EQUITRANS℠

Equitrans Expansion Project

Docket No. CP16-__-000

Resource Report 1 – General Project Description

October 2015

Equitrans Expansion Project
Resource Report 1 – General Project Description

Resource Report 1—General Project Description	
Filing Requirement	**Location in Resource Report**
1. Provide a detailed description and location map of the project facilities (§ 380.12(c)(1)). • Include all pipeline and aboveground facilities. • Include support areas for construction or operation. • Identify facilities to be abandoned.	Section 1.2 Figure 1.2-1
2. Describe any non-jurisdictional facilities that would be built in association with the project. (§ 380.12(c)(2)). • Include auxiliary facilities (See § 2.55(a)). • Describe the relationship to the jurisdictional facilities. • Include ownership, land requirements, gas consumption, megawatt size, construction status, and an update of the latest status of Federal, state, and local permits/approvals. • Include the length and diameter of any interconnecting pipeline. • Apply the four-factor test to each facility (see § 380.12(c)(2)(ii)).	Section 1.2.6
3. Provide current, original United States Geological Survey (USGS) 7.5-minute series topographic maps with mileposts showing the project facilities (§ 380.12(c)(3)). • Maps of equivalent details are acceptable if legible (check with staff). • Show locations of all linear project elements, and label them. • Show locations of all significant aboveground facilities, and label them.	Appendix 1-B
4. Provide aerial images or photographs or alignment sheets based on these sources with mileposts showing the project facilities. (§ 380.12(c)(3)). • No more than 1-year old • Scale no smaller than 1:6,000	Appendix 1-A (2013 aerial images)
5. Provide plot/site plans of compressor stations showing the location of the nearest noise-sensitive areas (NSA) within 1 mile. (§ 380.12(c)(3,4)). • Scale no smaller than 1:3,600 • Show reference to topographic maps and aerial alignments provided above.	Appendix 1-D
6. Describe construction and restoration methods. (§ 380.12(c)(6)).	Section 1.4
7. Identify the permits required for construction across surface waters. (§ 380.12(c)(9)). • Include the status of all permits. • For construction in the Federal offshore area be sure to include consultation with the MMS. File with the MMS for rights-of-way grants at the same time or before you file with the FERC.	Section 1.7 Table 1.7-1
8. Provide the names and addresses of all affected landowners as required and certify that all affected landowners will be notified; • Affected landowners are defined in § 157.6(d)(2) • Provide an electronic copy directly to the environmental staff.	Appendix 1-M

Resource Report 1—General Project Description	
Filing Requirement	**Location in Resource Report**
Additional Information Often Missing and Resulting in Data Requests	
1. Describe all authorizations required to complete the proposed action and the status of applications for such authorizations	Section 1.7 Table 1.7-1
2. Provide plot/site plans of all other aboveground facilities that are not completely within the right-of-way.	Appendix 1-C
3. Provide detailed typical construction right-of-way cross-section diagrams showing information such as widths and relative locations of existing rights-of-way, new permanent rights-of-way, and temporary construction rights-of-way. See Resource Report 8 – Land Use, Recreation, and Aesthetics.	Appendix 1-E
4. Summarize the total acreage of land affected by construction and operation of the project.	Section 1.3 Resource Report 8
5. If Resource Report 5 - Socioeconomics is not provided, provide the start and end dates of construction, the number of pipeline spreads that would be used, and the workforce per spread.	Section 1.4.5 Resource Report 5
6. Send two (2) additional copies of topographic maps and aerial images/photographs directly to the environmental staff of the Office of Energy Projects (OEP).	N/A

FERC Environmental Information Request for Resource Report 1 Dated July 2, 2015	
Request	**Status**
1. Identify the potential shippers for the proposed 600,000 dekatherms per day (Dth/day) of natural gas. Indicate how much of this volume is currently under binding contract.	Section 1.1.1
2. Indicate if Equitrans plans to install any communication towers along the proposed pipeline route, and if so, identify their location and height.	Section 1.2.2.1
3. Clarify the statement that the proposed Redhook Compressor Station would be "a new compressor station that will, ***in part***, replace an existing compressor station."	Section 1.1
4. Include the width of the survey corridor for access roads in section 1.1.2.	Section 1.1.2
5. Revise figure 1.2-1 to depict all Pennsylvania Project components, using inset maps as appropriate (for example, the H-158/M80 pipelines and the compressor station are not currently depicted). In addition, add the existing H-302 pipeline, the Texas Eastern line served by the H-302 pipeline, the Applegate Gathering System, the H-148 pipeline, and the existing Sunoco Mariner East pipeline to figure 1.2-1. Lastly, include a new figure(s) to depict the H-306/H-600 pipelines (Webster Interconnect) as well as the interconnects with Texas Eastern and Dominion.	Figure 1.2-1
6. Fill in data marked "TBD" in tables 1.2-2, 1.3-3, 1.3-4, 1.3-5, 1.4-1, 1.4-2, and 1.4-3.	Tables 1.2-2, 1.3-3, 1.3-4, 1.3-5, 1.4-1, 1.4-2, and 1.4-3 (last 3 tables are now 1.4-2, 1.4-3, and 1.4-4).
7. Include additional detail regarding why and how adjacent pipelines described in section 1.2.6 would be potentially relocated based on Project impacts.	Section 1.2.6
8. Clarify why there would be permanent impacts (1.06 acres) associated with contractor yards as listed in table 1.3-1.	Table 1.3-1.
9. Include a table listing additional temporary workspaces (ATWS), by purpose (i.e., road crossing), milepost, dimensions (in feet), and acres impacted. Indicate in section 1.3.4 whether Equitrans could locate ATWS to avoid forest, waterbodies, wetlands, and other sensitive resources.	Section 1.4.1.1
10. Include a table listing all residences (by milepost) within 100 feet of the construction work area. For each residence, indicate the distance (in feet) from the outer limits of the construction work space.	Table 1.4-4.
11. Revise section 1.2.3 to describe in more detail the "modification" and "rerouting" proposed for the M-80 and H-158 pipelines. Include the distance between the M-80 and H-158 pipelines.	Section 1.3.1
12. Include a detailed discussion regarding which facilities would remain in-service following demolition of the Pratt Compressor Station. Include a discussion of the purpose of all remaining facilities. Also include a discussion of planned demolition activities for the existing Pratt Compressor Station.	Section 1.4.3
13. Include a detailed plot plan for the proposed Webster Interconnect and any other proposed interconnections.	Appendix 1-C
14. Section 1.1 states the proposed pipelines would total approximately 9 miles. However, table 1.2-1 indicated there would be only 7.3 miles of pipeline. Resolve the apparent discrepancy.	Section 1.1. and throughout Resource Report 1

FERC Environmental Information Request for Resource Report 1 Dated July 2, 2015	
Request	**Status**
15. Revise section 1.2 to include a detailed discussion regarding Equitrans' intent to supply gas to Texas Eastern and Dominion. Include details regarding the need for associated aboveground facilities and/or piping. Analyze all impacts for these facilities throughout all other RRs.	Section 1.2.1
16. Revise table 1.2-2 to include pig launcher/receiver facilities as discussed in section 1.4.2.	Section 1.2-2
17. Revise table 1.3-1 to depict the Webster Interconnect as a separate item. Include proposed meter stations, pig launcher/receiver facilities, pipe storage yards, contractor staging yards, cathodic protection rectifiers and beds, and mainline valve sites (even if they would be contained within the pipeline right-of-way).	Table 1.3-1
18. Revise table 1.3-2 to include the Project component, adjacent facility type and name, paralleled length (feet), width of the foreign right-of-way (feet), width of the foreign right-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). Table 1.3-2 indicates the proposed H-318 pipeline would not be co-located with any existing rights-of-way. However, comment letters received by the FERC indicate the proposed H-318 line would be co-located with the existing Sunoco Mariner East pipeline. Clarify the apparent discrepancy.	Partially addressed in Table 1.3-2. Will be addressed with supplemental information
19. Explain in detail, on a site-specific basis, and further justify why a 110-foot-wide construction right-of-way is needed along the H-316 pipeline segment and a 100-foot-wide construction right-of-way would be needed for the H-318, H-158, and M-80 pipeline segments, particularly in forested uplands (if applicable) where topsoil stripping may not be required.	Section 1.3.1
20. Explain and justify any request to modify the FERC's *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures, May 2013 version) or our *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan, May 2013 version). In particular, present site-specific reasons to use a construction right-of-way across wetlands greater than 75-feet-wide.	Section 1.4.1.1(l)
21. Include measures to be implemented to avoid or minimize impacts on sensitive resources, such as waterbodies, wetlands, and forest, along new access roads.	Addressed throughout Resource Report 1
22. Include in section 1.4.1.1 a description of which areas would be subject to local, state, or federal requirements regarding burning of brush and slash as well as summarizing the pertinent regulations (also include in table 1.7-1). Further, include Equitrans' proposed best management practices (a Fire Prevention and Suppression Plan) that would be used to prevent impacts from burning to all potentially affected resources such as waterbodies, wetlands, wildlife, air quality, and risk to nearby structures. The plan should establish protocols and lines of communication for reporting fires, describe the fire equipment that would be present during all Project-related burns, and outline any fire training that would be provided to Project personnel	Section 1.4.1.1(b)
23. Clarify in section 1.4.1.1 whether "all waterbody banks would be restored to the original grade" or if some waterbody banks may be modified to a stable angle of repose when approved by the environmental inspector as allowed in our Procedures in section V.C.3.	Section 1.4.1.1(b)
24. Revise table 1.3-5 to include pipe storage yards.	Table 1.3-1 (see note a/)

FERC Environmental Information Request for Resource Report 1 Dated July 2, 2015	
Request	**Status**
25. Given that the Mountain Valley Pipeline Project (MVP) in Docket No. PF15-3-000 and EEP will be evaluated in the same EIS, and given that Equitrans is involved with both projects, clearly identify any differences between MVP's and Equitrans' proposed standard construction and restoration techniques	Section 1.4
26. In situations where Equitrans proposes to use a horizontal directional drill (HDD), indicate: a. If a geotechnical study has been completed at each HDD location to evaluate the probability of success; b. The reasons why a 15-foot-wide corridor along the path of the HDD would be cleared, and analyze if a narrower pathway could be used; c. Clarify the specific diameter of large trees that would be avoided and not cut within the HDD corridor; and d. Evaluate the feasibility of pulling the HDD pipe in segments, rather than pre-fabricating the entire HDD length.	Section 1.4.1.1
27. Section 1.4.1.1 states that equipment may operate in the water for some open-cut waterbody crossings. In the waterbody crossing table to be provided in RR2, denote at which specific crossings equipment would be placed in the water.	Section 1.4.1.1(e)
28. Where Equitrans proposes to use a bore to cross a waterbody, road, or railroad, include a site-specific description of the associated topography, elevations at both ends of the bore, pit dimensions, and the size and location of temporary extra workspace to store spoil.	Addressed partially in Section 1.4.1.1. Will be addressed with supplemental information
29. Supplement the measures listed for construction in residential areas in section 1.4.1.1 to also include preventing overnight access to the trench and capping of the open ends of pipe.	Section 1.4.1.1
30. Section 1.4.1.1 states that Equitrans would provide in RR 8 site-specific residential construction plans for all houses within 25 feet of the construction right-of-way. Instead, include site-specific plans for all residences within 50 feet of the exterior boundary of the construction workspace.	Section 1.4.1.1
31. Include a table of both vertical and lateral (side) slopes between 15 percent and 30 percent grade and a table of both vertical and lateral (side) slopes greater than 30 percent grade that would be crossed by the Project. Include a discussion of specialized construction methods that would be utilized by Equitrans for each area of steep slope.	Table 1.4-5
32. Describe special measures that would be used for construction or restoration in steep terrain. Explain how Equitrans would prevent rocks from rolling off the right-of-way, install erosion controls, and prevent post-construction landslides, particularly in relation to the replacement and compaction of soils. Where applicable, list areas that would be subject to a proposed variance from the Plan section V.A.5. Include typical cross-sectional diagrams that illustrate both construction and restoration processes for the pipeline construction right-of-way for steep-vertical slopes and steep-lateral side slopes.	Section 1.4.3.1 and Appendix 1-C
33. Include a Project-specific plan for winter construction. If construction would be halted during the winter, include a Winterization Plan that outlines measures to secure the right-of-way, and protect it from erosion or other damages, until construction would resume in the spring.	Section 1.4.1.2 and Appendix 1-K
34. Section 1.4.2 states "Mainline valves (MLVs) will be installed within proposed new compressor station sites…" Clarify if Equitrans is proposing more than one new compressor station.	Section 1.4.2

FERC Environmental Information Request for Resource Report 1 Dated July 2, 2015	
Request	**Status**
35. Clarify whether the natural gas transported would be odorized and discuss any potential advantages to installing automatically closing mainline block valves. Further, estimate the amount of time between the issuance of a remote signal to close a MLV and the actual closing of the valve.	Section 1.2.1.3
36. Clearly state whether or not Equitrans would participate in FERC's third-party construction compliance monitoring program, in association with MVP's commitment to do so.	Section 1.4.4
37. Section 1.4.5 states Equitrans' expected in-service date for the Project is December 2017. However, table 1.4-3 does not depict construction ending until December 2018 and states the anticipated in-service date is December 2018. Clarify the discrepancy.	Section 1.4.5
38. Estimate, by construction spread, the number of temporary employees that would be hired during construction of the Project, and their typical length of employment on the Project. Estimate the percentage of the workforce that would be local (same state), and the percent that would be union labor. Indicate how many new permanent jobs would be required to operate the Project, and where the new permanent employees would be stationed.	Resource Report 5
39. Describe plans for invasive plant species control during construction. Given that "it is Equitrans policy not to use herbicides to maintain the right-of-way" describe the proposed methods to control invasive plant species during Project operations.	Section 1.4.1.1
40. Revise section 1.10 of RR1 to identify the location [e.g., county, state, watershed, and Air Quality Control Region], timeframe, general description, and estimated impact acres of recently completed, current, and reasonably foreseeable projects. Use the fifth-field hydrologic unit code watershed as the geographic extent of the analyses, except where that is non-applicable, such as for an air quality basin and socioeconomics at the county level. Include a detailed discussion of cumulative impacts that these projects combined with the proposed EEP would have on each of the applicable environmental resources, such as soils, vegetation, wildlife, cultural resources, land use, air quality, etc. Outline measures other project proponents may implement, if required for local, state, or federal permitting, to avoid, minimize, or mitigate cumulative impacts.	Section 1.10
41. Section 1.10 states "no other utility projects in the vicinity of the Project have been identified at this time." Revise section 1.10 to include a discussion of the existing Sunoco Mariner East fuel pipeline and Sunoco's planned Mariner East 2 Pipeline.	Section 1.10
42. Revise table 1.7-1 to include an anticipated permit application submittal date for each permit.	Table 1.7-1

FERC Environmental Information Request for Resource Report 1 Dated July 2, 2015	
Request	**Status**
43. If there are any non-jurisdictional facilities that would be built as a result of the new gas volumes associated with this Project, include the following detailed information for each facility: a. company/owner; b. type of facility; c. dimensions (pipe diameter, length, horsepower, etc. as appropriate for pipeline and land area for other facilities); d. maps showing locations; e. federal permits required and their status; f. status of local and state permits required; and g. any environmental reviews required for local, state, or federal permitting authorities. Consider any water or electrical transmission lines that would be needed to supply the proposed compressor station, meter stations, MLVs, cathodic protection beds, or other facilities. Include a description, potential impacts, and proposed mitigation for these facilities.	Section 1.9
44. Include the missing data for the appendices: a. Appendix 1A – Alignment sheets; b. Appendix 1B – Topographic maps - revise page 1 of 3 to depict both the H-158 and M80 pipelines separately; c. Appendix 1C – Typical drawings; d. Appendix 1D – Project-Specific Erosion Control Plan; e. Appendix 1E – HDD Contingency Plan; f. Appendix 1F – tables - revise table 1-F to include columns for i) type of road surface (gravel or asphalt); ii) landowner (private, county, state); and iii) proposed crossing method for each railroad and roadway; g. Appendix 1G – Agency correspondence - include copies of any responses from agencies to the April 27, 2015 letters sent out by Equitrans regarding the EEP.	Addressed in Appendices

FERC Environmental Information Request for Resource Report 1 Dated September 28, 2015	
Request	**Status**
1. Describe in detail in section 1.1 realistic opportunities for the Project to provide natural gas service to local distribution companies (LDC) located along the pipeline routes, including specifics on which LDCs are currently coordinating with Equitrans and which communities may be served.	Section 1.1.2
2. Fully describe in section 1.2.2.1 all aspects of the proposed communication tower at the new Redhook Compressor Station, including dimensions, acres, height (in feet) and width, a typical drawing, and permitting requirements and status. Discuss throughout all resource reports (RR) potential impacts of the tower on migratory birds, bats, and visual resources.	Section 1.2.2.1 and compressor plot plan in Appendix 1-I
3. Add the H-305 and H-319 pipelines and any associated facilities to figure 1.2-1, or depict them in a separate figure.	Figure 1.2-1.

FERC Environmental Information Request for Resource Report 1 Dated September 28, 2015	
Request	**Status**
4. Section 1.2.3 states "the Webster Interconnect and Mobley Tap will only require a connection to the existing power on those sites." Both of these sites are greenfield locations. Clarify what is meant by "existing power." Clarify whether new utilities to provide potable water, telephone, or internet service to the Redhook Compressor Station or other aboveground facilities would be required. For all new non-jurisdictional facilities related to this Project, include details such as type, size, and location, the name of the company owning or building the facilities, and the status of permits. Discuss details about the projects for the cumulative impacts analysis (see question 40 in our July 2, 2015 data request).	Section 1.2.3
5. Resolve the apparent discrepancies in construction right-of-way widths for each Project component between table 1.3-1 and section 1.3.1.	Table 1.3-1 and Section 1.3.1
6. Include in section 1.3 a proposed construction right-of-way width for the H-305 and H-319 pipelines.	Section 1.3.1
7. Include an analysis of the potential to reduce the nominal construction right-of-way width in forested areas where topsoil would not typically be segregated, with additional temporary workspaces (ATWS) justified by site-specific conditions.	Section 1.3.1
8. Section 1.3.1 states that the Project would be collocated for approximately 0.99 mile, but section 1.2.1.1 states that the H-316 pipeline would be 2.99 miles long and would follow "an existing Texas Eastern corridor." Resolve the apparent discrepancy.	Section 1.2.1.1
9. Section 1.4 states electrical resistivity monitoring would be performed at the Monongahela River crossing. Clarify if this study would also be performed at the other proposed horizontal directional drill (HDD) crossing of Ten Mile Creek. File the results of all studies done to support HDDs.	Geotechnical investigations and the result of electrical resistivity monitoring are included as Appendix 1-F.
10. Include a table in section 1.4.1.1 listing any request to modify the FERC's *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures, May 2013 version) or our *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan, May 2013 version). Explain and justify, in narrative text, why such modifications are necessary, and indicate if alternative measures proposed by Equitrans would offer equivalent protection to environmental resources.	Section 1.4.1.1
11. Indicate in section 1.4.1.1 the source of any clean fill or soil/sand that may be used for the Project, and indicate whether it would be obtained from a certified weed-free source.	Section 1.4.1.1
12. Include, in section 1.4.1.1, a discussion of the feasibility of using Direct Pipe technology to cross specific waterbodies where that trenchless construction method may offer advantages relative to an HDD in certain situations such as unfavorable geology.	Section 1.4.1.1
13. Section 1.4 states "the current construction schedule for the Project does not indicate that construction will occur in the winter months." However, the Winterization Plan states "based on the Project construction schedule, Equitrans anticipates that standard construction and restoration may occur in the 2017-2018 winter seasons." Resolve the apparent discrepancy.	Section 1.4
14. Revise section 1.4.2 to include the number and installation depth of the subsurface friction piles needed for each aboveground facility. In addition, list the locations of all proposed mainline block valves (MLV).	Section 1.4.2
Appendices	
1. Ensure that the full extent of access roads are depicted on alignment sheets or other aerial imagery, not just where they occur within the limit of the aerial photography.	Appendix 1-A
2. Revise appendix 1-B to include maps of the H-319 and H-305 pipelines, the Webster Interconnect, and the Mobley Tap.	Appendix 1-B
3. Include typical drawings for the for the H-319 and H-305 pipelines.	Appendix 1-E

FERC Environmental Information Request for Resource Report 1 Dated September 28, 2015	
Request	**Status**
4. Revise the HDD Contingency Plan to include contact names and numbers for the FERC Project Manager, the U.S. Army Corps of Engineers (COE), and the Pennsylvania Department of Environmental Protection (PADEP).	Appendix 1-H
5. Revise table 1-F to include road and/or railroad crossing locations for the H-319 and H-305 pipelines, as appropriate. Indicate if no roads and/or railroads would be crossed by these pipelines. Also, indicate whether each road is publicly or privately owned.	Appendix 1-I
6. File Privileged and Confidential or Critical Energy Infrastructure plot plans for the Webster Interconnection so the image is legible.	Appendix 1-C
7. Clarify whether or not Equitrans has already identified ATWS expected to be needed for snow storage (from both the right-of-way and access roads) or if it would be identified on an as-needed basis. Describe all equipment that would be used to remove snow from the right-of-way and access roads.	Appendix 1-J
8. Indicate whether or not an open trench covered in snow would also be marked with high visibility poles to alert persons on all-terrain vehicles and others.	Appendix 1-J
9. Explain why mulching would cover “at least seventy-five percent of the ground surface” and not 100 percent.	Appendix 1-J
10. Clarify whether sediment barriers would be installed with the goal of “minimal reportable control failures” or with a goal of no control failures.	Appendix 1-J
11. Clarify the statement “topsoil piles will be left in a stabilized condition and replaced when weather conditions permit proper de-compaction of the areas.”	Appendix 1-K
12. Include specific timeframes for “continuously” monitored and maintained erosion control devices (ECD) and “consistent” inspections of stabilized and active construction areas.	Appendix 1-J
13. Clarify whether Equitrans would use a specialized “shoe” that may be fitted to the blade or bucket of heavy equipment as discussed in MVP’s draft winter construction plan. Describe in more detail how soil would not be disturbed and mixed with snow when “blading” is conducted during snow management activities on both the construction right-of-way and access roads.	Appendix 1-J
14. Describe in more detail how ECDs such as silt fence, staked hay bales, and slope breakers would be installed and repaired under frozen conditions or snow cover.	Appendix 1-J

RESOURCE REPORT 1
GENERAL PROJECT DESCRIPTION
TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

RESOURCE REPORT 1
GENERAL PROJECT DESCRIPTION

LIST OF ACRONYMS AND ABBREVIATIONS

APE	area of potential effect
API	American Petroleum Institute
ASME	American Society for Mechanical Engineers
ATWS	additional temporary workspace
Bcf/d	billion cubic feet per day
BMP	best management practice
CEII	Critical Energy Infrastructure Information
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO_2	carbon dioxide
Columbia	Columbia Gas Transmission, LLC
Dominion	Dominion Transmission, Inc.
Dth/day	dekatherms per day
EI	Environmental Inspector
EPA	U.S. Environmental Protection Agency
EQT Gathering	EQT Gathering, LLC
Equitrans	Equitrans, L.P.
ESCGP-2	Erosion and Sediment Control General Permit
FERC or Commission	Federal Energy Regulatory Commission
GHG	greenhouse gas
HDD	horizontal directional drilling
hp	horsepower
IPCC	Intergovernmental Panel on Climate Change
LDC	local distribution company
MAOP	Maximum Allowable Operating Pressure
MLV	mainline valve
MMcfd	million cubic feet per day
Mountain Valley	Mountain Valley Pipeline LLC
MTBM	Microtunnel Boring Machine
MVP	Mountain Valley Pipeline
NDE	non-destructive examination
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OEP	FERC Office of Energy Projects
OSHA	Occupational Safety and Health Administration
PL	Public Law
Plan	FERC May 2013 version of the Upland Erosion Control, Revegetation, and Maintenance Plan
Procedures	FERC May 2013 version of the Wetland and Waterbody Construction and Mitigation Procedures

Project	Equitrans Expansion Project
psig	pounds per square inch gauge
SHPO	State Historic Preservation Office
Tcf	trillion cubic feet
Texas Eastern	Texas Eastern Transmission, LP
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDOT	U.S. Department of Transportation
USGCRP	United States Global Change Research Program
USGS	U.S. Geological Survey

RESOURCE REPORT 1
GENERAL PROJECT DESCRIPTION

1.1 INTRODUCTION

Equitrans, L.P. (Equitrans) is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission (FERC or Commission) 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 (MVP), 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 MVP, as well as to existing interconnects with Texas Eastern Transmission, LP (Texas Eastern), Dominion Transmission, Inc. (Dominion), and Columbia Gas Transmission, LLC (Columbia). 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. The Project will also 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 (Dth/day) of north-south firm capacity on the Equitrans system.

1.1.1 Environmental Resource Report Organization

A complete summary of Project facilities proposed by Equitrans is provided in Section 1.2. Land requirements for Project facilities are provided in Section 1.3. Construction methods that may be used to install the pipeline and construct aboveground facilities, including restoration, are provided in Section 1.4. This section also includes the proposed construction schedule and workforce. Operation and maintenance of Project facilities is discussed in Section 1.5. Permits and approvals, including major consultations, are included in Section 1.7. A discussion regarding potential impacts on affected landowners is provided in Section 1.8. Non-jurisdictional facilities are discussed in Section 1.9. All cumulative impacts relating to the Project are discussed in Section 1.10. Lastly, Section 1.11 includes a list of the references cited for this report.

1.1.2 Purpose and Need

The Project is designed to provide shippers with the flexibility to transport up to an additional 400,000 Dth/day of natural gas produced in the central Appalachian Basin to meet the growing demand by local distribution companies (LDCs), industrial users, and power generation facilities located in the local, northeastern, Mid-Atlantic, and southeastern regions of the United States. Equitrans has negotiated a binding agreement with a Project shipper. Equitrans is filing this agreement with its certificate application. The Equitrans System currently services Peoples Natural Gas, Columbia Gas of Pennsylvania, and Dominion Hope Gas.

In recent years, the North American natural gas market has seen enormous growth in production and demand. The United States Energy Information Administration (EIA) estimates that total natural gas consumption in the United States will increase from 26.2 trillion cubic feet (Tcf) in 2013 to between 29.7 Tcf and 37.4 Tcf in 2040 (EIA 2015). The increased demand for natural gas is expected to be especially high in the southeastern United States, as coal-fired generation plants convert to or are replaced by natural gas-fired generation plants.

A sizable portion of natural gas production growth is occurring in the Appalachian Basin shale region. Appalachian Basin shale gas production has increased from 2 billion cubic feet per day (Bcf/d) in 2010 to over 15 Bcf/d in July 2014. The infrastructure design of the Project will bring natural gas supplies from the prolific Appalachian Basin and it to local, northeastern, Mid-Atlantic, and southeastern demand markets in order to support the growing demand for clean-burning natural gas, provide increased supply diversity, and improve supply reliability to these growing markets.

1.2 LOCATION AND DESCRIPTION OF FACILITIES

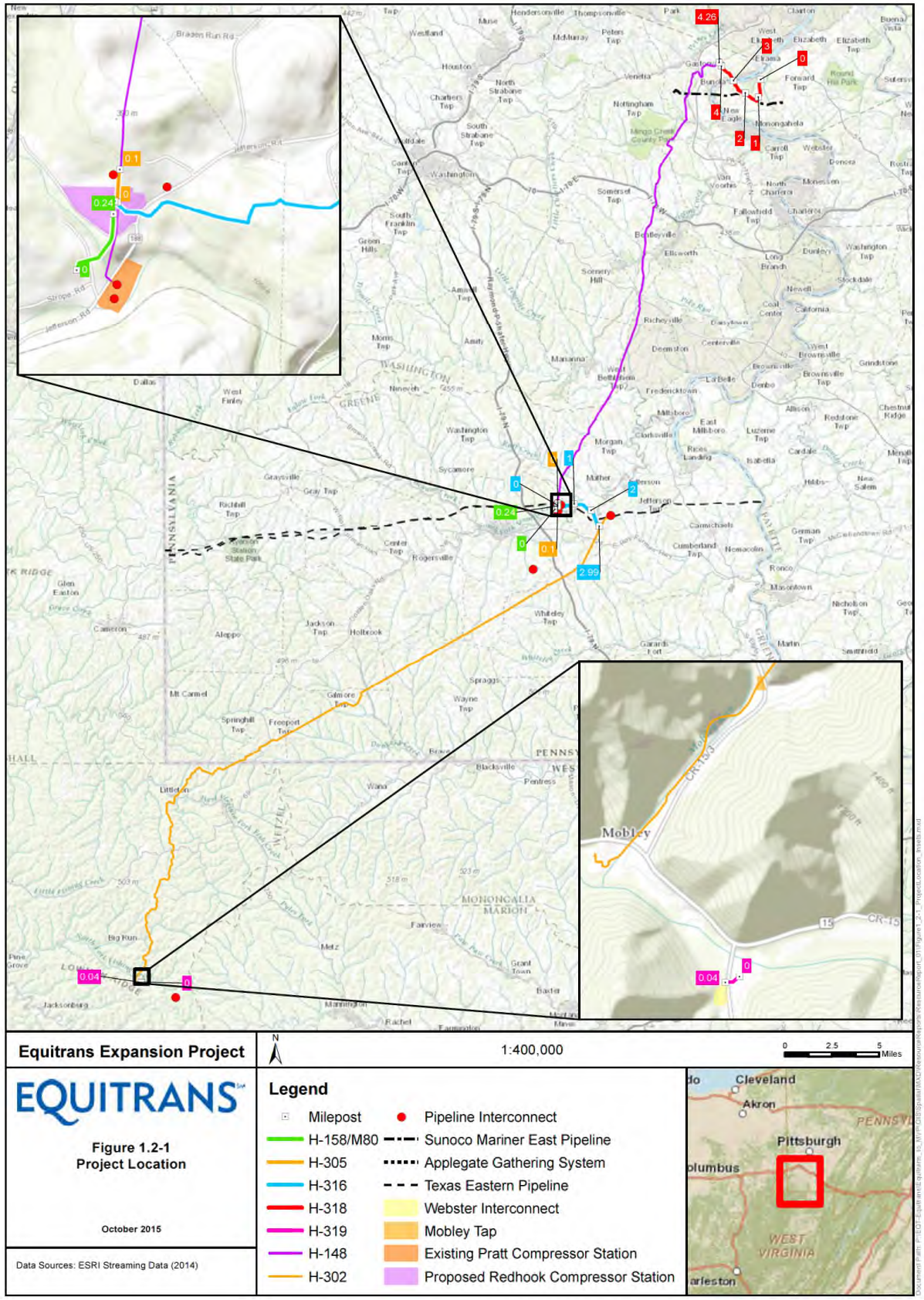
The pipeline and aboveground facilities described in this resource report will be designed, constructed, tested, operated, and maintained in accordance with the requirements of 49 Code of Federal Regulations (CFR), Part 192, Transportation of Natural Gas and Other Gas by Pipeline; Minimum Safety Standards; 18 CFR § 380.15, Site and Maintenance Requirements; and other applicable federal and state regulations.

1.2.1 Pipeline Facilities

The Project is designed to add up to 400,000 Dth/day of north-south firm capacity to bring natural gas from the central Appalachian Basin into the interstate pipeline grid or existing Equitrans markets. To add such capacity, Equitrans proposes the following five non-continuous system modifications: (i) build a new 2.99-mile, 30-inch diameter pipeline in Greene County, Pennsylvania (the "H-316 Pipeline"); (ii) build a new 4.26-mile, 20-inch-diameter pipeline in Allegheny and Washington Counties, Pennsylvania (the "H-318 Pipeline"); (iii) replace and expand its existing Pratt Compressor Station with the Redhook Compressor Station in Greene County, Pennsylvania; (iv) add the Webster interconnect with Mountain Valley Pipeline LLC's (Mountain Valley) proposed pipeline in Wetzel County, West Virginia, in the southern portion of Equitrans system; and (v) add the Mobley Tap on Equitrans' H-302 pipeline that also connects with Mountain Valley's proposed pipeline in Wetzel County, West Virginia. In total, the Project facilities include approximately 7.87 miles of pipeline and four compressor units with up to a total of approximately 31,300 horsepower (hp) of compression. Additionally, four smaller pipelines—the M-80, the H-158, the H-305, and the H-319 pipelines—will also be modified or constructed as part of the Project.

Together, the system modifications described above are designed to facilitate the transportation of 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, Dominion, and Columbia. Equitrans currently transports natural gas to multiple markets through the Pratt Compressor Station. Equitrans will continue to maintain transport to such markets through the new Redhook Compressor Station and pipelines at Pratt Station.

A map of the pipeline routes, compressor station locations, and interconnect and ancillary facilities is shown in Figure 1.2-1. The details of the pipelines, the compressor station, interconnect, ancillary facilities, and metering and regulation facilities are provided in the sections below.


Equitrans Expansion Project
1:400,000
0 2.5 5 Miles
EQUITRANS
Figure 1.2-1
Project Location
October 2015
Data Sources: ESRI Streaming Data (2014)
Legend
Milepost
Pipeline Interconnect
H-158/M80
Sunoco Mariner East Pipeline
H-305
Applegate Gathering System
H-316
Texas Eastern Pipeline
H-318
Webster Interconnect
H-319
Mobley Tap
H-148
Existing Pratt Compressor Station
H-302
Proposed Redhook Compressor Station
Cleveland
Akron
Pittsburgh
WEST VIRGINIA
Mobley

1.2.1.1 H-316 Pipeline

The H-316 pipeline consists of approximately 2.99 miles of 30-inch-diameter pipeline with a 1,200 pounds per square inch gauge (psig) Maximum Allowable Operating Pressure (MAOP). The pipeline will generally run east-west and will be located in Greene County, Pennsylvania, following an existing Texas Eastern corridor. The H-316 pipeline 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 Mountain Valley.

1.2.1.2 H-318 Pipeline

The H-318 pipeline consists of approximately 4.26 miles of 20-inch-diameter pipeline with a 1,200 psig MAOP. The pipeline will generally run east-west and will be located in Allegheny and Washington Counties, Pennsylvania, in the northern portion of Equitrans' system. The H-318 pipeline will move gas from the Applegate Gathering System, which is operated by EQT Gathering, LLC (EQT Gathering), to Equitrans' existing H-148 pipeline for delivery south. The Equitrans System has multiple delivery points with Peoples Natural Gas in areas near the H-318 pipeline.

1.2.1.3 Secondary Pipelines

Four short pipelines—the M-80, the H-158, the H-305, and the H-319 pipelines—are also included as part of the Project. 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 Braden Run Interconnect with Texas Eastern. The H-319 pipeline is a new 16-inch pipeline, approximately 200 feet in length that will connect the Equitrans H-306 pipeline to the Webster Interconnect with Mountain Valley. There are no current requirements from a compliance perspective for the gas within the pipeline to be odorized; therefore, transported natural gas will not be odorized.

Figure 1.2-1 provides an overview of the pipeline routes. Table 1.2-1 identifies the counties crossed by the pipeline by milepost. Appendix 1-A contains alignment sheets for the Project and the location of these facilities. Appendix 1-B contains U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle maps.

Table 1.2-1

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 4.26	Washington/PA	1.23
H-316	0.00 to 2.99	Green/PA	2.99
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	0.10
		Total	**7.87**

1.2.2 Aboveground Facilities

1.2.2.1 Compressor Station

The proposed Redhook Compressor Station is designed to replace the existing 4,800 hp Pratt Compressor Station and will consist of up to approximately 31,300 hp of compression that will be located in Greene County, Pennsylvania. It is anticipated that the compressors at the new Redhook Compressor Station will be driven by two natural gas-fired reciprocating engines and two natural gas-fired turbine engines. The new Redhook Compressor Station is proposed to be constructed on a new site so as to maintain service for existing contracts utilizing the Pratt Compressor Station until the Redhook Compressor Station is commissioned. Upon completion and full operation of the Redhook Compressor Station, the existing Pratt Compressor Station will be abandoned via demolition by the fourth quarter of 2018 (other than limited facilities in the yard that will remain in service). Some facilities will remain in place and operational at the Pratt Compressor Station Site. Additional details are provided in Section 1.4.2. The Project further includes re-routing the M-80 and H-158 pipelines from the Pratt Compressor Station to the Redhook Compressor Station. A 60-foot communication tower will also be constructed on the Redhook site. See Appendix 1-C (Critical Energy Infrastructure Information [CEII]) for plot plans and diagrams of the Redhook and Pratt Compressor Stations. In addition, the location of noise sensitive areas (i.e., residences) relative to the Redhook and Pratt Compressor Station sites are shown in Appendix 1-D. Potential noise impacts at noise sensitive areas are discussed further in Resource Report 9.

1.2.2.2 Webster Interconnect

The installation of a new custody-transfer interconnect station between the Project and MVP will consist of meters, pressure/flow control valves, isolation block valves, and associated instrumentation and controls in order to measure and control the flow of natural gas between the Project and MVP. The interconnect site will be located in a fenced and gated area, as close as practical to the actual intersection of the Equitrans H-306 pipeline and the proposed MVP H-600 pipeline in order to keep the length of the interconnecting piping to a minimum. See Appendix 1-C (CEII) for a plot plan of the proposed Webster Interconnect.

1.2.2.3 Mobley Tap

The installation of ancillary facilities between the Project and MVP will consist of two taps, a riser, and associated piping and valving into both Mountain Valley's proposed Mobley Tap and the Equitrans H-302 pipeline. The anticipated flow from the south (Mobley Plant) through the Mobley Tap will range from 300 to 920 million cubic feet per day (MMcfd). The anticipated flow from the north (Pennsylvania supply) through the Mobley Tap will range from 300 to 600 MMcfd. The Mobley Tap will be located in a fenced and gated area, as close as practical to the actual intersection of the Equitrans H-302 and Mountain Valley H-600 pipelines in order to keep the length of the interconnecting piping to a minimum. The station location is in the Grant District, Wetzel County, West Virginia. See Appendix 1-C (CEII) for a plot plan of the proposed Mobley Tap.

Table 1.2-2 provides a summary of aboveground facilities proposed as part of the Project.

Table 1.2-2

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 H-158/M80, MP 0.24	Greene County/PA	878.5	31,300	Turbine 700 Recip 380	Station 1200

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, 4.26	Washington/PA
H-302 Tap L/R Site	H-316, 2.99	Greene/PA
Tap Sites		
H-302 Tap Site	H-316, 2.99	Greene/PA
H-306 Tap Site	H-319, 0.00	Wetzel/WV
H-148 Tap Site	H-318, 4.20	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.

1.2.3 Utility Services

Electrical power lines will be needed to supply the Redhook Compressor Station. Power supply will be necessary for lights and back-up power. The Webster Interconnect and Mobley Tap will only require a connection to the existing power on those sites. There is currently single-phase electric distribution at the Webster and Mobley sites and no upgrades are required to power these facilities.

The Redhook Compressor Station will not require potable water. There is existing telephone service on the poles as well as existing power lines and T1 lines. These lines are adjacent to the Redhook Compressor station and no disturbance outside of the Redhook Compressor site boundary will be necessary to bring the lines into the station.

1.3 LAND REQUIREMENTS

A summary of Project land requirements is included in Table 1.3-1. Current land uses of those areas affected by the Project are described in Resource Report 8.

Table 1.3-1

Land Requirements for the Project

Facility	**Land Required by Construction (acres)**	**Land Required for Operation (acres)a/**
Pipeline	47.98	45.70
Additional Temporary Workspace (ATWS) a/	77.85	-
Access Roads	7.63	0.00
Redhook Compressor Station	17.74	17.74
Webster Interconnect	0.81	0.81

Table 1.3-1 Land Requirements for the Project		
Facility	**Land Required by Construction (acres)**	**Land Required for Operation (acres)a/**
Mobley Tap	0.38	0.38
Meter Stations	N/A	N/A
Pig Launcher/Receiver Facilities	0.83	0.83
Pipe storage yards (Pratt Compressor Station)	7.67	7.67
Mainline Valve Sites	N/A	0.00
a/ ATWS include those areas that will be used for equipment laydown, contractor staging yards, and pipeline storage. ATWS are not further categorized because each one will be used for multiple purposes.		

1.3.1 Pipeline

Depending on the pipeline segment, the pipeline will require a different construction right-of-way. The H-316 pipeline, which will consist of a 30-inch-diameter pipeline, will require a 125-foot-wide construction right-of-way. The H-318 pipeline, which will consist of a 20-inch-diameter pipeline, will require a 100-foot-wide construction right-of-way. The H-305 pipeline will consist of a 24-inch diameter pipeline and will require a 100-foot-wide construction right-of-way. The H-319 pipeline will consist of a 16-inch diameter pipeline and will require an 85-foot construction right-of-way. The M-80 and H-158 pipelines, which will consist of 6-inch- and 12-inch-diameter pipelines, respectively, will each require a single, collocated 125-foot-wide construction right-of-way and will be constructed approximately 15 feet apart. For all pipelines, there will be a 50-foot permanent right-of-way maintained. The M-80 and M-158 will require a 50-foot-wide permanent right-of-way. Based on its experience with constructing pipelines in this area, Equitrans has determined that the construction and permanent right-of-way proposed for the Project are necessary for the safe construction and operation of the pipeline. The additional right-of-way will be necessary for the safe travel of construction and maintenance vehicles and equipment, as well as stockpiling any additional material that may be encountered during trenching. Equitrans will decrease the construction right-of-way to 75 feet in wetlands and streams as shown in Appendix 1-E. Equitrans anticipates conducting full right-of-way topsoiling through forested uplands, so a wider construction right-of-way is necessary to accommodate topsoil piles and work areas. The H-158 and M-80 pipelines will be installed sequentially and will share a right-of-way.

To the extent practicable, the pipeline routes were collocated with or adjacent to existing utility corridors. As currently proposed, the Project is collocated or adjacent to existing utility corridors and roads for 1.58 miles of the route. These areas are listed in Table 1.3-2. Equitrans will coordinate with the owners of these foreign lines to address each operator's preference.

Table 1.3-2 Existing Corridors Adjacent to the Project				
Project Feature	**Facility Name**	**MP Begin**	**MP End**	**Distance**
H-158	Equitrans, L.P. (H-148 & H-106)	0.16	0.24	0.08
M-80	Equitrans, L.P. (H-148 & H-106)	0.16	0.24	0.08
H-305	Equitrans, L.P. (H-148 & H-106)	0.00	0.10	0.10
H-316	Texas Eastern (30")	0.20	0.46	0.26

Table 1.3-2 Existing Corridors Adjacent to the Project				
Project Feature	**Facility Name**	**MP Begin**	**MP End**	**Distance**
H-316	Texas Eastern (36")	0.20	0.46	0.26
H-318	Equitrans, L.P. (H-129 & GSF369)	0.00	0.80	0.80
H-318	Sunoco Mariner East	1.22	2.04	0.82

1.3.2 Aboveground Facilities

Land requirements for compressor stations, interconnect, ancillary facilities, receiver sites, and metering and regulation facilities are included in Table 1.3-3. Mainline valve (MLV) sites will be entirely contained within the pipeline right-of-way and will therefore not require any additional land disturbance.

Table 1.3-3 Land Requirements for Aboveground Facilities a/			
Facility Name	**Approximate Milepost**	**Land Required for Construction (acres)**	**Land Required for Operation (acres)**
Compressor Stations			
Redhook Station	H-316, MP 0.00; H-158/M-80, MP 0.24	23.99	17.74
Other Facilities			
Webster Interconnect	H-319, MP 0.04	2.47	0.81
Mobley Tap	H-302, MP 0.60	0.38	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	0.11	0.11
H-302 Tap L/R Site	H-316, 2.99	0.49	0.49
a/ 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.			

1.3.3 Access Roads

The length of new and existing roads that will be used to provide access to the pipeline right-of-way during construction and operation are provided in Table 1.3-4 and are further discussed in Resource Report 8. This list does not include existing interstate, state, and county highways, but does include private roads, drives, lanes, and other roads that will be utilized. To the extent possible, Equitrans will use existing access roads for the Project or other existing farm or construction access roads.

Table 1.3-4 Land Requirements for Access Roads		
Access Road ID	**Milepost**	**Acreage**
Construction		
H158 M80 AR 01	0.00	0.23
H158 M80 AR 02	0.06	0.13
H305 AR 01	0.10	0.51
H316 AR 01	0.07	0.20
H316 AR 02	0.02	0.09
H316 AR 03	0.65	0.50
H316 AR 04	0.90	0.30

Table 1.3-4 Land Requirements for Access Roads		
Access Road ID	**Milepost**	**Acreage**
H316 AR 05a	1.45	0.35
H316 AR 05b	1.45	0.49
H316 AR 06a	2.00	0.14
H316 AR 06b	2.00	0.16
H316 AR 07a	2.83	1.18
H316 AR 07b	2.83	0.29
H316 AR 08	N/A	0.19
H318 AR 01	0.00	1.60
H318 AR 02a	0.70	0.05
H318 AR 02b	0.70	0.04
H318 AR 03	1.00, 1.10	0.59
H318 AR 04a	1.92	0.45
H318 AR 05	3.50	0.11
H318 AR 06	3.60	0.49
H318 AR 07	4.22	0.24
H319 AR 01	0.01	0.07
Webster AR 01	N/A	0.02
Webster AR 02	N/A	0.03
Webster AR 03	N/A	0.09
Operation		
H305 AR 01	0.10	0.31
H316 AR 07a	2.83	0.89
H316 AR 07b	2.83	0.22
H318 AR 01	0.00	0.96
H318 AR 07	4.22	0.15
H319 AR 01	0.01	0.04
Webster AR 01	N/A	0.02

Field investigation indicates that the availability of existing roads is likely sufficient to provide access to most work areas; however, new access roads may be required in several locations that do not parallel existing infrastructure. Maintenance may be required on some of the existing roads prior to hauling construction equipment and materials. Some of the existing dirt or gravel access roads will simply be graded and maintained to prevent rutting. Others may require placement of additional gravel or crushed stone on the existing surface and/or widening, or replacement of damaged culverts.

1.3.4 Additional Temporary Workspace

Additional temporary workspace (ATWS) areas will be required for construction activities requiring space outside the construction right-of-way. Construction activities that may require ATWS areas include, but are not limited to:

- Road and railroad crossings;
- Wetland and waterbody crossings;
- Foreign pipeline crossings and interconnects;
- Foreign utility crossings;
- Areas requiring full-width topsoil segregation;
- Specific request of the landowner or land management agency;
- Areas with steep side slopes, rock, or other difficult terrain;

- Pipeline access and truck turnarounds;
- Fabrication and staging areas;
- Hydrostatic test water withdrawal and discharge locations; and
- Horizontal directional drilling (HDD) sites, footprint and pull back area.

The areal extent (size) of ATWS will be determined on a site-specific basis. The ATWS area will be restricted to the minimum size necessary to safely construct the pipeline with respect to the existing conditions anticipated at the time of construction. The ATWS will be utilized by construction for the purpose of material and equipment storage and laydown, storage of excess spoil at crossings, parking, and tractor trailer turning radius. In the case of wetlands and waterbodies, the ATWS area will be located in accordance with the 50-foot setback requirements described in the May 2013 version of the FERC Wetland and Waterbody Construction and Mitigation Procedures (Procedures), with the exception of select areas, discussed further in Section 1.4.1.1 of this report. Proposed ATWS and ancillary sites required for the Project are shown on the alignment sheets and maps in Appendix 1-A. ATWS areas are included in the total acreage of the area to be affected by pipeline construction right-of-way.

1.3.5 Contractor Yards

Potential pipe storage and contractor staging yards for temporary use during construction will be selected with consideration given to the avoidance of wetlands and other sensitive habitats. To the maximum extent practicable, Equitrans will avoid locating storage and contractor yards in forested tracts. Equitrans will use pipe storage yards to stockpile pipe, fabricate facilities, and concrete-coat joints, as necessary. Equitrans will use contractor yards during construction to stage construction operations, store materials, park equipment, and set up temporary construction offices. Depending upon the condition of these yards and their current use, some surface grading, drainage improvements, placement of surface materials (e.g., crushed rock), and internal roadways may be required. Equitrans has identified ATWS areas along the proposed route, which will also be used for contractor yards. Land requirements for ATWS are provided in Table 1.3-1. Additional information on potential contractor yards are discussed in Resource Report 8.

1.4 CONSTRUCTION PROCEDURES

Equitrans intends to implement the FERC Upland Erosion Control, Revegetation, and Maintenance Plan (Plan) and Procedures as a minimum standard during construction unless otherwise specifically noted within this resource report. Equitrans will ensure that construction personnel are adequately trained in the environmental restrictions and/or requirements applicable to their particular job duties. Construction management personnel and environmental inspectors (EI) will be provided with the appropriate environmental information/materials specific to the Project.

Equitrans anticipates that it will employ the following procedures to construct the Project; however, deviations are possible based on actual field conditions or to comply with regulatory requirements. The following proposed standard construction and restoration techniques will be implemented in essentially the same manner as for Mountain Valley (Docket No. PF15-3-000).

1.4.1 Pipeline

Construction of the Project will follow industry-accepted practices and procedures, as further described below. Generally, construction of the proposed pipeline will follow a set of sequential operations as shown in Figure 1.4-1. In this typical pipeline construction scenario, the construction spread proceeds along the

pipeline right-of-way in one continuous operation. The entire process will be coordinated in such a manner as to minimize the total time a tract of land is disturbed and therefore exposed to erosion and temporarily precluded from normal use. To minimize the impacts of construction disturbance, Equitrans will utilize the FERC Plan. Excess excavated material not required for backfill such as rock fragments, drill cuttings, etc. will be removed and disposed of offsite at an upland location. Equipment problems, terrain and soil conditions, and weather can affect the timing and consistency of the operation. Typical construction details depicting various construction scenarios are shown in Appendix 1-E. The following sections provide detailed descriptions of each proposed construction method.

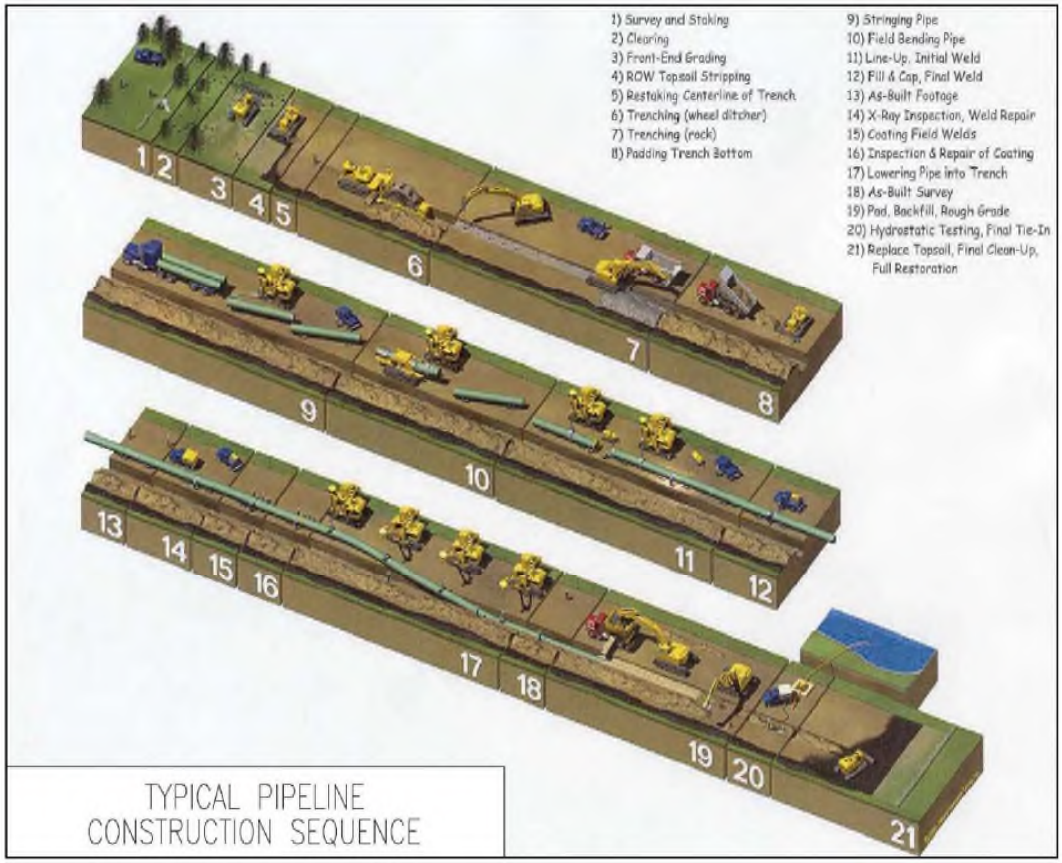


Figure 1.4-1 Typical Pipeline Construction

1.4.1.1 Standard Construction and Restoration Techniques and Typical Upland Pipeline Construction Procedures

Equitrans will conduct all construction activities in accordance with applicable federal and state regulations and guidelines, as well as the specific requirements of applicable permits. Equitrans will adopt the FERC Plan and Procedures and will comply with the state's permits and regulations. Equitrans is preparing a project-specific Erosion and Sediment Control Plan as part of the Erosion and Sediment Control General Permit (ESCGP-2) in Pennsylvania and the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit in West Virginia.

Prior to initializing construction-related activities, Equitrans will secure right-of-way easements, or other required authorizations, from landowners whose properties will be crossed by the proposed pipeline route.

Those portions of the Project located primarily in upland terrain will employ conventional overland construction techniques for large-diameter pipelines. In the typical pipeline construction scenario, the construction contractor will construct the pipeline along the construction right-of-way using sequential pipeline construction techniques, including survey, staking and fence crossing; clearing and grading; trenching; pipe stringing, bending and welding; lowering-in and backfilling; hydrostatic testing; clean-up and restoration; and commissioning.

At this time, it is estimated that four construction spreads will be used to construct the pipeline. The majority of the pipeline construction process will be accomplished using conventional open-cut methods, which typically include the steps described in the following paragraphs. The proposed methods for accomplishing pipeline installation across wetlands and waterbodies, as well as other specialized construction procedures, are also described in the following paragraphs.

(a) Surveying

The initial step in preparing the right-of-way for construction will be the civil survey. A civil survey crew will stake the outside limits of the construction right-of-way, the centerline location of the pipeline, centerlines and elevations, highway and railroad crossings, and any ATWS, such as lay down areas or at stream crossings. The "One Call" system of each state will be contacted and underground utilities (e.g., cables, conduits, and pipelines) will be located and flagged. Affected landowners will be notified prior to surveying and staking of the proposed route, following applicable state/federal guidelines. Surveying of the right-of-way began in June 2015; the status of the surveys is set forth above in Section 1.7.1.

(b) Clearing and Grading

After the right-of-way has been surveyed and easements have been secured (for the permanent and temporary construction right-of-way, and any existing right-of-way if necessary), the right-of-way will be cleared of obstructions (i.e., trees and stumps, brush, logs, and large rocks) according to the FERC Plan and will be outlined in Equitrans' ESCGP-2 and NPDES permits. The right-of-way will be cleared to the width required for construction, but not more than specified on the pipeline alignment sheets. These right-of-way widths indicate the maximum width necessary for construction, operation, and maintenance of the pipeline. At no time will Equitrans or its contractor clear or alter any areas outside of the boundaries of the pipeline right-of-way area, including ATWS areas, shown on the pipeline alignment sheets.

Merchantable timber will be cut into lengths and stacked off the edge of the right-of-way. Timber ranging from 4 inches to 8 inches in diameter at the butt end suitable for fence posts or other uses will be cut into usable lengths. Timber will be stacked adjacent to the right-of-way in accordance with landowner preferences. Brush and slash will be burned, stacked or chipped. If Equitrans' contractors elect to burn brush and slash, it shall be done by permit, subject to local ordinances, and when chipped, shall be piled so that it can be used for mulch. Contractors will be responsible for obtaining and complying with applicable permits and developing a fire prevention and suppression plan to prevent impacts on adjacent resources. This plan will be filed with FERC prior to implementation. All stumps will be disposed of to the satisfaction of the property owner and/or company representative in accordance with applicable law including, but not limited to, any anti-pollution law, rule or regulation. When feasible, vegetation will be cut to ground level only, leaving the root systems intact.

If fences (barbed wire, chain link, or other) are encountered along the construction right-of-way, then a fence crew will install temporary gates. The fence crew will install new posts to brace the areas on either

side of the proposed cut to ensure that no damage occurs to other portions of the fence or wall. Temporary gates will be installed, if necessary, to contain livestock or to prohibit or otherwise control public access across the right-of-way. These temporary fences and/or gates will remain closed at all times except as required for construction purposes.

Where needed for erosion control, the FERC Plan will be implemented along the construction right-of-way and best management practices (BMPs) outlined in the FERC Plan will be properly maintained throughout construction. BMPs will remain in place until permanent erosion controls are installed or restoration is completed.

During construction, Equitrans will require that equipment brought onto the Project is inspected and free of soil before first use on the Project. In Pennsylvania, spoil piles and areas left undisturbed for 4 days or longer are required to be temporarily stabilized, typically achieved using temporary seed and mulch; this temporary seed would discourage growth of invasive species. During operations, Equitrans may use herbicides to control invasive species on a limited basis in consultation with landowners. Applications are made in accordance with the FERC Plan and Procedures.

(c) Trenching

To bury the pipeline underground, it will be necessary to excavate a trench. The trench will be excavated with a track-mounted excavator, or similar equipment. On actively cultivated agricultural tracts and in residential areas, subsoil will be stockpiled separately from topsoil (or the upper 12 inches of topsoil, if the topsoil is deeper).

Generally, the trench will be excavated at least 12 inches wider than the diameter of the pipe. The sides of the trench will be sloped with the top of the trench up to 12 feet across, or more, depending upon the stability of the native soils. The trench will be excavated to a sufficient depth to allow a minimum of 3 feet of soil cover between the top of the pipe and the final land surface after backfilling (minimum of 18 inches of cover will be provided in consolidated rock except in Class 2 (or greater) locations or in ditches, where 24 inches of cover is required).

Excavated soils will typically be stockpiled along the right-of-way on the side of the trench (the “spoil” side) away from the construction traffic and pipe assembly area (the “working” side). Where the route is collocated adjacent to existing infrastructure, the spoil generally will be placed on the same side of the trench as the existing infrastructure.

Equitrans does not anticipate the need to blast on this Project; however, should it become necessary, Equitrans will develop and submit a blast plan to the FERC Office of Energy Projects (OEP) for its review and acceptance prior to use.

(d) Stringing

Steel pipe for the pipeline will be procured in nominal double random and/or triple random lengths, or “joints,” protected with an epoxy coating applied at the factory or at a coating yard (the beveled ends will be left uncoated for welding) and shipped to strategically located materials storage areas, or “pipe yards.” The individual joints will be transported to the right-of-way by truck and placed along the excavated trench in a single, continuous line, easily accessible to the construction personnel on the working side of the trench, typically opposite the spoil side. This will allow the subsequent lineup and welding operations to proceed

efficiently. At stream crossings, the amount of pipe required to span the stream will be stockpiled in ATWS areas on one or both banks of the stream.

(e) Pipe Bending

The pipe will be delivered to the job site in straight joints. Some induction bends may be used, and some bending of pipe will be required to allow the pipeline to follow natural grade changes and direction changes of the right-of-way. Prior to welding, selected joints will be bent in the field by tire-mounted hydraulic bending machines.

(f) Pipe Assembly and Welding

Following stringing and bending, the joints of pipe will be placed on temporary supports, adjacent to the trench. The ends will be carefully aligned and welded together using multiple passes for a full penetration weld. Only qualified welders will be allowed to perform the welding. Welders and welding procedures will be qualified according to applicable American Society for Mechanical Engineers (ASME), American Petroleum Institute (API) Standard 1104, and 49 CFR Part 192 Standards (part 192.225).

(g) Non-Destructive Examination and Weld Repair

To ensure that the assembled pipe will meet or exceed the design strength requirements, the completed welds will be visually inspected and tested for integrity using non-destructive examination (NDE) methods such as radiography (X-ray), or ultrasound, in accordance with API standards. Welds displaying unacceptable slag inclusions, void spaces, or other defects will be repaired or cut out and re- welded (for reference, see parts 192.241 and 192.2423).

(h) Coating Field Welds, Inspection, and Repair

Following welding, the previously uncoated ends of the pipe at the joints will be epoxy coated. The coating on the completed pipe section will be inspected and any damaged areas will be repaired. All coating will be inspected prior to lowering in accordance with all applicable industry standards. All defects discovered in the coating will be repaired prior to lowering.

(i) Pipe Lowering

The completed section of pipe will be lifted off the temporary supports and lowered into the trench by side-boom tractors or equivalent equipment. Prior to lowering the pipe, the trench will be inspected to ensure that it is free of rocks and other debris that could damage the pipe or the coating. Before the pipe is lowered into the trench, the pipe and trench will be inspected to ensure that the pipe and trench configurations are compatible. In rocky areas, if the bottom is not smooth, a layer of soil or sand may be placed on the bottom of the trench to protect the pipe using a padding machine or excavator with a “shaker bucket,” which separates rocks from satisfactory padding materials. Concrete-coated pipe or concrete weights will be used if required for negative buoyancy in areas of saturated soils.

(j) Padding and Backfilling

After the pipe is lowered into the trench, the trench will be backfilled. Previously excavated materials will be pushed back into the trench using bladed equipment or backhoes. Where the previously excavated material contains large rocks or other materials that could damage the pipe or coating, clean fill or protective coating will be placed around the pipe prior to backfilling. Segregated topsoil, where applicable, will be placed after backfilling the trench above the subsoil. Following backfilling in agricultural land, grassland, and open land, or in specified areas, a small crown may be left to account for any future soil settling that

might occur. In wetlands, a crown will not be left in order to restore hydrological conditions to pre-existing conditions. Excess soil will be distributed evenly on the right-of-way, only in upland areas, while maintaining existing contours and will be in accordance with landowner and agency requirements.

(k) Hydrostatic Test and Final Tie-In

Following backfilling of the trench, the pipeline will be hydrostatically tested using municipal water supply to ensure that it is capable of safely operating at the design pressure. Baseline water samples will be taken at the source prior to water-up and prior to discharge. Test segments of the pipeline will be capped and filled with water and pressurized to a minimum of 1.1 to 1.5 times (based on location class) the designed operating pressure for a minimum of eight hours in accordance with the U.S. Department of Transportation (USDOT) requirements identified in 49 CFR Part 192 prior to being placed in service. Any loss of pressure that cannot be attributed to other factors, such as temperature changes, will be investigated. Any leaks detected will be repaired, and the segment will be retested.

Upon completion of the test, the water may be pumped to the next segment for testing, or the water may be discharged. The test water will be discharged through an energy-dissipating device in compliance with NPDES permit conditions. Equitrans holds a state general permit (PAG-10) to discharge and will comply with its conditions. Test water will contact only new pipe, and no chemicals will be added. Equitrans will be using municipal water for all hydrotesting.

Once a segment of pipe has been successfully tested and dried, the test cap and manifold will be removed, and the pipe will be connected to the remainder of the pipeline. A series of foam pigs will be used to dry the pipe until the air inside the pipe reaches a dew point of -40 degrees Fahrenheit. If that cannot be achieved, with foam pigs alone, nitrogen slugs may be used for drying. Equitrans will implement Section VII of the FERC Procedures regarding hydrostatic testing, as well as any specifications in individual state permit guidelines. Hydrostatic testing is discussed further in Resource Report 2.

(l) Cleanup and Restoration

Post-construction restoration activities will be undertaken in accordance with the measures specified in the FERC Plan and Procedures, as applicable. After a segment of pipe has been installed, backfilled, and successfully tested, the right-of-way, ATWS, and other disturbed areas will be finish-graded, and the construction debris will be disposed of properly. The surface of the right-of-way disturbed by construction activities will be graded to match original contours and to be compatible with surrounding drainage patterns, except at those locations where permanent changes in drainage will be required to prevent erosion, scour, and possible exposure of the pipeline. In agricultural areas, the segregated topsoil will be returned to its original horizon, unless otherwise requested by the landowner. Temporary and permanent erosion and sediment control measures, including silt fencing, diversion terraces, and vegetation, will be installed at that time. Private and public property, such as fences, gates, driveways, and roads that have been disturbed by the pipeline construction will be restored to original or better condition. More information on restoration is provided in Section 1.4.3.

Typical Wetland Pipeline Construction

Crossing of jurisdictional wetlands will be done in accordance with state and federal permits and the FERC Procedures. Pending site conditions, Equitrans may request variances and these would require approval by the FERC prior to construction in these areas. Wetland crossings will be further discussed in Resource Report 2. In order to minimize impacts to streams and wetlands, crossings will be limited to 75 feet. Where

practicable, work through wetlands will be conducted on mats to minimize soil compaction. Streams will be crossed using dry-trench methods, including HDD, flume, and dam-and-pump. Appropriately sized sediment barriers will be used throughout the Project to manage construction stormwater runoff in accordance with state earth disturbance permits.

The construction right-of-way width through wetlands will be 75 feet. Operation of construction equipment in wetlands will be limited to that needed to clear the right-of-way, dig the trench, fabricate the pipe, install the pipe, backfill the trench, and restore the right-of-way. Equitrans will segregate the topsoil up to one foot in depth in wetlands where hydrologic conditions permit this practice. Work would be conducted on timber mats to minimize impacts, including rutting and compaction.

Segregated topsoil will be placed in the trench following subsoil backfilling. Restoration and monitoring of wetland crossings will be conducted in accordance with the FERC Procedures to ensure successful wetland revegetation. In accordance with FERC Procedures, fuel will not be stored within 100 feet of wetlands or other waterbodies.

Hydrological conditions along the construction corridor in areas proposed for conventional open-ditch construction will likely dictate the use of either conventional open-ditch lay or open-ditch push/pull lay methods. Selection of the most appropriate method will depend on site-specific weather conditions, inundation, soil saturation, and soil stability at the time of construction. The conventional open-ditch lay method will be the most frequently used technique for installation of the pipeline in wetlands.

Equitrans has considered avoidance of potential impacts on wetlands during the routing process for this pipeline. Where wetlands cannot be avoided, Equitrans will seek to minimize potential impacts through the use of wetland construction procedures. Equitrans is committed to constructing the Project in accordance with the FERC Plan and Procedures to the maximum extent practical. ATWS areas will be located at least 50 feet from wetland boundaries, with the exception of select features. Table 1.4-1 shows ATWS located within 50 feet of wetlands and waterbodies; however, Equitrans intends to redesign several of the ATWS so that the 50-foot offset will be maintained. Equitrans requests site-specific variances to Section VI.B.1 (location of extra workspaces in wetlands) of the FERC Procedures, as described below. The requested ATWS variance is necessary to provide additional work space due to steep terrain in the vicinity of the project as well as other features in the landscape which prevent flexibility of the ATWS location. Further information regarding the purpose of the ATWS, modifications to maintain a 50-foot offset, and justification for any variances are described further in Resource Report 2.

Table 1.4-1

ATWS Located within 50 feet of Waterbodies and Wetlands

Project Feature	Milepost	County	State	ATWS	Wetland or Waterbody ID	Offset (feet)
Wetlands						
H-316	2	Greene	Pennsylvania	H316 ATWS 06	W-AA9	0
H-316	2.8-3.0	Greene	Pennsylvania	H316 ATWS 07	W-M2,W-M3, W-M4, W-M5, W-M6	0 - 5
H-318	2	Allegheny	Pennsylvania	H318 ATWS 04b	W-BB7	0
H-318	2.8	Allegheny	Pennsylvania	H318 ATWS 05c	W-BB13	10.0

Table 1.4-1

ATWS Located within 50 feet of Waterbodies and Wetlands

Project Feature	Milepost	County	State	ATWS	Wetland or Waterbody ID	Offset (feet)
H-158/M-80	0.1	Greene	Pennsylvania	H-158/M-80 ATWS 04	W-AA1	0
Waterbodies						
H-158/M-80	0.1	Greene	Pennsylvania	H-158/M-80 ATWS 01	S-AA1	0
H-158/M-80	0.1	Greene	Pennsylvania	H-158/M-80ATWS 03	S-AA1	0
H-158/M-80	0.1	Greene	Pennsylvania	H-158/M-80 ATWS 01	S-AA1, S-AA2	0
H-158/M-80	0.1	Greene	Pennsylvania	H-158/M-80 ATWS 03	S-AA1	0
H-316	0.8	Greene	Pennsylvania	H316 ATWS 03d	S-AA8	42.7
H-316	2.8	Greene	Pennsylvania	H316 ATWS 07	S-M1	2.4
H-318	1.7	Allegheny	Pennsylvania	H318 ATWS 02a, b, c, d	S-BB3	10.0
H-318	2.8	Allegheny	Pennsylvania	H318 ATWS 05c	S-BB4, S-BB6	0
H-318	3.8	Washington	Pennsylvania	H318 ATWS 06c	S-BB2	45.1
H-318	4.3	Washington	Pennsylvania	H318 ATWS 07	S-BB1	2.1

(a) Unsaturated Wetland Crossings

In crossing unsaturated wetlands (wetlands without standing water or saturated soils), construction will be similar to the typical upland construction described above, with some exceptions, including that only one traffic lane will be provided for construction equipment. If normal construction equipment causes rutting or mixing of wetland topsoil and subsoil, low ground pressure equipment will be used, or temporary equipment mats will be installed to allow passage of equipment with minimal disturbance of the surface and vegetation. Trees will be cut to grade, but stumps will only be removed within 15 feet of the edge of the pipe trench, or where safety concerns dictate otherwise. Topsoil over the pipe trench will be segregated from subsoils. A vegetation buffer zone will be left between the wetland and the upland construction areas, except for the pipe trench and travel lane. Erosion control measures, such as silt fences and interceptor dikes, will be installed and maintained to minimize sedimentation within the wetland. Trench plugs will be installed where necessary to prevent the unintentional draining of water from the wetland. Upon completion of construction, the right-of-way will be restored and a 10-foot-wide strip centered on the pipeline will be maintained in an herbaceous state.

(b) Saturated Wetland Crossings

For the purposes of this report, saturated wetlands include wetlands with standing water, but not those wetlands that are constantly or regularly completely submerged. Topsoil segregation will not be practical in saturated wetlands. Otherwise, construction will be similar as described for unsaturated wetlands to provide for anticipated widths of the pipeline trench and trench spoil areas. Equipment mats or timbers would be used to facilitate equipment movement through and work within the wetland. Equipment not associated with the pipeline construction within the wetland will be allowed to pass through the wetland when there is no other reasonable access, as provided in the FERC Procedures.

Typical Waterbody Crossings

Construction across waterbodies will be performed to minimize the time that the trenches for the pipeline crossings of flowing streams and rivers will be left open. The normal trenching operation will skip the waterbody crossing, stopping on each side near the high bank. The waterbody section of the pipeline will

be installed by one of the methods described below, including by HDD or guided boring. In general, pipe will be bent and fabricated as the work progresses along the right-of-way so that the excavation of the waterbody crossing is only completed immediately prior to pipe installation by the tie-in crew. Locations of waterbody crossings are shown in Resource Report 2.

Construction methods at waterbody crossings will vary with the characteristics of the waterbody encountered and will be performed consistent with permit conditions outlined in the regulatory approvals.

Intermediate waterbodies (between 10 and 100 feet wide at water's edge) and minor waterbodies (less than 10 feet wide at water's edge) will be crossed by the open-cut/conventional lay or dry ditch crossing methods, unless otherwise required. Pipe will be installed to provide a minimum of 4 feet of cover from the waterbody bottom to the top of the pipeline, except in consolidated rock, where a minimum of 2 feet of cover will be required. Trench spoil will be placed on the bank above the high water mark for use as backfill.

A prefabricated segment of pipeline will be laid horizontally across the waterbody bed and continue 10 feet past the high banks on each side of the waterbody before raising in elevation to the normal trench level. The pipeline may be weighted with concrete weights, screw anchors, and/or concrete coating in order to obtain sufficient negative buoyancy of the line. All adjacent pipelines will be protected as necessary.

Normal backfill cover requirements will be met. Compaction percentage of backfill will be equal to or above that of the adjacent undisturbed areas. Ditch plugs of crushed stone, sandbags, or dry soil may also be used to keep backfill from sloughing in toward the center of the waterbody. All waterbody banks will be restored to the original grade and all foreign objects will be removed from the waterbody. Excavated material not required for backfill will be removed and disposed of at an upland site.

Equitrans will follow the FERC Procedures to limit water quality and aquatic resource impacts during and following construction. Construction activities will be scheduled so that the pipeline trench is excavated immediately prior to pipe laying activities. In accordance with the FERC Procedures, the duration of construction will be limited to 24 hours across minor waterbodies (10 feet wide or less) and 48 hours across intermediate waterbodies (between 10 and 100 feet wide) when blasting or extensive rock excavation is not required.

Crossings of minor perennial and intermittent streams will be accomplished in accordance with the FERC Procedures. Dry-ditch waterbody crossing methods include dam and pump, flume, conventional bore, and HDD. Milepost crossing locations, the crossing width measured at the time of the survey, the significance for fisheries or other aquatic resources as reported by each state, and the proposed crossing method are provided in Resource Report 2. The crossing method is subject to change depending upon the actual conditions encountered at the time of construction. Crossing methods are described below.

(a) Dam-and-Pump Crossing Method

The dam-and-pump method involves installation of temporary dams upstream and downstream of the proposed waterbody crossing. The temporary dams will typically be constructed using sandbags and plastic sheeting. Following dam installation, appropriately sized pumps will be used to dewater and transport the stream flow around the construction work area and trench. Intake screens will be installed at the pump inlets to prevent entrainment of aquatic life, and energy dissipating devices will be installed at the pump discharge point to minimize erosion and stream bed scour. Trench excavation and pipeline installation will then commence through the dewatered portion of the waterbody channel. Following completion of pipeline

installation, backfill of the trench, and restoration of stream banks, the temporary dams will be removed, and flow through the construction work area will be restored. This method is generally only appropriate for those waterbody crossings where pumps can adequately transfer the stream flow volume around the work area and there are no concerns about the passage of sensitive species.

(b) Flume Crossing Method

The flume crossing method will consist of temporarily directing the flow of water through one or more flume pipes placed over the area to be excavated. This method will allow excavation of the pipe trench across the waterbody completely underneath the flume pipes without disruption of water flow in the stream. Stream flow will be diverted through the flumes by constructing two bulkheads, using sand bags or plastic dams, to direct the stream flow through the flume pipes. Following completion of pipeline installation, backfill of the trench, and restoration of stream banks, the bulkheads and flume pipes will be removed. This crossing method generally minimizes the duration of downstream turbidity by allowing excavation of the pipeline trench under relatively dry conditions.

(c) Conventional Bore Crossing Method

Some waterbodies crossed by the Project are directly associated with or adjacent to roads or railroads. Where these roads or railroads are to be crossed using a conventional boring machine, the waterbody will typically be included within the length of the bore. Some elevated or channelized waterbodies, such as irrigation ditches, may also be successfully bored, depending upon the groundwater level in the area. To complete a conventional bore, two pits will be excavated, one on each side of the feature to be bored. A boring machine will be lowered into one pit, and a horizontal hole will be bored to a diameter equal to the diameter of the pipe (or casing, if required) at the depth of the pipeline installation. The pipeline section and/or casing will then be pushed through the bore to the opposite pit. If additional pipeline sections are required to span the length of the bore, they will be welded to the first section of the pipeline in the bore pit before being pushed through the bore.

(d) Horizontal Directional Drill

HDD is a method that allows for trenchless construction across an area by pre-drilling a hole well below the depth of a conventional pipeline lay and then pulling the pipeline through the pre-drilled borehole. HDD will be used by Equitrans to cross the Monongahela River (H-318 pipeline) and South Fork Tenmile Creek (H-316 pipeline) to avoid direct impacts on surface waters. The HDD method has been in use since the 1970s as a means to install pipelines across rivers and at shore approaches to eliminate pipeline exposure from erosion and scour and eliminate impacts on water quality from construction activities within the waterbody. Pipelines up to 60 inches in diameter have been successfully installed using this method. The length of pipeline that can be installed by HDD depends upon soil conditions and pipe diameters, and is limited by available technology and equipment sizes. Geotechnical studies have been performed at each location to evaluate subsurface conditions. Additionally, a geophysical survey was performed at the Monongahela River using Electrical Resistivity monitoring to create a profile of the rock/sediment interface. Geotechnical investigations and the result of electrical resistivity monitoring are included as Appendix 1-F.

Electromagnetic sensors will be located near the drill bit during the drilling of the pilot hole. The HDD Operator can use these sensors in one of two ways to track the location of the bit during drilling: a walkover unit or electric-grid guide wires. When using a walkover unit, a surveyor will use a handheld device that indicates when it is directly over the drill bit and how deep the drill bit is. The surveyor then uses their

location and the relative depth of the pipeline to determine the drill's location. The surveyor will radio back to the Operator steering the drill bit any variances from the predetermined path. A small path just large enough to walk through may need to be cleared of thick brush for the Surveyor during this process. Electric-grid guide wires may also be used as an alternative to the walkover units. A grid of a known location will be hand-laid across the land surface along the pipeline right-of-way to help guide the drill bit along the predetermined HDD route. The electromagnetic sensors will use a method of triangulation to determine the bit's location in relation to established grid. The Operator will then be able to use this information to steer the bit along its predetermined path. A small-diameter pilot hole will be drilled along a prescribed profile. Where electromagnetic sensors cannot be detected (e.g., deep drills greater than 100 feet), bit tip positioning sensors measuring roll and pitch will be used by the Operator to guide the drill bit along the predetermined path back to a position where survey readings can again be obtained.

Once the pilot hole is completed, it will be enlarged, using reaming tools to provide access for the pipe. The reaming tools will be attached to the drill string at the exit point of the pilot hole and then rotated and drawn back to the drilling rig, thus progressively enlarging the pilot hole with each pass. During this process, drilling fluid consisting of bentonite clay and water will be continuously pumped into the hole to remove cuttings and maintain the integrity of the hole. Once the hole has been sufficiently enlarged, a prefabricated segment of pipe will be attached behind the reaming tool on the exit side of the crossing and pulled back through the drill hole to the drill rig, completing the crossing.

The primary advantage of the HDD method is that there is minimal planned disturbance of the surface between the entry and exit points of the HDD (limited to the temporary deployment of telemetry cable and water pipe), provided there is reasonable access to the entry and exit points for the drilling rig and fluids handling equipment. However, because it is necessary to prefabricate a complete section, or several smaller sections of pipe aboveground that is equal to the length of the HDD, and because existing surface features such as roads and railroads could restrict the length of the prefabricated section to less than that of the HDD, the HDD method may not be appropriate for every site condition encountered. Site-specific HDD installations are shown in Appendix 1-G.

Where the HDD and the adjacent right-of-way are in or near parallel alignment, the pull section will be pre-fabricated within the construction right-of-way to the greatest extent practical; minimal extra workspace will be required for this pull section. However, if the adjacent right-of-way is not aligned with the HDD, it will not be possible to bend the pull section into the borehole, and an extra workspace (sometimes referred to as a "false right-of-way") may be required to accommodate the pullback section. Pull section extra workspaces, where required, will be shown on the alignment sheets in Appendix 1-A. HDD locations are also listed by milepost location in Table 1.4-2. Locations of waterbody and wetland crossings are provided in Resource Report 2.

Table 1.4-2

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

Although the HDD method is a proven technology for pipe installation, the potential exists for a HDD installation to fail for a number of reasons, including encountering soil conditions not conducive to boring,

caving of the borehole, loss of the drill string in the borehole, loss of circulation, and pullback refusal. Many of these potential failures can be avoided or mitigated by making appropriate adjustments to the operation of the HDD equipment. If needed, the borehole can usually be moved to another, adjacent location. However, due to conditions beyond the control of Equitrans, it may be impossible to install an HDD at a particular location. In that case, it will be necessary to install the pipe by an alternate method. An HDD Contingency Plan is included in Appendix 1-H to provide guidance on (a) the determination of an HDD failure, (b) alternate crossing methods in the event of an HDD failure, and (c) the prevention, detection, required notifications, and response to inadvertent returns.

(e) Direct Pipe® Technology

Direct Pipe is a trenchless installation method that combines features of HDD and microtunneling. Direct Pipe was developed by the Herrenknecht Company in Germany to provide a one-step pipe jacking method that offered the advantages of both HDD and microtunneling. Direct Pipe utilizes a Microtunnel Boring Machine (MTBM) connected to the leading edge of an assembled length of pipe and a pipe thruster to jack the pipeline into place, similar to, but in the opposite direction of HDD pullback operations.

Direct Pipe projects can range in diameter for 30 to 60 inches. Drilling lengths for Direct Pipe projects can range from 900 to 4,900 feet. Two projects installing 30-inch-diameter and 48-inch-diameter pipelines were completed in the United States during 2015. A wide range of soil types are suitable for installation by Direct Pipe, including boulders and rock. Boulders and cobbles up to one-third the diameter of the installed pipe can be accommodated by the MTBM at the front end of the pipeline. Due to the relatively new nature of the technology and the terrain crossed by the Project, Direct Pipe is not anticipated to be used.

During Direct Pipe operations, the tunnel face is excavated by an MTBM similar to the microtunneling and pipe-jacking method. The tunnel face is slurry-supported using a bentonite suspension. The excavated material is removed via a slurry circuit with separation plant in order to separate the spoil from the slurry liquid before feed pumps transport the liquid back to the tunnel face. The coated carrier pipe is attached to the MTBM. Typically, an abrasive resistant overcoat is used in combination with fusion bonded epoxy as the corrosion control coating. With the combination from the hole being 1 to 2 inches larger than the pipe and the abrasive resistant overcoat, the fusion bonded epoxy is protected during pipe installation. The MTBM is controlled from the operating container located on the surface adjacent to the pipe thruster. A gyro compass is used for steering control of the MTBM allow drill radius similar to HDD to be completed.

An advantage of Direct Pipe system is one-step jacking method, which allows the pipe to be installed in one pass. Also, the installation of the pipe directly behind the MTBM provides constant support to the bore hole. The receiving side footprint for Direct Pipe is small compared to other methods since all materials and equipment are located on the launch side. The advance control and guidance system provide high-precision target control. Finally, as with microtunneling, the slurry collection/recycling system and pressure control features at the excavation face minimize the potential for drilling fluid loss.

A disadvantage of Direct Pipe is the high equipment and project costs compared to more familiar methods. Direct Pipe requires a large work area on the launch side of a proposed crossing to accommodate the pipe thruster, supporting equipment and long lengths of welded product pipe. The pipe thruster requires that structural steel, including piles, be installed to support the operation. If a geologic formation is encountered that the cutting head cannot penetrate, the pipe and tunneling assembly must be extracted from the hole to change the cutting head creating a significant risk of hole collapse. If the pipe becomes stuck during

installation, the pipe and hole will be filled with concrete and abandoned. Direct Pipe is a relatively new trenchless technology, with the first pipeline construction projects in the United States using Direct Pipe during 2015. Because Direct Pipe is a new technology, limited experience with the technology exists among the few contractors who can perform it.

Due to the relative newness of the Direct Pipe technology, potential risk associated with geologic formations, and large impact area on the launch side, Equitrans does not intend to utilize Direct Pipe technology for the Project.

(f) Open-Cut Crossing Method

Although not expected to be necessary for the Project, an open-cut waterbody crossing, if needed, will be conducted using methods similar to conventional upland open-cut trenching. The open-cut construction method will involve excavation of the pipeline trench across the waterbody, installation of a prefabricated segment of pipeline, and backfilling of the trench with native material. No effort will be made to isolate the stream flow from the construction activities. Depending upon the width of the crossing and the reach of the excavating equipment, excavation, and backfilling of the trench will generally be accomplished using backhoes or other excavation equipment operating from one or both banks of the waterbody. All construction equipment will cross the waterbody using equipment bridges, unless otherwise allowed by the FERC Procedures for minor waterbody crossings.

Mitigation measures will be implemented to minimize impacts on the aquatic environment during construction as described in the FERC Procedures. Construction activities will be scheduled so that the trench is excavated immediately prior to pipe laying activities. The duration of construction within each waterbody will be limited to 24 hours for minor waterbodies (10 feet wide or less) and 48 hours for intermediate waterbodies (greater than 10 feet wide but less than or equal to 100 feet in width). In accordance with the FERC Procedures, excavated spoil that is stockpiled in the construction right-of-way will be at least 10 feet from the stream bank or in approved additional work areas, and will be surrounded by sediment control devices to prevent sediment from returning to the waterbody. The waterbody banks will be returned to as near to pre-construction conditions as possible within 24 hours of completion of each open-cut crossing.

