded / Grass	None	780	0	25	25	None	None	0.28	Deciduous Forest	-
H318	H318 AR 04b b/	1.90	Washington County, PA	Township	Temporary	Existing	Wooded / Grass	None	1,238	15	25	0	None	None	0.18	Pasture/Hay	
H318	H318 AR 05	3.50	Washington County, PA	Private	Temporary	Existing	Paved	None	414	10	15	15	None	None	0.09	Deciduous Forest	-
															0.03	Developed, Open Space	
H318	H318 AR 06	3.60	Washington County, PA	Private	Temporary	Existing	Gravel, Grass	None	857	10	25	25	None	None	0.03	Deciduous Forest	-
															0.16	Developed, Open Space	
															0.11	Grassland/Herbaceous	
															0.18	Pasture/Hay	
H318	H318 AR 07	4.25	Washington County, PA	Private	Temporary	Existing	Gravel	Add stone when needed	426	15	25	25	None	None	0.07	Cultivated Crops	-
															0.02	Pasture/Hay	
H318	H318 AR08	4.25	Washington County, PA	Private	Temporary	Existing	Paved	Add stone when needed	890	0	25	0	None	None	0.11	Developed, Low Intensity	-
H319	H319 AR 01	0.02	Wetzel County, WV	Private	Permanent	Existing	Gravel	Add stone and widen	129	10	25	25	None	None	0.40	Developed, Open Space	
Webster Interconnect	Webster AR 01	N/A	Wetzel County, WV	Private	Permanent	Existing	Gravel	Add stone and widen	50	10	25	20	None	None	0.02	Deciduous Forest	Access to tap valve set Entrance to Webster Interconnect site

Attachment 8-6
Table 8.1-7R
(Revised April 20, 2016)

Details for Temporary and Permanent Access Roads

Route	Name of Access Road	Milepost at ROW Connection	County and State	Ownership	Temporary / Permanent	Existing / New	Existing / Proposed Surface Type	Proposed Modifications	Length of Road (feet)	Width of Road (feet)	Width During Construction (feet)	ROW Width (feet)	Temporary Impact	Permanent Impact	Acres	Land Use	Justification for Permanent Access Roads
Webster Interconnect	Webster AR 02	N/A	Wetzel County, WV	Private	Permanent	Existing	Gravel	Add stone and widen	60	0	25	20	None	None	0.00	Deciduous Forest	Exit from Webster Interconnect site
															0.02	Developed, Open Space	
Webster Interconnect	Webster AR 03	N/A	Wetzel County, WV	Private	Temporary	New	Grass	Build Complete Road	204	0	25	20	None	None	0.04	Deciduous Forest	-
															0.05	Developed, Open Space	

a/ A dash (-) indicates this information is not available at this time.

b/ This is an existing road, which may or may be upgraded as a result of the Project



EQT Plaza
625 Liberty Avenue, Suite 1700
Pittsburgh PA 15222
www.eqt.com

TEL: (412) 395-3654

Mark A. Sowa
Sr. Environmental Coordinator

CERTIFIED MAIL # 7015 1730 0001 2996 5961

January 19, 2016

Mr. Devin P. Tomko
Air Quality Permitting
Pennsylvania Department of Environmental Protection
Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222

RE: *Equitrans, LP – Redhook Compressor Station
Franklin Township, Greene County, Pennsylvania
Plan Approval Permit Application PA-30-00234A (October 21, 2015)
APS No. 88359, AUTH No. 1095207
Response to Administrative Completeness Determination (November 23, 2015)*

Dear Mr. Tomko:

In response to your letter of November 25, 2015 letter concerning the subject EQT Plan Approval Application, please find the following requested documents:

1. **Cultural Resources Notification**
Copy of the notification to the Pennsylvania Historical and Museum Commission (PHMC) that was sent on April 27, 2015 regarding the proposed Redhook project and response from the PHMC dated July 27, 2015.
2. **Pennsylvania Natural Diversity Index**
Copy of PNDI submission package that was sent on June 24, 2015 for the proposed Redhook project and correspondence from the Pennsylvania Department of Conservation and Natural Resources, USDOI Fish and Wildlife Service, Pennsylvania Fish and Boat Commission and the Pennsylvania Game Commission concerning the project.

If you have any questions or have additional information requirements regarding the application, please feel free to contact me at (412)-395-3654.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Mark A. Sowa'.

Mark A. Sowa
Sr. Environmental Coordinator
EQT Corporation



ENVIRONMENTAL SOLUTIONS & INNOVATIONS, INC.

4525 Este Avenue
Cincinnati, OH 45232
Phone: (513) 451-1777; Fax: (513) 451-3321

Pesi 639

24 June 2015

Dept. of Conservation and Natural
Resources
Bureau of Forestry, Ecological Services
Section
400 Market St., PO Box 8552
Harrisburg, PA 17105

PA Game Commission
Bureau of Wildlife Habitat Management
Division of Environmental Planning &
Habitat Protection
2001 Elmerton Avenue
Harrisburg, PA 17110-9797

PA Fish and Boat Commission
Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823

US Fish and Wildlife Service
Pennsylvania Field Office
110 Radnor Rd; Suite 101
State College, PA 16801

RE: Large Project PNDI – Equitrans Expansion Project

Dear Reviewer:

EQT proposes to develop the Equitrans Expansion Project (Project) in Allegheny, Washington, and Greene counties, Pennsylvania and Wetzel County, West Virginia. The Project will involve the construction of three individual pipeline segments totaling approximately 7.3 miles of new 24 to 30-inch-diameter natural gas transmission pipelines. In addition, EQT plans to replace an existing compressor station with a newer, larger compressor station, adding approximately 48,000 horsepower of centrifugal compression and 12,600 horsepower of reciprocating compression in Greene County, Pennsylvania. USGS 7.5 minute quadrangle maps illustrating the individual segments of this Project are included as Attachment 1. The completed PNDI Review Form is included as Attachment 2. Shapefiles of the Project are also included on the disc enclosed with this submission.

Though the Project was designed to parallel existing EQT Rights-of-Way whenever possible, review of aerial photography indicates that the current route crosses through farmland and forest of various ages. Based on desktop analysis, the Project crosses multiple streams and waterways, and thus will require permits from the U.S. Army Corps of Engineers. No surveys have been conducted for the Project, so no specific wetland data or site specific photographs are yet available. Land disturbance is estimated at approximately 213 acres. Approximately 50 acres of tree removal is expected.

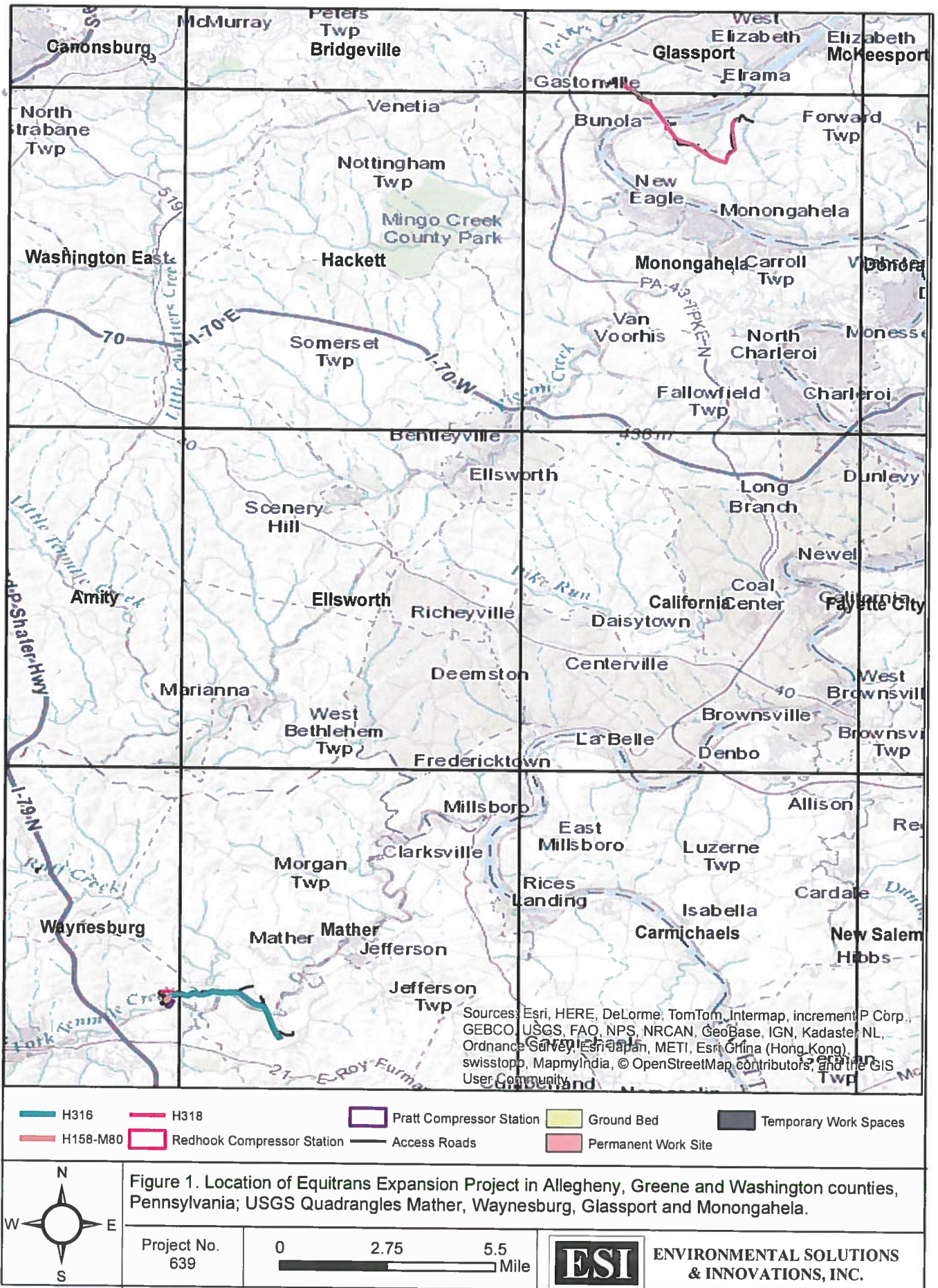
www.ENVSI.com

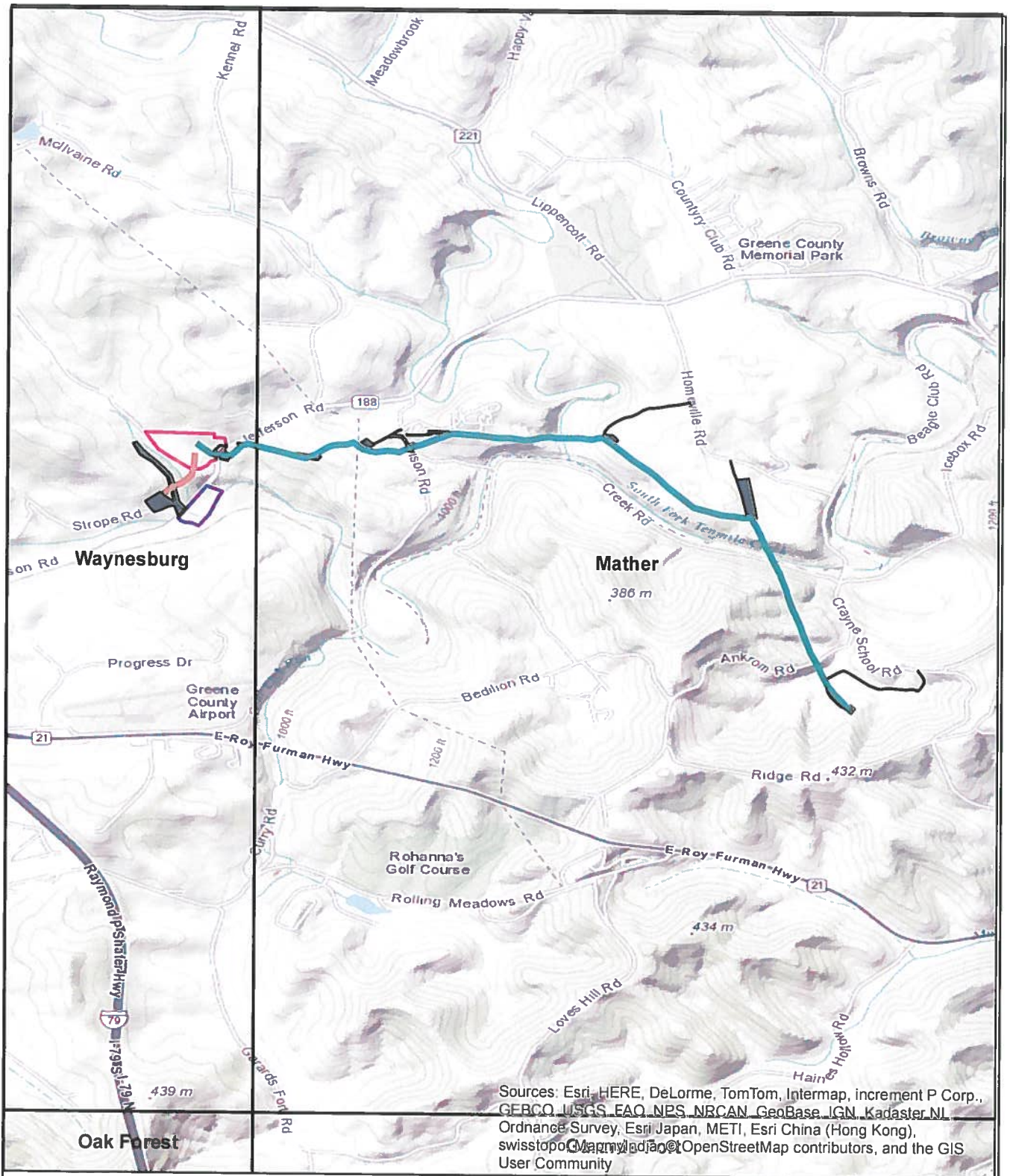
Thank you for your review. I can be contacted at 513-451-1777 or dsparks@envsi.com.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Dale W. Sparks', with a long horizontal flourish extending to the right.

