



November 20, 2020

Commissioners &
Executive Director Steven Tambini
Delaware River Basin Commission
25 Cosey Road
P.O. Box 7360
West Trenton, NJ 08628-0360

Dear Mr. Tambini and Commissioners,

The Delaware Riverkeeper Network and the Delaware Riverkeeper, Maya van Rossum (collectively, "DRN") ask the Delaware River Basin Commission ("DRBC" or "Commission") to find and determine that the PennEast Pipeline project substantially impairs and conflicts with the Comprehensive Plan due not only to its significant disturbance of ground cover negatively affecting water resources, but also its contribution to climate change.

It is also important for the public, the applicant, and the DRBC's Commissioners and staff to have a full and clear understanding of how DRBC intends to interpret and apply its jurisdictional authority over the pipeline. Being clear upfront, and allowing any legal questions regarding DRBC jurisdiction to be handled prior to implementation of docket review will help avoid the situation where we (we being DRN and the public) are victorious in confirming that DRBC authority extends to the entire footprint of the project within the Delaware River basin, but that victory comes after a docket is issued, forests are cut, streams are trenched, wetlands and waterways are contaminated, and peoples' property rights have been further trampled upon.

The Commission must deny the PennEast docket since it not only conflicts with the Comprehensive Plan but will also substantially impair the Delaware River Basin's waterbodies and wetlands. Doing otherwise would cause a significant detrimental impact on the Basin's water quality and water supply.

DRBC has Jurisdiction and Regulatory Authority over the Entire Footprint of the Penn East Pipeline within the Basin Because the Pipeline will Have Significant Disturbance of Ground Cover and Review Should Not be Limited to Comprehensive Plan Features

DRBC's limited interpretation of its review authority would cause adverse impacts to the Delaware River Basin. As such, DRBC should enforce its full legal authority to review the entire pipeline and ensure that the project does not have a substantial effect on the water resources of the Basin. Section 3.8 of the DRBC's Rules of Practice and Procedure provides:

DELAWARE RIVERKEEPER NETWORK
925 Canal Street, Suite 3701
Bristol, PA 19007
Office: (215) 369-1188
fax: (215) 369-1181
drm@delawareriverkeeper.org
www.delawareriverkeeper.org

No project having a substantial effect on the water resources of the basin shall hereafter be undertaken by any person, corporation or governmental authority unless it shall have been first submitted to and approved by the Commission, subject to the provisions of Sections 3.3 and 3.5. The Commission shall approve a project whenever it finds and determines that such project would not substantially impair or conflict with the Comprehensive Plan and may modify and approve as modified, or may disapprove any such project whenever it finds and determines that the project would substantially impair or conflict with such Plan. The Commission shall provide by regulation for the procedure of submission, review and consideration of projects, and for its determinations pursuant to this section. Any determination of the Commission hereunder shall be subject to judicial review in any court of competent jurisdiction.

With respect to natural gas pipeline projects, DRBC's rules categorizes them as projects that presumptively do not have a substantial effect on the water resources of the Basin and that therefore do not automatically require Commission review:

(12) Electric transmission or bulk power system lines and appurtenances; major trunk communication lines and appurtenances; natural and manufactured gas transmission lines and appurtenances; major water transmission lines and appurtenances; **unless they would pass in, on, under or across an existing or proposed reservoir or recreation project area as designated in the Comprehensive Plan; unless such lines would involve significant disturbance of ground cover affecting water resources.**

RPP Article 3, Section 2.3.5.A(12) (emphasis added). But, by its own terms, RPP Article 3, Section 2.3.5.A(12) contains two independent exceptions to the exemption that, if the stated conditions are met, trigger Commission review:

- 1) If the project in question crosses an existing or proposed reservoir or recreation area that has been incorporated into the Comprehensive Plan, and
- 2) If the project involves a significant disturbance of ground cover affecting water resources.

On January 30, 2013, the DRBC sent DRN a letter (attached hereto as Exhibit A) describing how the Commission interpreted the portion of 2.3.5.A(12) for projects that "involve a significant disturbance to ground cover affecting water resources." The DRBC clarified that it was guided by other land disturbances thresholds established in section 2.3.5(A). One standard described that a significant disturbance threshold was triggered by projects that involved "draining, filling, or otherwise altering marshes or wetlands" in excess of "25 acres." The DRBC stated that meeting this threshold "warrants basin wide review". Although, DRN notes that DRBC did not limit these criteria and left open other considerations.

A clear reading of DRBC's Rules and Procedures indicates that DRBC's jurisdiction extends to the entire pipeline footprint within the Delaware River Basin and is not limited to comprehensive plan

features because the Project would involve a significant disturbance of ground cover affecting the Basin's water resources.

Construction of the PennEast Pipeline project will impact 1,613.5 acres of land (1,065.2 acres for pipeline facilities, 110.1 acres for access roads; 372.3 acres for pipe and contractor ware yards, 31.1 acres for above ground facilities), the vast majority of which are located within the boundaries of the Delaware River basin. The project will cut through at least 255 waterbodies (including 159 perennial, 45 intermittent, 40 ephemeral, 11 open water), 633 acres of forest, 91 acres of wetlands, and impact "several" vernal pools—again, the vast majority of which lie within the boundaries of the Delaware River basin.

In addition, the PennEast Pipeline will result in the alteration or destruction of well over 25 acres of wetlands. According to the 25-acre standard articulated in the DRBC's January 30, 2013 letter which provided a description detailing how the Commission considered the portion of 2.3.5.A(12) for projects that "involve a significant disturbance of ground cover affecting water resources," the Project thereby involves the magnitude of disturbance that triggers basin-wide review even when using DRBC's limited interpretation of its own regulations.

A limited reading of the exceptions to 2.3.5.A(12), asserting jurisdiction over the project but only to portions that pass in, on, under or across an existing or proposed reservoir or recreation project area as designated in the Commission's Comprehensive Plan, contradicts the plain language of the Rules of Practice and Procedure.¹ This limited reading does not take into account that the second exception to 2.3.5.A(12) provides the Commission with basin-wide review of the project, thereby holistically protecting the Basin's water resources from projects that could substantially impair or conflict with the Comprehensive Plan. Instead of solely applying the first exception to determine their jurisdiction, the Commission should explicitly state that they have jurisdiction because the project involves a significant disturbance of ground cover affecting water resources.

PennEast's Assertions that the Project is Outside the Scope of DRBC's Jurisdiction are Not Supported by the Law, or by the Facts Submitted in their Application.

In PennEast's April 21, 2020 submission to FERC, PennEast asserted that the Commission does not have jurisdiction because (1) the Amendment application and proposed construction of Phase 1, are not "projects" under Section 3.8 of the Compact, and (2) the amendment application would not have a substantial effect on water resources in the basin. PennEast's assertions to FERC regarding DRBC's jurisdictional authority to review Phase 1 of the project are simply incorrect.

Section 3.8 of the Compact provides: "No project having a substantial effect on the water resources of the basin shall hereafter be undertaken by any person, corporation or governmental authority unless it shall have been first submitted to and approved by the [DRBC]." The Compact defines "Project" as:

[A]ny work, service or activity which is separately planned, financed, or identified by the commission, or any separate facility undertaken or to be undertaken within a specified area, for the conservation, utilization, control, development or management of water resources which can be established and utilized independently or as an addition to an existing

¹ See RPP § 2.3.5.A 12(18 CFR 401.35(a)(12))

facility, and can be considered as a separate entity for purposes of evaluation.²

PennEast incorrectly states that the 2020 amendment application and Phase 1 facilities do not fall under the Compact’s definition of “project” because they do not conserve, utilize, control, develop, or manage water resources. However, PennEast fails to acknowledge that water resources include “water and related natural resources in, on, under, or above the ground, including related uses of land, which are subject to beneficial use, ownership or control.”³

PennEast is clearly a “project” subject to Section 3.8 review because the facility will develop⁴ and utilize⁵ water and related natural resources by making use of water bodies within the Basin to construct and operate the business enterprise known as the PennEast pipeline. As such it is clear, that the proposed PennEast activities are “projects”, and are subject to the Commission’s Section 3.8 jurisdiction.

PennEast has also incorrectly asserted that, even if Phase 1 is a project, DRBC does not have jurisdictional authority over the project because it will not have a substantial effect on water resources in the basin. In its April 21, 2020 response to FERC, PennEast claimed that the Phase 1 project would "affect less than 19.7 acres of wetlands."⁶ PennEast should not be permitted to avoid basin-wide review by segmenting the project to fall below DRBC’s “25 acre” threshold (determining that a significant disturbance was triggered by projects that involved “draining, filling, or otherwise altering marshes or wetlands” in excess of “25 acres”). Despite PennEast’s veiled attempts to circumvent DRBC’s jurisdiction, it is clear that the entire project will involve significant disturbance to over 25 acres of wetlands, thereby triggering basin-wide review of the project.