Typical Road and Railroad Crossings

Road and railroad crossings will be maintained continuously using provisions such as steel plates or alternate access to minimize inconvenience to the public. Construction of the pipeline across hard surface roads will typically be installed through the roadbed by boring, with a pit on either side of the road or railroad to provide a working area for the equipment. At points of access to the right-of-way from hard-surfaced roads, a stone pad will be installed as a construction entrance to control mud and dirt tracking onto the highway. Most of the smaller unpaved roads and drives will be crossed by open trenching, and then restored to pre-construction conditions or better. If an open-cut road requires extensive construction time, provisions will be made for temporary detours or other measures to allow safe traffic flow during construction. The pipeline will be buried to a depth of at least 5 feet below the road surface, and 10 feet below a rail of the railroad, and will be designed to withstand anticipated external loadings. Preliminary road and railroad crossing locations are listed in Appendix 1-I. ATWS areas for road and railroad crossings are shown on the alignment sheets in Appendix 1-A. Typical details of bored and trenched road and railroad crossings are provided in Appendix 1-E.

Typical Foreign Pipeline Crossings

Portions of the Project are located in active oil and gas producing areas, resulting in crossings of numerous foreign pipelines and flow lines. The Project will cross under most existing foreign pipelines due to the large size of the pipeline and soil cover and separation requirements. The larger spoil volumes from increased excavation depths at these pipeline crossings and the preference not to place spoil or construction equipment over existing pipelines will require extra workspace at most crossings. Extra workspaces for foreign pipeline crossings are shown on the Project alignment sheets (Appendix 1-A). The locations of known foreign pipelines in relation to the proposed pipeline are listed in Table 1.4-3. Experience shows that additional foreign lines or flow lines will likely be identified during the pre-construction surveys.

Table 1.4-3

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	0.20	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	24”	HDD
H-318	0.08	Peoples Natural Gas	16”	Open Cut
H-318	0.09	Equitrans LP	16”	Open Cut
H-318	0.10	Equitrans LP	16”	Open Cut
H-318	0.71	Peoples Natural Gas	3”	Bore
H-318	1.92	Peoples Natural Gas	UNK	Open Cut

Table 1.4-3 Foreign Pipelines Crossed by the Project				
Pipeline	**MP**	**Name/Type**	**Size**	**Crossing Method**
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	4.20	Equitrans LP	20”	Open Cut

Precautions will be taken to ensure that the existing pipelines are positively identified, not damaged, and the pipeline crossing area is safe during construction, including:

- One Call will be contacted to locate all known pipelines and utilities;
- The existing pipelines will be precisely located prior to excavation using a hand-held magnetometer and/or by probing, as appropriate for actual conditions encountered;
- Right-of-way edges will be scanned prior to grading with passive inductive locating equipment to ensure that no unknown foreign pipelines cross into the work area;
- The operators of the existing pipelines will be given adequate notice of the crossing and the opportunity to be present during work around their pipelines;
- No mechanized excavation will be allowed within 3 feet of existing pipelines; the excavations will be completed by hand shoveling;
- Construction equipment and spoil piles will be kept off the existing pipeline’s centerline, to the extent practicable;
- The existing pipelines will be temporarily and adequately supported for the length of the span exposed by the crossing excavation. Supports will not be removed until the soil under the piping has been compacted and can adequately support the pipeline;
- The existing pipelines will be inspected before and after installation of the Project to ensure there is no damage to the existing pipelines or their coatings that could compromise their integrity;
- The minimum separation distance between the pipelines specified by the USDOT will be maintained; and
- Safety requirements of the foreign pipeline’s operator will be followed.

Equitrans will require monitoring of excavation activities whenever a contractor is excavating over or near a foreign pipeline. A working combustible gas indicator (when crossing hydro-carbon lines) will be available at the work site, and appropriate safety and rescue equipment will be available, based on Occupational Safety and Health Administration (OSHA) standards for working in excavations or confined spaces.

In the event accidental damage occurs to a foreign pipeline during construction, appropriate measures will be implemented to minimize undesirable effects to human health and the environment.

Typical Construction in Residential Areas

Where residences are located in close proximity to the edge of the construction right-of-way, Equitrans will reduce construction workspace areas as practicable to minimize inconvenience to property owners. If

construction requires the removal of private property features, such as gates or fences, the landowner or tenant will be notified prior to the action.

Residential structures within 50 feet of construction work areas are listed in Table 1.4-4 and will be identified in detail in Resource Report 8. Special care will be taken in residential areas to minimize neighborhood and traffic disruption and to control noise and dust to the extent practicable. Equitrans is currently negotiating or has negotiated the purchase of these residences which will be vacant or demolished prior to construction.

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.

In general, the following measures will be taken in residential areas:

- Fence the boundary to the construction work area for a distance of 100 feet on either side of the residence to ensure construction equipment, materials and spoil remain in the construction right-of-way;
- Notify local residents two weeks in advance of construction activities;
- Preserve trees and landscaping to the extent practicable;
- Utilize topsoil segregation procedures, as required, in accordance with the FERC Plan;
- Ensure piping is welded and installed as quickly as reasonably possible consistent with prudent pipeline construction practices to minimize construction time affecting a neighborhood;
- Backfill the trench and complete cleanup as soon as the pipe is laid or temporarily steel plate the trench;
- Complete cleanup (including grading) and installation of permanent erosion control measures within 10 days after the trench is backfilled, weather conditions permitting;
- Restore lawns and landscaping as soon as practical following final cleanup, or as specified in landowner agreements, weather conditions permitting; and
- If weather conditions prevent timely restoration of these areas, maintain and monitor temporary erosion controls until restoration is completed.

Additional measures, such as high-visibility safety fence or jersey barriers, will be used to prevent overnight access to the trench, in addition to installing overnight temporary end caps at the end of each work day. Additional details regarding the construction techniques, including proposed mitigation measures to be used in residential areas, are provided in Resource Report 8.

Following completion of major construction, the property will be restored in accordance with Equitrans standards regarding right-of-way restoration and maintenance. Property restoration will be in accordance with any agreements between Equitrans and the landowner. It is expected that residences within 50 feet

of construction will be vacant or demolished prior to construction, which will minimize any potential for disturbance to the property owners.

Typical Construction in Commercial and Industrial Areas

Impacts on commercial and industrial areas will be limited to the construction and post-construction restoration periods when construction activities can inconvenience business owners, employees, and customers. Equitrans will maintain close coordination with business owners to maintain access, decrease construction duration, and generally minimize impacts.

Typical Topsoil Segregation

Equitrans will conserve topsoil in actively cultivated and rotated cropland, improved pastureland, and non-saturated wetlands. In residential areas, Equitrans will either conserve topsoil or import topsoil as an alternative to topsoil segregation and conservation. A maximum of 12 inches of topsoil will be segregated as described in the FERC Plan, and in other areas at the specific request of the landowner. Where topsoil is less than 12 inches deep, the actual depth of the topsoil will be removed and segregated. The topsoil and subsoil will be temporarily stockpiled in separate windrows on the construction right-of-way. To the extent practicable, Equitrans will use weed-free fill. Should the need to import topsoil arise, Equitrans will use certified weed-free topsoil. Rock will not be used as upper backfill in rotated or permanent cropland.

Under typical conditions, the trench will be adequate to accommodate the 20- to 30-inch-diameter pipeline with 36 inches of cover and 48 inches of cover in actively cultivated agricultural lands. The trench width will vary based on site conditions (e.g., soil types, bedrock, and presence of groundwater). In agricultural areas and at certain crossings (e.g., road, waterbody), the trench depth will be greater in order to achieve the greater depth of cover requirements. Topsoil segregation extra workspaces are shown on the preliminary alignment sheets (Appendix 1-A), and listed in the extra workspace table in Resource Report 8. Once landowner consultations have been completed, topsoil extra workspaces may be added and the preliminary alignment sheets will be updated accordingly. Additional workspace may also be requested by Equitrans during construction if conditions encountered are found to be conducive to topsoil segregation in areas not previously designated for topsoil segregation. Upon completing construction, Equitrans will cooperate with local farmers and agricultural agencies to allow continued agricultural use of property while minimizing impacts on pipeline operations.

1.4.1.2 Special Construction Procedures

Blasting

Equitrans does not anticipate the need for blasting. Should blasting be necessary, Equitrans will develop and submit a blast plan for the OEP review and acceptance prior to initiating blasting activities.

Rugged Terrain

In most areas with steep side slopes, Equitrans will implement standard construction methods for the pipeline. It is not expected that additional workspace will be necessary. Land requirements for all ATWS are identified in Resource Report 8. Table 1.4-5 includes the slope percentage and mileage for each of the pipelines.

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%	0.20	5%
H-305	15-30%	0.06	54%
	>30%	0	0%
H-319	15-30%	0	0%
	>30%	0	0%

Additional surface grading may be required in areas where the Project route crosses rugged topography. It may be necessary to grade steep slopes to a gentler slope to accommodate pipe bending limitations. In these areas, the slopes will be cut down and, after the pipeline is installed, returned to their original contours during right-of-way restoration. In areas where the Project route crosses laterally across the face of a slope, cut-and-fill grading may be required to establish a safe, flat work terrace; this may require ATWS along the construction right-of-way. In rugged terrain, temporary erosion control measures will typically require closer spacing and more frequent maintenance until permanent post-construction erosion control measures can be established.

Equitrans has routed the project pipelines to avoid "side-hill" construction; the pipeline centerline follows ridgelines to allow for safe pipeline construction and to prevent slips. Large expanses of bedrock are not expected to be encountered during trenching operations; subsoils in the project area are typically readily broken without blasting. Spoils will be placed on the level construction right-of-way or in designated ATWS. In the absence of level ground, sediment barriers or similarly protective device will be installed to retain stockpiles within the designated construction workspace. Where ground seeps are encountered during construction, a ground seep collection BMP (e.g., rock-lined trench or underdrain) may be installed to manage the movement of water across the worksite. After installation of the pipe, the trench will be compacted and the right-of-way will be returned to original grade. Permanent waterbars will be installed following state spacing requirements to direct water off the right-of-way after construction is complete. Seed and mulch for temporary and permanent vegetation will be applied as soon as is practicable and in compliance with FERC and state guidelines. Equitrans does not propose any variance from the FERC Plan V.A.5. All areas are expected to be returned to preconstruction contours. Typical cross-section diagrams are provided in Appendix 1-E. Restoration practices are consistent with Project earth disturbance permits, and generally include the use of rolled or hydraulically applied erosion control fabric on slopes 3:1 or steeper.

Trench Dewatering

In most cases, trench dewatering will be limited to the removal of stormwater in the pipe trench excavated in upland locations. In saturated wetlands, it would not be practical to attempt to dewater the trench, since

the groundwater level is at or near the ground surface. At those locations, the pipe will be concrete-coated to overcome buoyancy in the flooded trench. In uplands, stormwater will typically be removed from the trench prior to lowering the pipe into place. The stormwater will be pumped from the trench to a location downgradient of the trench. The trench will be dewatered in a manner that does not cause erosion and does not result in heavily silt-laden water flowing into any waterbody or wetland. The stormwater will be discharged to an energy dissipation/filtration dewatering device, such as a filter bag. The dewatering structure will be removed as soon as possible after completion of the dewatering activities. Trench breakers (ditch plugs) will be used where necessary to separate the upland trench from adjacent wetlands or waterbodies to prevent the inadvertent draining of the wetland or diversion of water from the waterbody into the pipe trench.

Winter Construction Procedures

The current construction schedule for the Project construction will occur in the winter months. A Winterization Plan has been provided as Appendix 1-J.

Dust Control

Equitrans anticipates that water would be applied on the right-of-way as needed for dust suppression during construction. Water trucks would spray only enough water to control the dust or to reach the optimum soil moisture content to create a surface crust. Runoff should not be generated during this operation. Water may be obtained through municipal sources or withdrawn from surface water or groundwater sources. Equitrans will not be adding chemicals to the water to control fugitive dust. The locations and amount of disbursement of water will be decided by the spread lead environmental inspector. All appropriate permits/approvals would be obtained prior to withdrawal. Equitrans' Dust Suppression Plan is found in Appendix 1-K.

1.4.2 Aboveground Facilities Construction

Typical construction activities associated with the installation of the aboveground facilities are summarized below. No special construction methods will be required for the proposed facilities.

General

Construction activities and storage of construction materials and equipment will be confined within the compressor station and interconnect site boundaries. Debris and wastes generated from the construction and retirement of existing facilities will be disposed of as appropriate. All surface areas disturbed will be restored in a timely manner. The facilities will be constructed in accordance with Equitrans' construction standards and specifications as more generally described in the paragraphs that follow.

Foundations

Excavation will be performed as necessary to accommodate the new reinforced concrete foundations for the new compressor station, launching and receiving facilities, metering equipment, and buildings. Subsurface friction piles may be required to support the foundations, depending upon the bearing capacity of the existing soils and the equipment loads. Forms will be set, rebar installed, and the concrete poured and cured in accordance with applicable industry standards. Concrete pours will be randomly sampled to verify compliance with minimum strength requirements. Backfill will be compacted in place, and excess soil will be used elsewhere or distributed around the site to improve grade. Subsurface friction piles are

not currently planned for use in the Project; however, if foundation work must be completed in winter conditions, these may be necessary.

Equipment

The compression, piping, and other equipment will be shipped to the site by truck. The equipment will be offloaded using cranes or front-end loaders, or both. The equipment will then be positioned on the foundations, leveled, grouted where necessary, and secured with anchor bolts.

All non-screwed piping associated with the aboveground facilities will be welded, except where connected to flanged components. All welders and welding procedures will be qualified in accordance with API standards. All welds in large diameter gas piping systems will be examined using radiography, ultrasound, or other approved NDE methods to ensure compliance with code requirements.

All aboveground piping surfaces will be cleaned and painted in accordance with Equitrans construction specifications. All paint inspection and cleanup will be conducted in accordance with regulatory requirements and best engineering practices.

Testing

All components in high-pressure natural gas service will be tested prior to placing in service. Hydrostatic testing will follow all applicable federal, state, and local requirements. Before being placed in service, all controls and safety equipment and systems, including emergency shutdown, relief valves, gas and fire detection, and engine overspeed, and vibration protection will be calibrated and tested.

Launching and receiving facilities will be installed at the beginning and at the end of each of the lines at the Project, and at certain other points as identified in Table 1.2-2. The launcher and receiver stations will be designed to accommodate smart pigs for periodic internal inspections of the pipeline during operations. These facilities will meet the same standards and regulatory requirements established for the pipelines.

MLVs will be installed within the proposed new Redhook Compressor Station site and/or completely within the Project's permanent right-of-way, at locations dictated by pipeline class in accordance with 49 CFR Part 192.179(a). Equitrans will install MLVs at the start and end of the H-316, H-318, and H-305 pipelines. On the H-319, there will be an operator on the tap valve off of the H-306. The M-80 and H-158 will have MLVs only at Redhook Compressor Station. The installation of the MLVs will meet the same standards and requirements established for the construction of the compressor station and the pipeline. Equitrans will attempt to locate these MLVs as close to existing roads as possible to minimize impact on property and provide easy access for Equitrans maintenance personnel.

1.4.3 Restoration

Following construction of the Project, the areas disturbed by construction will be restored to their original grades, condition and use, to the greatest extent practicable. However, aboveground facilities will be fenced and converted to industrial use. The Pratt Compressor Station will be abandoned once the new connections to the Redhook Compressor Station are placed in operation, as described below.

Once the Redhook Compressor Station is in service, the Pratt Compressor Station will be demolished although some facilities will remain. Equitrans will utilize BMPs to safely remove the old station equipment that has no future use. The equipment will be salvaged where available or disposed of properly and safely.

Facilities remaining at the Pratt Compressor Station Yard include the H-147 Receiver and the H-147 Ultrasonic Meter. Also remaining at the Pratt Compressor Station Yard are two existing Dominion interconnects. One interconnect includes a control valve, filter/separators (2), regulation runs (2), and ultrasonic meter runs/chromatograph (in the building). The site also contains an Equitrans electronics building and Dominion dekatherm building that will remain, and also a tap valve. The other interconnect on-site includes a control valve, ultrasonic meter and customer valve set, as well as the H-137 to H-136 separator/overpressure protection.

New facilities will need to be constructed within the existing Pratt Compressor Station Yard site. A new regulator run and meter run will be rebuilt to feed Peoples Natural Gas, LLC. A new prefabricated Gas Chromatograph/Instrument/Remote Terminal Unit building will be installed to replace the old station equipment. Additionally, Equitrans will work to tie-over the various pipelines to the Pratt Compressor Station Yard. Pipeline yard tie-ins for the Project include:

- H-147 to H-148,
- H-137 to H-106,
- H-117 to H-108,
- GSF-360 to Dominion Pratt II Interconnect,
- GSF-360 to Dominion Pratt I Interconnect (via repurposed segment of M-80 and some new pipe), and
- H-137 to H-136.

Equitrans will utilize BMPs to safely remove the old station equipment that has no future use. The equipment will be salvaged where available and disposed of safely. Equitrans will work to tie-over the various pipelines in the Pratt Compressor Station Yard in order to minimize the disruption to the service of existing customers.

At a given location, restoration activities will employ the most stringent applicable measures, either those specified in the FERC Plan and Procedures or those described in the Project permits.

1.4.3.1 Pipeline

Upon completion of the pipeline installation, the surface of the right-of-way disturbed by construction activities will be graded to match original contours to the extent practicable and to be compatible with surrounding drainage patterns, except at those locations where permanent changes in drainage will be required to prevent erosion, scour, and possible exposure of the pipeline. HDD entry and exit pits will be backfilled and the disturbed ground surface similarly graded. Segregated topsoil will be replaced, and soils that have been compacted by construction equipment traffic will be decompacted. Permanent erosion control measures will be installed at this time. Temporary construction erosion control measures may be left in place, or replaced with interim erosion control measures, where appropriate, until sufficient vegetative cover is re-established to prevent significant erosion and sedimentation.

Uplands

In most upland locations, excluding actively cultivated cropland, an herbaceous vegetative cover will be re-established by spreading a grass seed and hydro/straw-mulch mixture over the disturbed surface. The type of seed will be selected based on soil fertility sampling and based on proposed land use. In addition, seed mixes will be selected that are wildlife-friendly and beneficial to pollinators and butterflies. The type

of seed will be compatible with state and county recommendations. Depending upon the time of year, a seasonal variety, such as ryegrass, may be broadcast until a more permanent cover can be established. Steep slopes may require rolled erosion control fabric, hydraulically applied blankets, or revetments. Vegetation success in these areas will be monitored by Equitrans, and reseeding, fertilizing, and other measures will be employed until based upon visual survey, the density and cover of non-nuisance vegetation is similar in density and cover to adjacent undisturbed lands. An exception to this approach will be made for the permanent right-of-way that must be maintained in herbaceous vegetative cover. No woody vegetation will be allowed to grow within the permanent right-of-way. Temporary and interim erosion control measures will be removed at that time.

Actively cultivated cropland may be left unseeded at the request of the landowner. Pasture will be reseeded with a similar species or mixture. Pasture revegetation will be considered successful when density and cover are similar to adjacent undisturbed portions of the same pasture.

Residential and commercial lawns will be reseeded or sodded, depending upon the original grass variety. Shrubs and small trees on residential properties will be temporarily transplanted and replaced where practicable and where allowed relative to the permanent right-of-way. Forested areas will be allowed to recover, except that no trees will be allowed to grow within the permanent right-of-way.

Wetlands

Original surface hydrology will be re-established in wetlands by backfilling the pipe trench and grading the surface with backhoes operating from the equipment mats, or low-ground-pressure tracked vehicles working in the spoil pile, depending upon the ambient water level, degree of soil saturation, and the bearing capacity of the soils. Segregated topsoil will be replaced in unsaturated wetlands. Roots and stumps will have been removed only in the areas of the pipe trench, allowing existing vegetation to recover more rapidly in the remainder of the right-of-way once the equipment mats and spoil piles have been removed. Wetlands along the proposed pipeline are expected to exhibit varying degrees of saturation and water elevation, requiring a variety of plant species to be re-established. In unsaturated wetlands, most vegetation will be replaced by seeding. Saturated wetlands will typically be allowed to re-vegetate naturally. Wetland revegetation will be considered successful when the cover of herbaceous and/or woody species is at least 80 percent of the type, density, and distribution of the vegetation in adjacent wetland areas that were not disturbed by construction. Revegetation efforts will continue until wetland revegetation is successful. Restoration and mitigation for impacts on forested wetlands are addressed in Resource Report 2.

1.4.3.2 Aboveground Facilities

The areas inside the fence at the aboveground facilities will be permanently converted to industrial use. Most areas in and around the buildings, meters, and associated piping and equipment will be covered with crushed rock (or equivalent) to minimize the amount of maintenance required. Roads and parking areas may be crushed rock, concrete, or asphalt. Other ground surfaces will be seeded with a grass that is compatible with the climate and easily maintained. Disturbed areas outside the fence will be restored as described above for the pipeline right-of-way.

1.4.3.3 Access Roads

Previously existing access roads that were modified and used during construction will be returned to original or better condition upon completion of the pipeline facilities installation. New access roads constructed specifically for the Project installation will be removed, the surface graded to original contours,

and the land restored as close as practicable to its original use, unless otherwise requested by the landowner, or unless the roads will be required for permanent access to the right-of-way during pipeline operations, and in accordance with any permit requirements. Temporary erosion control measures will be removed upon final stabilization and installation of permanent erosion control measures.

1.4.3.4 Contractor Yards

Upon completion of construction, all temporary facilities (e.g., trailers, sheds, latrines, pipe racks, fencing, and gates) will be removed from the pipe storage and contractor yards. Unless otherwise requested by the landowner, each site will be graded to original contours, and the land restored to its original use. The site will be re-vegetated, any permanent erosion control measures will be installed, and temporary erosion control measures will be removed.

1.4.4 Quality Assurance Measures

To ensure that construction of the proposed facilities will comply with mitigation measures identified in the resource reports, the FERC evaluation of the Project, and the requirements of other federal and state permitting agencies, Equitrans will include, whenever appropriate, implementation details in its construction drawings and specifications. In addition, Equitrans will participate in FERC's third-party construction compliance monitoring program, also committed to by Mountain Valley, to the extent practicable given the difference in project sizes. Selected contractors will receive copies of specifications and a Construction Drawing Package containing, among other things, plant and equipment drawings designated as being approved for construction. To solicit accurate bids for construction, specifications and advance versions of the Construction Drawing Package will be provided to prospective contractors.

For those mitigation measures that address permit conditions from federal, state, and local agencies, copies of permits and related drawings will also be added to the Construction Bid Package. For those mitigation measures that, in part, address post-construction requirements, instructions and documentation will be provided to operating personnel following the completion of construction.

The selected contractors will install facilities according to company specifications, the Construction Drawing Package, the terms of the negotiated contract, and the FERC Plan and Procedures. Equitrans conducts training for all personnel involved on the Project. The Project's inspectors will be drawn from the industry's inspector pool utilizing only qualified third-party contractors. Prior to and during construction, training for field construction personnel and contractor personnel will be conducted. This training will focus on the FERC Plan and Procedures, as well as other regulatory requirements such as endangered species, cultural resources, and wetlands. The training will also cover Project-specific construction and mitigation plans, operator qualifications, and site-specific safety requirements.

For purposes of quality assurance and compliance with mitigation measures, other applicable regulatory requirements, and company specifications, appropriate Equitrans inspectors will be on-site to represent the company. One or more craft inspectors, and NDE technicians will also be on-site to oversee construction during all phases of the Project. In addition, there will be at least one EI assigned to each construction spread during active construction or restoration. The EI's duties are consistent with those outlined in Section II.B (Responsibilities of the Environmental Inspector) of the FERC Plan and shall be:

- Responsible for monitoring and documenting compliance with all mitigation measures required by the FERC Order and any other grants, permits, certificates, or other authorizing documents;

- Responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract or any other authorizing document;
- Empowered to order correction of acts that violate the environmental conditions of the FERC Order, or any other authorizing document (e.g., U.S. Army Corps of Engineers [USACE] Section 404 permit), including stop work authority;
- A full-time position separate from all other activity inspectors; and
- Responsible for maintaining status reports and training records.

A number of copies of the Construction Drawing Package will be distributed to inspectors and to contractors' supervisory personnel. If a contractor's performance is unsatisfactory, the terms of the contract will allow for work stoppage and will require the contractor to begin remedial work.

The Equitrans engineering and construction departments are responsible for designing and constructing certificated facilities in compliance with regulatory and contractual requirements and agreements. If technical or management assistance is required, the responsible Equitrans Construction Manager and/or Chief Inspector will request assistance from the appropriate company department. The operations department will be responsible for long-term Project maintenance and regulatory compliance.

1.4.4.1 Environmental Training and Inspection

Consistent with the FERC guidelines, environmental training will be given to Equitrans personnel and to contractor personnel whose activities may impact the environment during pipeline and aboveground facility construction. The level of training will be commensurate with the type of duties of the personnel. All construction personnel from the Chief Inspector, EI, craft inspectors, and contractor job superintendent to loggers, welders, equipment operators, and laborers will be given the appropriate level of environmental training. The training will be given prior to the start of construction and throughout the construction process, as needed. The training program will cover job-specific permit conditions, contaminated sediment and groundwater management, health and safety, company policies, cultural resource procedures, threatened and endangered species restrictions, the Spill Prevention Control and Countermeasures Plan, ESCGP-2, and any other pertinent information related to the job. In addition to the EIs, all other construction personnel will play an important role in maintaining strict compliance with all permit conditions to protect the environment during construction.

At least one EI will be assigned to each construction spread during active construction or restoration. In addition, Equitrans will participate in the FERC's third-party construction compliance monitoring program. The EI will have peer status with all other activity inspectors and will report directly to the Resident Engineer/Chief Inspector who has overall authority on the construction spread. The EI will have the authority to stop activities that violate the environmental conditions of the FERC certificate (if applicable), other federal and state permits, or landowner requirements, and to order corrective action.

1.4.5 Construction Schedule and Workforce

The order in which each facility will be constructed may vary, depending upon numerous factors, including the receipt of necessary authorizations, the capabilities of each contractor, available workforce, and optimized logistics. Additional details regarding construction workforce are provided in Resource Report 5. Pipeline construction is expected to commence in December 2016 with the target in-service date for the Project of December 2017. Once the Redhook Compressor Station is commissioned, anticipated in April

2018, Equitrans will start demolition of the Pratt Compressor Station, which will become a storage yard for materials. Demolition will be completed by December 2018. A construction duration schedule is provided in Table 1.4-6.

Table 1.4-6

Construction Schedule for Major Components of the Project a/

Component	Commence Construction	Complete Construction
Clearing and Grading	December 2016	October 2017
Pipeline Construction	February 2017	November 2017
Pipeline Restoration	October 2017	December 2017
Pipeline Hydrostatic Testing	October 2017	December 2017
Redhook Compressor Station Construction and Commissioning	February 2017	April 2018
Pratt Compressor Station Demolition	May 2018	December 2018
a/ Anticipated in-service date of December 2017		

1.5 OPERATIONS AND MAINTENANCE

Following construction of the Project facilities, certain areas along the pipeline alignment (and at aboveground facilities) will comprise permanent right-of-way or facility sites. For pipeline facilities, Equitrans will maintain a typical permanent right-of-way easement of 50 feet in width. MLVs will be contained within the operational right-of-way. Land requirements for permanent operating right-of-way for pipeline facilities are listed in Table 1.3-1. In some locations it will be necessary to retain access roads used for construction to support ongoing pipeline operations. Land requirements for permanent access roads are listed in Table 1.3-4.

Equitrans will operate and maintain the Project and aboveground facilities in compliance with USDOT regulations provided at 49 CFR Part 192, the FERC regulations at 18 CFR Part 380.15, and maintenance provisions of the FERC Plan and Procedures. Operations and maintenance considerations for pipeline facilities are discussed below and described more fully in Resource Report 11.

1.5.1 Pipeline

Operational activity on the pipeline will be limited primarily to maintenance of the right-of-way and inspection, repair, and cleaning of the pipeline. Periodic aerial and ground inspections by pipeline personnel will identify soil erosion that may expose the pipe; dead vegetation that may indicate a leak in the line; conditions of the vegetation cover and erosion control measures; unauthorized encroachment on the right-of-way, such as buildings and other substantial structures; and other conditions that could present a safety hazard or require preventive maintenance or repairs. The pipeline's cathodic protection system will also be monitored and inspected in accordance with 49 CFR Part 192 requirements to ensure proper and adequate corrosion protection. The pipeline will be designed for internal inspection technology. Appropriate responses to conditions observed during internal inspections will be taken as necessary. In addition, class study changes will also occur to identify areas of development. Vegetation on the permanent right-of-way will be maintained by mowing, cutting, and trimming. The right-of-way will be allowed to revegetate; however, large brush and trees will be periodically removed in accordance with the FERC Plan

and Procedures. Trees or deep-rooted shrubs could damage the pipeline's protective coating, obscure periodic surveillance, or interfere with potential repairs and would not be allowed to grow within the permanent right-of-way. Along the length of the pipeline, including wetlands, a 10 foot-wide strip over the pipeline will be maintained by mowing. Vegetation maintenance will be conducted in accordance with the FERC Plan and Procedures.

Vegetation maintenance normally will not be required in agricultural or grazing areas. Other than preventing wetland tree growth and clearing the 10-foot inspection corridor as described above, vegetation maintenance will also not normally be required in wetlands.

The pipeline facilities will be clearly marked at line-of-sight intervals and at crossings of roads, railroads, waterbodies, and other key points, in accordance with USDOT regulations. The markers will clearly indicate the presence of the pipeline and provide a telephone number and address where a company representative can be reached in the event of an emergency or prior to any excavation in the area of the pipeline by a third party. Equitrans participates in all One Call systems in Pennsylvania and West Virginia.

1.5.2 Aboveground Facilities

1.5.2.1 Compressor Stations

The compressor station crews will perform operation and maintenance of all equipment. Crews will perform routine checks of the facilities including calibration of equipment and instrumentation, inspection of critical components, and scheduled and routine maintenance of equipment. Safety equipment, such as pressure relief devices, fire detection and suppression systems, and gas detection systems will be tested for proper operation. Corrective actions will be taken for any identified problem.

The compressor station will be equipped with combustible gas and fire detection alarm systems and an emergency shutdown system. The gas detection system will alarm upon detection of 25 percent of the lower explosive limit of natural gas in air. Automatic emergency shutdown of the compressors, evacuation or venting of gas from the station piping, and isolation of the station from the main pipeline will occur following a fire detection alarm or the detection of a 50 percent lower explosive limit inside the station. The compressor station will also be equipped with relief valves or pressure protection devices to protect the station piping from overpressure if station or unit control systems fail. The station will normally be unmanned with start/stop control capabilities controlled by Equitrans' Gas Control headquarters, located in Pittsburgh, Pennsylvania, at EQT Plaza. A telemetry system will notify personnel locally and at the Gas Control headquarters of the activation of safety systems and alarms as appropriate. Maintenance personnel may be dispatched to investigate and take proper corrective actions, if necessary.

1.5.2.2 Measurement Stations

Measurement technicians, based at existing Equitrans satellite office locations, will operate and maintain the new equipment. Site personnel will perform routine checks of the facilities, including calibration of equipment and instrumentation, inspection of critical components, and scheduled and preventative maintenance of equipment. Safety equipment, such as pressure-relief devices, will be tested for proper operation, per 49 CFR Part 192 requirements. Corrective actions will be taken for any identified problem.

The interconnect sites will be equipped with relief valves or other pressure-protection devices to protect the site piping from overpressure conditions. A telemetry system will notify personnel locally and at Equitrans'

Gas Control headquarters of the activation of safety systems and alarms, which may in turn instruct maintenance personnel to investigate and take proper corrective action.

1.6 FUTURE PLANS AND ABANDONMENT

Equitrans has no current plans for either future expansion or abandonment of the facilities. Market forces will determine the timing and need for future expansions.

The Project is projected to have at least a 50-year minimum physical life. However, the life of the Project may be constrained by other factors, such as gas supply life. The supply of gas and the market needs are the major factors in determining the economic life of the Project.

At the end of the useful life of the Project, Equitrans will obtain the necessary permission to decommission its facilities.

1.7 PERMITS AND APPROVALS

Various state and federal laws provide protection of resources that may be potentially affected by the Project. For example, cultural resources are protected by the Antiquities Act of 1906 (16 United States Code [USC] 431-433); the National Historic Preservation Act of 1966 (Public Law [PL] 89-665), as amended, and its regulations (36 CFR 800); the Archaeological and Historical Preservation Act of 1974 (PL 93-291); the Archaeological Resources Protection Act of 1979 (PL 96-95) and its regulation (43 CFR 7); the American Indian Religious Freedom Act (42 USC 1996); and the Native American Graves Protection and Repatriation Act of 1990.

Threatened and endangered flora and fauna species are protected under the Endangered Species Act of 1973, as amended (PL 94-325). Additionally, the Migratory Bird Treaty Act (16 USC 703-71 L) and the Bald and Golden Eagle Protection Act (16 USC 668a-668b) protect other sensitive wildlife species potentially occurring within the Project area.

The states of Pennsylvania and West Virginia maintain a permit program for activities in and around waterbodies. The permit is a joint permit with the USACE, which satisfies the requirements of Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899, and the respective state agency permit requirements.

1.7.1 Status of Field Surveys

Field surveys consist of a 300-foot-wide corridor centered on the proposed pipeline centerline and a 25-foot-wide corridor centered on all access roads. As of July 13, 2015, survey permission was granted for 100 percent of the survey corridor. The environmental surveys include land use, wetlands delineation, threatened and endangered species identification and habitat delineation, and cultural resources reconnaissance. Consultations with agencies regarding these surveys began in early June 2015, followed by commencement of field surveys in early July 2015.

As of October 1, 2015, the stream and wetland field surveys and the Phase I cultural resource surveys for the Project have been completed. Additionally, per guidance from federal and state agencies, mist netting for Project facilities in Pennsylvania and habitat assessments in West Virginia for protected bat species were completed. During the surveys, field staff identified potential wintering habitat within the Project

vicinity. Subsequent field investigations have been initiated to verify if wintering habitat exists within the recently identified mine portals.

Surveys for protected species of mussels will commence in October 2015. These surveys are planned for the South Fork Tenmile Creek and the surveys for the Monongahela River have been scheduled for early 2016. Three separate plant surveys have been scheduled for early spring, mid-spring, and late summer 2016 for protected species in accordance with their optimal survey time periods. Consultation with agencies is ongoing.

The applicable federal, state, and local permits and approvals, responsible agencies, and the anticipated schedule for filing applications or documentation for these permits and approvals for the Project are summarized in Table 1.7-1. Appendix 1-L contains agency correspondence.

Table 1.7-1

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 1st Street NE Washington, DC 20426 Rich McGuire, Acting Director	April 1, 2015	Yes	March 25, 2015	October 2015	October 15, 2016
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	April 27, 2015	Pending further consultation	April 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	April 27, 2015	Pending further consultation	April 27, 2015	N/A	N/A
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	Pittsburgh District Corps of Engineers Regulatory/Permits Federal Bldg., 20th Floor 1000 Liberty Ave. Pittsburgh, PA 15222 412-395-7152	April 27, 2015	Pending further consultation	April 27, 2015	October 2015	October 2016

Table 1.7-1

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
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	April 27, 2015	Pending further consultation	April 27, 2015	October 2015	October 2016
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	April 27, 2015	Pending further consultation	April 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	April 27, 2015	Pending further consultation	June 24, 2015	N/A	October 2016

Table 1.7-1

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
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	April 27, 2015	Pending further consultation	June 24, 2015	N/A	October, 2016
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	April 27, 2015	Pending further consultation	June 24, 2015	N/A	October 2016
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	April 27, 2015	Pending further consultation	June 24, 2015	N/A	October 2016
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	April 27, 2015	Pending further consultation	March 10, 2015	October 2015	August 2016

Table 1.7-1

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
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	April 27, 2015	Pending further consultation	April 27, 2015	November 2015 State-wide PAG-10 authorization held	October 2016
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	April 27, 2015	Pending further consultation	April 27, 2015	October 2015	October 2016

Table 1.7-1

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 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	April 27, 2015	Pending further consultation	April 27, 2015	ongoing	October 2016
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	April 27, 2015	Pending further consultation	May 7, 2015	N/A	June 2016

Table 1.7-1

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	April 27, 2015	Pending further consultation	June 24, 2015	N/A	June 2016
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	April 27, 2015	Pending further consultation	April 27, 2015	June 2016	July 2016
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 Discharge Permit	WVDEP, Division of Water and Waste Management 601 57th Street SE Charleston, WV 25304 Phone: (304) 926-0499 Ext. 1571	April 27, 2015	Pending further consultation	April 27, 2015	April 2016	July 2016
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	April 27, 2015	Pending further consultation	April 27, 2015	ongoing	October 2016

Table 1.7-1

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 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	April 27, 2015	Pending further consultation	May 7, 2015	N/A	June 2016
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	April 27, 2015	Pending further consultation	April 27, 2015	June 2016	July 2016
Note: Consultations will occur continuously throughout the development of the Project.							

1.8 AFFECTED LANDOWNERS

The names and addresses of affected landowners are included in Appendix 1-M (Privileged). Affected landowners include:

- All landowners whose land will be crossed or used for the proposed construction activities, including all facility sites, right-of-ways, access roads, pipe and contractor yards, ancillary sites and temporary workspaces;
- Landowners and residents within 0.5 mile of new or modified compressor stations; and
- Landowners whose land abuts the edge of the proposed facility site or right-of-way or which contains a residence within 50 feet of the proposed construction work area.

Equitrans has developed a comprehensive Public Participation Plan (Appendix 1-N) that outlines a commitment to engage actively with stakeholders throughout the life cycle of the Project and provides the following activities that Equitrans has identified to ensure successful ongoing communication with stakeholders, including establishing a Project website and a single point of contact.

- Equitrans held open houses in order to provide information about the Project to all interested state and federal agencies, interested stakeholders, as well as the public;
- Equitrans continues to identify and hold meetings with local associations, affected public groups and other non-governmental organizations concerning the Project;
- Equitrans continues to meet with state and local government representatives to seek input, provide updates as the Project progresses, and extend an open invitation to all public meetings;
- Equitrans continues to meet frequently with state and federal agencies for guidance during permitting and with development of resource reports. Equitrans will respond rapidly to requests for information from permitting agencies and the FERC, and will meet with them in person, if that assists in understanding the request and providing the best possible response; and
- Equitrans has established and periodically updates a publicly available website providing pertinent information about the Project. The website has the following address: www.equitransproject.com.

Equitrans will work to address and resolve complaints regarding the construction and/or operation of the Project in timely manner. Equitrans has an established protocol to resolve any landowner concerns prior to construction using the Project 24-hour hotline (1-855-EEP-7675). The hotline is a toll-free number that serves as a means for landowners and stakeholders to contact appropriate Project representatives with questions, concerns, and complaints. Affected landowners will be provided with the 24-hour hotline number by land agents during construction notification. The call response is a three-step process.

Step 1: Gathering Information

An Equitrans representative will contact and request all necessary information to complete the caller information section of the hotline record, including the caller's name, address, phone number, and Project reference. Additionally, any details offered by the caller regarding the purpose of the call will be entered on the hotline record.

Step 2: Defining the Issues

The Equitrans representative will work with the caller to help understand and address their concerns. If a representative can resolve the issue, they will record this on the hotline record. Otherwise, the caller will be advised that their concerns have been documented and that they can generally expect a return call within 24 hours from an appropriate Equitrans representative. The hotline record documenting the concerns will then be directed to the appropriate right-of-way agent.

Step 3: Resolution

If the issues are resolved during Step 2, a representative will complete the process by documenting how a resolution was reached for the hotline record. If a resolution is not reached during Step 2, the hotline record will be forwarded to the appropriate right-of-way agent who will return the call. The delegation of the issue should generally follow this progression until resolution is reached. If a right-of-way agent receives a direct phone call relating to environmental, construction, or off-right-of-way issues from a landowner during pre-construction, construction, or post-construction activities, the agent will request all necessary information to complete the caller information section of the hotline record, including the caller's name, address, phone number, and Project reference. The agent will then proceed to Steps 2 and 3 until a resolution is reached.

1.9 NON-JURISDICTIONAL FACILITIES

At this time, Equitrans is not planning any non-jurisdictional facilities for this Project.

1.10 CUMULATIVE IMPACTS

Cumulative impacts may result when the environmental effects associated with a proposed project are added to temporary (construction-related) or permanent (operations-related) impacts associated with other past, present, or reasonably foreseeable future projects. Although the individual impact of each separate project might not be significant, the additive or synergistic effects of multiple projects could be significant. Equitrans has identified reasonably foreseeable future projects from a review of their Project alignment sheets and topographic maps; field reconnaissance; internet research of publicly available information; and through consultation with local planning departments and regional planning councils. Commercial and residential developments included in this cumulative impact analysis are those located within the same municipalities directly affected by construction of the Project and within 0.5 mile of the Project right-of-way.

Equitrans is evaluating recently completed, current, and reasonably foreseeable projects in the Project area. No cumulative impacts are anticipated from pipeline construction or operation. Additional projects, such as road improvements or housing developments, could be proposed in the vicinity of the Project; however, at this time these have not been identified. If constructed in close proximity, both in time and space, to the Project, cumulative impacts on socioeconomics, water resources, wetlands, soil, fugitive dust, etc. could occur.

The Council on Environmental Quality (CEQ) regulations that implement the National Environmental Policy Act define cumulative effects as "the impact on the environment which results from the incremental consequences of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions" (40 CFR 1508.7). Cumulative effects include both direct and indirect, or induced, effects that would result from the proposed Project, as well as the effects from other projects (past, present, and reasonably foreseeable future actions) not related to or

caused by the Project. Cumulative impacts may result when the environmental effects associated with a proposed Project are added to temporary (construction-related) or permanent (operations-related) impacts associated with other past, present, or reasonably foreseeable future projects. Although the individual impact of each separate project might not be significant, the additive or synergistic effects of multiple projects could be significant. The cumulative effects analysis evaluates the magnitude of cumulative effects on natural resources such as wetlands, water quality, floodplains, and threatened and endangered species, as well as cumulative effects on land use, socioeconomics, air quality, noise, and cultural resources. CEQ regulations (40 CFR 1508.8) also require that the cumulative effects analysis consider the indirect effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

The purpose of the cumulative impacts analysis is to identify and describe cumulative impacts that would potentially result from implementation of the Project. Inclusion of actions within the analysis is based on identifying commonalities of impacts from other actions to potential impacts that would result from the Project. In order to avoid unnecessary discussions of insignificant impacts and projects and to adequately address and accomplish the purposes of this analysis, the cumulative impacts analysis for the proposed Project will be conducted using the following guidelines:

- A project must impact a resource category potentially affected by the proposed Project. For the most part, these projects are located in the same general area that would be directly affected by construction of the proposed Project. The effects of more distant projects are in most cases not assessed, because their impacts would tend to be localized and not contribute significantly to the impacts of the proposed project. Potential cumulative impacts on air quality and watersheds, however, were considered on a broader, more regional basis.

- The distance into the past and future which other projects could potentially cumulatively impact the area of the proposed Project was based on whether the impacts are short-term, long-term, or permanent. Most of the impacts related to the other proposed projects would occur during the construction phase, and would be short-term impacts. Timing will be evaluated based on the submittal date of the Project's 7(c) Application and the proposed in-service date. "Past" projects were identified as those where impacts from construction and/or operation of the completed project continue to affect resources. "Present" projects are those currently under construction. Projects will be determined to be "reasonably foreseeable" when information about the project is publicly available.

Projects meeting one or more of the criteria listed below will be considered in this cumulative analysis. These criteria define the projects' region of influence, which was used in this analysis to describe the general area for which the proposed projects could potentially contribute to cumulative impacts. The region of influence varies depending on the resource being discussed. This approach was developed based on cumulative analysis conducted in recent FERC filings. Specifically, the cumulative impacts analysis for the Project will include:

- Minor projects, such as residential development, small commercial development, and small transportation projects within 0.25 mile of the proposed Project area;

- Major projects, such as large commercial, industrial, transportation and energy development projects within a 10-mile corridor of the proposed Project area (5 miles of the Project centerline). This includes natural gas well permitting and development projects;
- Major projects within watersheds crossed by the proposed Project. Watershed boundaries were identified using the 10-digit Hydrologic Unit Code, or fifth-level watershed; and
- Projects with potential to result in longer term impacts on air quality (for example, natural gas pipeline compressor stations) located within air quality control regions crossed by the other proposed projects. These are typically organized by county. If the other project is near the county border, the adjoining county will also be reviewed.

An assumption related to identifying projects to include in the cumulative impact analysis is that information necessary to compile the analysis is available to the public from various local, county, state, and federal sources, and is up to date and accurate. The level of information available varies considerably based on the source. For example, information is available to interested parties in a variety of formats regarding natural gas exploration and production, and current and future natural gas related projects; however, providing an informed cumulative impact analysis requires the gathering of pertinent information from a number of different sources for an individual project.

The following are sources of projects included in this evaluation:

- Federal Agencies – Information on projects pending before the FERC (either in the Pre-filing Process or with a filed application) is available on the FERC's eLibrary system. USACE regional websites provide information regarding recently approved permits and pending USACE permits that are available for public comment. Available information varies by website but a brief description of the activity requiring the permit and the applicant is provided.
- State Agency – Information on projects recently reviewed or under review for the Pennsylvania and West Virginia state agencies. Available information varies by agency; however, projects that are publically posted will be included.
- County Agencies – County and local government websites are possible sources of information about natural gas or energy-related projects. In addition, each county has been contacted directly for information related to potential developments within 0.5 mile from the proposed pipeline corridor. In cases where individual counties do not maintain a comprehensive list for planned development, the individual townships have also been contacted.
- Private Companies – Information on projects listed by their owners and developers on their public websites is included.

At this phase in Project development, the exact design of the pipeline, ancillary facilities, and compressor station facilities is not finalized and therefore it is not possible to predict potential cumulative impacts. Several energy projects have been identified and preliminary information is provided on those projects in Table 1.10-1. It is assumed that numerous state and county road projects, as well as several other development projects, will occur within the vicinity of the Project during the project time window. In addition, other projects in the region are also in the initial design phase, which makes it impossible to predict cumulative impacts with any certainty.

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.

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
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 Wetzel and Tyler 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; Fishing Creek	Southwest Pennsylvania Intrastate AQCR and West Virginia 2	Connects to the Project	N	Operational
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.

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
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							
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

The following subsections provide resource-specific summaries of cumulative effects.

1.10.1 Geology and Soils

The development associated with the Project is expected to have a direct but temporary impact on near-surface geology and soils. Clearing activities could expose the soil to erosive elements such as precipitation and wind. Approximately 19 percent of soil affected by the Project is considered prime farmland, the entirety of which is located in Pennsylvania. No soils considered to be prime farmland are affected by the Project in West Virginia. The Project area is located among a mix of landforms including floodplains, stream terraces, upland terraces, hillslopes, hills, and plateaus. The overall terrain is moderately hilly, with 19 percent of the pipelines and facilities crossing areas with an average slope above 15 percent. Therefore, it is expected that the route will affect soils with a relatively high erosion potential. Temporary erosion controls in accordance with FERC Plan and Procedures will be used to minimize these impacts.

Coal mining near the Project, which in most cases involves the displacement or large amounts of soil and rock, can have significant impacts on geology and soil resources. Exposure of soils, removal of vegetation, and vehicle traffic all contribute to erosion in mining areas.

This Project's effect on geology and soils will be highly localized and primarily limited to the construction period. Cumulative impacts will only occur if other projects are constructed during the Project's construction period in a shared location. The Ohio Valley Connector Project shares location with the Project, but would result in minimal cumulative impacts because the construction periods would not overlap. The Sunoco Mariner East Pipeline could result in cumulative impacts because it shares location with the Project route in Washington and Allegheny Counties in Pennsylvania, but any such impacts would be minimal since the Mariner East Pipeline has already been constructed. The Sunoco Mariner East 2 Pipeline may result in cumulative impacts because its construction period overlaps with that of the Project; however, the Mariner East 2 Pipeline's route has not yet been finalized, and may be up to 3 miles from the Project route. The MVP also has the potential to cumulatively impact both geology and soils, because it shares both location and construction period with the Project. The duration and effect of these projects will be minimized by the implementation of erosion control and restoration measures. Construction and restoration activities as well as operation and maintenance activities will be monitored throughout the process to ensure compliance. Should hazardous materials or contaminated soils and/or sediments be encountered during construction, they will be disposed of at fully licensed and permitted disposal facilities in accordance with applicable state and federal laws and regulations. Consequently, any potential cumulative effects on geological and soil resources will be minor. Further discussion of geological resources and soils is provided in Resource Reports 6 and 7, respectively.

1.10.2 Waterbodies, Groundwater, and Wetlands

Cumulative effects from the Project on surface water will be limited to waterbodies that are affected by other projects located within the same major watersheds. A total of 31 waterbodies will be crossed by the Project facilities, 24 crossed by the pipeline route or access roads. Of the pipeline route and access road crossings, 10 are perennial, 6 are intermittent, and 8 are ephemeral. No permanent diversions or dams are planned, so any impacts from construction on surface waters will be temporary. The greatest potential impacts of pipeline construction on surface waters will result from an increase in sediment loading to surface waters and an increase in internal sediment loading due to channel/floodplain instability as a result of a change in erosion deposition patterns. Some of the projects listed in Table 1.10-1 will be located within

the same major watersheds as the Project, but only a small number would affect the same waterbodies during the same time frame. The Sunoco Mariner East is an existing pipeline that crosses the Monongahela River just upstream of the Project crossing. As it is an existing pipeline located under the river, no impacts to water quality are ongoing. Any further plans for additional pipelines in the vicinity have unknown locations. Equitrans plans to bore under the Monongahela River to avoid impacts; therefore, no cumulative impacts to the Monongahela River are expected due to these pipeline projects.

Cumulative effects on groundwater resources are expected to be limited to areas that are affected by other projects located near the Project route. Impacts on groundwater could include turbidity, reduced water levels, and contamination. Construction activities such as trenching, dewatering, and backfilling may encounter shallow alluvial aquifers and could cause minor fluctuation in groundwater levels and/or increased turbidity. It is unlikely that Project construction would negatively impact wells close to the Project because no blasting is planned. FERC Procedures, Equitrans' Erosion and Sediment Control Plan, and BMPs will limit water quality and aquatic resource impacts during and following construction across all waterbodies. Nearby projects, such as transportation and energy projects, may expose erodible soil and release contaminates, resulting in cumulative impacts on groundwater.

The pipeline will be hydrostatically tested in accordance with the USDOT's Pipeline and Hazardous Materials Safety Administration pipeline safety regulations in 49 CFR 192 prior to placing the pipeline facilities into service. An estimated 951,000 gallons of water will be needed for this process for all the pipeline segments. This water will be obtained from municipal sources and for the most part will be discharged in upland areas. Discharge will be regulated to prevent erosion, and the only additive to the water would be a dechlorinating agent, which may be used depending on the discharge location. Any impacts resulting from this pipeline testing activity will be temporary and any cumulative impacts minimal.

The Project could cause some short-term impacts to the 23 wetland areas crossed by the pipeline facilities during construction. Construction of the Project along with the other projects in the area could result in the conversion or reduction in the amount of existing wetlands in the vicinity; however, the creation of new wetlands and restoration or enhancement of existing wetlands as required by the USACE are expected to appropriately mitigate for impacts on wetland resources and minimize any cumulative wetland effects. Further discussion of waterbodies, wetlands, and groundwater is provided in Resource Report 2.

1.10.3 Vegetation, Wildlife and Habitat, and Aquatic Resources

This Project traverses through various habitat types within the Western Allegheny Plateau ecoregion, and Project habitats are generally categorized as upland forest, agricultural lands, herbaceous uplands, and wetland. The Project also is located within industrial, commercial, and residential lands. Approximately 3.83 miles of the pipeline segments (49%) will cross forested vegetation (upland deciduous and mixed). During construction, approximately 73 acres of forest will be cleared from within the construction right-of-ways and within the footprints of the aboveground facilities. Of that, approximately 45 acres will be within the temporary construction work space and allowed to revegetate naturally following construction, and 28 acres within the permanent operational right-of-way will be maintained in a shrub or herbaceous condition.

Cumulative impacts to vegetation and wildlife, including aquatic resources, in conjunction with other area projects is expected. Most will be temporary, but there will be some permanent impacts. Several energy projects that are planned for construction or currently being constructed in the Project region will have cumulative impacts to vegetation and wildlife resources, including the MVP, Ohio Valley Connector

project, Supply Header project , Rover Pipeline, and Mariner East and Mariner East 2 pipelines. All of these projects either connect to this Project or are located within watersheds also crossed by the Project (Monongahela River, South Fork Tenmile Creek, or Fishing Creek); and all are located within 20 miles of this Project. Right-of-way clearing and grading associated with these regional projects will result in the removal of vegetation; alteration of wildlife habitat; displacement of wildlife; and other potential secondary effects such as increased population stress, predation, establishment of invasive plant species, and impacts to water quality. These effects will be greatest for regional projects that are constructed within the same timeframe and areas as the proposed Project. However, even construction timeframes that do not overlap temporally can have cumulative effects, because it takes time for vegetation/habitat to return to a preconstruction state.

All of these regional projects, including energy, transportation, and commercial/residential developments, will permanently convert wildlife habitat to commercial energy uses as a result of construction of facilities and infrastructure. Edge effects, which will be permanent due to the necessity of keeping the right-of-way of these various, regional projects clear, will result in permanent cumulative impacts on the environment. A number of nearby projects, such as the ones that will connect to this Project (e.g., MVP) and the ones located closest to the Project (Ohio Valley Connector, Mariner East Pipeline, Mariner East 2 Pipeline, and Supply Header Project) will contribute most to these cumulative impacts. While clearing of the right-of-way might change the natural environment, this change could result in increased habitat for species that prefer open areas. The impacts of these projects will be minimized by implementing the FERC Plan and Procedures and by the incorporation of native grasses and other native herbaceous plants (i.e., wildflowers) into seed mixtures used during the restoration process. This should have a direct benefit to domestic pollinators (birds, bees and butterflies). Additionally, 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. Further discussion of vegetation, wildlife and habitat, and aquatic resources is provided in Resource Report 3.

1.10.4 Cultural Resources

Historic and cultural resource impacts of concern for the Project are associated with following types of resources and applicable impacts:

- Archaeological sites—Sites are primarily vulnerable to soil-disturbing activities, but in rare cases the site's relationship to the surrounding environment is an essential characteristic and could be subject to visual impacts.
- Historic properties (buildings, structures, objects, and landscape features)—Assuming the Project would avoid any direct impacts to these properties, impacts could involve introduction of non-historic visual or, occasionally, auditory elements.
- Tribal lands or historic properties of religious and cultural significance to an Indian Tribe—These could be subject to impacts from direct physical disturbances or from changes to the visual surrounding, auditory field, or other characteristics of their setting.

The assessment of cumulative impacts for the Project is based on archaeological, historic, and tribal resources identified through background research, consisting primarily of information on file with the respective State Historic Preservations Offices (SHPOs) and the National Park Service, the results of the

archaeological and architectural surveys undertaken for the Project, and consideration of ongoing or foreseeable projects in the vicinity of the Project.

Background research did not identify any archaeological sites, historic properties, tribal lands or properties of significance within the direct effects area of potential effects (APE) for the Project. Within the indirect effects APE, background research identified four historic properties previously listed in or determined eligible for the National Register of Historic Places (NRHP) that are potentially subject to impacts by the Project. Subsequent field surveys identified five archaeological sites within the direct effects APE and confirmed the four historic properties that background research identified as within the indirect effects APE.

No impacts are expected to the five identified archaeological sites. Equitrans plans on incorporating micro-siting adjustments as needed in Project engineering to avoid direct impacts to archaeological sites. Indirect impacts to archaeological sites are not anticipated. None of the sites identified during the field surveys exhibit an exceptional relationship to the surrounding environment that would be subject to visual impacts, and background research for the indirect effects APE likewise identified no archaeological sites that are likely to experience visual impacts from the Project. Sunoco's Mariner East Project utilizes a portion of existing right-of-way within the same footprint as the Project. This section of right-of-way has no associated archaeological sites. Additionally, the MVP contains an archaeological site that lies adjacent to the Webster Interconnect survey area. The site is a low-density scatter of artifacts associated with a twentieth-century farmstead. Recent investigation of the site indicates that it has little historical significance or research value, and the West Virginia Division of Cultural and History, which serves as the SHPO, has determined that the site is not eligible for the NRHP. Therefore, Equitrans does not need to take particular measures to avoid impacting the site while constructing and operating the Webster facility. Although Equitrans, the Mariner East Project, and the MVP potentially contain ground disturbance areas that overlap, cumulative impacts are not anticipated for archaeological resources, because construction of all three of these projects will not alter patterns of land use, erosion, or ground disturbance in ways that additively impact known archaeological resources.

Of the four NRHP-listed or eligible historic properties identified within the indirect APE, two are intersected by the Project: the Monongahela River Navigation System—Pool 3 and the Pittsburgh & Lake Erie Railroad. However, the portion of the right-of-way that crosses the two properties is a proposed HDD portion of the pipeline; no direct impacts to these properties are anticipated due to the proposed construction method. In addition, alterations to woodlands on the hillslopes adjacent to the these resources on the east, resulting from the construction and maintenance of the Project right-of-way, are judged not to constitute adverse effects because the landscape setting of these resources does not contribute significantly to their NRHP eligibility or historical significance and because the adjoining present woodlands adjacent developed primarily over the past 50 years on reclaimed strip-mined land, post-dating the periods of significance of the resources. The two NRHP-listed or eligible historic properties that are not intersected by the Project are not anticipated to be subject to adverse effects due to their distance from the Project and because vistas of the primary façades of these properties face away from the Project. Based on the current information available on future projects in the vicinity of the Project, cumulative impacts are not anticipated for historic properties due to the distance separating the resources and each of the projects and due to the limited importance of views towards the projects for the historical significance of the resources.

No tribal lands or historic properties of religious and cultural significance to an Indian tribe have been identified in the Project area. Equitrans has initiated tribal notification concerning the Project, and no

Native American tribes or groups have identified or expressed concerns about historic or cultural properties within the Project area. Therefore, cumulative impacts are not anticipated for tribal lands or historic properties of religious and cultural significance to an Indian tribe. Further discussion of cultural resources is provided in Resource Report 4.

1.10.5 Land Use

The Project will result in temporary and permanent changes in land use. The construction right-of-way width will vary between 85 and 125 feet, and the new permanent right-of-way will be 50 feet wide. Vegetation in this area will be maintained in an herbaceous state, except in wetlands and areas adjacent to perennial waterbodies, where maintenance clearing of woody vegetation will be limited to a 10-foot-wide area directly above the pipeline. Of the total 142.2 acres permanently impacted by this Project, 28.94 acres are forest/woodland, 27.90 acres are agricultural, 12.04 acres are open land, 1.2 acres are residential, 0.13 acre is industrial/commercial land, and 0.89 acre is open water. Although other projects exist in the area, it is likely that cumulative impact of these projects on land use will be minimal. Further discussion of land use is provided in Resource Report 8.

1.10.6 Recreation and Special Interest Areas

Very few recreational areas would be affected by the Project. However, cumulative impacts on recreational or special interest areas could result if the other foreseeable future projects listed in Table 1.10-1 would affect the same area at the same time. The only recreation resources identified within 0.25 mile of the Project facilities are the Riverview Golf Course and the Monongahela River. Project impacts on recreational and special interest areas occurring outside of forest land will be temporary and limited to the period of active construction, which typically lasts only several days to several weeks in any one area. These impacts will be minimized by implementing Equitrans' ESCGP-2. No national parks, state parks, local parks, trails, water trails, state or federal scenic byways or scenic areas, National or State Wild or Scenic Rivers, and registered landmarks will be impacted by the Project. Further discussion of recreation and special interest areas is provided in Resource Report 8.

1.10.7 Visual Resources

The geographical extent for the visual resources direct cumulative effects analysis for the Project was generally associated with the 0.25-mile visual resource analysis area. Direct and indirect cumulative effects were assessed for both construction and operation activities associated with the Project.

Construction of the Project will result in the short-term visual intrusion of construction vehicles, equipment, materials, and a work force along the pipeline right-of-way and at temporary work areas and aboveground facility sites. Vehicles, heavy equipment, structure components, ancillary facility components and materials, and workers will be visible during construction activities (i.e., clearing and grading, trenching, facility installation, and cleanup and restoration) and will create short-term and local contrast within the areas where construction is taking place. Construction activities will result in cumulative effects that contribute incrementally to present projects, such as the Sunoco Mariner East Project that parallels a portion of the H-318 pipeline corridor; however, these impacts will be short term. Foreseeable projects identified within the visual resource analysis area that may result in cumulative impacts include the Mariner East 2 Pipeline Project, which is anticipated to be constructed in 2016 and may overlap with construction of the Project.

Operations activities associated with the Project will be ongoing and long term, and will occur along the right-of-way and at aboveground facilities for the life of the Project. The proposed pipeline, aboveground facilities, and associated long-term access will be permanent and require routine maintenance. The majority of the Project facilities will be buried (i.e., the pipeline) or adjacent to existing facilities of similar appearance (i.e., the aboveground facilities). Additionally, most disturbed areas will be revegetated as appropriate after construction, thereby limiting permanent visual impacts on those areas. In locations where forested areas will be cleared for the pipeline right-of-way, trees will not be allowed to reestablish within the right-of-way due to pipeline safety and operational requirements; therefore, visual impacts in these areas will persist. Past projects, including several gas pipelines that cross the Projects visual resource analysis area (see Table 1.4-3), have previously modified the natural landscape by removing vegetation and introducing landscape contrast into the visual resource analysis area. The Project, when added to the direct effects of the past projects, will incrementally convert the natural landscape into a developed landscape. Foreseeable projects, noted in Table 1.10-1, will continue to incrementally convert the natural landscape and will adversely affect the scenery over time. Further discussion of visual resources is provided in Resource Report 8.

1.10.8 Socioeconomics

Approximately 300 temporary jobs will be created during the peak construction phase of the pipeline and Redhook Compressor Station, plus additional workforce associated with the demolition of the Pratt Compressor Station (30 workers at peak). With other projects taken into account, the cumulative impact will be a significant increase in employment opportunity. Also, the combined tax revenue from the various projects will have a positive cumulative impact on the economies of West Virginia and Pennsylvania. Further discussion of socioeconomics is provided in Resource Report 5.

1.10.9 Temporary Housing

Temporary housing will not be required for construction workers needed for the portion of the workforce not drawn from the local area. Given the current vacancy rates, the number of rental housing units in the area, and the number of hotel/motel rooms available in the cities and towns in the vicinity of the Project, construction workers are not expected to encounter difficulty finding places to stay. If other projects are happening concurrently, the cumulative demand could result in a shortage of temporary housing. Further discussion of temporary housing is provided in Resource Report 5

1.10.10 Air Quality and Noise

Construction of most of the reasonably foreseeable future projects and activities listed in Table 1.10-1 will involve the use of heavy equipment that would generate emissions of air contaminants, fugitive dust, and noise. Construction and operation of the Project will contribute cumulatively to air quality impacts. The combined impact of multiple construction projects occurring in the same airshed and timeframe as the Project could temporarily add to air impacts in the Project area.

Oil and gas wells within close proximity to the route could result in cumulative impacts, especially during the construction phase, due to emissions from construction vehicles. However, it is unlikely that these emissions, together with emissions from gas wells, will have a significant impact on air quality.

The Redhook Compressor Station will be a permanent source of noise and airborne emissions. Other projects also involve the construction and operation of compressor stations. Together, these compressor

stations could have a cumulative impact on air quality. However, the maximum modeled concentrations from the Redhook Compressor Station are very localized (i.e., at the fence and decreasing sharply thereafter) and any cumulative impacts will not be significant. Noise impacts are also highly localized, and cumulative impacts will be minimal. Further discussion of air quality and noise is provided in Resource Report 9.

1.10.11 Climate Change

Climate change is the change in climate over time, whether due to natural variability or as a result of human activity, and cannot be represented by single annual events or individual anomalies.

The Intergovernmental Panel on Climate Change (IPCC) is the leading international, multi-governmental scientific body for the assessment of climate change. The United States is a member of the IPCC and participates in the IPCC working groups to develop reports. The leading United States scientific body on climate change is the United States Global Change Research Program (USGCRP). Thirteen federal departments and agencies participate in the USGCRP, which began as a presidential initiative in 1989 and was mandated by Congress in the Global Change Research Act of 1990.

The IPCC and USGCRP have recognized that:

- globally, greenhouse gases (GHGs) have been accumulating in the atmosphere since the beginning of the industrial era (circa 1750);
- combustion of fossil fuels (coal, petroleum, and natural gas), combined with agriculture and clearing of forests, is primarily responsible for this accumulation of GHG;
- these anthropogenic GHG emissions are the primary contributing factor to climate change; and
- impacts extend beyond atmospheric climate change alone, and include changes to water resources, transportation, agriculture, ecosystems, and human health.

The Project will have negligible direct emissions of GHGs from equipment during Project construction. During operations, the Project will have GHG emissions at the Redhook Compressor station. These projected emissions are outlined in Resource Report 9.

There is currently no standard methodology to determine how one project's contribution to GHG emissions would impact the global environment. However, a comparison to existing local GHG emissions shows that the Project will make a relatively small contribution. The U.S. Environmental Protection Agency (EPA), as part of its final Clean Power Plan for reducing GHG emissions from electric generating facilities in the U.S., has estimated current carbon dioxide (CO_2) emissions from electric generating units in each state. In 2012, Pennsylvania had actual CO_2 emissions from electric generation of 116,657,632 tons (EPA 2015). By comparison, maximum potential annual operating emissions of GHG from the Redhook Compressor Station are estimated to total 167,091 tons (expressed as CO_2 equivalents, or CO_2e), which is about 0.1 percent of Pennsylvania's current electric generation CO_2 emissions.

In addition to the Project's relatively small contribution to existing GHG emissions, the natural gas transported by the Project pipeline can play an important role in helping to reduce overall regional, national, and global GHG emissions during the lifetime of the Project. As the IPCC notes in its Fifth Assessment Report on climate change, "GHG emissions from energy supply can be reduced significantly by replacing current world average coal-fired power plants with modern, highly efficient natural gas combined-cycle

power plants or combined heat and power plants, provided that natural gas is available and the fugitive emissions associated with extraction and supply are low or mitigated" (IPCC 2014). In Pennsylvania, for example, much of the state's current electric generation is supplied by coal-fired power plants, which produce far more CO_2 per unit of power output than natural gas-fired power plants. EPA's Clean Power Plan establishes a goal for Pennsylvania to reduce its electric generation CO_2 emissions to 89,822,308 tons per year by 2030, a reduction of approximately 23 percent below the 2012 rate. Natural gas made available by the Project and other projects like it will be a necessary resource for Pennsylvania to achieve its CO_2 reduction goal, by allowing a portion of its existing coal-fired power generation to be replaced by natural-gas fired facilities.

1.10.12 Conclusion

Recently completed, ongoing, and planned projects in the Project area were identified for inclusion in this cumulative impact analysis (refer to Table 1.10-1). The majority of cumulative impacts will be temporary and minor when considered in combination with past, present, and reasonably foreseeable activities. Some short-term impacts to wetland areas are expected but, through mitigation required by the USACE, impacts will be minimized. Impacts will also occur on wildlife habitat due to clearing of the right-of-way, but impacts will be minimized by implementing FERC Plan and Procedures. Some long-term cumulative benefits to the community will be realized from the increased tax revenues. Short-term cumulative benefits also would be realized through jobs and wages and purchases of goods and materials. The Redhook Compressor Station will contribute to noise and air quality emissions; however, they will be localized and not contribute in a significantly on a cumulative basis. There also is the potential that the Project would contribute to a cumulative improvement in regional air quality if a portion of the natural gas associated with the Project displaces the use of other more polluting fossil fuels. In summary, due to the implementation of specialized construction techniques, the relatively short construction timeframe in any one location, and carefully developed resource protection and mitigation plans designed to minimize and control environmental impacts for the Project as a whole, minimal cumulative effects are anticipated when the impacts of the Project are added to the identified ongoing projects in the immediate area.

1.11 REFERENCES

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Equitrans Expansion Project

Docket No. CP16-__-000

Resource Report 1

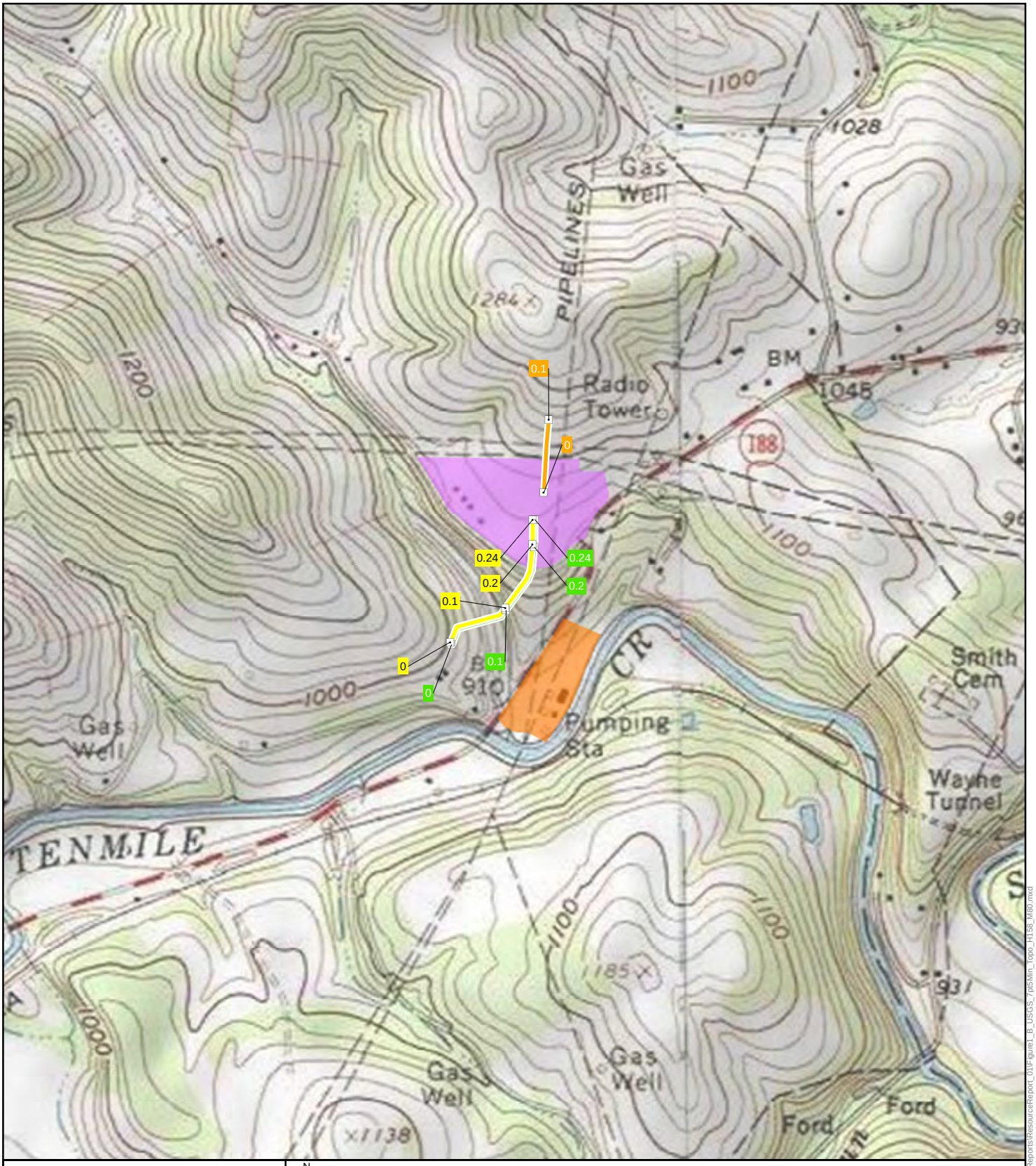
Appendix 1-A
Alignment Sheets

Equitrans Expansion Project

Docket No. CP16-__-000

Resource Report 1

Appendix 1-B
USGS 7.5-Minute Topographic Maps



Equitrans Expansion Project

N

1:12,000

0 500 1,000 Feet

EQUITRANS℠

Appendix 1-B
USGS 7.5 Minute
Topographic Maps

Page 1 of 4

October 2015

Data Sources: ESRI Streaming Data (2014)

Legend

- Milepost
- H-158
- M80
- H-305
- Existing Pratt Compressor Station Site
- Proposed Redhook Comperssor Station Site

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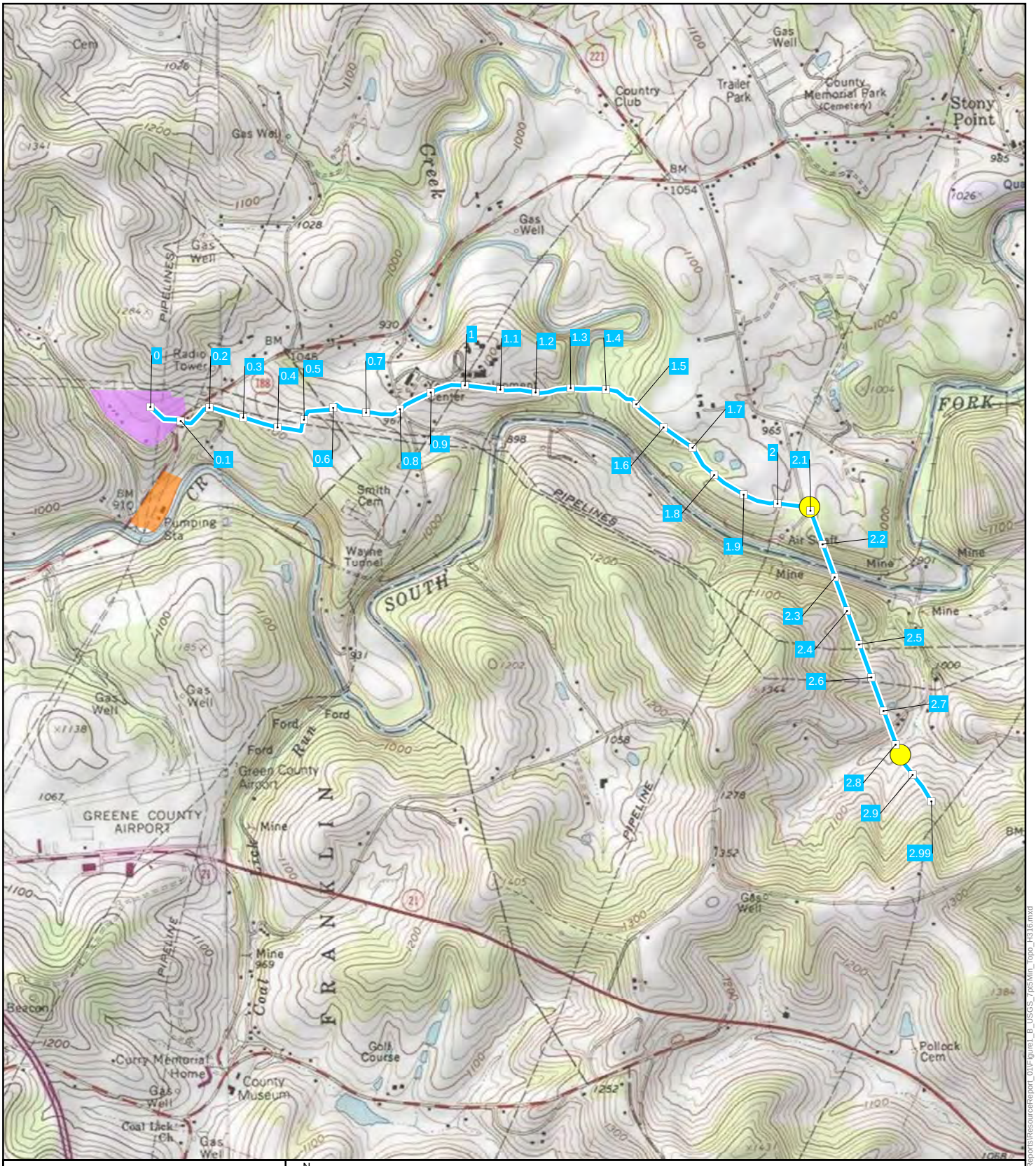

Equitrans Expansion Project

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0 0.5 1 Miles

EQUITRANS℠

Appendix 1-B
USGS 7.5 Minute
Topographic Maps

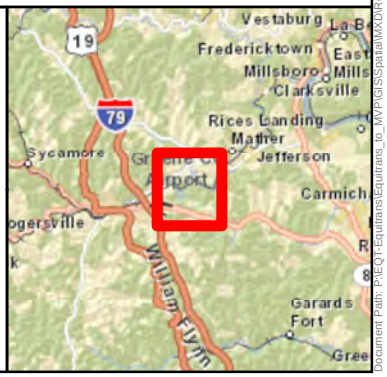
Page 2 of 4

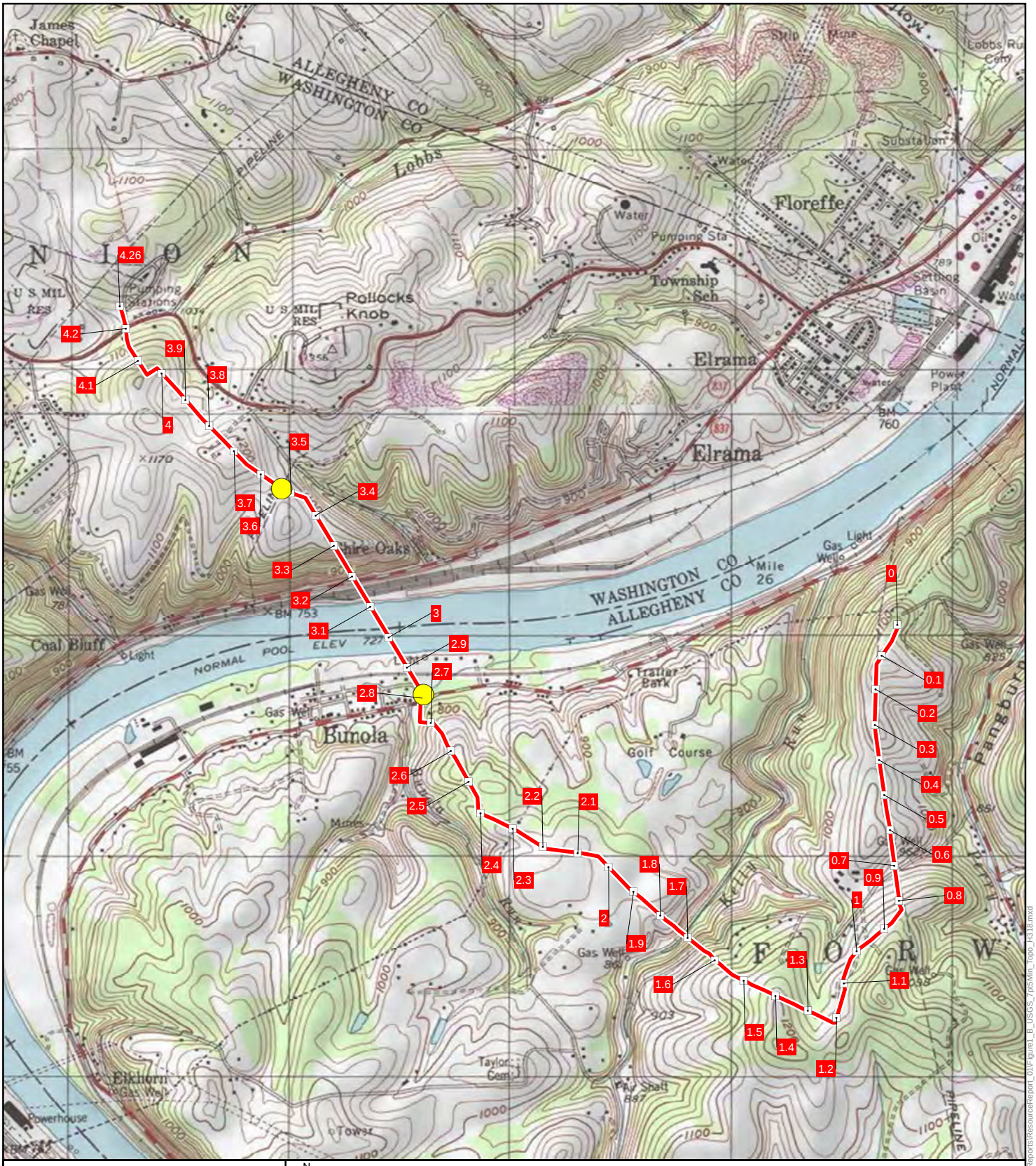
October 2015

Data Sources: ESRI Streaming Data (2014)

Legend

- Milepost
- Proposed HDD Entry/Exit Point
- H-316
- Existing Pratt Compressor Station Site
- Proposed Redhook Comperssor Station Site





Equitrans Expansion Project

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0 0.5 1 Miles

EQUITRANS℠

Appendix 1-B
USGS 7.5 Minute
Topographic Maps

Page 3 of 4

October 2015

Data Sources: ESRI Streaming Data (2014)

Legend

- Milepost
- Proposed HDD Entry/Exit Point
- H-318

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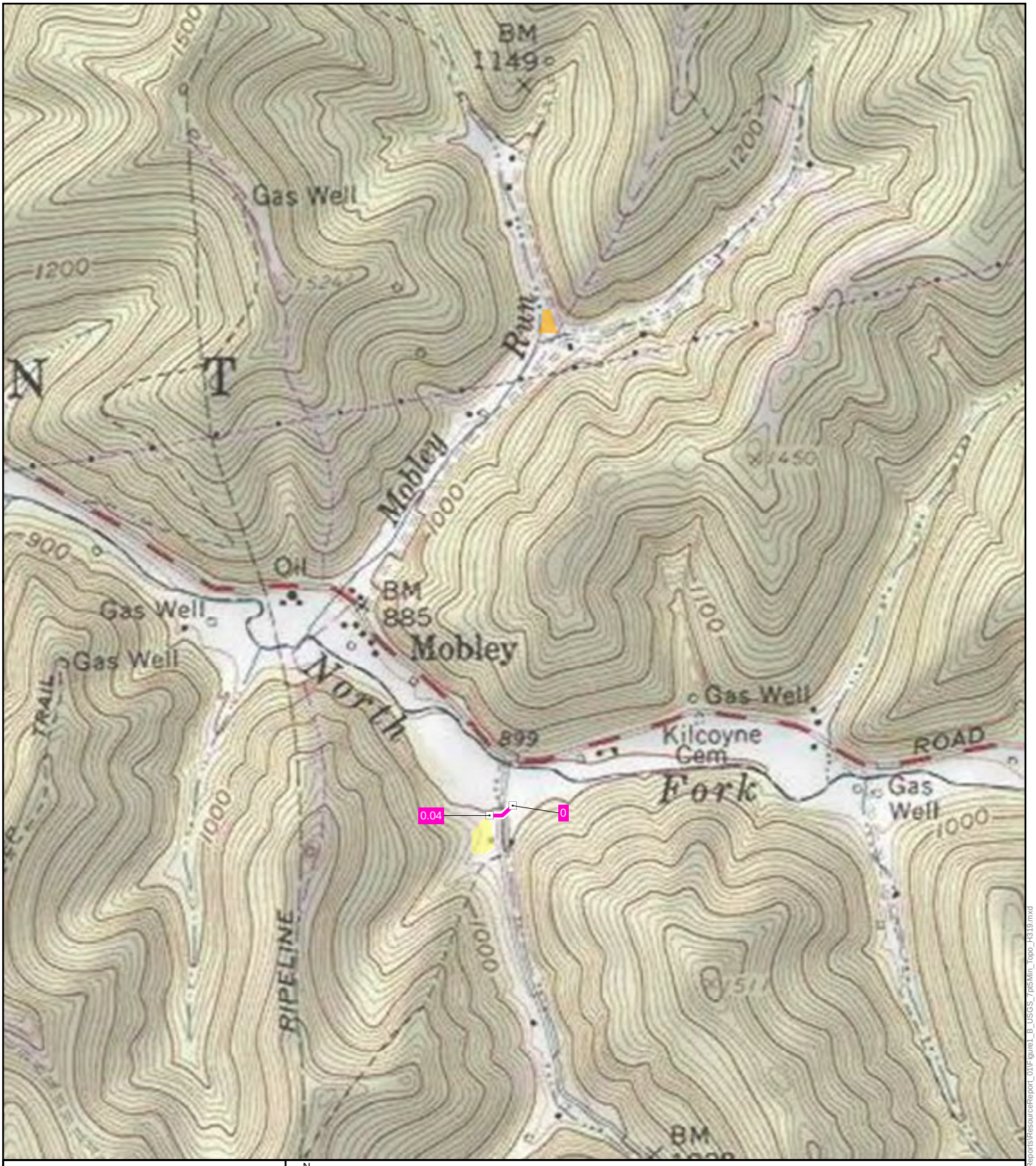

Equitrans Expansion Project

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0 1,250 2,500 Feet

EQUITRANS℠

Appendix 1-B
USGS 7.5 Minute
Topographic Maps

Page 4 of 4

October 2015

Data Sources: ESRI Streaming Data (2014)

Legend

- Milepost
- H-319
- Webster Interconnect
- Mobley Tap

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Equitrans Expansion Project

Docket No. CP16-__-000

Resource Report 1

Appendix 1-C
Aboveground Facility Plot Plans and Diagrams

(refer to CEII Volume)

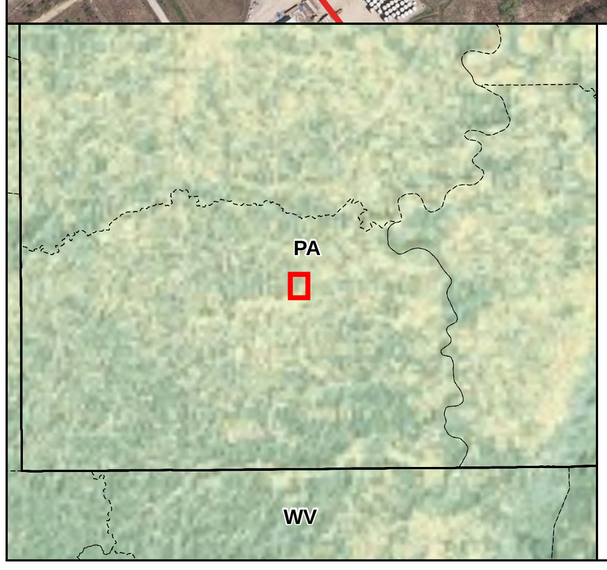
Equitrans Expansion Project

Docket No. CP16-__-000

Resource Report 1

Appendix 1-D
Compressor Station and Noise Sensitive Area Locations

P-13
P-14
NSA-3
REDHOOK
NSA-4
PRATT
NSA-2
NSA-1
P-1
P-2
P-3



EQUITRANS, LP
EQUITRANS EXPANSION PROJECT

REDHOOK AND PRATT NOISE-SENSITIVE AREAS
PAGE 1 OF 4

0 330 660 1,320 Feet

1:3,600

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S

DATE: OCTOBER 20, 2015
FILE: REDHOOK-PRATT NSA 20151020

LEGEND

- Redhook
- Pratt
- Noise-sensitive Area
- Redhook Site
- Pratt Site
- Redhook One Mile Ring
- Pratt One Mile Ring

Aerial Imagery: Spring 2015
Data Sources: ESRI Streaming Data (2014)

NSA POINT	DISTANCE IN FEET	
	REDHOOK SITE	PRATT SITE
NSA-1	3,236	2,978
NSA-2	2,322	1,932
NSA-3	1,566	2,933
NSA-4	204	927
P-1	3,991	3,804
P-2	4,787	4,267
P-3	3,078	2,134
P-4	3,810	3,012
P-5	4,387	3,760
P-6	3,801	3,502
P-7	3,724	3,614
P-8	3,229	3,679
P-9	2,607	3,311
P-10	2,805	3,778
P-11	4,116	4,712
P-12	3,777	4,819
P-13	2,983	4,201
P-14	3,267	4,658

EQUITRANS, LP
EQUITRANS EXPANSION PROJECT

REDHOOK AND PRATT NOISE-SENSITIVE AREAS
PAGE 2 OF 4

0 330 660 1,320 Feet

1:3,600

N W E S

DATE: OCTOBER 20, 2015

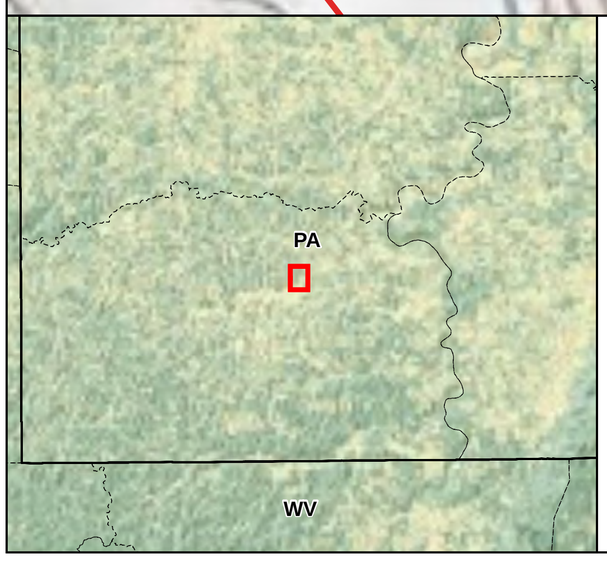
FILE: REDHOOK-PRATT NSA 20151020

LEGEND

- Redhook
- Pratt
- Noise-sensitive Area
- Redhook Site
- Pratt Site
- Redhook One Mile Ring
- Pratt One Mile Ring

Aerial Imagery: Spring 2015
Data Sources: ESRI Streaming Data (2014)

NSA POINT	DISTANCE IN FEET	
	REDHOOK SITE	PRATT SITE
NSA-1	3,236	2,978
NSA-2	2,322	1,932
NSA-3	1,566	2,933
NSA-4	204	927
P-1	3,991	3,804
P-2	4,787	4,267
P-3	3,078	2,134
P-4	3,810	3,012
P-5	4,387	3,760
P-6	3,801	3,502
P-7	3,724	3,614
P-8	3,229	3,679
P-9	2,607	3,311
P-10	2,805	3,778
P-11	4,116	4,712
P-12	3,777	4,819
P-13	2,983	4,201
P-14	3,267	4,658



EQUITRANS, LP
EQUITRANS EXPANSION PROJECT

REDHOOK AND PRATT NOISE-SENSITIVE AREAS
PAGE 3 OF 4

0 330 660 1,320 Feet

1:3,600

N W E S

DATE: OCTOBER 20, 2015

FILE: REDHOOK-PRATT NSA 20151020

LEGEND

- Redhook
- Pratt
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- Redhook Site
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EQUITRANS, LP
EQUITRANS EXPANSION PROJECT

REDHOOK AND PRATT NOISE-SENSITIVE AREAS
PAGE 4 OF 4

0 330 660 1,320 Feet

1:3,600

N W E S

DATE: OCTOBER 20, 2015

FILE: REDHOOK-PRATT NSA 20151020

LEGEND

- Redhook
- Pratt
- Noise-sensitive Area
- Redhook Site
- Pratt Site
- Redhook One Mile Ring
- Pratt One Mile Ring

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P-10	2,805	3,778
P-11	4,116	4,712
P-12	3,777	4,819
P-13	2,983	4,201
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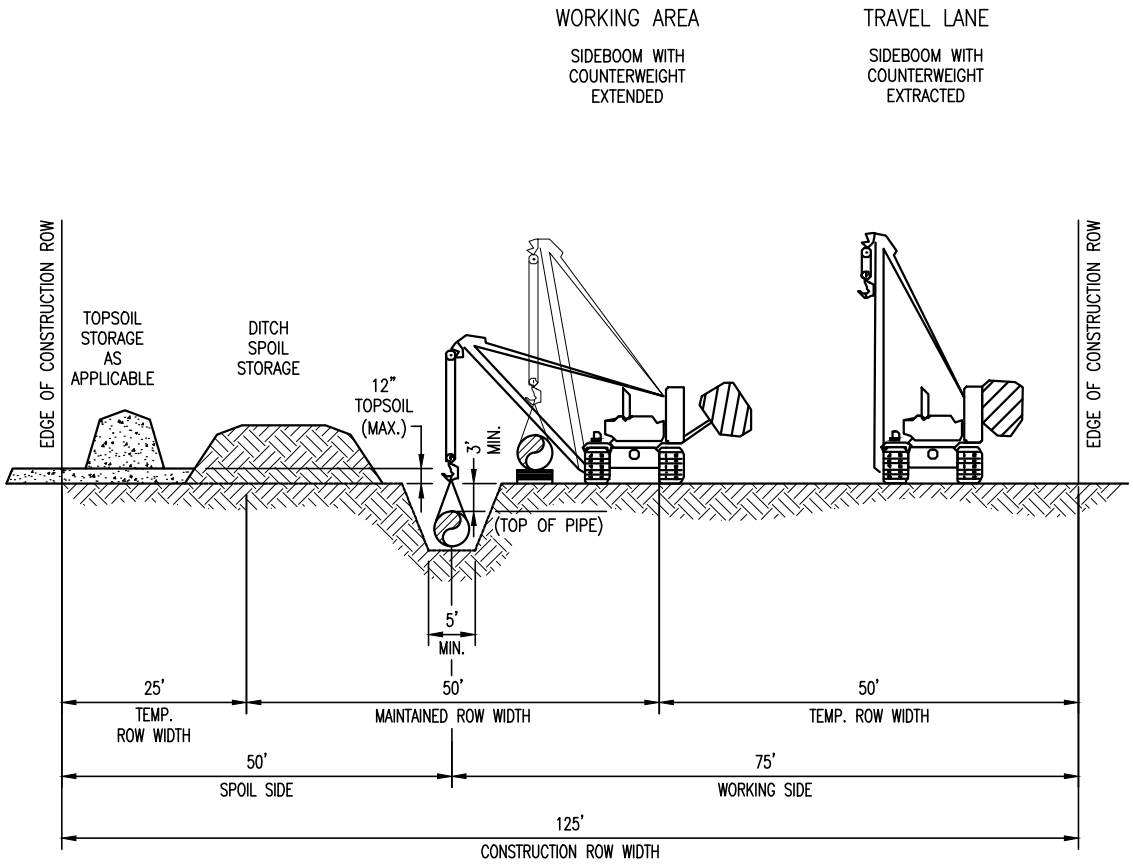
Equitrans Expansion Project

Docket No. CP16-__-000

Resource Report 1

Appendix 1-E
Typical Drawings

The attached construction cross-section typicals are for illustrative purposes; actual construction methods may vary to accommodate site-specific field conditions and other regulatory requirements.