Dale W. Sparks, Ph.D.
Senior Project Manager





- | | | | |
|----------|--------------------------|----------------------------|----------------------------|
| H158-M80 | H316 Ground Bed | H316 Temporary Work Spaces | Pratt Compressor Station |
| H316 | H316 Permanent Work Site | H316 Access Roads | Redhook Compressor Station |

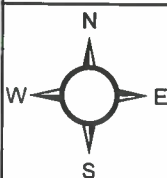


Figure 2. Location of Equitrans Expansion Project in Greene County, Pennsylvania; USGS Quadrangles Waynesburg and Mather.

Project No.
639

0 0.5 1
Mile



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& INNOVATIONS, INC.

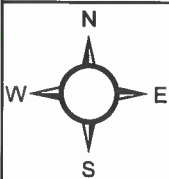
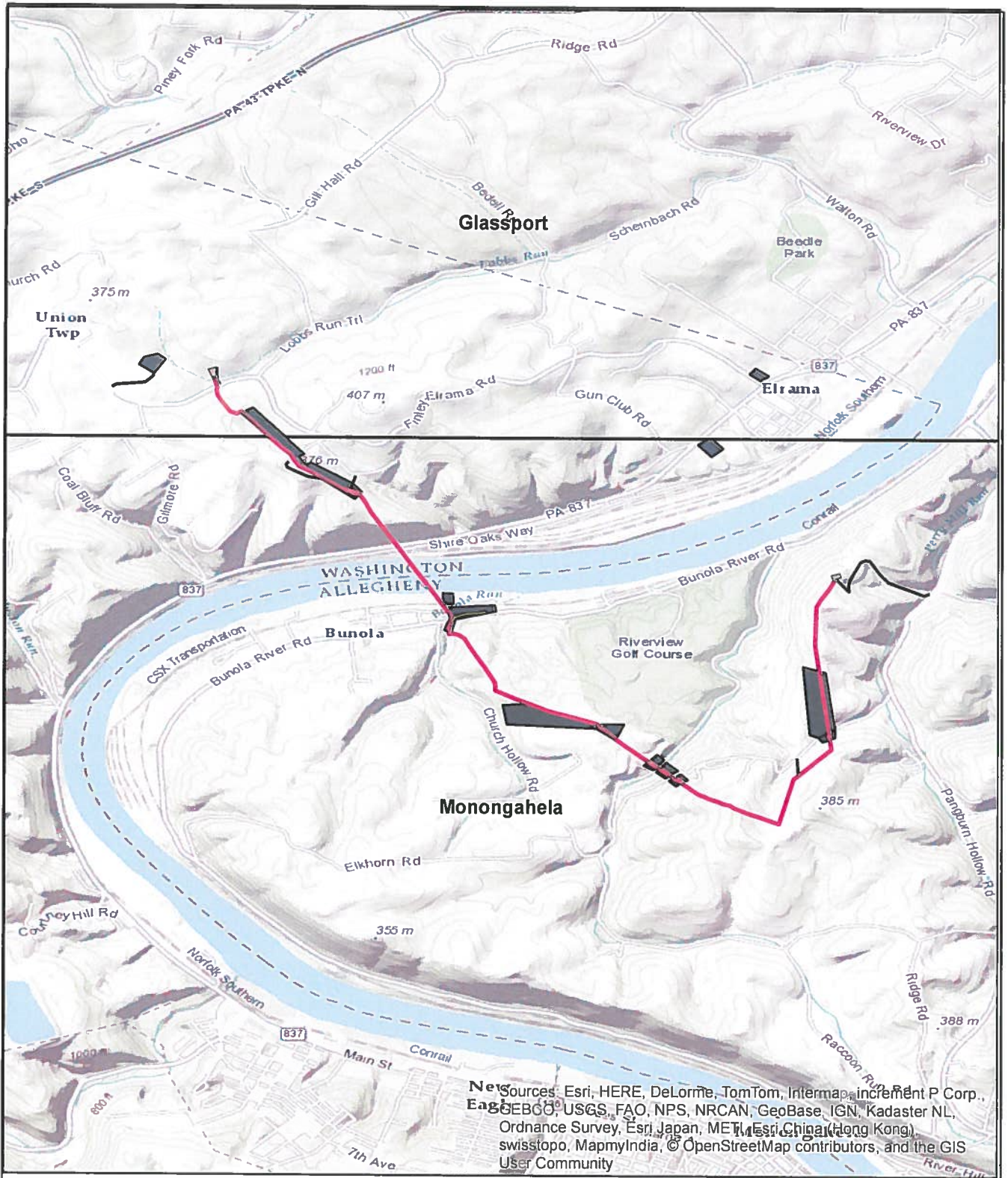


Figure 3. Location of Equitrans Expansion Project in Allegheny and Washington counties, Pennsylvania; USGS Quadrangles Glassport and Monongahela.

Project No.
639

0 0.5 1
Mile



ENVIRONMENTAL SOLUTIONS
& INNOVATIONS, INC.

Pennsylvania Natural Diversity Inventory

LARGE PROJECT FORM

How to Use the PNDI Large Project Form

If your Project is a "Large Project"— too large/long to search on the online system
Projects are considered "Large Projects" when the ENTIRE project is:

- Linear/Large Projects that exceed the PNDI online project size limits of 10 miles in length or 5165 acres
- Township-wide, Countywide or Statewide Projects. Examples: Act 537 Sewage Plans, Wind Farms, Roadway Improvements exceeding map limits above.

Due to system limitations and agency requirements, projects should not be submitted piecemeal. The entire project area including roads and infrastructure should be submitted as a single unit.

What to Send to Jurisdictional Agencies

Send the following information to all of the agencies listed on the Large Project Form.

Check-list of Minimum Materials to be submitted:

- ☒ Completed Large Project Form
- ☒ Supplemental project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
- ☒ USGS 7.5-minute Quadrangle with project boundary clearly indicated, and quad name on the map

The inclusion of the following information may expedite the review process.

- ☒ GIS shapefiles depicting the project extent
- ☒ A basic site plan (particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
- ☐ Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
- ☐ Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams

PNDI Large Project Form Definitions

Applicant: Person that owns the property or is proposing the project or activity

Contact Person: Person to receive response if different than applicant (e.g. Consultant)

Project Name: Descriptive title of project (e.g. Twin Pines Subdivision, Miller Bridge Replacement)

Proposed Activity: Include ALL earth disturbance activities for project (e.g. for a timber sale—include stream crossings, cutting areas and new roadway accesses). Also include Current Conditions (e.g. housing, farmland, current land cover), and how Construction/Maintenance Activity is to be accomplished

Total Acres of Property: Entire site acreage (e.g. timber sale property—including road access (200 acres)

Acreage to be Impacted: Disturbance acreage (e.g. timber sale—if the property is 200 acres, but only 100 acres will be disturbed, for example: cutting on 90 acres, a road impacting 10 acres); include all temporary and permanent activities



Pennsylvania Natural Diversity Inventory

Pennsylvania Natural Diversity Inventory LARGE PROJECT FORM

This form provides site information necessary to perform an Environmental Review for special concern species and resources listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, the Pennsylvania Fish and Boat Code or the Pennsylvania Game and Wildlife Code.

Applicant Information

Name: Stephanie Frazier - Eqt

Address: 625 Liberty Avenue, Suite 1700, Pittsburgh, Pa 15222

Phone Number: (412) 553-5798

Fax Number: (412) 395-2156

Contact Person Information - if different from applicant

Name: Environmental Solutions & Innovations, Inc.

Address: 4525 Este Ave., Cincinnati, Oh 45232

Phone Number: (513) 451-1777

Fax Number: (513) 451-3321

Email: dsparks@envsi.

Project Information

Project Name: Equitrans Expansion Project

Project Reference Point (center point of project): Latitude: 39 55 5.9 N Longitude: 80 7 12.6 W Datum:

Municipality: Franklin, Jefferson, Morgan, 40 14 23.4 N 79 56 22.4 W

Forward, Union

County: Allegheny, Washington, Greene

☐ Attach a copy of a U.S.G.S. 7 1/2 Minute Quadrangle Map with Project Boundaries clearly marked.

U.S.G.S. Quad Name: Mather, Waynesburg, Glassport, Monongahela

Provide GIS shapefiles showing the project boundary (strongly recommended)

Project Description

Proposed Project Activity (including ALL earth disturbance areas and current conditions)

EQT proposes to develop the Equitrans Expansion Project (Project) in Allegheny, Washington, and Greene counties, Pennsylvania and Whetzel County, West Virginia. The Project will involve the construction of three individual pipeline segments totaling approximately 7.3 miles of new 24 to 30-inch-diameter natural gas transmission pipelines. In addition, EQT plans to replace an existing compressor station with a newer, larger compressor station, adding approximately 48,000 horsepower of centrifugal compression and 12,600 horsepower of reciprocating compression in Greene County, Pennsylvania.

Total Acres of Property: Approx 213 Acreage to be Impacted: Approx 213

1. Will the entire project occur in or on an existing building, parking lot, driveway, road, maintained road shoulder, street, runway, paved area, railroad bed, or maintained lawn? Yes ☐ No ☒
2. Are there any waterways or waterbodies (intermittent or perennial rivers, streams, creeks, tributaries, lakes or ponds) in or near the project area, or on the land parcel? If so, how many feet away is the project? Yes ☒ 0 Feet No ☐
3. Are wetlands located in or within 300 feet of the project area? Yes ☒ No ☐ If No, is this the result of a wetland delineation?
4. How many acres of tree removal, tree cutting or forest clearing will be necessary to implement all aspects of this project? Approx. 50 Acres

Dept. of Conservation and Natural Resources

Bureau of Forestry, Ecological Services Section
400 Market St., PO Box 8552
Harrisburg, PA 17105
fax: 717-772-0271

PA Game Commission

Bureau of Wildlife Habitat Management
Division of Environmental Planning & Habitat Protection
2001 Elmerton Avenue
Harrisburg, PA 17110-9797

PA Fish and Boat Commission

Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823

US Fish and Wildlife Service

Pennsylvania Field Office
110 Radnor Rd; Suite 101
State College, PA 16801
no faxes please

BUREAU OF FORESTRY

July 22, 2015

PNDI Number: 22453

Dale Sparks

Environmental Solutions & Innovations, Inc.

4525 Este Avenue

Cincinnati, OH 45232

Email: dsparks@envsi.com (hard copy will not follow)

Re: Equitrans Expansion Project

Allegheny, Washington, and Greene Counties, PA

Dear Mr. Sparks,

Thank you for the submission of the Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Large Project Number 22453 for review. PA Department of Conservation and Natural Resources screened this project for potential impacts to species and resources under DCNR's responsibility, which includes plants, terrestrial invertebrates, natural communities, and geologic features only.

Potential Impact Anticipated

PNDI records indicate species or resources under DCNR's jurisdiction are located in the project vicinity. Based on a detailed PNDI review, DCNR determined potential impacts to the following threatened or endangered species or species of special concern.

Segment H318

Scientific Name	Common Name	PA Current Status	PA Proposed Status
<i>Baptisia australis</i>	Blue False-indigo	Not Listed	Threatened
<i>Erythronium albidum</i>	White Trout-lily	Not Listed	Rare
<i>Iodanthus pinnatifidus</i>	Purple Rocket	Endangered	Endangered
<i>Scutellaria saxatilis</i>	Rock Skullcap	Undetermined	Endangered
<i>Trillium nivale</i>	Snow Trillium	Rare	Rare

Segments H316/H158-M80

Scientific Name	Common Name	PA Current Status	PA Proposed Status
<i>Erythronium albidum</i>	White Trout-lily	Not Listed	Rare
<i>Scutellaria saxatilis</i>	Rock Skullcap	Undetermined	Endangered
<i>Tipularia discolor</i>	Cranefly Orchid	Rare	Rare
<i>Trillium nivale</i>	Snow Trillium	Rare	Rare

Survey Request

DCNR requests a survey for the following species:

- ***Baptisia australis* (Blue False-indigo):** locally documented on a rich wooded riverine slope; prefers open woods, stream banks, and sandy floodplains; flowers May – June
- ***Erythronium albidum* (White Trout-lily):** locally documented in floodplain forest and on rich wooded slopes along rivers and creeks; prefers moist woods and rich slopes, especially on limestone; flowers April – May

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P.O. Box 8552, Harrisburg, PA 17015-8552 717-787-3444 (fax) 717-772-0271

- ***Iodanthus pinnatifidus* (Purple Rocket):** locally documented on a rich wooded riverine slope; prefers moist alluvial woods and wooded slopes; flowers May – June
 - ***Scutellaria saxatilis* (Rock Skullcap):** locally documented in sycamore scrub floodplain; prefers low woods, rocky stream banks, and roadsides; flowers July – August
 - ***Tipularia discolor* (Cranefly Orchid):** locally documented in red oak mixed hardwood forest; prefers deciduous forest and stream banks; leaf visible fall, winter, and spring
 - ***Trillium nivale* (Snow Trillium):** locally documented on rich stream valley wooded slopes; prefers stream valleys and wooded slopes, especially on limestone; flowers late March – April
- ✓ A survey for the above species should be conducted by a qualified botanist *at the appropriate time of year and then submitted to our office for review*. Your botanist should carefully review the new DCNR Botanical Survey Protocols available at <http://www.gis.dcnr.state.pa.us/hgis-er/Login.aspx>. These protocols are recommended to ensure that the all necessary information is collected and that survey reports are prepared properly. It is the expectation of DCNR that these protocols will be followed when conducting surveys for species under our jurisdiction.
 - ✓ Your botanist should fill out the field survey form while performing their survey: <http://www.gis.dcnr.state.pa.us/hgis-er/hgis/2012%20DCNR%20Field%20Survey%20Form.pdf>. Contact our office prior to the survey for detailed information about the species, or for a list of qualified surveyors.
 - ✓ Any target and non-target state-listed species found during the site visit should be reported to our office. Mitigation measures and monitoring may be requested if species or communities of special concern are found on or adjacent to site.
 - ✓ If the land type(s) does not exist on site, a survey may not be necessary; please submit a habitat assessment report which describes the current land cover, habitat types, and species found on site.