PennEast further supports its argument by claiming that it will obtain water for hydrostatic testing and dust suppression from approved sources (e.g. commercial and municipal suppliers), and that no chemicals will be added to hydrostatic testing water.⁷ PennEast has also indicated that they will dispose of the waters at approved wastewater treatment facilities.⁸ PennEast has proposed the use of horizontal directional drilling (HDD) in two locations within the Delaware River Basin in Phase 1 of the project. The locations of the HDDs are proposed as follows:

Location/Feature	County	Begin MP⁹	End MP¹	Length (feet)
Interstate 80	Carbon	26.8R2	27.6R2	3,824

² Delaware River Basin Commission Compact (“Compact”) § 1.2(g) (1961).

³ Compact § 1.2(i).

⁴ “to make actually available or usable (something previously only potentially available and usable) <~ing the natural resources of the region>” or “to convert (as raw land) into an area suitable to residential or business purposes.” *Develop*, Webster’s 3d New Int’l Dictionary (2002).

⁵ “turn to profitable account or use,” “make use of.” *Utilize*, Webster’s 3d New Int’l Dictionary (2002).

⁶ Response to April 1, 2020 Environmental Information Request, PennEast Pipeline Co., LLC, FERC Docket No. CP20-47-000 (Apr. 21, 2020).

⁷ Abbreviated Application for Amendment to Certificate of Public Convenience and Necessity, PennEast Pipeline Co., LLC, FERC Docket No. CP20-47 (Jan. 30, 2020) at F-1, Section 2.3.

⁸ *Id.*

⁹ Begin/End MPs are at the approximate locations of the HDD entry/exit points.

Wild Creek & Pohopoco Creek (Beltzville Lake)	Carbon	43.2R3	44.4R3	6,100
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However, as the Commission explained in a comment to FERC, if HDD water is drawn from sources with a current DRBC docket and the withdrawal exceeds 100,000 gallon-per-day average over a 30-day period, additional approval may be needed from the Commission.¹⁰

Specifically, the Commission has advised PennEast that:

(1) Section 3.8 review and approval are required for daily average gross water withdrawals of more than 100,000 gpd during any 30 consecutive day period. See RPP §§ 2.3.5 A 2. and 3(18 CFR 401.35(a)(2) and (3)).

(2) The Delaware River Basin Water Code requires review and approval for importation outside the basin of 100,000 gpd or more of water for use within the basin or exported within the basin for any use outside it. See WC § 2.30 and RPP §§ 2.3.4 A.16. and 17 (18 CFR 401.35(a)(16) and (17)).

(3) Facilities for the direct discharge of industrial wastewater to surface or ground waters of the basin are subject to Section 3.8 review and approval. The RPP exempts from this requirement such facilities with design capacities of less than 10,000 gpd within the drainage area of the Commission’s Special Protection Waters, and less than 50,000 gpd elsewhere in the basin. See RPP § 2.3.5 A.5(18 CFR 401.35(a)(5)).¹¹

If HDD water is drawn from sources that have a current DRBC docket (or dockets) and if no increase in an approved DRBC allocation is needed, then the use of basin water for HDD does not require separate DRBC approval. In accordance with the RPP (18 CFR 401.35(a)(2) and (3)), no approval is required for a daily average gross withdrawal that does not exceed 100,000 gallons over any 30 consecutive-day period. Above that threshold, or if transfers of water into the basin are undertaken, then DRBC review may be required in accordance with the provisions noted above.

While it appears that HDD discharges for the Phase 1 project will be disposed of at approved wastewater treatment facilities, DRBC review in accordance with 18 CFR 401.35(a)(5) may be required for discharges of used HDD directly to basin waters. We note that Phase 1 is located entirely within the drainage area of the Commission’s Special Protection Waters, where the applicable threshold for review is 10,000 gpd of discharge design capacity. Indeed, in its recent response to Commission inquiries, PennEast explained that it will be withdrawing and discharging hydrostatic test water and water used for HDD activities at a number of facilities with existing DRBC dockets, totaling 19,305,000 gallons to be withdrawn and discharged.¹² There is still not enough information in the record to determine

¹⁰ Letter from Steven J. Tambini, Executive Director, DRBC, to Kimberly D. Bose, Secretary, FERC, FERC Docket No. CP20-47-000 (March 30, 2020).

¹¹ *Id.*

¹² Letter from Amber Holly, Environmental Manager, PennEast Pipeline Co., LLC, to David Kovach, Delaware River Basin Commission (July 17, 2020).

whether these withdrawals or discharges will result in a volume sufficient to trigger the Commission's approval.

It is clear that the project will have a substantial effect on the water resources of the basin, and that DRBC has jurisdiction to review and approve the application. Despite PennEast's assertions, obtaining withdrawals from commercial and municipal suppliers will likely cause those suppliers to overdraw their waters. Also, disposal of treated waters at wastewater facilities will burden the communities that those facilities serve. As discussed below, the project will also substantially affect the Basin's waterbodies and wetlands, and will exacerbate the environmental harms caused by climate change.

The PennEast Project Must be Denied because It Substantially Interferes with the Comprehensive Plan

The purpose of the comprehensive plan, as set forth in Phase 1 of the existing Comprehensive Plan, is to provide an established framework of commission policy for the immediate and long-range development and use of the water resources of the basin.¹³ The Comprehensive Plan, including its various parts, is intended to describe the general characteristics of river basin development which the Commission finds to be in the public interest.¹⁴ It does not mandate construction of any project or the acquisition of any land.¹⁵ It provides a flexible, growing and evolving general framework for the orderly development of the water and related resources of the basin.

The Commission will only accept projects that conform to the Comprehensive Plan because they: (1) are beneficial to the development of the water resources in a given locality or region, (2) are economically and physically feasible, (3) conform with accepted public policy, and (4) don't adversely influence the present or future use and development of the water resources of the basin.¹⁶ As set out in the Commission's Rules and Procedures, the Commission may disapprove of any project whenever it finds and determines that the project would substantially impair or conflict with the Comprehensive Plan.¹⁷

The PennEast docket clearly conflicts with the Comprehensive Plan. The Project must be denied because it: (1) is detrimental to the development of the Basin's waterbodies and wetlands; (2) it would incur severe climate costs; (3) it does not conform with accepted public policy as it will severely harm our Basin's water quality and supply, and would exacerbate climate change impacts; and (4) is detrimental to the present and future use and development of the Basin's water quality and resources.

The PennEast Project will Have a Detrimental Effect on the Delaware River Basin's Waterbodies and Wetlands

The Commission cannot permit any encroachment on wetlands unless an assessment of the environmental and economic impacts establishes that there are no feasible alternatives and that an overriding public interest has been demonstrated.¹⁸ As per the Commission's Water Code, the Commission has a duty to support the preservation and protection of wetlands by:

¹³ Delaware River Basin Commission Comprehensive Plan Phase I § 1(b) (1962).

¹⁴ Delaware River Basin Commission Comprehensive Plan § 1(A)(d) (2001).

¹⁵ *Id.*

¹⁶ *Id.*

¹⁷ Compact § 3.8.

¹⁸ Delaware River Basin Water Code ("Water Code") § 2.350.3.

- A. Minimizing adverse alterations in the quantity and quality of the underlying soils and natural flow of waters that nourish wetlands.
- B. Safeguarding against adverse draining, dredging or filling practices, liquid or solid waste management practices, and siltation.
- C. Preventing the excessive addition of pesticides, salts or toxic materials arising from non-point source wastes.
- D. Preventing destructive construction activities generally.¹⁹

The Commission's issuance of a docket to PennEast would result in destructive construction activities. In the application document entitled, "Waterbodies Crossed by the Phase 1 of the Project within the Delaware River Basin", there are 96 waterbodies crossed. 65 of them are designated high quality ("HQ") by the Pennsylvania Department of Environmental Protection ("PADEP"), 14 are Exceptional Value Streams ("EV"), and there are only two proposed HDD crossings—at Beltzville Lake and unnamed tributaries of Pohopoco Creek. According to the application document entitled, "Wetlands Crossed by Phase 1 of the Project within the Delaware River Basin", there are a total of 130 wetlands crossed by the project. Of these, 92 wetlands are EV and only 38 wetlands are labeled "other" (ordinary resource value wetlands).

PennEast has failed to mention that the majority of wetlands impacted by this project are EV. Most of the proposed crossing methods for these 130 wetlands are open-cut with only five HDD crossings. PennEast asserts that permanent wetland impacts within the pipeline corridor will be associated with the conversion of Palustrine forested ("PFO") and Palustrine shrub ("PSS") wetlands to PSS and Palustrine emergent ("PEM") wetlands. PennEast's "Wetland and Riparian Reforestation Plan" proposes the planting of native trees and shrubs to restore wetlands to pre-construction conditions. However, PennEast only plans to monitor survivorship of these plantings for five years. It will take 30 years or more for trees in a PFO wetland to grow to pre-construction conditions, as acknowledged by PennEast in previous applications. In addition, PennEast provides a document entitled, "Off-Site Compensatory Wetland Mitigation Plan", asserting that wetland mitigation will offset the loss/negative impacts to wetlands crossed by the project.