DRAWN TDD	DATE 6/03/2015
CHECKED JSW	DATE 6/03/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

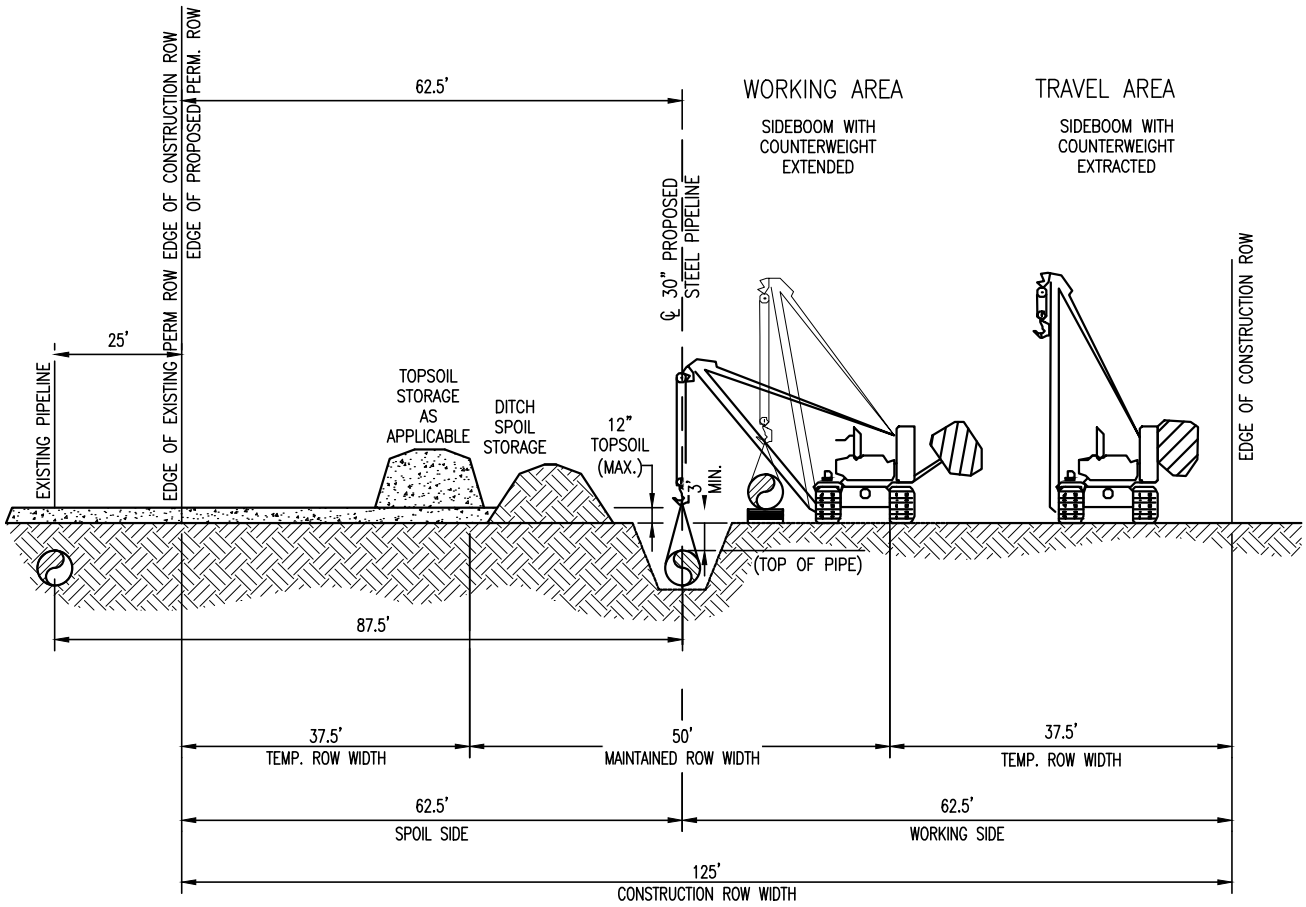
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
30" H-316 NON-PARALLEL CONSTRUCTION
WITH TOP SOIL SEGREGATION
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 1	0



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APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

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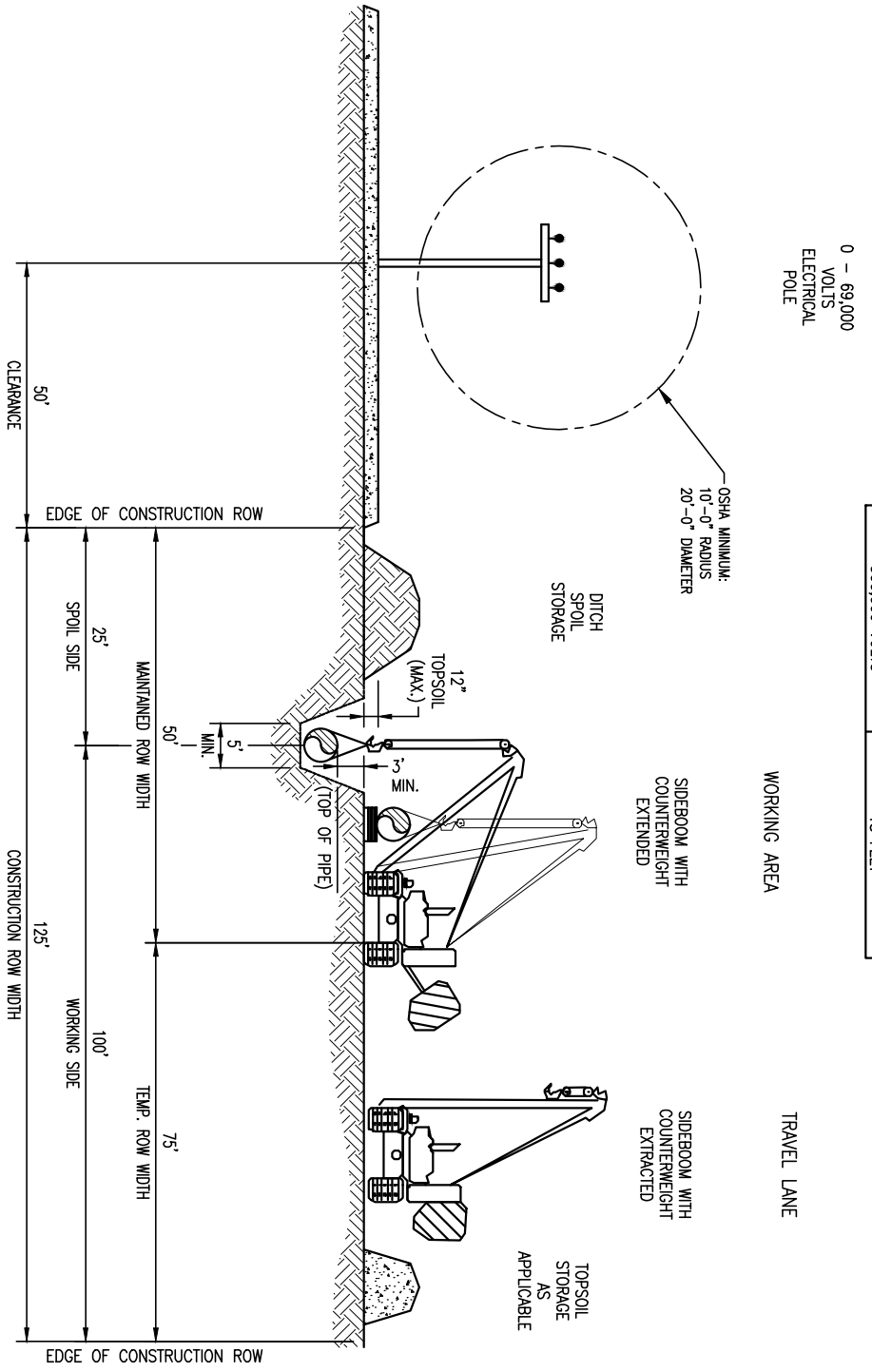
DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
30" H-316
PARALLEL CONSTRUCTION
RIGHT-OF-WAY

DRAWING NO.	REV.
METHOD 2	0



POWER LINE VOLTAGE	OSHA MINIMUM APPROACH DISTANCE
0 – 69,000 VOLTS	10 FEET
115,000 – 138,000 VOLTS	11 FEET
230,000 VOLTS	13 FEET
500,000 VOLTS	18 FEET

GENERAL NOTES:

1. DRAWING ASSUMES TYPE "B" SOIL

DRAWN TDD	DATE 6/03/2015
CHECKED JSW	DATE 6/03/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

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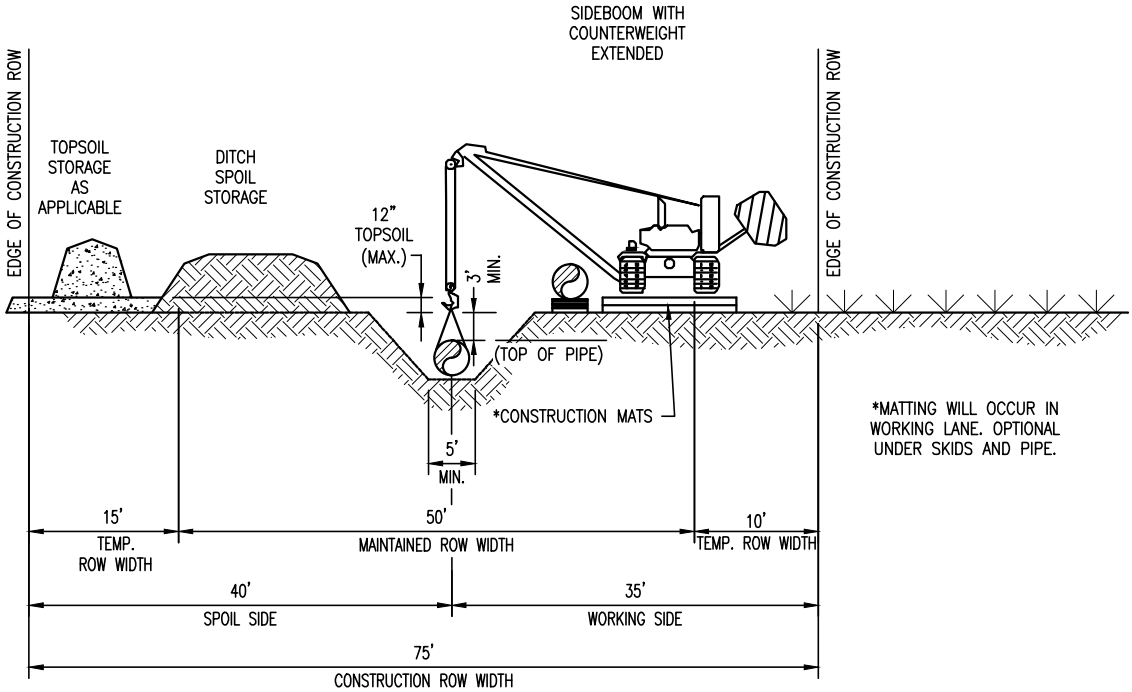
DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
30" H-316
PARALLEL TO POWER LINES
RIGHT OF WAY

DRAWING NO. METHOD 3

REV. 0



GENERAL NOTES:
1. EXTRA DEPTH MAY BE REQUIRED FOR CONCRETE COATED PIPE OR WEIGHTS.

DRAWN TDD	DATE 6/03/2015
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SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

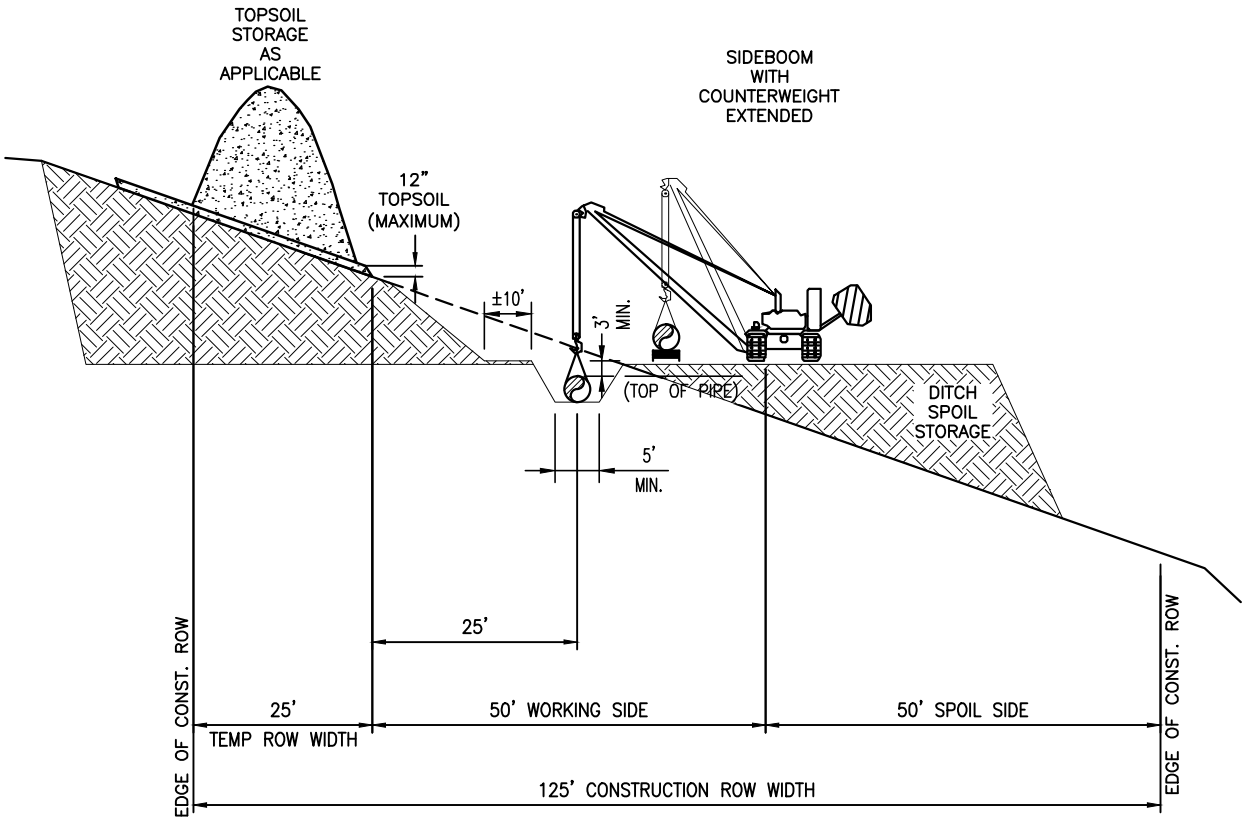
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
30" H-316 WETLAND CONSTRUCTION
WORKING AREA NON-SATURATED
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 4	0



DRAWN	TDD	DATE	6/03/2015
CHECKED	JSW	DATE	6/03/2015
APP'D		DATE	
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID: PXXXX			

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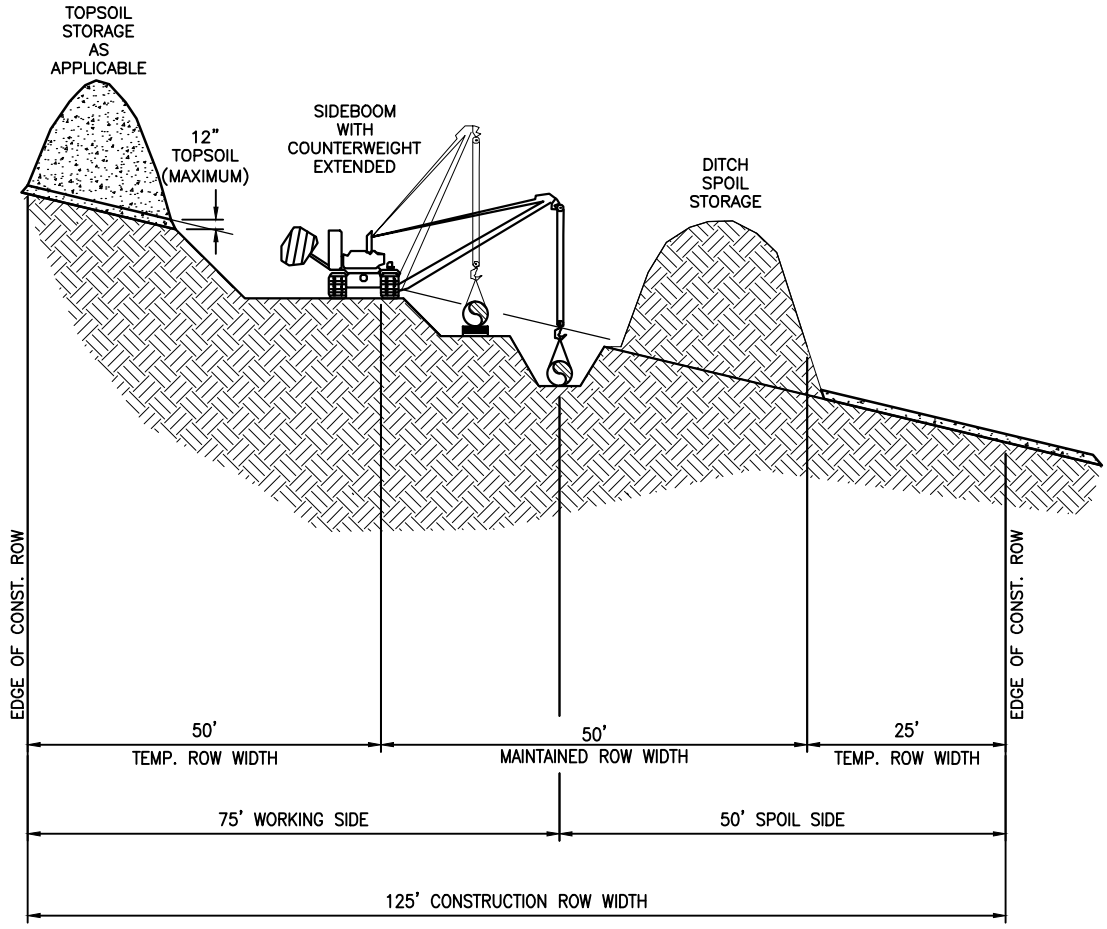
DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
30" H-316
SIDE HILL CONSTRUCTION
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 5	0



DRAWN TDD	DATE 6/03/2015
CHECKED JSW	DATE 6/03/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

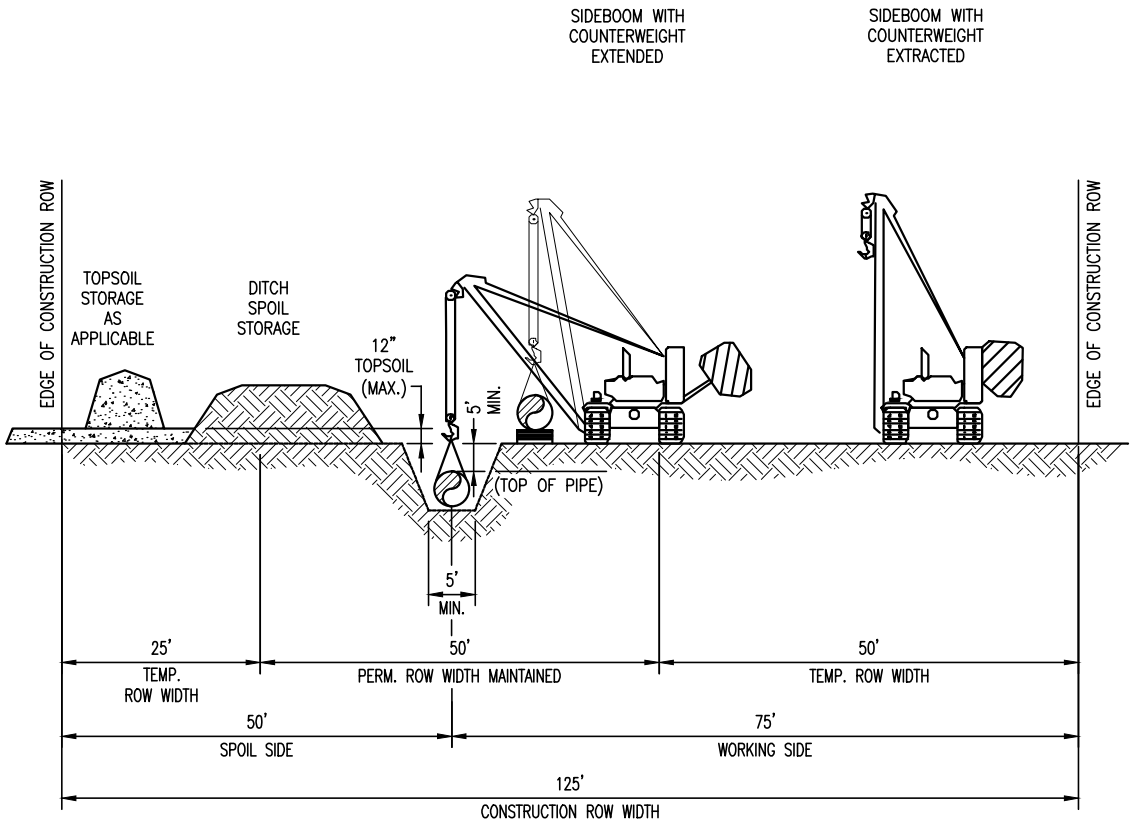
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
30" H-316
TWO TONE METHOD
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 6	0



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SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

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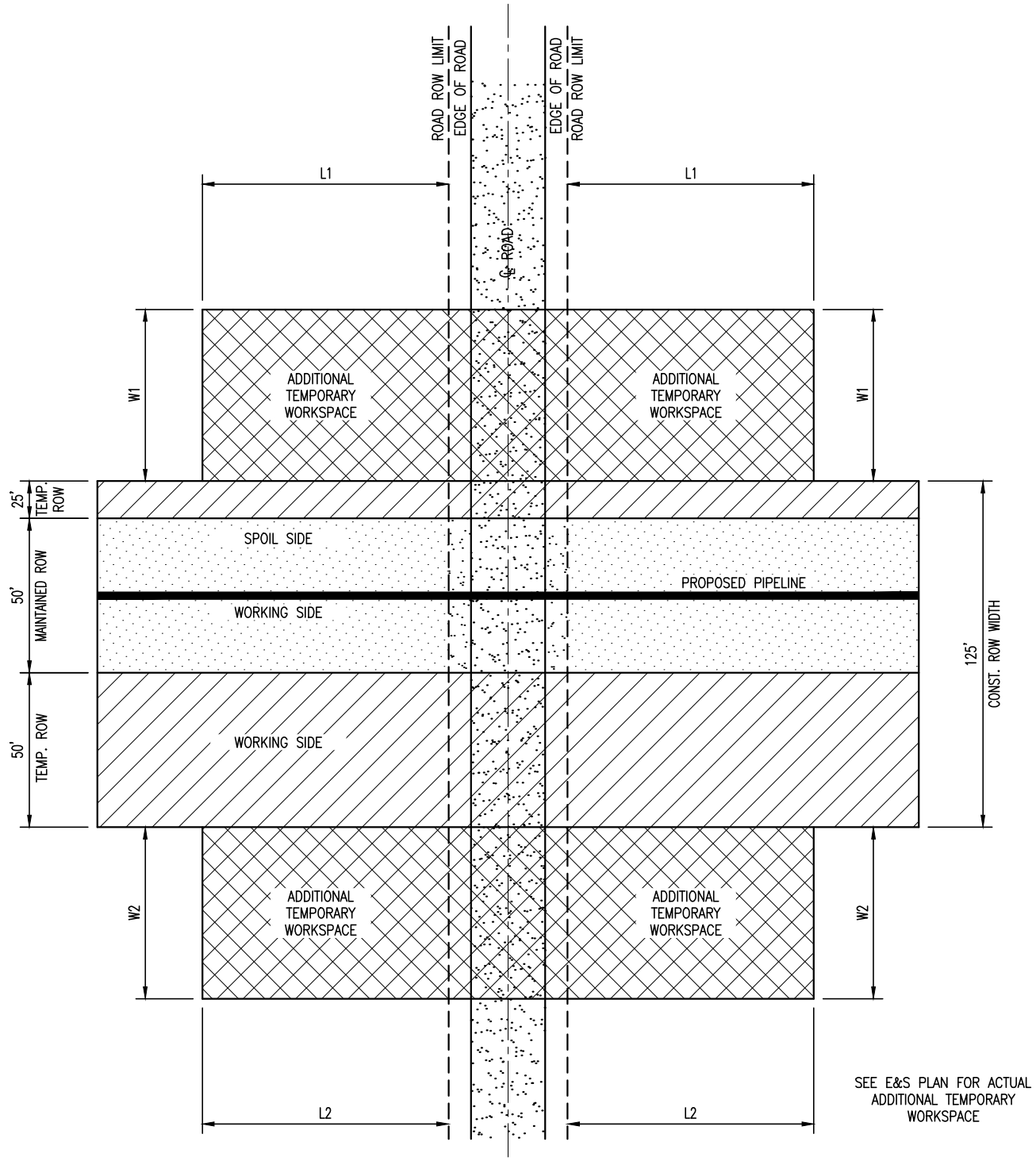
DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
30" H-316 NON-PARALLEL CONSTRUCTION
EXTRA DEPTH DITCH (5' COVER)
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 7	0



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CHECKED	JSW	DATE	6/03/2015
APP'D		DATE	
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID: PXXXX			

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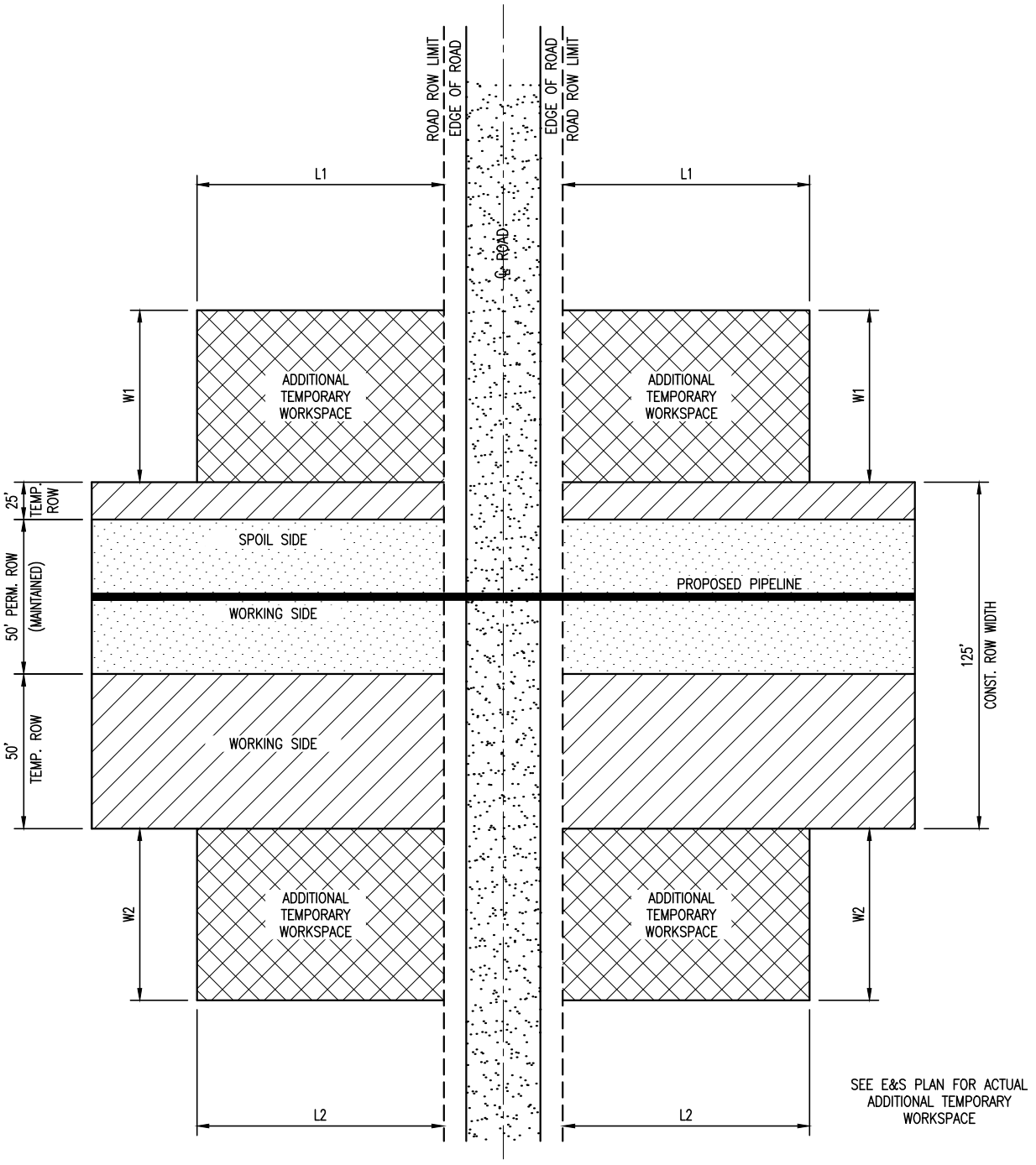
DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
30" H-316
OPEN CUT ROAD CROSSING
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 8	0



DRAWN TDD	DATE 6/03/2015
CHECKED JSW	DATE 6/03/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

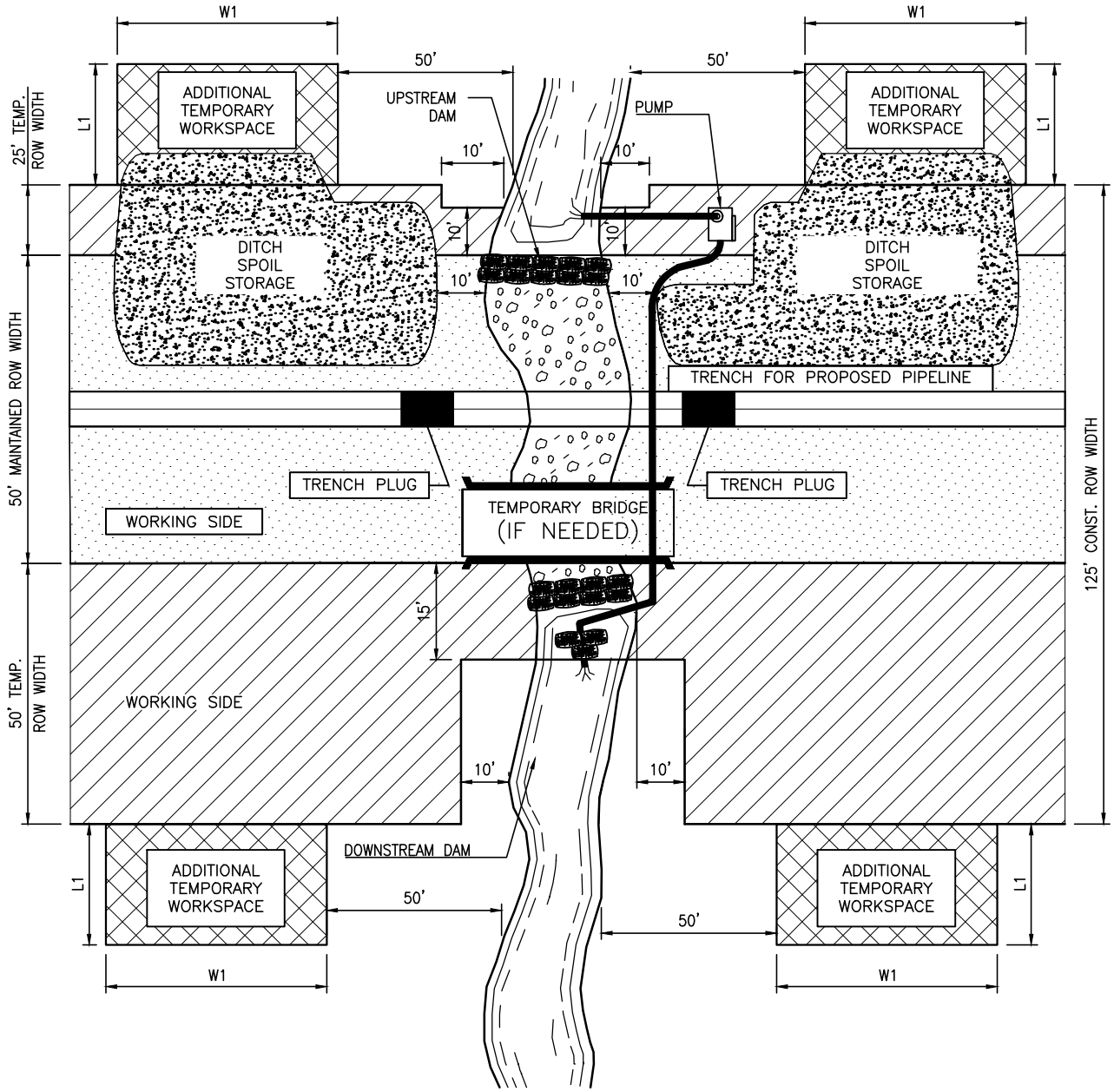
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
30" H-316
BORED ROAD CROSSING
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 9	0



DRAWN	TDD	DATE	6/03/2015
CHECKED	JSW	DATE	6/03/2015
APP'D		DATE	
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID: PXXXX			

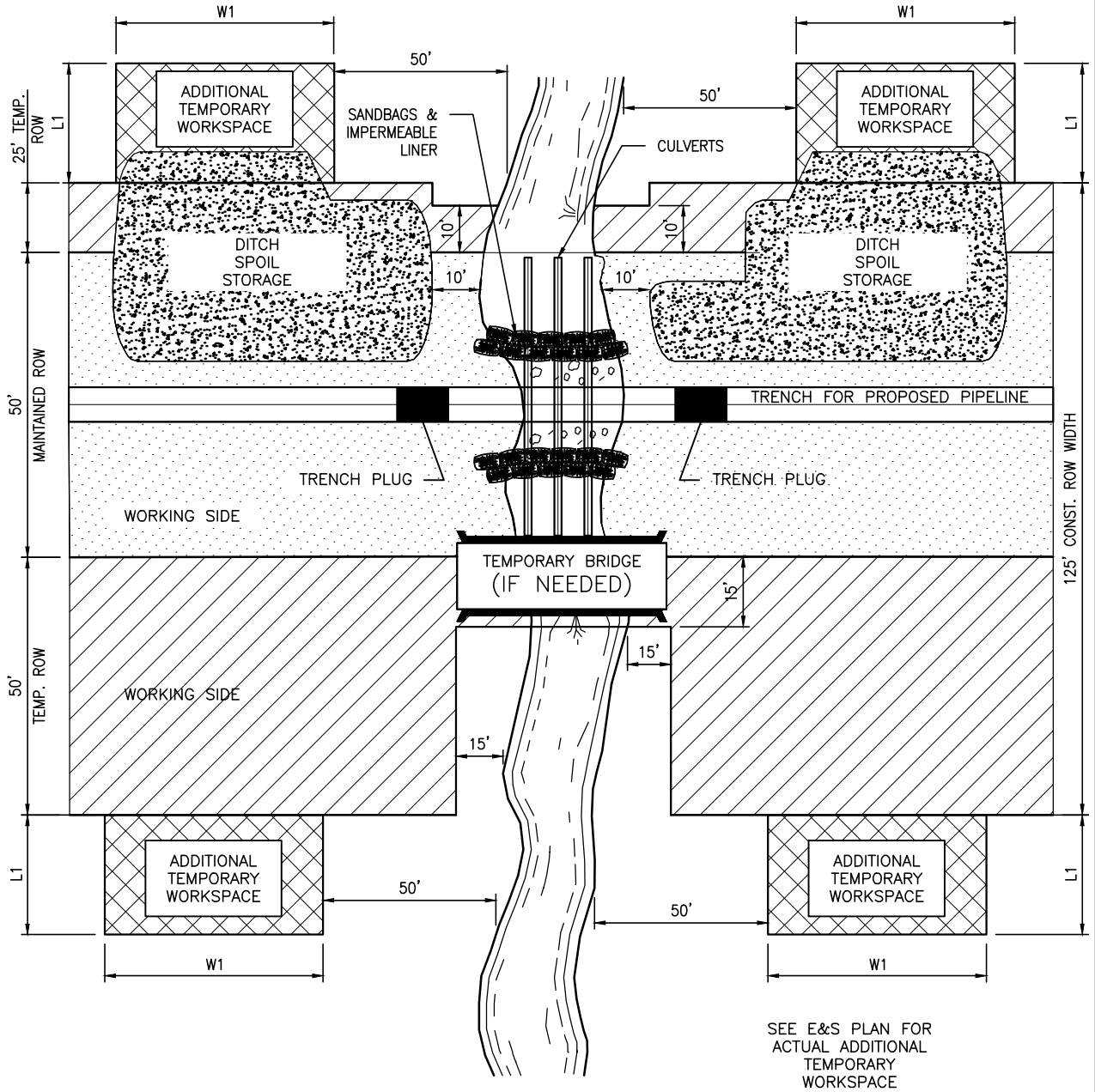
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
30" H-316
OPEN CUT – DAM AND PUMP
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 10A	0



DRAWN TDD	DATE 6/03/2015
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APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

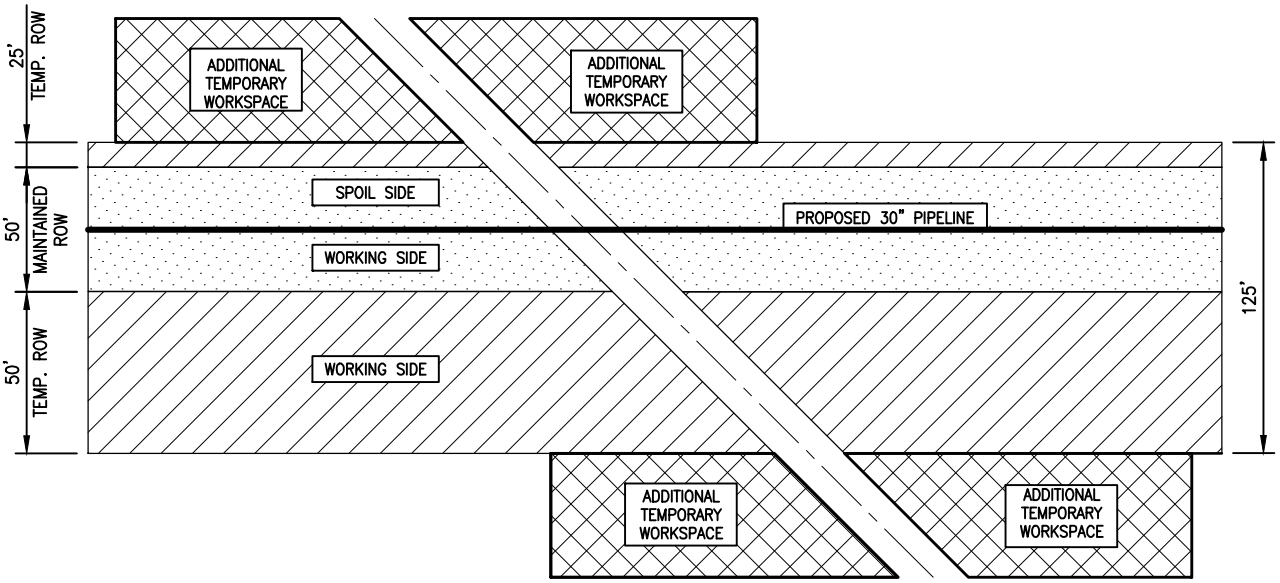
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
30" H-316
OPEN CUT – FLUME
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 10B	0



NOTE:

1. DIMENSIONS DEPENDENT ON PROPOSED AND EXISTING PIPELINE DIAMETERS, BURIAL DEPTHS AND LOCAL SITE SPECIFIC CONDITIONS.
2. TRAVEL LANE ON WORKING SIDE TO BE MATTED AS REQUIRED BY EXISTING PIPELINE COMPANY REQUIREMENTS AND LOCAL CONDITIONS.
3. SEE E&S PLAN FOR ACTUAL ADDITIONAL TEMPORARY WORKSPACE.

DRAWN TDD	DATE 6/03/2015
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APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

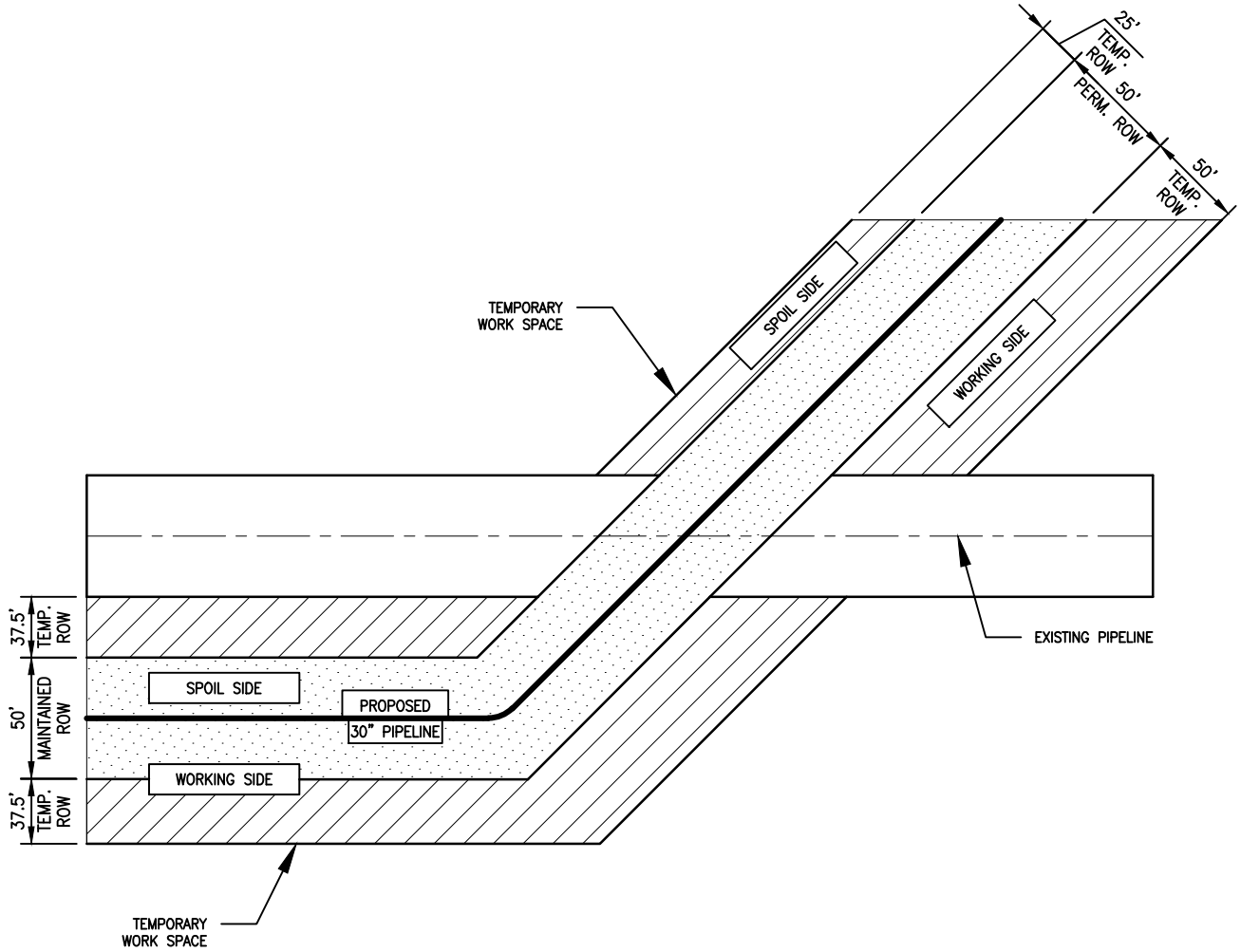
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
30" H-316
PIPELINE CROSSING
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 11	0



GENERAL NOTES:

1. IF ATWS IS EXTENDED ONTO EXISTING R.O.W. OR WHERE EQUIPMENT IS TO CROSS, MATTING MAY BE REQUIRED.

DRAWN TDD	DATE 6/03/2015
CHECKED JSW	DATE 6/03/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

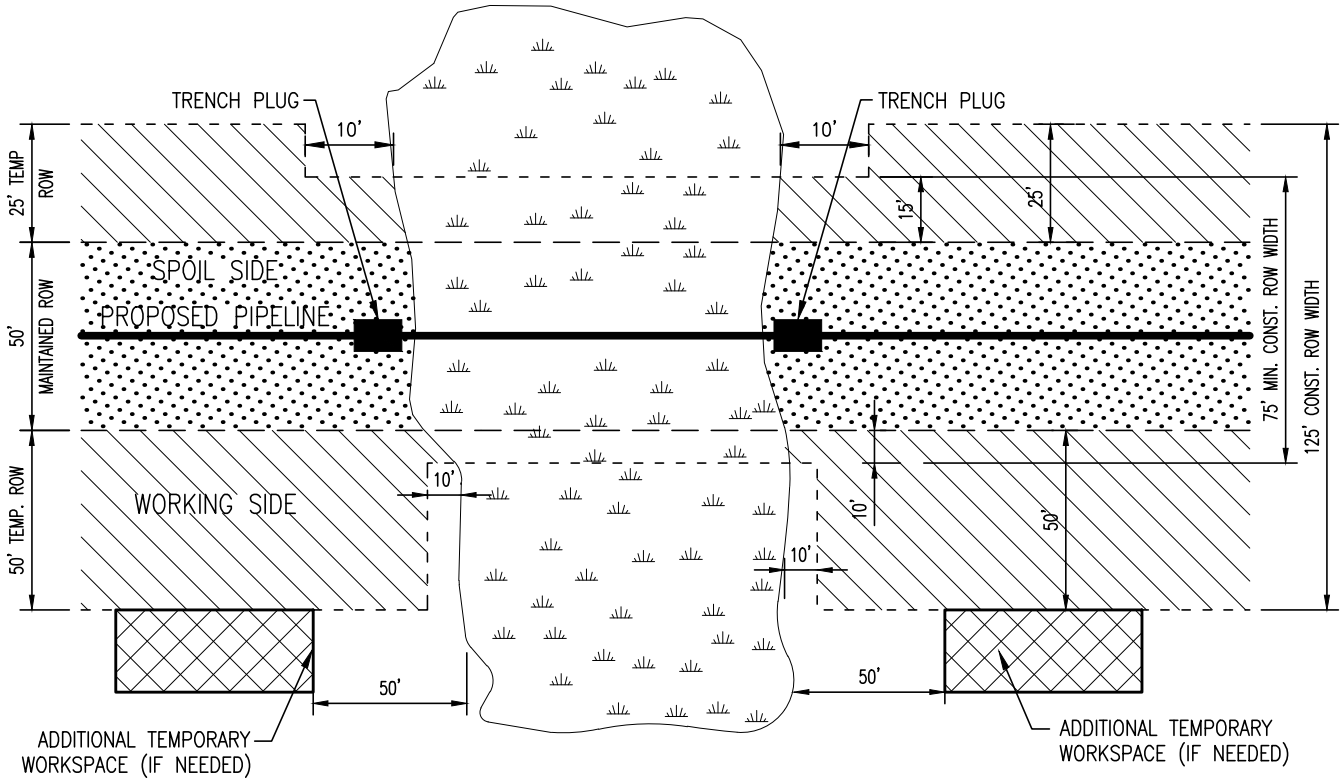
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
30" H-316
PIPELINE CROSSING FROM PARALLEL RIGHT OF WAY

DRAWING NO.	REV.
METHOD 12	0



SEE E&S PLAN FOR ACTUAL ADDITIONAL TEMPORARY WORKSPACE

DRAWN	TDD	DATE	6/03/2015
CHECKED	JSW	DATE	6/03/2015
APP'D		DATE	
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID: PXXXX			

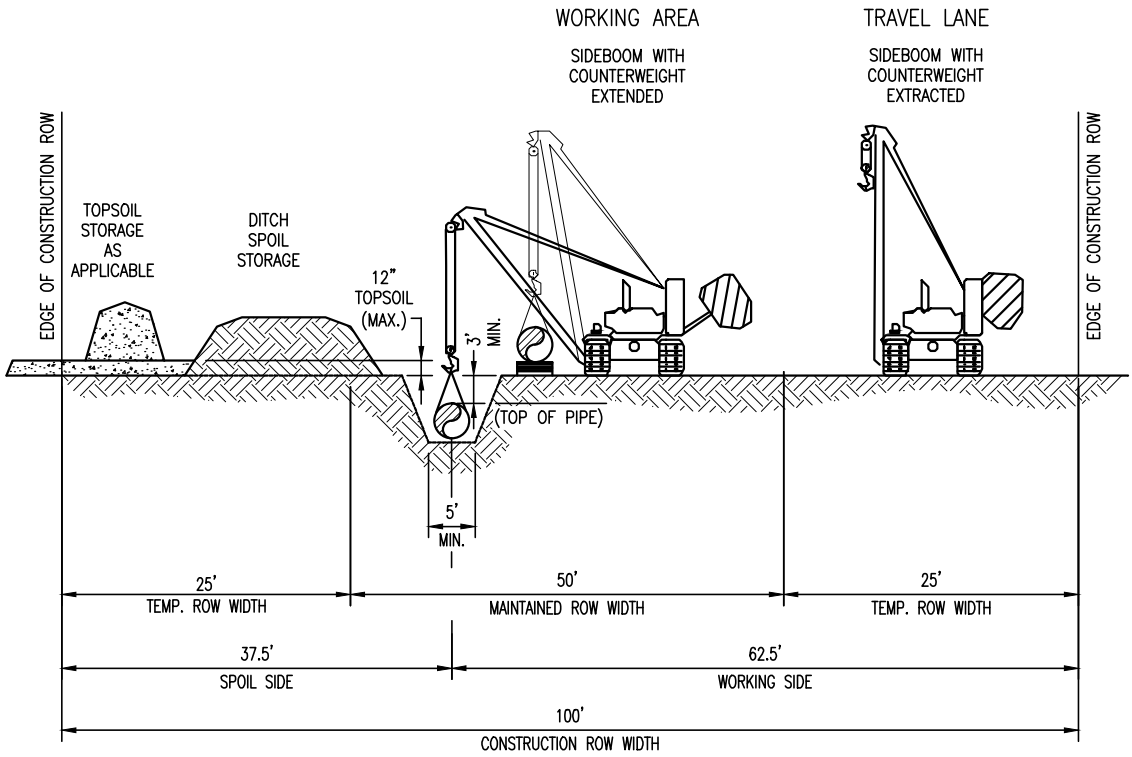
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
30" H-316
WETLAND CROSSING
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 13	0



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CHECKED JSW	DATE 6/03/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

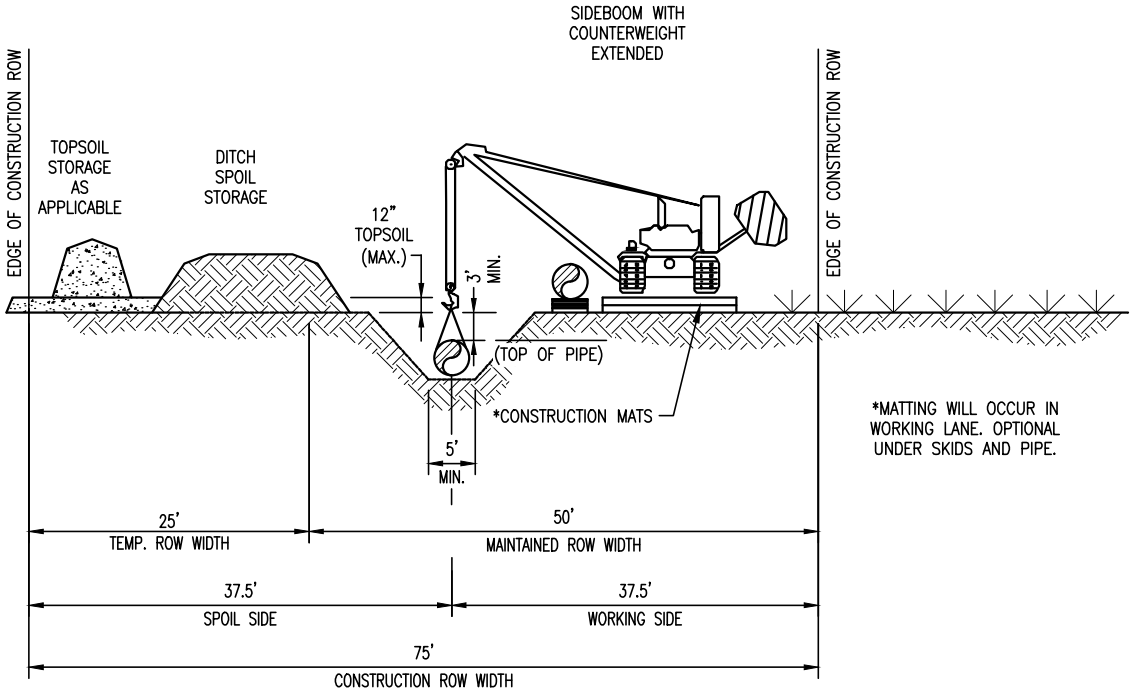
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
20" H-318 NON-PARALLEL CONSTRUCTION
WITH TOP SOIL SEGREGATION
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 14	0



GENERAL NOTES:
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DRAWN TDD	DATE 6/03/2015
CHECKED JSW	DATE 6/03/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

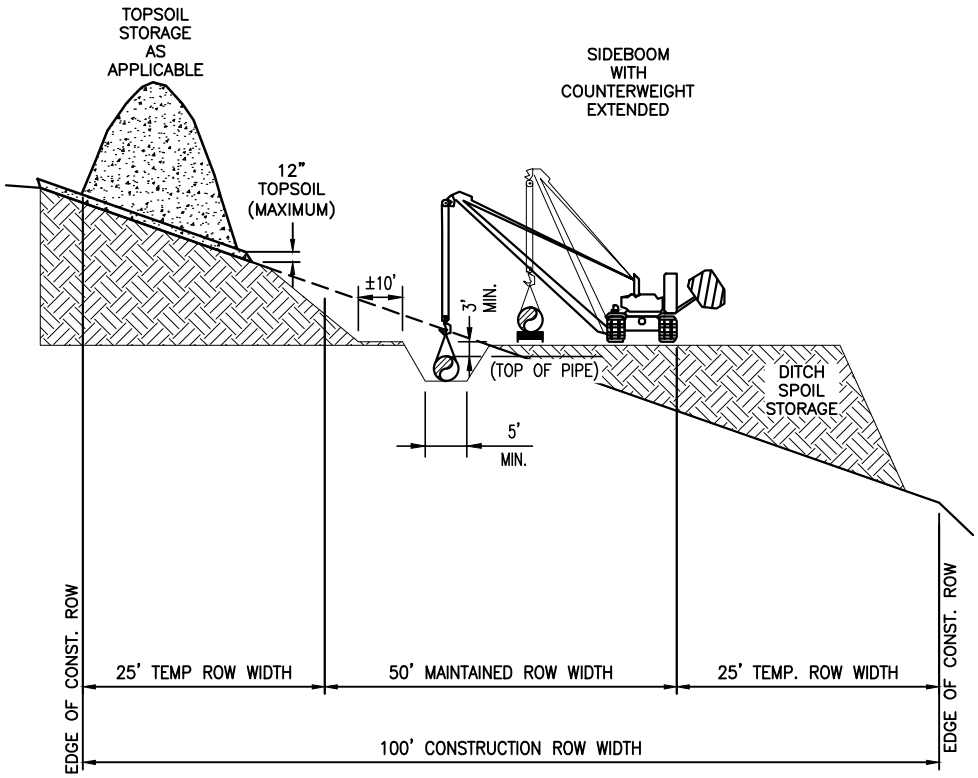
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
20" H-318 NON-PARALLEL CONSTRUCTION
WORKING AREA NON-SATURATED
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 15	0



DRAWN TDD	DATE 6/03/2015
CHECKED JSW	DATE 6/03/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

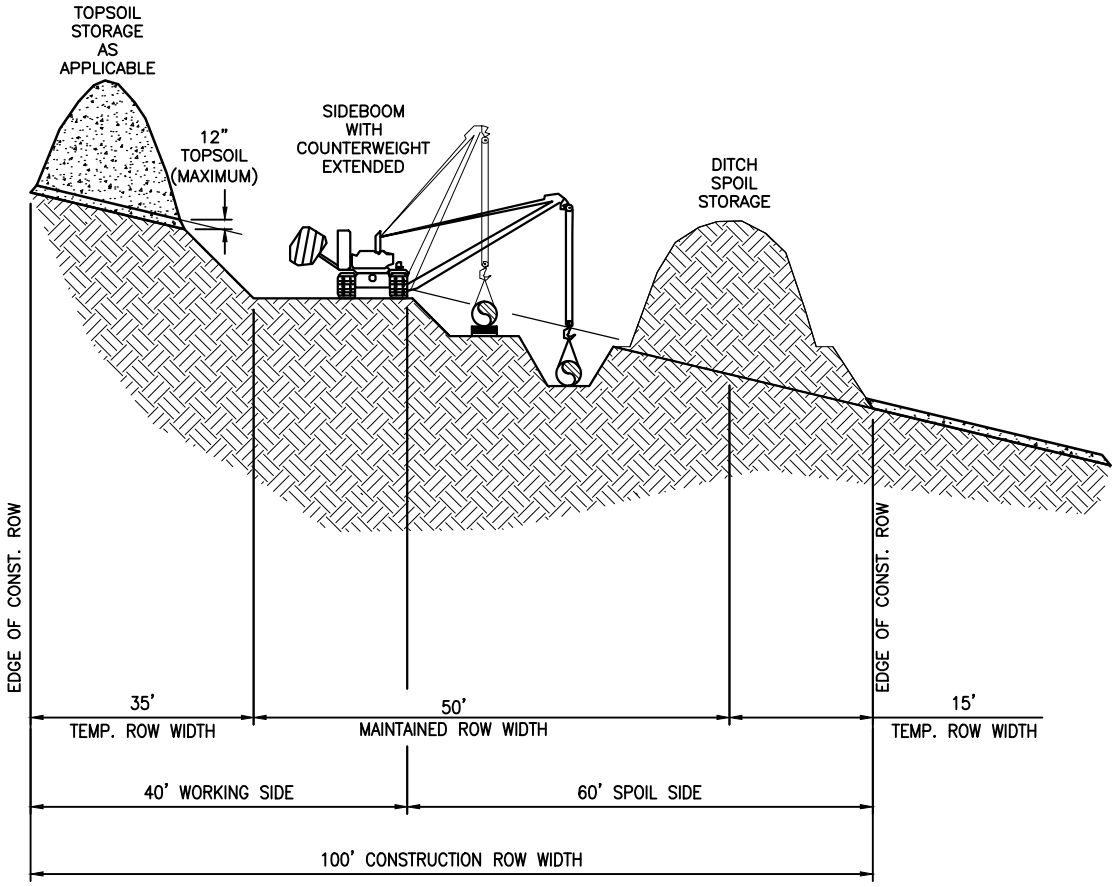
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
20" H-318
SIDE HILL CONSTRUCTION
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 16	0



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CHECKED JSW	DATE 6/03/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

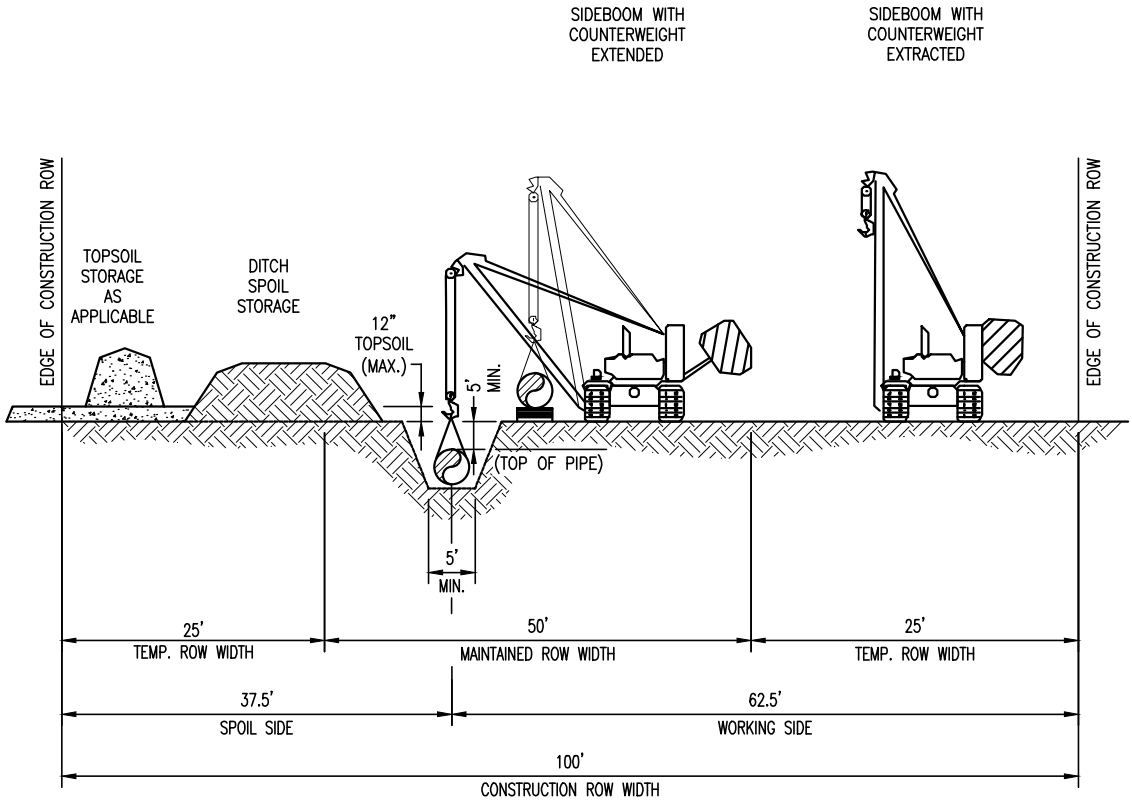
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
20" H-318 SIDE HILL
TWO TONE METHOD
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 17	0



DRAWN TDD	DATE 6/03/2015
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APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

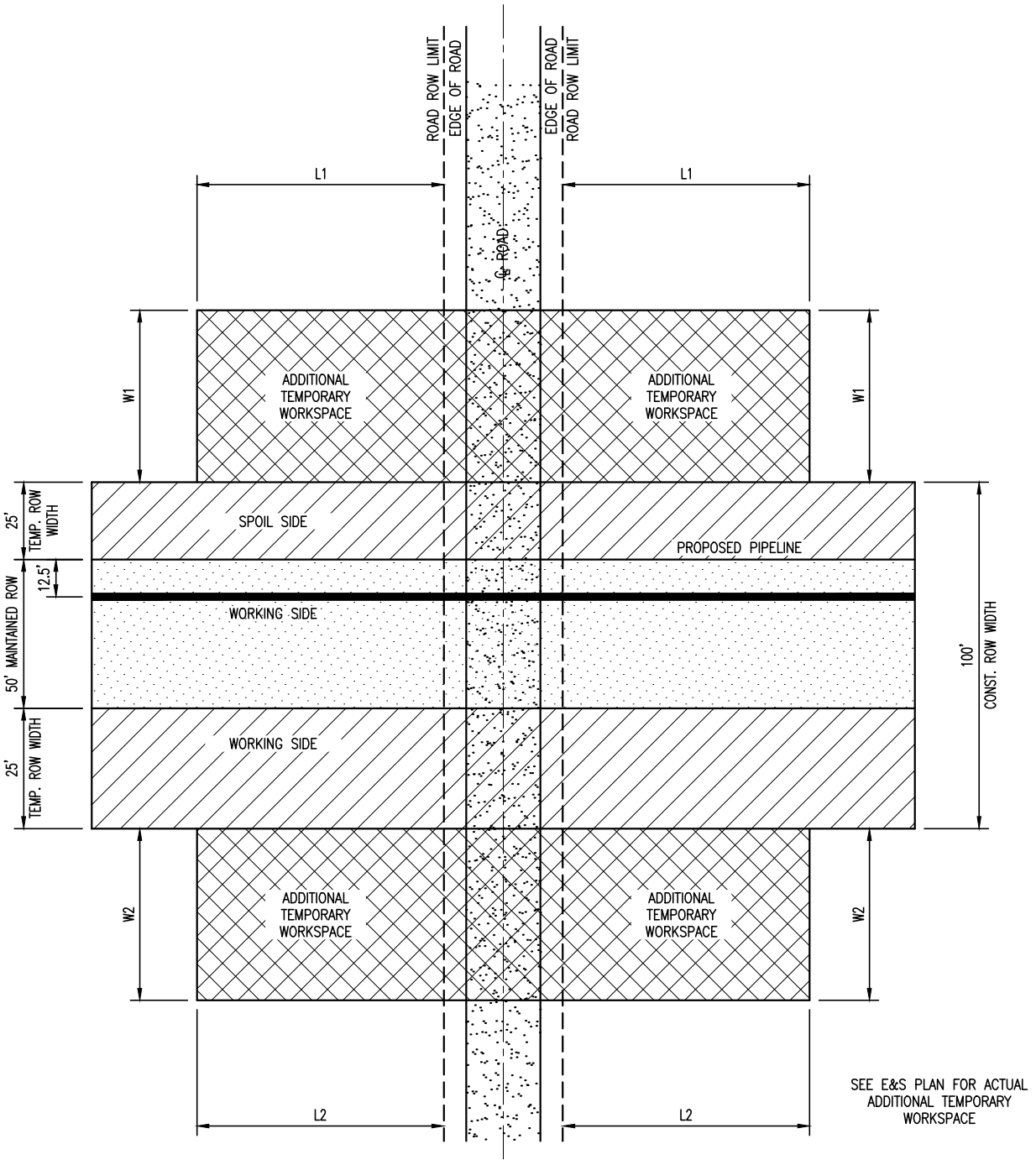
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
20" H-318 NON-PARALLEL CONSTRUCTION
EXTRA DEPTH DITCH (5' COVER)
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 18	0



DRAWN TDD	DATE 6/03/2015
CHECKED JSW	DATE 6/03/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

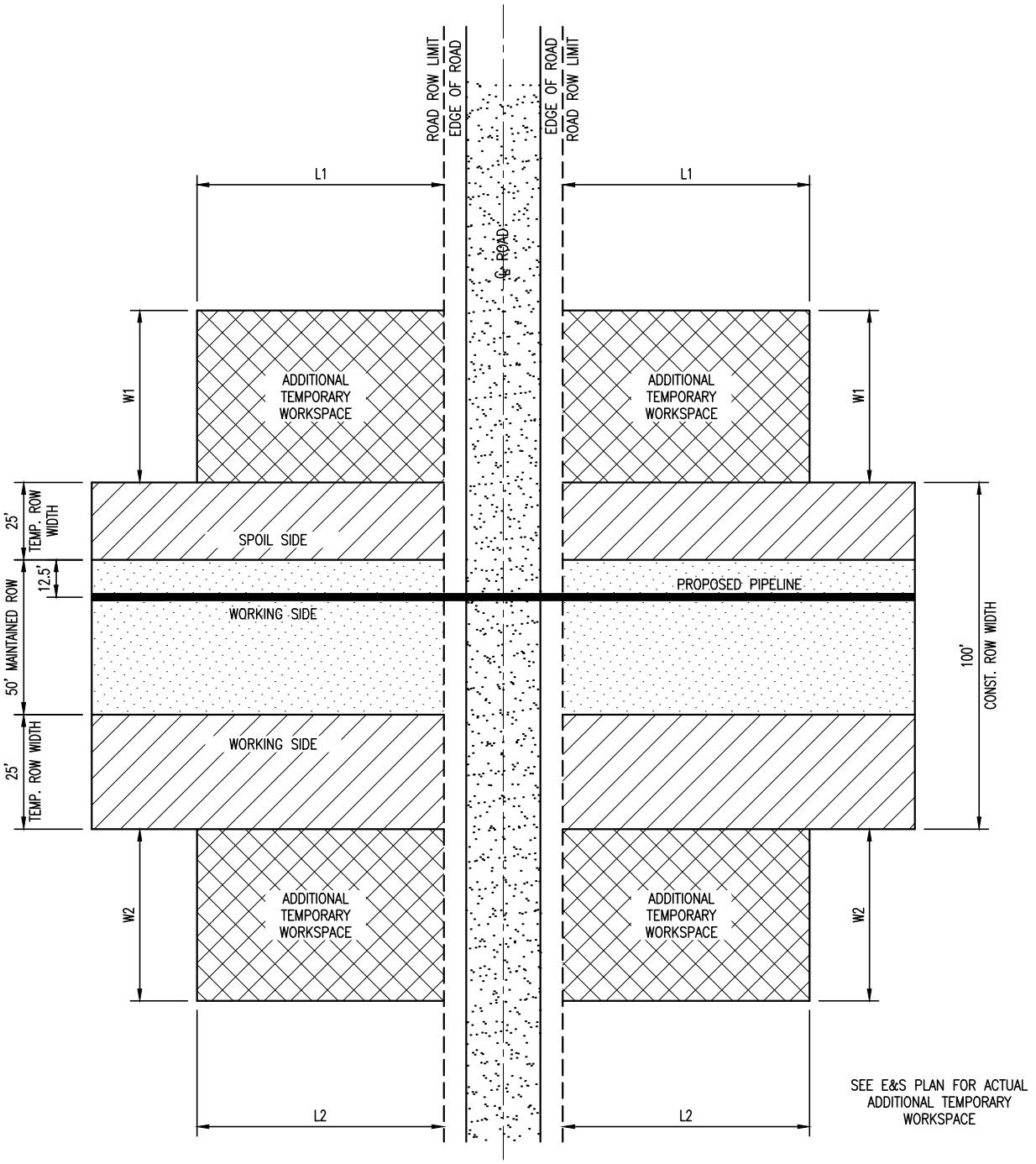
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
20" H-318
OPEN CUT ROAD CROSSING
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 19	0



DRAWN TDD	DATE 6/03/2015
CHECKED JSW	DATE 6/03/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

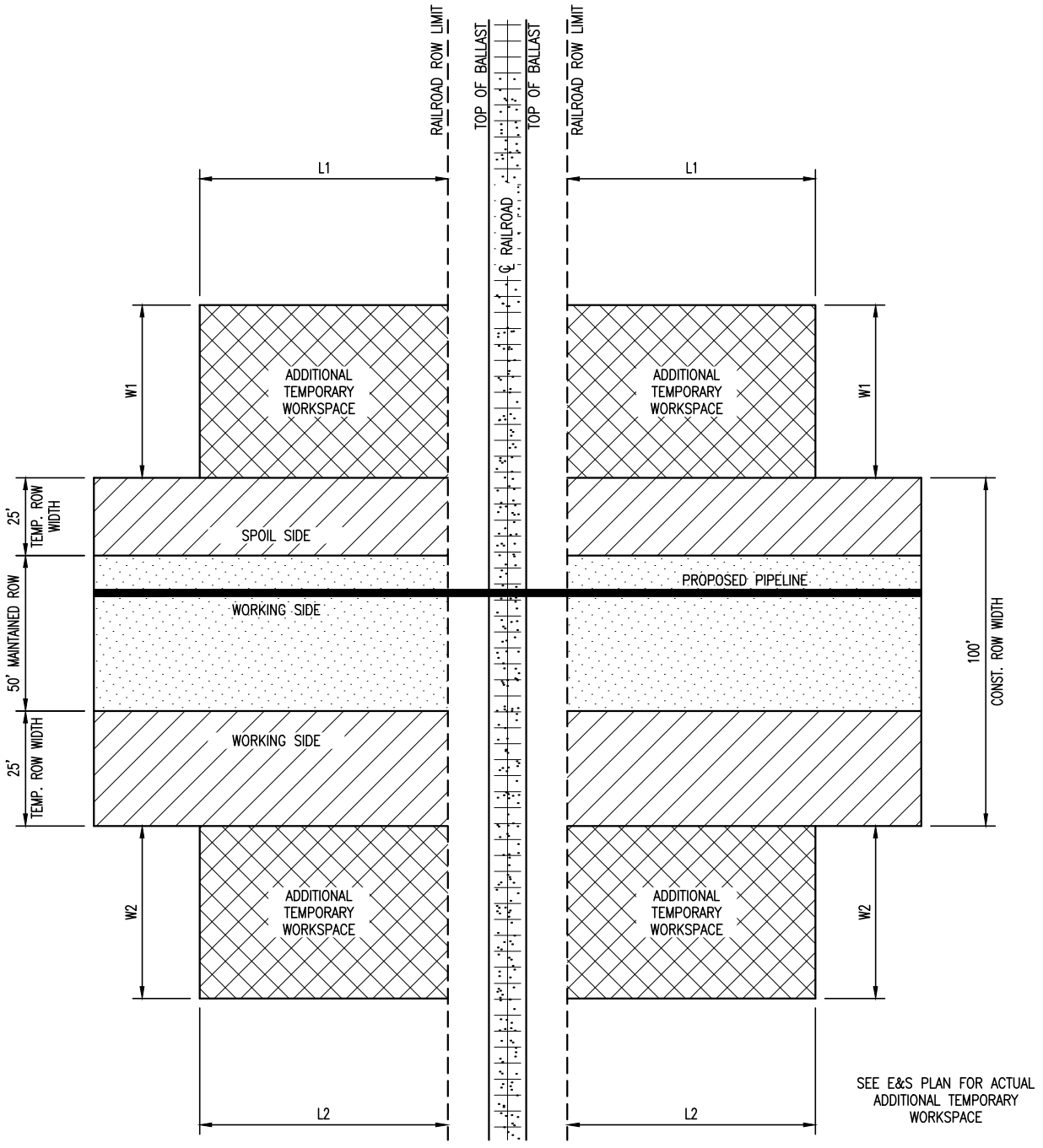
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
20" H-318
BORED ROAD CROSSING
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 20	0



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CHECKED JSW	DATE 6/03/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

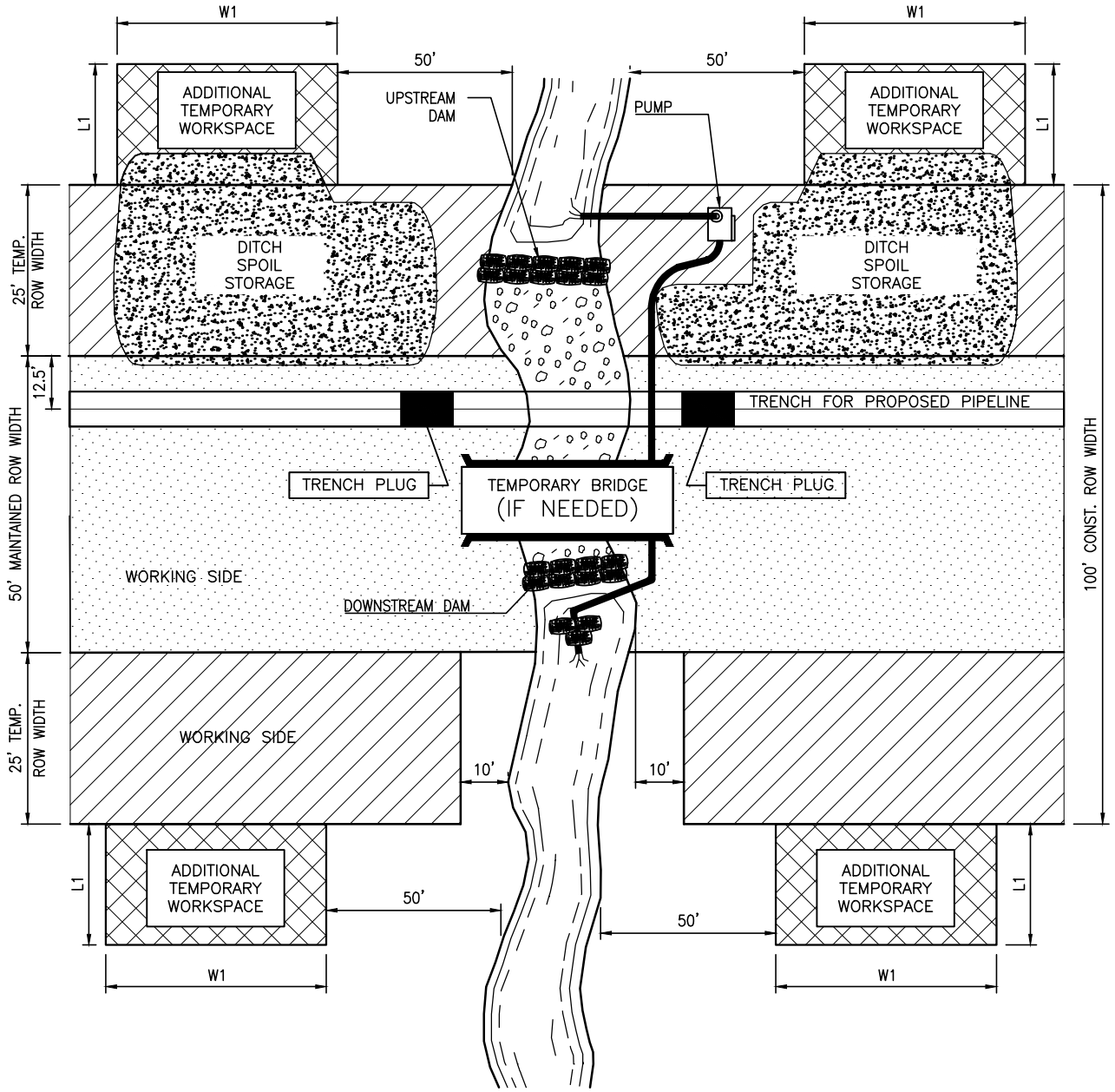
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
20" H-318
BORED RAIL ROAD CROSSING
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 21	0



SEE E&S PLAN FOR ACTUAL ADDITIONAL TEMPORARY WORKSPACE

DRAWN TDD	DATE 6/03/2015
CHECKED JSW	DATE 6/03/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

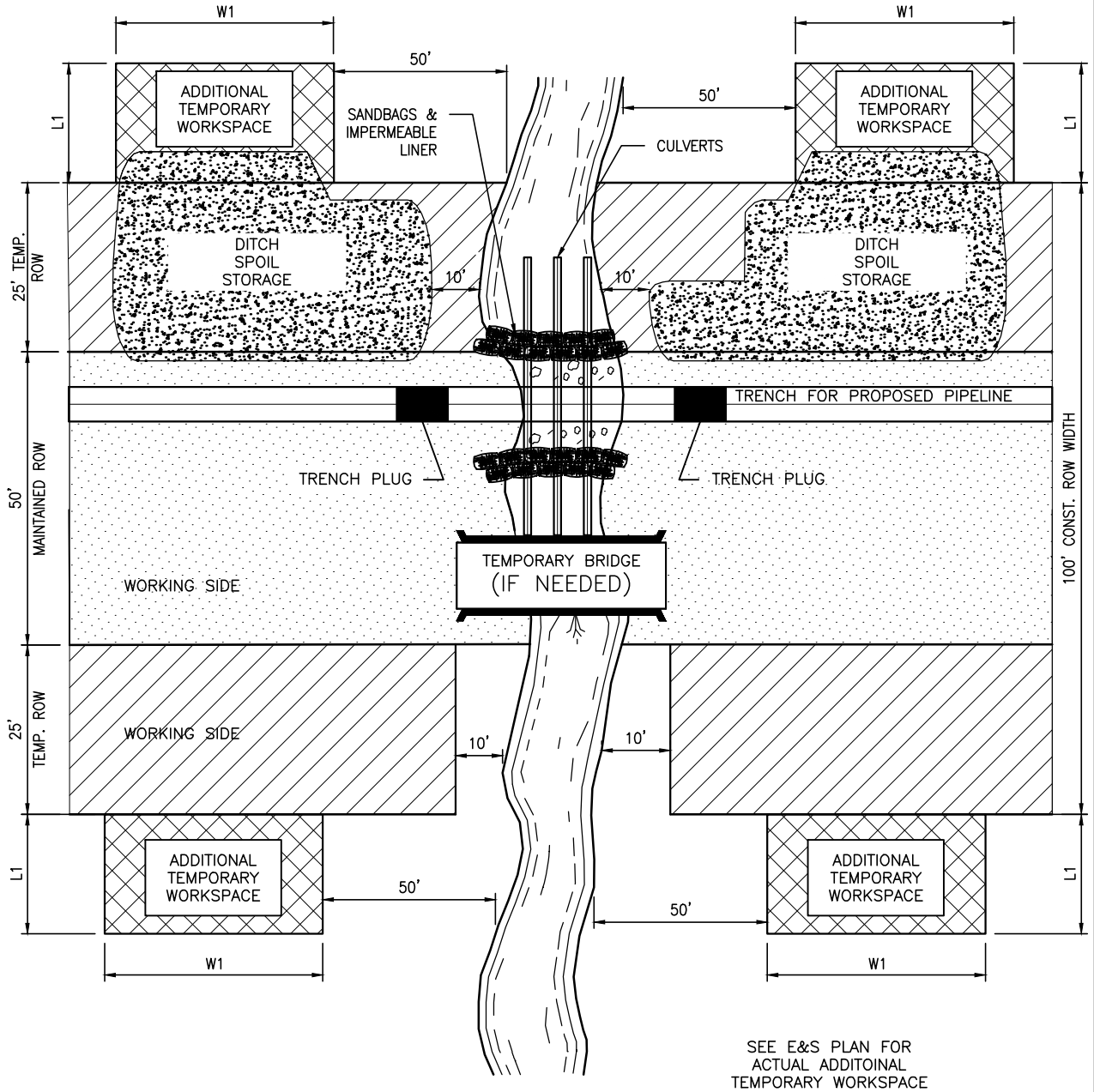
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
20" H-318
OPEN CUT – DAM AND PUMP
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 22A	0



SEE E&S PLAN FOR ACTUAL ADDITOINAL TEMPORARY WORKSPACE

DRAWN TDD	DATE 6/03/2015
CHECKED JSW	DATE 6/03/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

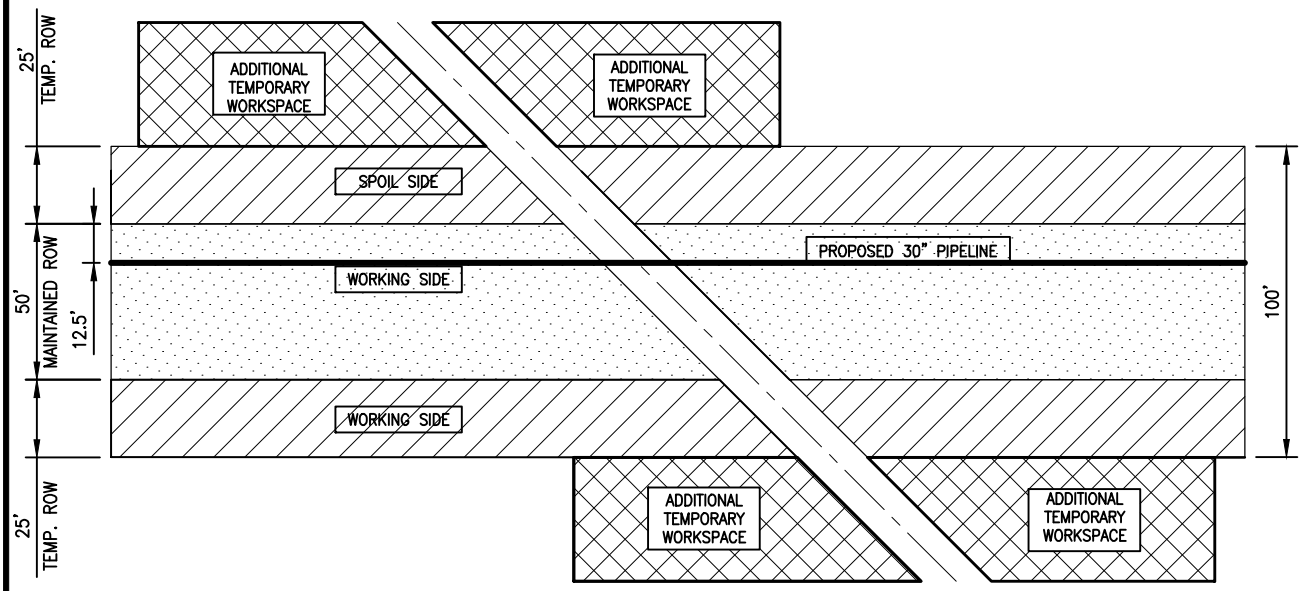
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
20" H-318
OPEN CUT – FLUME
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 22B	0



NOTE:

1. DIMENSIONS DEPENDENT ON PROPOSED AND EXISTING PIPELINE DIAMETERS, BURIAL DEPTHS AND LOCAL SITE SPECIFIC CONDITIONS.
2. TRAVEL LANE ON WORKING SIDE TO BE MATTED AS REQUIRED BY EXISTING PIPELINE COMPANY REQUIREMENTS AND LOCAL CONDITIONS.
3. SEE E&S PLAN FOR ACTUAL ADDITIONAL TEMPORARY WORKSPACE.