This response represents the most up-to-date review of the PNDI data files and is valid for two (2) years only. If project plans change or more information on listed or proposed species becomes available, our determination may be reconsidered. Should the proposed work continue beyond the period covered by this letter, please resubmit the project to this agency as an “Update” (including an updated PNDI receipt, project narrative and accurate map). As a reminder, this finding applies to potential impacts under DCNR’s jurisdiction only. Visit the PNHP website for directions on contacting the Commonwealth’s other resource agencies for environmental review.

Should you have any questions or concerns, please contact Jason Ryndock, Ecological Information Specialist, by phone (717-705-2822) or via email (c-jryndock@pa.gov).

Sincerely



Greg Podnieszinski, Section Chief
Natural Heritage Section

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United States Department of the Interior



FISH AND WILDLIFE SERVICE
Pennsylvania Field Office
110 Radnor Road, Suite 101
State College, Pennsylvania 16801-4850

July 27, 2015

Stephanie Frazier
Equitrans, L.P.
625 Liberty Avenue
Suite 1700
Pittsburgh, PA 15222

RE: USFWS Project #2015-0578

Dear Ms. Frazier:

Thank you for your letter of April 27, 2015, regarding information about federally listed and proposed endangered and threatened species within the area affected by Equitrans, L.P., proposed Equitrans Expansion project located in Allegheny, Washington, and Greene counties, Pennsylvania, and Wetzel County, West Virginia. The following comments are provided pursuant to the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) to ensure the protection of endangered and threatened species and the Migratory Bird Treaty Act (MBTA, 16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755, as amended) to ensure the protection of migratory bird species.

The proposed project consists of the replacement and expansion of compressor stations, installation of pipelines, and a new interconnect to deliver natural gas volumes into Mountain Valley Pipeline, LLC's proposed pipeline in West Virginia.

Federally Listed Species

The proposed project is located within the range of the Indiana bat (*Myotis sodalis*), a species that is federally listed as endangered and within the range of the federally threatened northern long-eared bat (*Myotis septentrionalis*). On May 4, 2015, the northern long-eared bat listing became effective; more information on the new listing of this species can be found at: <http://www.fws.gov/midwest/endangered/mammals/nlba/index.html>

Land-clearing associated with the project may result in the death or injury of roosting Indiana bats if tree-cutting is conducted during the time of year when bats may be present (*i.e.*, April 1 to September 30). Due to the potential for these bat species to occur within the project area, the Service recommends that measures be implemented to avoid killing or injuring them. This can be accomplished by carrying out tree-cutting activities from October 1 to March 31, during which time bats are hibernating or concentrated near their hibernacula. This seasonal restriction on tree cutting applies to trees that are greater than or equal to 3 inches in diameter at breast

height (d.b.h). Where possible, retain shagbark hickory trees, dead and dying trees, and large diameter trees (greater than 12 inches d.b.h.) to serve as roost trees for bats. Where possible, also retain forested riparian corridors and forested wetlands.

If you are unable to adopt the tree-cutting restrictions detailed above, a bat survey of the project area should be conducted between May 15 and August 15 by a qualified, Service-approved biologist (see enclosed list) using the 2015 RANGE-WIDE INDIANA BAT SUMMER SURVEY GUIDELINES April 2015, which can be found at the following link:
<http://www.fws.gov/northeast/pafo/surveys.html>.

Survey results should be submitted to the Service for review and concurrence.

Please advise this office as to whether you intend to conduct bat surveys, or assume bats are present and implement a seasonal restriction on tree-cutting.

Assessment of Risks to Migratory Birds

The Service is the principal Federal agency charged with protecting and enhancing populations and habitat of migratory bird species. The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. While the MBTA has no provision for authorizing incidental take, the Service recognizes that some birds may be killed even if all reasonable measures to avoid take are implemented.

The potential exists for avian mortality from habitat destruction and alteration within the project boundaries. Site-specific factors that should be considered in project siting to avoid and minimize the risk to birds include avian abundance; the quality, quantity and type of habitat; geographic location; type and extent of bird use (e.g. breeding, foraging, migrating, etc.); and landscape features. Please review the enclosed information for general recommendations for avoiding and minimizing impacts to migratory birds within and around the project area. Please be aware that since these are general guidelines, some of them may not be applicable to the current project design or they may have already been included in the project design.

To avoid potential delays in reviewing your project, please use the above-referenced USFWS project tracking number in any future correspondence regarding this project.

If you have any questions regarding this matter, please contact Pamela Shellenberger of my staff at 814-234-4090.

Sincerely,



Lora L. Zimmerman
Field Office Supervisor

Enclosures

cc: USFWS – West Virginia Field Office

U.S. FISH AND WILDLIFE SERVICE
Pennsylvania Field Office

QUALIFIED BAT SURVEYORS

The following list includes persons known by the U.S. Fish and Wildlife Service to have the skills and experience to conduct surveys for Indiana bats. Any individuals handling or conducting surveys for state or federally listed bats must first obtain a permit from the Pennsylvania Game Commission. All state and federally listed bat captures must be reported in writing to the Service and Commission within 72 hours. Bat surveys will be overseen by a qualified surveyor, who will be present in the field at all times during the investigation. Summer surveys should be carried out in accordance with the Service's most recent summer survey guidance. If any state or federally listed bats are captured during summer surveys, a surveyor with bat telemetry experience should be prepared to place a transmitter on the bat(s) to identify roost trees and foraging habitat. Various sampling and survey techniques, including mist-netting, radio-telemetry, harp-trapping, acoustic surveys and hibernacula surveys, are used to detect and monitor bats. Some individuals on this list may not be qualified to conduct all types of sampling.

This information is not to be construed as an endorsement of individuals or firms by the Service or any of its employees. Persons not on this list, but who have documented experience in conducting scientific studies of, or successful searches for, Pennsylvania State or federally listed bats may submit their qualifications to the Service for review. The submission must include documentation that the requestor has experience successfully locating and identifying state or federally listed bats in their hibernacula and their summer habitat. Additions to and deletions from this list are at the sole discretion of the Service. This list is subject to revision at any time without prior notice.

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Adaptive Management Practices for Conserving Migratory Birds

The Fish and Wildlife Service is the principal Federal agency charged with protecting and enhancing populations and habitat of migratory bird species. The Migratory Bird Treaty Act (MBTA, 16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755, as amended) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. While the MBTA has no provision for authorizing incidental take, the Service recognizes that some birds may be killed even if all reasonable measures to avoid take are implemented. Unless the take is authorized, it is not possible to absolve individuals, companies or agencies from liability (even if they implement avian mortality avoidance or similar conservation measures). However, the Office of Law Enforcement focuses on those individuals, companies, or agencies that take migratory birds with disregard for their actions and the law.

The potential exists for avian mortality from habitat destruction and alteration within the project boundaries. Site-specific factors that should be considered in project siting to avoid and minimize the risk to birds include avian abundance; the quality, quantity and type of habitat; geographic location; type and extent of bird use (*e.g.* breeding, foraging, migrating, etc.); and landscape features.

We offer the following recommendations to avoid and minimize impacts to migratory birds within and around the project area:

1. Where disturbance is necessary, clear natural or semi-natural habitats (*e.g.*, forests, woodlots, reverting fields, shrubby areas) and perform maintenance activities (*e.g.*, mowing) between September 1 and March 31, which is outside the nesting season for most native bird species. Without undertaking specific analysis of breeding species and their respective nesting seasons on the project site, implementation of this seasonal restriction will avoid take of most breeding birds, their nests, and their young (*i.e.*, eggs, hatchlings, fledglings).
2. Minimize land and vegetation disturbance during project design and construction. To reduce habitat fragmentation, co-locate roads, fences, lay down areas, staging areas, and other infrastructure in or immediately adjacent to already-disturbed areas (*e.g.*, existing roads, pipelines, agricultural fields) and cluster development features (*e.g.*, buildings, roads) as opposed to distributing them throughout land parcels. Where this is not possible, minimize roads, fences, and other infrastructure.
3. Avoid permanent habitat alterations in areas where birds are highly concentrated. Examples of high concentration areas for birds are wetlands, State or Federal refuges, Audubon Important Bird Areas, private duck clubs, staging areas, rookeries, leks, roosts, and riparian areas. Avoid establishing sizable structures along known bird migration pathways or known daily movement flyways (*e.g.*, between roosting and feeding areas).
4. To conserve area-sensitive species, avoid fragmenting large, contiguous tracts of wildlife habitat, especially if habitat cannot be fully restored after construction. Maintain

contiguous habitat corridors to facilitate wildlife dispersal. Where practicable, concentrate construction activities, infrastructure, and man-made structures (*e.g.*, buildings, cell towers, roads, parking lots) on lands already altered or cultivated, and away from areas of intact and healthy native habitats. If not feasible, select fragmented or degraded habitats over relatively intact areas.

5. Develop a habitat restoration plan for the proposed site that avoids or minimizes negative impacts to birds, and that creates functional habitat for a variety of bird species. Use only plant species that are native to the local area for revegetation of the project area.

If you have any questions regarding these measures, please contact Lora Zimmerman of the Pennsylvania Field Office located in State College, PA at 814-234-4090.



Pennsylvania Fish & Boat Commission

Division of Environmental Services
Natural Gas Section
450 Robinson Lane
Bellefonte, PA 16823

January 5, 2016

IN REPLY REFER TO
SIR# 44257

Environmental Solutions & Innovations, Inc.
John Spaeth
4525 Este Avenue
Cincinnati, Ohio 45232

RE: Species Impact Review (SIR) – Rare, Candidate, Threatened and Endangered Species
PNDI Search No.
Equitrans Expansion Project.
GREENE County: - WASHINGTON County:

Dear John Spaeth:

This responds to your inquiry about a Pennsylvania Natural Diversity Inventory (PNDI) Internet Database search “potential conflict” or a threatened and endangered species impact review. These projects are screened for potential conflicts with rare, candidate, threatened or endangered species under Pennsylvania Fish & Boat Commission jurisdiction (fish, reptiles, amphibians, aquatic invertebrates only) using the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files. These species of special concern are listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, and the Pennsylvania Fish & Boat Code (Chapter 75), or the Wildlife Code.

On October 11, 2015, you conducted a mussel presence/absence survey at the proposed pipeline crossing of South Fork Tenmile Creek (39.90999 -80.09235). According to the resulting report, timed searches yielded four live individuals of three species: two Fragile Papershell (*Leptodea fragilis*) in the downstream indirect effects area, one Giant Floater (*Pyganodon grandis*) in the upstream indirect effects area, and one Fluted-shell (*Lasmigona costata*) in the direct effects area. I concur with the results of this evaluation. The project proposes to traverse South Fork Tenmile Creek via HDD techniques; therefore, I do not foresee the proposed project resulting in adverse impacts to the mussel species of special concern. If proposed crossing method on the South Fork Tenmile Creek changes, you will need to contact this office for further consultation and we will recommend moving mussels out of the affected areas.

This response represents the most up-to-date summary of the PNDI data and our files and is valid for two (2) years from the date of this letter. An absence of recorded species information does not necessarily imply species absence. Our data files and the PNDI system are continuously being updated

Our Mission:

www.fish.state.pa.us

To protect, conserve and enhance the Commonwealth's aquatic resources and provide fishing and boating opportunities.

with species occurrence information. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered, and consultation shall be re-initiated.

If you have any questions regarding this review, please contact Gary Smith at 814-279-3080 and refer to the SIR # 44257. Thank you for your cooperation and attention to this important matter of species conservation and habitat protection.

Sincerely,



Heather A. Smiles, Chief
Natural Gas Section

HAS/GAS/dn



Division of Environmental
Planning and Habitat
Protection
717-783-5957

COMMONWEALTH OF PENNSYLVANIA
Pennsylvania Game Commission
2001 ELMERTON AVENUE
HARRISBURG, PA 17110-9797

*"To manage all wild birds, mammals and their habitats
for current and future generations."*

ADMINISTRATIVE BUREAUS:

ADMINISTRATION.....717-787-5670
HUMAN RESOURCES.....717-787-7836
FISCAL MANAGEMENT.....717-787-7314
CONTRACTS AND
PROCUREMENT.....717-787-6594
LICENSING.....717-787-2084
OFFICE SERVICES.....717-787-2116
WILDLIFE MANAGEMENT.....717-787-5529
INFORMATION & EDUCATION.....717-787-6286
WILDLIFE PROTECTION.....717-783-6526
WILDLIFE HABITAT
MANAGEMENT.....717-787-6818
REAL ESTATE DIVISION.....717-787-6568
AUTOMATED TECHNOLOGY
SERVICES.....717-787-4076

www.pgc.state.pa.us

May 7, 2015

PGC ID Number: 201505050202

Stephanie Frazier
Equitrans, L.P.
625 Liberty Avenue, Suite 1700
Pittsburgh, PA 15222
sfrazier@eqt.com

Re: Equitrans, L.P – Equitrans Expansion Project
Large Project PNDI Review
Multiple Townships, Greene, Allegheny & Washington Counties, PA

Dear Ms. Frazier,

Thank you for submitting your Pennsylvania Natural Diversity Inventory (PNDI) Large Project Environmental Review request. The Pennsylvania Game Commission (PGC) screened the centerline and the requested 2000 foot buffer (1000 feet on either side of centerline) for potential impacts to species and resources of concern under PGC responsibility, which includes birds and mammals only.