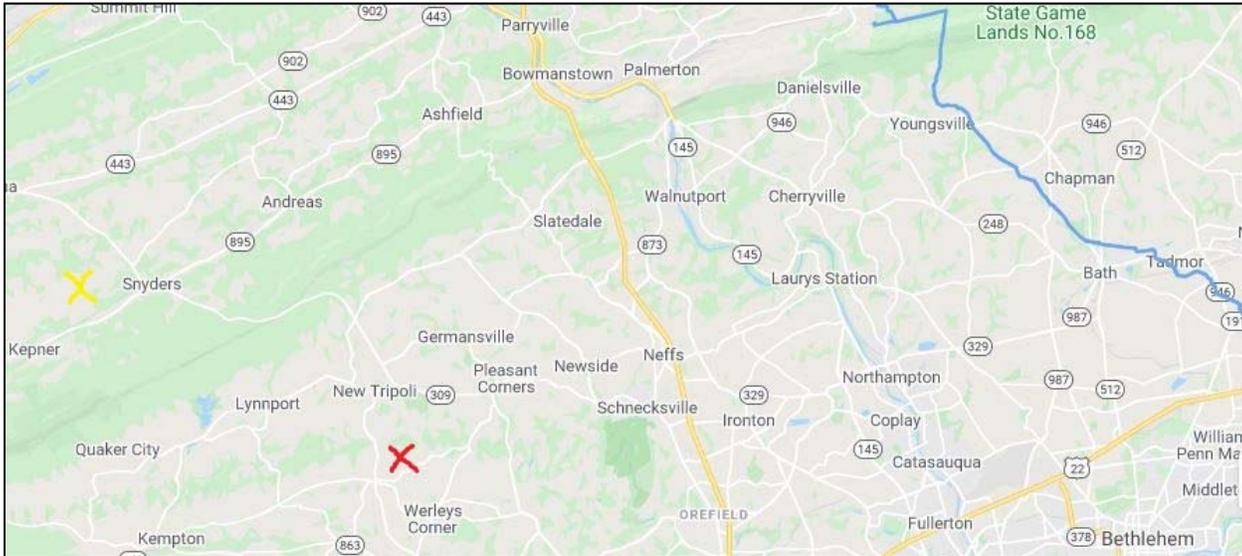
This plan suggests two wetland mitigation sites within the Delaware River Watershed. The first site is called the Kistler Mitigation Site and is located in West Penn Township, Schuylkill County, in the Lizard Creek Watershed. The second site is called the Shirk Mitigation Site and is located in New Tripoli, Lehigh County, in the Switzer Creek Watershed. Both mitigation sites are agricultural farmlands located west of the Lehigh River and barely within the Delaware River Watershed. In fact, both sites are over 20 miles away from the proposed pipeline route in counties and sub-watersheds not even remotely affected by the project. The creation and enhancement of agricultural wetlands over 20 miles away in no way compensates for the loss or negative impacts on EV wetlands from the pipeline project.

Moreover, PennEast estimates that Phase 1 of the pipeline project will result in a total wetland impact area of 17.354 acres and a permanent wetland conversion of 5.49 acres. All mitigation sites combined only result in 14.31 acres of wetland enhancement and 0.08 acre of wetland creation. Finally,

¹⁹ Water Code Article 2 § 2.350.2

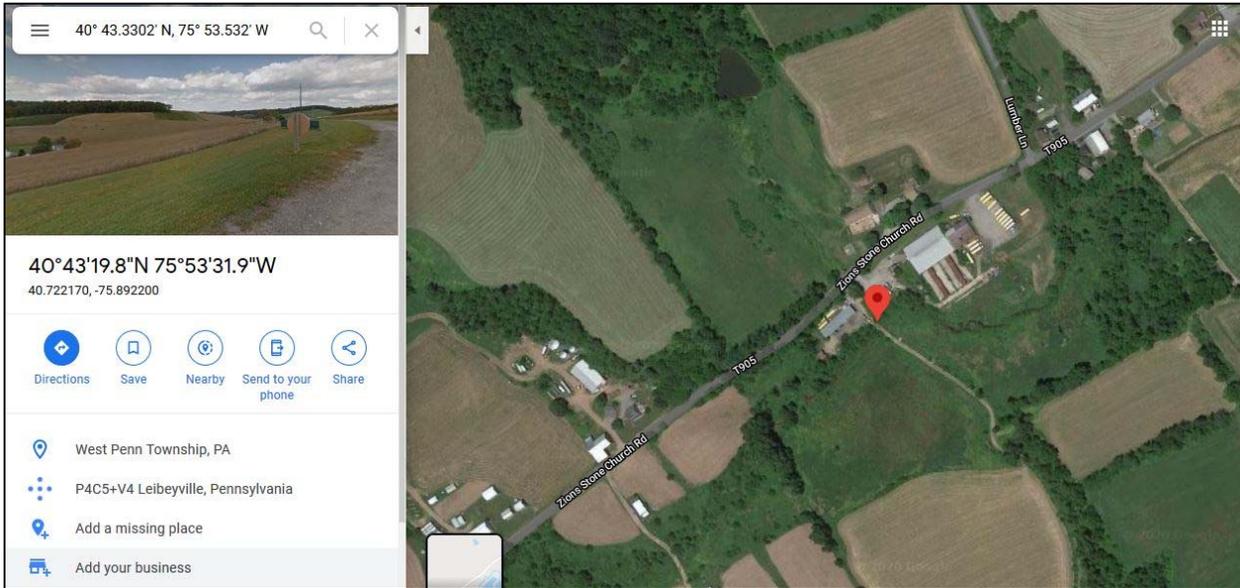
PennEast does not provide a map showing how far away the mitigation sites are from the actual pipeline route. Instead, they provide latitude and longitude coordinates in a format that is not compatible with Google Maps and must be converted in order for members of the public to see where the mitigation sites are located. Below are maps created by DRN.

Offsite Wetland Mitigation Site Map

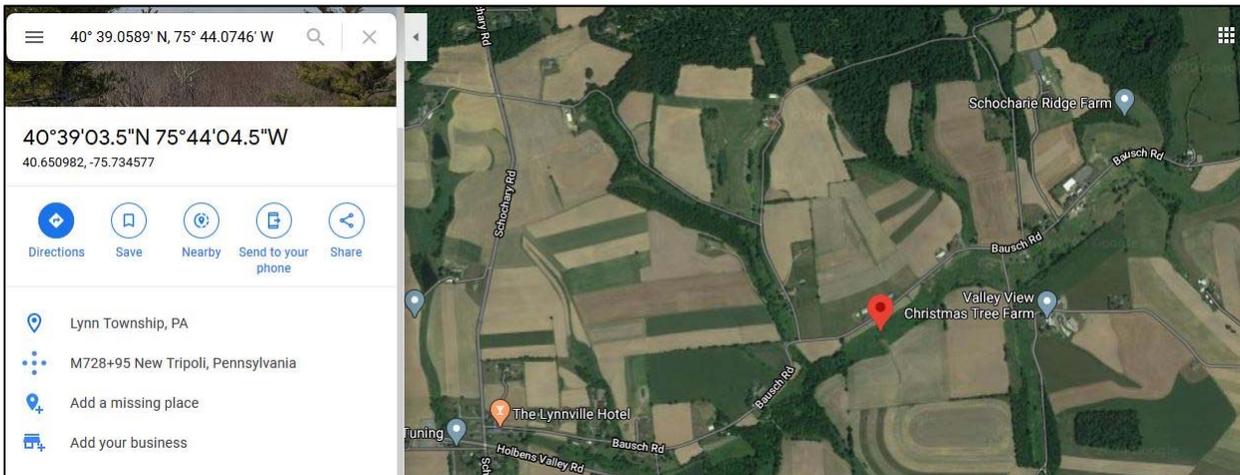


The blue line to the right is the proposed pipeline route. The yellow X to the left is the location of the Kistler Mitigation Site in Schuylkill County. The red X to the left is the location of the Shirk Mitigation Site in Lehigh County. Note that both sites are a significant distance (over 20 miles) from the pipeline route.

Kistler Mitigation Site



Shirk Mitigation Site



The proposed route will also impact waters that have been designated as significant resource waters by DRBC, and are afforded special protection. "Significant Resource Waters" (SRW) are interstate waters that have exceptionally high scenic, recreational, ecological, and/or water supply uses that require special protection.²⁰ Under the Commission's water quality regulations, SRW cannot be degraded below the existing water quality.²¹

Given the detrimental effects on wetlands and lack of mitigation, PennEast has not shown an overriding public interest that would justify the issuance of a docket. Approval of the PennEast Phase 1

²⁰ Water Code § 3.10.3(A)(2)(a)(2).