DRAWN TDD	DATE 6/03/2015
CHECKED JSW	DATE 6/03/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

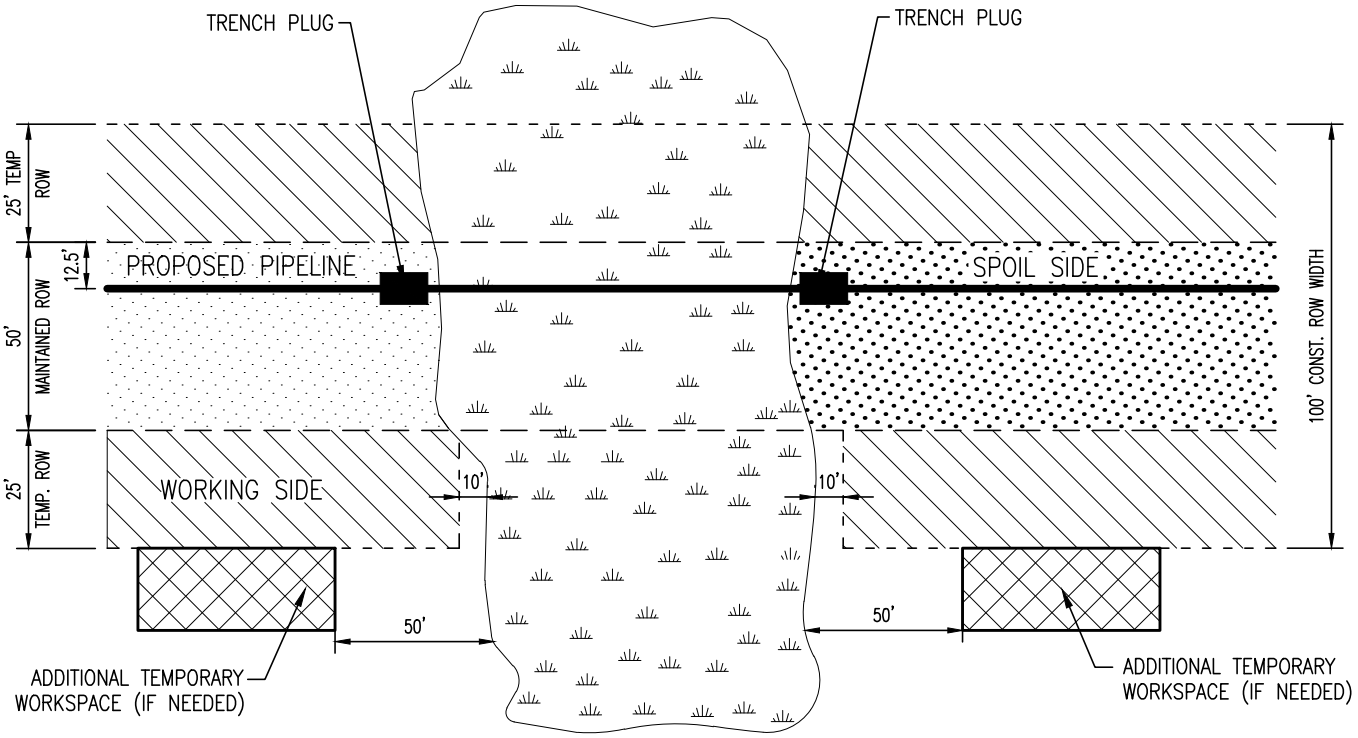
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
20" H-318
PIPELINE CROSSING
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 23	0



SEE E&S PLAN FOR ACTUAL ADDITIONAL TEMPORARY WORKSPACE.

DRAWN	TDD	DATE	6/03/2015
CHECKED	JSW	DATE	6/03/2015
APP'D		DATE	
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID: PXXXX			

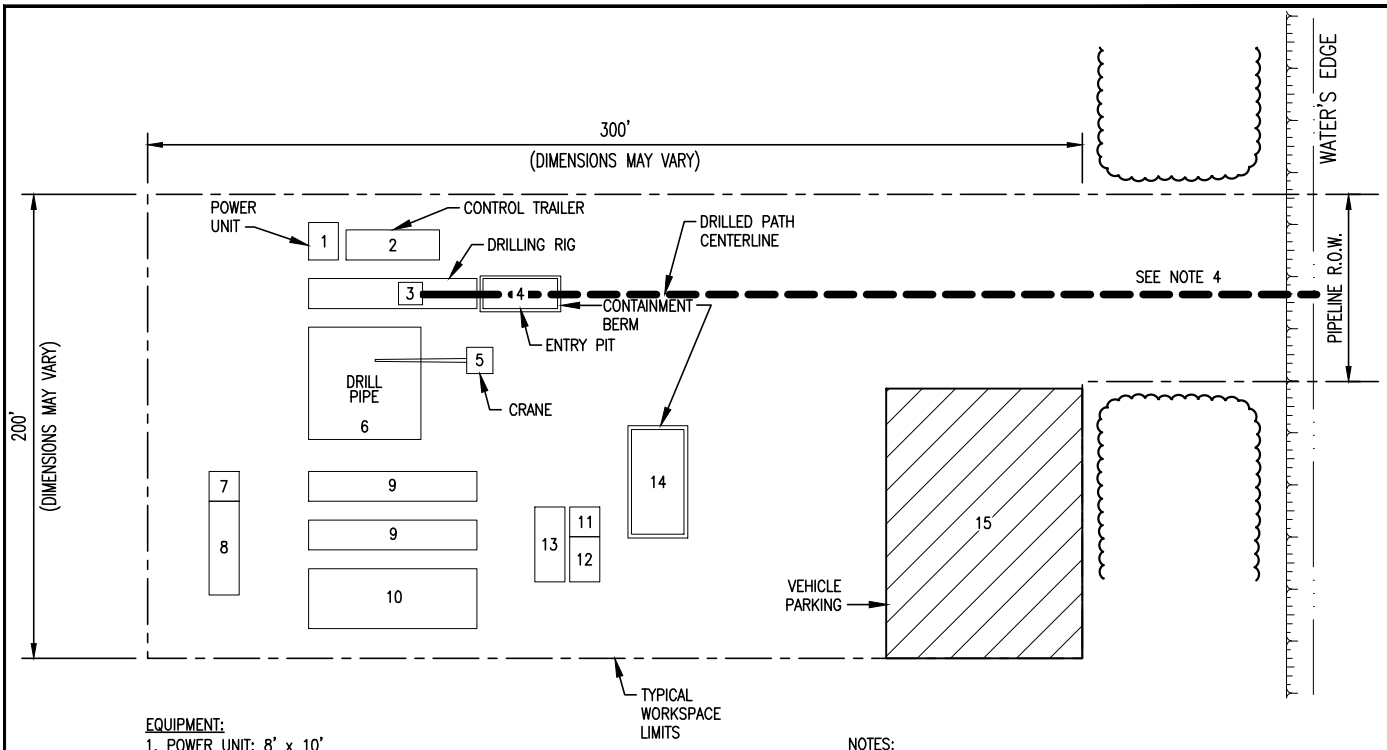
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
20" H-318
WETLAND CROSSING
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 24	0



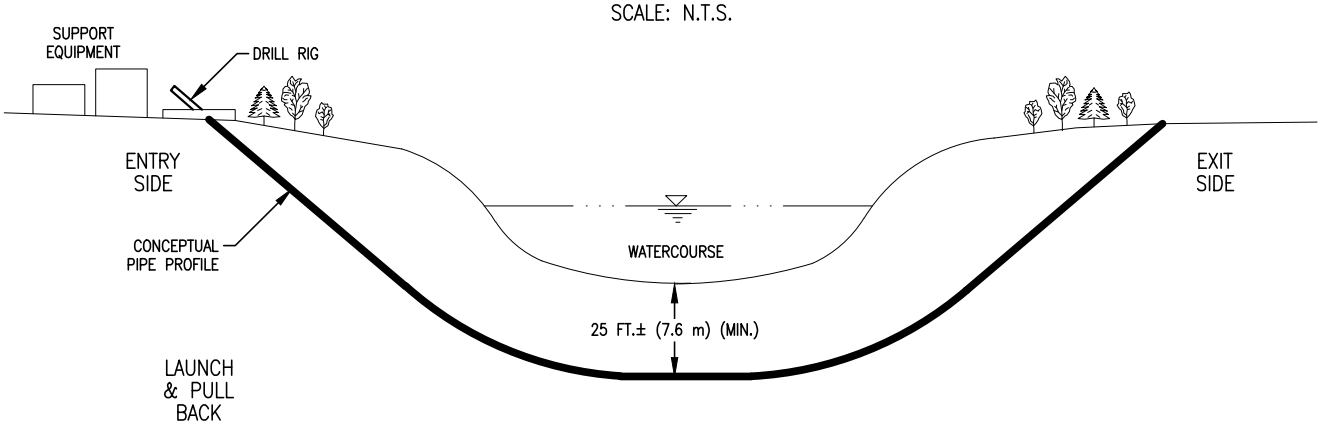
EQUIPMENT:

1. POWER UNIT: 8' x 10'
2. CONTROL TRAILER: 8' x 25'
3. DRILL RIG: 8' x 45'
4. SLURRY PIT W/BERM: 8' x 20'
5. CRANE: 8' x 8'
6. DRILL PIPE: 30' x 30'
7. SLURRY PUMP: 8' x 10'
8. SLURRY MIXING TANK: 8' x 20'
9. FRAC TANK(S): 8' x 45'
10. BENTONITE STORAGE: 20' x 45'
11. DESTILTER: 8' x 8'
12. SHAKER: 8' x 12'
13. SPOILS CONTAINER: 8' x 20'
14. CUTTINGS SETTLEMENT PIT: 10' x 25'
15. PARKING & STORAGE: 50' X 100'

NOTES:

1. EQUIPMENT ORIENTATION MAY VARY DEPENDING ON CONTRACTOR OR SITE CONDITIONS.
2. EQUIPMENT TO BE SUPPORTED ON THE GROUND SURFACE OR TIMBER MATS AS CONDITIONS DICTATE
3. SILT FENCE, BERMS AND/OR STRAW BALE BARRIER TO BE USED AS REQUIRED TO PREVENT IMPACTS FROM OCCURRING OUTSIDE OF PROJECT LIMITS.
4. HAND CLEARED ACCESS PATH WILL BE USED TO OBTAIN WATER FROM SOURCE WHERE PERMITTED.

ENTRY SITE PLAN
SCALE: N.T.S.



PROFILE
SCALE: N.T.S.

GENERAL NOTES:

1. PIPE DEPTHS MAY VARY

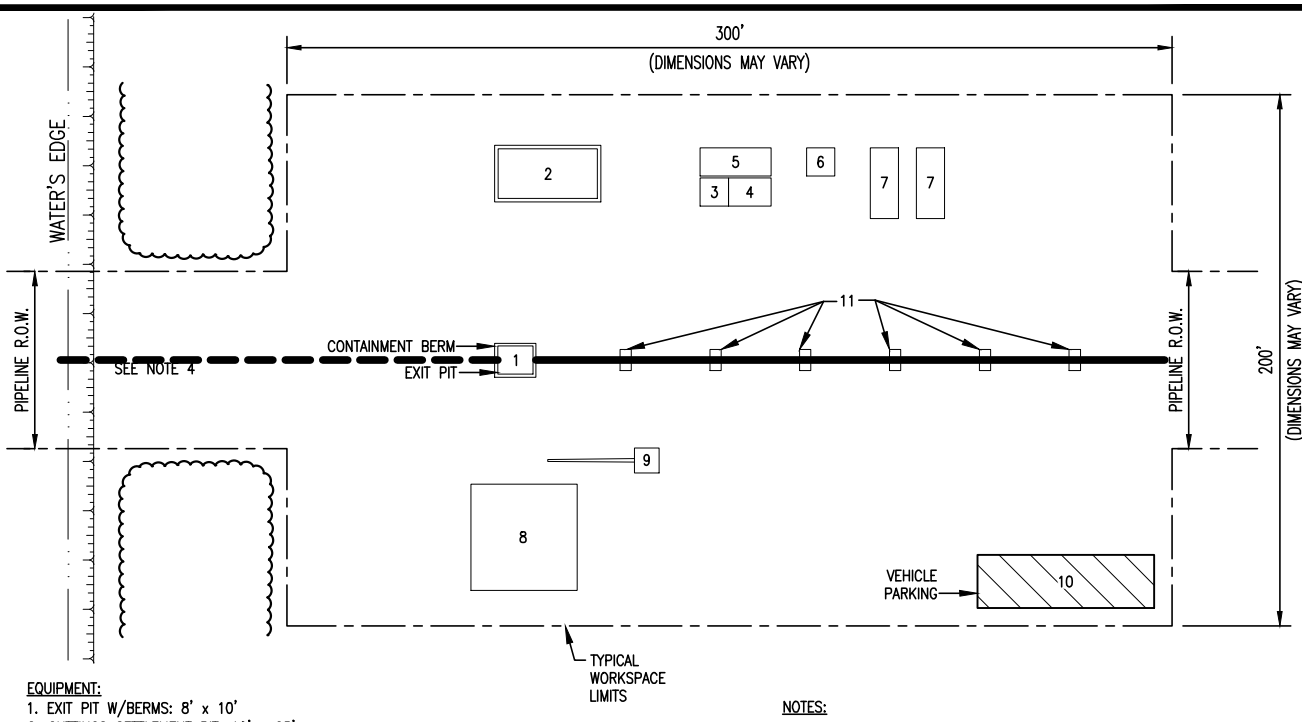
DRAWN	TDD	DATE	6/09/2015
CHECKED	JSW	DATE	6/09/2015
APP'D		DATE	
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID: PXXXX			

EQT SM
DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
30" H-316/20" H-318
TYPICAL DIRECTIONAL DRILL
ENTRY SITE PLAN & PROFILE

DRAWING NO.	REV.
METHOD 25	0



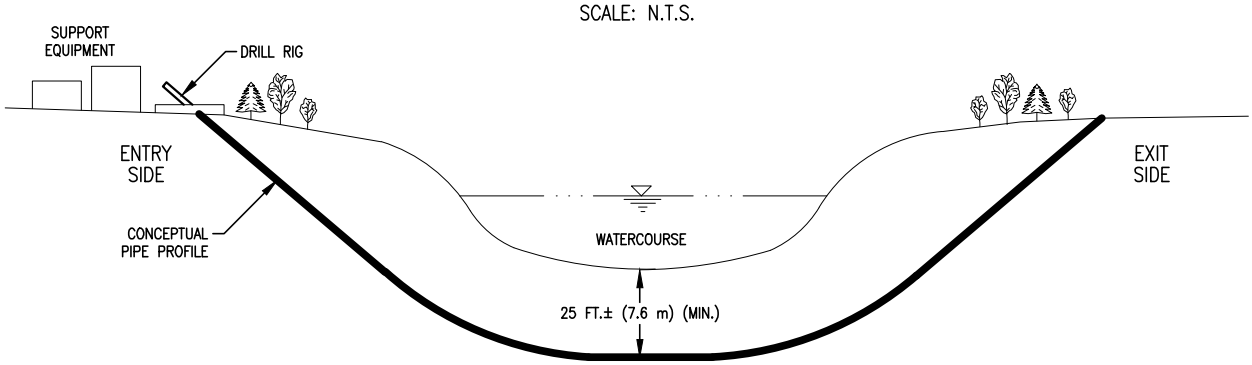
EQUIPMENT:

1. EXIT PIT W/BERMS: 8' x 10'
2. CUTTINGS SETTLEMENT PIT: 10' x 25'
3. DESILTER: 8' x 8'
4. SHAKER: 8' x 12'
5. SPOILS CONTAINER: 8' x 20'
6. POWER UNIT: 8' x 10'
7. FRAC TANK(S): 8' x 45'
8. DRILL PIPE: 30' x 30'
9. CONSTRUCTION EQUIPMENT: 8' x 8'
10. PARKING & STORAGE: 15' x 50'
11. PIPE ROLLERS

NOTES:

1. EQUIPMENT ORIENTATION MAY VARY DEPENDING ON CONTRACTOR OR SITE CONDITIONS.
2. EQUIPMENT TO BE SUPPORTED ON THE GROUND SURFACE OR TIMBER MATS AS CONDITIONS DICTATE
3. SILT FENCE, BERMS AND/OR STRAW BALE BARRIER TO BE USED AS REQUIRED TO PREVENT IMPACTS FROM OCCURRING OUTSIDE OF PROJECT LIMITS.
4. HAND CLEARED ACCESS PATH WILL BE USED TO OBTAIN WATER FROM SOURCE WHERE PERMITTED.

EXIT SITE PLAN
SCALE: N.T.S.



PROFILE
SCALE: N.T.S.

GENERAL NOTES:

1. PIPE DEPTHS MAY VARY

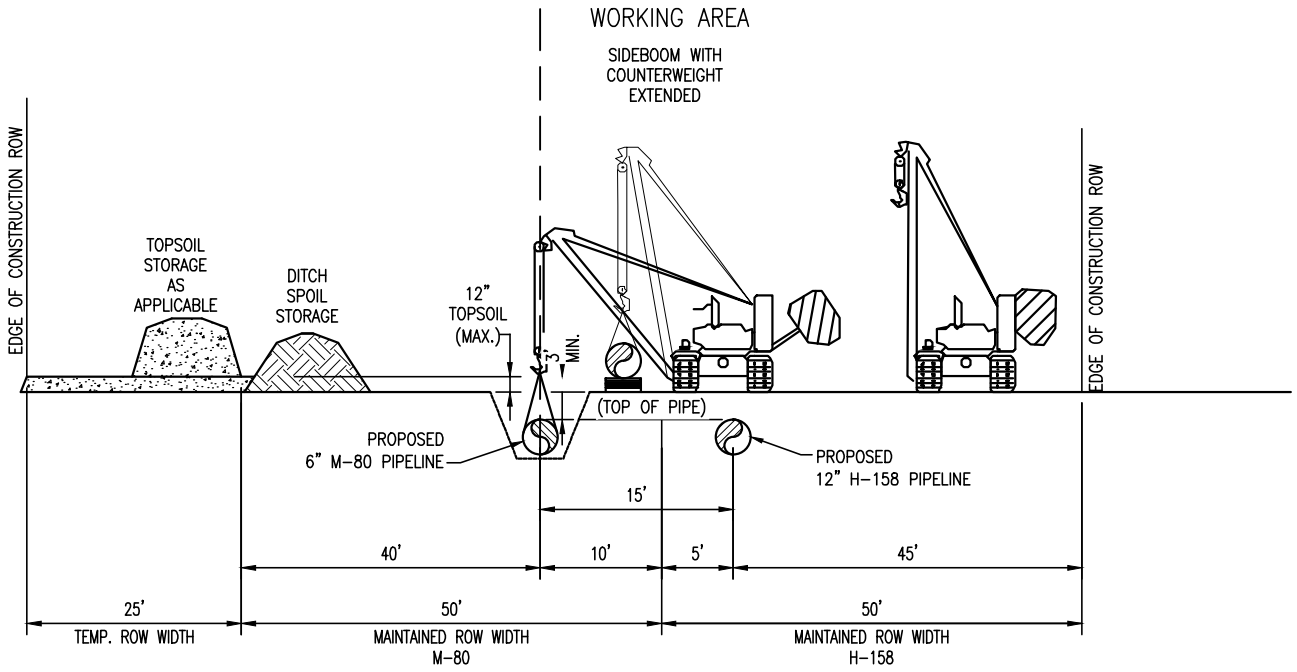
DRAWN	TDD	DATE	6/09/2015
CHECKED	JSW	DATE	6/09/2015
APP'D		DATE	
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID: PXXXX			

EQT SM
DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
30" H-316/20" H-318
TYPICAL DIRECTIONAL DRILL
EXIT SITE PLAN & PROFILE

DRAWING NO.	REV.
METHOD 26	0



NOTES:
1. PROPOSED PIPELINE M-80 TO BE CONSTRUCTED FIRST WITH H-158 FOLLOWING IN SUCCESSION.

DRAWN TDD	DATE 6/09/2015
CHECKED JSW	DATE 6/09/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

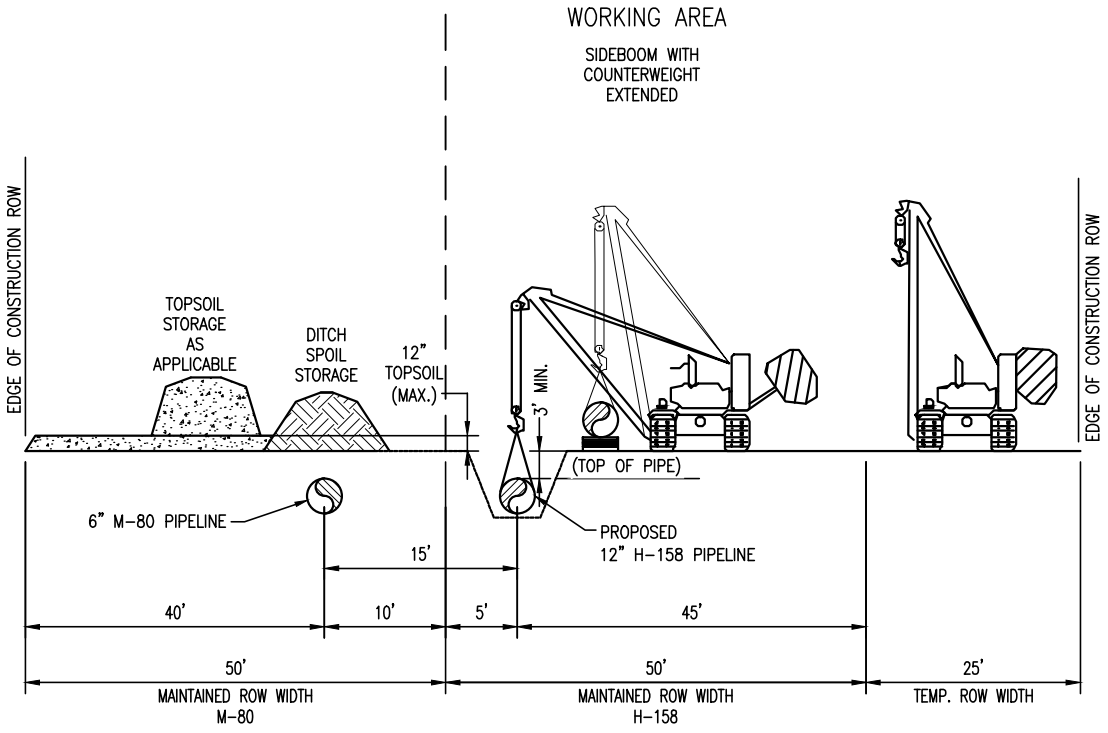
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
6" M-80
PARALLEL CONSTRUCTION
RIGHT-OF-WAY

DRAWING NO.	REV.
METHOD 27	0



NOTES:
1. PROPOSED PIPELINE M-80 TO BE CONSTRUCTED FIRST WITH H-158 FOLLOWING IN SUCCESSION.

DRAWN TDD	DATE 6/09/2015
CHECKED JSW	DATE 6/09/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

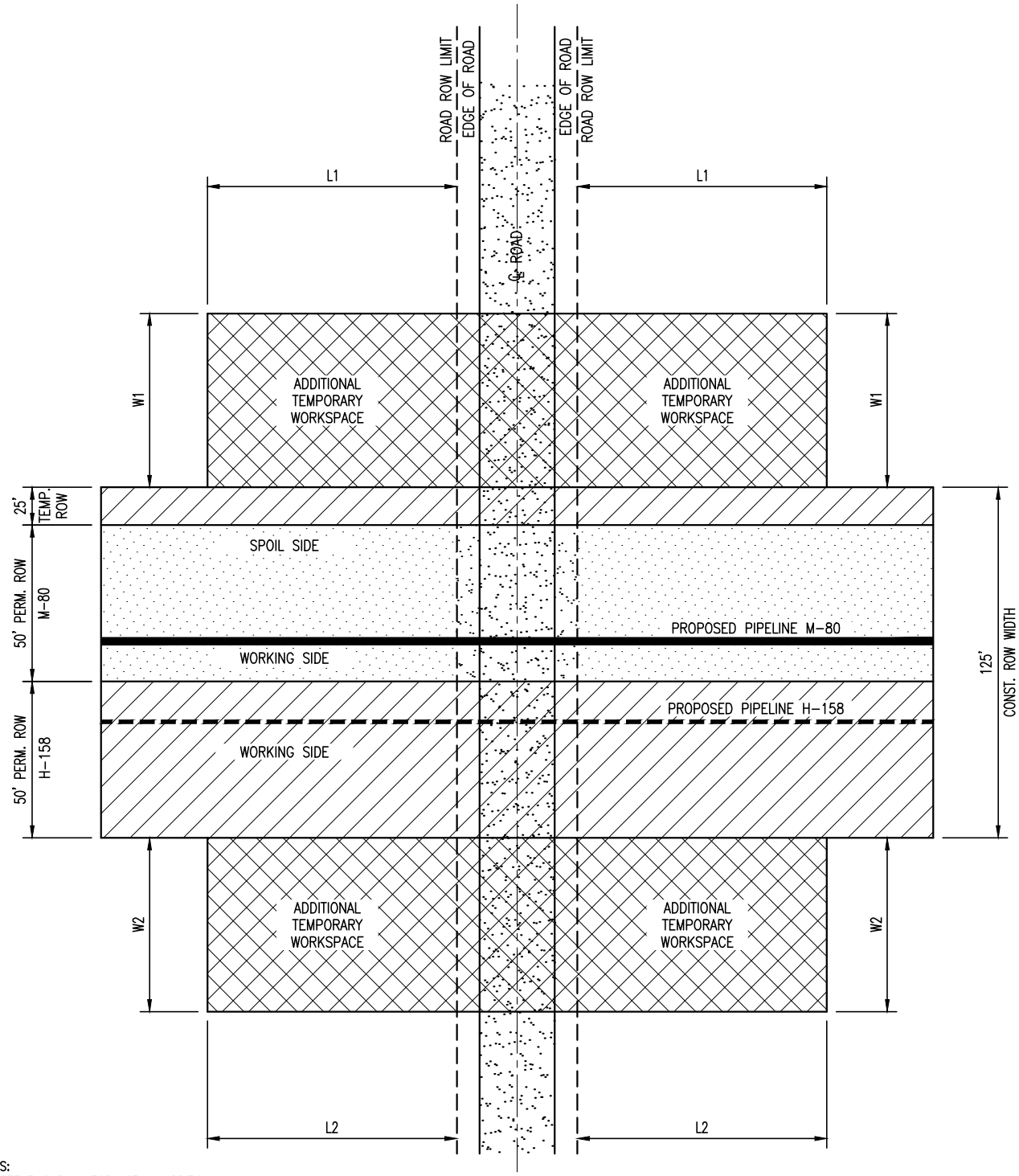
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
12" H-158
PARALLEL CONSTRUCTION
RIGHT-OF-WAY

DRAWING NO.	REV.
METHOD 28	0



NOTES:
1. SEE E&S PLAN FOR ACTUAL ADDITIONAL TEMPORARY WORKSPACE.
2. PROPOSED PIPELINE M-80 TO BE CONSTRUCTED FIRST WITH H-158 FOLLOWING IN SUCCESSION.

DRAWN TDD	DATE 6/09/2015
CHECKED JSW	DATE 6/09/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

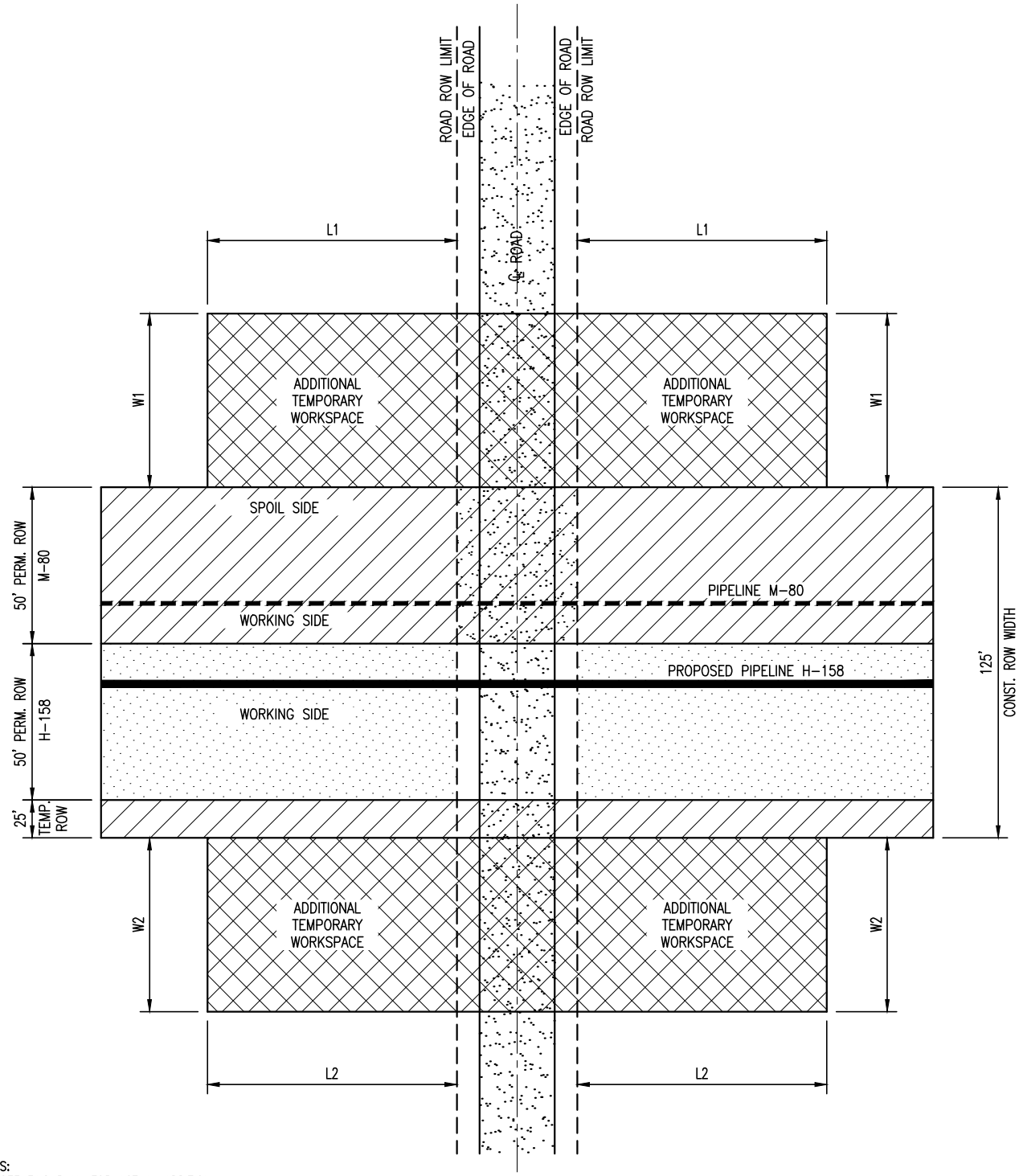
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
6" M-80
OPEN CUT ROAD CROSSING
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 29	0



NOTES:
1. SEE E&S PLAN FOR ACTUAL ADDITIONAL TEMPORARY WORKSPACE.
2. PROPOSED PIPELINE M-80 TO BE CONSTRUCTED FIRST WITH H-158 FOLLOWING IN SUCCESSION.

DRAWN TDD	DATE 6/09/2015
CHECKED JSW	DATE 6/09/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

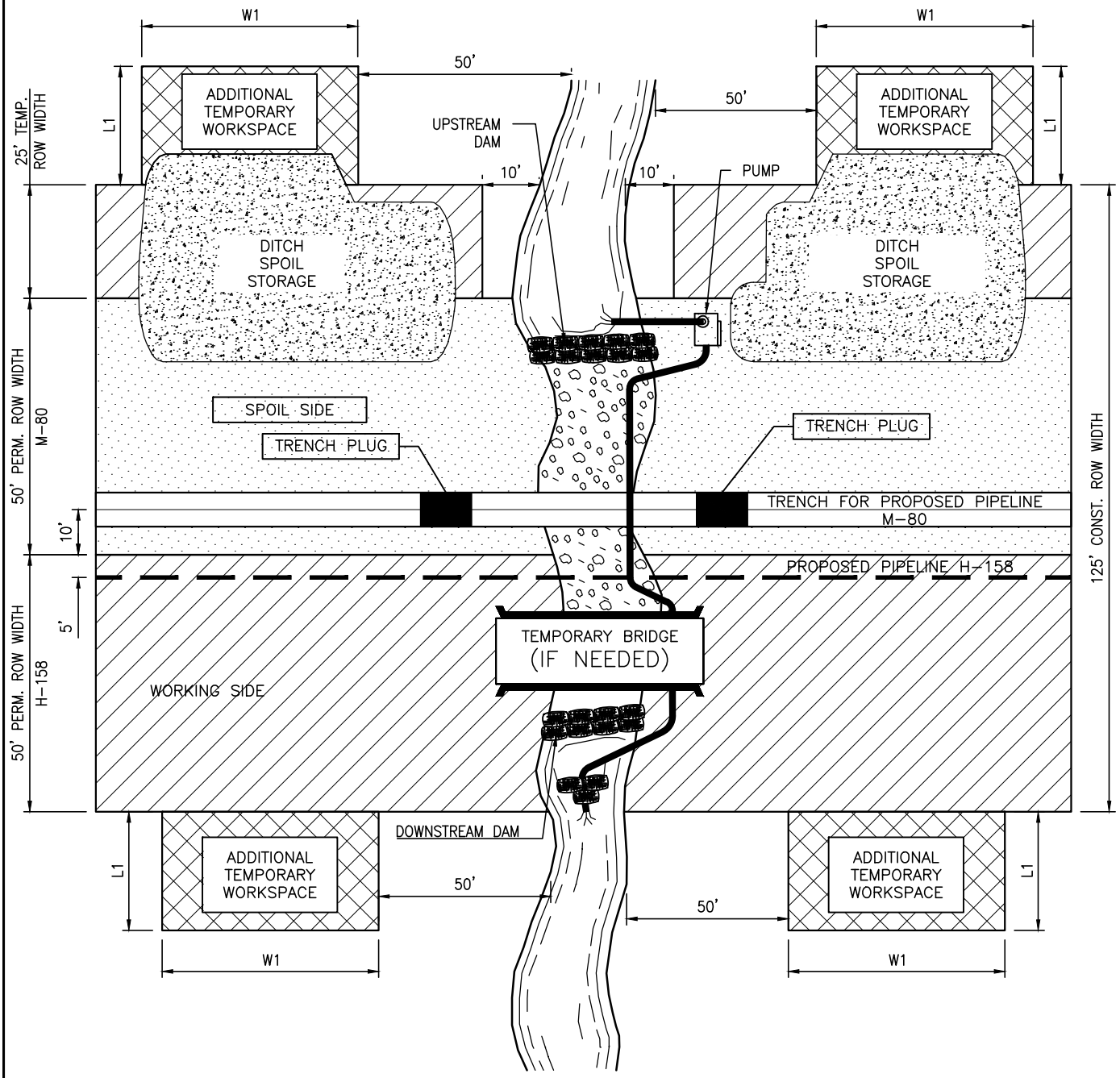
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
12" H-158
OPEN CUT ROAD CROSSING
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 30	0



NOTES:
1. SEE E&S PLAN FOR ACTUAL ADDITIONAL TEMPORARY WORKSPACE.
2. PROPOSED PIPELINE M-80 TO BE CONSTRUCTED FIRST WITH H-158 FOLLOWING IN SUCCESSION.
3. DAM AND PUMP TO REMAIN IN OPERATION UNTIL COMPLETION OF BOTH PIPELINES.

DRAWN	TDD	DATE	6/09/2015
CHECKED	JSW	DATE	6/09/2015
APP'D		DATE	
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID: PXXXX			

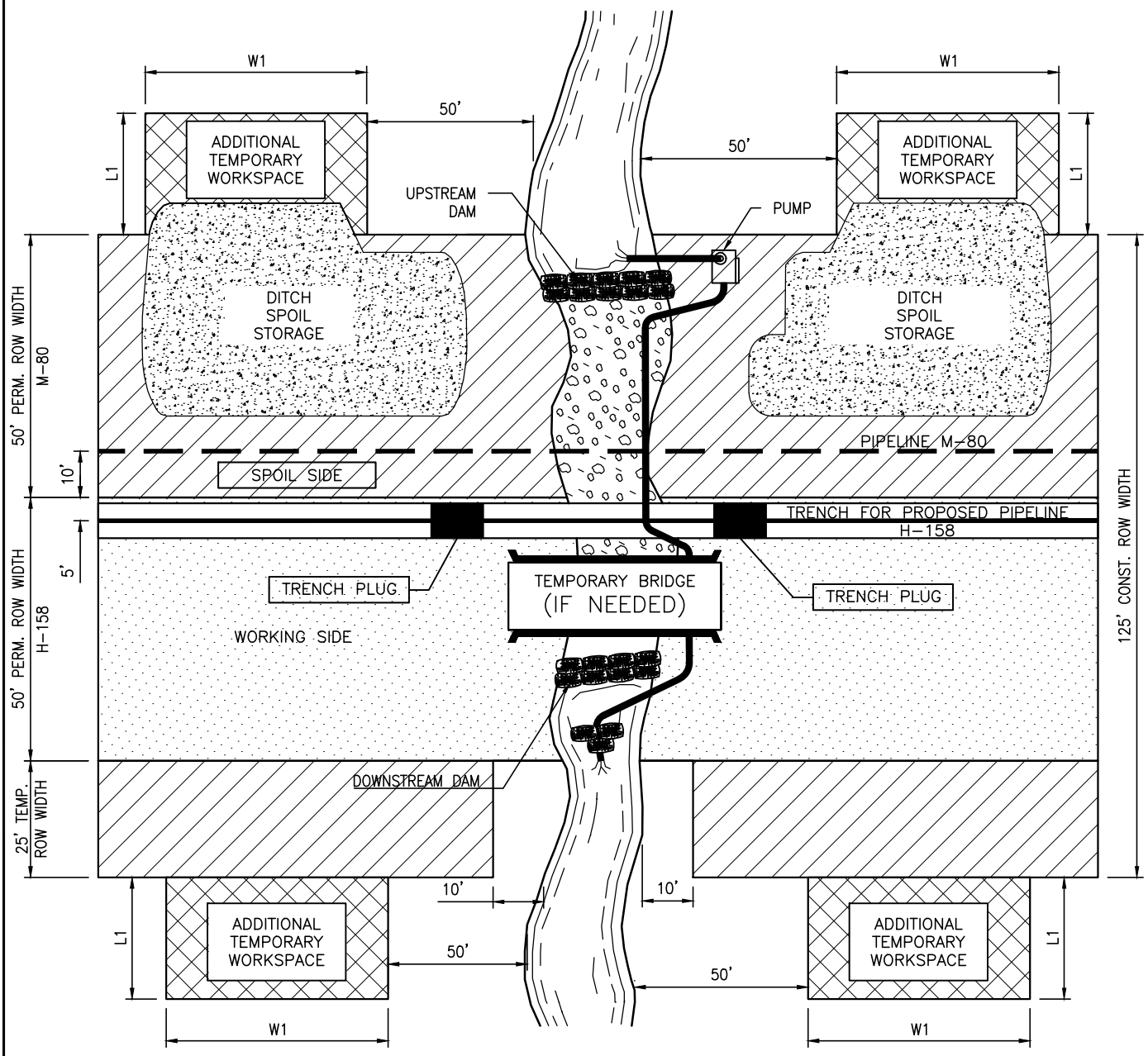
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
6" M-80
OPEN CUT – DAM AND PUMP
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 31	0



NOTES:
1. SEE E&S PLAN FOR ACTUAL ADDITIONAL TEMPORARY WORKSPACE.
2. PROPOSED PIPELINE M-80 TO BE CONSTRUCTED FIRST WITH H-158 FOLLOWING IN SUCCESSION.
3. DAM AND PUMP TO REMAIN IN OPERATION UNTIL COMPLETION OF BOTH PIPELINES.

DRAWN TDD	DATE 6/09/2015
CHECKED JSW	DATE 6/09/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

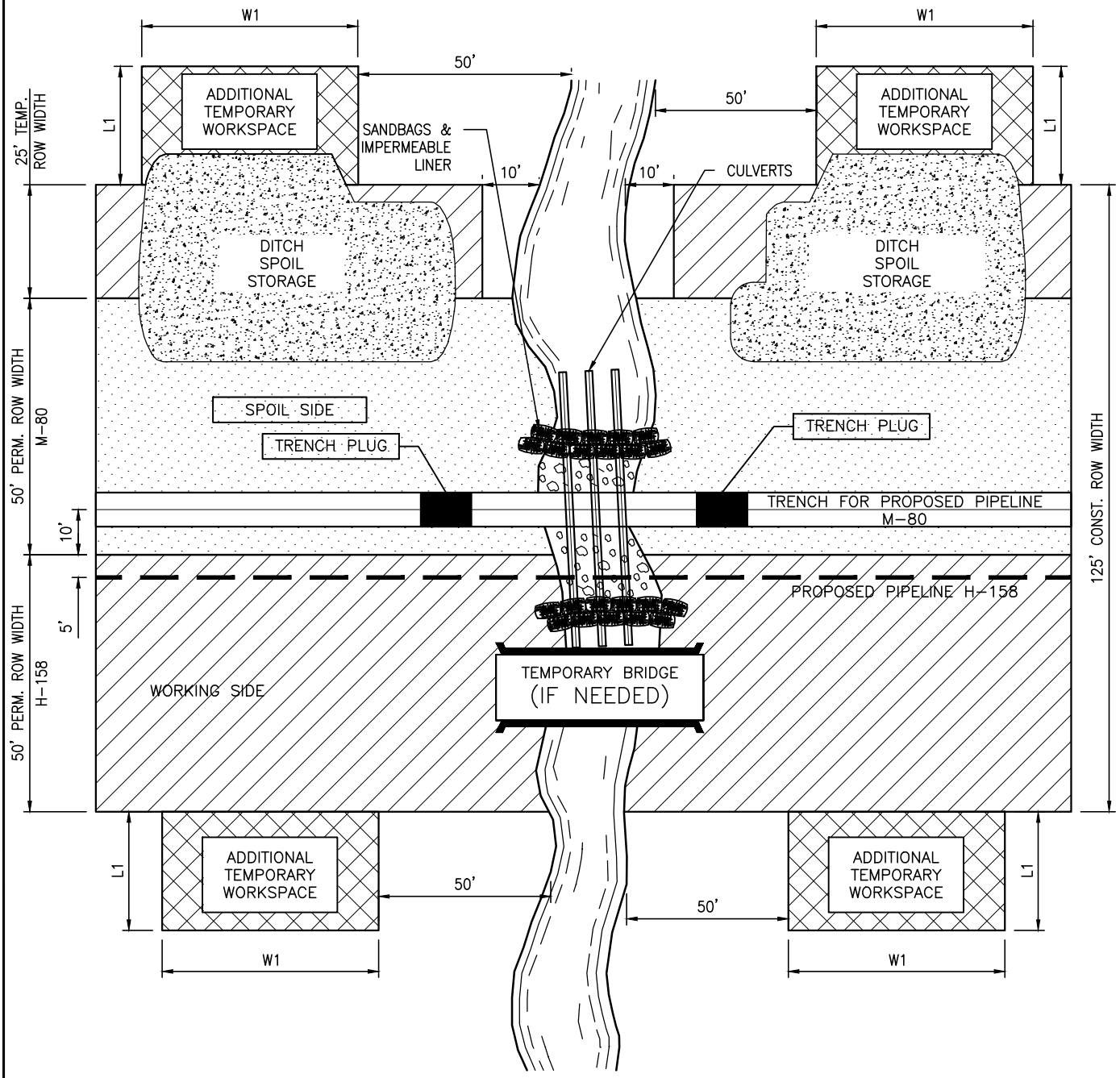
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
12" H-158
OPEN CUT – DAM AND PUMP
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 32	0



NOTES:
1. SEE E&S PLAN FOR ACTUAL ADDITIONAL TEMPORARY WORKSPACE.
2. PROPOSED PIPELINE M-80 TO BE CONSTRUCTED FIRST WITH H-158 FOLLOWING IN SUCCESSION.
3. FLUMES TO REMAIN IN OPERATION UNTIL COMPLETION OF BOTH PIPELINES.

DRAWN TDD	DATE 6/09/2015
CHECKED JSW	DATE 6/09/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

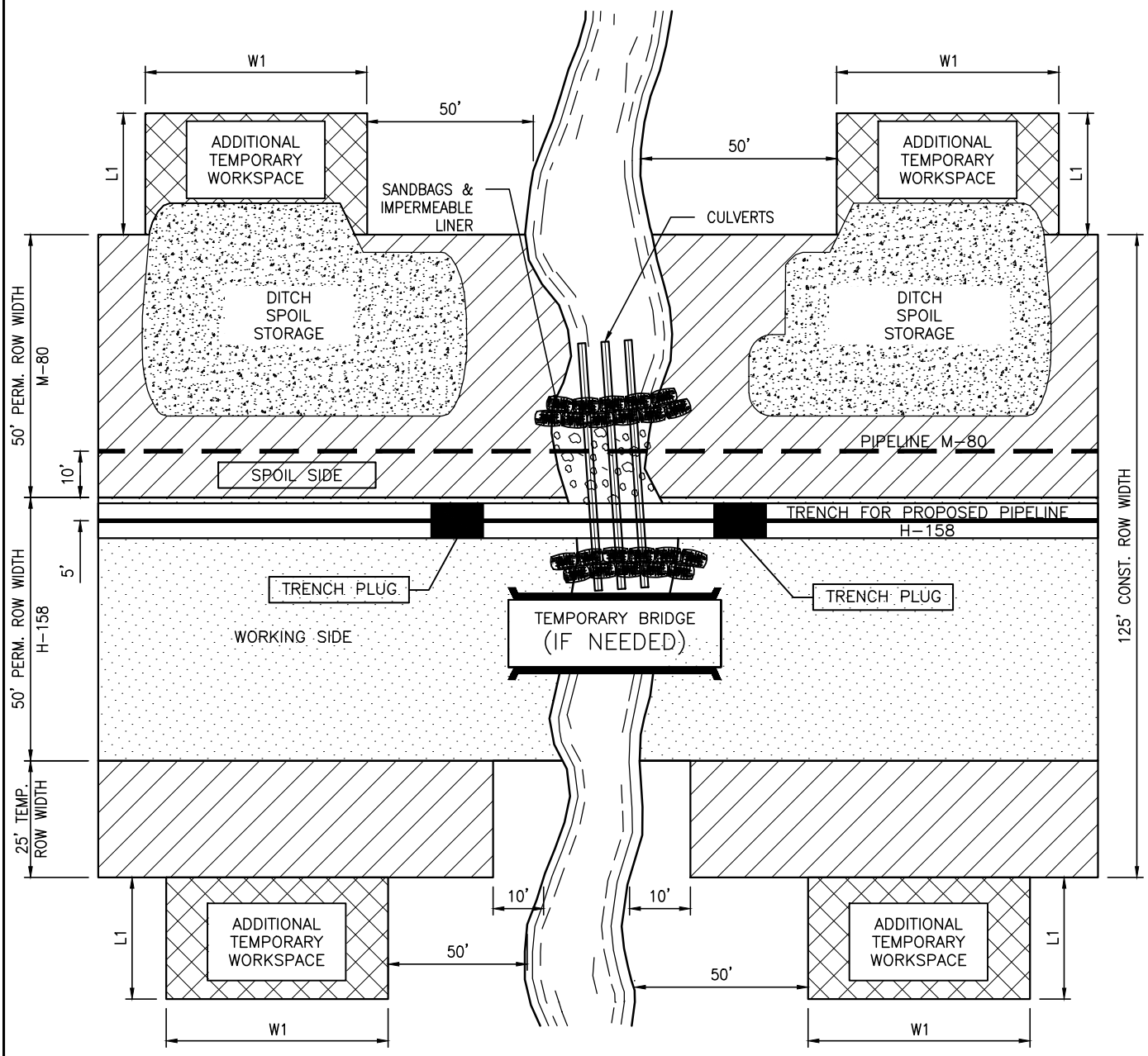
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
6" M-80
OPEN CUT - FLUME
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 33	0



NOTES:
1. SEE E&S PLAN FOR ACTUAL ADDITIONAL TEMPORARY WORKSPACE.
2. PROPOSED PIPELINE M-80 TO BE CONSTRUCTED FIRST WITH H-158 FOLLOWING IN SUCCESSION.
3. FLUMES TO REMAIN IN OPERATION UNTIL COMPLETION OF BOTH PIPELINES.

DRAWN TDD	DATE 6/09/2015
CHECKED JSW	DATE 6/09/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

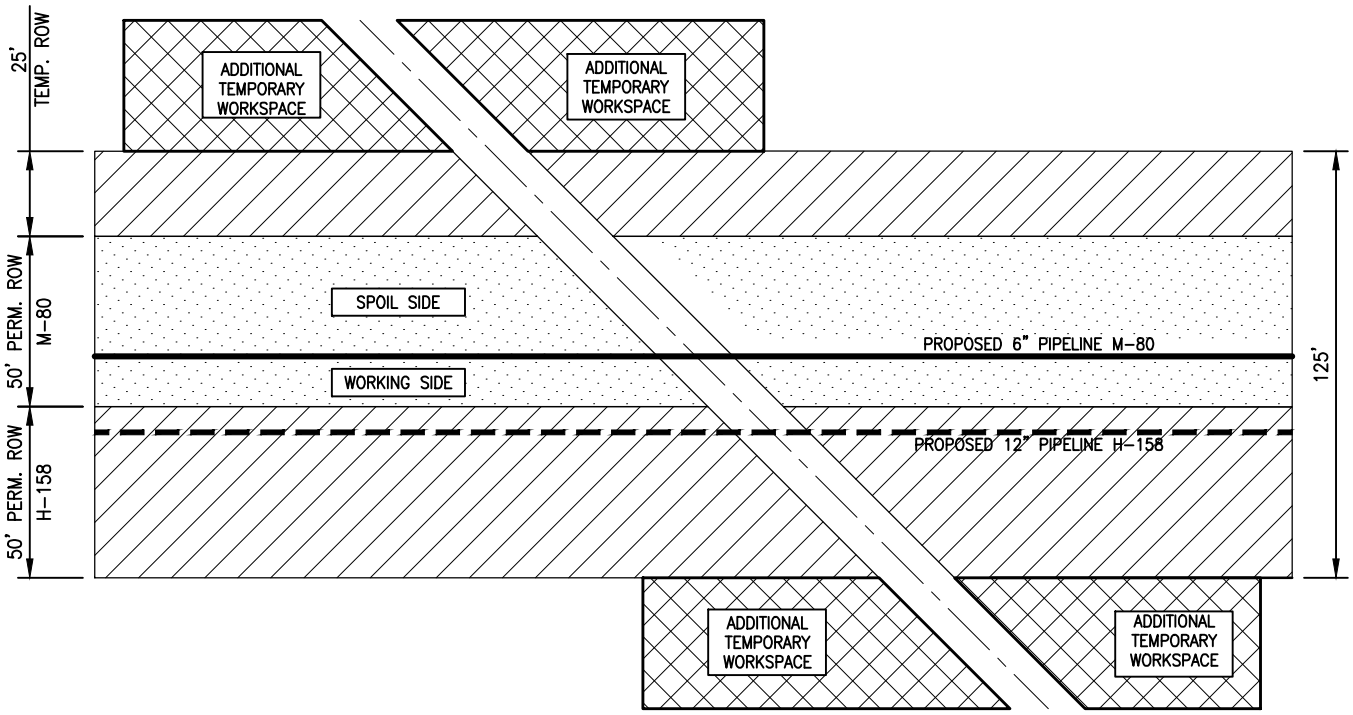
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
12" H-158
OPEN CUT - FLUME
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 34	0



NOTE:

1. DIMENSIONS DEPENDENT ON PROPOSED AND EXISTING PIPELINE DIAMETERS, BURIAL DEPTHS AND LOCAL SITE SPECIFIC CONDITIONS.
2. TRAVEL LANE ON WORKING SIDE TO BE MATTED AS REQUIRED BY EXISTING PIPELINE COMPANY REQUIREMENTS AND LOCAL CONDITIONS.
3. SEE E&S PLAN FOR ACTUAL ADDITIONAL TEMPORARY WORKSPACE.
4. PROPOSED PIPELINE M-80 TO BE CONSTRUCTED FIRST WITH H-158 FOLLOWING IN SUCCESSION.

DRAWN	TDD	DATE	6/09/2015
CHECKED	JSW	DATE	6/09/2015
APP'D		DATE	
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID: PXXXX			

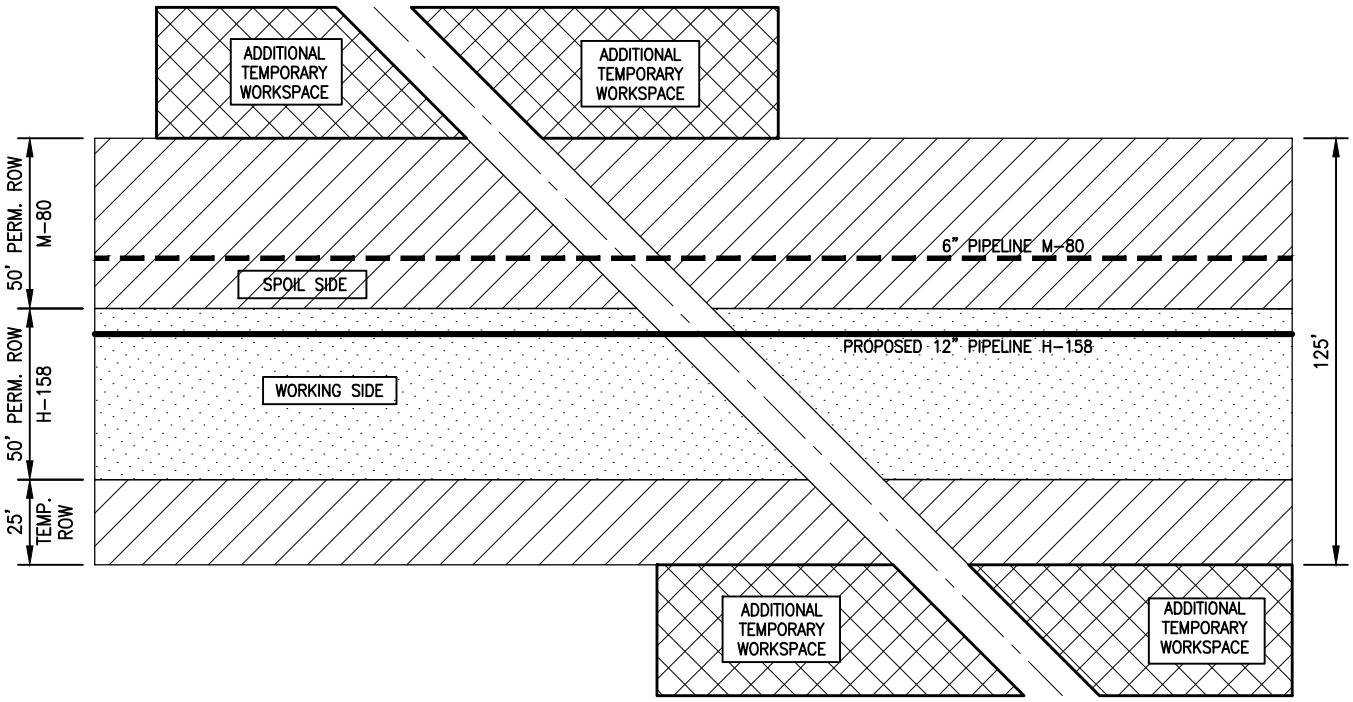
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
6" M-80
PIPELINE CROSSING
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 35	0



NOTE:

1. DIMENSIONS DEPENDENT ON PROPOSED AND EXISTING PIPELINE DIAMETERS, BURIAL DEPTHS AND LOCAL SITE SPECIFIC CONDITIONS.
2. TRAVEL LANE ON WORKING SIDE TO BE MATTED AS REQUIRED BY EXISTING PIPELINE COMPANY REQUIREMENTS AND LOCAL CONDITIONS.
3. SEE E&S PLAN FOR ACTUAL ADDITIONAL TEMPORARY WORKSPACE.
4. PROPOSED PIPELINE M-80 TO BE CONSTRUCTED FIRST WITH H-158 FOLLOWING IN SUCCESSION.

DRAWN	TDD	DATE	6/09/2015
CHECKED	JSW	DATE	6/09/2015
APP'D		DATE	
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID: PXXXX			

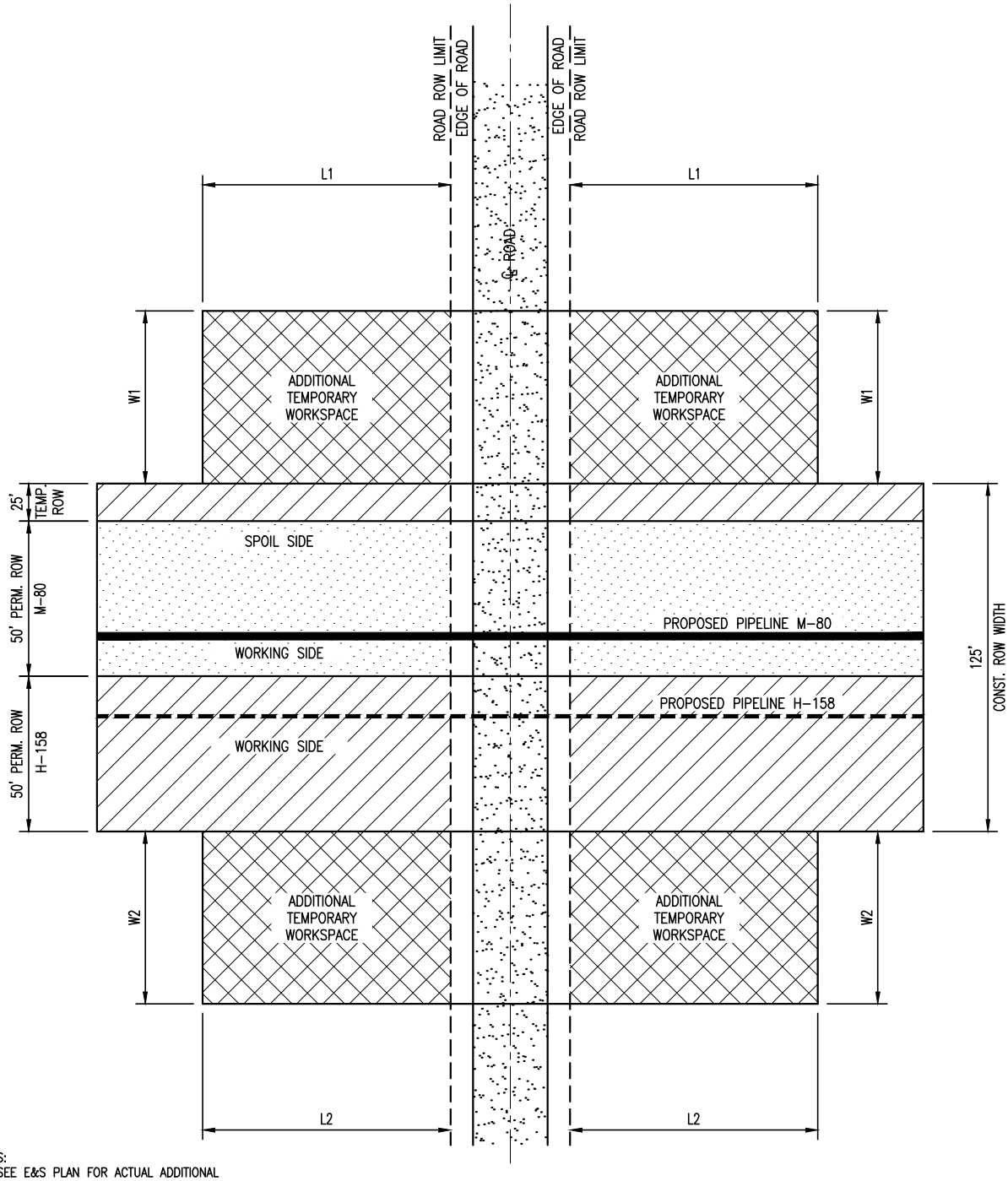
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
12" H-158
PIPELINE CROSSING
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 36	0



NOTES:
1. SEE E&S PLAN FOR ACTUAL ADDITIONAL TEMPORARY WORKSPACE.
2. PROPOSED PIPELINE M-80 TO BE CONSTRUCTED FIRST WITH H-158 FOLLOWING IN SUCCESSION.

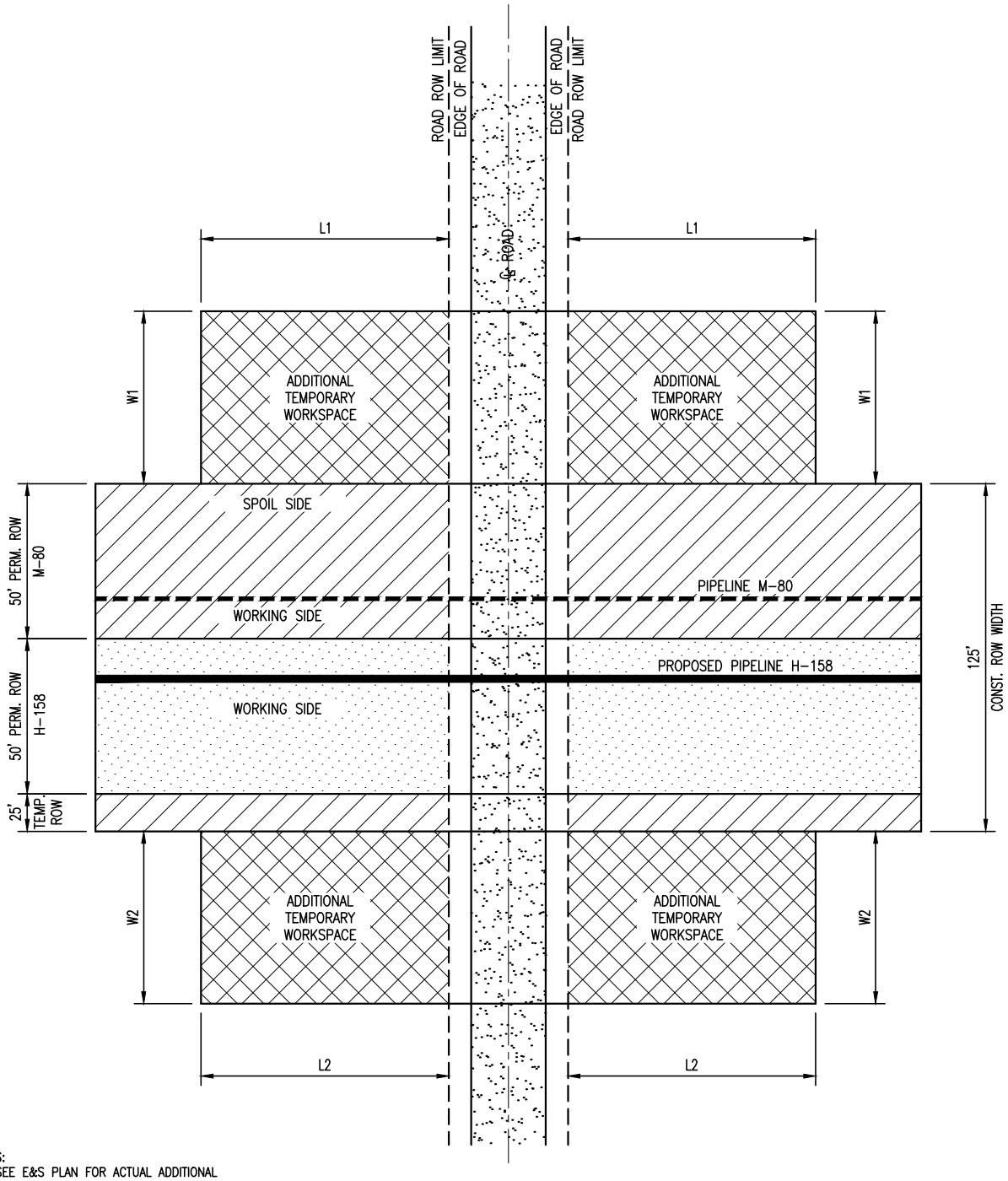
DRAWN TDD	DATE 6/09/2015
CHECKED JSW	DATE 6/09/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

EQT SM
DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
6" M-80
BORED ROAD CROSSING
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 37	0



NOTES:
1. SEE E&S PLAN FOR ACTUAL ADDITIONAL TEMPORARY WORKSPACE.
2. PROPOSED PIPELINE M-80 TO BE CONSTRUCTED FIRST WITH H-158 FOLLOWING IN SUCCESSION.