No Impact Anticipated – PNDI Species

PNDI records indicate species or resources of concern are located in the vicinity of the project. However, based on the information you submitted concerning the nature of the project, the immediate location, and our detailed resource information, the PGC has determined that no impact is likely. Therefore, no further PNDI coordination with the PGC will be necessary for this project at this time.

This response represents the most up-to-date summary of the PNDI data files and is valid for two (2) years from the date of this letter. An absence of recorded information does not necessarily imply actual conditions on site. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered

Should the proposed work continue beyond the period covered by this letter, please resubmit the project to the PGC at the following address as an "Update" (including an updated PNDI receipt, project narrative and accurate map):

PA Game Commission
Bureau of Wildlife Habitat Management

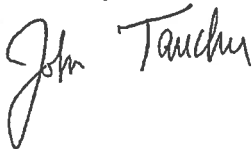
Division of Environmental Planning & Habitat Protection
2001 Elmerton Avenue
Harrisburg, PA 17110-9797

If the proposed work has not changed and no additional information concerning listed species is found, the project will be cleared for PNDI requirements by the PGC for an additional 2 years.

This finding applies to impacts to birds and mammals only. To complete your review of state and federally-listed threatened and endangered species and species of special concern, please be sure that the U.S. Fish and Wildlife Service, the PA Department of Conservation and Natural Resources, and/or the PA Fish and Boat Commission have been contacted regarding this project as directed by the online PNDI ER Tool found at www.naturalheritage.state.pa.us.

Please be sure to include the above-referenced PGC ID Number on any future correspondence with the PGC regarding this project.

Sincerely,



John Taucher
Division of Environmental Planning & Habitat Protection
Bureau of Wildlife Habitat Management
Phone: 717-787-4250, Extension 3632
Fax: 717-787-6957
E-mail: jotaucher@pa.gov

A PNHP Partner



JWT/jwt

cc: H:\OIL&GAS_PNDI_Reviews\Southwest Region



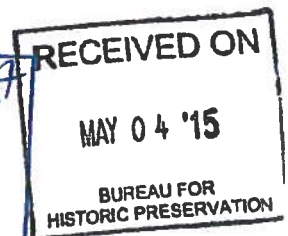
April 27, 2015

Barbara Frederick
Historic Preservation Supervisor
Bureau for Historic Preservation
Pennsylvania Historical and Museum Commission
400 North Street, 2nd Floor
Harrisburg, PA 17120-0093

ER No. 2015-2081-042-7A

**SHPO REQUESTS ADDITIONAL
INFORMATION (see attached)**

Date 5/7/15 Reviewer B. Gudench



**Subject: Equitrans Expansion Project, Green Allegheny and Washington Counties,
Pennsylvania, and Wetzel County, West Virginia
Docket No. PF15-22**

Dear Ms. Frederick,

Equitrans, L.P. (Equitrans) is hereby providing background information on the proposed Equitrans Expansion Project (Project) in Greene, Allegheny and Washington Counties, Pennsylvania. The Project will add up to 600,000 dekatherms per day (Dth/day) of north-to south firm capacity on the Equitrans system. The Project includes the replacement and expansion of the 4,800 horsepower Pratt Compressor Station with the 31,300 horsepower Redhook Compressor Station in Greene County, Pennsylvania; approximately four miles of 30-inch diameter pipeline between the proposed Redhook Compressor Station and the existing Equitrans H-302 pipeline in Greene County, Pennsylvania; approximately five miles of 24-inch diameter pipeline between the EQT Gathering, LLC Applegate Gathering System and Equitrans' existing H-148 pipeline in Allegheny and Washington Counties, Pennsylvania; and the new Webster interconnect to deliver natural gas volumes into Mountain Valley Pipeline, LLC's ("Mountain Valley") proposed pipeline in Wetzel County, West Virginia. The Project is designed to transport natural gas from the northern portion of Equitrans' system south to a future interconnection with Mountain Valley, as well as existing interconnects on the southern portion of Equitrans' system with Texas Eastern Transmission, LP and Dominion Transmission, Inc. The Project will provide shippers with the flexibility to transport additional natural gas produced in the central Appalachian Basin to meet the growing demand by local distribution companies, industrial users, and power generation facilities located in local, northeastern, Mid-Atlantic and southeastern regions of the United States. The Project will also increase system reliability, efficiency, and operational flexibility for the benefit of all Equitrans customers.

An overall Project location map and more specific Project component location maps have been included as attachments to this letter. To establish the pipeline corridor for the proposed Project, it will be necessary to clear forest land along the corridor. Equitrans has contracted with Tetra Tech, Inc. to conduct biological and cultural field surveys for the Project which are scheduled to commence in May 2015. Equitrans will coordinate the survey plans with appropriate agency staff for review and concurrence prior to initiating the field surveys. The attached CD contains a GIS shapefile of the proposed centerline for the pipelines for your use in evaluating the effects of the project. Ideally your review will include our footprint as submitted and an additional 2,000' buffer to allow for design changes if necessary.

PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION
BUREAU FOR HISTORIC PRESERVATION
<http://phmc.info/historicpreservation>

ADDITIONAL INFORMATION REQUEST SHEET

(Revised May 2014)

Please submit checked items for PHMC-BHP to proceed with project review.

A. FUNDING/PERMITTING/LICENSING/APPROVAL PROGRAM

- ☐ 1. Identify the Federal/State Agency and funding program or permit/license

B. PROJECT DESCRIPTION

- ☐ 1. Narrative description of the project and related actions resulting from the project
☐ 2. Proposed boundary of the project's Area of Potential Effect (APE). Provide Justification of APE. Remember to consider visual impacts
☐ 3. Architectural plans of existing conditions (as-built or as-found)
☐ 4. Preliminary architectural drawings or plans (floor plans, elevations, specifications)
☐ 5. Work write-ups
☐ 6. Site plans of existing conditions
☐ 7. Site plans of proposed development
☐ 8. For linear project: highlight any portion of the alignment that is located outside of current road/railroad or buried utility Right-of-Way (ROW)

C. PROJECT LOCATION

- ☒ 1. U.S.G.S 7.5 min. series quadrangle with the **PROJECT LOCATION(S) AND LIMITS CLEARLY MARKED** using a colored pen. Please include the name of the quadrangle. Map must include nearest place name.
☐ 2. Street map (for properties in densely populated areas)
☐ 3. Street map showing location and historic district boundaries (if appropriate)
☐ 4. Street address of property
☐ 5. Municipality in which project is located (not mailing address location)

D. PROJECT SIZE (supply as appropriate for project)

- ☐ 1. Acreage of project area
☐ 2. Miles/feet of project area and Right-of-Way (ROW) width
☐ 3. Extent and nature of ground disturbing activities (i.e. grading, trenching, foundation excavation)

E. PHOTOGRAPHS (No photocopies. Clear, color, high resolution digital images preferred)

- ☐ 1. Exterior of all building(s)/structures in project area
☐ 2. Interior of building(s) in project area
☐ 3. Interior of building(s) illustrating the proposed work areas/features
☐ 4. Buildings, streetscape, setting of features in Area of Potential Effect (APE)
☐ 5. Views of project area

F. CULTURAL RESOURCE IDENTIFICATION

- ☐ 1. Pennsylvania Historic Resource Survey Form(s) for all properties 50 years or older within the Area of Potential Effect (APE) (see our website at: <http://phmc.info/historicpreservation>, Select "Forms and Guidance")
☐ 2. Historical background, context report, information for historic resources identified
Apply this context, available on our website: _____

G. EFFECTS

- ☐ 1. How will the project affect building(s) over 50 years old?
☐ 2. National Register listed/eligible property(s) exist in project area. How will the project affect this historic property(s)?

(OVER)



Commonwealth of Pennsylvania
Pennsylvania Historical and Museum Commission
Bureau for Historic Preservation
Commonwealth Keystone Building, 2nd Floor
400 North Street
Harrisburg, PA 17120-0093
www.phmc.state.pa.us

July 27, 2015

Christopher L. Borstel, Ph.D., RPA
Tetra Tech, Inc.
1000 The American Road
Morris Plains, NJ 07950

TO EXPEDITE REVIEW USE
BHP REFERENCE NUMBER

Re: File No. ER 2015-1446-042-A
FERC: Equitrans, LP, Proposed Equitrans
Expansion Project, Greene, Allegheny &
Washington Counties

Dear Mr. Borstel:

Thank you for submitting information concerning the above referenced project. The Bureau for Historic Preservation (the State Historic Preservation Office) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

Archaeology

Based on an evaluation by our staff, there is a high probability that significant archaeological sites are located in this project area and could be adversely affected by project activities. Although there are no recorded archaeological sites within the project boundaries, the soil type, topographic setting, slope direction, and distance to water of the project area are similar to the settings of known archaeological sites in the vicinity. A Phase I archaeological survey of the project area is required to locate potentially significant archaeological resources. Guidelines and instructions for conducting Phase I surveys are available on our web site or from our office upon request.

Historic Structures

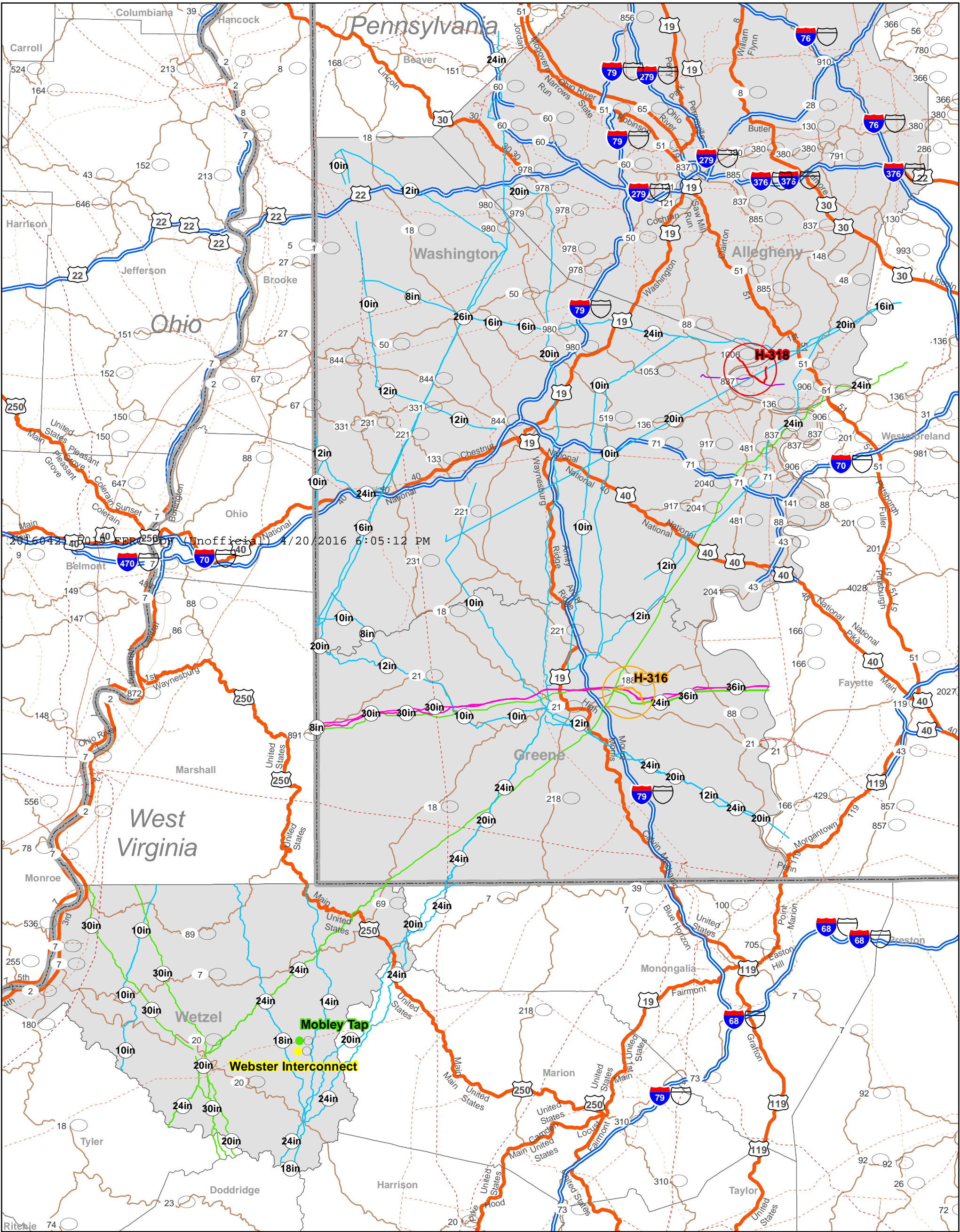
We find the proposed work plan to be appropriate. We look forward to receipt of additional information.

If you need further information regarding archaeological resources, please contact Kira Heinrich at (717) 705-0700. If you need further information concerning historic structures, please contact Barbara Frederick at (717) 772-0921.