²¹ Water Code § 3.10.3(A)(2)(b)(2).

project would cause significant harms to the Delaware River Basin and substantially interferes with the purpose of the Comprehensive Plan, namely the Commission's duty to protect wetlands.

The PennEast Project Will Exacerbate Climate Change Impacts

The PennEast docket should be denied in order to avoid unnecessary climate change impacts. Climate change has serious and significant environmental, economic, and safety impacts and as a result of its harmful impacts on our communities and environment, climate change poses one of the most extreme existential threats facing humanity. The Commission has previously outlined various local climate change impacts facing the Delaware River Basin, including increased temperatures, changes in precipitation patterns, and sea level rise, all of which affect the Basin's water supply and water quality.²² Specifically, the Commission has stated that:

- Increased temperatures will affect evapotranspiration rates; more evaporation means less water available for streamflow. Increased temperatures will also affect stream water quality; turbidity levels will likely increase, and dissolved oxygen levels decrease.
- Precipitation is predicted to occur in the form of fewer, more intense storms occurring in the winter months. This means a potential increase in flood events coupled with extended drought cycles.
- The seasonality of flows may also change, for example, less snowpack in the winter may cause lower flows in the spring.
- Sea level rise may require increased releases from storage to augment river flows to repel salinity and/or costly modifications by water suppliers to treat increases in dissolved solids.
- Climate change could also affect instream flow and temperature conditions for aquatic biota.²³

As such, in December 2019, the Commission formed the Advisory Committee on Climate Change to provide the Commission and the basin community with scientifically based information for identifying and prioritizing these threats to the basin's water resources, as well as recommendations for mitigation, adaptation and improved resiliency.²⁴

The drilling and completion of anticipated new wells to supply the demand created by the PennEast pipeline will contribute to increased greenhouse gas emissions, as outlined in the table below²⁵:

²² Climate Change, Delaware River Basin Commission, <https://www.state.nj.us/drbc/hydrological/climate/> (Sept. 25 2020).

²³ *Id.*

²⁴ *Id.*

²⁵ See Synapse Energy Economics, Inc., Impacts of the PennEast and Adelpia Gateway Pipelines on Gas Drilling in Pennsylvania (March 20, 2020) at 8 (Attached hereto as Exhibit B).

<u>Pipeline Project</u>	<u>Low Estimate of New Wells</u>	<u>High Estimate of New Wells</u>	<u>Low Estimate of Drilling-Related Emissions (mt CO2e)</u>	<u>High Estimate of Drilling-Related Emissions (mt CO2e)</u>
Phase 1	917	1,466	1,254,641	2,007,425
Phase 2	644	1,031	882,109	1,411,374

Unconventional gas wells release CO₂ (carbon dioxide) and CH₄ (methane) through combustion emissions, equipment leaks, and vented emissions from the wells themselves.²⁶ If the PennEast pipeline is constructed, between 882,000 and 1.4 million Mt of CO₂e (carbon dioxide equivalent) will be emitted into the atmosphere as a result of drilling and completion alone.

The PennEast project will also cause climate damages associated with an increase in greenhouse gas emissions, including but not limited to, property damage from floods, changes in agricultural productivity, extinction of endangered species, and loss of unique environments.²⁷ These damages translate to increased health care costs, destruction of property, and increased food prices, which cost families and businesses billions of dollars.²⁸ The new capacity of the various components of this pipeline project could carry large quantities of natural gas, resulting in the potential release of enormous quantities of greenhouse gas emissions.²⁹ In addition to emissions generated by combustion of the gas that flows through the pipeline, additional emissions result from pipeline operations (including gas consumed by compressor stations, leaks, and other sources).³⁰ The preset value cost over a projected lifetime of 40 years, ranges from a low of almost \$6 billion under the Trump administration’s values to a high of just over \$43 billion using the estimates developed by the Obama administration.³¹ These numbers are likely conservative, as studies have found that emissions leakage is up to 60 percent higher than U.S. EPA estimates.³²

The Commission must begin implementing climate change mitigation measures immediately by denying dockets for projects that commit the Basin to reliance on fossil fuels, which contribute to increases in greenhouse gas emissions and have a significant effect on the Delaware River Basin’s water supply and water quality. Doing otherwise would cause damage to the Delaware River Basin and would interfere with the Comprehensive Plan.

In the Event that a Docket is Erroneously Issued to PennEast, The Commission Must Ensure That No Construction Activities, Including Tree Clearing or Felling, Take Place Before the Final Docket is Issued.

Section 3.8 of the Delaware River Basin Compact provides in relevant part: “No project having a substantial effect on the water resources of the basin shall hereafter be undertaken by any person, corporation or governmental authority unless it shall have been first submitted to and approved by the

²⁶ *Id.* at 9.

²⁷ *Id.*

²⁸ *Id.*

²⁹ *Id.* at 10.

³⁰ *Id.*

³¹ *Id.* at 11. (These estimates vary substantially because the Obama administration value includes global damages, while the Trump administration value only includes damages that occur within the United States).

³² Alvarez, R., et al. Assessment of methane emissions from the U.S. Oil and gas supply chain. *Science* 361, 186-188 (2018), available at: <https://science.sciencemag.org/content/361/6398/186/tab-pdf>.

commission...”. PennEast notes in its application that it plans to begin tree felling in January 2021—a mere three months from now. Tree felling will result in significant harms to the Basin’s water quality. As required by Section 3.8, DRBC must enforce PennEast’s legal obligation to obtain the necessary docket approval prior to commencing construction activities. If PennEast commences tree felling before DRBC acts on its application, there may be long-term or, in some cases, permanent impacts on the basin regardless of DRBC’s ultimate decision on the project and regardless of whether the pipeline ever gets completed.

Tree felling removes forest and forest cover, resulting in increased runoff and pollution to adjacent waterbodies, including streams and rivers. Forests play an essential role in water purification. The relationship between forest loss, degraded water quality, and increased runoff is well-established in scientific literature. The Commission is well aware of the links between forest cover and water quality, as summarized by Drs. Jackson and Sweeney in the expert report submitted on the Commission’s behalf in the exploratory wells hearing process.³³ Loss of trees in a watershed, even when there exists a buffer between the cuts and the creek, can still have direct impacts on water quality. For example, a seven-year long hydrological study on water quality demonstrates that cutting trees can increase turbidity in nearby water bodies even if the cut trees and vegetation are left in place.³⁴ Another study, also involving leaving cut trees/vegetation in place, demonstrates that even five months after deforestation, nitrates had increased and pH was altered in a water body, adversely impacting water quality.³⁵

In addition, tree felling activities involve permanently converting forested wetlands into non-forested emergent wetlands, forever degrading the functions and values that those wetlands are capable of providing. Such tree felling necessarily results in discharges to and from these wetlands in at least three ways:

- First, tree felling results in the introduction of tree trunks, dead branches, leaves, bark, and numerous other organic matter into the wetlands, thus constituting a “discharge.”³⁶ Indeed, the case law is clear, the felling of trees and other vegetation in wetlands for a Project constitutes a “discharge” pursuant to the Clean Water Act. In *Avoyelles Sportsmen’s League, Inc. v. Marsh*, the Fifth Circuit found that the clearing of vegetation in wetlands would “significantly alter the character of the wetlands and limit the vital ecological functions served by the tract,” and therefore, when vegetation or other materials are “redeposited” in the wetland, the “discharge” language of the Clean Water Act is triggered.³⁷

³³ See “Expert Report on the Relationship between Land Use and Stream Condition, as Measured by Water Chemistry and Aquatic Macroinvertebrates, in the Delaware River Basin,” (November 2010), available at: <https://www.nj.gov/drbc/library/documents/Sweeney-Jackson.pdf>.

³⁴ See Marryanna, L. et al, “Water Quality Response To Clear Felling Trees For Forest Plantation Establishment At Bukit Tarek F.R., Selangor,” Vol. 18[1] *Journal of Physical Science* 33-45 (2007), available at https://www.delawareriverkeeper.org/sites/default/files/JPS18_1_marryanna.pdf (experimental plot was clear cut, left in place with a 65.6 foot wide buffer next to river, and river’s turbidity increased on-average by 279%).

³⁵ See Likens, G.L. et al., “Effects of Forest Cutting and Herbicide Treatment on Nutrient Budgets in the Hubbard Brook Watershed-Ecosystem” 40 *Ecol. Monogr.* 23-47 (1970), available at: https://www.delawareriverkeeper.org/sites/default/files/Likens%20et%20al,%201970_0.pdf (study also showed large increases for all major ions, except for ammonium, bicarbonate, and sulfate).

³⁶ See *Alabama Rivers Alliance v. Federal Energy Regulatory Commission*, 325 F.3d 290, 299 (D.C. Cir. 2003) (finding that the “word ‘discharge’ contemplates the addition . . . of a substance or substances” to a navigable water) (internal quotations and citations omitted); 33 U.S.C. § 1362(6) (the discharge of a pollutant includes “biological material”).