DRAWN TDD	DATE 6/09/2015
CHECKED JSW	DATE 6/09/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

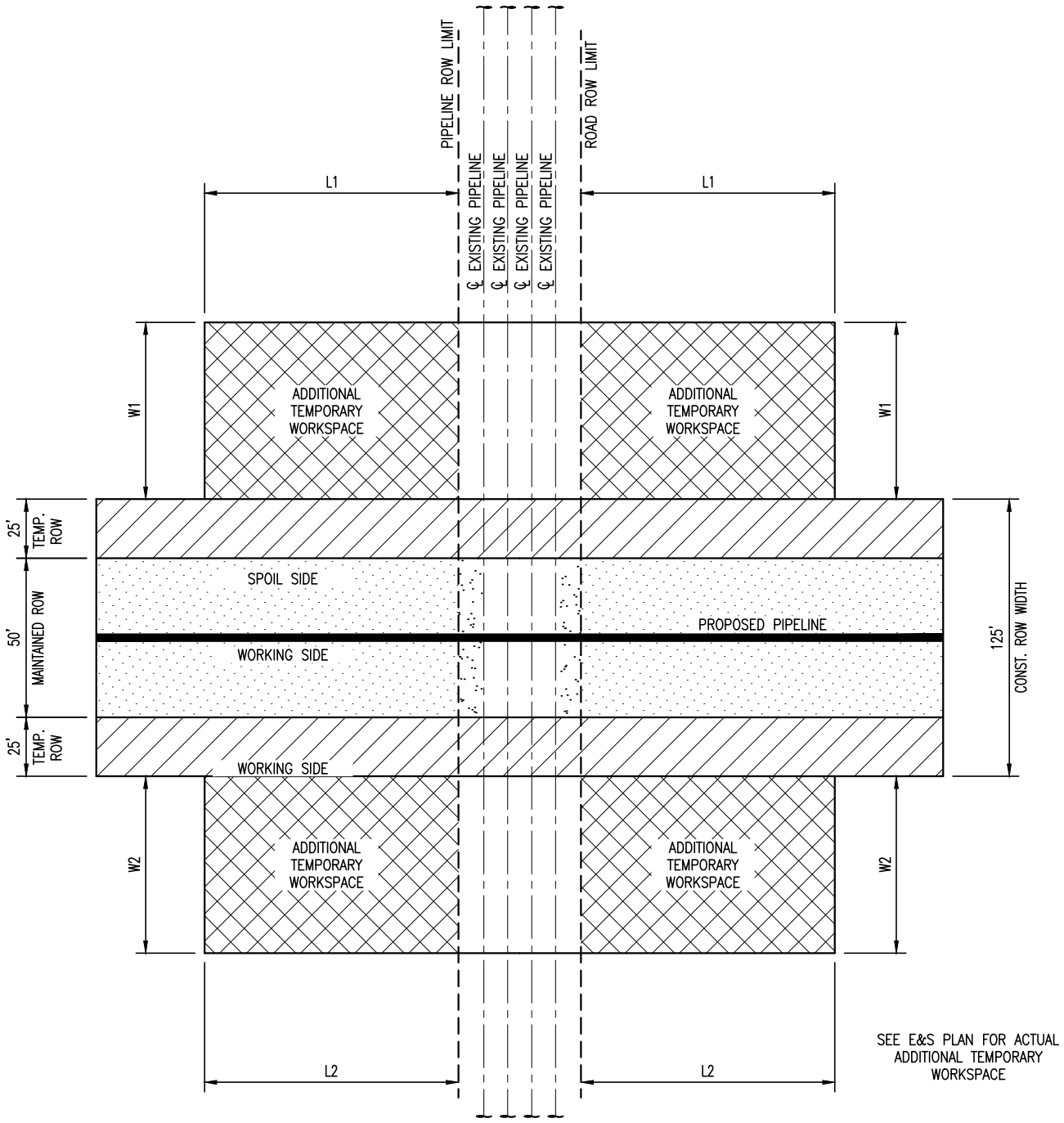
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
12" H-158
BORED ROAD CROSSING
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 38	0



DRAWN TDD	DATE 6/03/2015
CHECKED JSW	DATE 6/03/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: PXXXX	

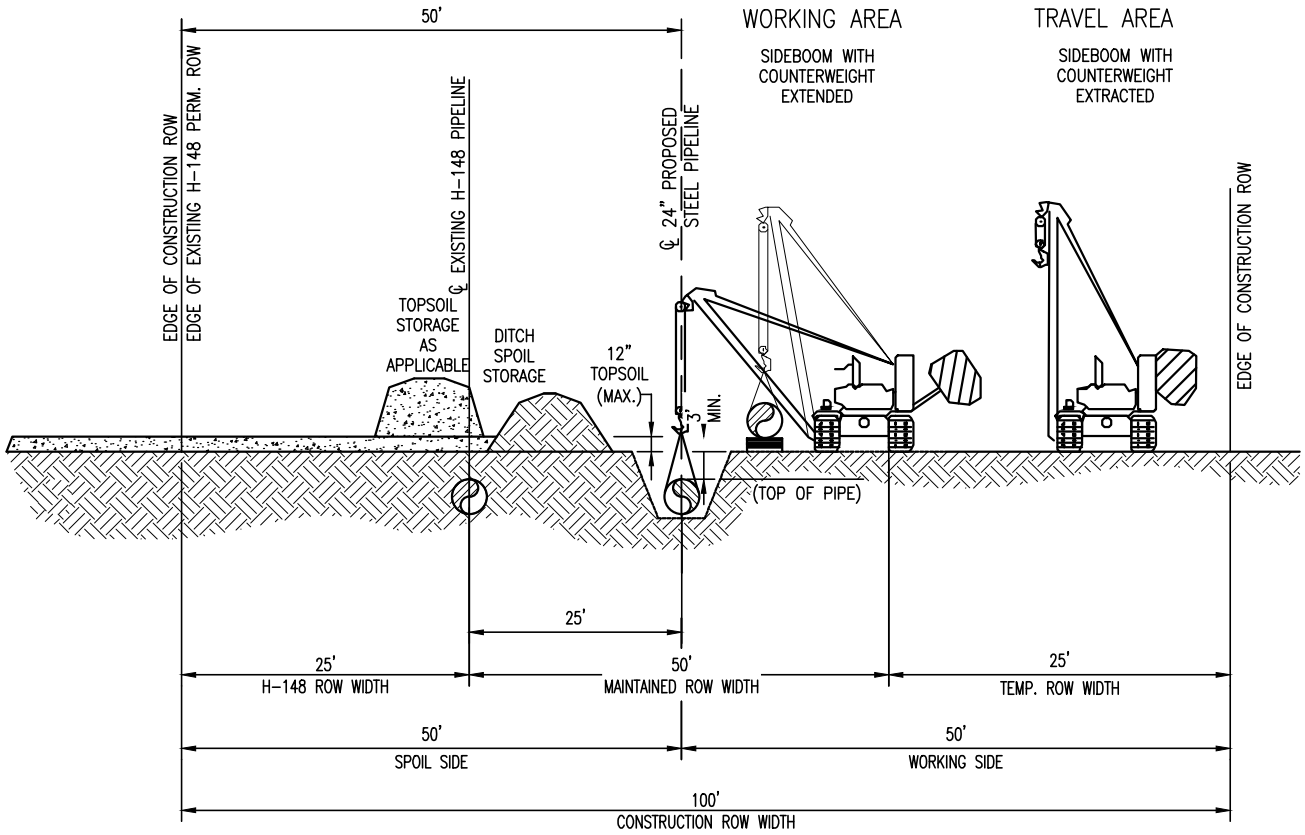
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
24" H-305
OPEN CUT PIPELINE CROSSING
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 39	0



DRAWN	TDD	DATE	6/03/2015
CHECKED	JSW	DATE	6/03/2015
APP'D		DATE	
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID: PXXXX			

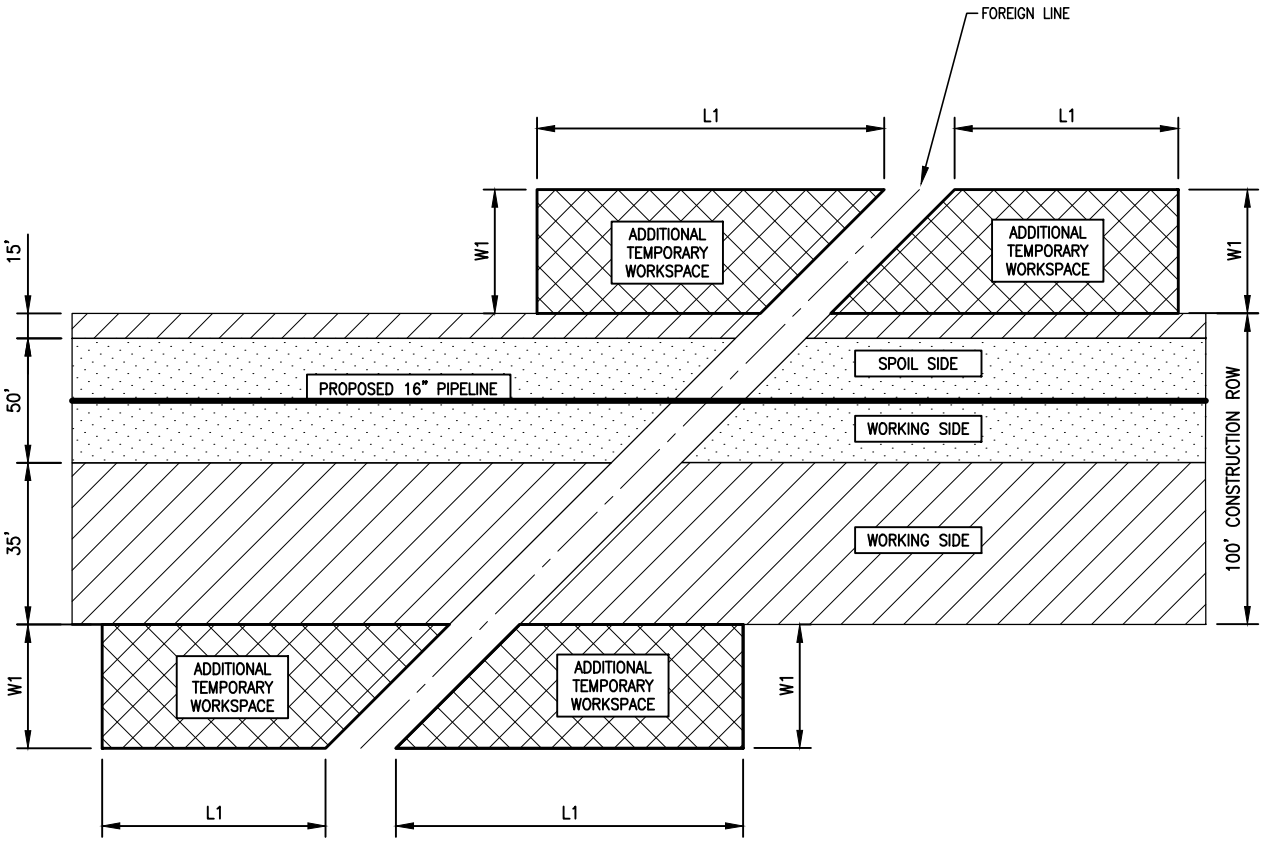
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
24" H-305
PARALLEL CONSTRUCTION
RIGHT-OF-WAY

DRAWING NO.	REV.
METHOD 40	0



NOTE:

1. PROPOSED EQUITRANS 30" CONSTRUCTED AS CLOSE TO 90° TO FOREIGN LINE AS POSSIBLE

DRAWN JJM	DATE 9/30/2015
CHECKED KMS	DATE 9/30/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: P_____	

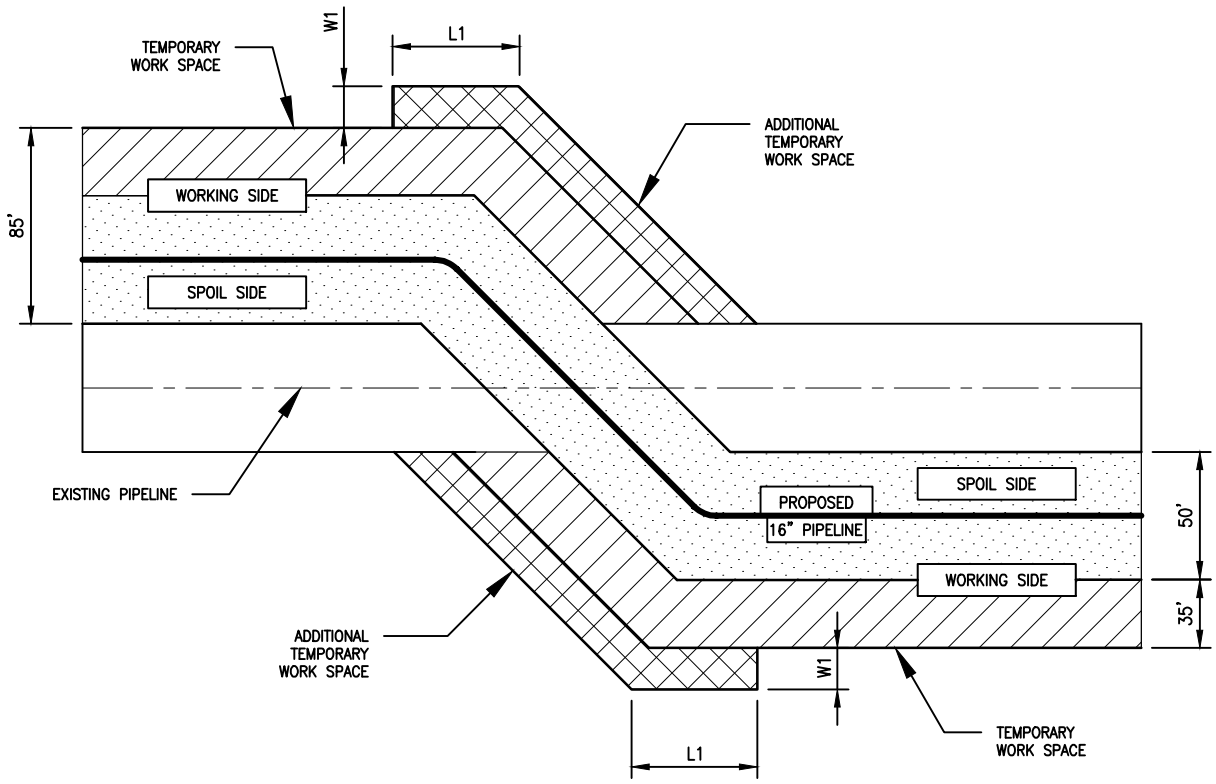
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
16" H-319
FOREIGN LINE CROSSING

DRAWING NO.	REV.
METHOD 41A	0



DRAWN JJM	DATE 9/30/2015
CHECKED KMS	DATE 9/30/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: P_____	

EQT SM

DESIGN ENGINEERING

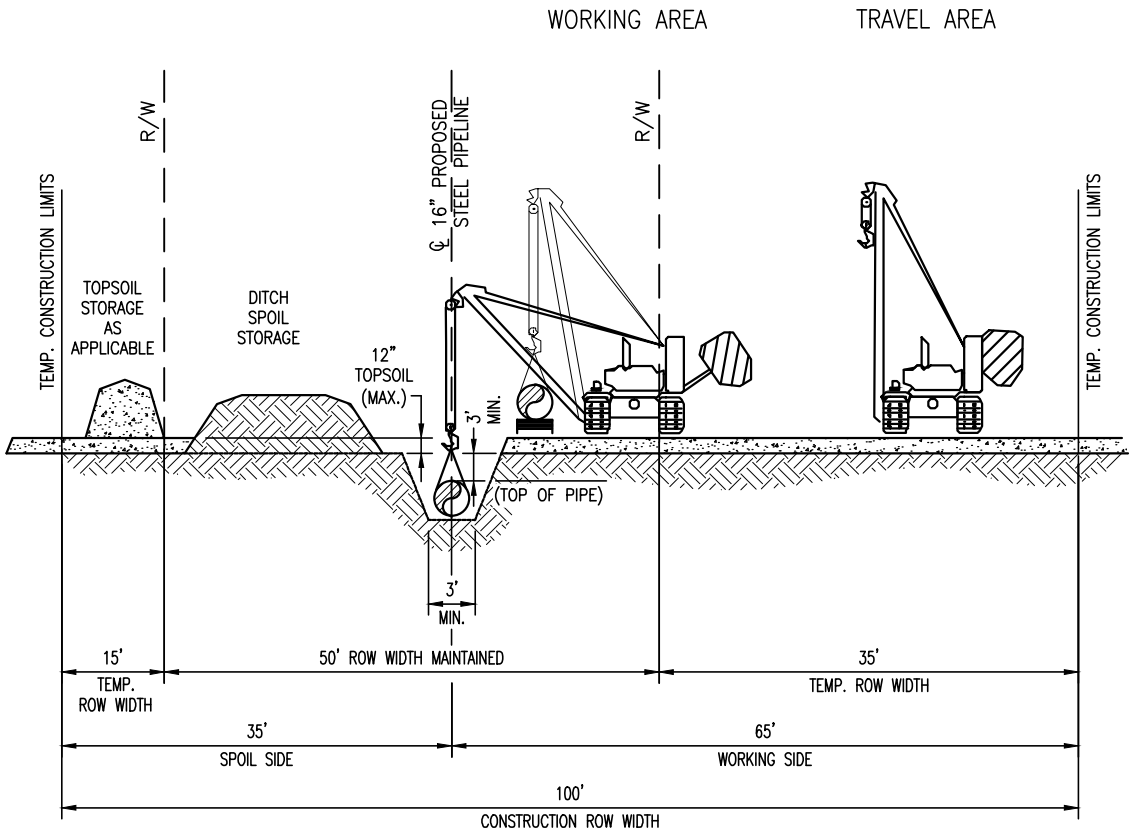
ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT

16" H-319

FOREIGN LINE CROSSING

DRAWING NO.	REV.
METHOD 41B	0



DRAWN	JJM	DATE	9/30/2015
CHECKED	KMS	DATE	9/30/2015
APP'D		DATE	
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID: P_____			

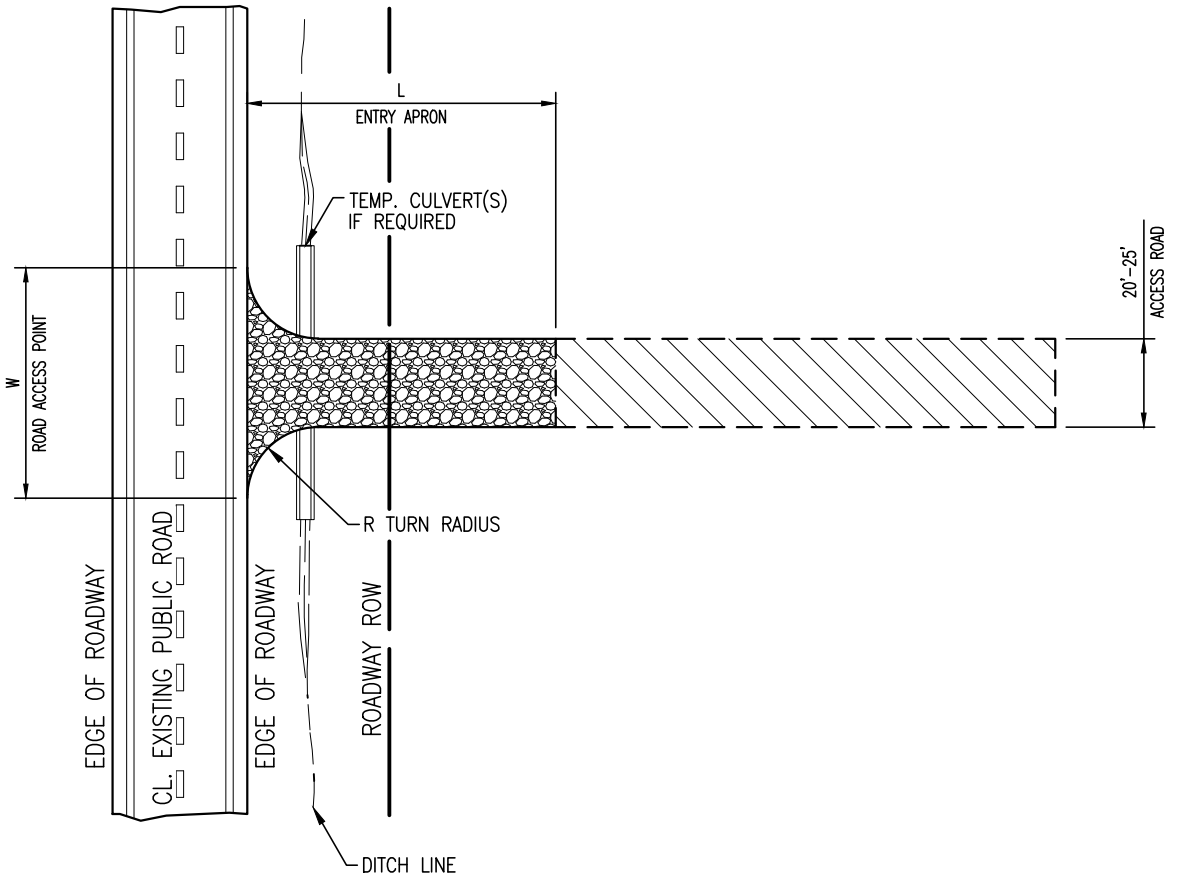
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
16" H-319
50 FOOT R/W LIMITS
TYPICAL 100' CONST. R/W

DRAWING NO.	REV.
METHOD 42	0



GENERAL NOTES:

1. DIMENSIONS FOR L, R AND W ARE AS REQUIRED BY LOCAL PERMITS.

DRAWN JJM	DATE 9/30/2015
CHECKED KMS	DATE 9/30/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: P_____	

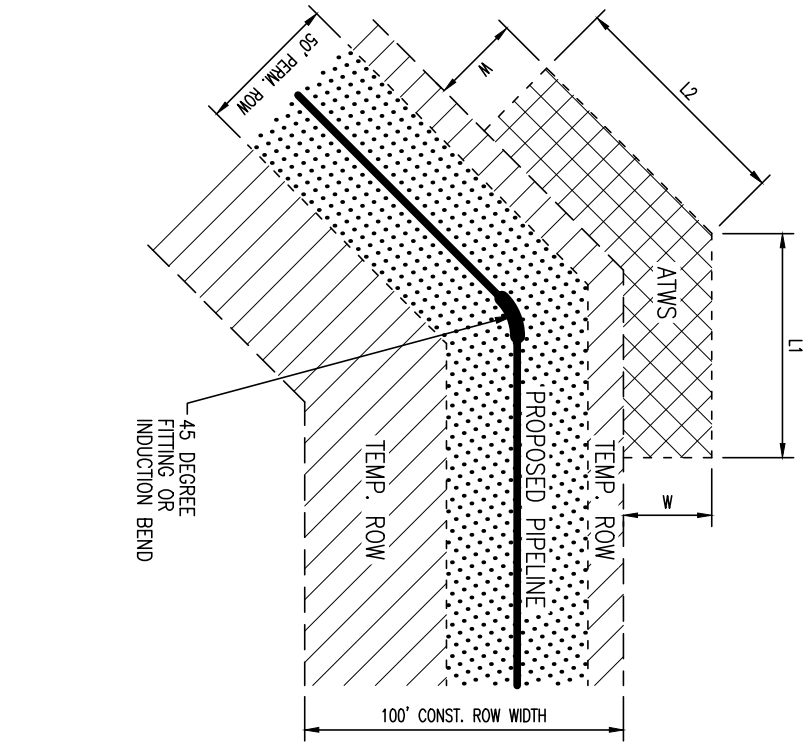
EQT SM

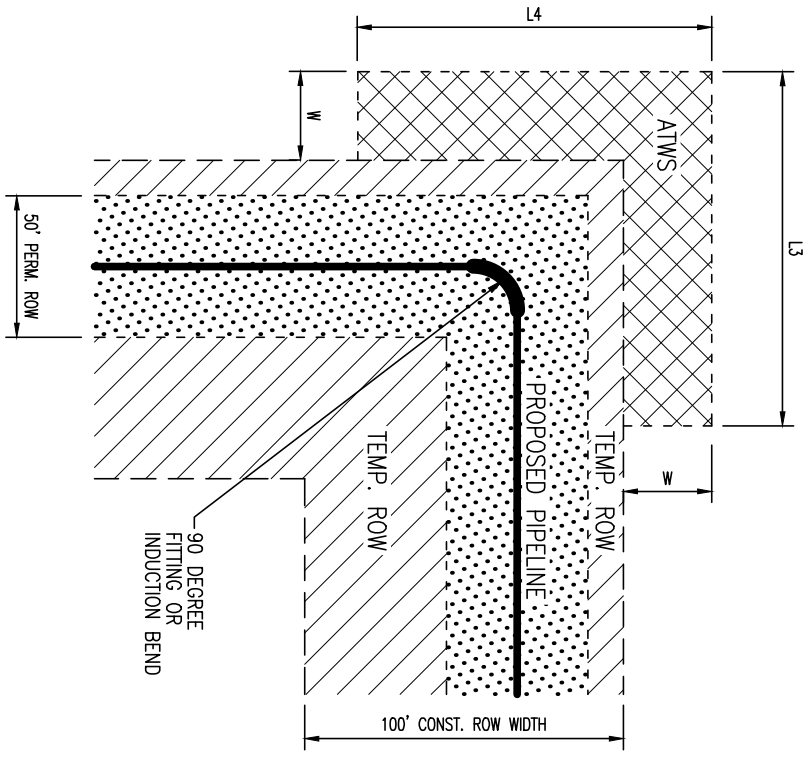
DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
16" H-319
16" TYPICAL ACCESS ROAD
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 43	0





DRAWN JJM	DATE 9/30/2015
CHECKED KMS	DATE 9/30/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: P_____	

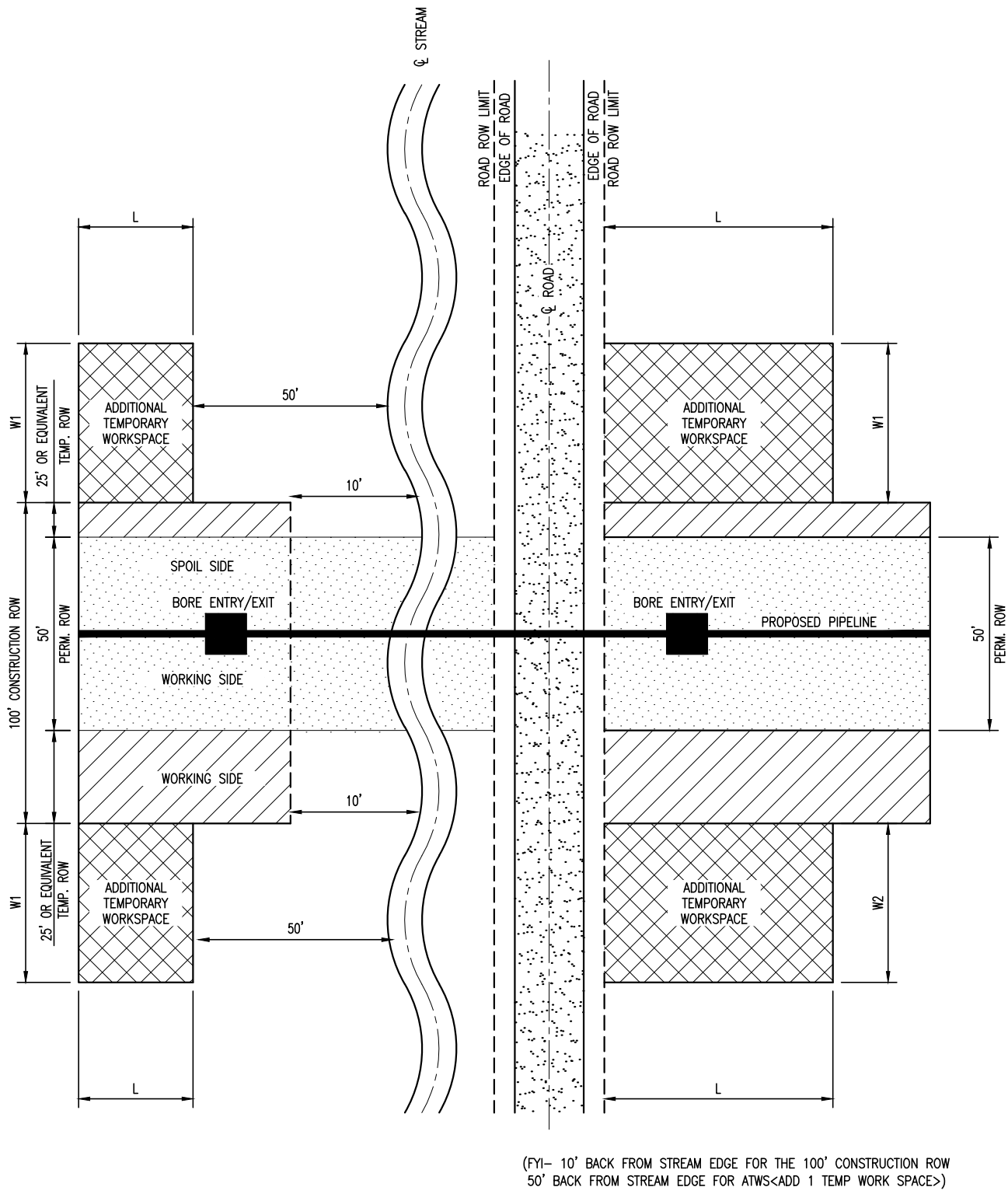
EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
16" H-319
16" FITTING OR INDUCTION BENDS
RIGHT OF WAY

DRAWING NO.	REV.
METHOD 44	0



(FYI– 10' BACK FROM STREAM EDGE FOR THE 100' CONSTRUCTION ROW
50' BACK FROM STREAM EDGE FOR ATWS<ADD 1 TEMP WORK SPACE>)

DRAWN JJM	DATE 9/30/2015
CHECKED KMS	DATE 9/30/2015
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID: P_____	

EQT SM

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

EQUITRANS EXPANSION PROJECT
16" H–319
16" ROAD CROSSING & STREAM CROSSING – BORED, RIGHT OF WAY

DRAWING NO.	REV.
METHOD 45	0

Equitrans Expansion Project

Docket No. CP16-__-000

Resource Report 1

Appendix 1-F
Geotechnical Investigations

REPORT OF GEOTECHNICAL EXPLORATION

EQT H-316 HDD LINE
WAYNESBURG, PENNSYLVANIA

TRIAD PROJECT NO. 02-15-0085

PREPARED FOR:

EQT MIDSTREAM
625 LIBERTY AVENUE, SUITE 1700
PITTSBURGH, PA 15222

PREPARED BY:

TRIAD ENGINEERING, INC.

500 BURSCA DRIVE
SUITE 504
BRIDGEVILLE, PA 15017
WWW.TRIADENG.COM

SEPTEMBER 18, 2015

September 18, 2015

Mr. Jeremy Watts, P.E., PMP
EQT Midstream
625 Liberty Avenue, Suite 1700
Pittsburgh, PA 15222

RE: Report of Geotechnical Exploration
EQT H-316 HDD Line
Waynesburg, Pennsylvania
Triad Project No. 02-15-0085

Dear Mr. Watts:

In accordance with your request, we have completed a geotechnical exploration for the proposed EQT H-316 HDD Line in Waynesburg, Pennsylvania. Authorization to proceed with this project was provided by receipt of Purchase Order No. 132049 OC dated July 16, 2015. The subsurface exploration was performed to evaluate the subsurface conditions encountered at the proposed EQT H-316 HDD Line for the limited purposes of preparing design and construction recommendations for geotechnical aspects of the project. It is emphasized that subsurface conditions may vary dramatically between borings, and Triad makes no representations as to subsurface conditions other than those encountered at the specific boring locations.

This report has been prepared for the exclusive use of EQT Midstream for specific application to the design of the proposed EQT H-316 HDD Line in Waynesburg, Pennsylvania. Triad's responsibilities and liabilities are limited to our Client and apply only to their use of our report for the purposes described above. To observe compliance with design concepts and specifications, and to facilitate design changes in the event that subsurface conditions differ from those anticipated prior to construction, it is recommended that Triad be retained to provide continuous engineering and testing services during the earthwork and foundation construction phases of the work.

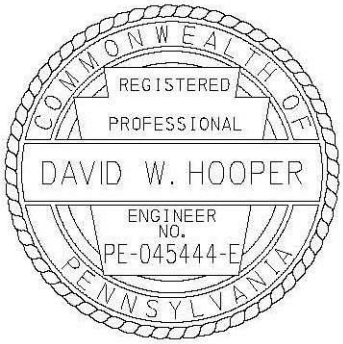
We appreciate the opportunity to assist you on this project and trust this report satisfies your needs at this time. Please feel free to contact us if you have questions concerning this report, or if we can provide further assistance.

Sincerely,

TRIAD ENGINEERING, INC.

Scott A. Hatfield, EIT
Geotechnical/QC Services Manager

David W. Hooper, P.E.
Market Sector Leader, Energy



Report of Geotechnical Exploration
EQT H-316 HDD Line
Waynesburg, Pennsylvania

TABLE OF CONTENTS

APPENDICES

Report of Geotechnical Exploration
EQT H-316 HDD Line
Waynesburg, Pennsylvania

FOREWORD

This report has been prepared for the exclusive use of EQT Midstream for specific application to the design of the proposed EQT H-316 HDD Line in Waynesburg, Pennsylvania. The work has been performed in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

This report should not be used for estimation of construction quantities and/or costs, and contractors should conduct their own investigation of site conditions for these purposes. Please note that Triad is not responsible for any claims, damages or liability associated with any other party's interpretation of the data or reuse of these data or engineering analyses without the express written authorization of Triad. Additionally, this report must be read in its entirety. Individual sections of this report may cause the reader to draw incorrect conclusions if considered in isolation from each other.

The conclusions and recommendations contained in this report are based, in part, upon our field observations and data obtained from the borings at the site. The nature and extent of variations may not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations presented herein. Similarly, in the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained herein shall not be considered valid unless the changes are reviewed and the conclusions are modified or verified in writing by Triad.

SITE AND PROJECT DESCRIPTION

The proposed EQT H-316 Horizontal Directional Drill (HDD) Line is to extend a new pipeline beneath utility right-of-ways, Creek Road and Ankrom Road, a creek and a railroad in Greene County, Pennsylvania. The site aerial view is illustrated on Figure A-2 and the approximate site location is illustrated on Figure A-1 in Appendix A. The project area currently consists mostly of wooded areas.

GEOLOGIC SETTING AND MINING

The rock strata beneath the project area are of the Waynesburg Formation of the Permian and Pennsylvanian geologic system. The Waynesburg Formation is divided into upper, middle, and lower members, and its rocks occur in cyclic

sequences. The upper member consists chiefly of gray to black, locally calcareous shale and gray sandstone. The middle member is predominantly gray shale, sandstone, and siltstone. The Waynesburg coal is at its base. The Waynesburg sandstone, which overlies the Waynesburg coal is gray, massive and crossbedded and grades to siltstone and shale. Some limestone as well as plant fossils are found in the formation. According to the mapping provided by the Pennsylvania Department of Environmental Resources, the Pittsburgh coal seam has been deep mined in the project area.

SUBSURFACE EXPLORATION

As requested, three test borings, labelled B-1 through B-3, were drilled at the proposed site from August 3 through August 6, 2015. The boring locations were determined in the field and surface elevations were provided by others. Figure A-2 in Appendix A depicts the approximate locations of the test borings drilled for the project. The results of the field exploration are contained in Appendix B.

SUBSURFACE CONDITIONS

Detailed information and descriptions of the materials, as well as any groundwater levels encountered in the borings, are contained in Appendix B on the boring logs. Boring log keys are provided as Figures B-1 and B-2. A profile of the borings is provided as Figure B-3. The test boring logs were developed by visually classifying the samples obtained during the exploration. The various substrata revealed by the borings are briefly described below.

Surface Materials: In boring B-2, asphalt and subbase was encountered at the surface to a depth of approximately 0.7 feet below existing grade. Boring B-3 encountered a discernible layer of topsoil at the surface, with an approximate thickness of 0.2 feet. Boring B-1 encountered natural soils at the ground surface.

Natural Soils: In all three borings, natural soils were encountered beneath the surface materials or at the surface, and extended to depths of approximately 12.5 to 40 feet below existing grades. At these points, sampler refusal was encountered. These natural soils consisted primarily of either silt, clay or sand with varying amounts of rock fragments and organics. Standard Penetration Test (SPT) N-values obtained within the natural soil ranged from 6 to greater than 50 blows per foot, indicating a medium stiff to very stiff consistency or a loose to very dense relative density.

Bedrock: Once sampler refusal was attained, boring B-1 was advanced to a termination depth of 90.5 feet below existing grade, boring B-2 was advanced to a termination depth of 70.2 feet below existing grade and B-3 was advanced to a termination depth of 74.6 feet below existing grade utilizing rock coring techniques. Bedrock cored in boring B-1 consisted of medium hard to hard sandstone with interbedded soft claystone. Rockcore recoveries ranged from 94

to 100 percent and Rock Quality Designation (RQD) values ranged from 32 to 100 percent. Bedrock cored in boring B-2 consisted of medium hard to hard sandstone, soft to hard siltstone and hard to very hard limestone. Rock core recoveries ranged from 82 to 100 percent and Rock Quality Designation (RQD) values ranged from 18 to 98 percent. Bedrock cored in B-3 consisted of medium hard to hard sandstone, medium hard claystone and medium hard siltstone. Rock core recoveries ranged from 90 to 100 percent and Rock Quality Designation (RQD) values ranged from 8 to 86 percent. Additionally, layers of coal with approximately thicknesses of 2.5 and 7 feet were encountered in borings B-2 and B-3. Unconfined compressive strength tests were performed on samples of rock core recovered from the borings.

Groundwater: Groundwater levels were checked both during and after drilling operations. Groundwater levels are indicated on the boring logs in Appendix B. The water levels ranged from approximately 10 to 22 feet below existing grade after coring operations. However, this may have been influenced by the use of water for rock coring. It is emphasized that fluctuations in true groundwater levels can occur due to variations in seasonal and climatic conditions that were not evident at the time measurements were taken and recorded.

LABORATORY TESTING

Laboratory tests were performed on selected soil and rock samples to aid in classification and provide a basis for estimating their engineering properties. The laboratory tests were performed in accordance with ASTM standard test methods. Detailed results are contained in Appendix C, and the results are summarized in the following table:

TEST TYPE	TEST RESULTS
Moisture Content	12.4 to 17.2%
Atterberg Limits	Liquid Limit: 26-34 Plasticity Index: 5-7
Percent Passing No. 200 Sieve	41-59%
Unconfined Compressive Strength of Rock	4587 - 8985 psi

The test results for the Unconfined Compressive Strength ranged from 4587 to 8985 psi in the sandstone. Complete results of the Unconfined Compressive Strength testing are provided in Appendix C.

DISCUSSION

The following sections of this report include recommendations for design and construction of the geotechnical elements of the project. Based on the results of the borings, soil overburden extended to depths of approximately 12.5 to 40 feet below existing grades. Weathered and broken sandstone, siltstone and claystone were encountered immediately beneath the soil. The results of the borings suggest that the HDD alignment will likely need to extend through the overlying soil overburden and weathered bedrock strata to attain a sufficient depth below the stream, road and railroad elevation.

DESIGN RECOMMENDATIONS

Our geotechnical engineering evaluation of the site and subsurface conditions within the subject portion of property, as well as our recommendations for site preparation, are based on our site observations, the drilling data obtained and our understanding of the project information as presented in this report. If our understanding of the project is incorrect, please contact us so that we can review our recommendations. Also, the discovery of any site or subsurface conditions during construction that deviate from the data obtained during the geotechnical exploration should be reported to us for our evaluation.

Horizontal Directional Drill Method: The designer should select a method for advancing the HDD which is appropriate for soft to hard sandstone, siltstone and claystone bedrock. RQD values were above 40% from a depth of 16 feet to termination depths in borings B-1 and B-2. However, this level of rock quality was not encountered in boring B-3 until a depth of 50 feet below existing grade. Thus, if more competent and less fractured bedrock is desired, choosing a profile into rock encountered below depths of 50 feet near the area of boring B-3 is recommended.

Temporary Cut Slope Design: Cut slopes no steeper than 1.5:1 (horizontal:vertical) should be considered for the temporary project excavations. All cut slopes should be designed to comply with all Occupational Safety and Health Administration (OSHA) regulations.

Temporary Foundations: If temporary concrete foundations are required for construction of the HDD, the foundations should be designed considering a maximum allowable bearing pressure of 2,000 psf when bearing in natural soil. If temporary foundations will be extended to bear on weathered bedrock, a maximum allowable bearing pressure of 4,000 psf can be utilized for design. All foundations should be constructed to bear at least 36 inches below grade. Settlement of these foundations under static loading should be negligible.

CONSTRUCTION RECOMMENDATIONS

Site Preparation

Initial preparation of the site for construction should include stripping the bore pits of all trees, brush, root mass and topsoil. Existing utilities that are in conflict with proposed foundations and/or new utility alignments should be relocated as necessary. Any soft areas encountered in the pits should be over-excavated to a firm material and should be backfilled with a well-compacted structural fill. Special attention should be given to surface water management both during and after construction.

Site Excavations

It is anticipated that the majority of the on-site soils and weathered bedrock can be effectively removed with conventional earth-moving equipment such as backhoes and dozers. However, harder bedrock that is encountered may require rock removal techniques such as hoe-ram chipping or hydraulic splitting for effective removal. Excavated materials should not be stockpiled and construction equipment should not be positioned beside open excavations, since the added load may cause a sudden collapse of the excavation side walls.

The means necessary to excavate rock are a function of the consistency/hardness of the material, the type/size of excavation equipment utilized and the effort the contractor is willing to apply. If the plans call for excavation of rock, for bidding purposes, potential contractors should be instructed to perform their own investigations as to measures necessary to excavate bedrock encountered.

The design and construction of all excavations should comply with applicable local, state, and federal safety regulations, including the current requirements of the Occupational Safety and Health Administration (OSHA). In no case should slope height, slope inclination, or excavation depth exceed those specified by OSHA or any other regulatory agencies or local authorities having jurisdiction at the construction site.

Spread Foundations

Foundation excavations should be cleaned of all loose or otherwise disturbed materials present in the base of the excavations. The excavations should be observed by a qualified geotechnical engineer, or his/her representative, prior to concrete placement to verify that materials capable of providing the recommended bearing capacity are present. Unsuitable bearing soils should be removed to the level of sufficiently stable material and replaced with suitable backfill.

Materials exposed in the foundation excavations will be susceptible to softening and/or degradation if exposed to precipitation or surface water runoff. In addition, some foundation excavations could be relatively deep. Consequently, foundation concrete should be placed in the excavations as soon as possible once the excavations have been observed and approved, and only that amount of foundation excavation which can be backfilled with concrete should be opened up on any given day. Depending upon the length of time necessary to prepare foundations, consideration should be given to placement of a "mud mat" consisting of lean mix concrete or flowable fill which will protect the bearing level while reinforcing steel and formwork is being placed.

Groundwater and Surface Runoff Control

The contractor should still be prepared to implement temporary and/or permanent dewatering measures since groundwater conditions can change. Dewatering measures may include strategically-located sump pits and pumps, well points and/or sloping of excavations to low points where water can be removed by pumping. In the event that sump pits and pumps are employed, discharge from the pumps should be monitored to verify that soil is not present in the effluent. If soil is present in the discharged water, it may indicate soil loss from beneath the existing structure, resulting in reduced bearing support. In this event, we recommend that dewatering measures be performed utilizing a well point system.

Surface water runoff should be prevented from flowing through the pit area. If necessary, diversion ditches or berms should be installed upslope of the construction area. Ditches should be protected from excessive erosion through the use of rip-rap, erosion control matting, or vegetation.

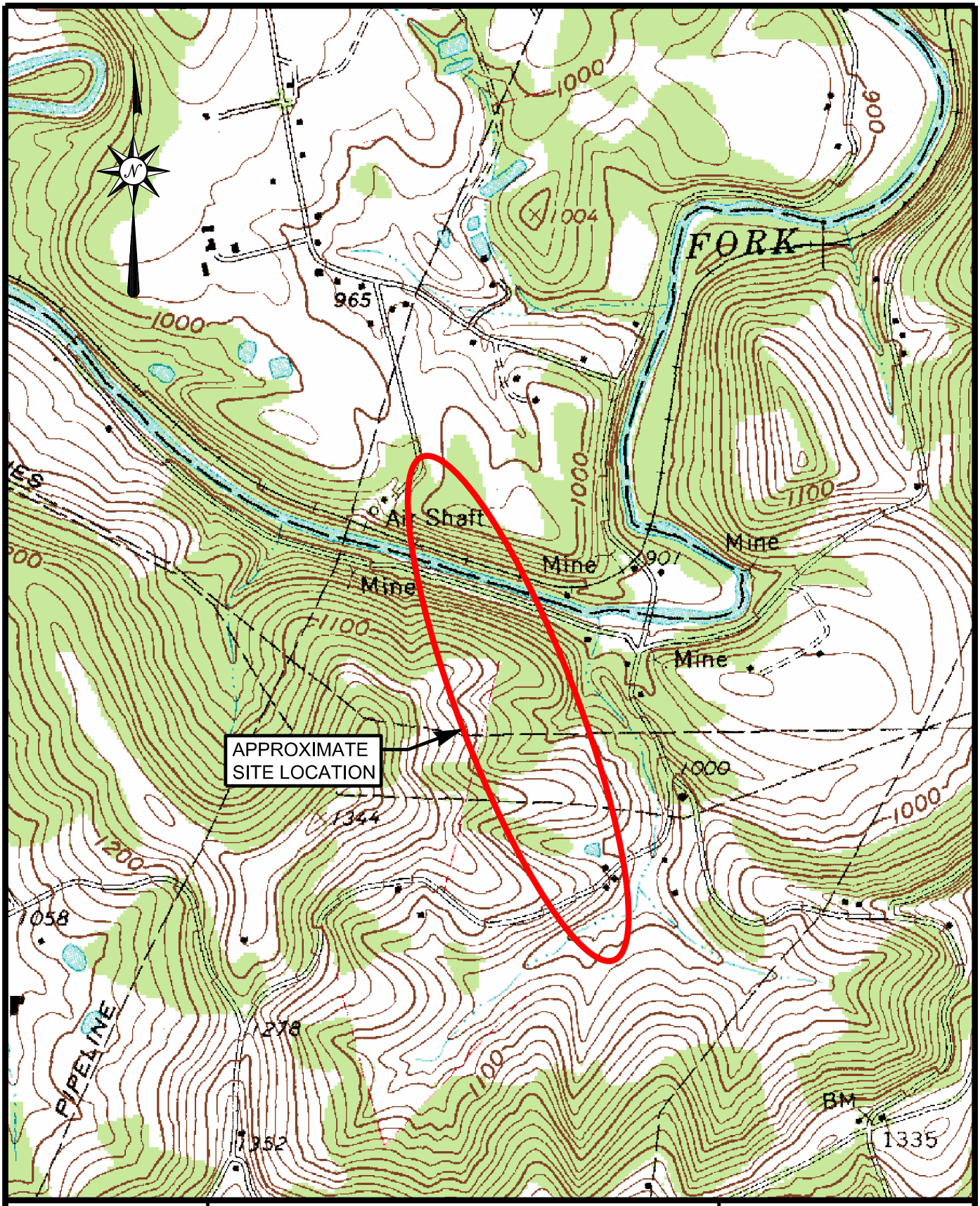
Quality Assurance and Control

We recommend that the licensed geotechnical engineer of record be retained to monitor the construction activities to verify that the field conditions are consistent with the findings of our exploration. If significant variations are encountered, or if the design is altered, we should be notified.

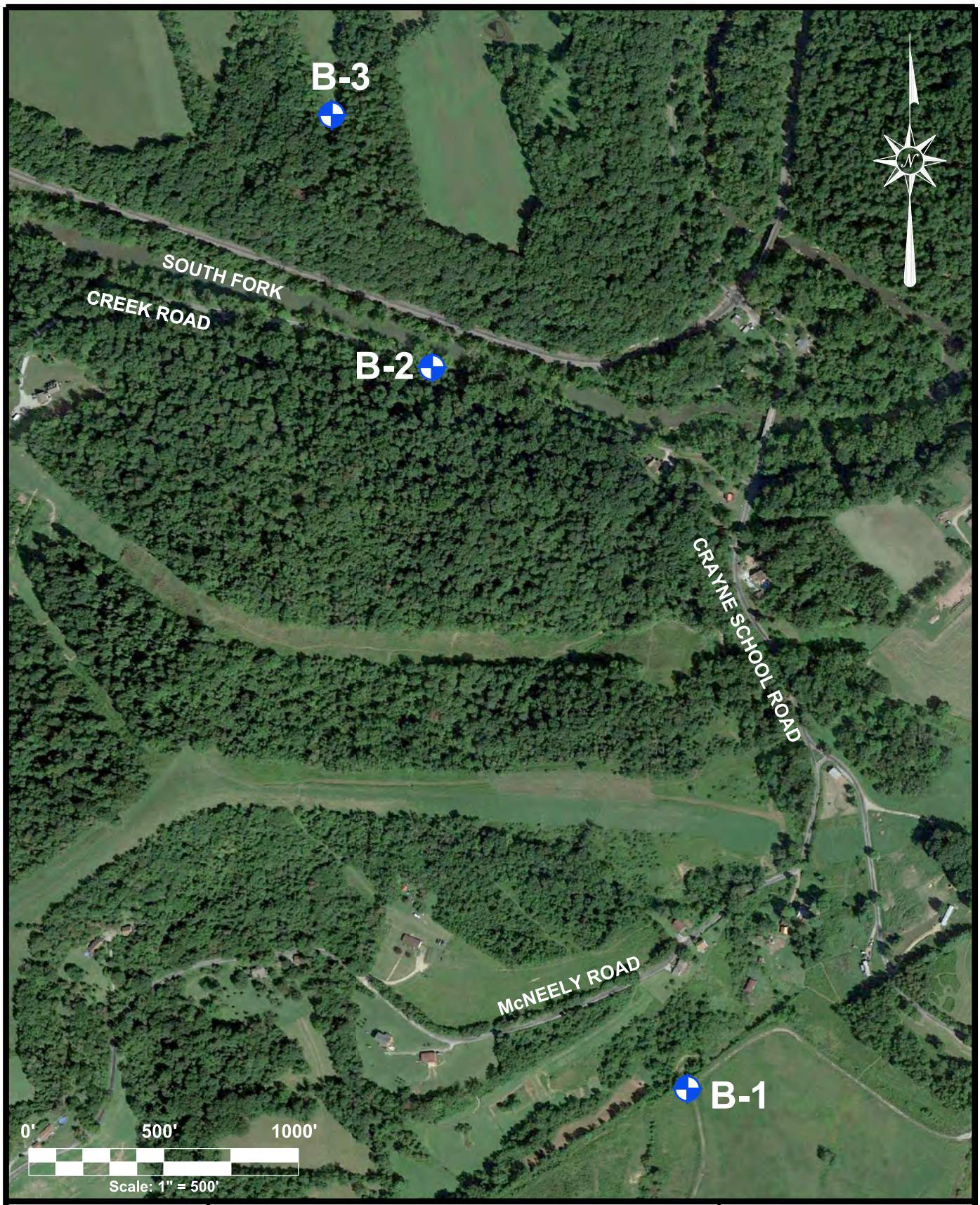
TRIAD ENGINEERING, INC.

APPENDIX A

Figures



CADD FILE: Figure A-1.dgn		EQT EXPANSION H316 HDD LINE MORGAN & JEFFERSON TOWNSHIP GREENE COUNTY, PA Mather, PA USGS Quadrangle (1961 - Photorevised 1994) SITE VICINITY PLAN	TRIAD ENGINEERING, INC. www.triadeng.com 500 BURSCA DRIVE, SUITE 504 BRIDGEVILLE, PA 15017
DRAWN BY: MAD	CHECKED BY: DWH		
DATE: 09-11-2015	SCALE: 1"= 1000'	PROJECT NO. 02-15-0085 FIGURE A-1	



CADD FILE: Figure A-2.dgn		EQT EXPANSION H316 HDD LINE MORGAN & JEFFERSON TOWNSHIP GREENE COUNTY, PA	TRIAD ENGINEERING, INC. www.triadeng.com
DRAWN BY: MAD	CHECKED BY: DWH	BORING LOCATION PLAN	
DATE: 09-11-2015	SCALE: 1"= 500'	PROJECT NO. 02-15-0085 FIGURE A-2	500 BURSCA DRIVE, SUITE 504 BRIDGEVILLE, PA 15017

TRIAD ENGINEERING, INC.

APPENDIX B

Field Exploration

Triad Engineering, Inc.

Field Exploration

A representative of the geotechnical engineer was present to direct the drill crew, log recovered samples and observe groundwater conditions. The borings were drilled utilizing a CME-45C rotary auger drill rig. Samples of in-situ soil and weathered bedrock were obtained using a split-barrel sampler while performing Standard Penetration Tests (ASTM D 1586). The results of these tests (N-values) are commonly interpreted to provide an index to strength, consistency or relative density of the sampled materials and their ability to support foundations.

Once auger or sampler refusal on harder rock was encountered, all borings were further advanced using rock coring techniques. Continuous rock core samples were obtained from auger/sampler refusal depth to the boring termination depth. The harder rock materials were penetrated and sampled using a conventional, double-tubed core barrel and diamond coring bit, producing a rock core sample a nominal two (2) inches in diameter. The rock coring was performed to assess the type, quality and continuity of the bedrock at the drilled locations. The Rock Quality Designation (RQD) noted on the logs provides an indication of the relative quality and soundness of a specific bedrock stratum by measuring the lengths of intact rock core (unbroken core samples) that are larger than twice the core sample diameter for a specific rock stratum and/or core run and dividing the sum of the cumulative lengths by the thickness of the stratum and/or core run.

Groundwater levels were checked both during and after drilling operations. Groundwater levels encountered during the auger drilling operations are recorded on the individual logs. Groundwater levels indicated after rock coring operations are not considered representative of true groundwater levels, due to the introduction of water into the borehole during rock coring. It is emphasized that groundwater levels typically vary and are dependent upon climatic conditions and other environmental factors.

It is also emphasized that the lines shown on the logs are estimates of the changes in material. Actual changes may be gradual and may vary from those indicated on the logs, and the subsurface conditions between the borings may differ from those depicted on the logs. The boreholes were backfilled upon completion of the drilling with auger cuttings. Samples were transported to our office for temporary storage and additional analysis. The samples will be discarded after a period of 60 days unless other arrangements are made.

Triad Engineering, Inc.

KEY TO IDENTIFICATION OF SOIL AND WEATHERED ROCK SAMPLES

The material descriptions on the logs indicate the visual identification of the soil and rock recovered from the exploration and are based on the following criteria. Major soil components are designated by capital letters and minor components are described by terms indicating the percentage by weight of each component. Standard Penetration Testing (SPT) and sampling was conducted in accordance with ASTM D1586. N-values in blows per foot are used to describe the *relative density* of coarse-grained soils or the *consistency* of fine-grained soils.

The MAJOR components constitute more than 50% of the sample and have the following size designation.		The MINOR components have the following percentage designation.	
COMPONENT	**PARTICLE SIZE**	**ADJECTIVE**	**PERCENTAGE**
Boulders	12 inches plus		
Cobbles	3 to 12 inches	and	35 - 50
Gravel -coarse	¾ to 3 inches		
-fine	#4 to ¾ inches	some	20 - 35
Sand -coarse	#10 to #4		
-medium	#40 to #10	little	10 - 20
-fine	#200 to #40		
Silt or Clay	Minus #200 (fine-grained soil)	trace	0 - 10

Relative Density – Coarse-grained Soils		**Consistency – Fine-grained Soils**	
Term	***N-Value***	***Term***	***N-Value***
Very Loose	≤4	Very Soft	≤2
Loose	5 to 10	Soft	3 to 4
Medium Dense	11 to 30	Medium Stiff	5 to 8
Dense	31 to 50	Stiff	9 to 16
Very Dense	>50	Very Stiff	>16

Soil Plasticity	**Plasticity Index (PI)**	**Weathered Rock Description**	
None	Nonplastic	***Term***	***N-Value***
Low	1 to 5	Residual	Original minerals of rock have been entirely decomposed and original rock fabric is not apparent
Medium	5 to 20		
High	20 to 40		
Very High	over 40	Completely Weathered	≤50/.5
		Weathered	50/.4

Moisture Description
Dry - Dusty, dry to touch
Slightly Moist - damp
Moist - no visible free water
Wet - visible free water, saturated

PLATE 1

TRIAD ENGINEERING, INC.

TRIAD ENGINEERING, INC.

KEY TO IDENTIFICATION OF HARD ROCK SAMPLES

The material descriptions on the logs indicate the visual identification of the rock recovered from the NQ/NX coring operations and are based on the following criteria. Core recovery is the ratio of the length of core recovered in each run to the total length of the core run in percent. Rock Quality Designation (RQD) is the ratio of the sum of the lengths of rock core pieces 4 inches or longer divided by the length of the core run or stratum in percent.

Relative Degree of Rock Hardness

Term	***Defining Characteristics***
Very Soft	Can be indented by thumb or crushed under pressure of finger and/or thumb
Soft	Can be scratched by fingernail, peeled by pocket knife or crushed with pressed hammer
Medium Hard	Cannot be scraped or peeled with knife but can be scratched, breaks easily with hammer blow
Hard	Breaks under one or two strong hammer blows or scratched with knife with difficulty
Very Hard	Breaks under several strong hammer blows with very resistant sharp edges

Rock Adjectives

Seam	Thin layer (12 inches or less)
Interbedded	Thin or very thin alternating seams of bedrock occurring in equal amounts
Some	Significant amount of accessory material (15 to 40 percent)
Few	Insignificant amount of accessory material (0 to 15 percent)

Rock Weathering Description

Descriptor and Symbol	***Criteria***
Fresh (F)	**No visible sign of decomposition or discoloration**.
Minor Weathering (M)	**<10% of rock mass has some degree of decomposition**. Slight discoloration inwards towards open fractures.
Weathered (W)	**10%-50% of rock mass has some degree of decomposition**. Significant portions of rock show discoloration. Weaker minerals such as feldspar decomposed. Apparent strength less than fresh parent rock.
Highly Weathered (H)	**>50% of rock mass has some degree of decomposition**. Rock is significantly weakened relative to its unweathered state. Less weathered core stones may be present in rock mass. Most rock types, when highly weathered, can be broken by hand or shaved with knife.

Rock Structure

Degree of Fracturing

Term	***Spacing***
Intensely fractured or very broken	2 in.
Highly fractured or broken	2 in. to 8 in.
Moderately fractured or blocky	8 in. to 2 ft.
Slightly Fractured	2 ft. to 6 ft.

Thickness of Bedding

Term	***Spacing***
Thinly bedded	<4 in.
Medium bedded	4 in. to 1 ft.
Thickly bedded	1 ft. to 3 ft.
Massive	>3 ft.

Dip of Bed or Fracturing

Flat	0º to 20º
Dipping	20º to 45º
Steeply Dipping	45º to 90º

PLATE 2

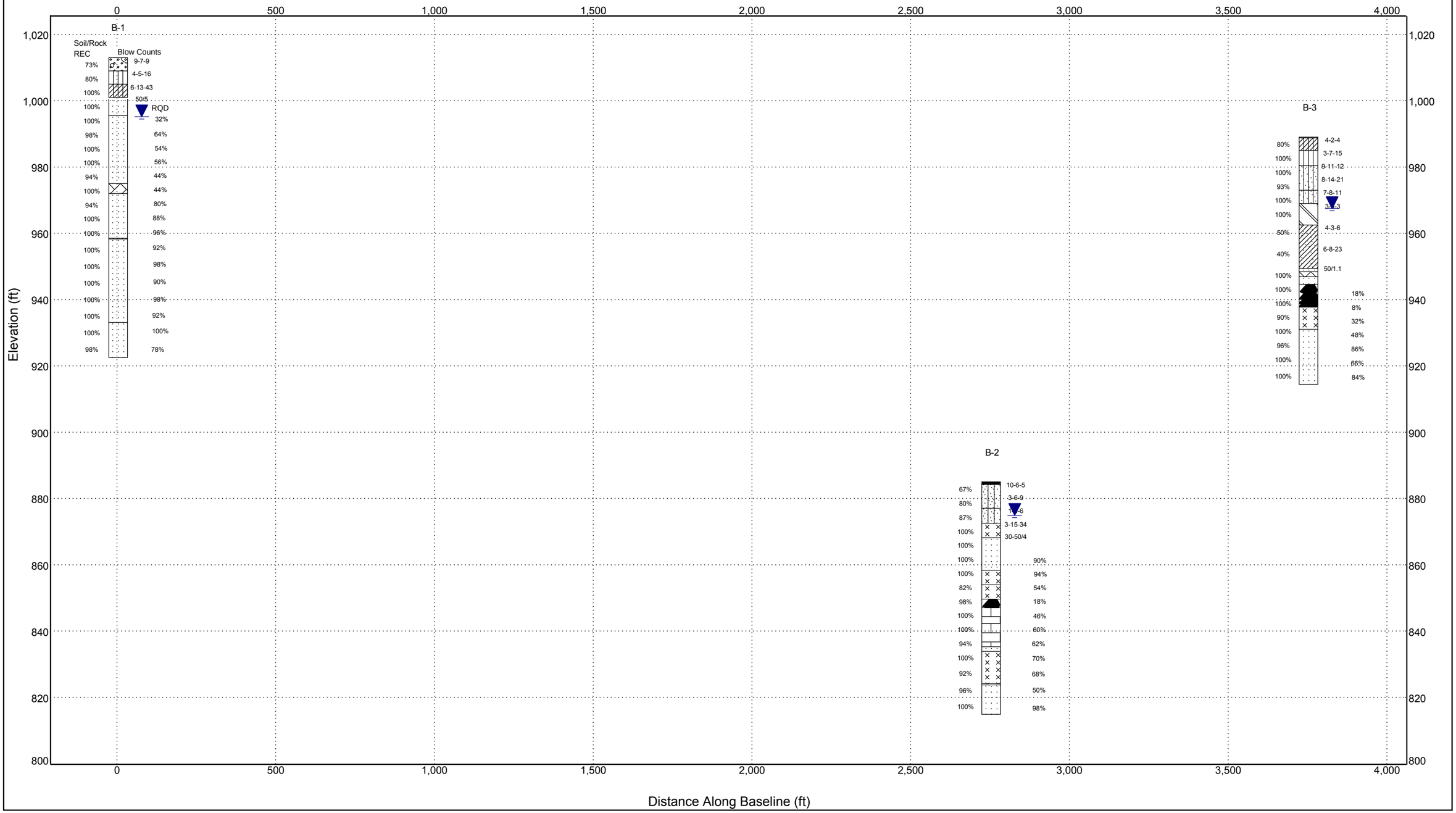
TRIAD ENGINEERING, INC.

USCS Well-graded Gravelly Sand
Sandstone
Asphalt
Coal
USCS Silt
Claystone
USCS Silty Sand
Limestone
USCS Low Plasticity Silty Clay
USCS Low Plasticity Clay
Siltstone
Topsoil
Water Level Upon Completion

CLIENT EQT
PROJECT NUMBER 02-15-0085
PROJECT NAME H318 Mon Crossing
PROJECT LOCATION

TRIAD ENGINEERING, INC.
P.O. Box 889, Morgantown, WV 26507
Telephone: (304) 296-2562
Fax: (304) 296-8739

SUBSURFACE DIAGRAM
B-3



TEST BORING LOG

Project Number: **02-15-0085** Project Name: **H318 Mon Crossing** Boring No.: **B-1**

Logger: L. HANSON Boring Location: See Boring Location Plan

Date Started: 8/3/15 Drill/Method: CME-45C/HSA

Date Completed: 8/4/15 Driller: TRIAD Ground Elev.: 1013

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 17.8 ft.

Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
	S-1		9-7-9	73%		4.0	Tan SAND and GRAVEL, dry, some silty clay, trace organics, medium dense (Residual) PP = >4.5 tsf				1009.0
5.0	S-2		4-5-16	80%		8.0	Tan SILT and CLAY, some sand, trace gravel, slightly moist, very stiff (Residual) PP = >4.5 tsf				1005.0
	S-3		6-13-43	100%		12.0	Tan SILTY CLAY, some brown sand, very stiff, slightly moist to moist (Residual) PP = 3.5-4.5 tsf				1001.0
10.0	S-4		50/5	100%			Highly-weathered gray SANDSTONE fragments				
	R-1			100%	32%		Gray SANDSTONE, some orange oxidization, flat medium-hard, weathered to highly weathered, highly fractured				
15.0						17.5					995.5
	R-2			98%	64%		Gray SANDSTONE, medium hard, weathered, moderately fractured/blocky, flat, thin bedding, some dark gray and black thin fine-grained seams				
20.0	R-3			100%	54%						
25.0	R-4			100%	56%						
30.0	R-5			94%	44%		Seams of soft gray clay and claystone Seams of highly-weathered black carbonaceous shale Flat to dipping bedding, thin bedding seams of soft gray clay and seam of back shale				
35.0											

TRIAD_C BORING LOGS.GPJ TRIAD 3.GDT 9/28/15

TRIAD ENGINEERING, INC.
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412.257.1325
Fax: 412.257.1329

Remarks:

TEST BORING LOG

Project Number: **02-15-0085** Project Name: **H318 Mon Crossing** Boring No.: **B-1**

Logger: L. HANSON Boring Location: See Boring Location Plan

Date Started: 8/3/15 Drill/Method: CME-45C/HSA

Date Completed: 8/4/15 Driller: TRIAD Ground Elev.: 1013

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 17.8 ft.

Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
							Gray SANDSTONE, medium hard, weathered, moderately fractured/blocky, flat, thin bedding, some dark gray and black thin fine-grained seams (continued)				
40.0	R-6			100%	44%	38.0	Gray CLAYSTONE, soft, weathered to highly-weathered, highly to intensely fractured, medium bedding				975.0
	R-7			94%	80%	41.0	Gray SANDSTONE, medium hard to hard, slightly weathered, flat, massive bedding Slightly calcareous				972.0
45.0	R-8			100%	88%		Some vertical fractures				
50.0	R-9			100%	96%						
55.0	R-10			100%	92%	54.5 54.7	Gray soft CLAY seam Gray coarse grained SANDSTONE, hard, weathered, moderately fractured, massive bedding, calcareous				958.5 958.3
60.0	R-11			100%	98%		Flat to dipping bedding				
65.0	R-12			100%	90%						
70.0											

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Remarks:

TEST BORING LOG

Project Number: 02-15-0085 Project Name: H318 Mon Crossing Boring No.: B-1
Logger: L. HANSON Boring Location: See Boring Location Plan
Date Started: 8/3/15 Drill/Method: CME-45C/HSA
Date Completed: 8/4/15 Driller: TRIAD Ground Elev.: 1013

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 17.8 ft.
Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
75.0	R-13			100%	96%		Gray coarse grained SANDSTONE, hard, weathered, moderately fractured, massive bedding, calcareous (continued)				
	R-14			100%	92%		Some fine grained seams				
80.0						79.9					933.1
	R-15			100%	100%		Black and Gray fine SANDSTONE, hard, weathered, moderately fractured, thin bedding, flat bedding Flat and dipping bedding				
85.0											
	R-16			98%	78%		Dipping bedding				
90.0						90.5					922.5
							Boring Terminated at 90.5 feet.				
95.0											
100.0											
105.0											

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Remarks:

TEST BORING LOG

Project Number: **02-15-0085** Project Name: **H318 Mon Crossing** Boring No.: **B-2**

Logger: L. HANSON Boring Location: See Boring Location Plan

Date Started: 8/6/15 Drill/Method: CME-45C/HSA

Date Completed: 8/6/15 Driller: TRIAD Ground Elev.: 885

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 10.1 ft.

Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
	S-1		10-6-5	67%		0.7	ASPHALT and SUBBASE				884.3
							Brown SILT and SAND, trace gravel, stiff, slightly moist (Fill) PP = 4.0 tsf				
5.0	S-2		3-6-9	80%			Trace asphalt PP >4.5 tsf				
						8.0					877.0
	S-3		1-3-6	87%			Gray and orange SILT and SAND, trace gravel, medium stiff, moist (Residual) PP = 0.5-1.0 tsf				
10.0											
	S-4		3-15-34	100%		12.5					872.5
							Light gray SILT and SILTSTONE fragments, very stiff, slightly moist (Residual) PP = 3.5 tsf				
15.0											
	S-5		30-50/4	100%		16.9					868.1
	R-1			100%	90%		Gray fine SANDSTONE, medium hard to hard, very thin silty seams, minor weathering, moderately fractured, thin, flat to dipping bedding				
20.0											
	R-2			100%	94%		Flat, dipping and cross bedding				
25.0											

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Remarks:

TEST BORING LOG

Project Number: 02-15-0085 Project Name: H318 Mon Crossing Boring No.: B-2
Logger: L. HANSON Boring Location: See Boring Location Plan
Date Started: 8/6/15 Drill/Method: CME-45C/HSA
Date Completed: 8/6/15 Driller: TRIAD Ground Elev.: 885

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 10.1 ft.
Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
						26.7	Gray fine SANDSTONE, medium hard to hard, very thin silty seams, minor weathering, moderately fractured, thin, flat to dipping bedding (continued)				858.3
30.0	R-3			82%	54%	31.1	Gray SILTSTONE, medium hard to hard, minor weathering, moderately fractured, thin, flat bedding Water was lost at 27 ft.				853.9
35.0	R-4			98%	18%	35.4	Gray SILTSTONE and silt seams, soft to medium hard, highly weathered, intensely fractured				849.6
	R-5			100%	46%	37.9	Black COAL, soft to medium hard, weathered, highly fractured, thin bedding Wash water returned near 37 ft.				847.1
40.0	R-6			100%	60%	42.8	Gray fine LIMESTONE, hard, slightly weathered, moderately fractured, thin flat bedding, calcareous, thin black seams				842.2
45.0	R-7			94%	62%	49.8	Gray and Tan LIMESTONE, hard to very hard, minor weathering, moderately fractured, thin flat bedding, calcareous, effervescent, with smoke and strong odor				835.2
50.0											

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Remarks:

TEST BORING LOG

Project Number: 02-15-0085 Project Name: H318 Mon Crossing Boring No.: B-2
Logger: L. HANSON Boring Location: See Boring Location Plan
Date Started: 8/6/15 Drill/Method: CME-45C/HSA
Date Completed: 8/6/15 Driller: TRIAD Ground Elev.: 885

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 10.1 ft.
Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
						51.2	Black and gray SANDSTONE with silt seams, soft to medium hard, highly fractured, flat bedding (continued)				833.8
	R-8			100%	70%		Grey SILTSTONE, medium hard, moderately fractured, thin, flat to dipping bedding, slightly calcareous				
55.0											
	R-9			92%	68%		Seams of Silt				
60.0						60.9					824.1
						61.3	Black SILTSTONE, medium hard, highly fractured, thin, flat bedding, calcareous, effervescent, strong reaction, smoke and odor				823.7
	R-10			96%	50%		Gray SANDSTONE, medium hard, moderately fractured, thin, flat bedding, calcareous, effervescent, produces smoke and odor with HCL				
65.0											
	R-11			100%	98%						
70.0						70.2					814.8
							Boring Terminated at 70.2 feet.				
75.0											

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Remarks:

TEST BORING LOG

Project Number: **02-15-0085** Project Name: **H318 Mon Crossing** Boring No.: **B-3**

Logger: L. HANSON Boring Location: See Boring Location Plan

Date Started: 8/4/15 Drill/Method: CME-45C/HSA

Date Completed: 8/4/15 Driller: TRIAD Ground Elev.: 989

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 21.5 ft.

Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
	S-1		4-2-4	80%		0.2	Topsoil				988.8
							Tan SILT and CLAY, some sand, trace gravel, medium stiff, slightly moist (Residual) PP = 2.5 tsf				
						4.0					985.0
5.0	S-2		3-7-15	100%			Tan SILT, trace grey sand, trace organics, very stiff, moist (Residual) PP = 3.0-4.5 tsf				
	S-3		9-11-12	100%		8.6					980.4
10.0							Tan SILT and SAND, slightly moist, very stiff, medium dense PP = 4.0 tsf				
	S-4		8-14-21	93%			Trace highly-weathered sandstone fragments Trace organics PP = 3.5 tsf				
15.0						16.0					973.0
	S-5		7-8-11	100%			Tan SILT and SAND, trace gravel, very stiff, medium dense PP = 4.0-4.5 tsf				
20.0						20.0					969.0
	S-6		3-3-3	100%			Tan CLAY, soft to medium stiff, wet (Residual) PP = < 0.5 tsf				
25.0											

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Remarks:

TEST BORING LOG

Project Number: 02-15-0085 Project Name: H318 Mon Crossing Boring No.: B-3
Logger: L. HANSON Boring Location: See Boring Location Plan
Date Started: 8/4/15 Drill/Method: CME-45C/HSA
Date Completed: 8/4/15 Driller: TRIAD Ground Elev.: 989

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 21.5 ft.
Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
						26.5	Tan CLAY, soft to medium stiff, wet (Residual) PP = < 0.5 tsf (continued)				962.5
	S-7		4-3-6	50%			Gray Clayey, Silty SAND, some gravel, medium dense, wet (Residual)				
30.0											
	S-8		6-8-23	40%							
35.0											
						39.6					949.4
40.0	S-9		50/1.1	100%			Gray SANDSTONE, medium hard, weathered, highly fractured				
						40.6					948.4
	R-1			100%	18%	42.1	Gray CLAYSTONE, medium hard, weathered, highly fractured, trace clay seams				946.9
						44.4	Gray SANDSTONE, thin organic seams, hard to medium hard, weathered, highly fractured				944.6
45.0	R-2			100%	8%		Black COAL, low specific gravity, at least two cleavage planes, flat, thin bedding, weathered to highly weathered with 1 ft. seam of soft gray claystone				
50.0				90%	48%						

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Remarks:

TEST BORING LOG

Project Number: 02-15-0085 Project Name: H318 Mon Crossing Boring No.: B-3
Logger: L. HANSON Boring Location: See Boring Location Plan
Date Started: 8/4/15 Drill/Method: CME-45C/HSA
Date Completed: 8/4/15 Driller: TRIAD Ground Elev.: 989

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 21.5 ft.
Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
						51.2					937.8
	R-3			90%	48%		Gray SILTSTONE, possibly fine-grained SANDSTONE, medium hard, slightly weathered, clayey silty seams				
							Coarsening downward				
55.0											
	R-4			100%	48%	58.0					931.0
							Gray SANDSTONE, medium hard, minor weathering, thin, flat to dipping bedding, some cross bedding				
60.0											
	R-5			96%	86%						
65.0											
	R-6			100%	66%		Cross bedding				
							Very thin black silty seams				
70.0											
	R-7			100%	84%	74.6					914.4
75.0											

Boring Terminated at 74.6 feet.

Remarks:

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APPENDIX C

Laboratory Testing

TRIAD ENGINEERING, INC.

SOIL DATA SUMMARY

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMPLE TYPE	NATURAL MOISTURE (%)	ATTERBERG LIMITS			GRADATION			USCS SOIL CLASS.	PROCTOR		UNCONFINED COMPRESSION TEST (psi)
				LL	PL	PI	% GRAVEL	% SAND	% FINES		MAX. DD (pcf)	OPT. M (%)	
B-1	0.0-5.5	SS	12.4	34	27	7	9	34	57	ML			
B-1	24.0-24.0	RC											4,587
B-1	81.0-90.0	RC											8,985
B-2	45.0-47.0	RC											6,767
B-2	69.0-70.0	RC											6,731
B-3	0.0-5.5	SS	15.4	28	22	6	14	27	59	CL-ML			
B-3	26.5-34.5	SS	17.2	26	21	5	27	32	41	SC-SM			
B-3	64.0-64.5	RC											5,594

TRIAD ENGINEERING, INC.

Notes: 1) Soil tests performed in accordance with recognized ASTM testing standards.

2) SS = Split Spoon; UD = Undisturbed

Project Number: 02-15-0085

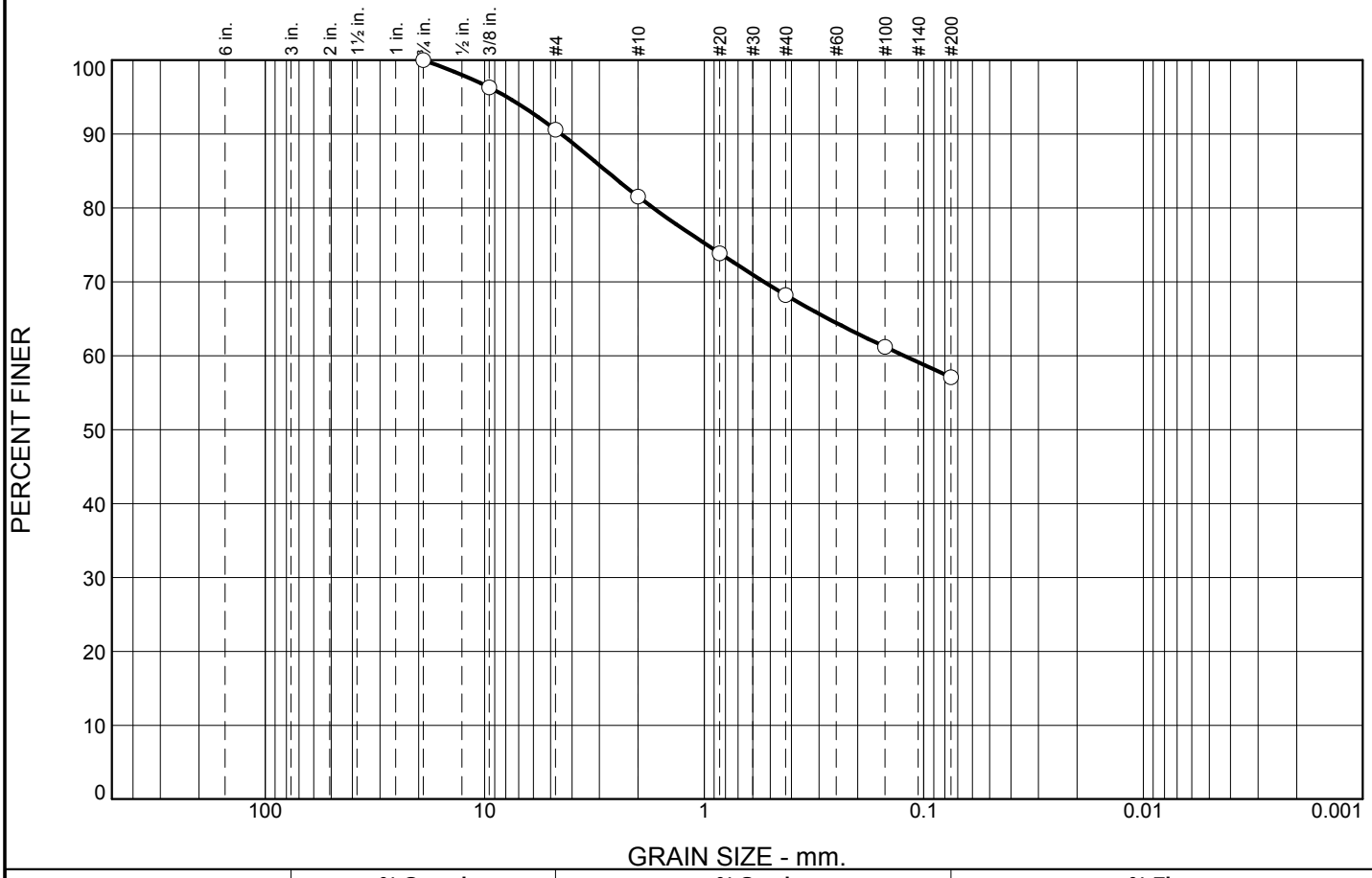
Project Name: EQT H-316 HDD Line

Location: Waynesburg, PA

FIGURE

C-1

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	9.4	9.1	13.3	11.1	57.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
3/8"	96.3		
#4	90.6		
#10	81.5		
#20	73.9		
#40	68.2		
#100	61.2		
#200	57.1		

* (no specification provided)

Soil Description

Tan SILT and CLAY, some sand, trace gravel

Atterberg Limits

PL= 27 LL= 34 PI= 7

Coefficients

D_{90}= 4.4899 D_{85}= 2.7908 D_{60}= 0.1229
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(2)

Remarks

Location: B-1
Sample Number: B-1 S-1/S-2 **Depth:** 0-5.5' **Date:**

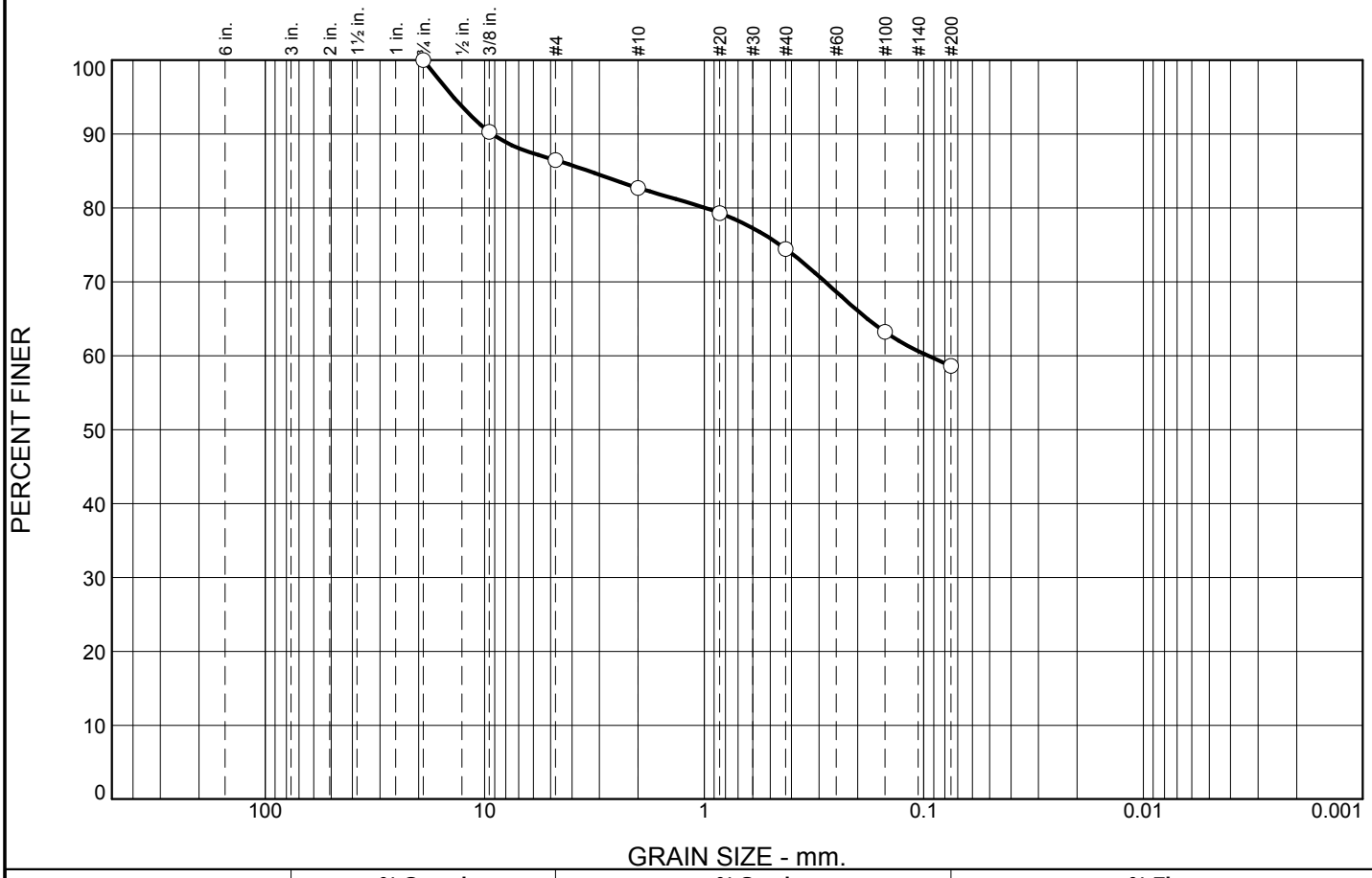
Triad Engineering, Inc.

Bridgeville, Pennsylvania

Client: EQT
Project: Equitrans Expansion Project - Pipeline H-316

Project No: 02-15-0085 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	13.5	3.8	8.3	15.8	58.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
3/8"	90.3		
#4	86.5		
#10	82.7		
#20	79.3		
#40	74.4		
#100	63.2		
#200	58.6		

* (no specification provided)

Soil Description

Tan SILT and CLAY, some sand, little gravel

Atterberg Limits

PL= 22 LL= 28 PI= 6

Coefficients

D_{90}= 9.2359 D_{85}= 3.3715 D_{60}= 0.0958
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL-ML AASHTO= A-4(2)

Remarks

Location: B-3
Sample Number: B-3 S-1/S-2 **Depth:** 0-5.5' **Date:**

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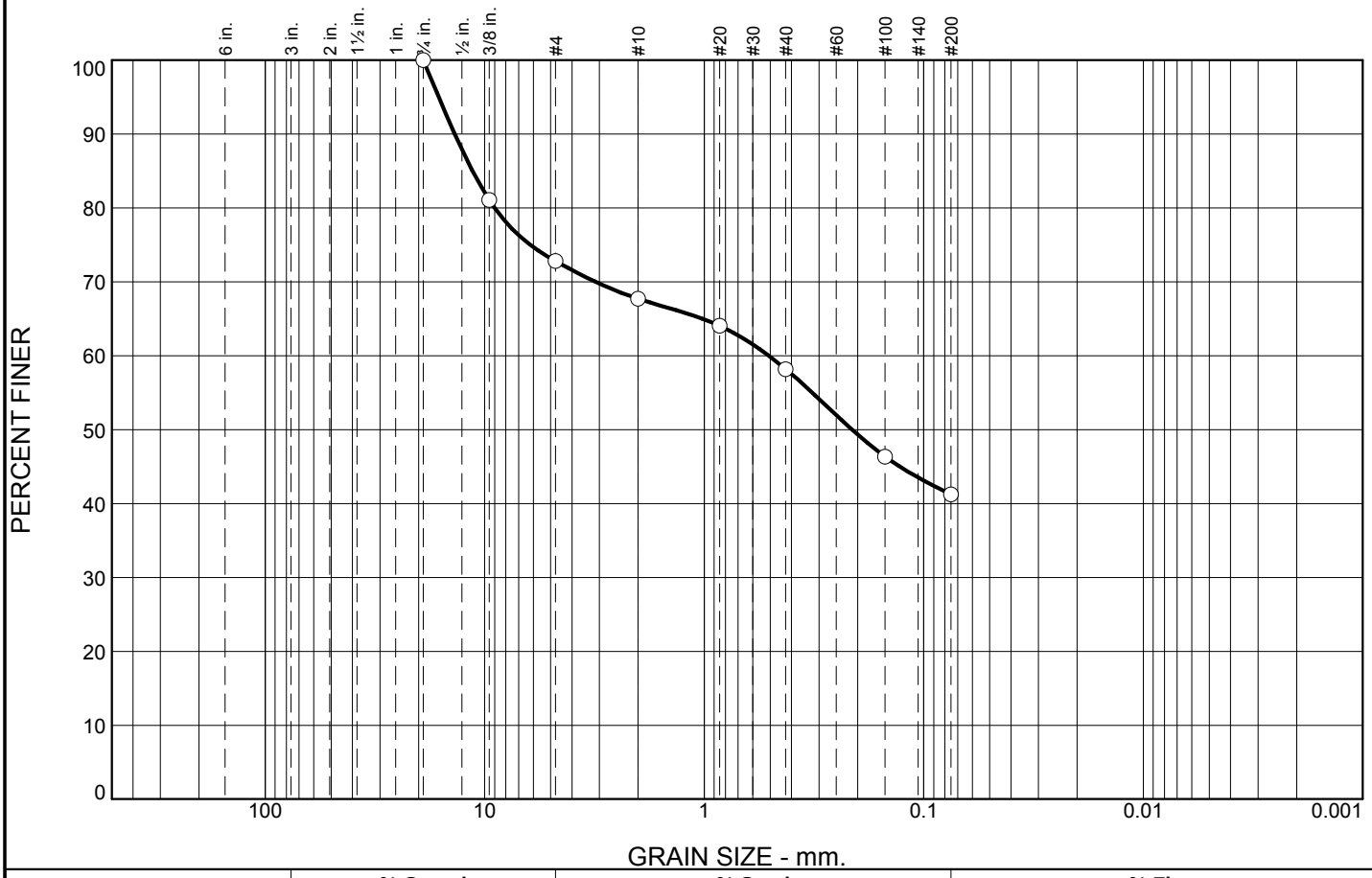
Bridgeville, Pennsylvania

Client: EQT
Project: Equitrans Expansion Project - Pipeline H-316

Project No: 02-15-0085 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	27.2	5.1	9.5	17.0	41.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4"	100.0		
3/8"	81.1		
#4	72.8		
#10	67.7		
#20	64.1		
#40	58.2		
#100	46.3		
#200	41.2		

* (no specification provided)

Soil Description

Clayey, silty SAND, some gravel

Atterberg Limits

PL= 21 LL= 26 PI= 5

Coefficients

D_{90}= 13.6806 D_{85}= 11.3499 D_{60}= 0.5081
D_{50}= 0.2117 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC-SM AASHTO= A-4(0)

Remarks

Location: B-3
Sample Number: B-3 S-7/S-8 **Depth:** 26.5-34.5' **Date:**

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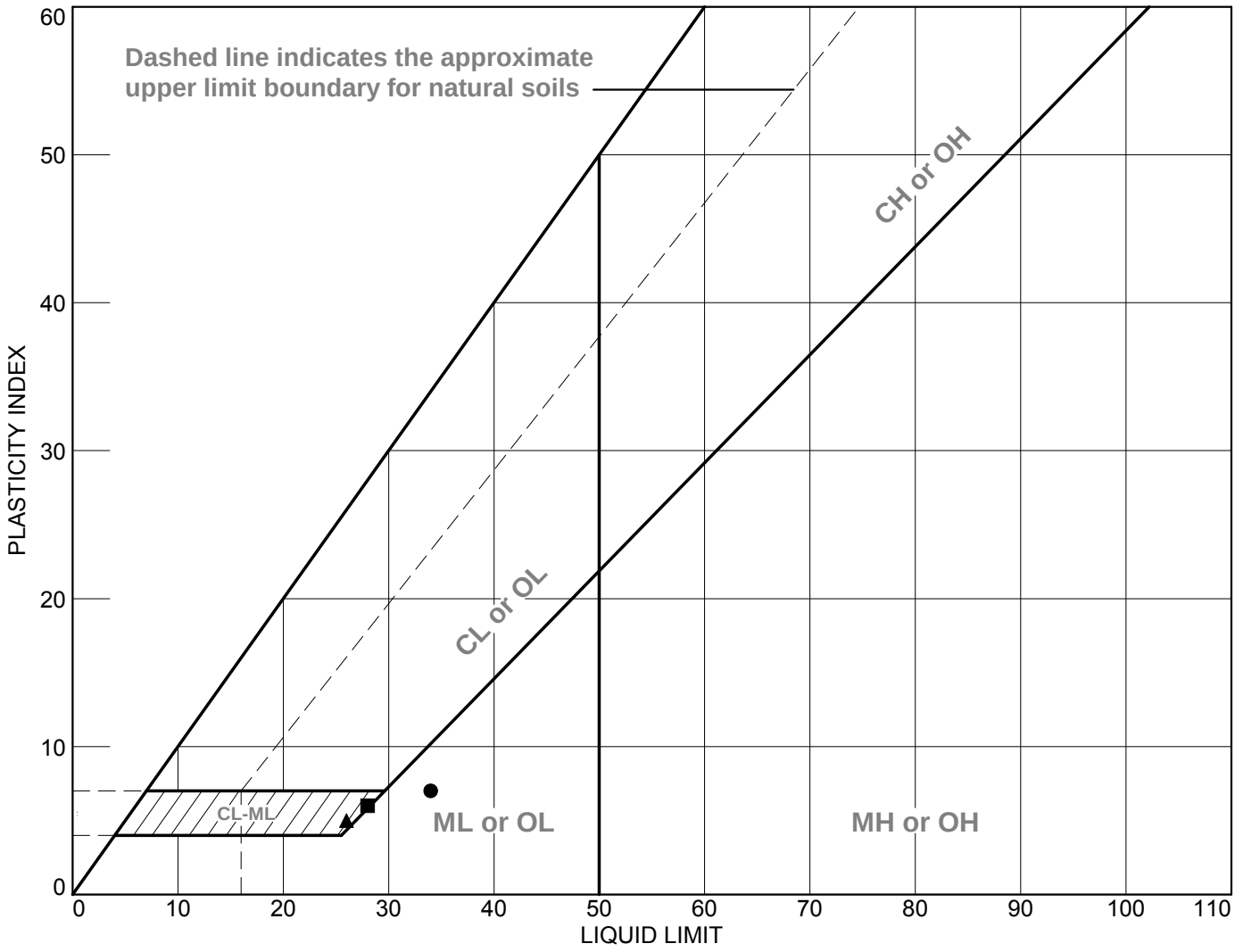
Bridgeville, Pennsylvania

Client: EQT
Project: Equitrans Expansion Project - Pipeline H-316

Project No: 02-15-0085 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●		B-1 S-1/S-2	0-5.5'	12.4	27	34	7	ML
■		B-3 S-1/S-2	0-5.5'	15.4	22	28	6	CL-ML
▲		B-3 S-7/S-8	26.5-34.5'	17.2	21	26	5	SC-SM

Triad Engineering, Inc.