Sincerely,

Douglas C. McLearen, Chief
Division of Archaeology &
Protection

DCM/tmw



Equitrans Expansion Project



Attachment 10-3
Figure 10.2-1
Other Pipeline Systems, Electric
Transmission Lines and Major
Highways in Allegheny, Greene, &
Washington Counties (PA) &
Wetzel County (WV)
(Revised April 20, 2016)

Data Sources: ESRI Data, Ventyx



1:400,000

0 5 10 Miles

Legend

Existing Natural Gas Pipeline Systems

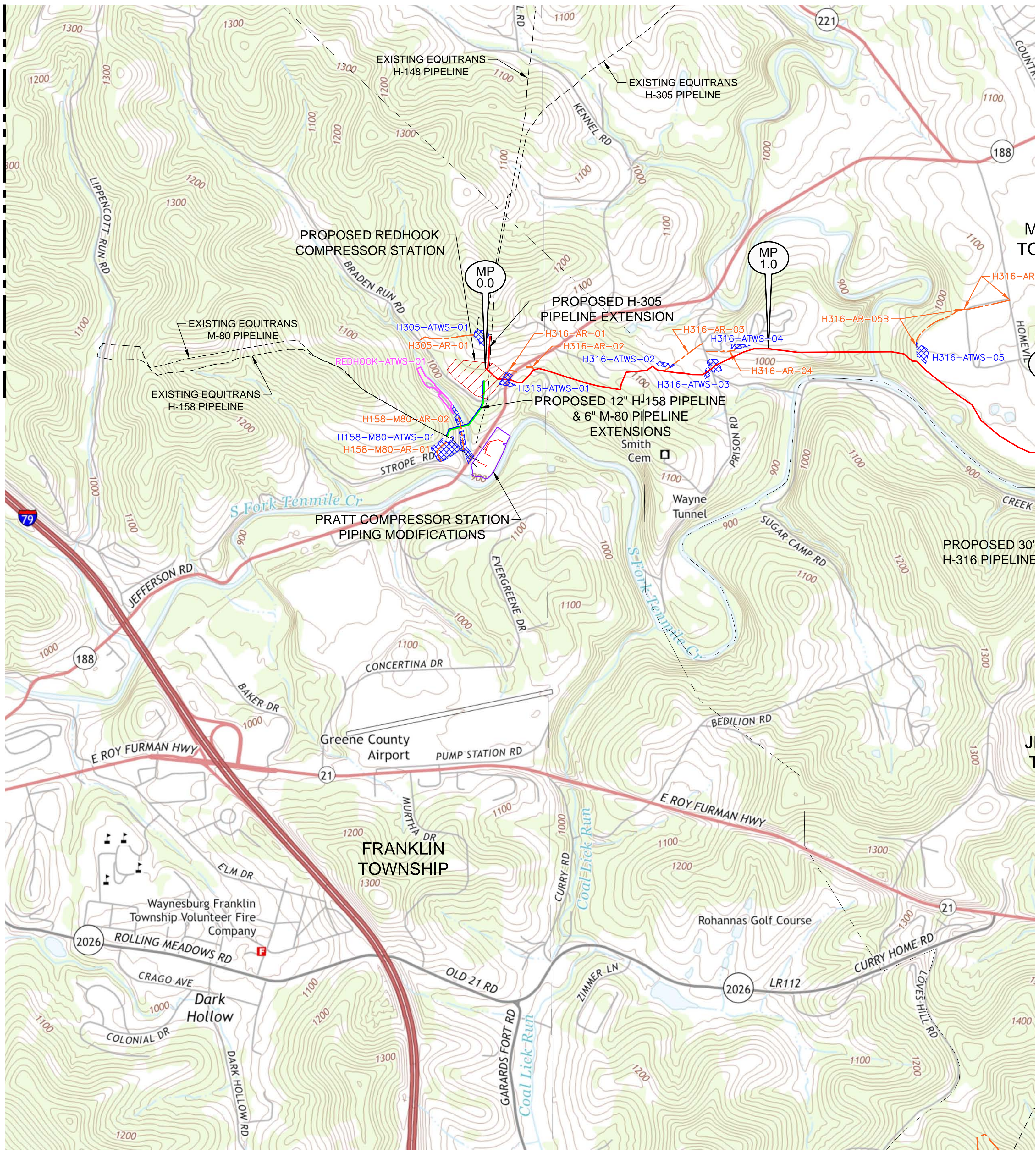
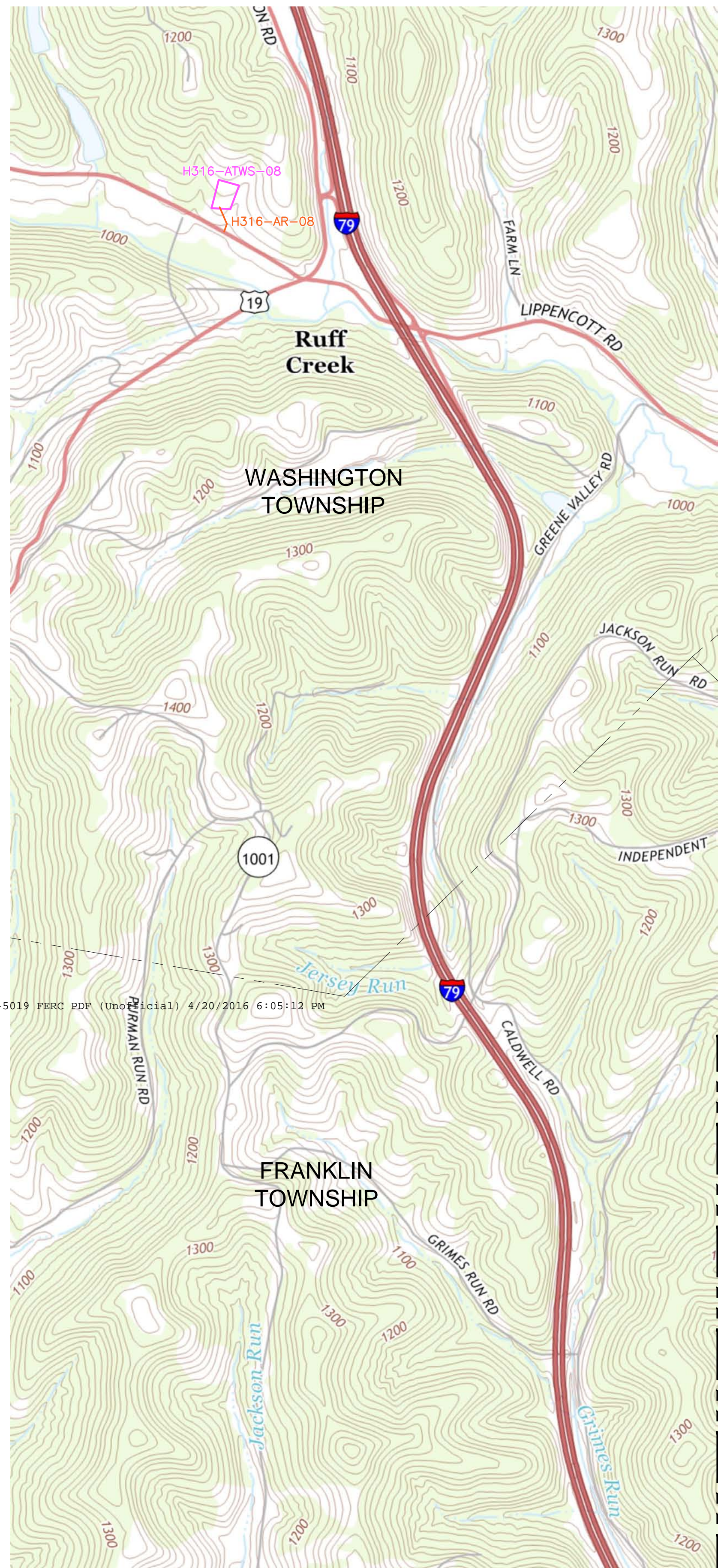
- Dominion Transmission, Inc. Pipeline
- Columbia/NiSource Gas Pipeline
- Texas Eastern Transmission (TETCO) Pipeline

Existing Transmission Lines

- 4kV
- 69kV
- 115kV
- 138kV
- 345kV
- 500kV
- 765kV

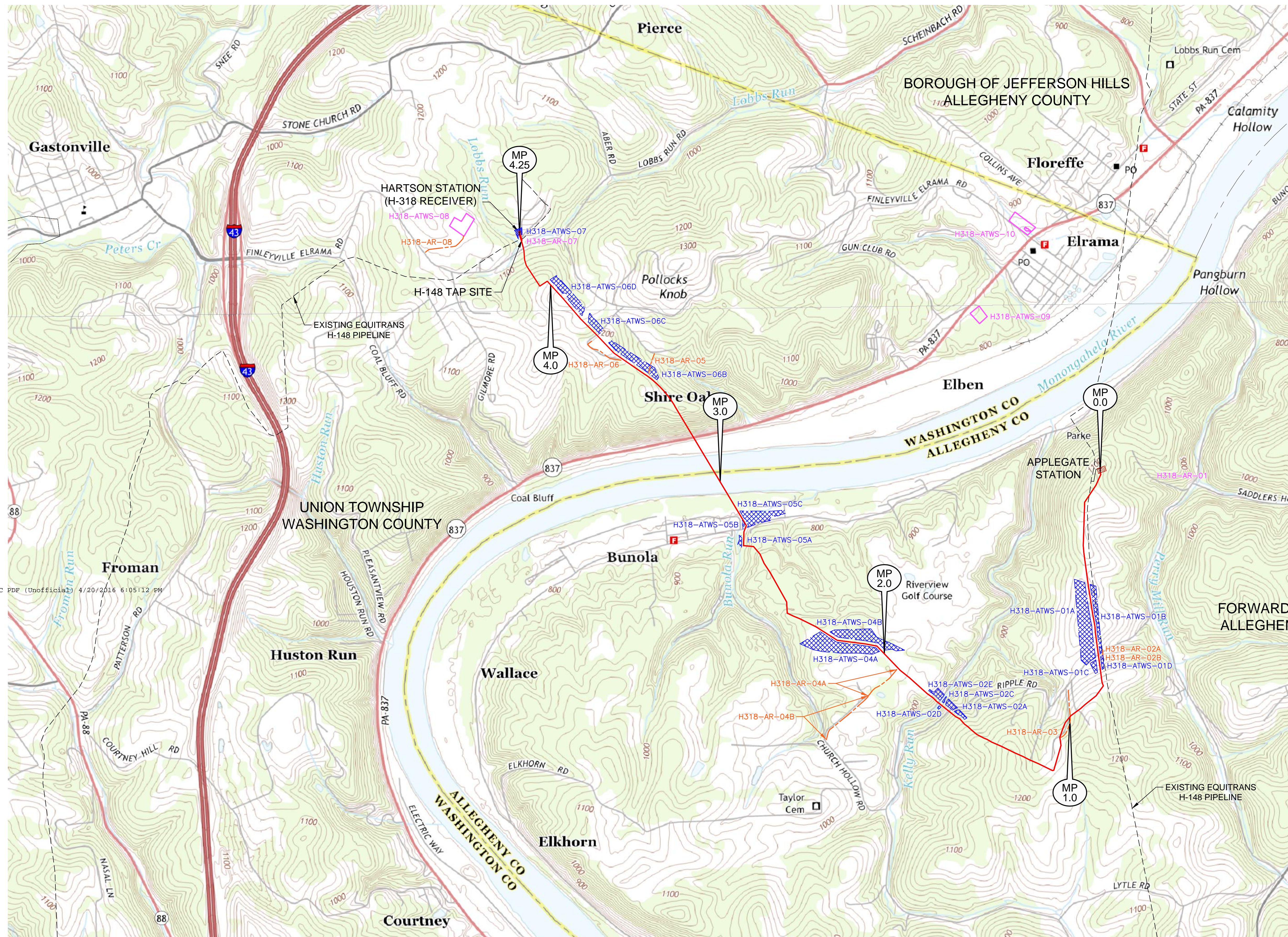
- Sunoco Mariner East Oil Pipeline
- Interstate Highway
- US Highway
- State/County Road
- County Boundary
- State Boundary