³⁷ 715 F.2d 897, 923-924 (5th Cir. 1983); see also *United States v. Deaton*, 209 F.3d 331 (4th Cir. 2000) (holding that returning “seemingly benign substances like rock, sand, cellar dirt, and biological materials” to a wetland may constitute a “discharge” pursuant to the Clean Water Act.); *Borden Ranch Partnership v. U.S. Army Corps of Engineers*, 261 F.3d 810,

- Second, the previously-forested wetlands will also be subject to an increased discharge of sediment-laden water, and will discharge more sediment-laden water to adjacent water bodies and uplands as a result of tree felling activities. Expert analysis confirms that tree felling activities in wetlands impact the drainage patterns, water quantity, and water quality of wetlands, thereby fundamentally altering the physical and biological functions and values of the wetlands.³⁸ For example, tree felling results in additional discharges of water to the wetland and from the wetland as a result of losses to “aboveground biomass” thereby increasing “erosion and sedimentation” to the wetland, and decreasing “pollution prevention,” “soil stabilization,” “streambank anchoring against erosion,” “nutrient storage,” and “temperature maintenance” wetland functions.

- Finally, eliminating forested buffers exposes streams to direct sunlight and raises water temperature, which may result in fish kills for species such as trout that require cold water to live. In addition, vernal pools exposed to direct sunlight may quickly dry up, destroying their ecological function. The destruction of vernal pools can lead to the extirpation of obligate vernal pool breeding amphibian species.

Until DRBC and other permitting authorities have completed their review and approvals of the permit applications, any project that has been issued a FERC certificate remains tentative and is subject to change. An assumption that the project will be allowed to proceed along the proposed right of way, or that it will proceed at all, is premature. Allowing tree felling to occur in a tentative project location prior to obtaining the necessary permit reviews and approvals is dangerous and could result in unnecessary adverse impacts.

Because tree felling necessarily results in measurable and significant discharges to waterbodies and degrades their quality and health, the Commission must prohibit any such activities until a docket is ruled upon by the Commission. Doing otherwise would cause unnecessary or long-term and substantial impacts to ecological and water resources, particularly in the context of such a large project involving hundreds of river, stream, and wetland crossings. To avoid these outcomes and to ensure the protection of the water resources in the Delaware River Basin region, no tree felling should begin prior to DRBC review of the project.

Conclusion

Time is of the essence. PennEast has imminent plans to begin construction of the project, with or without DRBC review and approval of the docket. The Commission must deny the PennEast docket as it will have substantial effects on the water supply and water resources of the Delaware River Basin. The Project must also be denied since it substantially impairs and conflicts with the Comprehensive Plan due not only to its significant disturbance of ground cover negatively affecting water resources, but also its contribution to climate change. DRBC must issue an official, clear, and final response, emphasizing that their jurisdiction extends over the entire footprint of the Project. Doing otherwise and

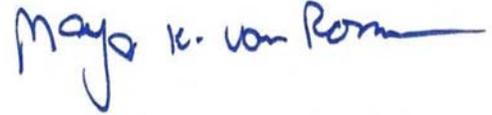
814-815 (9th Cir. 2001) (holding that the removal of a “protective layer of soil” in a wetland triggered the “discharge” language of the Clean Water Act).

³⁸ See The Effects of the Proposed PennEast Pipeline on Exceptional Value Wetlands in Pennsylvania -Schmid & Co. (2016) (attached hereto as Exhibit C).

failing to take immediate action would result in the infliction of preventable and devastating harms upon the Delaware River Basin.

Respectfully and Urgently,

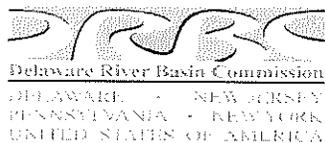
Maya K. van Rossum

A handwritten signature in blue ink that reads "Maya K. van Rossum". The signature is written in a cursive style with a long horizontal line extending to the right.

the Delaware Riverkeeper
Delaware Riverkeeper Network

Enclosures

EXHIBIT A



Delaware River Basin Commission

25 State Police Drive

PO Box 7360

West Trenton, New Jersey

08628-0360

Phone: (609) 883-9500 Fax: (609) 883-9522

Web Site: <http://www.drbc.net>

Carol R. Collier

Executive Director

Robert Tudor

Deputy Executive Director

January 30, 2013

Via Email and Facsimile

Maya K. van Rossum
The Delaware Riverkeeper
Delaware Riverkeeper Network
925 Canal Street, Suite 3701
Bristol, Pennsylvania 19007

SUBJECT: Amended Letter Determination Regarding Tennessee Gas Pipeline 300 Line Extension Project and Columbia 1278 Replacement Project

Dear Ms. van Rossum:

At the Commission's meeting of December 5, 2012, the Commissioners responded in two parts to DRN's request for hearing in connection with my letter to you of July 10, 2012 concerning natural gas pipeline projects:

1. The Commissioners declined as moot DRN's request for hearing with respect to the Tennessee Gas Pipeline ("TGP") Company's Northeast Upgrade Project ("NEUP"), on grounds that the Commission issued Docket D-2011-22-1 for the project on July 11, 2012. The Commission's docket approval superseded my earlier determination and entailed the very review that DRN requested. DRN did not challenge the docket approval.
2. The Commission chair explained that staff had undertaken a thorough re-examination of the review criteria for the two other pipeline projects discussed by name in my letter of July 10, 2012 – the Columbia 1278 Replacement Project and the TGP 300 Line. The Commissioners asked me to examine the additional information furnished by staff and authorized me to revise the determinations set forth in my July 2012 letter on the basis of that information, if appropriate, by January 31, 2013.

In accordance with the Commissioners' direction, I have examined the additional information furnished by my staff (summarized in the attached memo), showing that both the Columbia 1278 Replacement Project and the TGP 300 Line pass through Delaware State Forest in Pennsylvania. Because this state forest is a recreation area that has been incorporated into the Commission's Comprehensive Plan, review of the projects, both of which have been constructed,

was properly triggered under section 2.3.5 A.12 of the Commission's Rules of Practice and Procedure. The status of Delaware State Forest as a recreation area included in the Comprehensive Plan ("CP") was not recognized during our original screening of the two projects. The accompanying staff memorandum sets forth the staff's subsequent analysis and conclusions in detail. It also explains that to ensure an oversight of this nature does not occur again, the Project Review Section is putting in place a checklist process that includes review of the complete list of CP recreation areas when determining whether pipeline and powerline projects traversing the Basin require a docket.

In light of the staff's revised findings, the conclusions set forth in my letter of July 10, 2012 concerning the Columbia 1278 Replacement Project and the TGP 300 Line are hereby amended. Both projects are subject to Commission review in accordance with Section 3.8 of the Delaware River Basin Compact and Article 3 of the Rules of Practice and Procedure. Accordingly, I am directing my staff to undertake reviews of these projects after the fact. The project sponsors will be so informed and will be directed to submit applications that include the projects' as-built characteristics. Commission review will not interrupt operation of the projects, but will involve consideration of any additional conditions that may be necessary to ensure the projects do not impair or conflict with the Comprehensive Plan. As is the case with all Section 3.8 reviews, the process will entail in each instance the development of a draft docket, followed by a duly noticed public hearing, and Commission consideration and action at a public meeting.

Sincerely,

A handwritten signature in black ink that reads "Carol R. Collier". The signature is written in a cursive, slightly slanted style.

Carol R. Collier
Executive Director

c: DRBC Commissioners

MEMORANDUM

TO: Carol R. Collier, Executive Director
FR:  William Muszynski, Manager, Water Management Branch
DA: January 30, 2013
RE: Reviewability of Columbia 1278 Replacement Project and TGP 300 Line

Introduction and Findings

This is to memorialize the November 2012 reevaluation conducted by Water Resource Management Branch staff of the Commission's criteria for review of projects in accordance with Section 3.8 of the Delaware River Basin Compact, as applied to two natural gas pipeline projects – the Columbia 1278 Replacement Project and the Tennessee Gas Pipeline Company (“TGP” or “Tennessee”) 300 Line Project. Our reevaluation was undertaken in response to a request for hearing in accordance with Article 6 of the *Rules of Practice and Procedure* (“RPP”) on my staff's conclusion, set forth in your letter to Maya von Rossum, Delaware Riverkeeper, of July 10, 2012, that neither of the two projects required a docket.

As discussed in greater detail below, we are amending our original findings. An aspect of both the TGP 300 Line and the Columbia 1278 Replacement Project that the staff overlooked in our initial evaluation – crossing of Delaware State Forest in Pennsylvania – triggers review under an exception to the exclusion for natural gas transmission line projects established by the *Rules of Practice and Procedure* (RPP). Specifically, Section 2.3.5 A.12. of the RPP in relevant part exempts from review all “natural and manufactured gas transmission lines and appurtenances ... *unless* they would pass in, on, under or across an existing or proposed reservoir or recreation project area as designated in the Comprehensive Plan” (Emphasis added). The status of Delaware State Forest as a recreation area included in the Comprehensive Plan (“CP”) was not recognized in our original screening of the two projects.