Bridgeville, Pennsylvania

Client: EQT

Project: Equitrans Expansion Project - Pipeline H-316

Project No.: 02-15-0085

Figure

Checked By: LP

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Fax No. (304) 296-8739

Triad Engineering, Inc.

Rock Core Compressive Strength Worksheet
ASTM D7012

Project Name: EQT H-316/Mon Crossing HDD

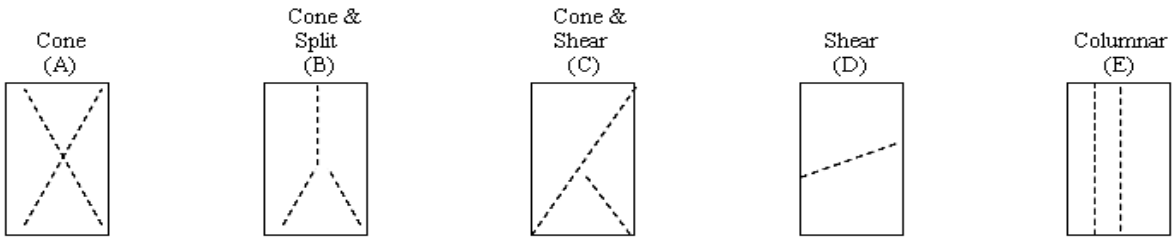
Project # : 02-15-0085 Date : 8/18/2015

Core # : B-1 Depth: 23.0'-24.0'

Sample Description: medium gray sandstone

Measurements (inches)		
	Length	Diameter
#1	3.907	1.979
#2		
#3		
Avg.	3.907	1.979

Length to Diameter Ratio :	**1.97**		Correction Factor:	**1**
Area:	**3.0760**	in^2	Flatness of Sample:	FLAT
Load:	**14110**	lbs	Surface Straightness:	STRAIGHT
Compressive Strength:	**4587**	lbs/in^2	Moisture Condition:	DRY
Compressive Strength:	**330**	$tons/ft^2$	Deformation Rate:	s
Corrected Strength :	**4587**	lbs/in^2	Type of Break:	C
Corrected Strength :	**330**	$tons/ft^2$		



Remarks:

Tested by: Checked by:

Figure #

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Triad Engineering, Inc.

Rock Core Compressive Strength Worksheet
ASTM D7012

Project Name: EQT H-316/Mon Crossing HDD

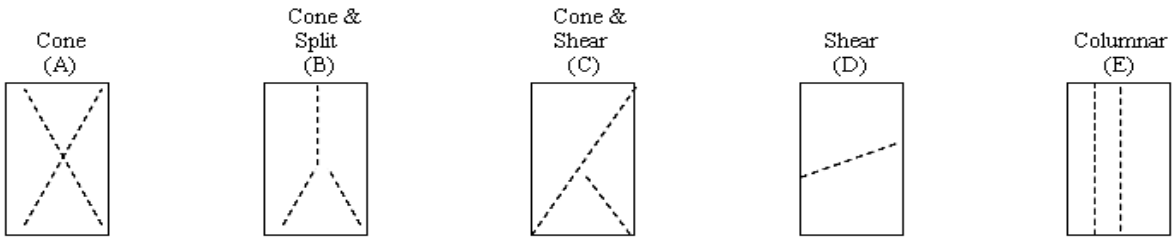
Project # : 02-15-0085 Date : 8/18/2015

Core # : B-1 Depth: 89.0'-90.0'

Sample Description: light gray, white sandstone

Measurements (inches)		
	Length	Diameter
#1	3.987	1.982
#2		
#3		
Avg.	3.987	1.982

Length to Diameter Ratio :	**2.01**		Correction Factor:	**1**
Area:	**3.0853**	in^2	Flatness of Sample:	FLAT
Load:	**27720**	lbs	Surface Straightness:	STRAIGHT
Compressive Strength:	**8985**	lbs/in^2	Moisture Condition:	DRY
Compressive Strength:	**647**	$tons/ft^2$	Deformation Rate:	s
Corrected Strength :	**8985**	lbs/in^2	Type of Break:	E
Corrected Strength :	**647**	$tons/ft^2$		



Remarks:

Tested by: Checked by:

Figure #

TRIAD ENGINEERING, INC.
1097 Chaplin Hill Road
Morgantown, WV 26501
Phone No. (304) 296-2562
Fax No. (304) 296-8739

Triad Engineering, Inc.

Rock Core Compressive Strength Worksheet
ASTM D7012

Project Name: EQT H-316/Mon Crossing HDD

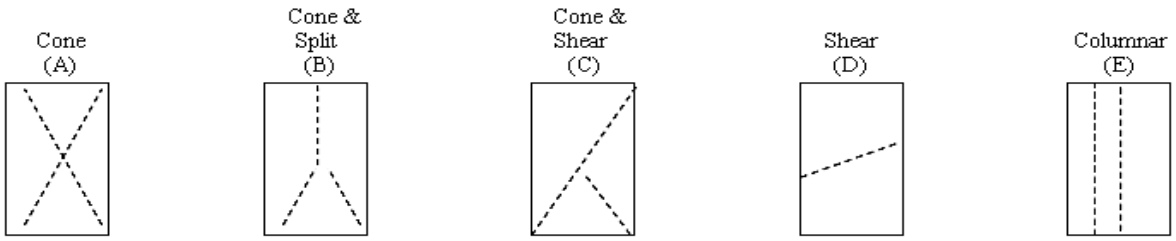
Project # : 02-15-0085 Date : 8/18/2015

Core # : B-2 Depth: 45.0'-47.0'

Sample Description: light gray limey sandstone

Measurements (inches)		
	Length	Diameter
#1	3.961	1.984
#2		
#3		
Avg.	3.961	1.984

Length to Diameter Ratio :	**2.00**		Correction Factor:	**1**
Area:	**3.0915**	in^2	Flatness of Sample:	FLAT
Load:	**20920**	lbs	Surface Straightness:	STRAIGHT
Compressive Strength:	**6767**	lbs/in^2	Moisture Condition:	DRY
Compressive Strength:	**487**	$tons/ft^2$	Deformation Rate:	s
Corrected Strength :	**6767**	lbs/in^2	Type of Break:	B
Corrected Strength :	**487**	$tons/ft^2$		



Remarks:

Tested by: Checked by:

Figure #

TRIAD ENGINEERING, INC.
1097 Chaplin Hill Road
Morgantown, WV 26501
Phone No. (304) 296-2562
Fax No. (304) 296-8739

Triad Engineering, Inc.

Rock Core Compressive Strength Worksheet
ASTM D7012

Project Name: EQT H-316/Mon Crossing HDD

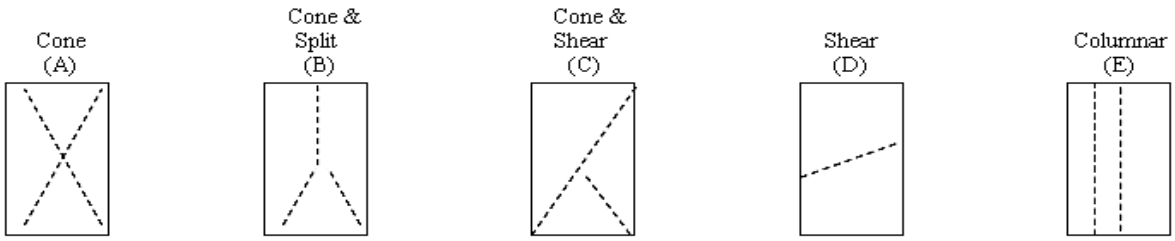
Project # : 02-15-0085 Date : 8/18/2015

Core # : B-2 Depth: 69.0'-70.0'

Sample Description: light gray sandstone

Measurements (inches)		
	Length	Diameter
#1	3.952	1.984
#2		
#3		
Avg.	3.952	1.984

Length to Diameter Ratio :	**1.99**		Correction Factor:	**1**
Area:	**3.0915**	in^2	Flatness of Sample:	FLAT
Load:	**20810**	lbs	Surface Straightness:	STRAIGHT
Compressive Strength:	**6731**	lbs/in^2	Moisture Condition:	DRY
Compressive Strength:	**485**	$tons/ft^2$	Deformation Rate:	s
Corrected Strength :	**6731**	lbs/in^2	Type of Break:	C
Corrected Strength :	**485**	$tons/ft^2$		



Remarks:

Tested by: Checked by:

Figure #

TRIAD ENGINEERING, INC.
1097 Chaplin Hill Road
Morgantown, WV 26501
Phone No. (304) 296-2562
Fax No. (304) 296-8739

Triad Engineering, Inc.

Rock Core Compressive Strength Worksheet
ASTM D7012

Project Name: EQT H-316/Mon Crossing HDD

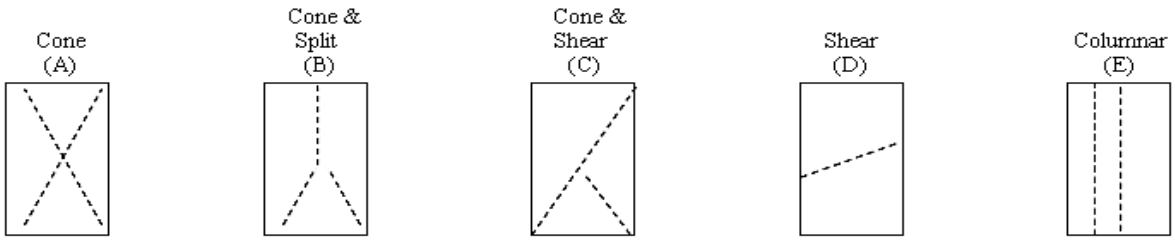
Project # : 02-15-0085 Date : 8/18/2015

Core # : B-3 Depth: 64.0'-64.5'

Sample Description: light gray, white layered sandstone

Measurements (inches)		
	Length	Diameter
#1	3.963	1.985
#2		
#3		
Avg.	3.963	1.985

Length to Diameter Ratio :	**2.00**		Correction Factor:	**1**
Area:	**3.0946**	in^2	Flatness of Sample:	FLAT
Load:	**17310**	lbs	Surface Straightness:	STRAIGHT
Compressive Strength:	**5594**	lbs/in^2	Moisture Condition:	DRY
Compressive Strength:	**403**	$tons/ft^2$	Deformation Rate:	s
Corrected Strength :	**5594**	lbs/in^2	Type of Break:	C
Corrected Strength :	**403**	$tons/ft^2$		



Remarks:

Tested by: Checked by:

Figure #

TRIAD ENGINEERING, INC.

APPENDIX D

Core Box Photos

Photo 1: Boring B-1, Box 1 of 6

Photo 2: Boring B-1, Box 2 of 6

Photo 3: Boring B-1, Box 3 of 6

Photo 4: Boring B-1, Box 4 of 6

Photo 5: Boring B-1, Box 5 of 6

Photo 6: Boring B-1, Box 6 of 6

Photo 7: Boring B-2, Box 1 of 4

Photo 8: Boring B-2, Box 2 of 4

Photo 9: Boring B-2, Box 3 of 4

Photo 10: Boring B-2, Box 4 of 4

Photo 11: Boring B-3, Box 1 of 3

Photo 12: Boring B-3, Box 2 of 3

Photo 13: Boring B-3, Box 3 of 3

REPORT OF GEOTECHNICAL EXPLORATION

EQT
MONONGAHELA RIVER CROSSING
H-318 LINE - REVISED
ALLEGHENY AND WASHINGTON COUNTY, PENNSYLVANIA

TRIAD PROJECT NO. 02-15-0085

PREPARED FOR:

EQT MIDSTREAM
625 LIBERTY AVENUE, SUITE 1700
PITTSBURGH, PA 15222

PREPARED BY:

TRIAD ENGINEERING, INC.

500 BURSCA DRIVE
SUITE 504
BRIDGEVILLE, PA 15017
WWW.TRIADENG.COM

OCTOBER 7, 2015

October 7, 2015

Mr. Jeremy Watts, P.E., PMP
EQT Midstream
625 Liberty Avenue, Suite 1700
Pittsburgh, PA 15222

RE: Report of Geotechnical Exploration
EQT H-318 HDD Line (Mon River Crossing) - Revised
Bunola, Pennsylvania
Triad Project No. 02-15-0085

Dear Mr. Watts:

In accordance with your request, we have completed a geotechnical exploration for the proposed EQT H-318 HDD Line (Mon River Crossing) in Bunola, Allegheny County and Elrama, Washington, Pennsylvania. Authorization to proceed with this project was provided by receipt of Purchase Order No. 132049 OC dated July 16, 2015. The subsurface exploration was performed to evaluate the subsurface conditions encountered at the proposed EQT H-318 HDD Line (Mon River Crossing) for the limited purposes of preparing design and construction recommendations for geotechnical aspects of the project. It is emphasized that subsurface conditions may vary dramatically between borings, and Triad makes no representations as to subsurface conditions other than those encountered at the specific boring locations.

This report has been prepared for the exclusive use of EQT Midstream for specific application to the design of the proposed EQT H-318 HDD Line (Mon River Crossing) in Bunola, Allegheny County, Pennsylvania. Triad's responsibilities and liabilities are limited to our Client and apply only to their use of our report for the purposes described above. To observe compliance with design concepts and specifications, and to facilitate design changes in the event that subsurface conditions differ from those anticipated prior to construction, it is recommended that Triad be retained to provide continuous engineering and testing services during the earthwork and foundation construction phases of the work.

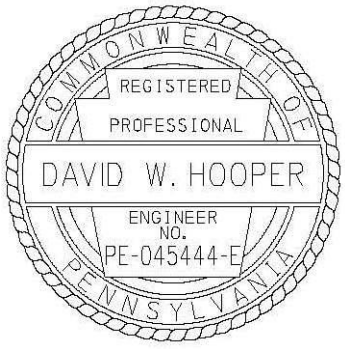
We appreciate the opportunity to assist you on this project and trust this report satisfies your needs at this time. Please feel free to contact us if you have questions concerning this report, or if we can provide further assistance.

Sincerely,

TRIAD ENGINEERING, INC.

Scott A. Hatfield, EIT
Geotechnical/QC Services Manager

David W. Hooper, P.E.
Market Sector Leader, Energy



Report of Geotechnical Exploration
EQT H-318 HDD Line (Mon River Crossing) - Revised
Allegheny County, Pennsylvania

TABLE OF CONTENTS

APPENDICES

Report of Geotechnical Exploration
EQT H-318 HDD Line (Mon River Crossing) - Revised
Allegheny County, Pennsylvania

FOREWORD

This report has been prepared for the exclusive use of EQT Midstream for specific application to the design of the proposed EQT H-318 HDD Line (Mon River Crossing) in Bunola, Allegheny County and Elrama, Washington, Pennsylvania. The work has been performed in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made.

This report should not be used for estimation of construction quantities and/or costs, and contractors should conduct their own investigation of site conditions for these purposes. Please note that Triad is not responsible for any claims, damages or liability associated with any other party's interpretation of the data or reuse of these data or engineering analyses without the express written authorization of Triad. Additionally, this report must be read in its entirety. Individual sections of this report may cause the reader to draw incorrect conclusions if considered in isolation from each other.

The conclusions and recommendations contained in this report are based, in part, upon our field observations and data obtained from the borings at the site. The nature and extent of variations may not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations presented herein. Similarly, in the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained herein shall not be considered valid unless the changes are reviewed and the conclusions are modified or verified in writing by Triad.

It is recommended that we be provided the opportunity to review the final plans and specifications so that earthwork and foundation recommendations may be properly interpreted and implemented. If we are not accorded the privilege of making this review, we will not assume responsibility for misinterpretation of our recommendations, as our recommendations are strictly limited to conditions represented to Triad at the time this report was issued.

SITE AND PROJECT DESCRIPTION

The proposed EQT Mon River Horizontal Directional Drill (HDD) Crossing Project is located in the northern part of the town of Bunola, in Allegheny County, Pennsylvania on the southern side of the river and west of the town of Elrama, Washington County, Pennsylvania on the northern side. The directional boring will cross under the Monongahela River approximately 3 miles south of Lock and Dam No. 3. The site aerial view is illustrated on Figure A-1 and the approximate site location is illustrated on Figure

A-2 in Appendix A. The project area consists of wooded areas along a railyard and farmland.

GEOLOGIC SETTING

The rock strata beneath the project area are of the Casselman Formation of the Conemaugh Group. This formation consists of cyclic sequences of shale, siltstone, sandstone, red beds, thin, impure limestone, and thin, nonpersistent coal. Red beds within this formation are associated with landslides. The base of the Casselman Formation sits at top the Ames limestone formation. According to the mapping provided by the Pennsylvania Department of Environmental Resources, the Pittsburgh coal seam has been deep mined in the project area. South of the Monongahela (B-4), ground surface elevations are below the crop elevation of the coal seam. Near borings B-5 and B-6, north of the Monongahela, the elevation of the Pittsburgh coal seam is near 815 feet, or approximately 285 feet below the existing ground surface elevation.

SUBSURFACE EXPLORATION

As requested, three test borings, labelled B-4 through B-6, were drilled at the proposed site from July 28 through August 26, 2015. Borings B-1 through B-3 were performed for a different crossing of the same project. The boring locations were determined in the field and surface elevations were provided by others. Figure A-2 in Appendix A depicts the approximate locations of the test borings drilled for the project. The results of the field exploration are contained in Appendix B. Figure A-3 in Appendix A provides a general subsurface profile along the alignment.

SUBSURFACE CONDITIONS

Detailed information and descriptions of the materials, as well as any groundwater levels encountered in the borings, are contained in Appendix B on the boring logs. Boring log keys are provided as Figures B-1 and B-2. The test boring logs were developed by visually classifying the samples obtained during the exploration. The various substrata revealed by the borings are briefly described below.

Surface Materials: An approximately 3.5 foot thick layer of asphalt and stone base was encountered at the ground surface at boring B-5. B-6 encountered a discernible layer of topsoil at the surface, with an approximate thickness of 0.3 feet, respectively. Boring B-4 encountered natural soils at the ground surface.

Fill: Fill was encountered in borings B-5 to an approximate depth of 12 feet below the existing ground surface. The fill consisted of a heterogeneous mixture of clay, sand and gravel. Some bituminous asphalt and associated gravel was also encountered within the upper 3 feet. Standard Penetration Test (SPT) N-values obtained within the old fill ranged from 3 to 10 blows per foot (bpf), which indicates a soft to stiff consistency or very loose to loose relative density.

Natural Soils: In all three borings, natural soils were encountered beneath the topsoil or at the surface, and extended to depths of approximately 19.0 to 61.5 feet below existing grades. At these points, sampler refusal was encountered. These natural soils consisted primarily of silt, clay or sand with varying amounts of rock fragments and organics. Beginning at the ground surface in boring B-4, and beneath the fill material in boring B-5, the natural soils are alluvial deposits. In boring B-6, natural soils are residual. Standard Penetration Test (SPT) N-values obtained within the natural soil ranged from weight-of-hammer (WOH) to greater than 50 blows per foot, indicating a very soft to very stiff consistency or a very loose to very dense relative density. Boring B-6 also encountered a layer of weathered sandstone prior to attaining sampler refusal, from a depth of approximately 15 feet to 19 feet.

Bedrock: Once sampler refusal was encountered, borings B-4 and B-5 were advanced to a termination depth of 160 feet below existing grades and boring B-6 was advanced to a termination depth of 100.7 feet below existing grade utilizing rock coring techniques. Bedrock cored in boring B-4 consisted of alternating layers of medium hard to hard shale and limestone, with layers of medium hard sandstone at increasing depths. Rock core recoveries ranged from 62 to 100 percent and Rock Quality Designation (RQD) values ranged from 0 to 100 percent. Bedrock cored in boring B-5 consisted of alternating layers of medium hard to very hard limestone, soft to medium hard shale, very soft to medium hard claystone, and medium hard to hard sandstone at increasing depths . Rock core recoveries ranged from 37 to 100 percent and Rock Quality Designation (RQD) values ranged from 0 to 100 percent. Bedrock cored in B-6 consisted of alternating layers of hard sandstone, very soft to medium hard shale and medium hard to hard siltstone to a depth of 71 feet below existing grade, followed by layers of very hard limestone to termination depth. Rock core recoveries ranged from 65 to 100 percent and Rock Quality Designation (RQD) values ranged from 28 to 100 percent. Unconfined compressive strength tests were performed on samples of rock core recovered from borings B-4 and B-5.

Groundwater: Groundwater levels were checked both during and after drilling operations. Groundwater levels are indicated on the boring logs in Appendix B. Borings B-4 and B-6 had water levels of approximately 8 and 4 feet below grade, respectively, after coring operations. However, this may have been influenced by the use of water for rock coring. It is emphasized that fluctuations in true groundwater levels can occur due to variations in seasonal and climatic conditions that were not evident at the time measurements were taken and recorded.

GEOPHYSICAL SURVEY

On August 19 and 28, 2015, a geophysical exploration was performed using marine geophysics equipment by The Hutchinson Group under subcontract to Triad Engineering. The geophysics method used was Electrical Imaging Investigation. Access to the river was provided by boat. Eight marine arrays and two surface arrays were performed to aid in the evaluation of the depth to bedrock within the limits of the river. The Electrical Imaging testing was used in conjunction with the bathymetric

survey provided for this project. The complete geophysics report is included in Appendix E.

LABORATORY TESTING

Laboratory tests were performed on selected soil and rock samples to aid in classification and provide a basis for estimating their engineering properties. The laboratory tests were performed in accordance with ASTM standard test methods. Detailed results are contained in Appendix C, and the results are summarized in the following table:

TEST TYPE	TEST RESULTS
Moisture Content	12.2 to 28.5%
Atterberg Limits	Liquid Limit: 31-36 Plasticity Index: 6-9
Percent Passing No. 200 Sieve	23-68%
Unconfined Compressive Strength of Rock	540 - 8555 psi

The test results for the Unconfined Compressive Strength ranged from 540 to 8555 psi in the sandstone. Complete results of the Unconfined Compressive Strength testing are provided in Appendix C.

DISCUSSION

The following sections of this report include recommendations for design and construction of the geotechnical elements of the project. Based on the results of the borings, soil overburden extended to depths of approximately 19 to 61.5 feet below existing grades. Weathered and broken sandstone, siltstone and claystone were encountered immediately beneath the soil. The results of the borings suggest that the HDD alignment will likely need to extend through the overlying soil overburden and weathered bedrock strata to attain a sufficient depth below the river, road and railroad elevation.

DESIGN RECOMMENDATIONS

Horizontal Directional Drill Method: The designer should select a method for advancing the HDD which is appropriate for soil, medium hard to hard shale and sandstone bedrock. RQD values obtained from the borings indicate very poor to excellent rock quality.

Temporary Cut Slope Design: Cut slopes no steeper than 1.5:1 (horizontal:vertical) should be considered for the temporary project excavations. All cut slopes should be designed to comply with all Occupational Safety and Health Administration (OSHA) regulations.

Temporary Foundations: If temporary concrete foundations are required for construction of the HDD, the foundations should be designed considering a maximum allowable bearing pressure of 2,000 psf when bearing in natural soil. All foundations should be constructed to bear at least 36 inches below grade. Settlement of these foundations under static loading should be negligible.

CONSTRUCTION RECOMMENDATIONS

Site Preparation

Initial preparation of the site for construction should include stripping the bore pits of all trees, brush, root mass and topsoil. Existing utilities that are in conflict with proposed foundations and/or new utility alignments should be relocated as necessary. Any soft areas encountered in the pits should be over-excavated to a firm material and should be backfilled with well-compacted structural fill. Special attention should be given to surface water management both during and after construction.

Site Excavations

It is anticipated that the majority of the on-site soils can be effectively removed with conventional earth-moving equipment such as backhoes and dozers. However, excavations that extend into the weathered bedrock may require rock removal techniques such as hoe-ram chipping or heavy ripping for effective removal. Excavated materials should not be stockpiled and construction equipment should not be positioned beside open excavations, since the added load may cause a sudden collapse of the excavation side walls. The design and construction of all excavations should comply with applicable local, state, and federal safety regulations, including the current requirements of OSHA. In no case should slope height, slope inclination or excavation depth exceed those specified by OSHA or any other regulatory agencies or local authorities having jurisdiction at the construction site.

Groundwater and Surface Runoff Control

Static groundwater was not encountered in the borings during or upon completion of the auger drilling. Nevertheless, the contractor should be prepared to implement temporary and/or permanent dewatering measures for the bore pits, depending on the depth of the excavations. Dewatering measures may include strategically-located sump pits and pumps, well points and/or sloping of excavations to low points where water can be removed by pumping. In the event that sump pits and pumps are employed, discharge from the pumps should be monitored to verify that soil is not present in the effluent. If soil is present in the discharged water, it may indicate soil loss from adjacent areas,

resulting in reduced bearing support. In this event, we recommend that dewatering measures be performed utilizing a well point system.

Surface water runoff should be prevented from flowing through the construction area. If necessary, diversion ditches or berms should be installed upslope of the construction area. Ditches should be protected from excessive erosion through the use of rip-rap, erosion control matting or vegetation.

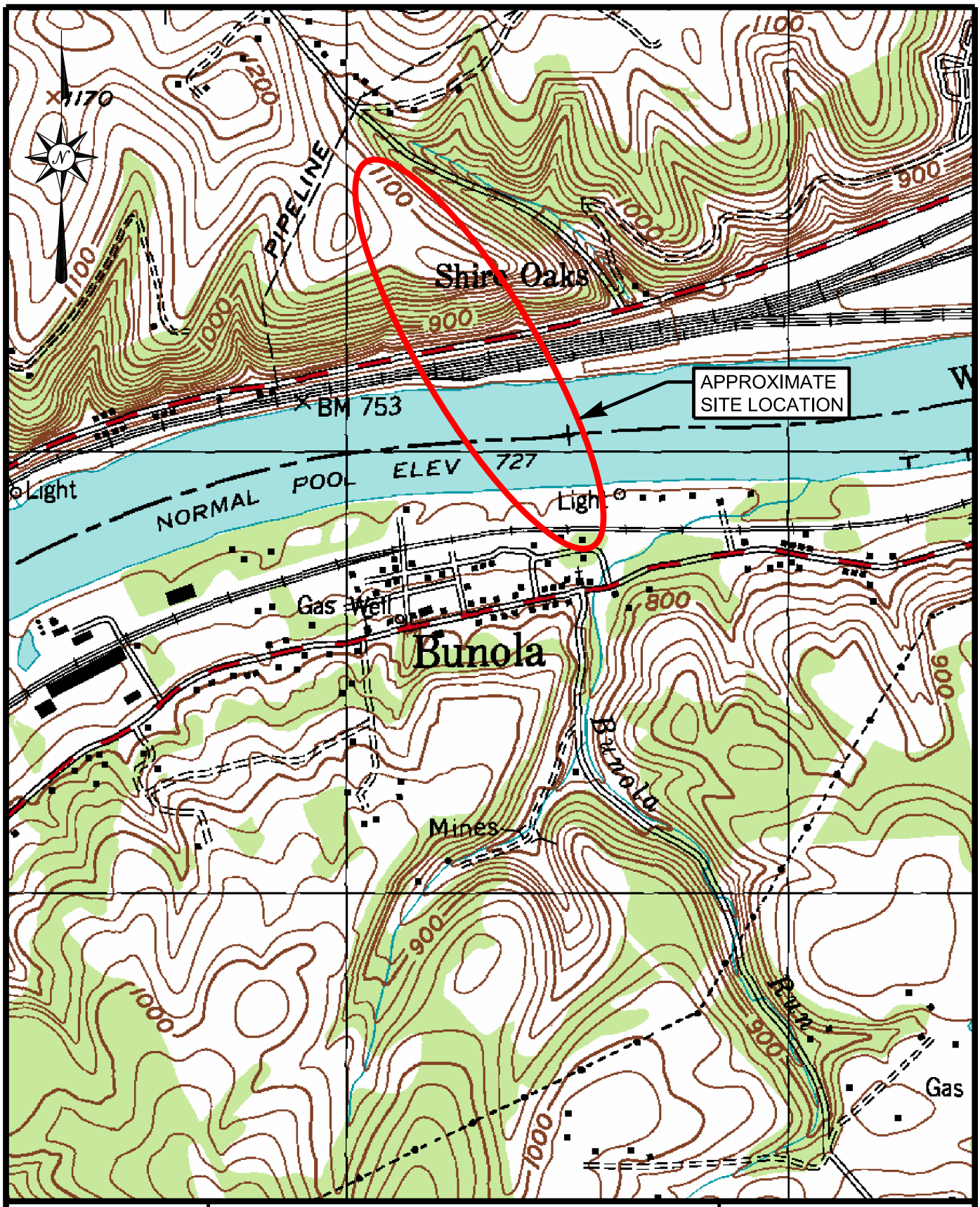
Quality Assurance and Control

We recommend that the licensed geotechnical engineer of record be retained to monitor the construction activities to verify that the field conditions are consistent with the findings of our exploration. If significant variations are encountered, or if the design is altered, we should be notified.

TRIAD ENGINEERING, INC.

APPENDIX A

Illustrations



CADD FILE: Figure A-1.dgn		EQT EXPANSION MONONGAHELA RIVER CROSSING UNION TOWNSHIP, WASHINGTON COUNTY & FORWARD TOWNSHIP, ALLEGHENY COUNTY, PA Monongahela, PA USGS Quadrangle (1993) SITE VICINITY PLAN	TRIAD ENGINEERING, INC. www.triadeng.com 500 BURSCA DRIVE, SUITE 504 BRIDGEVILLE, PA 15017
DRAWN BY: MAD	CHECKED BY: DWH		
DATE: 09-22-2015	SCALE: 1"= 1000'	PROJECT NO. 02-15-0085	FIGURE A-1

CADD FILE: Figure A-2.dgn		EQT EXPANSION MONONGAHELA RIVER CROSSING UNION TOWNSHIP, WASHINGTON COUNTY & FORWARD TOWNSHIP, ALLEGHENY COUNTY, PA
DRAWN BY: MAD	CHECKED BY: DWH	BORING LOCATION PLAN
DATE: 09-22-2015	SCALE: 1"= 400'	PROJECT NO. 02-15-0085 FIGURE A-2

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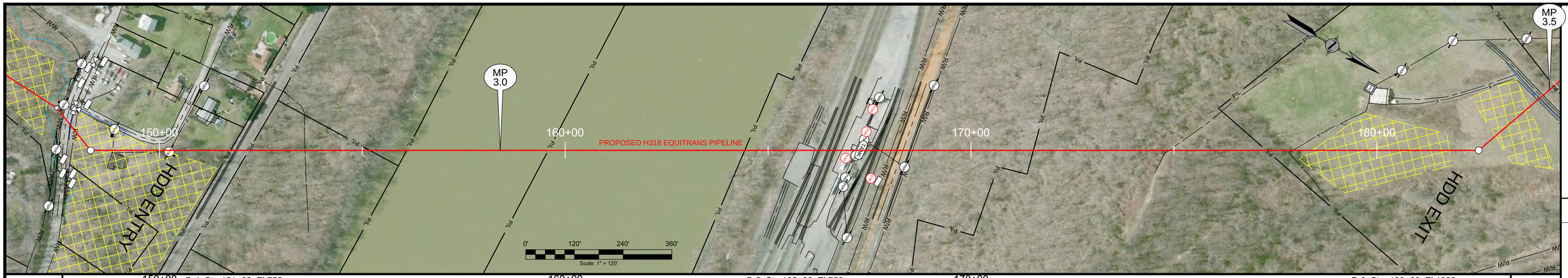
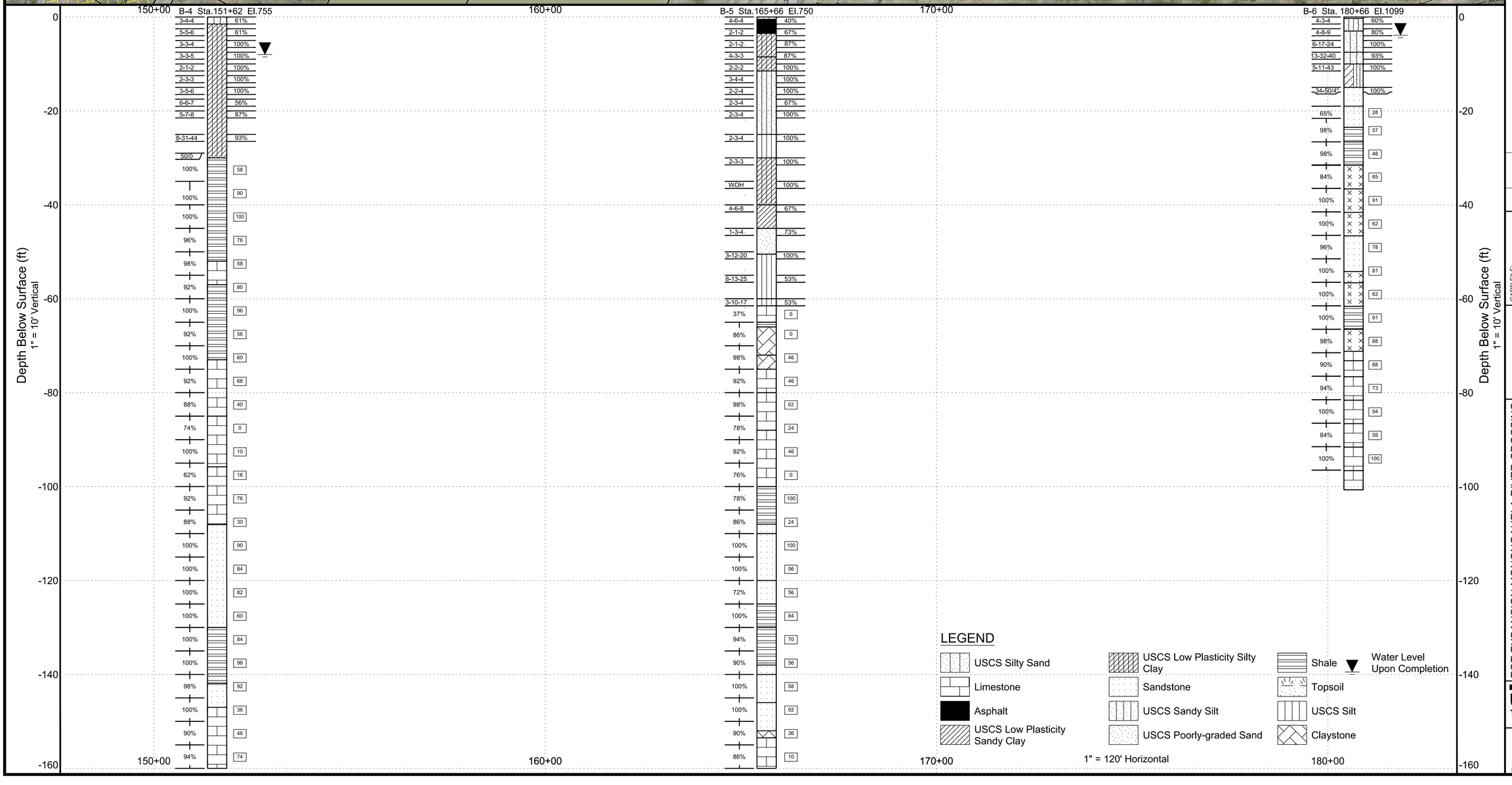
BRIDGEVILLE, PA 15017





TRIAD ENGINEERING, INC.
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BRIDGEVILLE, PA 15017
PH: 412.257.1325 FAX: 412.257.1329
OFFICE LOCATIONS
PENNSYLVANIA - VIRGINIA
MARYLAND - NEW YORK
WEST VIRGINIA - OHIO

BY	DESCRIPTION	DATE	REV. #

CADD FILE: figure A-3.dwg
DRAWN BY: MAD
CHECKED BY: DWH
DATE: 09-22-2015
SCALE: As Shown

EQT EXPANSION MONONGAHELA RIVER CROSSING
UNION TOWNSHIP, WASHINGTON COUNTY &
FORWARD TOWNSHIP, ALLEGHENY COUNTY, PA

SUBSURFACE PROFILE

TRIAD ENGINEERING, INC.
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FIGURE NUMBER:
A-3

PROJECT NO.: 02-15-0085

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APPENDIX B

Field Exploration

Field Exploration

A representative of the geotechnical engineer was present to direct the drill crew, log recovered samples and observe groundwater conditions. The borings were drilled utilizing a CME-550 ATV-mounted, rotary auger drill rig. Samples of in-situ soil and weathered bedrock were obtained using a split-barrel sampler while performing Standard Penetration Tests (ASTM D 1586). The results of these tests (N-values) are commonly interpreted to provide an index to strength, consistency or relative density of the sampled materials and their ability to support foundations.

Once auger or sampler refusal on harder rock was encountered, borings B-4, B-5, and B-6 were further advanced using rock coring techniques. Continuous rock core samples were obtained from auger/sampler refusal depth to the boring termination depth. The harder rock materials were penetrated and sampled using a conventional, double-tubed core barrel and diamond coring bit, producing a rock core sample a nominal two (2) inches in diameter. The rock coring was performed to assess the type, quality and continuity of the bedrock at the drilled locations. The Rock Quality Designation (RQD) noted on the logs provides an indication of the relative quality and soundness of a specific bedrock stratum by measuring the lengths of intact rock core (unbroken core samples) that are larger than twice the core sample diameter for a specific rock stratum and/or core run and dividing the sum of the cumulative lengths by the thickness of the stratum and/or core run.

Groundwater levels were checked both during and after drilling operations. Groundwater levels encountered during the auger drilling operations are recorded on the individual logs. Groundwater levels indicated after rock coring operations are not considered representative of true groundwater levels, due to the introduction of water into the borehole during rock coring. It is emphasized that groundwater levels typically vary and are dependent upon climatic conditions and other environmental factors.

It is also emphasized that the lines shown on the logs are estimates of the changes in material. Actual changes may be gradual and may vary from those indicated on the logs, and the subsurface conditions between the borings may differ from those depicted on the logs. The boreholes were backfilled upon completion of the drilling with auger cuttings. Samples were transported to our office for temporary storage and additional analysis. The samples will be discarded after a period of 60 days unless other arrangements are made.

Triad Engineering, Inc.

KEY TO IDENTIFICATION OF SOIL AND WEATHERED ROCK SAMPLES

The material descriptions on the logs indicate the visual identification of the soil and rock recovered from the exploration and are based on the following criteria. Major soil components are designated by capital letters and minor components are described by terms indicating the percentage by weight of each component. Standard Penetration Testing (SPT) and sampling was conducted in accordance with ASTM D1586. N-values in blows per foot are used to describe the *relative density* of coarse-grained soils or the *consistency* of fine-grained soils.

The MAJOR components constitute more than 50% of the sample and have the following size designation.		The MINOR components have the following percentage designation.	
COMPONENT	**PARTICLE SIZE**	**ADJECTIVE**	**PERCENTAGE**
Boulders	12 inches plus		
Cobbles	3 to 12 inches	and	35 - 50
Gravel -coarse	¾ to 3 inches		
-fine	#4 to ¾ inches	some	20 - 35
Sand -coarse	#10 to #4		
-medium	#40 to #10	little	10 - 20
-fine	#200 to #40		
Silt or Clay	Minus #200 (fine-grained soil)	trace	0 - 10

Relative Density – Coarse-grained Soils		**Consistency – Fine-grained Soils**	
Term	***N-Value***	***Term***	***N-Value***
Very Loose	≤4	Very Soft	≤2
Loose	5 to 10	Soft	3 to 4
Medium Dense	11 to 30	Medium Stiff	5 to 8
Dense	31 to 50	Stiff	9 to 16
Very Dense	>50	Very Stiff	>16

Soil Plasticity	**Plasticity Index (PI)**	**Weathered Rock Description**	
None	Nonplastic	***Term***	***N-Value***
Low	1 to 5	Residual	Original minerals of rock have been entirely decomposed and original rock fabric is not apparent
Medium	5 to 20		
High	20 to 40		
Very High	over 40	Completely Weathered	≤50/.5
		Weathered	50/.4

Moisture Description
Dry - Dusty, dry to touch
Slightly Moist - damp
Moist - no visible free water
Wet - visible free water, saturated

FIGURE B-1

TRIAD ENGINEERING, INC.

TRIAD ENGINEERING, INC.

KEY TO IDENTIFICATION OF HARD ROCK SAMPLES

The material descriptions on the logs indicate the visual identification of the rock recovered from the NQ/NX coring operations and are based on the following criteria. Core recovery is the ratio of the length of core recovered in each run to the total length of the core run in percent. Rock Quality Designation (RQD) is the ratio of the sum of the lengths of rock core pieces 4 inches or longer divided by the length of the core run or stratum in percent.

Relative Degree of Rock Hardness

Term	***Defining Characteristics***
Very Soft	Can be indented by thumb or crushed under pressure of finger and/or thumb
Soft	Can be scratched by fingernail, peeled by pocket knife or crushed with pressed hammer
Medium Hard	Cannot be scraped or peeled with knife but can be scratched, breaks easily with hammer blow
Hard	Breaks under one or two strong hammer blows or scratched with knife with difficulty
Very Hard	Breaks under several strong hammer blows with very resistant sharp edges

Rock Adjectives

Seam	Thin layer (12 inches or less)
Interbedded	Thin or very thin alternating seams of bedrock occurring in equal amounts
Some	Significant amount of accessory material (15 to 40 percent)
Few	Insignificant amount of accessory material (0 to 15 percent)

Rock Weathering Description

Descriptor and Symbol	***Criteria***
Fresh (F)	**No visible sign of decomposition or discoloration**.
Minor Weathering (M)	**<10% of rock mass has some degree of decomposition**. Slight discoloration inwards towards open fractures.
Weathered (W)	**10%-50% of rock mass has some degree of decomposition**. Significant portions of rock show discoloration. Weaker minerals such as feldspar decomposed. Apparent strength less than fresh parent rock.
Highly Weathered (H)	**>50% of rock mass has some degree of decomposition**. Rock is significantly weakened relative to its unweathered state. Less weathered core stones may be present in rock mass. Most rock types, when highly weathered, can be broken by hand or shaved with knife.

Rock Structure

Degree of Fracturing

Term	***Spacing***
Intensely fractured or very broken	2 in.
Highly fractured or broken	2 in. to 8 in.
Moderately fractured or blocky	8 in. to 2 ft.
Slightly Fractured	2 ft. to 6 ft.

Thickness of Bedding

Term	***Spacing***
Thinly bedded	<4 in.
Medium bedded	4 in. to 1 ft.
Thickly bedded	1 ft. to 3 ft.
Massive	>3 ft.

Dip of Bed or Fracturing

Flat	0º to 20º
Dipping	20º to 45º
Steeply Dipping	45º to 90º

FIGURE B-2

TRIAD ENGINEERING, INC.

TEST BORING LOG

Project Number: **02-15-0085** Project Name: **H318 Mon Crossing** Boring No.: **B-4**

Logger: L. HANSON Boring Location: See Boring Location Plan

Date Started: 8/6/15 Drill/Method: CME-550X/HSA

Date Completed: 8/6/15 Driller: TRIAD Ground Elev.: 755

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 8.0 ft.

Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
	S-1		3-4-4	61%		1.5	Brown Silty SAND, brick and cinder fragments, damp, loose				753.5
							Brown SAND, some clay, some gravel, moist, medium stiff (Alluvium)				
	S-2		5-5-6	61%							
5.0	S-3		3-3-4	100%							
	S-4		3-3-5	100%					▼		
10.0	S-5		2-1-2	100%			Some fine to medium gravel, wet, soft				
	S-6		2-3-3	100%							
15.0	S-7		3-5-6	100%							
	S-8		6-6-7	56%							
20.0	S-9		5-7-8	87%			Weathered claystone fragments				
25.0	S-10		8-31-44	93%			Reddish-brown weathered claystone				
30.0	S-11		50/0	100%		30.0					725.0

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Remarks:

TEST BORING LOG

Project Number: **02-15-0085** Project Name: **H318 Mon Crossing** Boring No.: **B-4**

Logger: L. HANSON Boring Location: See Boring Location Plan

Date Started: 8/6/15 Drill/Method: CME-550X/HSA

Date Completed: 8/6/15 Driller: TRIAD Ground Elev.: 755

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 8.0 ft.

Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
35.0	R-1			100%	58%		Gray SHALE with some gray sandstone above that fines into claystone/shale. Horizontal fractures, flat, thinly bedded, medium hard Brown stained vertical fracture				
	R-2			100%	90%						
40.0											
	R-3			100%	100%						
45.0											
	R-4			96%	76%						
50.0											
	R-5			98%	58%	52.0	Grayish brown LIMESTONE, moderately fractured, thinly bedded, medium hard				703.0
55.0											
	R-6			92%	80%	57.0	Gray SHALE, moderately fractured, thinly bedded, hard				698.0
60.0											

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Project Number: 02-15-0085 Project Name: H318 Mon Crossing Boring No.: B-4
Logger: L. HANSON Boring Location: See Boring Location Plan
Date Started: 8/6/15 Drill/Method: CME-550X/HSA
Date Completed: 8/6/15 Driller: TRIAD Ground Elev.: 755

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 8.0 ft.
Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
65.0	R-7			100%	96%		Gray SHALE, moderately fractured, thinly bedded, hard (continued)				
	R-8			92%	56%		Interbedded reddish-brown claystone				
70.0	R-9			100%	60%		Vertical fracture				
						73.0					682.0
75.0	R-10			92%	68%		Gray LIMESTONE, hard, moderately fractured, interbedded red claystone seams				
80.0	R-11			88%	40%						
85.0						85.0					670.0
	R-12			74%	0%		Reddish-purple LIMESTONE, hard, highly weathered, highly fractured, flat, massive bedding, slightly calcareous reaction to HCL				
90.0											

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Project Number: **02-15-0085** Project Name: **H318 Mon Crossing** Boring No.: **B-4**

Logger: L. HANSON Boring Location: See Boring Location Plan

Date Started: 8/6/15 Drill/Method: CME-550X/HSA

Date Completed: 8/6/15 Driller: TRIAD Ground Elev.: 755

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 8.0 ft.

Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
95.0	R-13			100%	10%		Reddish-purple LIMESTONE, hard, highly weathered, highly fractured, flat, massive bedding, slightly calcareous reaction to HCL (continued)				
						95.8	Brown Sand Seam				659.2
	R-14			62%	16%		Reddish-purple LIMESTONE (possibly limestone) hard, highly weathered, highly fractured, flat, massive beddng calcareous reaction to HCL produces some smoke and slight odor, bubbles on surface, effervescent				
100.0											
	R-15			92%	76%						
105.0											
	R-16			88%	30%						
						108.1	Gray fine grained SANDSTONE, with sandy and clay seams,medium hard, weathered, moderately fractured, thin, flat bedding. No reaction to HCL on any fresh surface. HCL reacts to fresh poder. Visible grains with eye. Trace silty seams in fractures.				646.9
110.0											
	R-17			100%	90%						
115.0											
	R-18			100%	84%						
120.0											

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Date Started: 8/6/15 Drill/Method: CME-550X/HSA
Date Completed: 8/6/15 Driller: TRIAD Ground Elev.: 755

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 8.0 ft. | Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
125.0	R-19			100%	82%		Gray fine grained SANDSTONE, with sandy and clay seams,medium hard, weathered, moderately fractured, thin, flat bedding. No reaction to HCL on any fresh surface. HCL reacts to fresh poder. Visible grains with eye. Trace silty seams in fractures. (continued)				
130.0	R-20			100%	60%	130.0					625.0
135.0	R-21			100%	84%		Reddish-gray SHALE, medium hard, weathered, moderately fractured, flat, thin bedding, trace silty seams at fracture points				
140.0	R-22			100%	98%						
145.0	R-23			98%	92%	142.0	Gray fine-grained SANDSTONE, interbedded gray shale, medium hard, weathered, moderately fractured, flat, thin bedding				613.0
150.0	R-24			100%	36%	147.0	Reddish-gray LIMESTONE, medium hard, highly weathered, broken, flat massive bedding, slightly calcarious reaction to HCL, trace claystone				608.0

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Logger: L. HANSON Boring Location: See Boring Location Plan

Date Started: 8/6/15 Drill/Method: CME-550X/HSA

Date Completed: 8/6/15 Driller: TRIAD Ground Elev.: 755

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 8.0 ft.

Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
155.0	R-25			90%	46%		Reddish-gray LIMESTONE, medium hard, highly weathered, broken, flat massive bedding, slightly calcarious reaction to HCL, trace claystone (continued) More reactive to HCL				
160.0	R-26			94%	74%	160.0	Slightly reactive to HCL, trace reddish shale				595.0
							Boring Terminated at 160.0 feet.				
165.0											
170.0											
175.0											
180.0											

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TEST BORING LOG

Project Number: **02-15-0085** Project Name: **H318 Mon Crossing** Boring No.: **B-5**

Logger: L HANSON Boring Location: See Boring Location Plan

Date Started: 7/28/15 Drill/Method: CME-550X/HSA

Date Completed: 8/4/15 Driller: TRIAD Ground Elev.: 750

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 25.0 ft.

Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
	S-1	X	4-6-4	40%		0.5	Topsoil				749.5
							Bituminous gravel ASPHALT (Fill)				
	S-2	X	2-1-2	67%		3.5					746.5
5.0	S-3	X	2-1-2	87%			Brownish-gray silty CLAY and bituminous material (Coal), trace sand, soft, slightly moist (Fill)				
	S-4	X	4-3-3	87%		8.5					741.5
10.0	S-5	X	2-2-2	100%			Brown silty CLAY, trace coal, very soft, moist (Fill)				
						11.5					738.5
	S-6	X	3-4-4	100%			Brown SILT, trace sand, soft, moist, veins of coal (Alluvium)				
15.0	S-7	X	2-2-4	100%							
	S-8	X	2-3-4	67%							
20.0	S-9	X	2-3-4	100%							
25.0	S-10	X	2-3-4	100%		25.0	Brown clayey SILT, some sand, soft moist (Alluvium)		▼		725.0
30.0						30.0					720.0

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TEST BORING LOG

Project Number: **02-15-0085** Project Name: **H318 Mon Crossing** Boring No.: **B-5**

Logger: L HANSON Boring Location: See Boring Location Plan

Date Started: 7/28/15 Drill/Method: CME-550X/HSA

Date Completed: 8/4/15 Driller: TRIAD Ground Elev.: 750

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 25.0 ft.

Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
	S-11	X	2-3-3	100%			Gray silty CLAY, some sand, soft, moist (Alluvium)				
35.0	S-12	X	WOH	100%			WOH = Weight of Hammer				
40.0	S-13	X	4-6-8	67%		40.0	Gray CLAY, some sandstone fragments, medium stiff, moist (Alluvium)				710.0
45.0	S-14	X	1-3-4	73%		45.0	Course gray SAND, very loose, wet (Alluvium)				705.0
50.0	S-15	X	3-12-20	100%		50.5	Grey-brown SILT and weathered rock fragments, trace coal, stiff, slightly moist (Alluvium)				699.5
55.0	S-16	X	8-13-25	53%			Some coarse sand				
60.0						60.0					690.0

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Date Completed: 8/4/15 Driller: TRIAD Ground Elev.: 750

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 25.0 ft.
Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
	S-17		3-10-17	53%		61.5	Grey-brown SILT and weathered rock fragments, stiff, slightly moist (Alluvium)				688.5
	R-1			37%	0%	65.0	Grey LIMESTONE, interbedded river cobble, very hard, weathered, broken				685.0
65.0	R-2			86%	0%	66.0	Brown-gray SHALE, few limestone fragments, soft, very weathered, very broken				684.0
70.0	R-3			98%	46%	72.0	Gray CLAYSTONE, some red shale, very soft, minor weathering, very broken Gray CLAYSTONE, some sandstone, medium hard, minor weathering, moderately fractured				678.0
75.0	R-4			92%	46%	80.0	Reddish-gray LIMESTONE, few claystone, medium hard, weathered, broken				675.0 670.0
80.0	R-5			98%	62%		Reddish-gray LIMESTONE, medium hard, weathered, broken				
85.0	R-6			78%	24%	88.0	Reddish-gray LIMESTONE, interbedded claystone, medium hard, weathered, broken				662.0
90.0											

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Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
95.0	R-7			92%	46%		Reddish-gray LIMESTONE, interbedded claystone, medium hard, weathered, broken (continued)				
	R-8			76%	0%	100.0					650.0
100.0	R-9			78%	100%		Reddish-gray SHALE, interbedded claystone, medium hard, weathered, broken, slightly calcarious				
105.0	R-10			86%	24%	108.0					642.0
110.0	R-11			100%	100%	110.0	Gray SANDSTONE, some gray shale, medium hard, minor weathering, broken, flat to slightly dipping bedding				640.0
115.0	R-12			100%	56%		Gray SANDSTONE, interbedded gray shale and claystone, hard, minor weathering, moderately fractured				
120.0						120.0					630.0

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Logger: L HANSON Boring Location: See Boring Location Plan
Date Started: 7/28/15 Drill/Method: CME-550X/HSA
Date Completed: 8/4/15 Driller: TRIAD Ground Elev.: 750

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 25.0 ft.
Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
125.0	R-13			72%	56%	125.0	Gray SANDSTONE, interbedded gray shale, hard, minor weathering, moderately fractured				625.0
130.0	R-14			100%	84%	130.0	Gray SHALE, interbedded gray sandstone, hard, minor weathering, moderately fractured				620.0
135.0	R-15			94%	70%		Reddish-gray SHALE, medium hard, minor weathering, moderately fractured				
	R-16			90%	56%	138.0					612.0
140.0						140.0	Gray SANDSTONE, interbedded gray shale, hard, minor weathering, moderately fractured				610.0
	R-17			100%	58%		Gray SANDSTONE, interbedded gray shale, medium hard to hard, minor weathering, moderately fractured, medium bedding				
145.0						146.0					604.0
	R-18			100%	92%		Gray SANDSTONE, hard, fresh, slightly fractured				
150.0											

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Project Number: **02-15-0085** Project Name: **H318 Mon Crossing** Boring No.: **B-5**

Logger: L HANSON Boring Location: See Boring Location Plan

Date Started: 7/28/15 Drill/Method: CME-550X/HSA

Date Completed: 8/4/15 Driller: TRIAD Ground Elev.: 750

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 25.0 ft.

Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
						152.0	Gray SANDSTONE, hard, fresh, slightly fractured (continued) Trace pyrite				598.0
	R-19			90%	36%	153.5	Gray CLAYSTONE, soft, minor weathering, broken				596.5
155.0							Reddish-gray LIMESTONE, interbedded claystone, medium hard, weathered, broken				
	R-20			86%	10%						
160.0						160.0					590.0
							Boring Terminated at 160.0 feet.				
165.0											
170.0											
175.0											
180.0											

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TEST BORING LOG

Project Number: **02-15-0085** Project Name: **H318 Mon Crossing** Boring No.: **B-6**

Logger: A MAXWELL Boring Location: See Boring Location Plan

Date Started: 8/26/15 Drill/Method: CME-550X/HSA

Date Completed: 8/26/15 Driller: TRIAD Ground Elev.: 1099

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 3.9 ft.

Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
						0.3	Topsoil				1098.7
	S-1		4-3-4	60%			Brown-Black SILT and fine-grain SAND, some organics, slightly moist, stiff (Residual) PP=2.5 tsf				
	S-2		4-8-9	80%		3.0	Brown SAND with some SILT, trace organics, medium dense, slightly moist (Residual)				1096.0
5.0	S-3		6-17-24	100%							
	S-4		13-32-40	93%		7.5	Orange-Tan SAND with trace SILT, some gravel-sized rocks, very stiff, dry (Residual)				1091.5
10.0	S-5		5-11-43	100%		10.0	Brown SAND with some gray CLAY, very dense, dry (Residual) PP=2.5 tsf				1089.0
15.0	S-6		34-50/4"	100%		15.0	Weathred Orange SANDSTONE, weathered, dry, very dense				1084.0
20.0	R-1			65%	28%	19.0	Gray SANDSTONE, minor weathering, highly fractured, massive bedding				1080.0
	R-2			98%	57%	23.5	Gray-Orange SHALE with interbedded clay seam, weathered, very soft to medium hard, intensely fractured, massive bedding, flat				1075.5
25.0	R-3			98%	48%	26.6	Gray SHALE with seams of black carbonaceous shale, medium hard, highly fractured, massive bedding				1072.4
30.0											

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Remarks:

TEST BORING LOG

Project Number: 02-15-0085 Project Name: H318 Mon Crossing Boring No.: B-6
Logger: A MAXWELL Boring Location: See Boring Location Plan
Date Started: 8/26/15 Drill/Method: CME-550X/HSA
Date Completed: 8/26/15 Driller: TRIAD Ground Elev.: 1099

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 3.9 ft.
Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
				98%	48%	31.6	Gray SHALE with seams of black carbonaceous shale, medium hard, highly fractured, massive bedding (continued)				1067.4
35.0	R-4			84%	65%	36.6	Gray SILTSTONE with interbedded black carbon, minor weathering, medium hard, moderately fractured				1062.4
40.0	R-5			100%	91%	41.6	Gray SILTSTONE, hard, minor weathering, moderately fractured, massive bedding				1057.4
45.0	R-6			100%	62%	46.6	Gray SILTSTONE, hard, some soft seams, minor weathering, massive bedding, flat				1052.4
50.0	R-7			96%	78%	54.2	Gray SANDSTONE, hard, minor weathering, massive bedding, flat, moderately fractured				1044.8
55.0	R-8			100%	81%	56.6	Gray SILTSTONE, hard, minor weathering, moderately fractured				1042.4
60.0	R-9			100%	62%		Gray-Black SILTSTONE, hard, minor weathering, highly fractured				

TRIAD_C BORING LOGS.GPJ TRIAD 3.GDT 10/7/15

TRIAD ENGINEERING, INC.
500 Bursca Drive, Suite 504
Bridgeville, PA 15017
412.257.1325
Fax: 412.257.1329

Remarks:

TEST BORING LOG

Project Number: 02-15-0085 Project Name: H318 Mon Crossing Boring No.: B-6
Logger: A MAXWELL Boring Location: See Boring Location Plan
Date Started: 8/26/15 Drill/Method: CME-550X/HSA
Date Completed: 8/26/15 Driller: TRIAD Ground Elev.: 1099

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 3.9 ft.
Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
				100%	62%	61.6	Gray-Black SILTSTONE, hard, minor weathering, highly fractured (continued)				1037.4
65.0	R-10			100%	91%	66.5	Gray-Black SHALE, some sandstone, minor weathering, highly fractured, massive bedding				1032.5
70.0	R-11			98%	68%	71.2	Gray-Black SILTSTONE and SHALE, medium hard, minor weathering, highly fractured, flat, massive bedding				1027.8
	R-12			90%	68%	73.2	Black-Gray LIMESTONE, very hard, massive bedding, highly fractured, minor weathering				1025.8
75.0						76.6	Gray LIMESTONE, very hard, high fractured, minor weathering, massive bedding				1022.4
80.0	R-13			94%	73%	81.6	Gray LIMESTONE, very hard, moderately fractured, minor weathering, dipping, massive bedding Soft seam of calcareous clay				1017.4
85.0	R-14			100%	94%	86.6	Gray-Black LIMESTONE, very hard, moderately fractured, massive bedding, flat				1012.4
90.0	R-15			84%	58%		Gray-Black LIMESTONE, very hard, highly fractured, massive bedding, minor weathering				

TRIAD_C BORING LOGS.GPJ TRIAD 3.GDT 10/7/15

TRIAD ENGINEERING, INC.
500 Bursca Drive, Suite 504
Bridgeville, PA 15017
412.257.1325
Fax: 412.257.1329

Remarks:

TEST BORING LOG

Project Number: **02-15-0085** Project Name: **H318 Mon Crossing** Boring No.: **B-6**

Logger: A MAXWELL Boring Location: See Boring Location Plan

Date Started: 8/26/15 Drill/Method: CME-550X/HSA

Date Completed: 8/26/15 Driller: TRIAD Ground Elev.: 1099

Shelby Tube | Standard Split Spoon | Water Level Upon Completion 3.9 ft.

Core Sample | Auger Probe

Depth (feet)	Sample No.	Sample Type	Blow Counts	Recovery (%)	RQD (RUN)	Strata Depth (ft)	MATERIAL DESCRIPTION	RQD (Strata)	Water Level	Graphic Log	Strata Elevation
				84%	58%	91.6	Gray-Black LIMESTONE, very hard, highly fractured, massive bedding, minor weathering (continued)				1007.4
95.0	R-16			100%	100%	96.6	Gray LIMESTONE, very hard, some interbedded sand, minor weathering, massive bedding, slightly fractured				1002.4
100.0	R-17					100.7	Gray LIMESTONE, very hard, moderately fractured, massive bedding				998.3
							Boring Terminated at 100.7 feet.				
105.0											
110.0											
115.0											
120.0											

TRIAD_C BORING LOGS.GPJ TRIAD 3.GDT 10/7/15

TRIAD ENGINEERING, INC.

500 Bursca Drive, Suite 504
Bridgeville, PA 15017
412.257.1325
Fax: 412.257.1329

Remarks:

TRIAD ENGINEERING, INC.

APPENDIX C

Laboratory Testing

TRIAD ENGINEERING, INC.

SOIL DATA SUMMARY

SAMPLE NO.	SAMPLE DEPTH (ft)	SAMPLE TYPE	NATURAL MOISTURE (%)	ATTERBERG LIMITS			GRADATION			USCS SOIL CLASS.	PROCTOR		UNCONFINED COMPRESSIVE STRENGTH ROCK (PSI)
				LL	PL	PI	% GRAVEL	% SAND	% FINES		MAX. DD (pcf)	OPT. M (%)	
B-4	2.5 - 6.5	Jar	17.9	31	25	6	21	56	23	SC	-	-	-
B-4	17.5 - 21.5	Jar	12.9	36	27	9	24	46	31	SM	-	-	-
B-5	12.5 - 16.5	Jar	22.4	32	23	9	0	44	56	CL	-	-	-
B-5	30 - 36.5	Jar	28.5	32	24	8	0	31	68	CL	-	-	-
B-6	2.5 - 6.5	Jar	12.2	32	23	9	10	46	44	SC	-	-	-
B-4	111 - 112	Rock Core	-	-	-	-	-	-	-	-	-	-	3975.0
B-5	101.5 - 102	Rock Core	-	-	-	-	-	-	-	-	-	-	540.0
B-5	113 - 114	Rock Core	-	-	-	-	-	-	-	-	-	-	8555.0
B-5	137.5 - 138	Rock Core	-	-	-	-	-	-	-	-	-	-	6049.0
B-5	150 - 151	Rock Core	-	-	-	-	-	-	-	-	-	-	7668.0

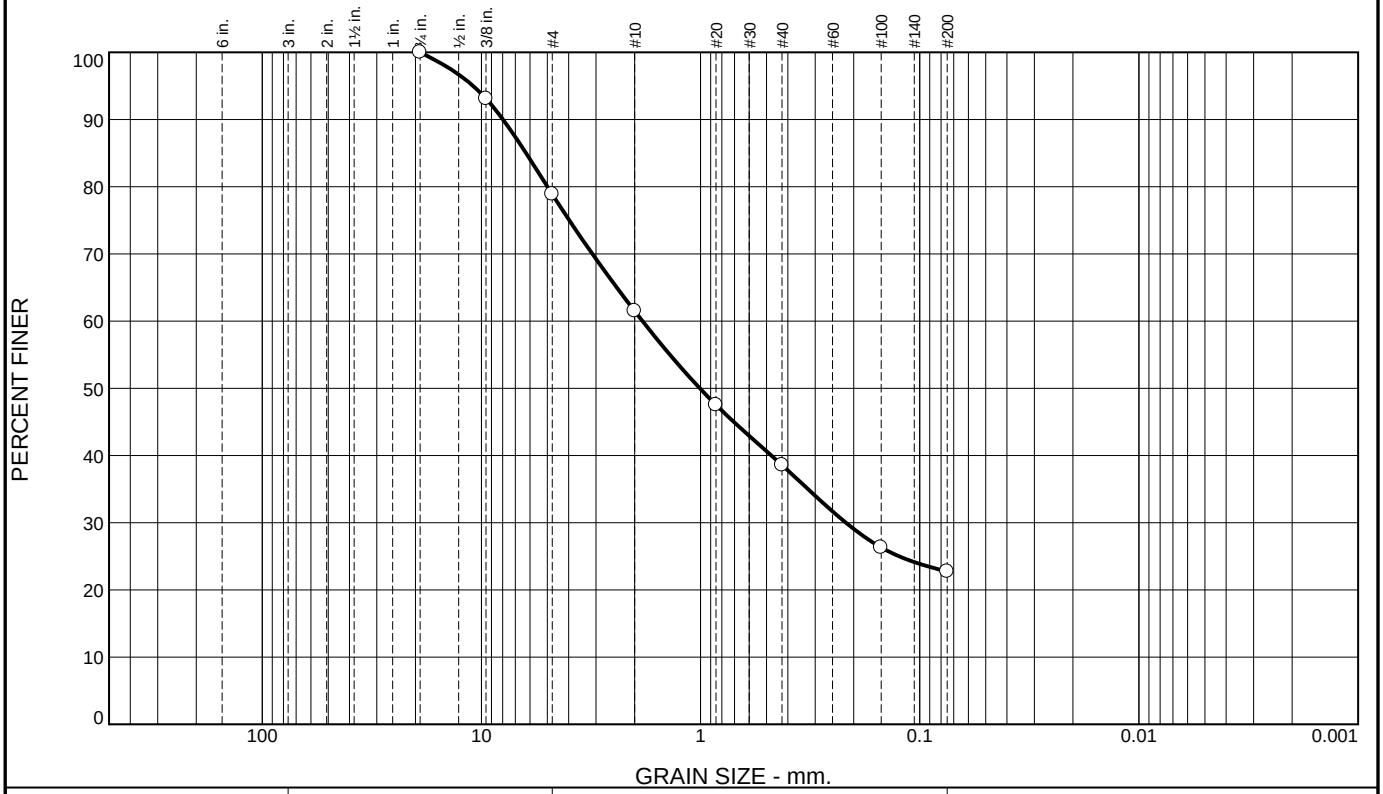
TRIAD ENGINEERING, INC.

Notes: 1) Soil tests performed in accordance with recognized ASTM testing standards.
2) SS = Split Spoon; UD = Undisturbed

Project Number: 02-15-0085
Project Name: H-318 HDD Line
Location: Washington County, PA

FIGURE
C-1

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	21.1	17.4	22.9	15.9	22.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.375	93.1		
#4	78.9		
#10	61.5		
#20	47.5		
#40	38.6		
#100	26.3		
#200	22.7		

* (no specification provided)

Material Description

light brown silty sand with gravel

Atterberg Limits

PL= 25 LL= 31 PI= 6

Coefficients

D_{90}= 7.9721 D_{85}= 6.2598 D_{60}= 1.8412
D_{50}= 1.0083 D_{30}= 0.2172 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-1-b

Remarks

Source of Sample: B-4 **Depth:** 2.5'-6.5'
Sample Number: S-2/S-3 **Date:** 9/15/15

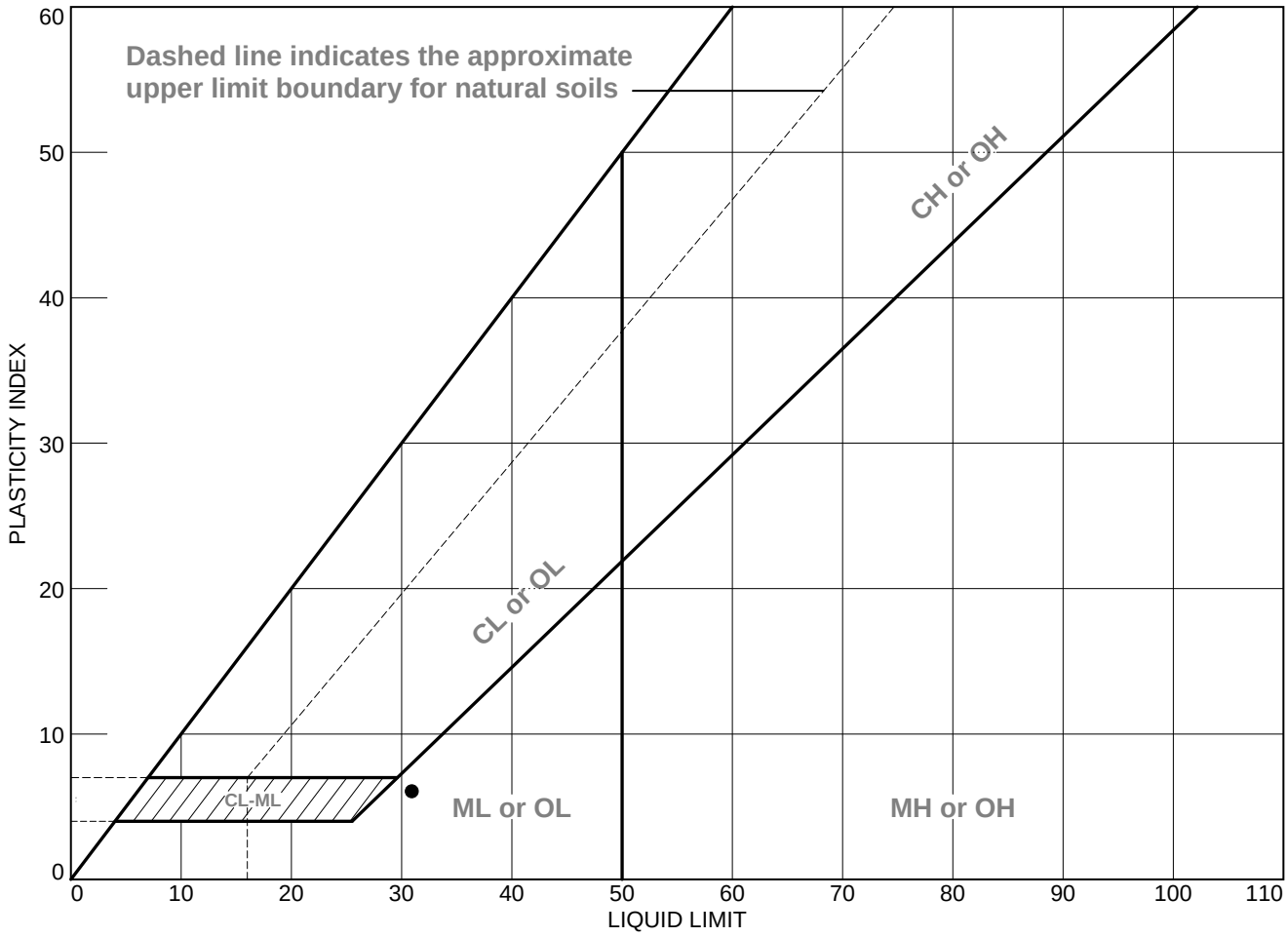
Triad Engineering, Inc.

Morgantown, WV

Client: EQT
Project: EQT H-318 HDD Line
Project No: 02-15-0085 **Figure** C-2

Tested By: DTB **Checked By:** RAS

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-4	S-2/S-3	2.5'-6.5'	17.9	25	31	6	SM

Triad Engineering, Inc.

Morgantown, WV

Client: EQT
Project: EQT H-318 HDD Line
Project No.: 02-15-0085
Figure C-3

Tested By: CLA **Checked By:** DTB

Particle Size Distribution Report

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	23.5	12.4	19.6	13.7	30.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.375	84.1		
#4	76.5		
#10	64.1		
#20	52.1		
#40	44.5		
#100	35.5		
#200	30.8		

* (no specification provided)

Material Description

light brown, gray silty sand with gravel

Atterberg Limits

PL= 27 LL= 36 PI= 9

Coefficients

D_{90}= 12.8238 D_{85}= 10.0542 D_{60}= 1.5204
D_{50}= 0.7123 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

Source of Sample: B-4 **Depth:** 17.5'-21.5'
Sample Number: S-8/S-9 **Date:** 9/15/15

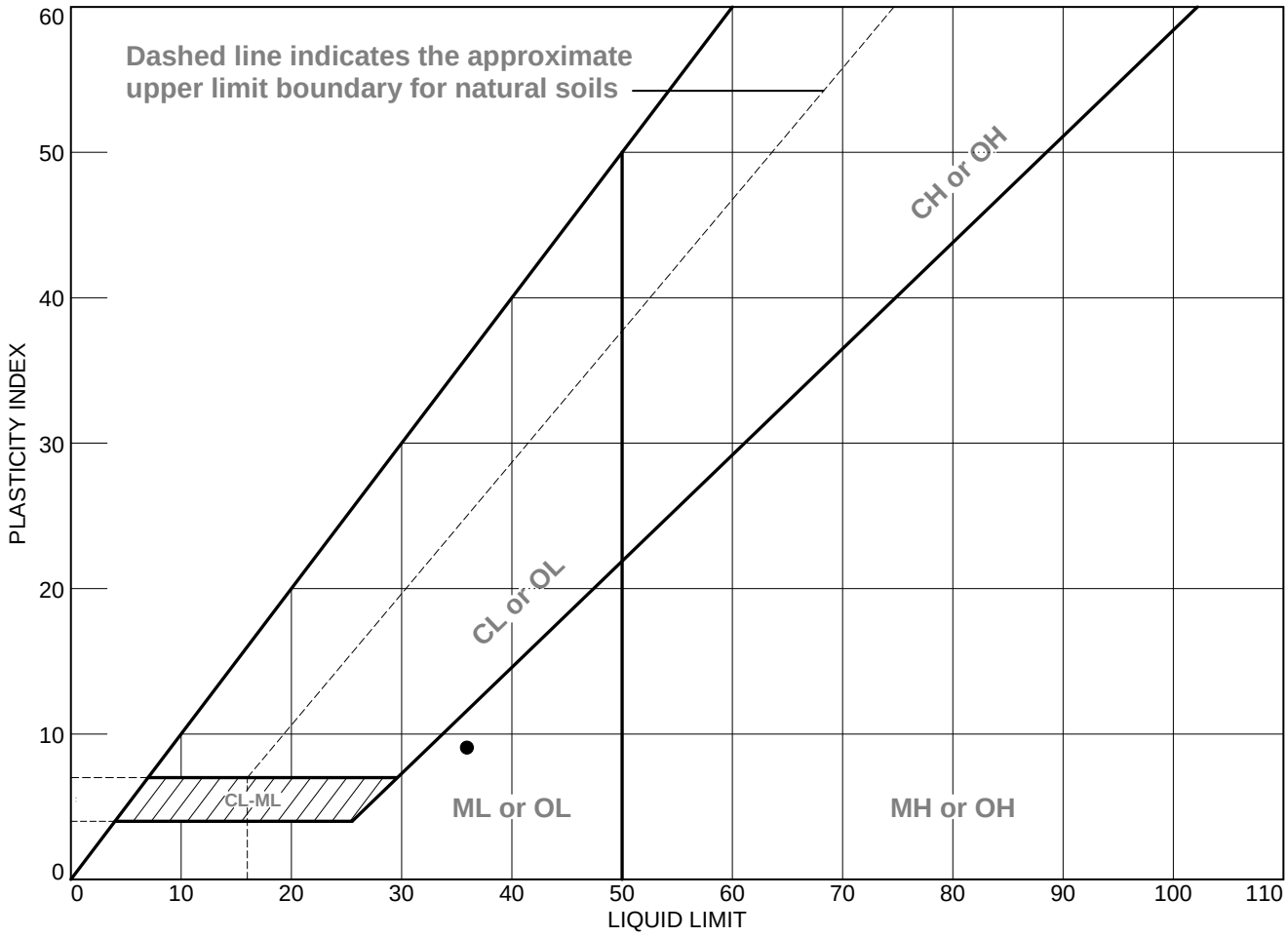
Triad Engineering, Inc.

Morgantown, WV

Client: EQT
Project: EQT H-318 HDD Line
Project No: 02-15-0085 **Figure** C-4

Tested By: DTB **Checked By:** RAS

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-4	S-8/S-9	17.5'-21.5'	12.9	27	36	9	SM

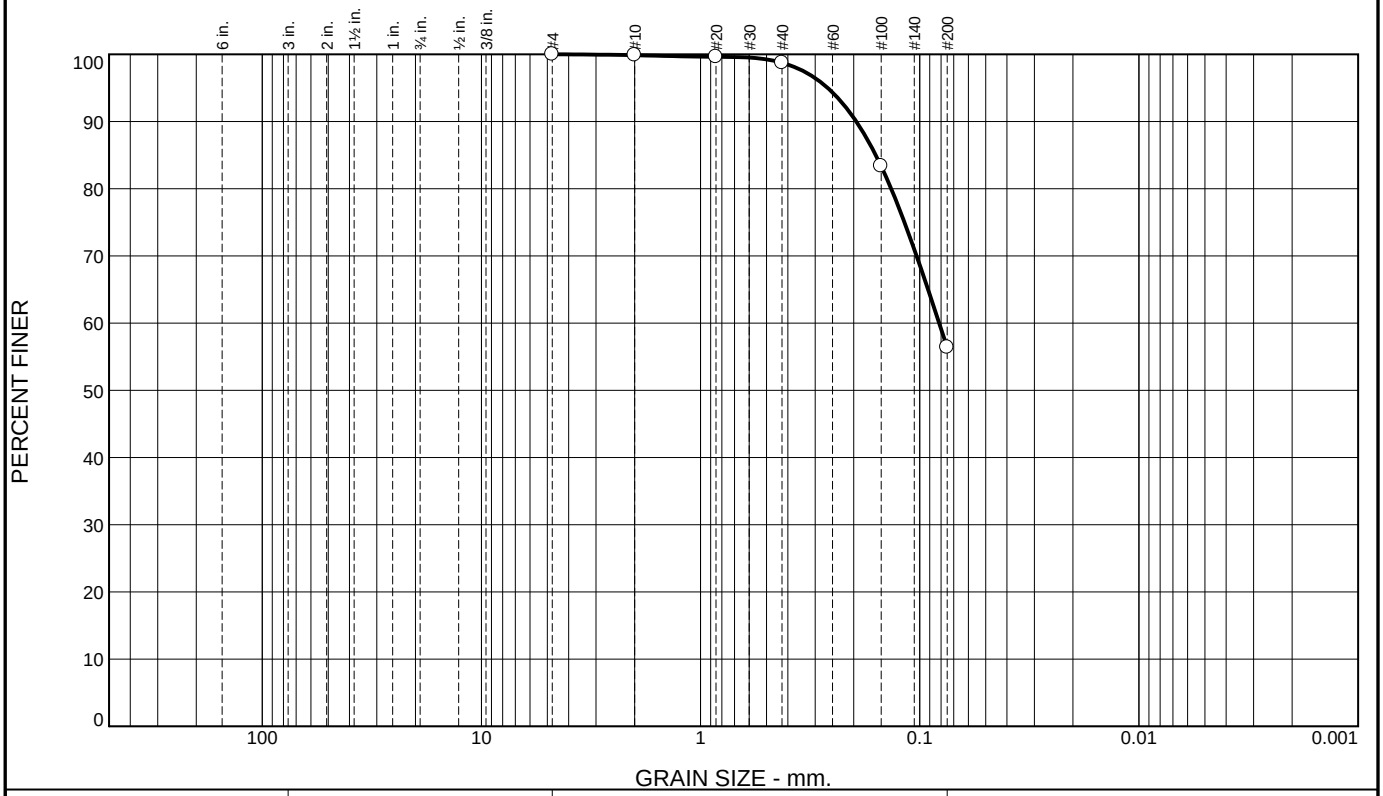
Triad Engineering, Inc.

Morgantown, WV

Client: EQT
Project: EQT H-318 HDD Line
Project No.: 02-15-0085
Figure C-5

Tested By: CLA **Checked By:** DTB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	1.2	42.3	56.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#20	99.6		
#40	98.7		
#100	83.4		
#200	56.4		

* (no specification provided)

Material Description

medium brown sandy lean clay

Atterberg Limits

PL= 23 LL= 32 PI= 9

Coefficients

D_{90}= 0.1948 D_{85}= 0.1587 D_{60}= 0.0816
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-4(3)

Remarks

Source of Sample: B-5 **Depth:** 12.5'-16.5'
Sample Number: S-6/S-7

Date: 9/15/15

Triad Engineering, Inc.

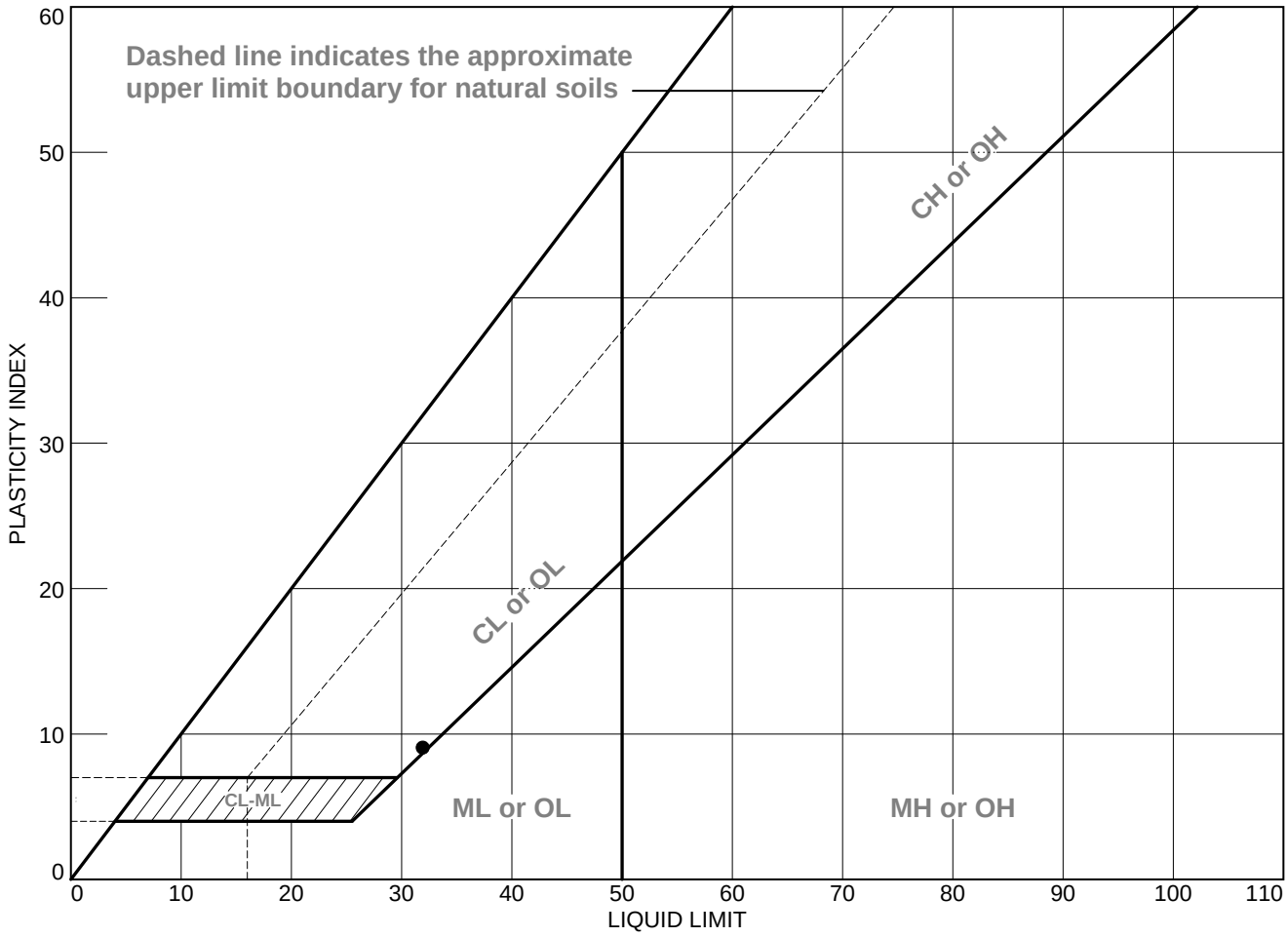
Morgantown, WV

Client: EQT
Project: EQT H-318 HDD Line

Project No: 02-15-0085 **Figure** C-6

Tested By: DTB **Checked By:** RAS

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-5	S-6/S-7	12.5'-16.5'	22.4	23	32	9	CL

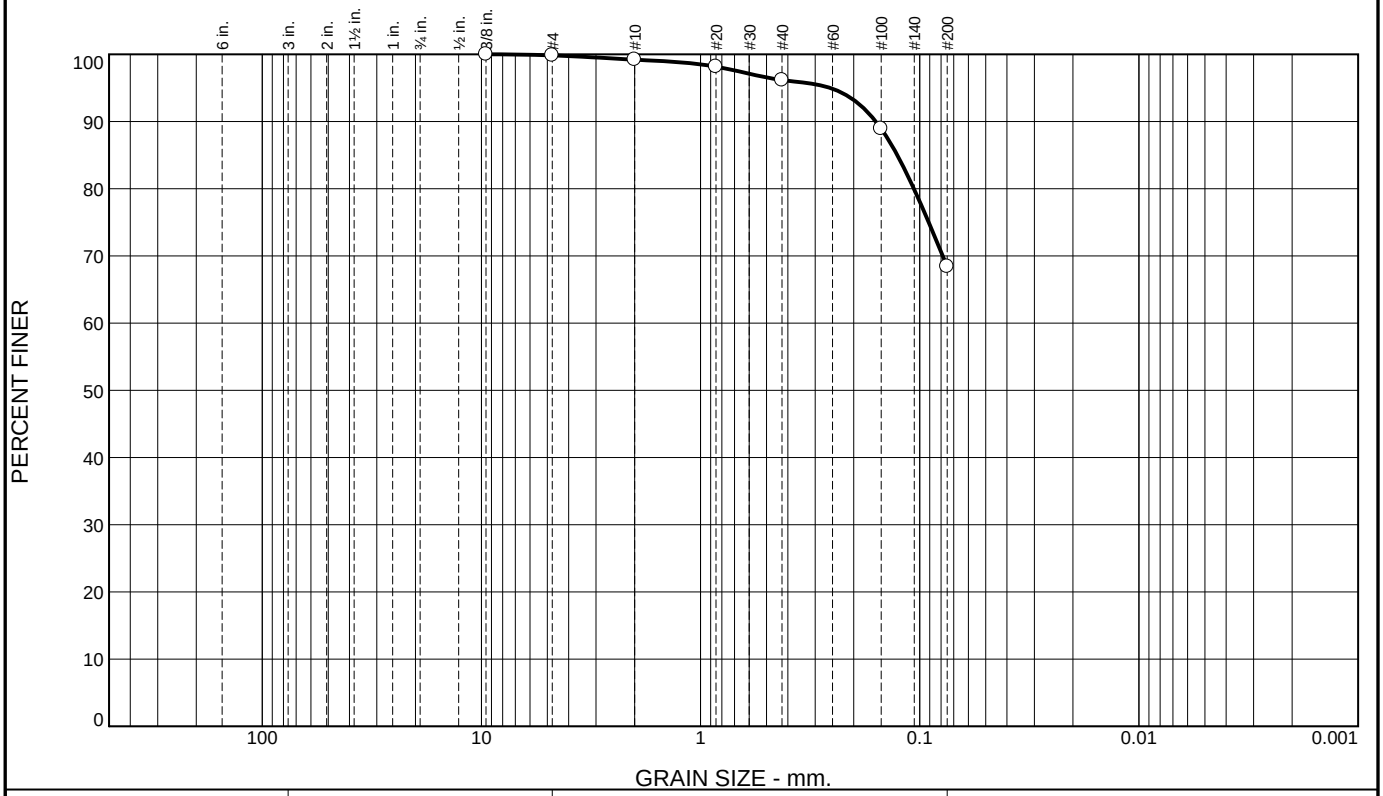
Triad Engineering, Inc.