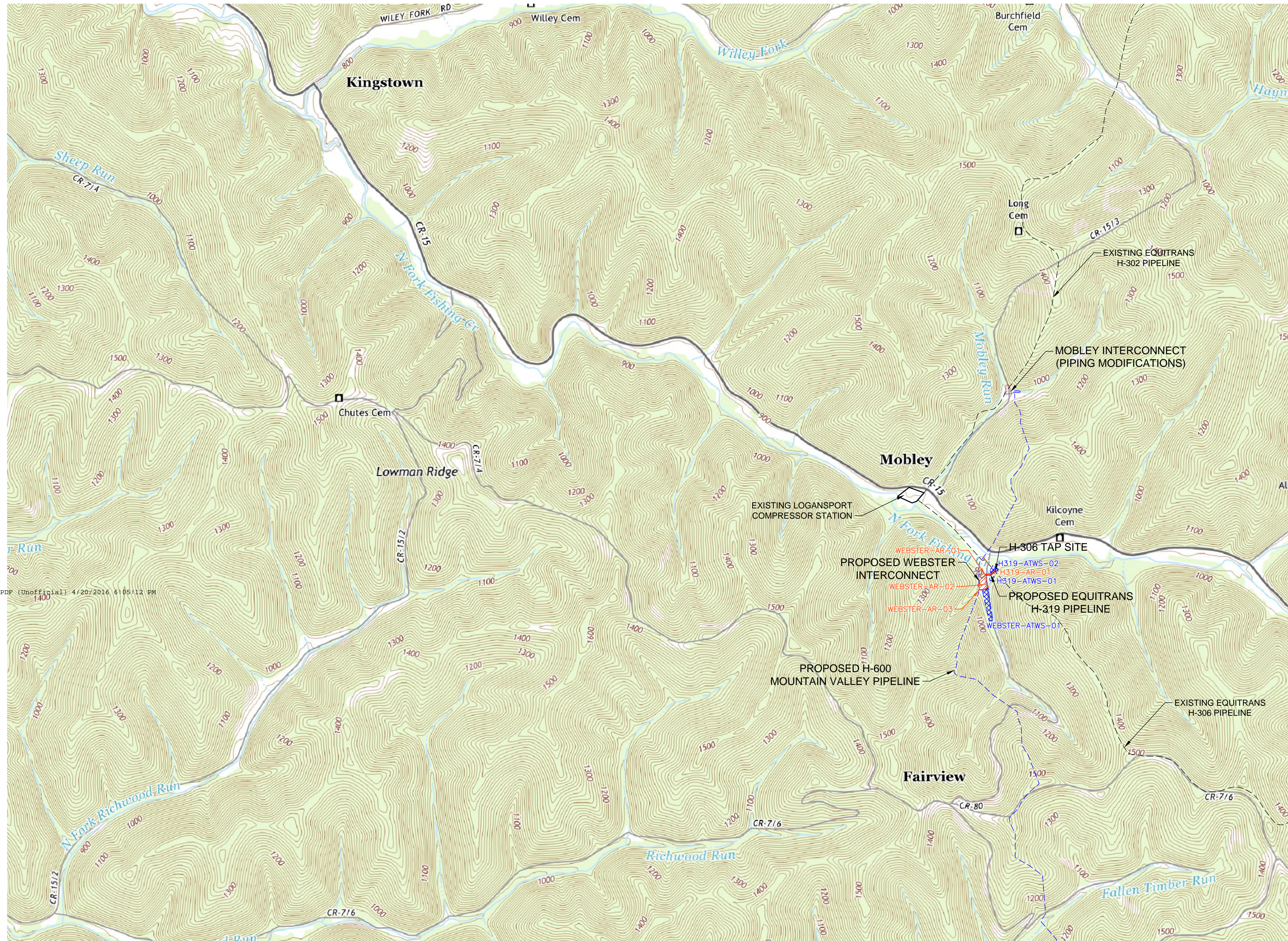
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HORIZONTAL DATUM: NAD 83 US SURVEY FEET
VERTICAL DATUM: NAVD88

[illegible]



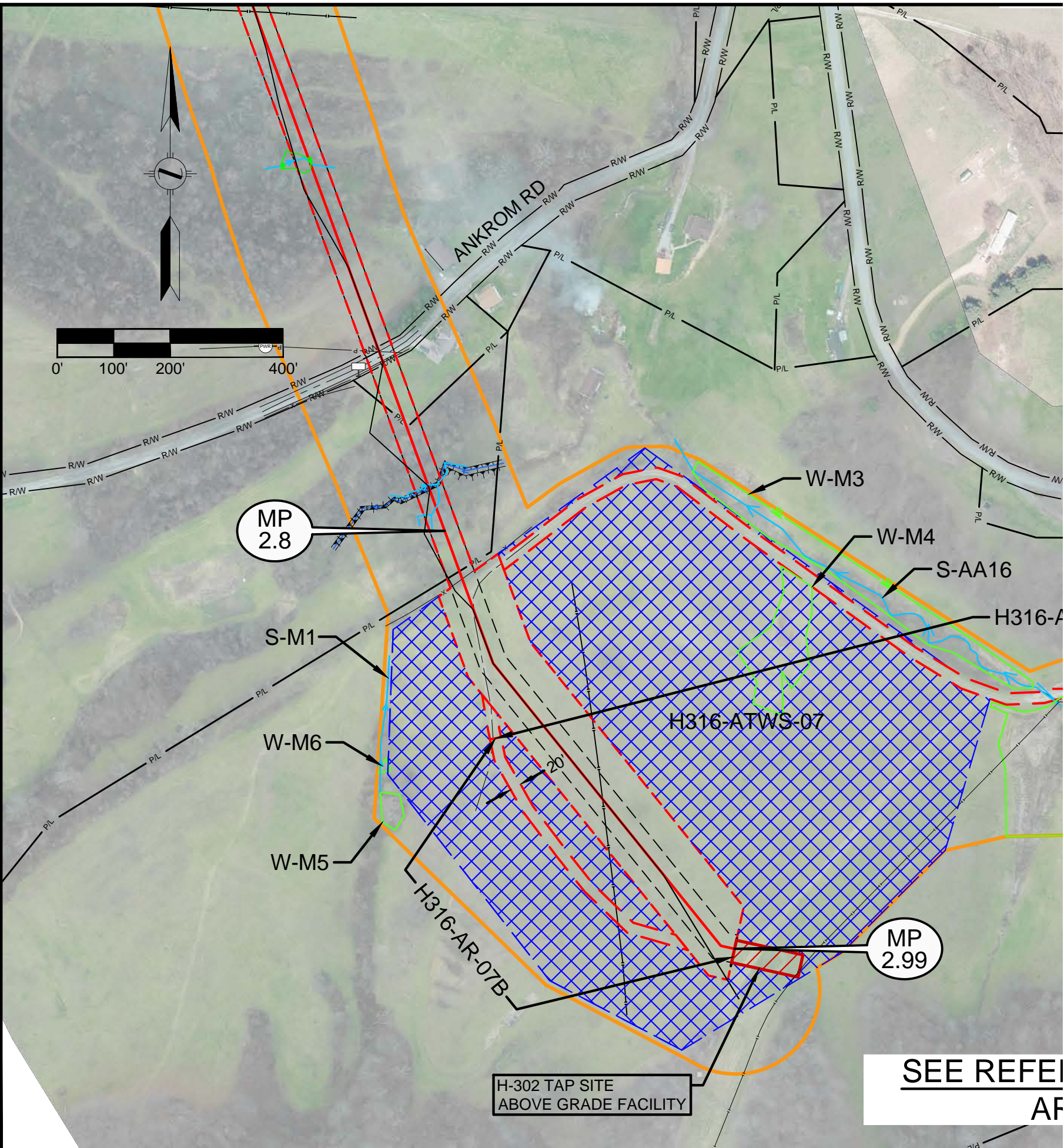
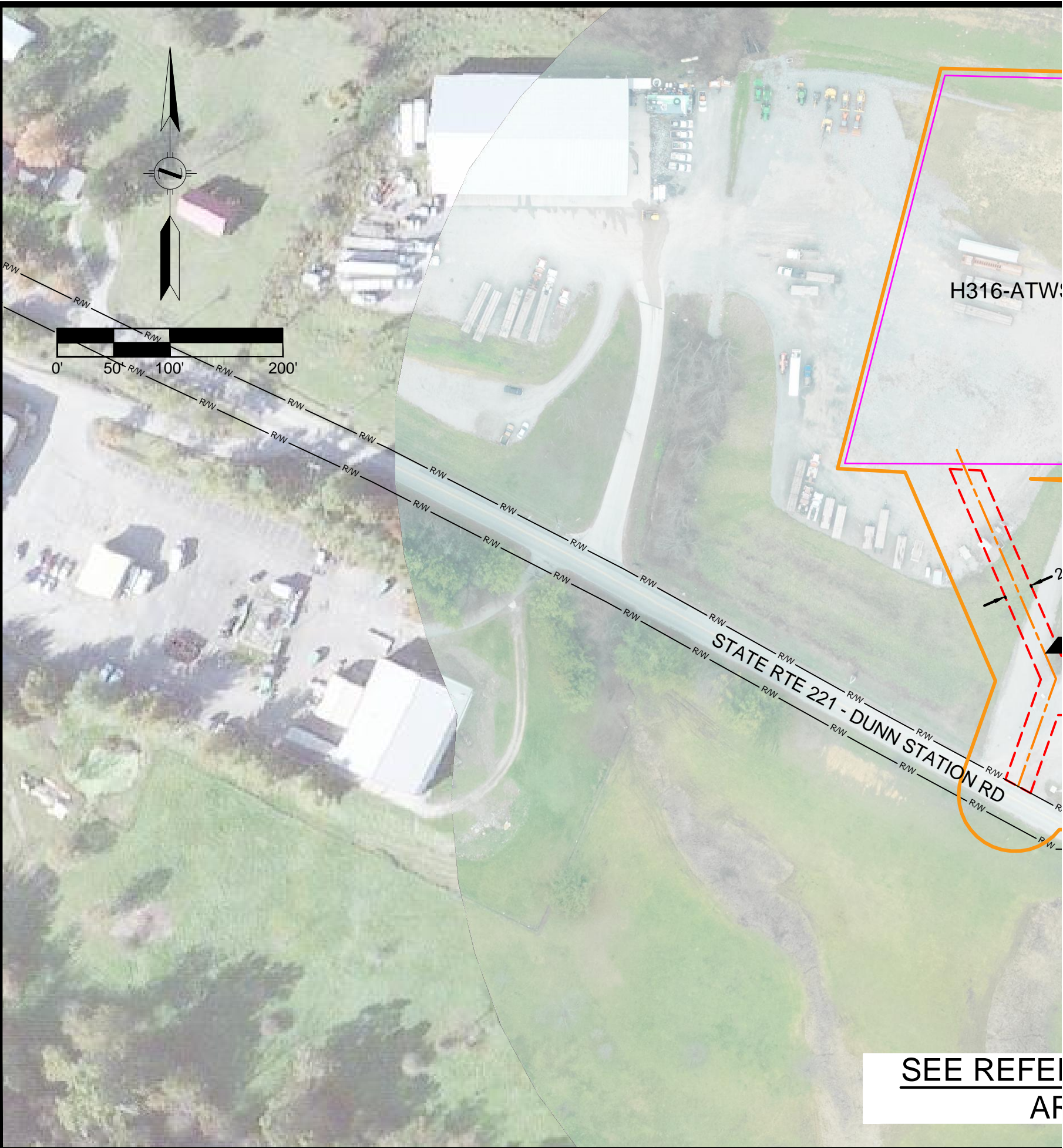
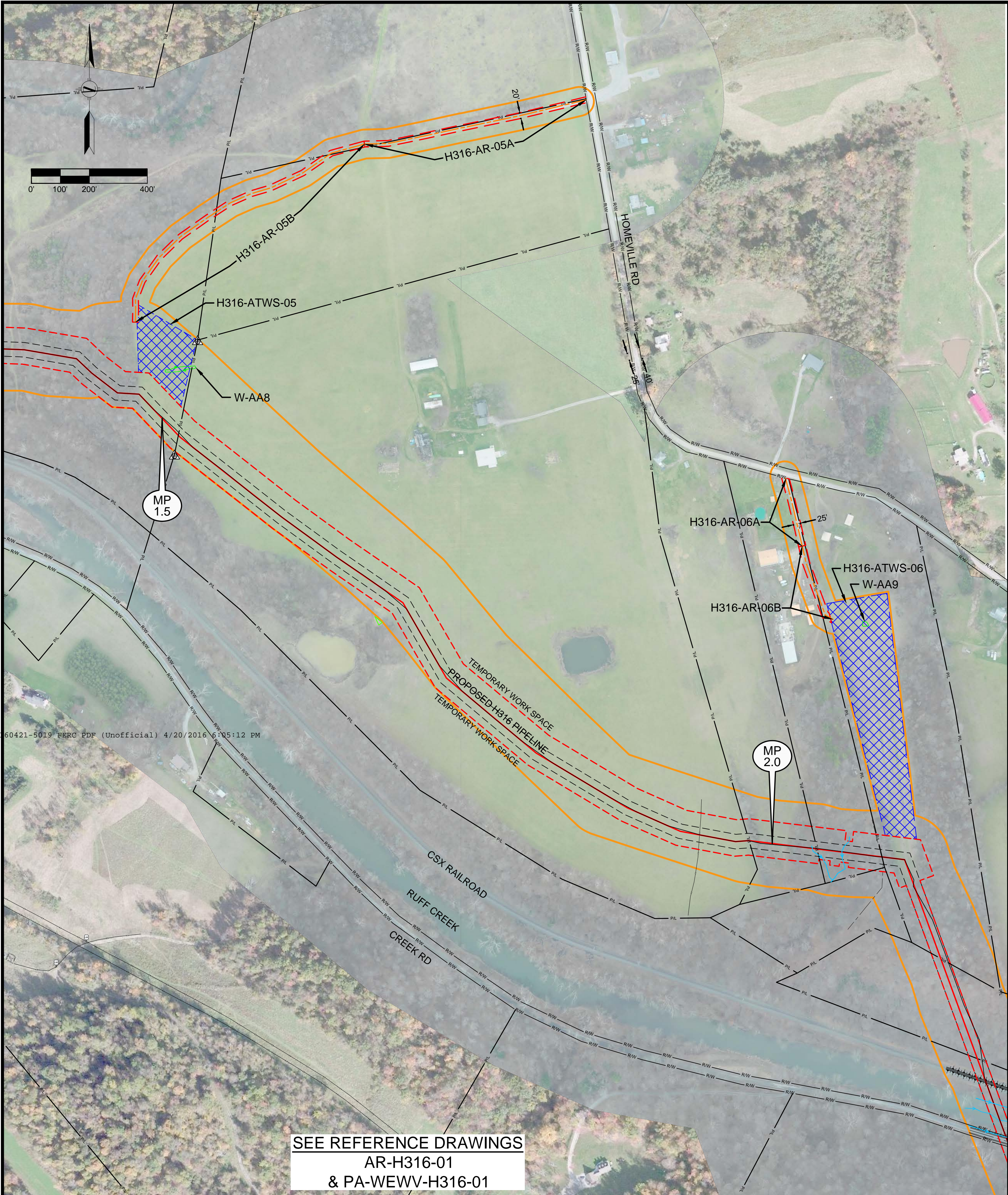
PROJECTION: UTM ZONE 17
HORIZONTAL DATUM: NAD 83 US SURVEY FEET
VERTICAL DATUM: NAVD88

[illegible]



PROJECTION: UTM ZONE 17
HORIZONTAL DATUM: NAD 83 US SURVEY FEET
VERTICAL DATUM: NAVD88

[illegible]



LEGEND	
	STUDY CORRIDOR
	ANCILLARY SITE
	PERMANENT ACCESS ROAD
	TEMPORARY ACCESS ROAD
	PROPOSED PIPELINE
	PROPOSED PERMANENT EASEMENT
	TEMPORARY WORK SPACE
	PIPELINE
	FENCE
	WATER LINE
	CHP LINE
	ROAD RIGHT-OF-WAY LINE
	UNKNOWN UNDERGROUND UTILITY
	WETLAND
	STREAM
	ABOVE GRADE FACILITY
	ADDITIONAL TEMPORARY WORK SPACE
	PIPELINE MARKER
	GATE - GATE POST
	POWER/TELEPHONE POLE
	WELL - GAS/OIL/WATER/MONITORING
	FIRE HYDRANT & VALVE
	PEDESTAL - UTILITY
	ELEC/GAS/WTR METER
	CULVERT
	BUILDING

REFERENCE DRAWINGS	
DRAWING NUMBER	TITLE
0	...
1	...
2	...
3	...
4	...
5	...
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10	...