To ensure that an oversight of this nature does not occur again, we are developing a checklist that will include a listing of the RPP requirements that pertain to pipeline and power line projects, including the complete list and map of CP recreation areas. This checklist will be used to assist the staff in determining whether pipeline and power line projects traversing the Basin require review and approval by the Commission.

The following discussion outlines our November 2012 reviewability screening of the Columbia 1278 Replacement Project and the TGP 300 Line Project in detail.

Discussion

I. DRBC Review Criteria Potentially Applicable to Pipeline Projects

A. Rules of Practice and Procedure

Article 3 of the RPP governs the submission and review of projects under Section 3.8 of the Delaware River Basin Compact. Section 2.3.5A. of that article sets forth classifications of projects that are generally *excluded* from Section 3.8 review, whereas Section 2.3.5B. sets forth classifications that are generally subject to review *if not excluded by Section 2.3.5A.*

Sections 2.3.5A.2, 3, 5, 6, 11, 12 and 15 of Article 3 of the RPP are the exclusions potentially applicable to pipeline projects.

Section 2.3.5 A. provides:

A. Except as the Executive Director may specially direct by notice to the project owner or sponsor, or as a state or federal agency may refer under paragraph C. of this section, a project in any of the following classifications will be deemed not to have a substantial effect on the water resources of the Basin and is not required to be submitted under Section 3.8 of the Compact:

* * * * *

2. A withdrawal from ground water for any purpose when the daily average gross withdrawal during any 30 consecutive day period does not exceed 100,000 gallons;
3. A withdrawal from impoundments or running streams for any purpose when the daily average gross withdrawal during any 30 consecutive day period does not exceed 100,000 gallons;

* * * * *

5. The construction of new facilities or alteration or addition to existing facilities for the direct discharge to surface or ground waters of industrial wastewater having design capacity of less than 10,000 gallons per day in the drainage area to Outstanding Basin Waters and Significant Resource Waters or less than 50,000 gallons per day elsewhere in the Basin; except where such wastewater contains toxic concentrations of waste materials;
6. A change in land cover on major ground water infiltration areas when the amount of land that would be altered is less than three square miles;

* * * * *

11. Liquid petroleum products pipelines and appurtenances designed to operate under pressures less than 150 psi; local electric distribution lines and appurtenances; local communication lines and appurtenances; local natural and manufactured gas distribution lines and appurtenances; local water distribution lines and appurtenances; and local sanitary sewer mains, unless such lines would involve significant disturbance of ground cover affecting water resources;
12. Electric transmission or bulk power system lines and appurtenances; major trunk communication lines and appurtenances; natural and manufactured gas transmission lines and appurtenances; major water transmission lines and appurtenances; unless they would pass in, on, under or across an existing or proposed reservoir or recreation project area as designated in the Comprehensive Plan; unless such lines would involve significant disturbance of ground cover affecting water resources;”

15. Draining, filling or otherwise altering marshes or wetlands when the area affected is less than 25 acres; provided; however, that areas less than 25 acres shall be subject to Commission review and action (1) where neither a state nor a federal level review and permit system is in effect, and the Executive Director determines that a project is of major regional or interstate significance requiring action by the Commission, or (2) when a Commissioner or the Executive Director determines that the final action of a state or federal permitting agency may not adequately reflect the Commission's policy as to wetlands of the Basin. In the case of a project affecting less than 25 acres for which there has been issued a state or federal permit, a determination to undertake review and action by the Commission shall be made no later than 30 days following notification of the Commission of such permit action. The Executive Director, with the approval of the Chairman, may at any time within the 30-day period inform any permit holder, signatory party or other interested party that the Commission will decline to undertake review and action concerning any such project;

Section 2.3.5 B. provides that "All other projects which have or may have a substantial effect on the water resources of the Basin shall be submitted to the Commission in accordance with these regulations for determination as to whether the project impairs or conflicts with the Comprehensive Plan." Section 2.3.5 B. includes a list of examples of the types of projects deemed subject to the review by the Commission when not excluded from review by Section 2.3.5 A.

B. May 19, 2009 Executive Director Determination

The Executive Director Determination ("EDD") issued on May 19, 2009 concerned natural gas extraction projects in shale formations located in Special Protection Waters. The EDD removed all RPP thresholds for review of natural gas extraction projects. Such projects were defined to include the drilling pad upon which a well intended for eventual production is located, all appurtenant facilities and activities related thereto, and all locations of water withdrawals used or to be used to supply water to the projects. An "appurtenant facility" has since been determined to refer to a facility that is connected directly to the well or well pad and required for the extraction of natural gas.

II. Application of Criteria to Projects

A. Columbia Gas Transmission, LLC Line 1278 to Line K Replacement Project FERC Docket Nos. PF10-6-000 and CP10-492-000

According to Columbia, the Columbia 1278 Replacement Project would allow the company to update its aging pipeline facilities and increase the diameter of the existing pipeline from 14 inches to 20 inches to be consistent with the remainder of the Line 1278 system in Pennsylvania. Columbia is not seeking authorization to increase the transportation capacity within the Line 1278 to Line K system. The portion of the two existing pipelines immediately adjacent to the Delaware River crossing would remain as 10-inch-diameter pipelines, and no construction would occur within the river.

The proposed project includes:

- Abandonment either in-place, by removal, or by replacement of approximately 16.84 miles of 14” diameter natural gas pipeline with 20” diameter pipe
- Temporary workspaces and staging on four previously disturbed areas in Pike County, PA and three previously disturbed areas in Orange County, NY
- Removal of an existing compressor station
- Pipeline located in Pike County, PA and Orange County, NY
- Purchase of 1.292 million gallons of water from public water suppliers (Borough of Milford, PA and Port Jervis, NY) for hydrostatic testing of replaced pipeline sections.
- Discharge of hydrostatic test water to land in-basin, general permits required by states; no direct discharge to water bodies
- Maximum area of disturbance, including staging and storage, of 195.87 acres (0.31 square miles), of which about 103.46 acres (0.16 square miles) would be permanently disturbed
- 75-foot-wide construction right-of-way. In areas of steep and/or side slope construction, an additional 25 feet of temporary construction right-of-way is proposed over short distances to facilitate installation of the replacement pipeline. In all, the total construction right-of-way would be 100-foot-wide at specific areas to accommodate steep slopes, road crossings, and water bodies.
- Wetland crossings and workspaces, limited to a 75-foot-wide construction right-of-way. Columbia has requested additional temporary workspaces within 50 feet of certain specific wetlands, mainly due to topography or road crossings.
- Disturbance of 4.06 acres of wetlands, including 0.61 acres permanently impacted
- Existing project right of way passing through Delaware State Forest, a CP recreation area. No new permanent right-of-way or impacts proposed within Delaware State Forest
- Approximately 0.13 miles of pipeline replacement activities within the boundary of the Upper Delaware Scenic and Recreational River corridor
- E&S control measures to be reviewed by County Conservation Districts
- No proposed direct connections to natural gas extraction wells (thus not subject to EDD for natural gas extraction projects)

Permits required for the project are listed in the following table:

Agency	Permit/Approval/ Consultation	Status
Federal		
Federal Energy Regulatory Commission	Certificate of Public Convenience and Necessity	Application filed August 26, 2010
USACE, New York District	Section 404 Permit	Anticipated filing date: February 2011
USACE, Philadelphia District	Section 404 Permit	Anticipated filing date: February 2011
U.S. Fish and Wildlife Service, New York Field Office	Section 7 Consultation	Anticipated filing date: January 2011
U.S. Fish and Wildlife Service, Pennsylvania Field Office	Section 7 Consultation	No permit required; Consultation response received January 3, 2011.
National Oceanic and Atmospheric Administration	Section 7 Consultation	No permit required; Consultation response received 2/2/10. No further consultation required.
National Park Service	Upper Delaware Scenic and Recreational River	No permit required, Consultation response received September 30, 2010.