Morgantown, WV

Client: EQT
Project: EQT H-318 HDD Line
Project No.: 02-15-0085
Figure C - 7

Tested By: CLA **Checked By:** DTB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.6	3.0	27.8	68.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375	100.0		
#4	99.8		
#10	99.2		
#20	98.1		
#40	96.2		
#100	88.9		
#200	68.4		

* (no specification provided)

Material Description

light brown, gray sandy silt

Atterberg Limits

PL= 24 LL= 32 PI= 8

Coefficients

D_{90}= 0.1586 D_{85}= 0.1267 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(4)

Remarks

Source of Sample: B-5 **Depth:** 30.0'-36.5'
Sample Number: S-11/S-12 **Date:** 9/15/15

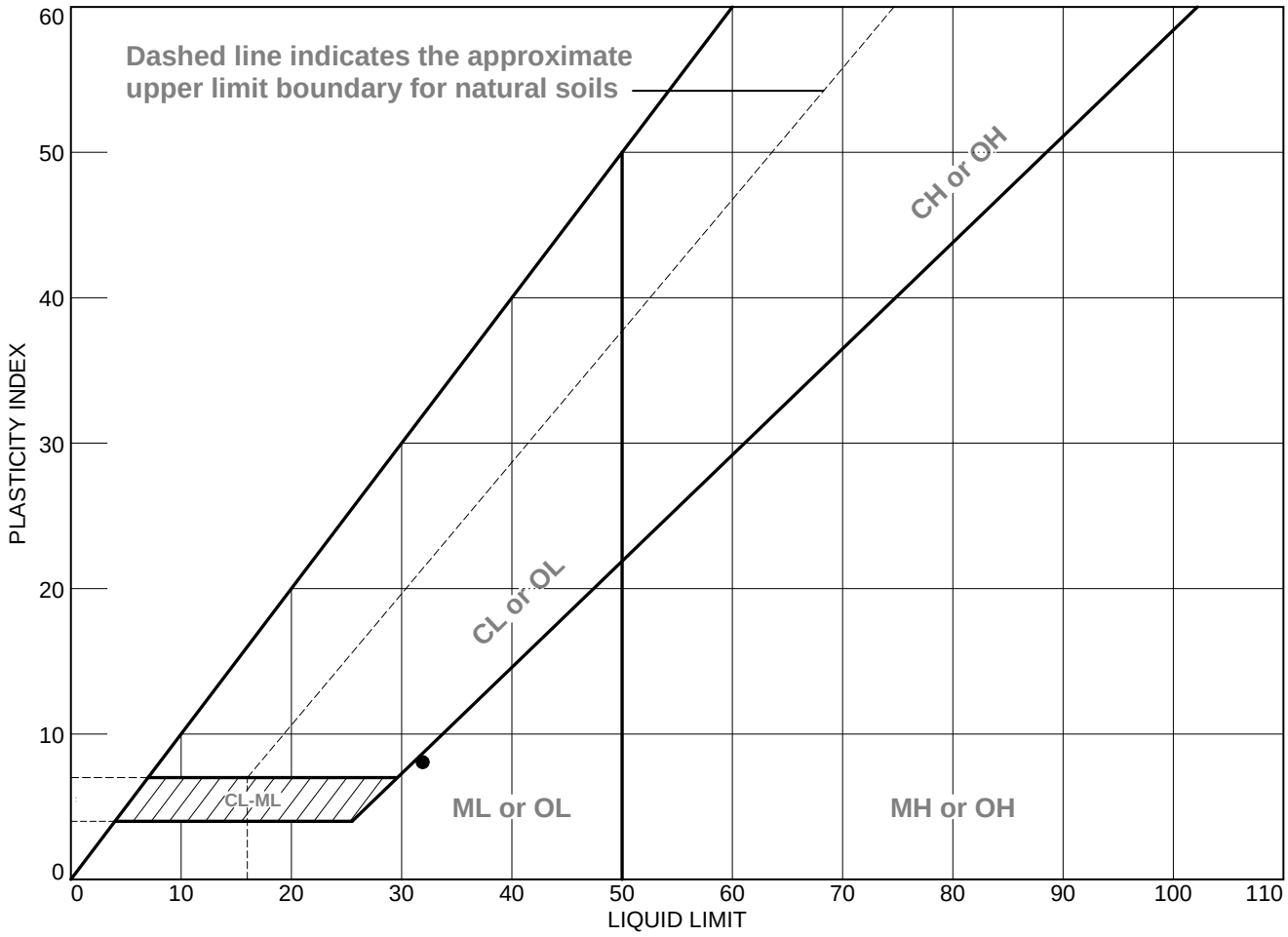
Triad Engineering, Inc.

Morgantown, WV

Client: EQT
Project: EQT H-318 HDD Line
Project No: 02-15-0085 **Figure** C-8

Tested By: DTB **Checked By:** RAS

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-5	S-11/S-12	30.0'-36.5'	28.5	24	32	8	ML

Triad Engineering, Inc.

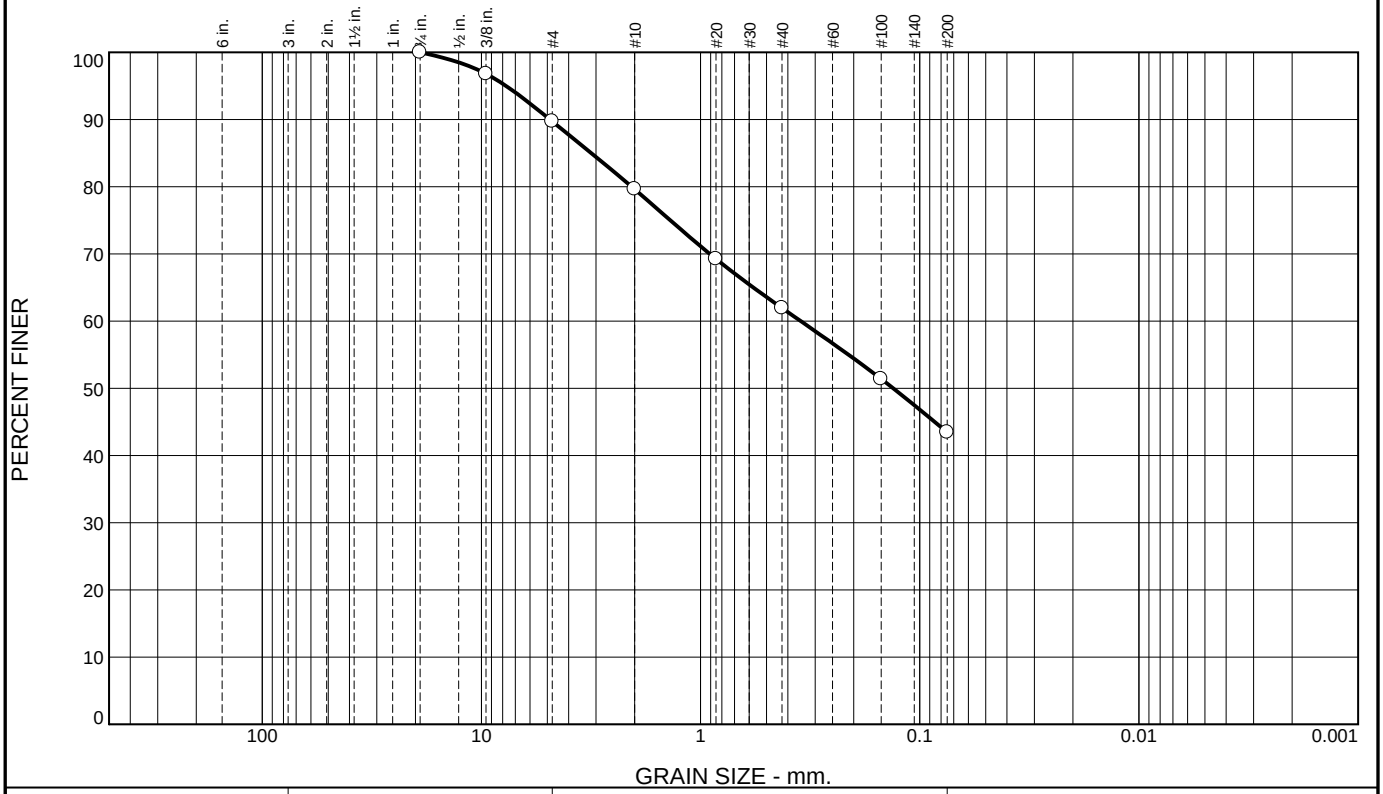
Morgantown, WV

Client: EQT
Project: EQT H-318 HDD Line
Project No.: 02-15-0085

Figure C-9

Tested By: CLA **Checked By:** DTB

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	10.3	10.1	17.7	18.4	43.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.375	96.8		
#4	89.7		
#10	79.6		
#20	69.2		
#40	61.9		
#100	51.4		
#200	43.5		

* (no specification provided)

Material Description

light brown clayey sand

Atterberg Limits

PL= 23 LL= 32 PI= 9

Coefficients

D_{90}= 4.8735 D_{85}= 3.1555 D_{60}= 0.3494
D_{50}= 0.1322 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO= A-4(1)

Remarks

Source of Sample: B-6 **Depth:** 2.5'-6.5'
Sample Number: S-2/S-3

Date: 9/15/15

Triad Engineering, Inc.

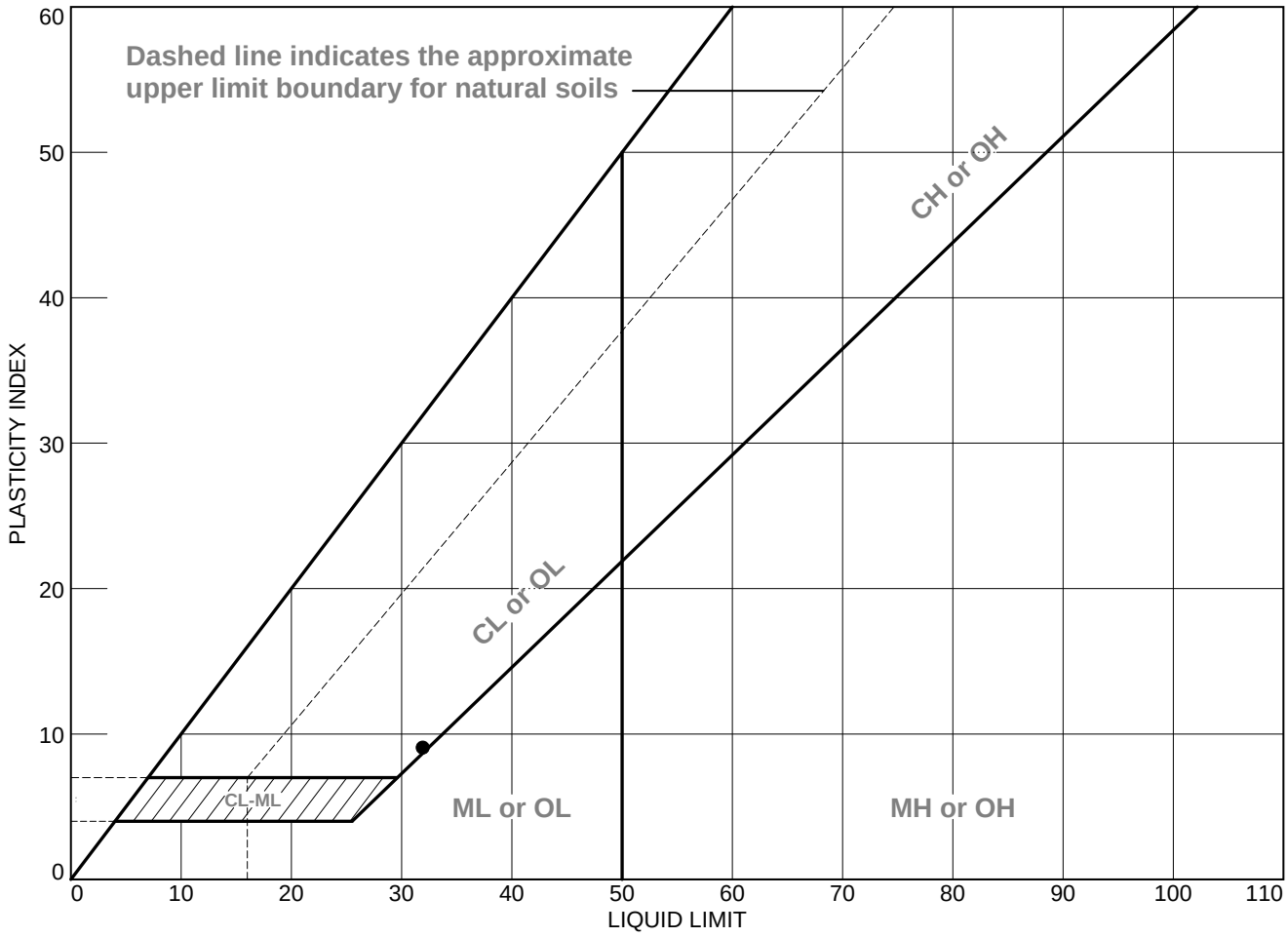
Morgantown, WV

Client: EQT
Project: EQT H-318 HDD Line

Project No: 02-15-0085 **Figure** C-10

Tested By: DTB **Checked By:** RAS

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	B-6	S-2/S-3	2.5'-6.5'	12.2	23	32	9	SC

Triad Engineering, Inc.

Morgantown, WV

Client: EQT
Project: EQT H-318 HDD Line
Project No.: 02-15-0085
Figure C-11

Tested By: CLA **Checked By:** DTB

TRIAD ENGINEERING, INC.
1097 Chaplin Hill Road
Morgantown, WV 26501
Phone No. (304) 296-2562
Fax No. (304) 296-8739

Triad Engineering, Inc.

Rock Core Compressive Strength Worksheet
ASTM D7012

Project Name: EQT H-318/Mon Crossing HDD

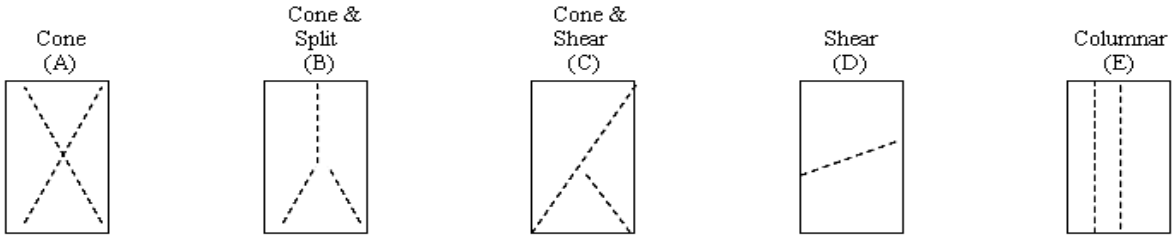
Project # : 02-15-0085 Date : 8/18/2015

Core # : B-4 Depth: 111.0'-112.0'

Sample Description: light gray,blue sandstone

Measurements (inches)		
	Length	Diameter
#1	3.950	1.984
#2		
#3		
Avg.	3.950	1.984

Length to Diameter Ratio :	**1.99**		Correction Factor:	**1**
Area:	**3.0915**	in^2	Flatness of Sample:	FLAT
Load:	**12290**	lbs	Surface Straightness:	STRAIGHT
Compressive Strength:	**3975**	lbs/in^2	Moisture Condition:	DRY
Compressive Strength:	**286**	$tons/ft^2$	Deformation Rate:	s
Corrected Strength :	**3975**	lbs/in^2	Type of Break:	B
Corrected Strength :	**286**	$tons/ft^2$		



Remarks:

Tested by: Checked by:

Figure # C-12

TRIAD ENGINEERING, INC.
1097 Chaplin Hill Road
Morgantown, WV 26501
Phone No. (304) 296-2562
Fax No. (304) 296-8739

Triad Engineering, Inc.

Rock Core Compressive Strength Worksheet
ASTM D7012

Project Name: EQT H-318/Mon Crossing HDD

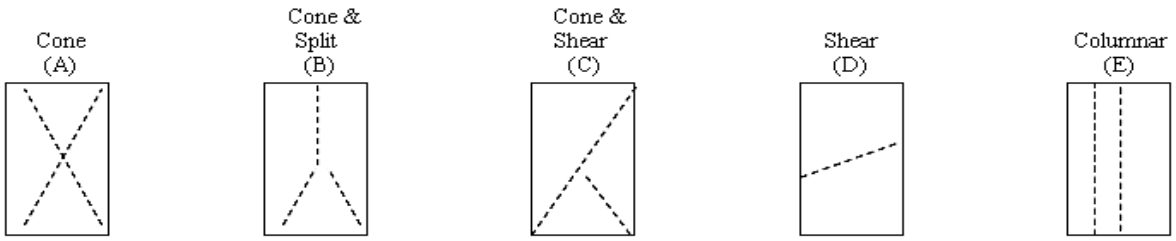
Project # : 02-15-0085 Date : 8/18/2015

Core # : B-5 Depth: 101.5'-102.0'

Sample Description: light brown,red silt/claystone

Measurements (inches)		
	Length	Diameter
#1	3.664	1.984
#2		
#3		
Avg.	3.664	1.984

Length to Diameter Ratio :	**1.85**		Correction Factor:	**1**
Area:	**3.0915**	in^2	Flatness of Sample:	FLAT
Load:	**1670**	lbs	Surface Straightness:	STRAIGHT
Compressive Strength:	**540**	lbs/in^2	Moisture Condition:	DRY
Compressive Strength:	**39**	$tons/ft^2$	Deformation Rate:	s
Corrected Strength :	**540**	lbs/in^2	Type of Break:	A
Corrected Strength :	**39**	$tons/ft^2$		



Remarks:

Tested by: Checked by:

Figure # C-13

TRIAD ENGINEERING, INC.
1097 Chaplin Hill Road
Morgantown, WV 26501
Phone No. (304) 296-2562
Fax No. (304) 296-8739

Triad Engineering, Inc.

Rock Core Compressive Strength Worksheet
ASTM D7012

Project Name: EQT H-318/Mon Crossing HDD

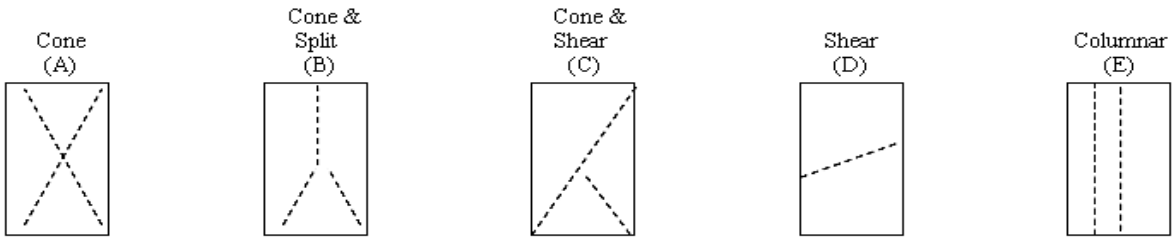
Project # : 02-15-0085 Date : 8/18/2015

Core # : B-5 Depth: 113.0'-114.0'

Sample Description: medium gray sandstone

Measurements (inches)		
	Length	Diameter
#1	3.951	1.983
#2		
#3		
Avg.	3.951	1.983

Length to Diameter Ratio :	**1.99**		Correction Factor:	**1**
Area:	**3.0884**	in^2	Flatness of Sample:	FLAT
Load:	**26420**	lbs	Surface Straightness:	STRAIGHT
Compressive Strength:	**8555**	lbs/in^2	Moisture Condition:	DRY
Compressive Strength:	**616**	$tons/ft^2$	Deformation Rate:	s
Corrected Strength :	**8555**	lbs/in^2	Type of Break:	E
Corrected Strength :	**616**	$tons/ft^2$		



Remarks:

Tested by: Checked by:

Figure # C-14

TRIAD ENGINEERING, INC.
1097 Chaplin Hill Road
Morgantown, WV 26501
Phone No. (304) 296-2562
Fax No. (304) 296-8739

Triad Engineering, Inc.

Rock Core Compressive Strength Worksheet
ASTM D7012

Project Name: EQT H-318/Mon Crossing HDD

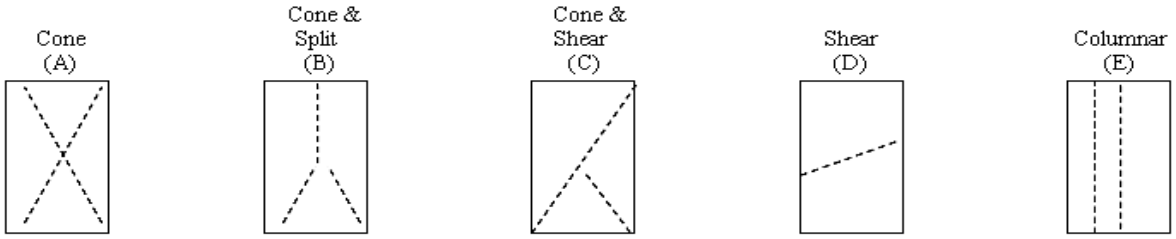
Project # : 02-15-0085 Date : 8/18/2015

Core # : B-5 Depth: 137.5'-138.0'

Sample Description: light gray sandstone

Measurements (inches)		
	Length	Diameter
#1	3.960	1.984
#2		
#3		
Avg.	3.960	1.984

Length to Diameter Ratio :	**2.00**		Correction Factor:	**1**
Area:	**3.0915**	in^2	Flatness of Sample:	FLAT
Load:	**18700**	lbs	Surface Straightness:	STRAIGHT
Compressive Strength:	**6049**	lbs/in^2	Moisture Condition:	DRY
Compressive Strength:	**436**	$tons/ft^2$	Deformation Rate:	s
Corrected Strength :	**6049**	lbs/in^2	Type of Break:	C
Corrected Strength :	**436**	$tons/ft^2$		



Remarks:

Tested by: Checked by:

Figure # C-15

TRIAD ENGINEERING, INC.
1097 Chaplin Hill Road
Morgantown, WV 26501
Phone No. (304) 296-2562
Fax No. (304) 296-8739

Triad Engineering, Inc.

Rock Core Compressive Strength Worksheet
ASTM D7012

Project Name: EQT H-318/Mon Crossing HDD

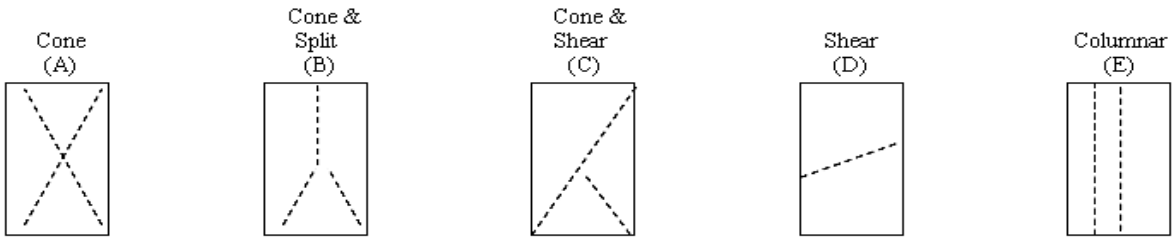
Project # : 02-15-0085 Date : 8/18/2015

Core # : B-5 Depth: 150.0'-151.0'

Sample Description: light gray,white sandstone

Measurements (inches)		
	Length	Diameter
#1	3.932	1.985
#2		
#3		
Avg.	3.932	1.985

Length to Diameter Ratio :	**1.98**		Correction Factor:	**1**
Area:	**3.0946**	in^2	Flatness of Sample:	FLAT
Load:	**23730**	lbs	Surface Straightness:	STRAIGHT
Compressive Strength:	**7668**	lbs/in^2	Moisture Condition:	DRY
Compressive Strength:	**552**	$tons/ft^2$	Deformation Rate:	s
Corrected Strength :	**7668**	lbs/in^2	Type of Break:	E
Corrected Strength :	**552**	$tons/ft^2$		



Remarks:

Tested by: Checked by:

Figure # C-16

TRIAD ENGINEERING, INC.

APPENDIX D

Rock Core Photos

Photo 1: Boring B-4, Box 1 of 9

Photo 2: Boring B-4, Box 2 of 9

Photo 3: Boring B-4, Box 3 of 9

Photo 4: Boring B-4, Box 4 of 9

EQT – Mon River HDD Crossing Geotechnical Report
Appendix D Core Box Photos
TRIAD ENGINEERING, INC.

Photo 5: Boring B-4, Box 5 of 9

Photo 6: Boring B-4, Box 6 of 9

Photo 7: Boring B-4, Box 7 of 9

Photo 8: Boring B-4, Box 8 of 9

Photo 9: Boring B-4, Box 9 of 9

Photo 10: Boring B-5, Box 1 of 7

Photo 11: Boring B-5, Box 2 of 7

Photo 12: Boring B-5, Box 3 of 7

Photo 13: Boring B-5, Box 4 of 7

Photo 14: Boring B-5, Box 5 of 7

Photo 15: Boring B-5, Box 6 of 7

Photo 16: Boring B-5, Box 7 of 7

Photo 17: Boring B-6, Box 1 of 6

Photo 18: Boring B-6, Box 2 of 6

Photo 19: Boring B-6, Box 3 of 6

Photo 20: Boring B-6, Box 4 of 6

Photo 21: Boring B-6, Box 5 of 6

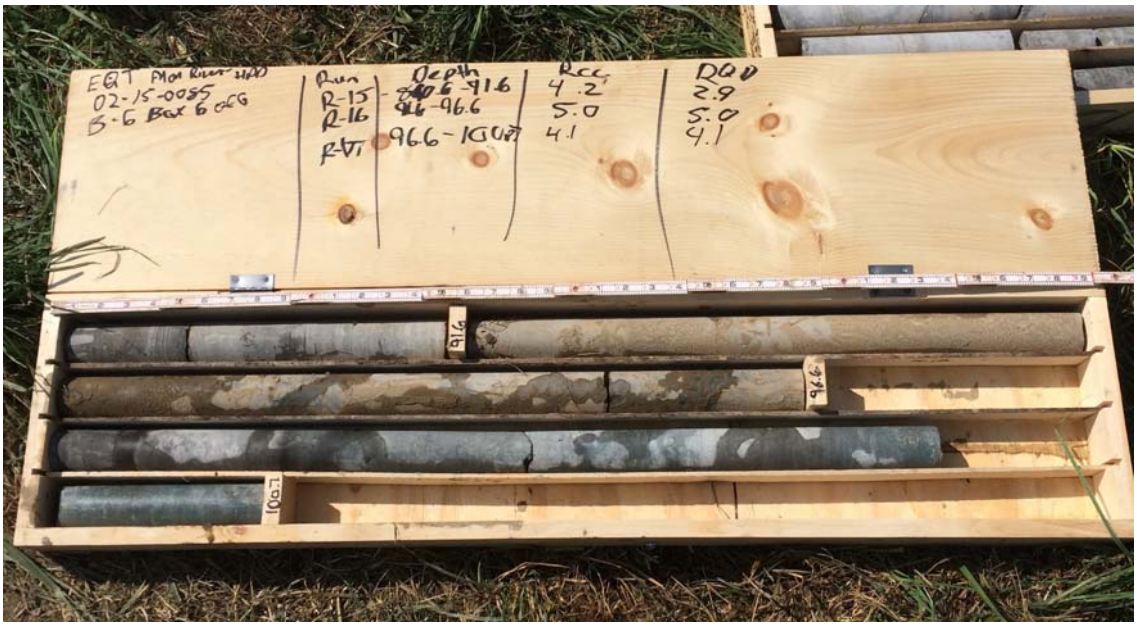


Photo 22: Boring B-6, Box 6 of 6

TRIAD ENGINEERING, INC.

APPENDIX E

Geophysical Survey

September 15, 2015

David W. Hooper, P.E.
Triad Engineering Inc.
500 Bursca Drive
Suite 504
Bridgeville, PA 15017

Re: Electrical Imaging Investigation
Proposed Pipeline Study
Monongahela River
Bunola, Pennsylvania
THG Project No. 120-6002

Dear Mr. Hooper:

THG Geophysics, Ltd. performed an electrical imaging (EI) investigation across the Monongahela River upstream of Lock 6 located north of Bunola, Pennsylvania on August 19 & 28, 2015 (Figures 1 and 2). The scope of work was to image the subsurface and to generate the subsurface soil and rock profile at the river crossing.

THEORY

Electrical resistance is based upon Ohm's Law, where resistance is equal to the difference between the current flow and voltage differential. However, resistivity depends upon the bulk property and geometry of the material. Consequently, resistivity is measured in Ohm-meters.

Currents are carried through earth materials by motion of the ions in connate water. Ions in connate water come from the dissociation of salts and provide for the flow of electric current. Further, resistivity decreases in water-bearing rocks and earth materials with increasing:

a. Fractional volume of the rock occupied by water;
b. Salinity content of the water;
c. Permeability of the pore spaces; and,
d. Temperature.

Materials that lack pore space (i.e., limestone, igneous rocks) or lack water in the pore space will show high resistivity (Mooney, 1958). Most earthen materials, however, show medium to low resistivity.

In homogeneous ground, the apparent resistivity is the true ground resistivity; however, in heterogeneous ground, the apparent resistivity represents a weighted average of all formations through which the current passes. Many electrode placements have been proposed (for examples see Reynolds, 1998); however, Schlumberger configurations have proven to be effective configurations for imaging fractures in shallow bedrock settings.

Eight marine electrical resistivity profiles were collected using an AGI SuperSting resistivity meter configured with the Marine Logging Module. The 2 land profiles were collected with a GF Instruments ARES continuous vertical electric sounder (Figure 2). A 3-m Schlumberger array configured with 13 graphite electrodes was used to collect the 8 continuous resistivity profiles (Figure 3) while being towed behind a moving boat. The 2 profiles collected on the land surface were collected using a 4-m Schlumberger array (Figure 4).

A forward modeling subroutine was used to calculate the apparent resistivity values using the EarthImager program (AGI, 2008, and Loke 1998). This program is based upon the smoothness-constrained least-squares method (deGroot-Hedlin and Constable, 1990; Loke and Barker, 1996). The EarthImager program divides the subsurface 2D space into a number of rectangular blocks. Resistivities of each block are then calculated to produce an apparent resistivity pseudosection. The pseudosection is compared to the actual measurements for consistency. A measure of the difference is given by the root-mean-squared error.

ANALYSIS

Generally, the marine resistivity system was not able to image to the bedrock depths. The marine profiles successfully imaged through the river bottom sediments, but only mapped the presence of bedrock in the eastern-most profile (Profile 6; Figure 3).

The land-based profiles mapped a resistive bedrock formation (Figure 4) 1-8 feet below the ground surface (bgs) on the eastern shore and 10 feet bgs on the western shore. This unit has a resistivity range of 60-100 ohm-meters which is likely indicative of an interbedded unit of limestone and shale. Below this unit lies a conductive unit (20-30 ohm-m) with resistivity values indicative of shale or claystone bedrock. These profiles imaged to approximately110 feet bgs.

If you have any questions or comments regarding this interpretation, please contact us to discuss in further detail.

Respectfully,
THG Geophysics, Ltd.

Kate McKinley, PG
Senior Geophysicist

REFERENCES

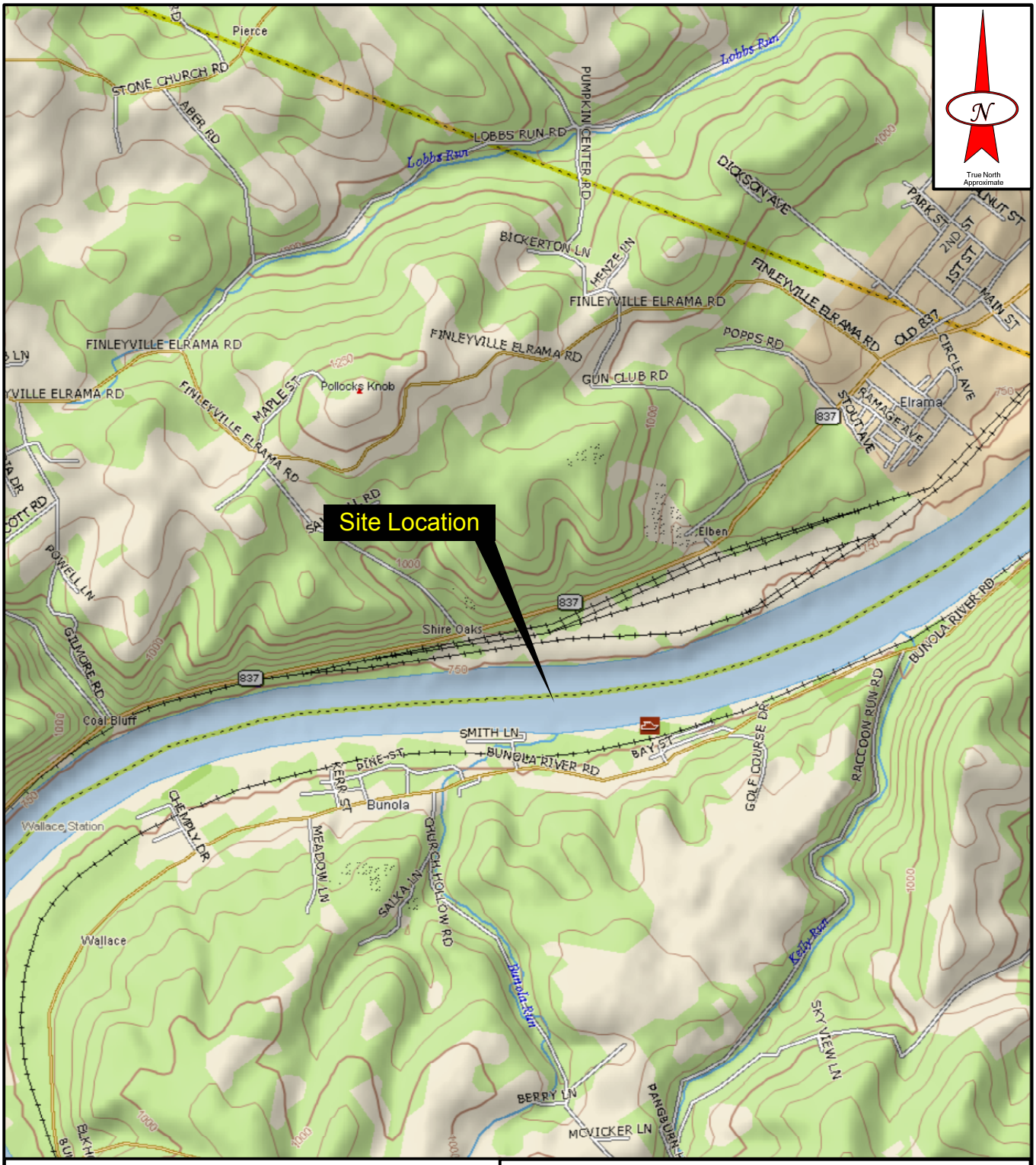
AGI, 2002. EarthImager Program. American Geosciences Inc., Austin Texas.

deGroot-Hedlin, C. and Constable, S., 1990, Occam's inversion to generate smooth, two-dimensional models from magnetotelluric data. Geophysics, V. 55, 1613-1624.

Loke, M. N., and Barker, R. D., 1996, Rapid least-squares inversion of apparent resistivity pseudosection by quasi-Newton method. Geophysical Prospecting, V. 44, 131-152.

Mooney, H. M. (1980). Handbook of Engineering Geophysics: Volume 2: Electrical Resistivity, Bison Instruments, Inc.

Reynolds, J. M. (1997). An Introduction to Applied and Environmental Geophysics. New York, NY, Wiley.



THG GEOPHYSICS Ltd

4280 Old William Penn Hwy
Murrysville, Pennsylvania 15668
(724) 325-3996 Fax: (724) 733-7901

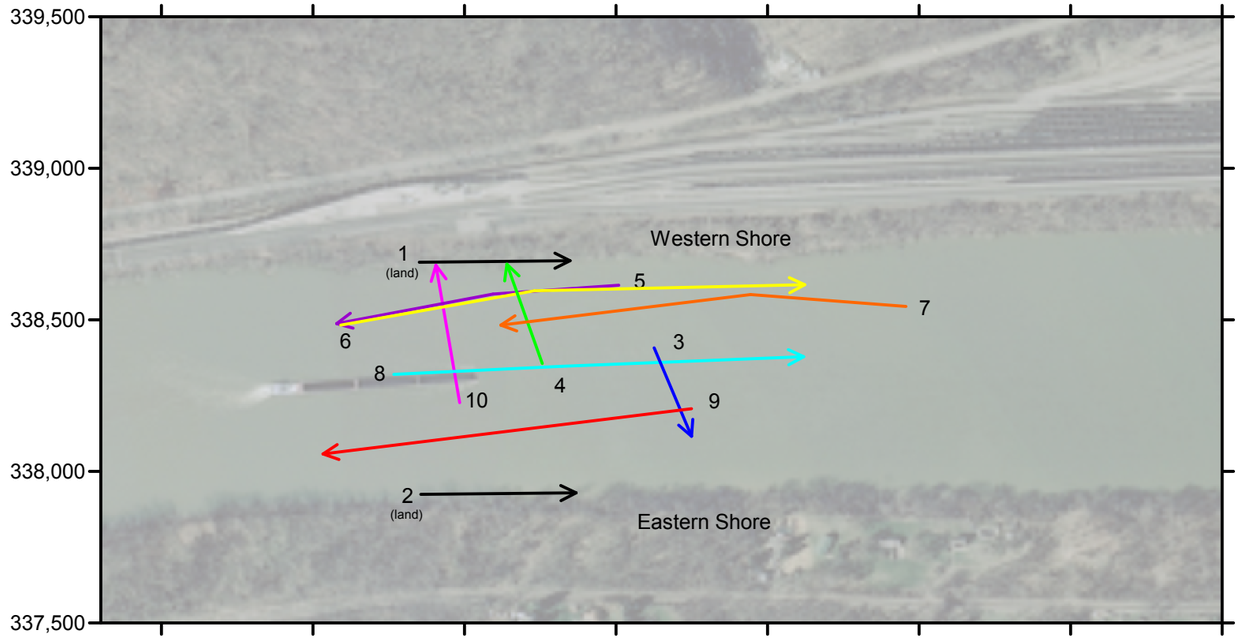
www.geo-image.com

0 ft 1000 ft 2000 ft 3000 ft 4000 ft 5000 ft

Figure 1
Site Location Map

Electrical Imaging Survey
Monongahela River Crossing
Bunola, Pennsylvania

SCALE: 1:24,000	PROJECT NO.: 129-6002	DRAWING NO.: DWG6002F1
DATE : 9/2/2015		
DRAWN BY: KSM	SOURCE: 1979 Monongahela (PA) USGS 7.5 Minute Topographic Quadrangle	
CHECKED BY: PJH		



0 ft 500 ft 1000 ft 1500 ft 2000 ft

Notes

Marine geophysical survey was conducted on August 19 , 2015 using an AGI SuperSting R8 equipped with 16 marine elelctodes. Positioning support provided by a Lowrance GPS system.

Land geophysicial survey was conducted on August 28, 2015 using a GF Instruments' ARES II electrical resistivity meter. Positioning support provided by a Trimble Geo7X GPS system.

Locations are approximate.

Legend

→ EI Line Location
(arrow indicates direction of acquisition)

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www.geo-image.com

DRN	KSM	9/1/15
DES	KSM	9/2/15
CHK	PJH	9/15/15
REV		
PROJ. MGR.	KSM	9/15/15

SCALE: 1 in = 500 ft

SOURCE: USGS, 2014
Lowrance and Trimble Geo7X Global Positioning Systems

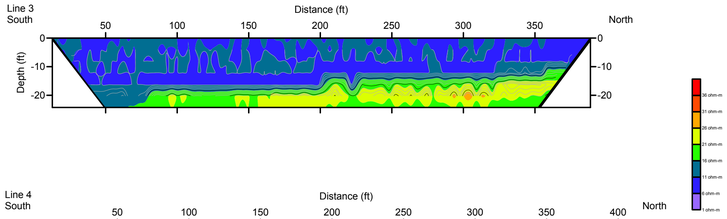
PROJECT:
Electrical Imaging Survey
Monongahela River Crossing
Bunola, Pennsylvania

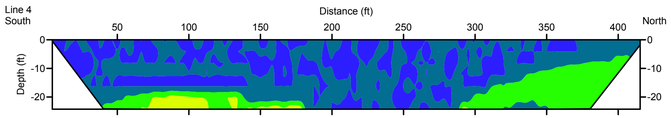
DRAWING NO.:
Figure 2
Geophysical Survey
Location Map

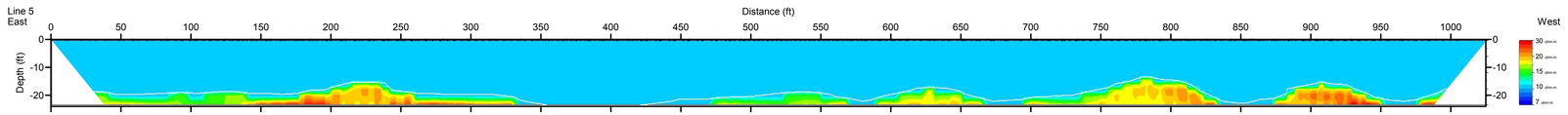
PREPARED FOR:
TRIAD ENGINEERING, INC.

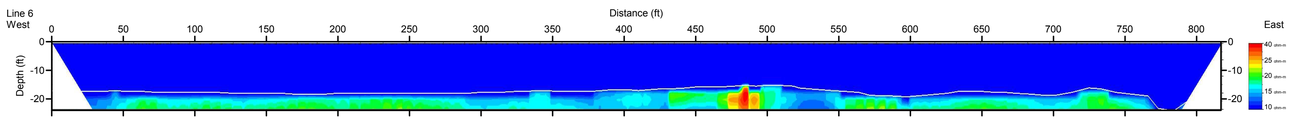
PROJECT NO.: 120-6002

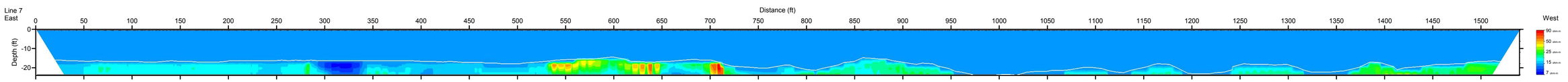
SHEET TITLE: DWG6002F2

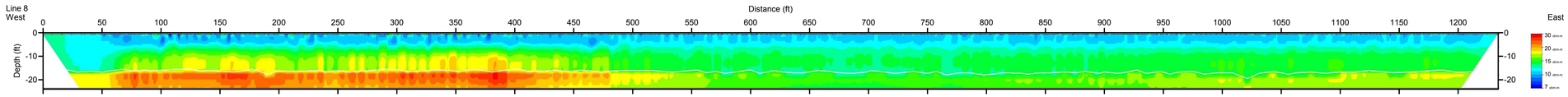


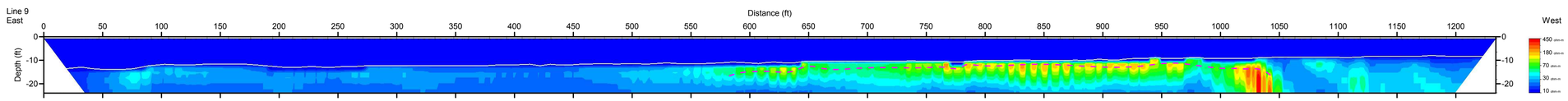


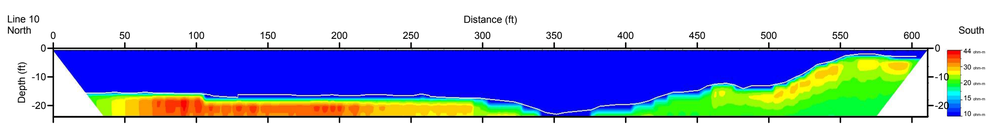












Legends

Interpreted Bedrock

Base of Water Column

Notes

Marine geophysical survey was conducted on August 19 , 2015 using an AGI SuperSting R8 equipped with 16 marine elelctodes. Positioning support provided by a Lowrance GPS system.

Land geophysicial survey was conducted on August 28, 2015 using a GF Instruments' ARES II electrical resistivity meter. Positioning support provided by a Trimble Geo7X GPS system.

Locations are approximate.

Horizontal scale: 1 inch = 50 feet
Vertical scale: 1 inch = 25 feet

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DRN	KSM	9/1/15
DES	KSM	9/2/15
CHK	PJH	9/15/15
REV		
PROJ. MGR.	KSM	9/15/15

SCALE: As Noted (Vertically Exaggerated)

SOURCE: Lowrance and Trimble Geo7X Global Positioning System

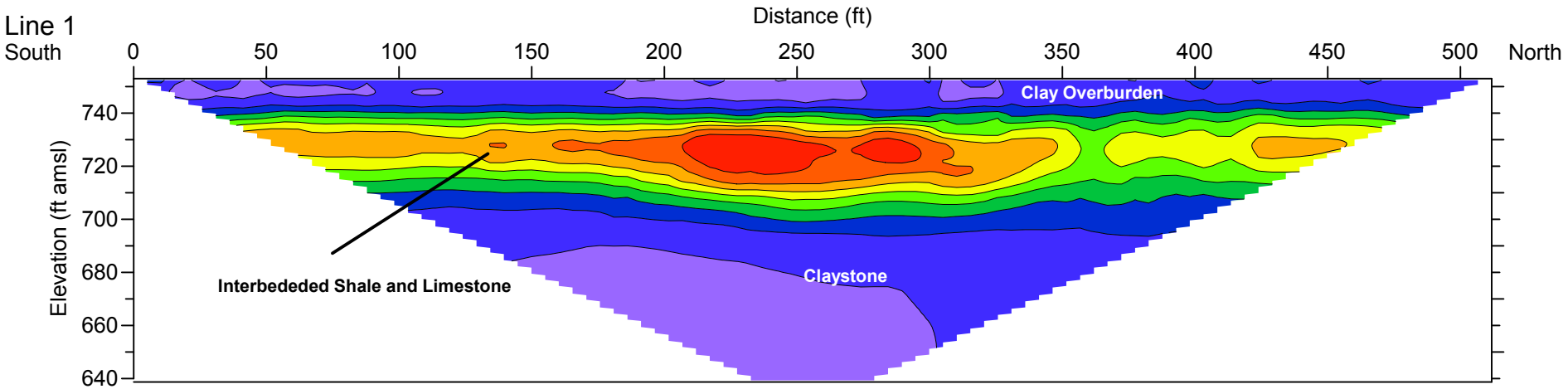
PROJECT:
Electrical Imaging Survey
Monongahela River Crossing
Bunola, Pennsylvania

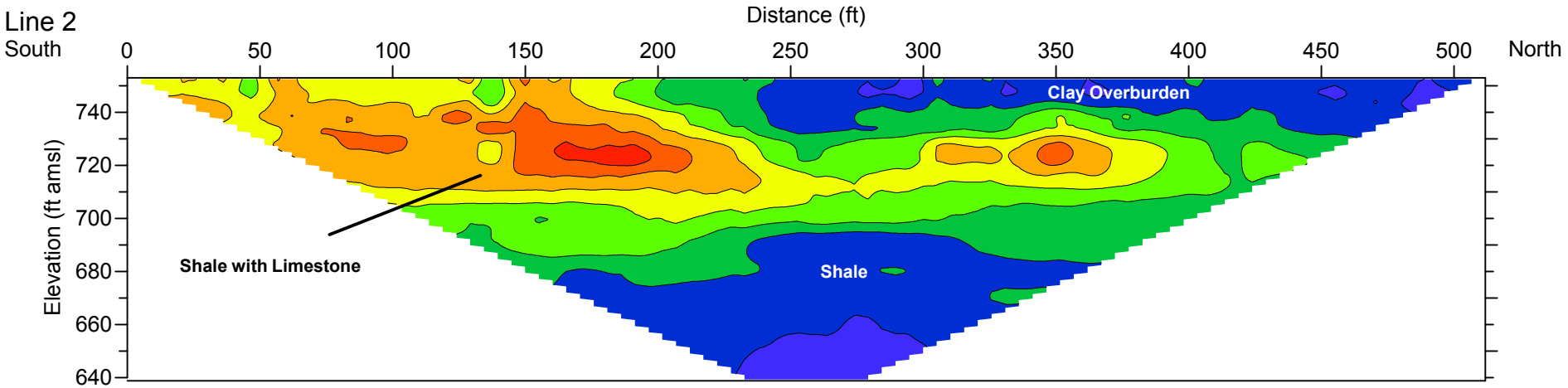
DRAWING NO.:
Figure 3
Geophysical Survey
Marine Electrical Imaging Data

PREPARED FOR:
TRIAD ENGINEERING, INC.

PROJECT NO.: 120-6002

SHEET TITLE: DWG6002F2





Notes

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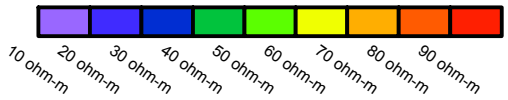
Land geophysicial survey was conducted on August 28, 2015 using a GF Instruments' ARES II electrical resistivity meter. Positioning support provided by a Trimble Geo7X GPS system.

Locations are approximate.

No vertical exaggeration.

Resistivity



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DRN	KSM	9/1/15
DES	KSM	9/2/15
CHK	MHB	9/14/15
REV		
PROJ. MGR.	KSM	9/14/15

SCALE: 1 in = 60 ft

SOURCE: Lowrance and Trimble Geo7X Global Positioning System

PROJECT:
Electrical Imaging Survey
Monongahela River Crossing
Bunola, Pennsylvania

DRAWING NO.:
Figure 4
Land Electrical Resistivity Data

PREPARED FOR:
TRIAD ENGINEERING, INC.

PROJECT NO.: 120-6002

SHEET TITLE: DWG6002F4

Equitrans Expansion Project

Docket No. CP16-__-000

Resource Report 1

Appendix 1-G
Site-Specific HDD Plans

HORIZONTAL DIRECTION DRILL

H316 PIPELINE CROSSING CSX RR, SOUTH FORK TENMILE CREEK, CREEK RD., & ANKROM RD.

EQUITRANS EXPANSION PROJECT

GREEN COUNTY, PENNSYLVANIA

LOCATION MAP

OCTOBER, 2015

INDEX OF SHEETS

FINAL DRAWING ISSUED FOR CONSTRUCTION

RUMMEL, KLEPPER & KAHL, LLP

CONSULTING ENGINEERS

125 FLOYD SMITH DRIVE, SUITE 140

CHARLOTTE, NC 28262

LICENSE # F–0112

PHONE: 980–235–0011

LINETYPE KEYS

BUILDINGS

CONCRETE

DITCH

DRIVEWAYS

EXISTING EDGE–OF–PAVEMENT

EXISTING ELECTRIC (OVERHEAD)

EXISTING ELECTRIC (UNDERGROUND)

EXISTING PIPELINE (UNKNOWN)

EXISTING STORM DRAIN

EXISTING TELEPHONE (UG)

EXISTING WATER

FENCE

PROPERTY LINE

OPEN WATER – STREAM

PROPOSED GAS (HDD)

PROPOSED GAS (TRENCHED)

RAILROAD

RAILROAD RIGHT–OF–WAY

ROAD RIGHT–OF–WAY

SILT FENCE

TEMPORARY ACCESS ROAD

TOE OF BANK

TOP OF BANK

TREELINE (WOODLINE)

ABBREVIATIONS

BOP	BOTTOM OF PIPE
CB	CATCH BASIN
CMP	CORRUGATED METAL PIPE
CO	CLEAN OUT
CP	CONTROL POINT (HDD)
CD	CHECK DAM
DI	DRAIN INLET
EIP	EXISTING IRON PIN
FH	FIRE HYDRANT
FM	FORCE MAIN SANITARY SEWER
FMV	FORCE MAIN VALVE
FO	FIBER OPTIC CABLE
GM	GAS MAIN
GV	GAS VALVE
GR	GUARDRAIL
HDD	HORIZONTAL DIRECTIONAL DRILL
IP	INLET PROTECTOR
OE	OVERHEAD ELECTRIC
PE	POLYETHYLENE PIPE
PP	POWER POLE (UTILITY POLE)
PIP	PIPE INLET PROTECTOR
RR	RAILROAD
R/W	RIGHT–OF–WAY
RCP	REINFORCED CONCRETE PIPE
SD	STORM DRAIN
SM	SEED AND MULCH
SF	SILT FENCE
SS	SANITARY SEWER
TELE	TELEPHONE CABLE
TOP	TOP OF PIPE (GAS MAIN)
TV	TV CABLE
UE	UNDERGROUND ELECTRIC
UG	UNDERGROUND
UT	UNDERGROUND TELEPHONE
UTV	UNDERGROUND TV CABLE
W	WATER
WM	WATER MAIN
WV	WATER VALVE

SYMBOLS KEYS

2' EP–GM DIMENSION (TYPICAL)

EM ELECTRIC METER

GEOTECH BORING

MISCELLANEOUS OBJECTS

NORTH ARROW

PED PEDESTAL

PWR POWER POLE (UTILITY POLE)

SIGN

SILT FENCE

STMH STORM DRAIN MANHOLE

TANK TANK

WATER VALVE

FINAL DRAWING ISSUED FOR CONSTRUCTION

LEGEND

REFERENCE DRAWINGS

DRAWING NUMBER	TITLE
-	....

REVISIONS

REV.	BY	DATE	DESCRIPTION
0	RK&K	10/8/15	ISSUED FOR REVIEW.
1	RK&K	10/9/15	ISSUED FOR CONSTRUCTION.

APPROVED FOR FERC			APPROVED FOR BIDDING			APPROVED FOR CONSTRUCTION		
REV.	BY	DATE	REV.	BY	DATE	REV.	BY	DATE
.	.	.						

SCALE: HORZ. N/A VERT. N/A	
DRAWN BY: JAS	10/8/15
DRAFTING CK: WRN	.
ENGINEERING CK: WPS	.
.	
.	
RK&K PROJECT NO.: 15040-02.3	
.	
DRAWING NO.: HDD-H316-LEGEND	
SHEET 2 OF 5	REV. 1
DATE OF PLOT: 10/9/15	

EQT

HORIZONTAL DIRECTION DRILL

H316 PIPELINE CROSSING CSX RR, SOUTH FORK TENMILE CREEK, CREEK RD, & ANKROM RD EQUITRANS EXPANSION PROJECT GREENE COUNTY, PENNSYLVANIA

GENERAL NOTES

1. ALL CONSTRUCTION METHODS AND MATERIALS SHALL CONFORM TO THE CURRENT SPECIFICATIONS AND STANDARDS OF EQUITRANS AND PENNSYLVANIA DEPARTMENT OF TRANSPORTATION (PENNDOT).

2. ALL WORK SHALL BE IN COMPLIANCE WITH OSHA TITLE 29 OF THE CODE OF FEDERAL REGULATIONS. CHAPTER 1 (29 CFR 1926), "OCCUPATION SAFETY AND HEALTH STANDARDS FOR THE CONSTRUCTION INDUSTRY".

3. TEMPORARY DRAINAGE DURING CONSTRUCTION SHALL BE PROVIDED BY THE CONTRACTOR TO RELIEVE AREAS THAT MAY CAUSE DAMAGE TO THE ROADWAYS OR IMPEDE TRAFFIC AS DIRECTED BY THE PENNDOT WITHIN THE PROJECT LIMITS.

4. PRIOR TO CONSTRUCTION OR EXCAVATION, THE CONTRACTOR SHALL ASSUME THE RESPONSIBILITY OF LOCATING ANY UNDERGROUND UTILITIES (PUBLIC AND/OR PRIVATE) THAT MAY EXIST IN THE AREA OF CONSTRUCTION. UTILITY OWNERS SHALL BE NOTIFIED IN ACCORDANCE WITH PA. ONE CALL TIME REQUIREMENTS IN ADVANCE OF ANY EXCAVATION IN THE PROXIMITY OF THE UTILITIES. THE CONTRACTOR, AT HIS OWN EXPENSE, SHALL BE RESPONSIBLE FOR THE REPAIR OF EXISTING UTILITIES DAMAGED DURING CONSTRUCTION. THE CONTRACTOR SHALL CONTACT PA811 AT 811 48 HOURS IN ADVANCE OF ANY CONSTRUCTION.

5. CONTRACTOR SHALL CLEARLY LOCATE ALL EXISTING UTILITY SERVICE CONNECTIONS AND AVOID DAMAGING THESE DURING CONSTRUCTION.

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGESAND/OR PENALTIES RESULTING FROM ALL NON-COMPLIANCE WITH FEDERAL, STATE AND LOCAL PERMITS AND ENCROACHMENT AGREEMENTS.

7. ALL PAVEMENT DAMAGED DURING CONSTRUCTION SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITIONS BY THE CONTRACTOR ACCORDING TO PENNDOT REQUIREMENTS.

8. THE GAS MAIN SHALL BE INSTALLED SO AS TO PROVIDE A MINIMUM OF TWENTY FOUR (24) INCHES OF CLEARANCE TO ALL OTHER UNDERGROUND UTILITIES AND STRUCTURES. WHERE THIS IS NOT POSSIBLE APPROPRIATE PROTECTION SHALL BE INSTALLED.

9. ALL DRAINAGE PIPES AND STRUCTURES SHALL BE CLEANED OF DEBRIS AND ERODED MATERIALS RESULTING FROM CONSTRUCTION. THESE PIPES AND STRUCTURES SHALL BE MAINTAINED CLEAN DURING THE PERIOD OF CONSTRUCTION.

10. ALL DISTURBED SLOPES SHALL BE RESTORED TO EXISTING GRADES AND STABILIZED WITH SEED AND TACK IF APPROPRIATE.

11. CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES AS DESCRIBED ON THE PROJECT PLANS AND DETAILS DURING CONSTRUCTION AND SURFACE RESTORATION UNTIL SUCH MEASURES ARE NOT NECESSARY. WHERE ADDITIONAL MEASURES ARE NECESSARY, THE CONTRACTOR SHALL INSTALL AND MAINTAIN THE APPROPRIATE MEASURES ACCORDING TO THE PENNSLVANIA EROSION AND SEDIMENT CONTROL PLANNING DESIGN MANUAL.

12. SEED ALL DISTURBED AREAS AND MULCH AS REQUIRED.

13. DIRECTIONAL DRILLS
- MINIMUM 20' DEPTH UNDER INTERSTATE AND CONTROLLED ACCESS ROADS
- MINIMUM 10' DEPTH FOR ALL OTHER STATE ROADS
- MINIMUM 4' DEPTH BELOW GROUND LEVEL FOR PARALLEL INSTALLATIONS
- MINIMUM 5' CLEARANCE HORIZONTAL OR VERTICAL FOR ANY KIND OF STRUCTURE OR PIPE REQUIRED
- DRIVEWAY BORES MUST MEET THE MINIMUM 4' FOR PARALLEL INSTALLATIONS

14. CULVERT CROSSINGS
- THE MINIMUM AMOUNT OF COVER BETWEEN THE TOP OF THE CULVERT AND UTILITY AND THE TOP OF THE FILL AT ALL PIPE CULVERTS SHALL BE EQUAL TO OR GREATER THAN 24-INCHES. THE EXCAVATION FOR THE LAST 6-INCHES SHALL BE PERFORMED BY HAND.
- THE MINIMUM AMOUNT OF SEPARATION BETWEEN THE BOTTOM OF THE CULVERT AND UTILITY LINE CROSSING UNDERNEATH THE CULVERT SHALL BE A MINIMUM 2-FEET.
- THE PROPOSED LINE LOOPS AROUND THE CULVERT EDGE, A MINIMUM 5' CLEARANCE (HORIZONTAL AND VERTICAL) WILL BE MAINTAINED FROM THE STRUCTURE.

VARIATIONS IN PLAN OR PROFILE

15. THE CONTRACTOR MAY REQUEST CHANGES TO THE PROPOSED VERTICAL AND HORIZONTAL ALIGNMENT OF THE INSTALLATION AND THE LOCATION OF THE ENTRY AND EXIT POINTS. PROPOSED CHANGES SHALL BE SUBMITTED TO THE OWNER AND RECEIVE APPROVAL OF THE OWNER PRIOR TO CONSTRUCTION.

16. THE CONTRACTOR SHALL MAINTAIN THE HORIZONTAL ALIGNMENT (PLAN VIEW) AS INDICATED ON THE PROJECT PLANS WITH A +/- 2 FOOT VARIANCE.

17. CONTROL POINT ELEVATIONS SHOWN INDICATE THE MINIMUM COVER AND SHALL NOT BE REDUCED THE CONTRACTOR MAY DRILL DEEPER WITH THE APPROVAL OF THE owner.

PILOT HOLE REQUIREMENTS

18. THE CONTRACTOR SHALL AT ALL TIMES PROVIDE AND MAINTAIN INSTRUMENTATION WHICH WILL ACCURATELY LOCATE THE PILOT HOLE, MEASURE DRILL STRING AXIAL AND TORSION LOADS, AND MEASURE DRILLING FLUID DISCHARGE RATE AND PRESSURE.

19. THE OWNER WILL HAVE ACCESS TO THESE INSTRUMENTS AND THEIR READINGS AT ALL TIMES.

20. THE CONTRACTOR, WHEN REQUESTED BY THE OWNER, WILL PROVIDE INSPECTION HOLES AT NO ADDITIONAL COST TO VISUALLY VERIFY THE LOCATION AND CONDITION OF THE DRILLED PIPELINE.

21. THE CONTRACTOR SHALL PLOT THE ACTUAL HORIZONTAL AND VERTICAL ALIGNMENT OF THE PILOT BORE AT INTERVALS NOT EXCEEDING 20 FEET.

22. THIS "AS-BUILT" PLAN AND PROFILE SHALL BE UPDATED AS THE PILOT BORE IS ADVANCED.

23. THE CONTRACTOR SHALL GRANT THE OWNER ACCESS TO ALL DATA READOUT PERTAINING TO THE POSITION AND INCLINATION OF THE BOREHEAD. WHEN REQUESTED, THE CONTRACTOR SHALL PROVIDE EXPLANATIONS OF HIS POSITION MONITORING AND STEERING EQUIPMENT.

24. THE ACTUAL PILOT HOLE EXIT POINT SHALL BE LOCATED WITHIN TWO (2) FEET LATERALLY OF THE EXIT POINT SHOWN ON THE DRAWINGS. LONGITUDINALLY THE ACTUAL EXIT POINT SHALL BE NO MORE THAN FIVE (5) FEET SHORT OR FIVE (5) FEET PAST THE EXIT POINT SHOWN ON THE DRAWINGS.

25. THE PILOT HOLE SHALL BE DRILLED ALONG THE PATH SHOWN ON THE PLAN AND PROFILE DRAWING MAINTAINING THE SPECIFIED TOLERANCES.

26. THE OWNER SHALL APPROVE THE ALIGNMENT OF THE PILOT BORE BEFORE THE REAMING PHASE OR PIPE PULLING MAY COMMENCE.

27. IF THE PILOT BORE FAILS TO CONFORM TO THE ABOVE TOLERANCES, OWNER MAY, AT HIS OPTION, REQUIRE A NEW PILOT BORE TO BE MADE.

28. IN ALL CASES, RIGHT OF WAY RESTRICTIONS SHALL TAKE PRECEDENCE OVER THE LISTED TOLERANCES.

29. NO PILOT HOLE WILL BE ACCEPTED IF IT WILL RESULT IN ANY OF THE PIPELINE BEING INSTALLED IN VIOLATION OF RIGHT OF WAY RESTRICTIONS.

30. CONCERN FOR ADJACENT UTILITIES AND/OR STRUCTURES SHALL TAKE PRECEDENCE OVER THE LISTED TOLERANCES. LISTING OF TOLERANCES DOES NOT RELIEVE CONTRACTOR FROM RESPONSIBILITY FOR SAFE OPERATIONS OR DAMAGE TO ADJACENT UTILITIES AND STRUCTURES.

31. ALL BEND RADII SHALL BE EQUAL TO OR GREATER THAN THOSE LISTED IN THE PROJECT PLANS.

INSTALLATION

32. THE CONTRACTOR, SUBJECT TO THE REQUIREMENTS OF THESE PLANS, WILL DETERMINE THE EXACT METHOD AND TECHNIQUES FOR COMPLETING THE HDD CROSSINGS. EXCAVATED MUD PITS CONSTRUCTED IN THE ENTRY AND EXIT AREAS WILL BE LIMITED TO THE PIPE BOREHOLE AREA ONLY.

33. AFTER COMPLETION OF THE DIRECTIONAL DRILLING WORK, THE ENTRY AND EXIT PIT LOCATION SHALL BE RESTORED TO THEIR ORIGINAL CONDITIONS.

PREREAMING REQUIREMENTS

34. AFTER THE PILOT HOLE IS ACCEPTED, THE CONTRACTOR SHALL PERFORM REAMING OPERATIONS AND PRODUCT PIPE PULL.

35. BUOYANCY MODIFICATIONS SHALL BE USED AT THE DISCRETION OF THE CONTRACTOR. ANY BUOYANCY MODIFICATION PROCEDURE PROPOSED FOR USE SHALL BE SUBMITTED TO OWNER FOR APPROVAL. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO THE PULL SECTION RESULTING FOR BUOYANCY MODIFICATIONS.

PULLBACK REQUIREMENTS

36. CONTRACTOR SHALL PULL EXTRA LENGTH OF PRODUCT PIPE SO ONE WELD JOINT CAN BE EXAMINED.

37. THE MAXIMUM ALLOWABLE TENSILE LOAD IMPOSED ON THE PRODUCT PIPE SHALL NOT EXCEED 1,629,000 LBF FOR THE 30-INCH PIPE.

38. CONTRACTOR SHALL SUPPORT THE PRODUCT PIPE PULL SECTION AS IT PROCEEDS DURING PULLBACK SO THAT IT MOVES FREELY AND IS NOT OVER STRESSED.

39. THE MAXIMUM SPACING OF PIPE SUPPORTS FOR THE PRODUCT PIPE DURING PULLBACK IS 160-FEET FOR THE 30-INCH PIPE.

40. THE MAXIMUM SPACING FROM THE ENDS OF PRODUCT PIPE TO FIRST PIPE SUPPORT IS 60-FEET FOR THE 30-INCH PIPE.

DRILLING FLUIDS

41. CONTRACTOR SHALL SUBMIT THE COMPOSITION OF ALL DRILLING FLUIDS TO OWNER FOR APPROVAL.

42. CONTRACTOR SHALL NOT USE ANY DRILLING FLUID THAT DOES NOT COMPLY WITH PERMIT REQUIREMENTS AND ENVIRONMENTAL REGULATIONS.

43. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING, TRANSPORTING, AND STORING ANY WATER REQUIRED FOR DRILLING FLUIDS.

44. CONTRACTOR SHALL MAXIMIZE RECIRCULATION OF DRILLING FLUID SURFACE RETURNS.

45. CONTRACTOR SHALL PROVIDE SOLIDS CONTROL AND FLUID CLEANING EQUIPMENT OF A CONFIGURATION AND CAPACITY THAT CAN PROCESS SURFACE RETURNS AND PRODUCE DRILLING FLUID SUITABLE FOR REUSE.

46. DISPOSAL OF EXCESS DRILLING FLUIDS IS THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE CONDUCTED IN COMPLIANCE WITH ALL ENVIRONMENTAL REGULATIONS, RIGHT OF WAY, AND WORKSPACE AGREEMENTS, AND PERMIT REQUIREMENTS.

47. IF INADVERTENT SURFACE RETURNS OF DRILLING FLUIDS OCCUR, CONTRACTOR SHALL IMMEDIATELY CONTAIN AND COLLECT.

48. CONTRACTOR SHALL SUBMIT DRILLING FLUID DISPOSAL PROCEDURES TO OWNER FOR APPROVAL.

49. CONTRACTOR SHALL EMPLOY BEST EFFORTS TO MAINTAIN FULL ANNULAR CIRCULATION OF DRILLING FLUID.

50. IN THE EVENT THAT ANNULAR CIRCULATION IS LOST CONTRACTOR SHALL TAKE ACTION TO RESTORE CIRCULATION.

FINAL DRAWING ISSUED FOR CONSTRUCTION

LEGEND

REFERENCE DRAWINGS

DRAWING NUMBER	TITLE
-	....

REVISIONS

REV.	BY	DATE	DESCRIPTION
0	RK&K	10/8/15	ISSUED FOR REVIEW.
1	RK&K	10/9/15	ISSUED FOR CONSTRUCTION.

APPROVED FOR FERC			APPROVED FOR BIDDING			APPROVED FOR CONSTRUCTION		
REV.	BY	DATE	REV.	BY	DATE	REV.	BY	DATE
-	-	-						

SCALE: HORZ.1"=150' VERT. 1"=150'
DRAWN BY: JAS 10/8/15
DRAFTING CK: WRN .
ENGINEERING CK: JAS .
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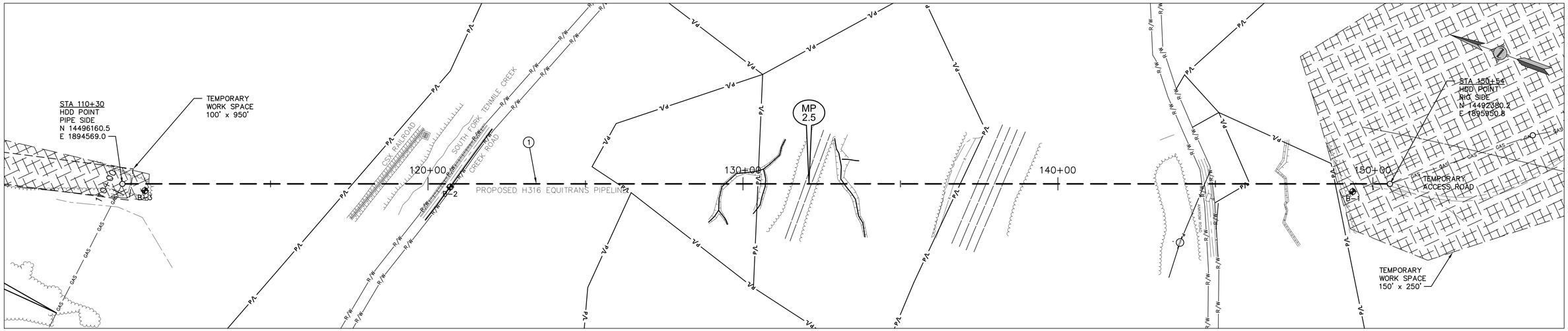
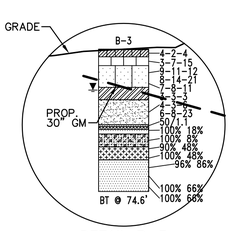
HEI PROJECT NO.: 15040-02.3
.
DRAWING NO.:
HDD-H316-NOTES
SHEET 3 OF 5 REV. 1
DATE OF PLOT: 10/9/15

EQT

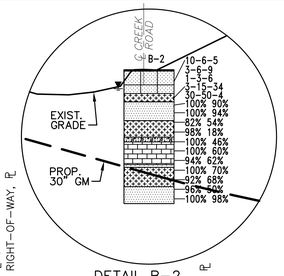
HORIZONTAL DIRECTION DRILL

H316 PIPELINE CROSSING CSX RR, SOUTH FORK TENMILE CREEK, CREEK RD, & ANKROM RD EQUITRANS EXPANSION PROJECT GREENE COUNTY, PENNSYLVANIA

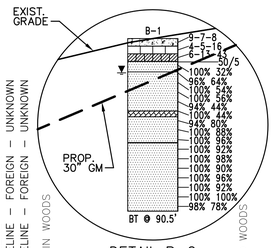




DETAIL B–3

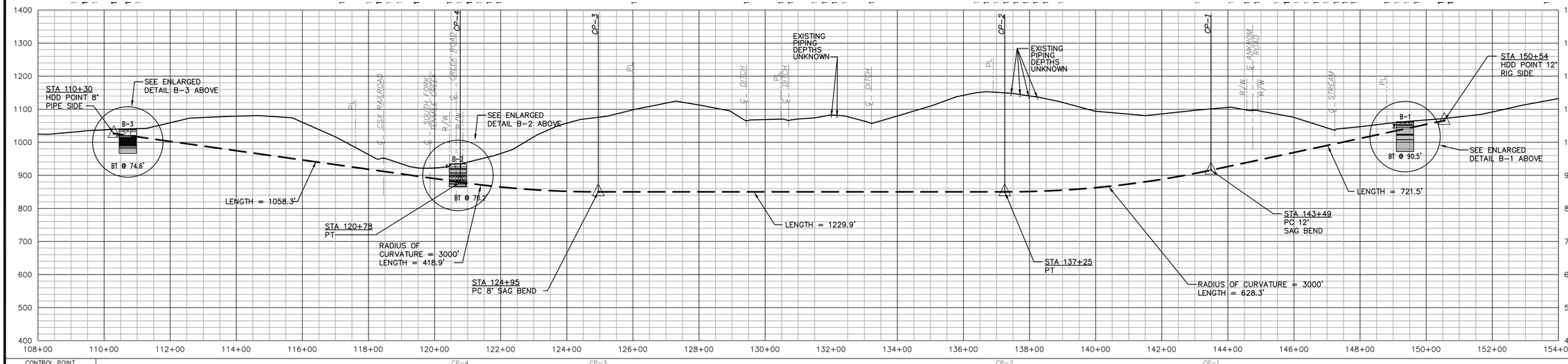


DETAIL B–2



DETAIL B–2

109+50	℄ FIELD ROAD(DIRT)
109+82	**BEGIN ATWS**
110+00	END WOODS
110+30	**BEGIN HDD(EXIT)**
111+13	**END ATWS**
111+22	BEGIN WOODS
117+61	℘
118+42	℄ RAIL
118+45	**℄ CSX RAILROAD**
118+48	℄ RAIL
119+34	SIGN, 89'LT
119+86	**℄ RIVER**
120+45	RIGHT–OF–WAY, ℘
120+55	BEGIN ASPHALT
120+65	**℄ COUNTY ROAD(ASPHALT)**
120+74	END ASPHALT
120+78	℄ DRAIN
120+85	RIGHT–OF–WAY, ℘
126+03	℘
129+43	℄ DRAIN
130+48	℘
130+71	℄ DRAIN
131+51	END WOODS
131+96	PIPELINE – FOREIGN – UNKNOWN
132+17	PIPELINE – FOREIGN – UNKNOWN
132+40	BEGIN WOODS
133+21	℄ DRAIN
136+38	END WOODS
136+49	℄ FIELD ROAD(DIRT)
136+69	FENCE
136+90	℘
137+44	PIPELINE – FOREIGN – UNKNOWN
137+72	PIPELINE – FOREIGN – UNKNOWN
137+98	PIPELINE – FOREIGN – UNKNOWN
138+25	PIPELINE – FOREIGN – UNKNOWN
138+94	BEGIN WOODS
143+07	END WOODS
144+09	BEGIN WOODS
144+57	RIGHT–OF–WAY, ℘
144+65	PIPELINE – FOREIGN – UNKNOWN
144+66	BEGIN ASPHALT
144+66	OHP LINE
144+75	**℄ ANKROM ROAD (ASPHALT)**
144+84	END ASPHALT
144+87	FENCE
144+91	RIGHT–OF–WAY, ℄
144+95	SIGN, 49'RT
146+01	℘ ℄ STREAM (S–AA17)(PER)
147+24	℄ ℄ STREAM (S–AA18)(INT)
147+60	STREAM
148+80	℘
148+95	FENCE
149+11	END WOODS
149+50	ACCESS ROAD – TEMPORARY
148+88	**BEGIN TWS**
150+54	**END HDD (ENTRY)**
153+64	PIPELINE – FOREIGN – PNG 4" PROPOSED TYPE 4 TEST STATION



CONTROL POINT	CP–4	CP–3	CP–2	CP–1
STATION	STA 120+78	STA 124+95	STA 137+25	STA 143+49
DEPTH	55.1'	225.5'	299.5'	185.3'
EROSION & SEDIMENTATION	NTS			

FINAL DRAWING ISSUED FOR CONSTRUCTION

LEGEND

- Asphalt and Subbase
- Silt and Clay
- Silt and Sand
- Silty Clay
- Sandstone
- Sand and Gravel
- Claystone
- Silt and Siltstone
- Coal
- Limestone
- Topsoil
- Clay
- Sand

NOTES

1. BASE DRAWING IS DERIVED FROM EXISTING MAP AND DRAWING INFORMATION AS INDICATED IN THE REFERENCE SECTION. THE ACCURACY OF THE INFORMATION IS NOT GUARANTEED. CONTRACTOR SHALL VERIFY CONDITIONS AND UTILITY LOCATIONS PRIOR TO CONSTRUCTION.
2. COORDINATE LOCATIONS ARE BASED ON UTM ZONE 17, HORIZONTAL DATUM; NAD 83 US SURVEY FEET, VERTICAL DATUM; NAVD88.
3. CALCULATED APPROXIMATE PULLBACK LOAD ON PRODUCT PIPE FOR HDD IS 272,000 LBF.
4. NO EXCAVATION WITHIN THE CLEAR RECOVERY ZONE SHALL BE LEFT OPEN OVERNIGHT.

SUMMARY OF MATERIALS

ITEM #	QUANTITY	DESCRIPTION
①	4060 LF	30" STL. PIPE, API 5L, 0.688" W.T., X–70, FBE

REFERENCE SECTION

TOPOGRAPHIC INFORMATION PROVIDED BY HEI 8/7/14

GEOTECH INFORMATION PROVIDED BY TRIAD ENGINEERING, TRIAD ENGINEERING, INC. PROJ. NO. 02–15–0085. 9/21/15

REVISIONS

REV.	BY	DATE	DESCRIPTION
0	RK&K	10/8/15	ISSUED FOR REVIEW.
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SCALE: HORZ.1"=150' VERT. 1"=150'	
DRAWN BY: JAS	10/8/15
DRAFTING CK: WRN	.
ENGINEERING CK: WPS	.
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RK&K PROJECT NO.:	15040-02.3
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DRAWING NO.:	HDD-H316-01
SHEET 4 OF 5	REV. 1
DATE OF PLOT:	10/9/15

EQT

HORIZONTAL DIRECTION DRILL

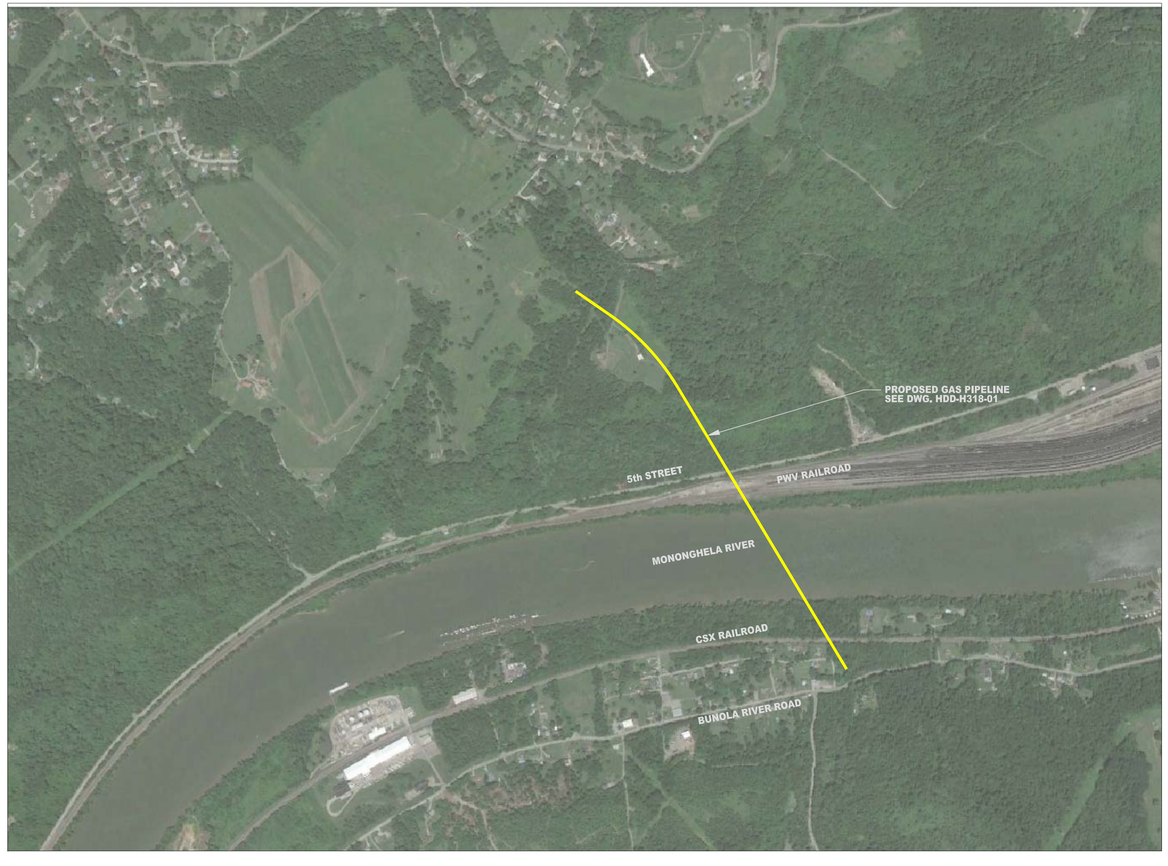
H316 PIPELINE CROSSING CSX RR, SOUTH FORK TENMILE CREEK, CREEK RD, & ANKROM RD EQUITRANS EXPANSION PROJECT GREENE COUNTY, PENNSYLVANIA

HORIZONTAL DIRECTION DRILL

H318 PIPELINE CROSSING CSX RR, MONONGAHELA RIVER, PWV RR & SR 837

EQUITRANS EXPANSION PROJECT

ALLEGHENY & WASHINGTON CO.S, PA.