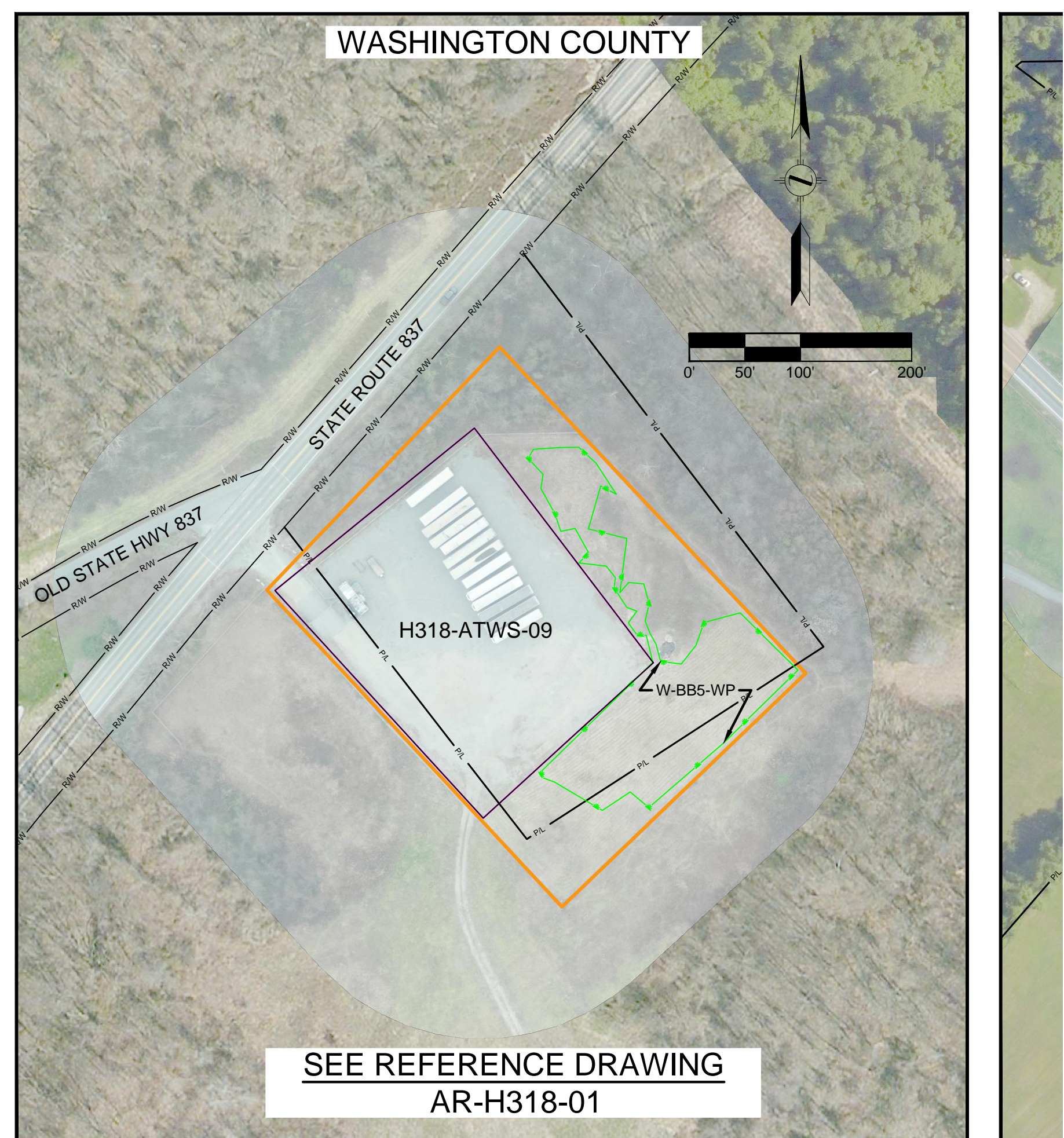
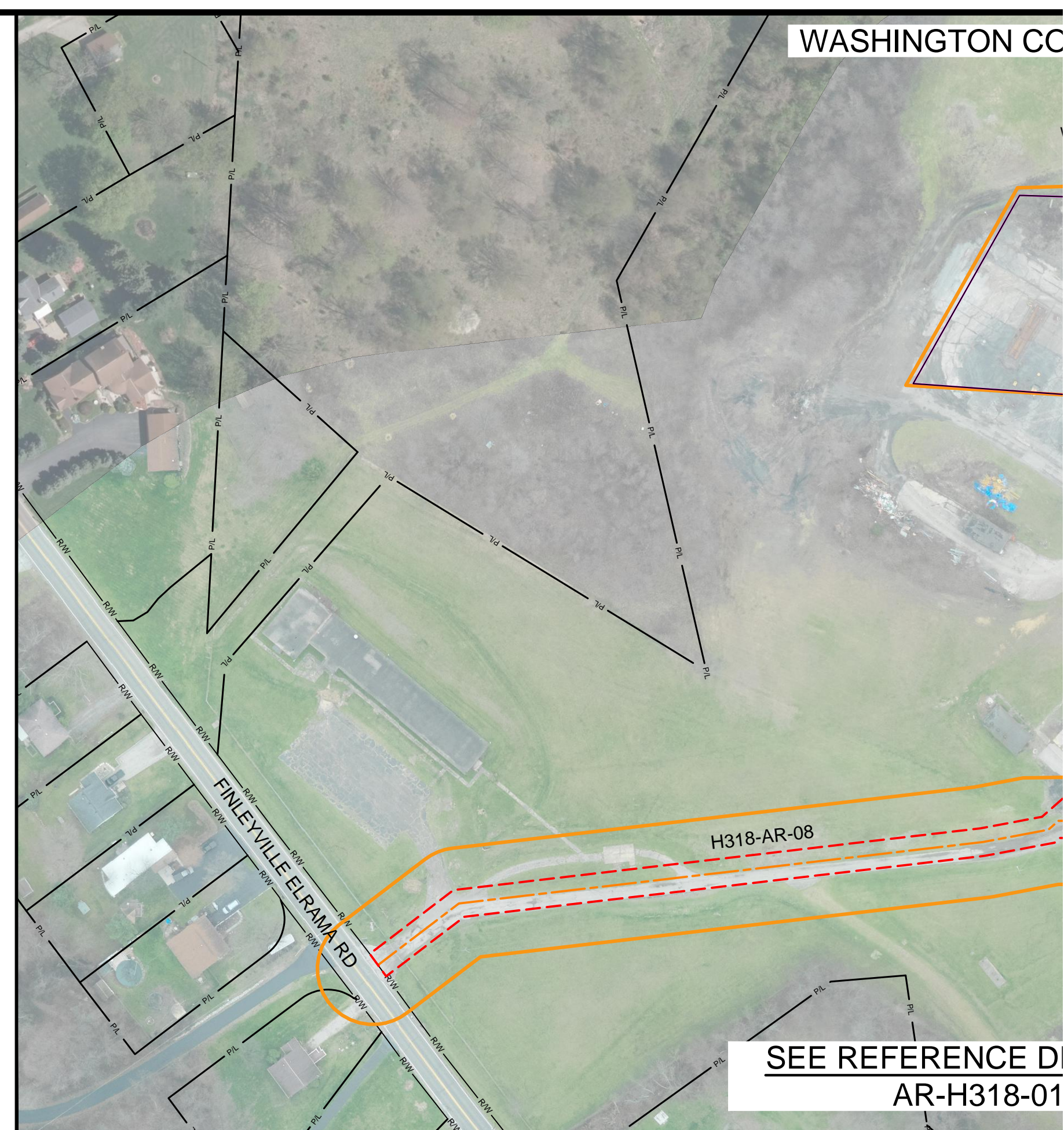
REVISIONS	
REV	DESCRIPTION
0	HEI 10/23/15 ISSUED TO FERC
1	HEI 02/05/16 RESPONSE TO FERC DATA REQUEST
2	HEI 04/15/16 RESPONSE TO FERC DATA REQUEST
3	...
4	...
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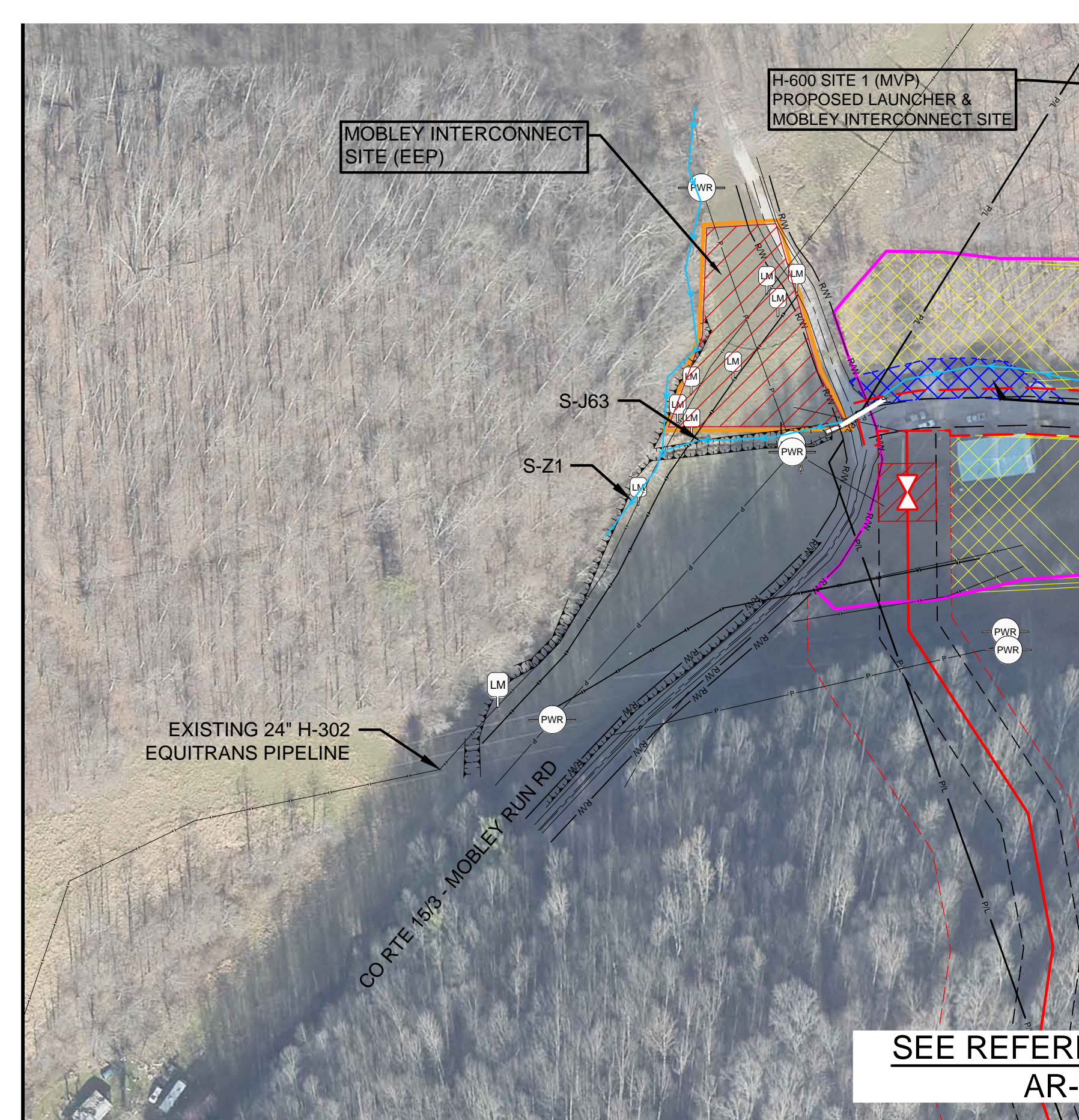
220 Hoover Boulevard, Suite 2
Holland, Michigan 49423-3766
T 616-392-5938 F 616-392-2116