**TABLE 3
Major Permits, Authorizations, and Clearances Required**

Agency	Permit/Approval/ Consultation	Status
New York State		
New York Natural Heritage Program Information Services and Region 3, NYSDEC	Consultation concerning protected and rare species	No permit required; Consultation response received December 15, 2009. Consultation is ongoing
New York State Office of Parks, Recreation and Historic Preservation, Historic Preservation Field Service Bureau [New York State Historic Preservation Office (SHPO)]	Section 106 Consultation 9/3/2009; 11/23/2009; 2/19/2010 Phase I/II Report: 8/30/2010	No permit required; Consultation responses received 9/28/2009; 11/23/2009; 3/19/2010; and 9/20/2010.
Orange County Health Department	Public and Private Water Supply Consultation	No permit required; Consultation response received December 15, 2009. Consultation is ongoing
City of Port Jervis, Department of Public Works	Public and Private Water Supply Consultation	No permit required; Consultation response received April 7, 2010.
NYSDEC, Region 3	State Environmental Quality Review	Anticipated filing date: January 2011
	Freshwater Wetland Permit	Anticipated filing date: January 2011
	Protection of Waters Permit	Anticipated filing date: January 2011
	Hydrostatic Test Water Discharge	Anticipated filing date: February 2011
	State Pollution Discharge Elimination System - Notice of Intent for Construction Activities	Permit received: October 28, 2010
Town of Deerpark	State Pollution Discharge Elimination System - Waiver to Disturb more than five acres	Waiver received: October 28, 2010
Town of Deerpark	Planning Commission Consultations	Consultation response received: September 28, 2010
Orange County	Planning Commission Consultation	Consultation response received: April 5, 2010
Pennsylvania State		
Pennsylvania Fish and Boat Commission (PFBC)	Consultation concerning state protected and rare species	Consultation response received December 21, 2009; Consultation ongoing
Pennsylvania Game Commission	Consultation concerning state protected and rare species	Consultation response received. December 23, 2009; Consultation ongoing
PADCNR	Consultation concerning state protected and rare species	Consultation response received: December 28, 2009; Consultation ongoing.
PADCNR, Bureau of Forestry, Forest District #19	Delaware State Forest right-of-way agreement	Anticipated filing date: January 2011
Pennsylvania Historical and Museum Commission, Bureau for Historic Preservation	Section 106 Consultation	Consultation responses received 9/14/2009; 12/15/2009; 3/19/2010; and 9/21/2010
Pennsylvania Department of Environmental Protection, Northeast Regional Office	Joint Permit Application - Section 404/Chapter 105 Water Encroachment Permit	Anticipated filing date: January 2011
	PAG-10: Hydrostatic Testing of Tanks and Pipelines	Anticipated filing date: February 2011
Pike County Conservation District	Notice of Intent - Erosion and Sediment Control General Permit	Anticipated filing date: December 15, 2010

The following table compares Columbia 1278 Replacement Project features to potentially applicable review thresholds:

RPP § 2.3.5 A. Exclusion	Columbia Gas 1278 to K-Line Replacement
2. A withdrawal from ground water for any purpose when the daily average gross withdrawal during any 30 consecutive day period does not exceed 100,000 gallons;	*1.292 million gallons of water will be purchased from public water suppliers (Borough of Milford, PA and Port Jervis, NY) for hydrostatic testing of replaced pipeline sections.
3. A withdrawal from impoundments or running streams for any purpose when the daily average gross withdrawal during any 30 consecutive day period does not exceed 100,000 gallons;	*1.292 million gallons of water will be purchased from public water suppliers (Borough of Milford, PA and Port Jervis, NY) for hydrostatic testing of replaced pipeline sections.
5. The construction of new facilities or alteration or addition to existing facilities for the direct discharge to surface or ground waters of industrial wastewater having design capacity of less than 10,000 gallons per day in the drainage area to Outstanding Basin Waters and Significant Resource Waters or less than 50,000 gallons per day elsewhere in the Basin; except where such wastewater contains toxic concentrations of waste materials;	*Discharge to land in-basin, general permits required by PA and NY. Energy dissipation devices and E&S will be implemented. No direct discharge to water bodies or groundwater will occur.
6. A change in land cover on major ground water infiltration areas when the amount of land that would be altered is less than three square miles;	*Maximum area disturbance including staging and storage = 195.87 acres of land (0.31 square miles), of which about 103.46 acres (0.16 square miles) would be permanently disturbed.
11. Liquid petroleum products pipelines and appurtenances designed to operate under pressures less than 150 psi; local electric distribution lines and appurtenances; local communication lines and appurtenances; local natural and manufactured gas distribution lines and appurtenances; local water distribution lines and appurtenances; and local sanitary sewer mains, unless such lines would involve significant disturbance of ground cover affecting water resources;	*Columbia 1278 to K-line is a natural gas transmission line. Threshold not applicable.
12. Electric transmission or bulk power system lines and appurtenances; major trunk communication lines and appurtenances; natural and manufactured gas transmission lines and appurtenances; major water transmission lines and appurtenances; unless they would pass in, on, under or across an existing or proposed reservoir or recreation project area as designated in the Comprehensive Plan; unless such lines would involve significant disturbance of ground cover affecting water resources;”	<p>*The existing project right of way passes through 1.45 miles of Delaware State Forest, a CP recreation area. No new permanent right-of-way or impacts would be created within Delaware State Forest as a result of the Project.</p> <p>*Approximately 0.13 miles of pipeline replacement activities would occur within the boundary of the Upper Delaware Scenic & Recreational River corridor, a CP recreation area. Columbia must address any mitigation or avoidance measures recommended by the NPS. Written NPS approval required before commencement of project construction.</p> <p>*E&S controls will be implemented to mitigate disturbance of ground cover.</p> <p><i>See discussion below relating to the “disturbance of ground cover” exception to the exclusion from review for natural gas pipelines.</i></p>

RPP § 2.3.5 A. Exclusion	Columbia Gas 1278 to K-Line Replacement
<p>15. Draining, filling or otherwise altering marshes or wetlands when the area affected is less than 25 acres; provided; however, that areas less than 25 acres shall be subject to Commission review and action (1) where neither a state nor a federal level review and permit system is in effect, and the Executive Director determines that a project is of major regional or interstate significance requiring action by the Commission, or (2) when a Commissioner or the Executive Director determines that the final action of a state or federal permitting agency may not adequately reflect the Commission's policy as to wetlands of the Basin. In the case of a project affecting less than 25 acres for which there has been issued a state or federal permit, a determination to undertake review and action by the Commission shall be made no later than 30 days following notification of the Commission of such permit action. The Executive Director, with the approval of the Chairman, may at any time within the 30-day period inform any permit holder, signatory party or other interested party that the Commission will decline to undertake review and action concerning any such project;</p>	<p>*4.06 acres of wetlands are proposed to be impacted during construction, including 0.61 acres of wetlands to be impacted permanently.</p>
EDD Determination	Not applicable – No proposed direct connections to natural gas extraction wells

DRN has argued that natural gas pipeline projects in general fall within the exception to the exclusion set forth at Section 2.3.5A.12 for projects that “involve a significant disturbance of ground cover affecting water resources”. In determining whether a “significant disturbance” would occur, the Project Review staff is guided by two other land disturbance thresholds established by section 2.3.5 A: those that, respectively, exclude from review projects involving “[a] change in land cover on major ground water infiltration areas when the amount of land that would be altered is less than three square miles” (RPP § 2.3.5 A.6); and projects that involve “[d]raining, filling or otherwise altering marshes or wetlands when the area affected is less than 25 acres” (RPP § 2.3.5 A.15). In our view, these thresholds indicate the general magnitude of disturbance that the Commission decided warrants basin-wide review. Neither project exceeds either of these thresholds. As the table of approvals above makes evident, localized water resource risks are ordinarily managed by other government agencies, including federal, state and local environmental agencies.

**B. Tennessee Gas Pipeline (TGP) 300 Line Upgrade Project
FERC Docket No. CP09-444-000**

The proposed Tennessee Gas Pipeline 300 Line Upgrade Project will include construction of approximately 128.7 miles of 30-inch pipeline consisting of seven separate pipeline loops in northern Pennsylvania, totaling approximately 111 miles, and one pipeline loop in northwestern New Jersey totaling approximately 17.3 miles. To the extent practicable and feasible, Tennessee proposes to locate the pipeline loops within and adjacent to the right-of-way (“ROW”) associated with its existing 24-inch pipeline designated as the 300 Line. Additionally, the project includes construction of two new compressor stations near Tennessee’s existing 300 Line ROW in

northwestern Pennsylvania, as well improvements and modifications at seven existing compressor station facilities in Pennsylvania and New Jersey. Tennessee proposes to begin project construction in the second half of 2010 and to place the facilities in-service by November 2011.

The proposed project includes:

- ROW width of 100 feet, generally consisting of 25 feet of existing, permanently maintained ROW, 25 feet of new permanent ROW and 50 feet of temporary construction workspace
- Temporary workspace within wetlands, limited to 75 feet to minimize adverse impacts. Permanent ROW within wetlands also limited to 75 feet. A 10-foot wide area centered over the pipeline will be maintained in an herbaceous or scrub-shrub vegetative state.
- Pipeline through Pike and Wayne Counties, PA in DRB
- Within DRB, 22.28 miles of 30" outer diameter ("O.D.") natural gas transmission pipeline in Loop 321; and 14.89 miles of 30" O.D. natural gas transmission pipeline in Loop 323
- Maximum acreage disturbance including staging and storage = 548.61 acres of land in basin (0.86 square miles), of which about 108.03 acres in basin (0.17 square miles) would be retained as new permanent right-of-way.
- Temporary impact to 15.62 acres of wetlands in DRB during construction phased and permanent impact to 2.44 acres of wetlands
- Withdrawal of 2.14 mg of water for hydrostatic testing in DRB from Lackawaxen River, West Branch Lackawaxen River, Still Water Lake, Dyberry Creek, Lords Creek, Twin Lakes, Savantine Creek. Withdrawals will not exceed 100,000 gpd over a 30-day period.
- Hydrostatic testing discharge to land in-basin, under general permits required by states. No direct discharge to water bodies.
- Pipeline crosses 1.5 miles of Delaware State Forest a CP Recreation project.
- E&S control measures are incorporated into project to be reviewed by County Conservation Districts.
- Project sponsors do not propose to have direct connections to natural gas extraction wells. Therefore, it is not subject to the EDD for natural gas extraction projects.