LOCATION MAP

OCTOBER, 2015

INDEX OF SHEETS

FINAL DRAWING ISSUED FOR CONSTRUCTION

RUMMEL, KLEPPER & KAHL, LLP

CONSULTING ENGINEERS

125 FLOYD SMITH DRIVE, SUITE 140

CHARLOTTE, NC 28262

LICENSE # F–0112

PHONE: 980–235–0011

LINETYPE KEYS

BUILDINGS

CONCRETE

DITCH

DRIVEWAYS

EXISTING EDGE–OF–PAVEMENT

EXISTING ELECTRIC (OVERHEAD)

EXISTING ELECTRIC (UNDERGROUND)

EXISTING PIPELINE (UNKNOWN)

EXISTING STORM DRAIN

EXISTING TELEPHONE (UG)

EXISTING WATER

FENCE

PROPERTY LINE

OPEN WATER – STREAM

PROPOSED GAS (HDD)

PROPOSED GAS (TRENCHED)

RAILROAD

RAILROAD RIGHT–OF–WAY

ROAD RIGHT–OF–WAY

SILT FENCE

TEMPORARY ACCESS ROAD

TOE OF BANK

TOP OF BANK

TREELINE (WOODLINE)

ABBREVIATIONS

BOP	BOTTOM OF PIPE
CB	CATCH BASIN
CMP	CORRUGATED METAL PIPE
CO	CLEAN OUT
CP	CONTROL POINT (HDD)
CD	CHECK DAM
DI	DRAIN INLET
EIP	EXISTING IRON PIN
FH	FIRE HYDRANT
FM	FORCE MAIN SANITARY SEWER
FMV	FORCE MAIN VALVE
FO	FIBER OPTIC CABLE
GM	GAS MAIN
GV	GAS VALVE
GR	GUARDRAIL
HDD	HORIZONTAL DIRECTIONAL DRILL
IP	INLET PROTECTOR
OE	OVERHEAD ELECTRIC
PE	POLYETHYLENE PIPE
PP	POWER POLE (UTILITY POLE)
PIP	PIPE INLET PROTECTOR
RR	RAILROAD
R/W	RIGHT–OF–WAY
RCP	REINFORCED CONCRETE PIPE
SD	STORM DRAIN
SM	SEED AND MULCH
SF	SILT FENCE
SS	SANITARY SEWER
TELE	TELEPHONE CABLE
TOP	TOP OF PIPE (GAS MAIN)
TV	TV CABLE
UE	UNDERGROUND ELECTRIC
UG	UNDERGROUND
UT	UNDERGROUND TELEPHONE
UTV	UNDERGROUND TV CABLE
W	WATER
WM	WATER MAIN
WV	WATER VALVE

SYMBOLS KEYS

2' EP–GM DIMENSION (TYPICAL)

EM ELECTRIC METER

GEOTECH BORING

MISCELLANEOUS OBJECTS

NORTH ARROW

PED PEDESTAL

PWR POWER POLE (UTILITY POLE)

SIGN

SILT FENCE

STMH STORM DRAIN MANHOLE

TANK TANK

WATER VALVE

FINAL DRAWING ISSUED FOR CONSTRUCTION

LEGEND

REFERENCE DRAWINGS

DRAWING NUMBER	TITLE
.	....

REVISIONS

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.	.	.						

SCALE: HORZ. N/A VERT. N/A

DRAWN BY: JAS 10/8/15

DRAFTING CK: WRN .

ENGINEERING CK: WPS .

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HEI PROJECT NO.: 15040-02.3

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DRAWING NO.:

HDD-H318-LEGEND

SHEET 2 OF 5 REV. 1

DATE OF PLOT: 10/9/15

EQT

HORIZONTAL DIRECTION DRILL

H318 PIPELINE CROSSING CSX RR, MONONGAHELA RIVER, PWV RR & SR 837

EQUITRANS EXPANSION PROJECT

ALLEGHENY & WASHINGTON CO.S, PA.

GENERAL NOTES

1. ALL CONSTRUCTION METHODS AND MATERIALS SHALL CONFORM TO THE CURRENT SPECIFICATIONS AND STANDARDS OF EQUITRANS AND PENNSYLVANIA DEPARTMENT OF TRANSPORTATION (PENNDOT).

2. ALL WORK SHALL BE IN COMPLIANCE WITH OSHA TITLE 29 OF THE CODE OF FEDERAL REGULATIONS. CHAPTER 1 (29 CFR 1926), "OCCUPATION SAFETY AND HEALTH STANDARDS FOR THE CONSTRUCTION INDUSTRY".

3. TEMPORARY DRAINAGE DURING CONSTRUCTION SHALL BE PROVIDED BY THE CONTRACTOR TO RELIEVE AREAS THAT MAY CAUSE DAMAGE TO THE ROADWAYS OR IMPEDE TRAFFIC AS DIRECTED BY THE PENNDOT WITHIN THE PROJECT LIMITS.

4. PRIOR TO CONSTRUCTION OR EXCAVATION, THE CONTRACTOR SHALL ASSUME THE RESPONSIBILITY OF LOCATING ANY UNDERGROUND UTILITIES (PUBLIC AND/OR PRIVATE) THAT MAY EXIST IN THE AREA OF CONSTRUCTION. UTILITY OWNERS SHALL BE NOTIFIED IN ACCORDANCE WITH PA. ONE CALL TIME REQUIREMENTS IN ADVANCE OF ANY EXCAVATION IN THE PROXIMITY OF THE UTILITIES. THE CONTRACTOR, AT HIS OWN EXPENSE, SHALL BE RESPONSIBLE FOR THE REPAIR OF EXISTING UTILITIES DAMAGED DURING CONSTRUCTION. THE CONTRACTOR SHALL CONTACT PA811 AT 811 48 HOURS IN ADVANCE OF ANY CONSTRUCTION.

5. CONTRACTOR SHALL CLEARLY LOCATE ALL EXISTING UTILITY SERVICE CONNECTIONS AND AVOID DAMAGING THESE DURING CONSTRUCTION.

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGESAND/OR PENALTIES RESULTING FROM ALL NON-COMPLIANCE WITH FEDERAL, STATE AND LOCAL PERMITS AND ENCROACHMENT AGREEMENTS.

7. ALL PAVEMENT DAMAGED DURING CONSTRUCTION SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITIONS BY THE CONTRACTOR ACCORDING TO PENNDOT REQUIREMENTS.

8. THE GAS MAIN SHALL BE INSTALLED SO AS TO PROVIDE A MINIMUM OF TWENTY FOUR (24) INCHES OF CLEARANCE TO ALL OTHER UNDERGROUND UTILITIES AND STRUCTURES. WHERE THIS IS NOT POSSIBLE APPROPRIATE PROTECTION SHALL BE INSTALLED.

9. ALL DRAINAGE PIPES AND STRUCTURES SHALL BE CLEANED OF DEBRIS AND ERODED MATERIALS RESULTING FROM CONSTRUCTION. THESE PIPES AND STRUCTURES SHALL BE MAINTAINED CLEAN DURING THE PERIOD OF CONSTRUCTION.

10. ALL DISTURBED SLOPES SHALL BE RESTORED TO EXISTING GRADES AND STABILIZED WITH SEED AND TACK IF APPROPRIATE.

11. CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES AS DESCRIBED ON THE PROJECT PLANS AND DETAILS DURING CONSTRUCTION AND SURFACE RESTORATION UNTIL SUCH MEASURES ARE NOT NECESSARY. WHERE ADDITIONAL MEASURES ARE NECESSARY, THE CONTRACTOR SHALL INSTALL AND MAINTAIN THE APPROPRIATE MEASURES ACCORDING TO THE PENNSLVANIA EROSION AND SEDIMENT CONTROL PLANNING DESIGN MANUAL.

12. SEED ALL DISTURBED AREAS AND MULCH AS REQUIRED.

13. DIRECTIONAL DRILLS
- -MINIMUM 20' DEPTH UNDER INTERSTATE AND CONTROLLED ACCESS ROADS
- -MINIMUM 10' DEPTH FOR ALL OTHER STATE ROADS
- -MINIMUM 4' DEPTH BELOW GROUND LEVEL FOR PARALLEL INSTALLATIONS
- -MINIMUM 5' CLEARANCE HORIZONTAL OR VERTICAL FOR ANY KIND OF STRUCTURE OR PIPE REQUIRED
- -DRIVEWAY BORES MUST MEET THE MINIMUM 4' FOR PARALLEL INSTALLATIONS

14. CULVERT CROSSINGS
- -THE MINIMUM AMOUNT OF COVER BETWEEN THE TOP OF THE CULVERT AND UTILITY AND THE TOP OF THE FILL AT ALL PIPE CULVERTS SHALL BE EQUAL TO OR GREATER THAN 24-INCHES. THE EXCAVATION FOR THE LAST 6-INCHES SHALL BE PERFORMED BY HAND.
- -THE MINIMUM AMOUNT OF SEPARATION BETWEEN THE BOTTOM OF THE CULVERT AND UTILITY LINE CROSSING UNDERNEATH THE CULVERT SHALL BE A MINIMUM 2-FEET.
- -THE PROPOSED LINE LOOPS AROUND THE CULVERT EDGE, A MINIMUM 5' CLEARANCE (HORIZONTAL AND VERTICAL) WILL BE MAINTAINED FROM THE STRUCTURE.

VARIATIONS IN PLAN OR PROFILE

15. THE CONTRACTOR MAY REQUEST CHANGES TO THE PROPOSED VERTICAL AND HORIZONTAL ALIGNMENT OF THE INSTALLATION AND THE LOCATION OF THE ENTRY AND EXIT POINTS. PROPOSED CHANGES SHALL BE SUBMITTED TO THE OWNER AND RECEIVE APPROVAL OF THE OWNER PRIOR TO CONSTRUCTION.

16. THE CONTRACTOR SHALL MAINTAIN THE HORIZONTAL ALIGNMENT (PLAN VIEW) AS INDICATED ON THE PROJECT PLANS WITH A +/- 2 FOOT VARIANCE.

17. CONTROL POINT ELEVATIONS SHOWN INDICATE THE MINIMUM COVER AND SHALL NOT BE REDUCED THE CONTRACTOR MAY DRILL DEEPER WITH THE APPROVAL OF THE owner.

PILOT HOLE REQUIREMENTS

18. THE CONTRACTOR SHALL AT ALL TIMES PROVIDE AND MAINTAIN INSTRUMENTATION WHICH WILL ACCURATELY LOCATE THE PILOT HOLE, MEASURE DRILL STRING AXIAL AND TORSION LOADS, AND MEASURE DRILLING FLUID DISCHARGE RATE AND PRESSURE.

19. THE OWNER WILL HAVE ACCESS TO THESE INSTRUMENTS AND THEIR READINGS AT ALL TIMES.

20. THE CONTRACTOR, WHEN REQUESTED BY THE OWNER, WILL PROVIDE INSPECTION HOLES AT NO ADDITIONAL COST TO VISUALLY VERIFY THE LOCATION AND CONDITION OF THE DRILLED PIPELINE.

21. THE CONTRACTOR SHALL PLOT THE ACTUAL HORIZONTAL AND VERTICAL ALIGNMENT OF THE PILOT BORE AT INTERVALS NOT EXCEEDING 20 FEET.

22. THIS "AS-BUILT" PLAN AND PROFILE SHALL BE UPDATED AS THE PILOT BORE IS ADVANCED.

23. THE CONTRACTOR SHALL GRANT THE OWNER ACCESS TO ALL DATA READOUT PERTAINING TO THE POSITION AND INCLINATION OF THE BOREHEAD. WHEN REQUESTED, THE CONTRACTOR SHALL PROVIDE EXPLANATIONS OF HIS POSITION MONITORING AND STEERING EQUIPMENT.

24. THE ACTUAL PILOT HOLE EXIT POINT SHALL BE LOCATED WITHIN TWO (2) FEET LATERALLY OF THE EXIT POINT SHOWN ON THE DRAWINGS. LONGITUDINALLY THE ACTUAL EXIT POINT SHALL BE NO MORE THAN FIVE (5) FEET SHORT OR FIVE (5) FEET PAST THE EXIT POINT SHOWN ON THE DRAWINGS.

25. THE PILOT HOLE SHALL BE DRILLED ALONG THE PATH SHOWN ON THE PLAN AND PROFILE DRAWING MAINTAINING THE SPECIFIED TOLERANCES.

26. THE OWNER SHALL APPROVE THE ALIGNMENT OF THE PILOT BORE BEFORE THE REAMING PHASE OR PIPE PULLING MAY COMMENCE.

27. IF THE PILOT BORE FAILS TO CONFORM TO THE ABOVE TOLERANCES, OWNER MAY, AT HIS OPTION, REQUIRE A NEW PILOT BORE TO BE MADE.

28. IN ALL CASES, RIGHT OF WAY RESTRICTIONS SHALL TAKE PRECEDENCE OVER THE LISTED TOLERANCES.

29. NO PILOT HOLE WILL BE ACCEPTED IF IT WILL RESULT IN ANY OF THE PIPELINE BEING INSTALLED IN VIOLATION OF RIGHT OF WAY RESTRICTIONS.

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31. ALL BEND RADII SHALL BE EQUAL TO OR GREATER THAN THOSE LISTED IN THE PROJECT PLANS.

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32. THE CONTRACTOR, SUBJECT TO THE REQUIREMENTS OF THESE PLANS, WILL DETERMINE THE EXACT METHOD AND TECHNIQUES FOR COMPLETING THE HDD CROSSINGS. EXCAVATED MUD PITS CONSTRUCTED IN THE ENTRY AND EXIT AREAS WILL BE LIMITED TO THE PIPE BOREHOLE AREA ONLY.

33. AFTER COMPLETION OF THE DIRECTIONAL DRILLING WORK, THE ENTRY AND EXIT PIT LOCATION SHALL BE RESTORED TO THEIR ORIGINAL CONDITIONS.

PREREAMING REQUIREMENTS

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PULLBACK REQUIREMENTS

36. CONTRACTOR SHALL PULL EXTRA LENGTH OF PRODUCT PIPE SO ONE WELD JOINT CAN BE EXAMINED.

37. THE MAXIMUM ALLOWABLE TENSILE LOAD IMPOSED ON THE PRODUCT PIPE SHALL NOT EXCEED 1,142,000 LBF FOR THE 20-INCH PIPE.

38. CONTRACTOR SHALL SUPPORT THE PRODUCT PIPE PULL SECTION AS IT PROCEEDS DURING PULLBACK SO THAT IT MOVES FREELY AND IS NOT OVER STRESSED.

39. THE MAXIMUM SPACING OF PIPE SUPPORTS FOR THE PRODUCT PIPE DURING PULLBACK IS 140-FEET FOR THE 20-INCH PIPE.

40. THE MAXIMUM SPACING FROM THE ENDS OF PRODUCT PIPE TO FIRST PIPE SUPPORT IS 50-FEET FOR THE 20-INCH PIPE.

DRILLING FLUIDS

41. CONTRACTOR SHALL SUBMIT THE COMPOSITION OF ALL DRILLING FLUIDS TO OWNER FOR APPROVAL.

42. CONTRACTOR SHALL NOT USE ANY DRILLING FLUID THAT DOES NOT COMPLY WITH PERMIT REQUIREMENTS AND ENVIRONMENTAL REGULATIONS.

43. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING, TRANSPORTING, AND STORING ANY WATER REQUIRED FOR DRILLING FLUIDS.

44. CONTRACTOR SHALL MAXIMIZE RECIRCULATION OF DRILLING FLUID SURFACE RETURNS.

45. CONTRACTOR SHALL PROVIDE SOLIDS CONTROL AND FLUID CLEANING EQUIPMENT OF A CONFIGURATION AND CAPACITY THAT CAN PROCESS SURFACE RETURNS AND PRODUCE DRILLING FLUID SUITABLE FOR REUSE.

46. DISPOSAL OF EXCESS DRILLING FLUIDS IS THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE CONDUCTED IN COMPLIANCE WITH ALL ENVIRONMENTAL REGULATIONS, RIGHT OF WAY, AND WORKSPACE AGREEMENTS, AND PERMIT REQUIREMENTS.

47. IF INADVERTENT SURFACE RETURNS OF DRILLING FLUIDS OCCUR, CONTRACTOR SHALL IMMEDIATELY CONTAIN AND COLLECT.

48. CONTRACTOR SHALL SUBMIT DRILLING FLUID DISPOSAL PROCEDURES TO OWNER FOR APPROVAL.

49. CONTRACTOR SHALL EMPLOY BEST EFFORTS TO MAINTAIN FULL ANNULAR CIRCULATION OF DRILLING FLUID.

50. IN THE EVENT THAT ANNULAR CIRCULATION IS LOST CONTRACTOR SHALL TAKE ACTION TO RESTORE CIRCULATION.

FINAL DRAWING ISSUED FOR CONSTRUCTION

LEGEND

REFERENCE DRAWINGS

DRAWING NUMBER	TITLE
.	....

REVISIONS

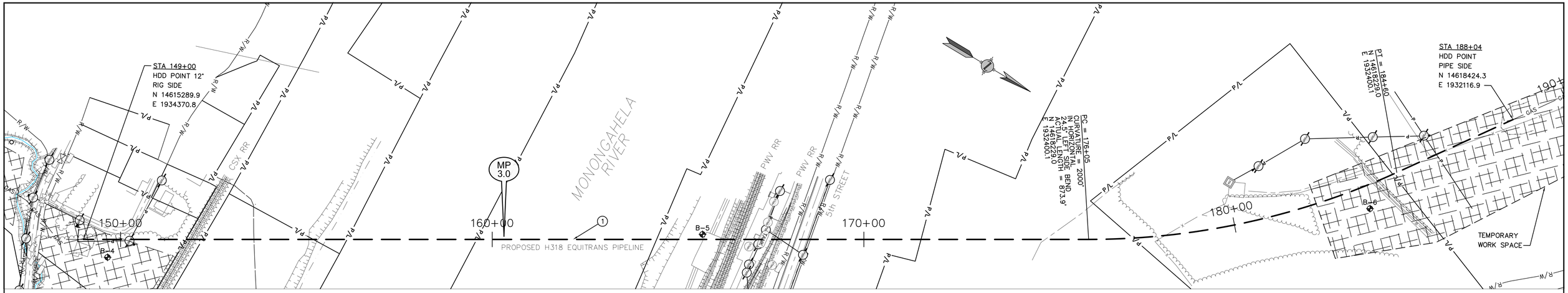
REV.	BY	DATE	DESCRIPTION
0	RK&K	10/8/15	ISSUED FOR REVIEW.
1	RK&K	10/9/15	ISSUED FOR CONSTRUCTION.

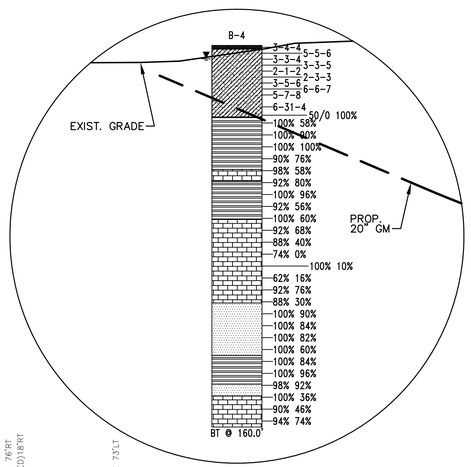
APPROVED FOR FERC			APPROVED FOR BIDDING			APPROVED FOR CONSTRUCTION		
REV.	BY	DATE	REV.	BY	DATE	REV.	BY	DATE
.	.	.						

SCALE: HORZ. N/A VERT. N/A
DRAWN BY: JAS 10/8/15
DRAFTING CK: WRN .
ENGINEERING CK: WPS .
.
.
HEI PROJECT NO.: 15040-02.3
.
DRAWING NO.:
HDD-H318-NOTES
SHEET 3 OF 5 REV. 1
DATE OF PLOT: 10/9/15

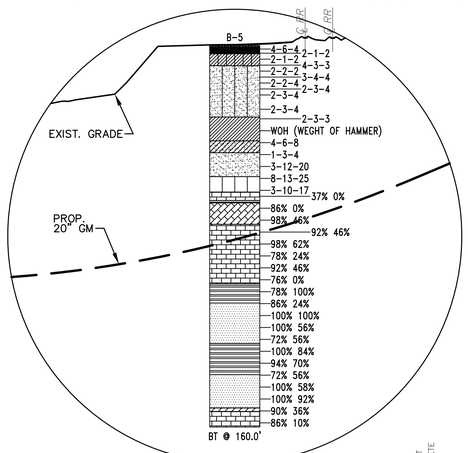
EQT

HORIZONTAL DIRECTION DRILL
H318 PIPELINE CROSSING CSX RR, MONONGAHELA RIVER, PWV RR & SR 837
EQUITRANS EXPANSION PROJECT
ALLEGHENY & WASHINGTON CO.S, PA.

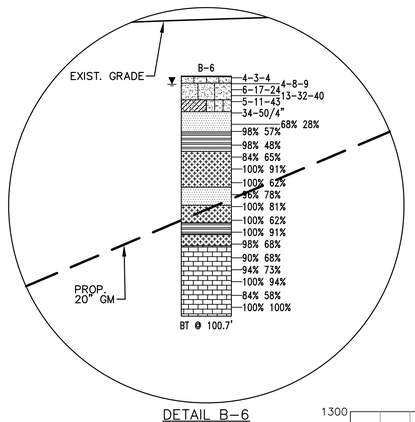




DETAIL B-4



DETAIL B-5

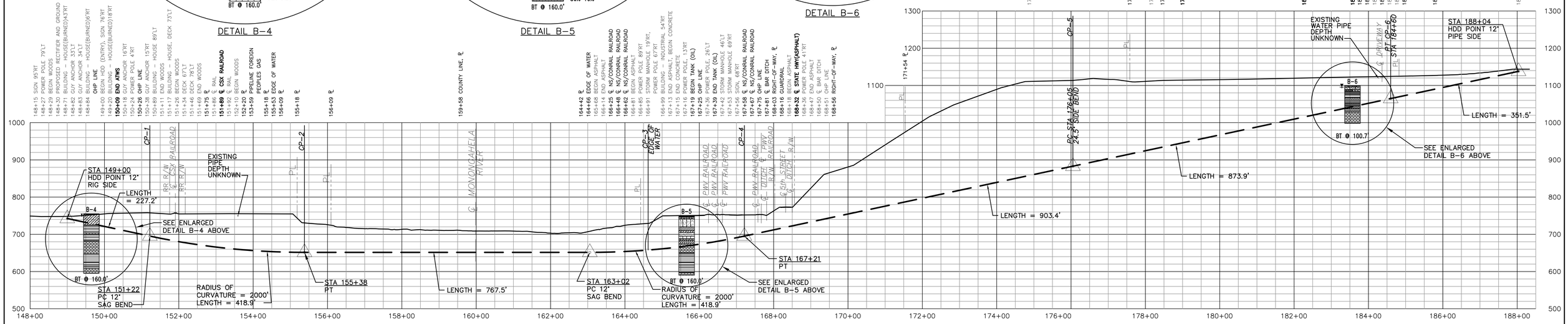


DETAIL B-6

LEGEND

Silty Sand	Claystone	Topsoil
Asphalt and Subbase	Siltstone	Clay
Silt	Limestone	
Sandy Silt	Shale	
Silty Clay	Sand	
Sandstone	Sandy Clay	

FINAL DRAWING ISSUED FOR CONSTRUCTION



CONTROL POINT	CP-1		CP-2			CP-3		CP-4		CP-5	CP-6
STATION	STA 151+22		STA 155+38			STA 164+62		STA 167+21		STA 176+05	STA 184+60
DEPTH	62.4'		79.1'			71.6'		56.8'		230.5'	59.6'
EROSION & SEDIMENTATION NTS											

NOTES

1. BASE DRAWING IS DERIVED FROM EXISTING MAP AND DRAWING INFORMATION AS INDICATED IN THE REFERENCE SECTION. THE ACCURACY OF THE INFORMATION IS NOT GUARANTEED. CONTRACTOR SHALL VERIFY CONDITIONS AND UTILITY LOCATIONS PRIOR TO CONSTRUCTION.
2. COORDINATE LOCATIONS ARE BASED ON UTM ZONE 17, HORIZONTAL DATUM; NAD 83 US SURVEY FEET, VERTICAL DATUM; NAVD88.
3. CALCULATED APPROXIMATE PULLBACK LOAD ON PRODUCT PIPE FOR HDD IS 277,000 LBF.
4. NO EXCAVATION WITHIN THE CLEAR RECOVERY ZONE SHALL BE LEFT OPEN OVERNIGHT.

SUMMARY OF MATERIALS

ITEM #	QUANTITY	DESCRIPTION
①	3965 LF	20" STL. PIPE, API 5L, 0.562" W.T., X-70, FBE

REFERENCE SECTION

TOPOGRAPHIC INFORMATION PROVIDED BY HEI 8/7/14

GEOTECH INFORMATION PROVIDED BY TRIAD ENGINEERING, TRIAD ENGINEERING, INC. PROJ. NO. 02-15-0085. 9/28/15

REVISIONS

REV.	BY	DATE	DESCRIPTION
0	RK&K	10/8/15	ISSUED FOR REVIEW.
1	RK&K	10/9/15	ISSUED FOR CONSTRUCTION.

APPROVED FOR FERC			APPROVED FOR BIDDING			APPROVED FOR CONSTRUCTION		
REV.	BY	DATE	REV.	BY	DATE	REV.	BY	DATE
.	.	.						

SCALE: HORZ.1"=120' VERT. 1"=120'	
DRAWN BY: JAS	10/8/15
DRAFTING CK: WRN	.
ENGINEERING CK: WPS	.
.	
.	
RK&K PROJECT NO.: 15040-02.3	
.	
DRAWING NO.:	
HDD-H318-01	
SHEET 4 OF 5	REV. 1
DATE OF PLOT: 10/9/15	

EQT

HORIZONTAL DIRECTION DRILL
H318 PIPELINE CROSSING CSX RR, MONONGAHELA RIVER, PWV RR & SR 837
EQUITRANS EXPANSION PROJECT
ALLEGHENY & WASHINGTON CO.S, PA.

Equitrans Expansion Project

Docket No. CP16-__-000

Resource Report 1

Appendix 1-H
HDD Contingency Plan

HORIZONTAL DIRECTIONAL DRILLING (HDD) CONTINGENCY PLAN

EQUITRANS EXPANSION PROJECT

ALLEGHENY, GREENE AND WASHINGTON COUNTIES, PENNSYLVANIA

OCTOBER 2015

Prepared by:
EQUITRANS
625 Liberty Avenue
Suite 1700
Pittsburgh, PA 15222-3111

EQUITRANS℠

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.

- Barriers (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.

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 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 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. When a loss in pressure dictates a change in operations, the Site Supervisor/Forman will contact EQT Project Manager prior to proceeding. 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.

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 Manager, 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.

- 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.

    - Determine the quantity (gallons) of material released
    - Determine the distance (feet) to the nearest waterbody
    - 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 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.

Aquatic (under water) IR Procedures:

- Stop work immediately.

- 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;

    - Determine the quantity (gallons) of the IR
    - Determine the quantity (gallons) that was released to the waterbody
    - Determine the distance (feet) the material traveled down the waterbody
    - 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 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.

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)

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.

AGENCY CONTACT INFORMATION

- U/S Army Corps of Engineers:
  Pittsburgh District Corps of Engineers
  Regulatory/Permits
  Federal Bldg., 20th Floor
  1000 Liberty Ave.
  Pittsburgh, PA 15222
  (412) 395-7152

- Pennsylvania Department of Environmental Protection:
  Rachel Carson State Office Building
  400 Market Street
  Harrisburg, PA 17101
  (717) 783-2300

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

Equitrans Expansion Project

Docket No. CP16-__-000

Resource Report 1

Appendix 1-I
Road and Railroad Crossings

Appendix 1-E Road and Railroad Crossing Locations

H-158/M80					
Milepost	**Crossing**	**Name**	**County**	**Road Material**	**Type of Crossing**
0.04	Road	Strope Rd	Greene	Rock Base	Open Cut
0.15	Road	Braden Run Rd (T588)	Greene	Asphalt	Conv. Bore

H-316					
Milepost	**Crossing**	**Name**	**County**	**Road Material**	**Type of Crossing**
0.09	Road	Rt. 188 (Jefferson Rd)	Greene	Asphalt	Conv. Bore
0.19	Road	Private Rd/Driveway	Greene	Rock Base	Open Cut
0.45	Road	Private Driveway	Greene	Rock Base	Open Cut
0.63	Road	Private Driveway	Greene	Rock Base	Open Cut
0.80	Road	Prison Rd	Greene	Asphalt	Open Cut
0.92	Road	Prison Prop. Road	Greene	Rock Base	Open Cut
1.14	Road	Prison Prop. Road	Greene	Rock Base	Open Cut
1.72	Road	Farm Road	Greene	Dirt Base	Open Cut
2.25	Railroad	Monongahela Railway	Greene	N/A	HDD
2.29	Road	Creek Rd (T555)	Greene	Rock Base	HDD
2.50	Road	Farm Road	Greene	Dirt Base	HDD
2.58	Road	Farm Path	Greene	Dirt Base	HDD
2.75	Road	Ankrom Rd (T543)	Greene	Asphalt	HDD
2.92	Well Road	Private Drive	Greene	Rock Base	HDD

H-318					
Milepost	**Crossing**	**Name**	**County**	**Road Material**	**Type of Crossing**
0.70	Road	Rippel Rd	Allegheny	Asphalt	Conv. Bore
0.93	Road	Private Rd/Driveway	Allegheny	Asphalt	Open Cut
0.96	Road	Farm Road	Allegheny	Rock Base	Open Cut
1.07	Road	Farm Road	Allegheny	Rock Base	Open Cut
1.63	Road	Rippel Rd	Allegheny	Asphalt	Conv. Bore
1.70	Road	Raccoon Run Rd	Allegheny	Asphalt	Conv. Bore
2.76	Road	Bunola River Rd	Allegheny	Asphalt	Conv. Bore
2.85	Railroad	Conrail/CSXT RR	Allegheny	N/A	HDD
3.13	Railroad	FRA Added	Washington	N/A	HDD
3.14	Railroad	Conrail RR	Washington	N/A	HDD
3.15	Railroad	Conrail RR	Washington	N/A	HDD
3.16	Road	Rt. 837 (5th St)	Washington	Asphalt	HDD
3.29	Road	Farm Path	Washington	Dirt Base	Open Cut
3.47	Driveway	Private Drive	Washington	Asphalt	Open Cut

3.70	Road	Seneca Dr	Washington	Rock Base	Open Cut
4.16	Road	Finleyville Elrama Rd	Washington	Asphalt	Conv. Bore

H-319					
Milepost	**Crossing**	**Name**	**County**	**Road Material**	**Type of Crossing**
70’	Well Road	Well Road – East of Rt. 80	Wetzel	Rock Base	Open Cut
178’	Road	Rt. 80 – Fallen Timber Rd (Shuman Hill Rd)	Wetzel	Asphalt	Conv. Bore

Equitrans Expansion Project

Docket No. CP16-__-000

Resource Report 1

Appendix 1-J
Winterization Plan

DRAFT Winter Construction Plan

Equitrans Expansion Project

Introduction

Based on the Project construction schedule, Equitrans anticipates that standard construction and restoration may occur in the 2017-2018 winter seasons. After consistent weather conditions preclude normal reclamation efforts and installation of permanent erosion and sediment control devices, the disturbed areas will be winterized in accordance with this plan. Final restoration and reseeding will occur the following spring.

All winter work will be conducted in accordance with the Federal Energy Regulatory Commission's (FERC's) Plan and Procedures, as well as the Project *National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit (PA and WV).*

Stabilization/Winterization

- The trench will be backfilled to the extent possible using subsoil.
- If there are open excavations left while snow is imminent high visibility poles will placed every 50 feet of the trench / or area will be Safety Fenced where ATV traffic is probable.
- Slope stabilization and stability of cuts and fills will be restored to the extent possible, and water bars will be installed crossing the right-of-way to divert surface run-off away from the construction area.
- Equipment mats will be removed from stream areas where destabilization of installed matting could potentially occur due to any unexpected increase in stream water flow caused by increased snow run-off or other natural factors.
- Breaks will be cut into spoil piles and through the berm across the ditch line to allow proper drainage across the right-of-way.
- Wetland areas where mats are removed will be restored to the extent possible.
- Disturbed soils adjacent to streams and wetlands will be mulched, where needed.
- Water bars, berms and erosion/sediment control measures will be installed to minimize erosion along the right-of-way and disposition of sediments beyond the boundaries of the right-of-way.
- In areas where final restoration has not been achieved, the right-of-way will be mulched and left in a roughened condition to reduce potential of erosion during times of snow thaw and/or significant rain accumulation.

Erosion and Sediment Control Measures

- Temporary water bars will be constructed on slopes greater than 5 percent where final clean-up and permanent erosion and sediment control devices have not been installed.
- Mulching will be applied to all slopes (actively cultivated cropland exempt) concurrent with or immediately after seeding, where necessary to stabilize the soil surface and to reduce wind and water erosion. Mulch will be uniformly dispersed over the area to cover one-hundred percent of the ground surface at a rate of 3 tons per acre of straw or its accepted equivalent, unless the local soil conservation authority, landowner, or land managing agency approval make formal request of any alternative action to be taken by Equitrans in writing.

- Temporary mulch will be applied to the right-of-way at a rate of 3 tons per acre on slopes greater than 5 percent and within 100 feet of water bodies and wetlands where final restoration has not been established to the satisfaction of the environmental inspector.
- If right-of-way is snow covered, the snow will serve as suitable ground cover. If snow cover recedes, exposed right-of-way will be stabilized utilizing the measures detailed in this plan.
- In the event soils are frozen, rough backfill will be conducted and soils will be stabilized until conditions improve that allow soil to be restored and proper compaction achieved.
- Temporary seeding will be applied as necessary to areas where topsoil has not been restored.
- Sediment barriers (i.e., silt fence, straw bales, filter sock, earthen berms) will be installed and maintained throughout the right-of-way at designated water bodies, wetlands, and paved road crossings. These structures will be inspected per the permit conditions and adequately maintained during the winter construction season to ensure there are minimal reportable control failures. Erosion and sedimentation control measures will be installed and repaired as determined by the on-site environmental inspector. Equipment will be utilized as needed to assist with installations in frozen conditions.

Access Road Usage

- Access roads will be graded where needed and approved by the assigned Environmental Inspector (EI). All access roads approved for this Project will remain in use during winter construction. All roads will be monitored and maintained in accordance with applicable permit and landowner requirements.
- Snow removal by equipment will not be performed beyond the road surface to prevent mixing soil with snow.

Right-of-Way Snow Removal

- All snow removed from the right-of-way will be in compliance with the footprint laid out for the Project. No equipment will be permitted beyond the limits of disturbance for the Project.
- In the event there is an extraordinary amount of snowfall, Equitrans' contractor will work with the Equitrans' Lead EI to designate stockpile areas. Breaks in windrowed snow will be placed at drainage crossings and as requested by the affected landowner.
- Snow will be removed from topsoil or spoil storage areas prior to using.
- The use of snow removal equipment will be restricted to use within the limits of disturbance and approved access roads.
- Snow will only be removed from active work areas at the direction of the EI.
- All snow and ice will be removed from pipe joints prior to being mobilized to position for alignment and welding.
- Plowing equipment used for snow removal operations will be operated in a manor to ensure blades do not remove topsoil or vegetation.
- Currently, no ATWS has been identified for snow storage, and will be determined on an as needed basis.
- Snow removal equipment will consist mainly of plowing equipment, such as bulldozers, loaders, utility trucks, dump trucks, and may include but is not limited to other equipment, such as snow blowers and hand shovels.

- Rather than blade as low as possible, snow removal operators will blade no lower than a height sufficient for construction vehicles to safely navigate the right-of-way.
- Snow removal operators will adjust blade height in areas of slope changes to ensure that contact with the ground is minimized to the greatest extent practical.
- Pickup trucks with front mounted blades will plow all access roads. Intersections, driveways and other private roads will not be blocked by plowed or stockpiled snow. Removed snow will not mix with sidecast stored soils.

Soil Handling

- Topsoil segregation will be completed prior to frozen soil conditions, where practicable.
- When stripping frozen topsoil, multiple passes with a bulldozer or other specialized equipment may be used to break up the topsoil prior to removal, so that only topsoil is removed.
- The trench may be crowned to allow for more compaction and settling issues to occur in freezing and thawing conditions.

Inspection and Maintenance

- Equitrans will monitor and maintain erosion and sedimentation controls during the winter period as part of routine SWPPP inspections as required by our earth disturbance permits.
- Inspections of both stabilized and active construction areas will be conducted on a consistent basis. When snow melts or the ground thaws, the frequency of inspections will increase to an extent necessary to confirm the integrity and effectiveness of all erosion and sediment control device's within twenty-four hours.
- Contractor and Equitrans will continuously evaluate the condition of construction areas in an effort to determine if a need exists for additional temporary erosion and sediment control measures, and, as conditions allow, where these corrective measures should be taken.
- Contractor shall have the proper equipment available at all times to allow access to the right-of-way under soft soil conditions.

Spring and Summer Restoration

- Equitrans and its contractor will identify any storm or winter damage that may have occurred on the right-of-way.
- Contractor and Equitrans will evaluate the condition of the right-of-way and will determine if a need exists for additional temporary erosion and sediment control measures.
- Trench compaction will be facilitated by back dragging, walking in backfill material with heavy equipment, and obtaining optimum moisture for the backfill material.
- Contractor will continue final restoration, which may require disking or tilling of the right-of-way to create a seed bed for germination.
- Restoration of topsoil will occur, where practicable, after both the stockpiled topsoil and exposed subsoil have thawed, and the ground has dried following the spring melt.

Equitrans Expansion Project

Docket No. CP16-__-000

Resource Report 1

Appendix 1-K
Dust Suppression Plan

FUGITIVE DUST CONTROL PLAN

Facility Name: Equitrans Expansion Project
Date: October 23, 2015

Contents

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1. INTRODUCTION

Land disturbance from clearing and excavation activities has the potential to generate a large amount of dust particles. Dust control measures are practices that help reduce surface and air movement of dust from disturbed soil surfaces.

EQT has developed this Fugitive Dust Compliance Plan to minimize visible fugitive dust emissions at or in proximity to the worksite. This plan outlines dust control methods, that will be used on the project to reduce fugitive dust emissions and outlines the recommended records to be maintained onsite during construction

2. FUGITIVE DUST EMISSION SOURCES

The following project activities have the potential to generate fugitive dust:

- Vegetation removal;
- Clearing and grading;
- Topsoil removal;
- Cutting and filling;
- Trenching;
- Backfilling;
- Track-out onto roads;
- Bulk material loading, hauling and unloading;
- Vehicle and motorized equipment movement on unpaved access roads;
- Use of material storage piles, and
- Use of parking, staging, and storage area

Strategic construction sequencing and disturbing only small areas at a time can greatly reduce problematic dust generation. If land disturbance is required, additional temporary stabilization measures should be considered prior to initiating grading activities.

It is the responsibility of the project contractor(s) and the designated environmental inspector(s) to ensure that:

1. sources of potential dust generation are identified;
2. specific areas of project construction will be monitored for fugitive dust generation;
3. appropriate dust suppression techniques are implemented when dust plumes are visible.

3. FUGITIVE DUST CONTROL METHODS

Implementation of construction and restoration best management practices and operational controls will be used to mitigate fugitive dust emissions. The project earth disturbance permit (found in the Project permit binder) outlines 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 use of a project-wide speed limit of 10 miles per hour 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 are taken to reduce fugitive dust from our operations.

3.1. 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. Spoil piles left undisturbed for 4 or more days should be temporarily stabilized with seed and mulch or tarped to prevent wind and water erosion.

3.2. **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 fugitive emissions. Watering will occur less frequently if meteorological conditions (e.g., rain, frozen surfaces, etc.) are adequate to suppress dust.

3.3. **Paved Roads**

Fugitive dust emissions from paved roads will be controlled with a combination of wet suppression, sweeping and/or vacuuming, as appropriate, to minimize the amount of fugitive dust that is generated.

3.4. **Trackout 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 on to public roadways.

3.5. **"Deposition on Other Premises"**

EQT 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 which 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.

4. 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 state and municipal entities 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 MSDS and application procedures.

5. Inspection, Monitoring, and Record Keeping

The construction contractor will implement the dust control measures specified in this plan and in any dust control permits issued by regulatory agencies. 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 ROW 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.

6. PLAN MAINTENANCE

A copy of this Fugitive Dust Compliance Plan will be retained on-site, and it will be made available to the federal, state and local agencies upon request.

7. STAFF TRAINING

All staff that are responsible for implementing this Fugitive Dust Compliance Plan shall be trained on its contents and requirements, including all control methods and phone numbers for contractor support.

Equitrans Expansion Project

Docket No. CP16-__-000

Resource Report 1

Appendix 1-L
Agency Correspondence

EQUITRANS℠

April 27, 2015

Johnna Blackhair
Deputy Regional Director
Bureau of Indian Affairs, Eastern Regional Office
545 Marriott Drive
Suite 700
Nashville, TN 37214

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Ms. Blackhair,

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.

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Equitrans | 625 Liberty Avenue Suite 1700 | Pittsburgh, PA 15 2223111
T 412.553.5700 | F 412.553.5757 | www.eqt.com

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Sincerely,

Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

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EQUITRANS℠

April 27, 2015

Barbara McCann
Director
U.S. Department of Transportation (DOT)
Office of Safety, Energy, and the Environment
1200 New Jersey Ave. SE
Washington, DC 20590

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Ms. McCann,

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.

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Sincerely,

Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
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EQUITRANS℠

April 27, 2015

U.S. Army Corps of Engineers (USACE)
Pittsburgh District
Federal Bldg., 20th Floor
1000 Liberty Ave.
Pittsburgh, PA 15222

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

To Whom It May Concern,

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EQUITRANS℠

April 27, 2015

Colonel Leon F. Parrott
U.S. Army Corps of Engineers (USACE), Huntington District Regulatory/Permits – Energy Resources (WV and OH)
502 Eighth St.
Huntington, WV 25701

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Colonel Parrott,

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EQUITRANS℠

April 27, 2015

Joe Kraft
State Soil Scientist
U.S. Department of Agriculture (USDA), Pennsylvania, PA NRCS State Office
One Credit Union Place, Suite 340
Harrisburg, PA 17110-2993

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Mr. Kraft,

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EQUITRANS℠

April 27, 2015

U.S. Environmental Protection Agency (EPA)
Region 3 Air Protection Division
1650 Arch Street (3AP00
Philadelphia, PA 19103-2029

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

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EQUITRANS℠

April 27, 2015

Lora Zimmerman
Project Leader
U.S. Fish and Wildlife Service (USFWS)
Pennsylvania Field Office
110 Radnor Road, Suite 101
State College, PA 16801

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Ms. Zimmerman,

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.

Equitrans | 625 Liberty Avenue Suite 1700 | Pittsburgh, PA 15 2223111
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The Federal Energy Regulatory Commission (FERC) will serve as the lead agency for the Project. FERC granted Equitrans request in Docket No. PF15-22 to use the FERC's pre-filing process in late April 2015 and Equitrans anticipates filing a formal application with the FERC in the fourth quarter of 2015. The FERC will then prepare an Environmental Assessment or an Environmental Impact Statement to satisfy the National Environmental Policy Act (NEPA) process for the Project.

In order to assist Equitrans in preparing the FERC application and identifying possible issues to be addressed during the NEPA process, the purpose of this letter is initiate dialogue, request information and identify any potential concerns you may have regarding the Project.

The Equitrans team looks forward to working with you as we move forward with development of this Project. We appreciate your assistance and thank in you advance for your willingness to work with Equitrans.

If you have questions or would like additional information about the Project please go to equitransproject.com, contact me at 412-553-5798 (SFrazier@eqt.com), or Tricia Pellerin at 617-443-7556 (tricia.pellerin@tetratech.com).

Sincerely,

Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

Enclosure(s)

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.

EQUITRANS℠

April 27, 2015

John Schmidt
Project Leader
USFWS, West Virginia Field Office
694 Beverly Pike
Elkins, WV 26241

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Mr. Schmidt,

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.

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The Federal Energy Regulatory Commission (FERC) will serve as the lead agency for the Project. FERC granted Equitrans request in Docket No. PF15-22 to use the FERC's pre-filing process in late April 2015 and Equitrans anticipates filing a formal application with the FERC in the fourth quarter of 2015. The FERC will then prepare an Environmental Assessment or an Environmental Impact Statement to satisfy the National Environmental Policy Act (NEPA) process for the Project.

In order to assist Equitrans in preparing the FERC application and identifying possible issues to be addressed during the NEPA process, the purpose of this letter is initiate dialogue, request information and identify any potential concerns you may have regarding the Project.

The Equitrans team looks forward to working with you as we move forward with development of this Project. We appreciate your assistance and thank in you advance for your willingness to work with Equitrans.

If you have questions or would like additional information about the Project please go to equitransproject.com, contact me at 412-553-5798 (SFrazier@eqt.com), or Tricia Pellerin at 617-443-7556 (tricia.pellerin@tetratech.com).

Sincerely,

Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
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EQUITRANS℠

April 27, 2015 SENT VIA EMAIL

Katie Venticinque, Specialist
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katie.venticinque@faa.gov

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Ms. Venticinque,

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If you have questions or would like additional information about the Project please go to equitransproject.com, contact me at 412-553-5798 (SFrazier@eqt.com), or Tricia Pellerin at 617-443-7556 (tricia.pellerin@tetratech.com).

Sincerely,

Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

Equitrans I 625 Liberty Avenue Suite 1700 I Pittsburgh, PA 15 2223111
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EQUITRANS℠

April 27, 2015 SENT VIA EMAIL

Joan Tengowski, Technician
Federal Aviation Administration (FAA)
Joan.tengowski@faa.gov

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Ms. Tengowski,

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 Federal Energy Regulatory Commission (FERC) will serve as the lead agency for the Project. FERC granted Equitrans request in Docket No. PF15-22 to use the FERC's pre-filing process in late April 2015 and Equitrans anticipates filing a formal application with the FERC in the fourth quarter of 2015. The FERC will then prepare an Environmental Assessment or an Environmental Impact Statement to satisfy the National Environmental Policy Act (NEPA) process for the Project.

In order to assist Equitrans in preparing the FERC application and identifying possible issues to be addressed during the NEPA process, the purpose of this letter is initiate dialogue, request information and identify any potential concerns you may have regarding the Project.

The Equitrans team looks forward to working with you as we move forward with development of this Project. We appreciate your assistance and thank in you advance for your willingness to work with Equitrans.

If you have questions or would like additional information about the Project please go to equitransproject.com, contact me at 412-553-5798 (SFrazier@eqt.com), or Tricia Pellerin at 617-443-7556 (tricia.pellerin@tetratech.com).

Sincerely,

Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

EQUITRANS℠

April 27, 2015

Pennsylvania Game Commission (PGC)
Bureau of Wildlife Habitat Management
Division of Environmental Planning & Habitat Protection
2001 Elmerton Avenue
Harrisburg, PA 17110-9797

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

To Whom It May Concern,

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.

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Equitrans I 625 Liberty Avenue Suite 1700 I Pittsburgh, PA 15 2223111
T 412.553.5700 I F 412.553.5757 I www.eqt.com

The Federal Energy Regulatory Commission (FERC) will serve as the lead agency for the Project. FERC granted Equitrans request in Docket No. PF15-22 to use the FERC's pre-filing process in late April 2015 and Equitrans anticipates filing a formal application with the FERC in the fourth quarter of 2015. The FERC will then prepare an Environmental Assessment or an Environmental Impact Statement to satisfy the National Environmental Policy Act (NEPA) process for the Project.

In order to assist Equitrans in preparing the FERC application and identifying possible issues to be addressed during the NEPA process, the purpose of this letter is initiate dialogue, request information and identify any potential concerns you may have regarding the Project.

The Equitrans team looks forward to working with you as we move forward with development of this Project. We appreciate your assistance and thank in you advance for your willingness to work with Equitrans.

If you have questions or would like additional information about the Project please go to equitransproject.com, contact me at 412-553-5798 (SFrazier@eqt.com), or Tricia Pellerin at 617-443-7556 (tricia.pellerin@tetratech.com).

Sincerely,

Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

Enclosure(s)

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

June 30, 2015 **PGC ID Number: 201505050202 Update**

Dale Sparks
Environmental Solutions & Innocations, Inc.
4525 Este Ave.
Cincinnati, OH 45232
dsparks@envsi.com

Re: EQT – Equitrans Expansion Project (*Update*)
Large Project PNDI Review
Greene, Allegheny & Washington Counties, PA

Dear Mr. Sparks,

Thank you for submitting your Pennsylvania Natural Diversity Inventory (PNDI) Large Project Environmental Review request. The Pennsylvania Game Commission (PGC) screened this project 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

Pennsylvania Natural Heritage Program

JWT/jwt

cc: H:\OIL&GAS_PNDI_Reviews\Southwest Region

EQUITRANS℠

April 27, 2015

Rachel Carson
Pennsylvania Department of Conservation and Natural Resources (PADCNR)
P.O. Box 8552
State Office Building, 6th Floor
Harrisburg, PA 17105-8552

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Ms. Carson,

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.

Equitrans | 625 Liberty Avenue Suite 1700 | Pittsburgh, PA 15 2223111
T 412.553.5700 | F 412.553.5757 | www.eqt.com

The Federal Energy Regulatory Commission (FERC) will serve as the lead agency for the Project. FERC granted Equitrans request in Docket No. PF15-22 to use the FERC's pre-filing process in late April 2015 and Equitrans anticipates filing a formal application with the FERC in the fourth quarter of 2015. The FERC will then prepare an Environmental Assessment or an Environmental Impact Statement to satisfy the National Environmental Policy Act (NEPA) process for the Project.

In order to assist Equitrans in preparing the FERC application and identifying possible issues to be addressed during the NEPA process, the purpose of this letter is initiate dialogue, request information and identify any potential concerns you may have regarding the Project.

The Equitrans team looks forward to working with you as we move forward with development of this Project. We appreciate your assistance and thank in you advance for your willingness to work with Equitrans.

If you have questions or would like additional information about the Project please go to equitransproject.com, contact me at 412-553-5798 (SFrazier@eqt.com), or Tricia Pellerin at 617-443-7556 (tricia.pellerin@tetratech.com).

Sincerely,

Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

Enclosure(s)

pennsylvania
DEPARTMENT OF CONSERVATION
AND NATURAL RESOURCES

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
Baptisia australis	Blue False-indigo	Not Listed	Threatened
Erythronium albidum	White Trout-lily	Not Listed	Rare
Iodanthus pinnatifidus	Purple Rocket	Endangered	Endangered
Scutellaria saxatilis	Rock Skullcap	Undetermined	Endangered
Trillium nivale	Snow Trillium	Rare	Rare

Segments H316/H158-M80

Scientific Name	Common Name	PA Current Status	PA Proposed Status
Erythronium albidum	White Trout-lily	Not Listed	Rare
Scutellaria saxatilis	Rock Skullcap	Undetermined	Endangered
Tipularia discolor	Cranefly Orchid	Rare	Rare
Trillium nivale	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

- ***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 Podniesinski, Section Chief
Natural Heritage Section

EQUITRANS℠

April 27, 2015

Dave Spotts, Chief
Pennsylvania Fish and Boat Commission
Division of Environmental Services
450 Robinson Lane
Bellefonte, PA 16823-9685

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Chief Spotts,

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T 412.553.5700 I F 412.553.5757 I www.eqt.com

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Sincerely,

Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

Enclosure(s)

Pennsylvania Fish & Boat Commission
established 1866

Division of Environmental Services
Natural Gas Section
450 Robinson Lane
Bellefonte, PA 16823

May 19, 2015

IN REPLY REFER TO
SIR# 44257

Equitrans
Stephanie Frazier
625 Liberty Avenue
Pittsburgh, Pennsylvania 15222

RE: Species Impact Review (SIR) – Rare, Candidate, Threatened and Endangered Species
PNDI Search No.
Equitrans Expansion Project.
GREENE County: - WASHINGTON County:

Dear Stephanie Frazier:

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.

Freshwater Mussels

Rare or protected freshwater mussel species are known from the vicinity of the project area in South Fork Tenmile Creek, Greene County:

Round Pigtoe (*Pleurobema sintoxia*, Rare)
Three-ridge (*Amblema plicata*, Rare)
Wabash Pigtoe (*Fusconaia flava*, Rare)

Freshwater mussels are the most imperiled taxonomic group in North America. Nearly 20% of the species historically known to occur in the Commonwealth are now extirpated (locally extinct). Additionally 60% of Pennsylvania's remaining species are of conservation concern. We are concerned about direct and indirect (i.e., runoff) effects that the proposed project may have on the species of concern. The freshwater mussel species known from the project area are especially vulnerable to physical (dredging, rip-rap, etc.) and chemical (pH, dissolved oxygen, temperature, heavy metals and organic

contaminants) changes to their aquatic environment. Therefore, **we recommend using directional boring** rather than open cutting for the South Fork Tenmile Creek crossing. Open cutting will most likely adversely impact the species of concern. Work should be conducted from the bank (e.g., no in-stream disturbance). Likewise, no erosion or sediment should be allowed to enter into the river (e.g., strict erosion and sedimentation control measures need to be employed).

Provided that directional boring methodology is used, in-stream work on South Fork Tenmile Creek is avoided, strict E&S control measures are maintained, and best management practices are employed, we do not foresee any significant adverse impacts from the proposed activity to the mussel species of special concern or any other rare or protected species under Pennsylvania Fish & Boat Commission jurisdiction **provided that the applicant implement the following contingencies to prevent impacts to water quality from drilling/boring operations:**

• Have a designated environmental inspector on site for the duration of the entire crossing operation

• Stop the bore/drill immediately if anyone on site observes an Inadvertent Return.

• Have a Vac Truck on site or on call (within three hours) to begin clean-up of the release in the stream channel to prevent downstream migration of drilling fluids

• Notify PFBC Bureau of Law Enforcement Regional Office within 24 hours http://fishandboat.com/dir_regions.htm (NC 814-359-5250; NE 570-477-5717; NW 814-337-0444; SW 814-445-8974)

Additionally, any release of sediment to the stream should be reason to initiate contact with the PFBC Bureau of Law Enforcement to address these issues. Any unauthorized disturbance, unpermitted discharge, or release of sediment(s) that is determined to be a pollution event (generally described http://www.fish.state.pa.us/fishpub/summary/reporting.html) per the Pennsylvania Fish and Boat Code will be subject to the appropriate legal enforcement action.

If, however, the work will necessitate any direct (e.g. equipment intrusion) or indirect impacts (e.g. runoff) to South Fork Tenmile Creek, then we request that a mussel survey and mussel relocation be conducted. The mussel survey would examine the proposed right-of-way (ROW) (direct impact area) as well as the indirect area. All live mussels encountered within the area of direct impact would be collected and relocated out of harm's way if the stream crossing is proposed to be open-cut. The mussel survey can be conducted by the PFBC or a qualified malacologist. Mussels are more readily detectible near the substrate surface during appropriate seasons (May 1 to October 15) and water temperatures (generally above 55 °F). In addition, a cursory mussel survey will require appropriate stream conditions, including normal flow and relatively clear water.

If you decide that you would like the PFBC to conduct the mussel survey, please schedule a field meeting with us so that we can complete an evaluation of mussel habitat quality as well as a mussel survey to determine presence/absence, location, and abundance of mussel species within or adjacent to the proposed project area.

Enclosed is a list of qualified malacologists and a PFBC approved mussel survey protocol if you prefer to arrange for a non-PFBC mussel survey. Prior to conducting a survey, the qualified malacologist should submit a proposed survey and relocation plan to this office. Upon completion of the mussel survey and relocation, please send a copy of the final report to this office for further evaluation. We look forward to receiving this information.

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 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

PENNSYLVANIA FISH & BOAT COMMISSION
Division of Environmental Services
Natural Diversity Section
450 Robinson Lane
Bellefonte, PA 16823-9620

QUALIFIED SURVEYORS FOR FRESHWATER MUSSELS in the INTERIOR BASIN (OHIO, ERIE, AND GENESEE WATERSHEDS)

58 Pa. Code §75.5 provides that in order to conduct surveys for endangered or threatened fish (fish, amphibians, reptiles and aquatic invertebrates) species or their habitat in connection with an application for a proposed or planned development activity, a surveyor must be deemed qualified by the Pennsylvania Fish and Boat Commission (PFBC). An individual who wishes to be qualified by the PFBC to conduct surveys for endangered or threatened species must demonstrate to the PFBC's satisfaction that he or she meets the qualified surveyor requirements as approved by the Executive Director and published in the *Pennsylvania Bulletin*. The following list includes persons deemed qualified by the PFBC to possess skills and to have experience in properly searching for and finding Threatened or Endangered Freshwater Mussel species and in identifying their critical habitat. Persons not on this list but who have documented experience in conducting scientific studies of, or successful searches for, Threatened or Endangered Freshwater Mussel species and their critical habitat may submit their qualifications to the Natural Diversity Section for review and possible inclusion as a qualified surveyor. When applicable, a qualified surveyor must meet the requirements pertaining to scientific collector's permits and special permits for endangered and threatened species. All permitted collector's encounters with Threatened or Endangered Freshwater Mussel species must be reported in writing to the PFBC's Natural Diversity Section.

Arthur Bogan
North Carolina Museum of
Natural Sciences
11 West Jones Street
Raleigh, NC 27601
(919)707-8863
arthur.bogan@ncdenr.gov

Heidi Dunn
1417 Hoff Industrial Drive
O'Fallon, MO 63366
(636)281-1982
hdunn@ecologicalspecialists.com

Greg Styborski
16211 West Road
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(814)282-2943
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EQUITRANS℠

April 27, 2015

Mark Wayner, Air Quality Program Manager
Pennsylvania Department of Environmental Protection (PADEP)
Air Permits Division
Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222-4745

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Mr. Wayner,

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.

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Equitrans | 625 Liberty Avenue Suite 1700 | Pittsburgh, PA 15 2223111
T 412.553.5700 | F 412.553.5757 | www.eqt.com

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Sincerely,

Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

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pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

May 6, 2015

Stephanie Frazier
Equitrans
625 Liberty Avenue, Suite 1700
Pittsburgh, PA 15222-3111

Re: Equitrans Expansion Project, Greene, Allegheny and Washington Counties, Pennsylvania and Wetzel County, West Virginia

Dear Ms. Frazier:

Thank you for your recent letter regarding the Pennsylvania Department of Environmental Protection's (DEP) environmental permitting requirements for the above referenced projects.

As part of its continuing effort to create a more efficient permit application procedure, DEP has developed an online Permit Application Consultation Tool (PACT). The online tool is designed to quickly and easily assist potential applicants in determining which types of environmental permits, authorizations or notifications would be needed for specific projects. Based on the user's responses to a series of simple questions, PACT automatically provides an email response with information on permits and other information an applicant should consider.

To use the tool, go to www.dep.state.pa.us and click on the "Permit Application Consultation Tool" button and follow the prompts. Upon submission, you will automatically receive an email response outlining the permitting requirements for your project. If you have any questions or do not have access to the internet, please contact me.

Sincerely,

Ronald A. Schwartz, P.E., BCEE
Assistant Regional Director
Southwest Regional Office

EQUITRANS℠

April 27, 2015

Mark Gorog, Environmental Engineer Manager
Pennsylvania Department of Environmental Protection (PADEP)
Air Permits Division
Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222-4745

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-

Dear Mr. Gorog,

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.

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Sincerely,

Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

EQUITRANS℠

April 27, 2015

Devin Tomko, Air Quality Engineering Specialist
Pennsylvania Department of Environmental Protection (PADEP)
Air Permits Division
Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222-4745

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Mr. Tomko,

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Sincerely,

Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

EQUITRANS℠

April 27, 2015

Chuck Colbert
Engineer - Permitting
Pennsylvania Department of Environmental Protection (PADEP)
Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222-4745

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Mr. Colbert,

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.

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Equitrans I 625 Liberty Avenue Suite 1700 I Pittsburgh, PA 15 2223111
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Sincerely,

Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

Enclosure(s)

EQUITRANS℠

April 27, 2015

Greg Holesh, Civil Engineer Manager
Hydraulic (Permits)
PADEP, Division of Waterways, Wetlands, & Stormwater Management (DWWSM)
Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222-4745

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Mr. Holesh,

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Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

Enclosure(s)

EQUITRANS℠

April 27, 2015

PADEP District Office
California Technology Park
25 Technology Drive
Coal Center, PA 15423

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

To Whom It May Concern,

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.

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Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

EQUITRANS℠

April 27, 2015

John Brosnan, H.O.P. Manager
Pennsylvania Department of Transportation
Engineering District 11-0 (Allegheny County)
45 Thoms Run Road
Bridgeville, PA 15017

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

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EQUITRANS℠

April 27, 2015

Richard Marker, P.E., H.O.P. Manager
Pennsylvania Department of Transportation
Engineering District 12-0 (Washington and Greene Counties)
PO Box 259
N. Gallatin Avenue Ext
Uniontown, PA 15401

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

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Sincerely,

Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

EQUITRANS℠

April 27, 2015 SENT VIA EMAIL

Serena Bellew
Bureau Director/Deputy State Historic Preservation Officer
Pennsylvania Historical and Museum Commission
Bureau for Historic Preservation
sbellew@pa.gov

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Ms. Bellew,

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.

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Sincerely,

Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

Enclosure(s)

EQUITRANS℠

April 27, 2015 SENT VIA EMAIL

Barbara Frederick
Pennsylvania Historical and Museum Commission
Bureau for Historic Preservation
Western Region, Historic Resources
bafrederic@pa.gov

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.

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Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

Enclosure(s)

EQUITRANS℠

April 27, 2015 SENT VIA EMAIL

Kira Heinrich
Pennsylvania Historical and Museum Commission
Bureau for Historic Preservation
Archaeological Resources
kiheinrich@pa.gov

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Ms. Heinrich,

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.

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Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

Enclosure(s)

EQUITRANS℠

April 27, 2015

Barbara Sargent
West Virginia Division of Natural Resources (WVDNR)
Natural Heritage Program
67 Ward Road
Elkins, WV 26241

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Ms. Sargent,

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.

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T 412.553.5700 | F 412.553.5757 | www.eqt.com

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Sincerely,

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Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

DIVISION OF NATURAL RESOURCES
Wildlife Resources Section
Operations Center
P.O. Box 67
Elkins, West Virginia 26241-3235
Telephone (304) 637-0245
Fax (304) 637-0250

Earl Ray Tomblin
Governor

Robert A. Fala
Director

May 12, 2015

Ms. Stephanie Frazier
Equitrans, LP
625 Liberty Avenue, Suite 1700
Pittsburgh, PA 15222

Dear Ms. Frazier:

We have reviewed our files for information on rare, threatened and endangered (RTE) species and sensitive habitats for the area of the proposed Equitrans Expansion Project in Wetzel County, WV (Docket No. PF15-22).

We have no known records of any RTE species or sensitive habitats within the project area. The Wildlife Resources Section knows of no surveys that have been conducted in the area for rare species or rare species habitat. Consequently, this response is based on information currently available and should not be considered a comprehensive survey of the area under review.

The information provided above is the product of a database search and retrieval. This information does not satisfy other consultation or permitting requirements for disturbances to the natural resources of the state, and further consultation may be required. Additionally, any concurrence requirements for federally listed species must come from the US Fish and Wildlife Service.

Thank you for your inquiry, and should you have any questions please feel free to contact me at the above number, or barbara.d.sargent@wv.gov. Enclosed please find an invoice.

Sincerely,

Barbara Sargent
Environmental Resources Specialist
Wildlife Diversity Unit

enclosure

S:\Monthly\Barb\Invoices\Equitrans.doc

NO. 215-583

INVOICE

West Virginia Division of Natural Resources

Wildlife Resources Section, P.O. Box 67, Elkins, WV 26241
Attention: Ms. Patty Fordyce

In Account With: Equitrans, LP
625 Liberty Avenue, Suite 1700
Pittsburgh, PA 15222

Date: May 12, 2015

Attention: Ms. Stephanie Frazier

For the retrieval and compilation of information on rare, threatened and endangered species and sensitive habitats for the proposed Equitrans Expansion Project in Wetzel County, WV (Docket No. PF15-22).

AMOUNT DUE: $75.00

Make check payable to WV Division of Natural Resources. **Please reference the invoice number on your check.** Mail to the above address and to the attention of Ms. Fordyce.

EQUITRANS℠

April 27, 2015

Joe T. Scarberry
WVDNR, Office of Land and Streams
Building 74, Room 200
324 Fourth Avenue
South Charleston, WV 25303

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Mr. Scarberry,

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.

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Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
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Dave Richardson, Tetra Tech

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EQUITRANS℠

April 27, 2015

Jamon Goodrich
West Virginia Department of Environmental Protection (WV DEP)
North Central Regional Office
2031 Pleasant Valley Road, Ste. #1
Fairmont, WV 26554

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Mr. Goodrich,

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Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

EQUITRANS℠

April 27, 2015

Tom Bass
WVDEP, Office of Oil and Gas
601 57th Street, SE
Charleston, WV 25304

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Mr. Bass,

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.

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Supervisor Permitting – Environmental, EQT Corporation

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Dave Richardson, Tetra Tech

EQUITRANS℠

April 27, 2015

Scott G. Mandirola
Division Director
WVDEP, Division of Water and Waste Management
601 57th Street SE
Charleston, WV 25304

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Mr. Mandirola,

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Sincerely,

Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

EQUITRANS℠

April 27, 2015

Jay Fedczak
Assistant Director for Permitting
WVDEP, Division of Air Quality
601 57th Street SE
Charleston, WV 25304

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Mr. Fedczak,

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.

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Supervisor Permitting – Environmental, EQT Corporation

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Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

EQUITRANS℠

April 27, 2015

Wayne Kessinger, Permit Section Administrator
West Virginia Department of Transportation (WVDOT)
Division of Highways (DOH)
Building Five, Room 356
1900 Kanawha Boulevard East
Charleston, WV 25305

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Mr. Kessinger,

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EQUITRANS℠

April 27, 2015

Susan Pierce
Director, Deputy State Historic Preservation Officer
West Virginia Division of Culture and History
1900 Kanawha Boulevard East
Charleston, WV 25305

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Ms. Pierce,

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WEST VIRGINIA
Division of Culture and History

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

August 10, 2015

Rec'd 8/19/2015
CLB

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-1

Dear Dr. Borstel:

We have reviewed the work plan and unanticipated discoveries plan that were submitted for 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.

According to the submitted information, Equitrans, L.P. is proposing an expansion project in Greene, Allegheny and Washington Counties, Pennsylvania and Wetzel County, West Virginia. Within West Virginia, the proposed project will involve the construction of a new natural gas pipeline interconnect to deliver natural gas into Mountain Valley Pipeline LLC's proposed pipeline. The proposed project will be located south of Mobley, Wetzel County, WV. The Federal Energy Regulatory Commission (FERC) has jurisdiction over the proposed project and will serve as the lead agency. It is our understanding that part of the proposed pipeline interconnect project area overlaps with the study area for the proposed Mountain Valley Pipeline (MVP) and that survey efforts will be coordinated to avoid unnecessary duplication.

Archaeological Resources:
We concur with the Area of Potential Effect (APE) as defined for direct effects, which is comprised of the proposed limits of disturbance for the proposed project. According to the work plan, Phase I investigations will be conducted in accordance with federal and state standards and guidelines and will include pedestrian reconnaissance and shovel probe excavation of all areas located on visually undisturbed landforms with less than 20 percent slope and less than 75 percent surface visibility. In addition, some form of deep testing will occur in areas containing alluvial soils. Any archaeological sites identified during the survey will be documented and investigated in accordance with our guidelines. As well, any artifacts collected will be processed according to our guidelines. The field investigations and results will be documented in a report that meets federal and state standards and guidelines. We understand that the survey will not duplicate the field work already conducted within the proposed project area for the proposed MVP project. We concur with the work plan and look forward to reviewing the resulting technical report.

We have also reviewed the proposed plan for the treatment of unanticipated historic properties and human remains that was submitted for the above referenced project. This document outlines notification protocols and levels of field investigation to be undertaken should cultural resources or human remains be discovered during construction of the proposed project. In general we find the proposed plan to be acceptable.

Architectural Resources:
We have reviewed the submitted information. We understand that the Area of Potential Effects (APE) for historic architectural resources would include all areas that might be visually affected by the proposed compressor station construction and its operation. Tetra Tech proposes a 0.50 mile indirect APE for aboveground facilities. We concur with the proposed indirect APE, and we understand that this may vary depending on viewshed analysis results and site specific factors. We also concur with the proposed survey methodology that will be comprised of background research, field investigations, site form preparation, and reporting. Further comment specific to affected architectural resources will be provided upon receipt of your report and any resulting Historic Property Inventory (HPI) forms.

Public Comment:
We note that Equitrans has developed a list of Native American Tribes who may have historical connection to the project area. We also understand that consultation letters informing the respective tribes about the proposed project were sent on April 27, 2015 and, to date, Equitrans has received two responses.

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 Jeffrey S. Smith, Structural Historian at (304) 558-0240.*

Sincerely,

Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/LLD/JSS

EQUITRANS℠

April 27, 2015

Lisa Snider
District Manager
Department of Economic Development for Greene County
Fort Jackson Building, Mezzanine
19 South Washington Street
Waynesburg, PA 15370

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Ms. Snider,

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Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

EQUITRANS℠

April 27, 2015

Brent Burnett, Chairman
Greene County Planning Commission
Greene County Office Building
93 E. High Street
Waynesburg, PA 15370

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Mr. Burnett,

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Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

EQUITRANS℠

April 27, 2015

Mike Burdelsky
Allegheny County Department of Public Works
501 County Office Building
542 Forbes Ave
Pittsburgh, PA 15219

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Mr. Burdelsky,

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EQUITRANS℠

April 27, 2015

Robert Hurley, Director
Allegheny County Economic Development, Planning Division
One Chatham Center, Ste. 900
112 Washington Place
Pittsburgh, PA 15219

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Mr. Hurley,

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The Federal Energy Regulatory Commission (FERC) will serve as the lead agency for the Project. FERC granted Equitrans request in Docket No. PF15-22 to use the FERC's pre-filing process in late April 2015 and Equitrans anticipates filing a formal application with the FERC in the fourth quarter of 2015. The FERC will then prepare an Environmental Assessment or an Environmental Impact Statement to satisfy the National Environmental Policy Act (NEPA) process for the Project.

In order to assist Equitrans in preparing the FERC application and identifying possible issues to be addressed during the NEPA process, the purpose of this letter is initiate dialogue, request information and identify any potential concerns you may have regarding the Project.

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If you have questions or would like additional information about the Project please go to equitransproject.com, contact me at 412-553-5798 (SFrazier@eqt.com), or Tricia Pellerin at 617-443-7556 (tricia.pellerin@tetratech.com).

Sincerely,

Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

EQUITRANS℠

April 27, 2015

Caroline Sinchar
Planning Administrator
Washington County Planning Commission
Courthouse Square
100 W. Beau St., Ste. 701
Washington, PA 15301

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Ms. Sinchar,

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.

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Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

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T 412.553.5700 I F 412.553.5757 I www.eqt.com

EQUITRANS℠

April 27, 2015

Edgar Sapp, Director
Wetzel County Flood Plain Management
Wetzel County Emergency Services
P.O. Box 156
New Martinsville, WV 26155

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Sapp,

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.

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Sincerely,

Stephanie Frazier
Supervisor Permitting – Environmental, EQT Corporation

cc: J. Nathanial Manchin, EQT
Tricia Pellerin, Tetra Tech
Dave Richardson, Tetra Tech

EQUITRANS[SM]

August 28, 2015

Mr. Joe Hatton
United States Department of Agriculture
Natural Resources Conservation Service
West Virginia State Office
1550 Earl Core Road, Suite 200
Morgantown, WV 26505

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Mr. Hatton,

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Dave Richardson, Tetra Tech

EQUITRANS℠

August 28, 2015

Mr. Josiah Kim
United States Forest Service
Eastern Region Headquarters
626 East Wisconsin Avenue
Milwaukee, WI 53202

Subject: **Equitrans Expansion Project, Green Allegheny and Washington Counties, Pennsylvania, and Wetzel County, West Virginia**
Docket No. PF15-22

Dear Mr. Kim,

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Equitrans Expansion Project

Docket No. CP16-__-000

Resource Report 1

Appendix 1-M
Affected Landowners
(Privileged)

Equitrans Expansion Project

Docket No. CP16-__-000

Resource Report 1

Appendix 1-N
Public Participation Plan

EQUITRANS, LP
Equitrans Expansion Project
PUBLIC PARTICIPATION PLAN
October 27, 2015

Equitrans, LP (Equitrans), a wholly owned subsidiary of EQT Midstream Partners, LP, knows that stakeholder outreach and public consultation are essential elements of the permitting process and will play an important role in the overall successful development of the Equitrans Expansion Project (EEP or Project).

Equitrans has developed a comprehensive, proactive stakeholder outreach and public participation plan to determine appropriate and effective methods of communication with stakeholders, identify responsible parties, document the public consultation process, and adhere to communication protocols. Our goal is to work with stakeholders to achieve consensus and settlements on mutually acceptable project designs. We believe an early and more collaborative approach will lead to project designs that minimize impacts to landowners, communities, and the environment, while enabling us to develop more comprehensive applications for submittal to the Federal Energy Regulatory Commission (FERC) and other agencies.

Project Scope
As proposed, Equitrans plans to construct approximately 7.87 miles of 6-inch to 30-inch diameter pipeline (at separate locations); replace the existing Pratt Compressor Station with a state-of-the-art 31,300 horsepower compressor station, to be named Redhook Compressor Station; construct a future interconnect and tap with Mountain Valley Pipeline, LLC; and construct additional ancillary facilities. As designed, the Project will transport up to 600,000 dekatherms per day of natural gas from production supply in the central Appalachian Basin -- utilizing existing and future interconnects to provide timely, cost-effective natural gas access to the growing demand by local distribution companies, industrial users, and power generation facilities in the northeastern, Mid-Atlantic, and southeastern regions, as well as to potential markets in the Appalachian region.

The pipeline will be governed under Section 7C of the Natural Gas Act, which requires a Certificate of Public Convenience and Necessity from the FERC and other relevant approvals before construction can commence. Subject to regulatory approvals, the Project is expected to be fully in-service in April 2018, with the demolition of the compressor station expected to be complete by December 2018.

Outreach Strategies and Public Participation
It is Equitrans' objective that all potential federal, state, and community stakeholders be informed of our intentions relative to the proposed Project in a timely manner. The EEP's Public Participation Plan has the following objectives:

Identify all of the Project's key stakeholders. While landowners are the most obvious and directly affected stakeholders, many individuals and organizations within the scope of the Project have an interest. Identifying and engaging them is essential to the success of the Project.

Be early and proactive. Equitrans will communicate with identified stakeholders early and often during all phases of the Project. While not always possible, it is our desire for stakeholders to hear about significant project-related news from us before they hear it from other sources. Doing so will help Equitrans maintain positive relationships and ensure the accuracy of the information they are receiving.

Establish channels for two-way communication throughout the life of the Project. Equitrans realizes that effective communication must be two-way. In addition to sharing information, Equitrans' outreach effort is designed to create a continuing dialogue with stakeholders, from the start of the pre-filing process through construction, restoration, and operation. It is also designed to provide stakeholders with a minimal number of contacts to maintain ease of communication and ensure consistency of messaging.

Ask for public input at critical stages of planning. Equitrans believes that the Project is a partnership not only with the commercial partners, but with all stakeholders. With that idea in mind, Equitrans will seek to gain input and ideas from stakeholders during the planning stage for the EEP. This will help identify and address areas of concern.

Keep stakeholders informed throughout the process. Many outreach plans are designed to communicate effectively during early stages of implementation — especially during the approval stage — but then reduce communication during construction. While communication regarding the EEP will certainly be heaviest early in the process, Equitrans plans to proactively communicate, via website updates and additional outreach methods during all phases of the project, even after all approvals have been received.

Stakeholder Identification

Equitrans will focus its efforts on reaching the following audiences:

- Landowners
- Local elected officials
    - Mayors, city councils
    - County commissioners
    - County and municipal planning organizations
    - Zoning boards, etc.
- State elected officials
    - State Senators (local area staff)
    - State congressmen (local area staff)
- Federal elected officials
    - U.S. Senators (local area staff)
    - U.S. congressmen (local area staff)
- Federal, State, and local regulatory agencies
- Economic development agencies/chambers of commerce
- Owners of mineral rights, such as coal companies
- Local law enforcement agencies
- Local media outlets
- Community at large

The status of contacts made to date with federal and state agencies, local elected officials, and municipal planning agencies can be found in the Project's monthly status updates to the docket during the pre-filing process with the FERC.

Agencies

In April 2015, the EEP project team mailed letters to all permitting agencies and agencies that require consultation notifying them its plans to use the FERC pre-filing process and invite them to participate. Follow-up phone calls were made to seek guidance from agencies and request meetings as appropriate.

The EEP team is committed to working with federal and state agencies and, in the spirit of two-way engagement, will respond to requests for information from these agencies in a timely manner. During the initial contacts, a specific line of communication was established between the agency personnel and Project staff. This line of communication will be utilized to confirm full understanding of agency requests and to confirm agency receipt of requested information.

Stakeholder Outreach Activities
Equitrans will employ several methods to ensure successful communication and outreach, including:

Stakeholder identification and issues management database/tracking system. After identifying stakeholders, Equitrans developed, and continues to maintain, an issues management system to track contact with these stakeholders in a manner that helps identify and resolve emerging issues and concerns.

Informational materials. Equitrans developed, and will continue to develop, messages and materials to inform stakeholders about the EEP and to address potential questions and areas of concern. These materials will include, for example:

- A project fact sheet that incorporates FAQ's
- "Standard presentation" information posters, etc. for use at Open Houses and subsequent meetings
- Internal project guidance concerning key messages about the EEP to ensure consistency in communication
- Media advertisements to announce public meetings and other project updates
- Project newsletter to be directly mailed to stakeholders and accessible online via the Project website

Keeping the media appropriately informed. To help minimize the potential for misunderstanding and to provide accurate information and messages regarding the EEP, it is necessary to utilize the media as a well-informed stakeholder. Important informational updates include:

- Information on Equitrans, including the purpose and need for the Project
- Information on environmental and other benefits of natural gas
- Discussion of today's energy market and the need for expanded natural gas infrastructure
- FERC background information — The role of the FERC and other regulatory agencies in the process, and an overview of the pre-filing and filing processes
- Information on construction, including the types and sizes of equipment used
- Information on environmental activities conducted throughout the project, including pre-construction environmental surveys, measures during construction to minimize impact on environmental resources including agricultural resources, restoration, and post-construction monitoring
- Safety information — A discussion of pre- and post-construction safety, and an overview of the safety record of the interstate natural gas pipeline industry and of Equitrans
- A project time line — An intended time frame for completing key phases of the EEP

Website. Because of its accessibility and the ability to be constantly updated, online communications will play a vital role in stakeholder dialogue. In addition to serving as an EEP repository for up-to-date materials and information, the EEP Website features mechanisms for stakeholders to ask questions and provide input about the project. The EEP Website contains:

- A narrative and graphic overview of the EEP
- A downloadable map of the proposed route
- Downloadable detailed maps of the affected counties along the proposed route.
- Downloadable project fact sheet about the EEP and project schedule graphic
- Frequently Asked Questions (FAQs)
- FERC information, including an overview of the FERC's role, where the EEP is in the FERC process, and links to EEP's FERC filings.
- Information on the public open houses
- News and information featuring project announcements, news releases, media advisories
- Links to the FERC, Office of Pipeline Safety, industry coalitions, and state agencies

Direct Contact. Equitrans will utilize direct contact, either in person, by phone, or correspondence (e-mail and letter) for certain stakeholders throughout the project, as appropriate. Equitrans will notify landowners affected by the project as required by the FERC's regulations. For example, direct contact by company right-of-way representatives is a necessity in communicating with affected landowners. Direct contact with agencies will be initiated by project environmental staff and Equitrans' outreach staff will be responsible for contact with key elected officials (county commissioners, state and federal senators and representatives) along the proposed route. Direct contact will allow Equitrans to respond in a timely fashion to all inquiries from any agency, federal, state, or local authorities. Other stakeholders, including environmental organizations, economic development councils, and the news media will be contacted directly as appropriate to inform those stakeholders of the status of the project.

Community Open Houses. Equitrans held two centrally located open houses (May 20 - 21, 2015) along the proposed route, one in Allegheny County, and one in Greene County in Pennsylvania.

Open House Meeting Locations and Dates

Allegheny County	Date
Forward Township Municipal Office 100 Golden Circle Elizabeth, PA 15037	May 20, 2015
Greene County	**Date**
Jefferson Volunteer Fire Company 1483 Jefferson Road Jefferson, PA 15344	May 21, 2015

The Project's identified stakeholders were notified and invited, both directly (with invitations sent by U.S. mail) and indirectly (through the media). The meetings were arranged so that no interested party needed to drive further than 50 miles to attend, unless there was no viable alternative for a meeting location.

Utilizing a "station" format, stations were established for various issues; including rights-of-way, environmental, construction, engineering, etc. and additionally included a FERC station. Each station contained information pertinent to that area of project responsibility, presented both in larger visual aids and/or in handout form manned by project team members knowledgeable of the subject presented. This allowed attendees arriving at different times to circulate among the stations and gather information in a more informal fashion. The information provided to attendees was basic enough to allow people who are unfamiliar with a project like the EEP to gain a solid understanding.

Public Information Contact Vehicles

- Website: http://equitransproject.com
- Toll-free hotline: 1-855-EEP-7675
- Email: Equitransproject@eqt.com
- Mailing: Equitrans Expansion Project 625 Liberty Avenue Suite 1700 Pittsburgh, PA 15222

EEP Landowner Resolution Process

In the early stages of the Project's planning and development, the EEP established a protocol to address landowner concerns and answer questions. The procedure utilizes EEP's 24-hour toll-free hotline (855-EEP-7675) and/or email submission to equitransproiect@eqt.com, and this same method will be utilized during the construction phase as well. These communication portals were created as a means for landowners, as well as community members, to contact Project representatives with questions, concerns, and issues. The EEP also keeps a formal record of all calls and emails in order to effectively track inquiries and resolutions. The three-step resolution process is as follows:

Step 1: *Gather Information*

EEP representative will request all necessary information to complete the information section of the Inquiry/issues tracking log, including the individual's name, address, parcel number, phone number, and project reference. Additionally, any details offered regarding the purpose of the call will be entered on the tracking log.

Step 2: *Define the Inquiry/Issue*

EEP representative will work with the individual to help understand and address their concerns. If the representative can resolve the issue, they will record this on the tracking log. Otherwise, the individual will be advised that their concerns have been documented and that they can generally expect a return call within three business days from an EEP Project representative. The questions/concerns/issues as documented on the tracking log will then be directed to the appropriate right-of-way (ROW) agent.

Step 3: *Resolution*

If the issues are resolved during the above step, the EEP representative will complete the process by documenting how a resolution was reached. If a resolution was not reached, the tracking log is forwarded to the appropriate ROW agent who will return the call and then update the tracking log with the resolution. The delegation of the issue will generally follow this progression until the resolution is reached.

In any event that a ROW agent receives a direct phone call, the agent will request all necessary information (as outlined in step 1) and will initiate submission of the information on the inquiry/issues tracking log. The agent will then proceed to steps 2 and 3 until a resolution is reached.

FERC Landowner Assistance

After working with the EEP representative and appropriate ROW agent, if the landowner is still not completely satisfied with the resolution, the individual should contact the Federal Energy Regulatory Commission's Landowner Helpline by calling: (877) 337-2237, or by email: landownerhelp@ferc.gov

Equitrans Expansion Project 7C Application—Public Viewing Locations

When the EEP's formal application is filed with the FERC, copies will be sent to public libraries in each county in Pennsylvania, and Wetzel County in West Virginia. The following list identifies the respective libraries where the public may review a hard copy or digital version.

County	Library	Address
Allegheny	Clairton Public Library	616 Miller Ave. Clairton, PA 15025
Washington	Citizens Library	55 S. College St. Washington, PA 15301
Greene	Eva K. Bowlby Library	311 N. West Street Waynesburg, PA 15270
Wetzel	New Martinsville Public Library	160 Washington St. New Martinsville, WV 26155