28555 Evergreen Rd., Suite 430
Southfield, Michigan 48076
T 248-827-7322 F 248-827-7549

www.hollandengineering.com

APPROVED FOR FERC			APPROVED FOR BIDDING			APPROVED FOR CONSTRUCTION		
REV.	BY	DATE	REV.	BY	DATE	REV.	BY	DATE
0	JSW	10/23/15						
1	JSW	02/05/16						
2	JSW	04/15/16						
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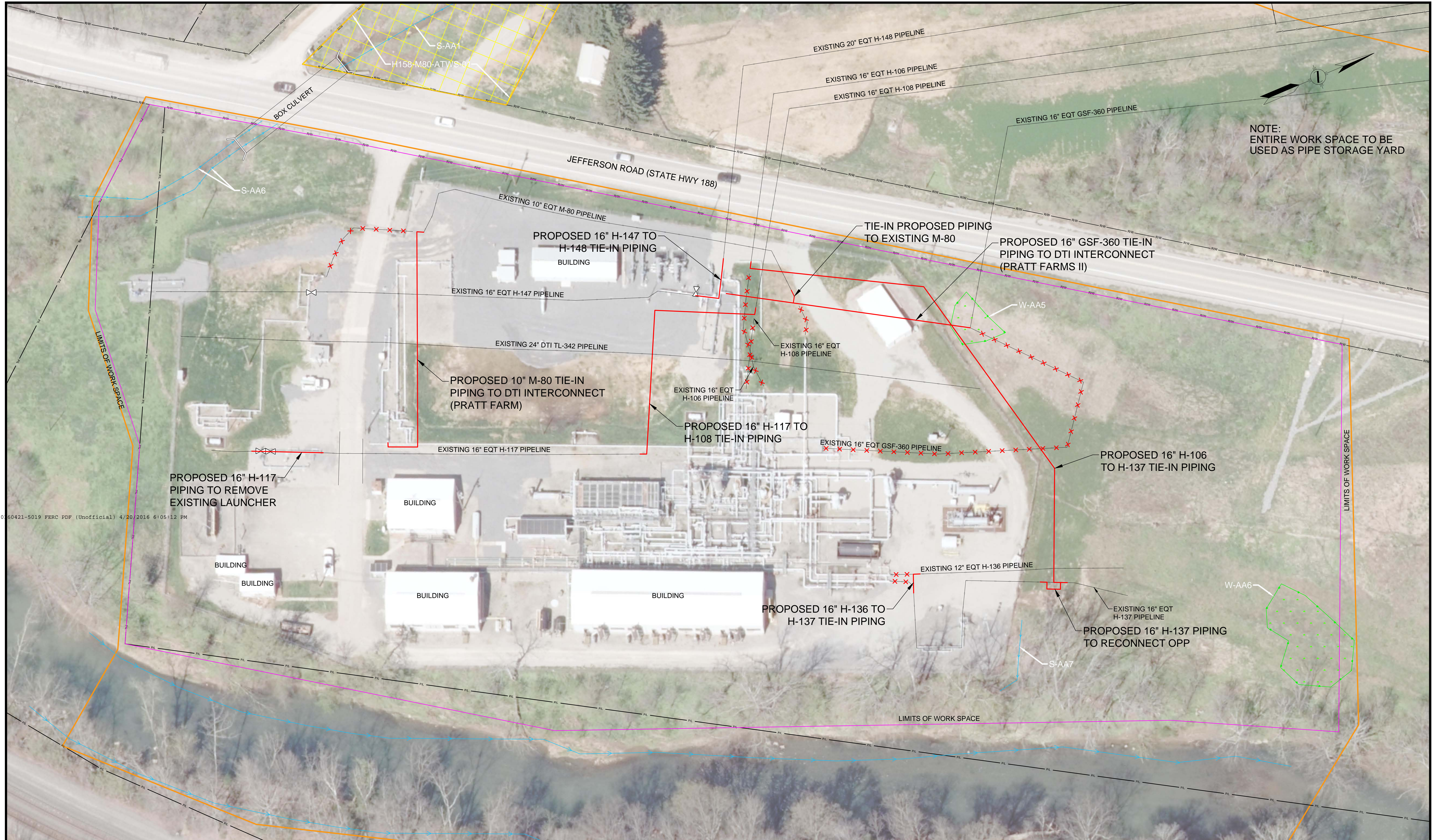


LEGEND		REFERENCE DRAWINGS		REVISIONS				APPROVED FOR FERC		APPROVED FOR BIDDING				APPROVED FOR CONSTRUCTION			
	STUDY CORRIDOR		ABOVE GRADE FACILITY	DRAWING NUMBER	TITLE	REV.	BY	DATE	DESCRIPTION	REV.	BY	DATE	REV.	BY	DATE		
	ANCILLARY SITE		ADDITIONAL TEMPORARY WORK SPACE (EEP)	0	HEI	10/23/15			ISSUED TO FERC	1	JSW	10/23/15					
	PERMANENT ACCESS ROAD		ADDITIONAL TEMPORARY WORK SPACE (MVP)	1	HEI	02/05/16			RESPONSE TO FERC DATA REQUEST	0	JSW	02/05/16					
	TEMPORARY ACCESS ROAD			2	HEI	04/15/16			RESPONSE TO FERC DATA REQUEST #2	1	JSW	02/05/16					
	PROPOSED PIPELINE									2	JSW	04/15/16					
	PROPOSED PERMANENT EASEMENT		CULVERT														
	TEMPORARY WORK SPACE		BUILDING														
			PIPELINE MARKER														
			GATE - GATE POST														
			POWER/TELEPHONE POLE														
			WELL - GAS/OIL/WATER/MONITORING														
			FIRE HYDRANT & VALVE														
			PEDESTAL - UTILITY														
			ELEC-GAS/WTR METER														
			WETLAND														
			STREAM														
PROJECTION: UTM ZONE 17		HORIZONTAL DATUM: NAD 83 US SURVEY FEET		VERTICAL DATUM: NAVD88													

220 Hoover Boulevard, Suite 2
Holland, Michigan 49423-3786
P 616-362-5538 F 616-362-2116

26555 Evergreen Rd., Suite. 430
Southfield, Michigan 48076
P 248-827-7522 F 248-827-7549

www.hollandengineering.com



20160421-5019 FERC PDF (Unofficial) 4/20/2016 6:05:12 PM

PROPOSED PIPELINE

EXISTING PIPELINE TO REMAIN

EXISTING PIPELINE TO BE REMOVED

WORK SPACE LIMITS

PERMANENT ACCESS RD

TEMPORARY ACCESS RD

LAYDOWN CONTRACTOR YARD

PROPERTY LINE

ROAD RIGHT-OF-WAY

FENCE LINE

OVERHEAD POWER

OVERHEAD TELEPHONE

CIL ROAD

CIL RAILROAD

DELINEATED STREAM (PROVIDED BY OTHERS)

DELINEATED WETLAND (PROVIDED BY OTHERS)

ABOVE GROUND FACILITY

ADDITIONAL TEMPORARY WORK SPACE (ATWS)

LINE MARKER

POWER/TELE POLE

TANK

TREE

GUY ANCHOR

GAS VALVE

GAS/OIL/WATER WELL

GATE POST

ELEC/GAS/WTR METER

CULVERT

DRAWING NUMBER

TITLE

REV

BY

DATE

DESCRIPTION

0

HEI

10/23/15

ISSUED TO FERC

2

HEI

04/15/16

ISSUED FOR RESPONSE TO DATA REQUEST #2

HOLLAND

ENGINEERING

220 Hoover Boulevard, Suite 2
Holland, Michigan 49423-3766
T 616-392-5938 F 616-392-2116

26555 Evergreen Rd, Suite 430
Southfield, Michigan 48076
T 248-827-7322 F 248-827-7549

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APPROVED FOR FERC

APPROVED FOR BIDDING

APPROVED FOR CONSTRUCTION

REV.

BY

DATE

REV.

BY

DATE

REV.

BY

DATE

0

JSW

10/23/15

2

JSW

04/15/16

HORZ. SCALE: 1" = 30'

DRAWN BY: HEI(JDB)

09/24/15

DRAFTING CK:

ENGINEERING CK:

UIE JOB NO.:

AFE/P.O. NO.:

HEI PROJECT NO.: 15-03-071

UIE FILE NO.:

DRAWING NO.:

SITE-PRATT-01

SHEET 1 OF 1

REV. 2

DATE OF PLOT: 4/14/16 9:40 AM

EQUITRANS

PRATT COMPRESSOR
STATION MODIFICATIONS
EQUITRANS EXPANSION PROJECT
GREENE COUNTY, PENNSYLVANIA

PROJECTION: UTM ZONE 17

HORIZONTAL DATUM: NAD 83 US SURVEY FEET

VERTICAL DATUM: NAVD83

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

RIGHT-OF-WAY & OWNERSHIP DATA

DESIGN	PIPE / COATING	CLASS LOCATION / HCA
PIPE / COATING	PIPE / COATING	CLASS LOCATION / HCA
SLOPE DISTANCE		
CLASS LOCATION / HCA		

ENVIRONMENTAL

CONSTRUCTION EXCLUSION	WETLAND / STREAM	SEDIMENT BARRIER LEFT	SEDIMENT BARRIER RIGHT
CONSTRUCTION EXCLUSION	W-BB8, W-BB9, W-BB10, W-BB11, S-BB4	SEDIMENT BARRIER LEFT	SEDIMENT BARRIER RIGHT

PLAN VIEW

LEGEND

- STUDY CORRIDOR
- PROPOSED PIPELINE
- 500' TICK MARK
- EXISTING PIPELINE
- PERMANENT EASEMENT
- WORK SPACE LIMITS
- PERMANENT ACCESS RD
- TEMPORARY ACCESS RD
- ANCILLARY SITE
- COUNTY LINE
- PROPERTY LINE
- ROAD RIGHT-OF-WAY
- FENCE LINE
- OVERHEAD POWER
- OVERHEAD TELEPHONE
- CL ROAD
- CL RAILROAD
- DELINEATED STREAM
- DELINEATED WETLAND
- BARRICADE FENCE
- PROPOSED FENCE
- PROPOSED TEST STATION
- PI SYMBOL
- MAILBOX
- LINE MARKER - VENT PIPE
- POWERTILE POLE
- SIGN
- TOWER LEG
- TREE
- GUY ANCHOR
- TANK
- GAS VALVE
- WELL - GAS/OIL/WATER
- MONITORING
- POST - GATE/FENCE
- ELEC GAS/WTR METER
- PEDESTAL - UTILITY
- MH - SANITARY/WATER
- CATCH BASIN - CULVERT
- ADDITIONAL TEMPORARY WORK SPACE (ATWS)
- ABOVE GROUND FACILITY

REFERENCE DRAWINGS

DRAWING NO.	DESCRIPTION
1	115+71 MATCH LINE
2	119+27 BEGIN WOODS
3	119+56 R
4	120+52 END WOODS
5	120+86 TOWER LEG 62' LT
6	120+96 OHP LINE
7	121+12 TOWER LEG 60' LT
8	121+52 BEGIN WOODS
9	122+49 BEGIN WETLAND(W-BB8)(PFO)
10	123+19 END WETLAND(W-BB8)(PFO)
11	126+17 BEGIN WETLAND(W-BB9)(PFO)
12	126+42 END WETLAND(W-BB9)(PFO)
13	127+61 BEGIN WETLAND(W-BB10)(PFO)
14	127+84 END WETLAND(W-BB10)(PFO)
15	140+84 BEGIN WETLAND(W-BB11)(PFO)
16	141+52 END WETLAND(W-BB11)(PFO)
17	143+40 R
18	146+60 PROPOSED TYPE 1 TEST STATION
19	146+63 STREAM BANK(S-BB4)(PER)
20	146+89 STREAM BANK(S-BB4)(PER)
21	146+93 GUY ANCHOR 15' LT
22	146+94 GUY ANCHOR 15' LT
23	146+96 END WOODS, SIGN 83' LT
24	147+01 POWER POLE 19' LT
25	147+14 PROPOSED TYPE 1 TEST STATION, OHP LINE
26	147+18 OHP LINE
27	147+21 VALVE(WATER) 39' LT, SIGN 59' LT
28	147+22 BEGIN ASPHALT
29	147+26 VALVE(WATER) 39' LT
30	147+26 VALVE(WATER) 39' LT
31	147+36 BUNOLA RIVER ROAD
32	147+51 UNDRG. UTILITY - WATER
33	147+51 UNDRG. UTILITY - GREEN
34	147+52 PROPOSED TYPE 1 TEST STATION, RIGHT-OF-WAY, R
35	147+68 POWER POLE 65' RT
36	147+75 POWER POLE 65' RT
37	148+20 PROPOSED RECTIFIER & GROUNDED
38	148+27 POWER POLE 79' LT
39	148+29 BEGIN WOODS
40	148+30 BUILDING - HOUSE(BURNED)43' RT
41	148+31 BUILDING - HOUSE(BURNED)43' RT
42	148+32 GUY ANCHOR 33' LT
43	148+33 GUY ANCHOR 34' LT
44	148+34 BUILDING - HOUSE(BURNED)6' RT
45	148+34 BUILDING - HOUSE(BURNED)6' RT
46	149+00 BEGIN HDD(ENTRY)
47	149+00 BUILDING - HOUSE(BURNED)18' RT
48	150+18 GUY ANCHOR 16' RT
49	150+24 POWER POLE 4' RT
50	150+25 OHP LINE
51	150+25 OHP LINE
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98	150+25 OHP LINE
99	150+25 OHP LINE
100	150+25 OHP LINE

HORIZONTAL STATIONING

WORK SPACE

CONSTRUCTION METHOD

PROFILE

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