Permits required for the project are listed in Table 1.6-1 of the TGP document entitled, *Environmental Report, 300 Line Project: Resource Report 1*, pp. 1-63 through 1-66.

The following table compares Tennessee Gas Pipeline 300 Line Project features to potentially applicable review thresholds:

RPP § 2.3.5 A. Exclusion	Tennessee Gas Pipeline Co. 300 Line
2. A withdrawal from ground water for any purpose when the daily average gross withdrawal during any 30 consecutive day period does not exceed 100,000 gallons;	*Threshold not applicable
3. A withdrawal from impoundments or running streams for any purpose when the daily average gross withdrawal during any 30 consecutive day period does not exceed 100,000 gallons;	*2.14 mg of water for hydrostatic testing in DRB will be withdrawn from Lackawaxen River, West Branch Lackawaxen River, Still Water Lake, Dyberry Creek, Lords Creek, Twin Lakes, Savantine Creek. Withdrawals will occur at less than 100,000 gpd over a 30-day period.
5. The construction of new facilities or alteration or addition to existing facilities for the direct discharge to surface or ground waters of industrial wastewater having design capacity of less than 10,000 gallons per day in the drainage area to Outstanding Basin Waters and Significant Resource Waters or less than 50,000 gallons per day elsewhere in the Basin; except where such wastewater contains toxic concentrations of waste materials;	*Discharge to land in-basin, general permits required by states. Energy dissipation devices and E&S will be implemented. No direct discharge to water bodies or groundwater will occur.
6. A change in land cover on major ground water infiltration areas when the amount of land that would be altered is less than three square miles;	*Maximum acreage disturbance including staging and storage = 548.61 acres of land in basin (0.86 square miles), of which about 108.03 acres in basin (0.17 square miles) would be retained as new permanent right-of-way.
11. Liquid petroleum products pipelines and appurtenances designed to operate under pressures less than 150 psi; local electric distribution lines and appurtenances; local communication lines and appurtenances; local natural and manufactured gas distribution lines and appurtenances; local water distribution lines and appurtenances; and local sanitary sewer mains, unless such lines would involve significant disturbance of ground cover affecting water resources;	*TGP 300 Line is a natural gas transmission line. Threshold not applicable.
12. Electric transmission or bulk power system lines and appurtenances; major trunk communication lines and appurtenances; natural and manufactured gas transmission lines and appurtenances; major water transmission lines and appurtenances; unless they would pass in, on, under or across an existing or proposed reservoir or recreation project area as designated in the Comprehensive Plan; unless such lines would involve significant disturbance of ground cover affecting water resources;”	*300 Line crosses 1.5 miles of Delaware State Forest, a CP recreation area. E&S controls to mitigate disturbance of ground cover will be reviewed by County Conservation Districts. <i>See the last paragraph of the previous section (relating to the Columbia 1278 Replacement Project) for discussion of the “significant disturbance of ground cover” exception to the exclusion from review for natural gas transmission lines.</i>

RPP § 2.3.5 A. Exclusion	Tennessee Gas Pipeline Co. 300 Line
<p>15. Draining, filling or otherwise altering marshes or wetlands when the area affected is less than 25 acres; provided; however, that areas less than 25 acres shall be subject to Commission review and action (1) where neither a state nor a federal level review and permit system is in effect, and the Executive Director determines that a project is of major regional or interstate significance requiring action by the Commission, or (2) when a Commissioner or the Executive Director determines that the final action of a state or federal permitting agency may not adequately reflect the Commission's policy as to wetlands of the Basin. In the case of a project affecting less than 25 acres for which there has been issued a state or federal permit, a determination to undertake review and action by the Commission shall be made no later than 30 days following notification of the Commission of such permit action. The Executive Director, with the approval of the Chairman, may at any time within the 30-day period inform any permit holder, signatory party or other interested party that the Commission will decline to undertake review and action concerning any such project;</p>	<p>*15.62 acres of wetlands in DRB are proposed to be temporarily impacted during construction of the TGP 300 Line project. 2.44 acres are to be impacted permanently.</p>
<p>EDD Determination</p>	<p>Not applicable – No proposed direct connections to natural gas extraction wells</p>

III. Conclusions

The above analysis confirms that neither the Columbia 1278 Replacement Project nor the TGP 300 Line involves a water withdrawal, diversion or discharge that triggers Commission review. Nor in the view of staff does either project involve a level of ground cover disturbance that warrants our review, on the basis of land disturbance thresholds the Commission has expressly established for infiltration areas and wetlands. However, both projects trigger review on grounds that they traverse Delaware State Forest, a recreation area incorporated in the Commission's Comprehensive Plan.

EXHIBIT B

Impacts of the PennEast and Adelphia Gateway Pipelines on Gas Drilling in Pennsylvania

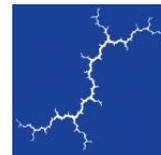
An estimate of induced new gas wells and
associated greenhouse gas emissions

Prepared for Delaware Riverkeeper Network

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AUTHORS

Rachel Wilson
Erin Camp, PhD
Jason Frost



Synapse
Energy Economics, Inc.

485 Massachusetts Avenue, Suite 3
Cambridge, Massachusetts 02139

617.661.3248 | www.synapse-energy.com

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1. INTRODUCTION

Economics dictate that expansion of natural gas pipeline infrastructure in constrained zones will cause an increase in the total production of natural gas. This is particularly likely in the constrained zones in Pennsylvania, where shale gas is being produced from the Marcellus and Utica Shales. Two proposed connected and interrelated pipeline projects in Pennsylvania—PennEast and Adelpia Gateway—would greatly expand the capacity of natural gas leaving the region, thereby leading to increased gas production and drilling. This report provides a background on the economic relationship between pipeline infrastructure and resource extraction, describes the two pipeline projects of interest, and estimates the number of new wells that would be drilled if the pipelines are built. Next, we provide an estimate of the increased emissions associated with the drilling and completion of these new wells. Finally, we calculate the climate damages associated with the drilling emissions and the increased utilization of natural gas using two values for the Social Cost of Carbon.

2. BACKGROUND

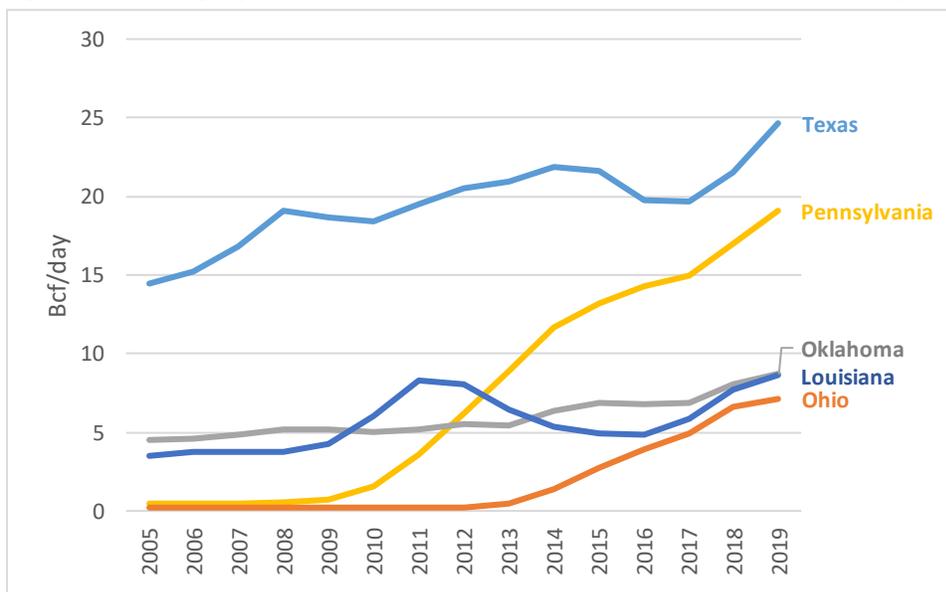
2.1. Appalachian Basin Natural Gas Pipeline Constraints

Natural gas prices are lowest in the regions in which gas is produced. For many years, the lowest natural gas prices in the East were found at Henry Hub, located near the Gulf of Mexico where much of the natural gas in the United States was produced. With the increase in shale gas production, however, the lowest natural gas prices in the country are now found at trading points in and around the Marcellus and Utica shale plays in Pennsylvania, West Virginia, and Ohio (i.e., the Appalachian Basin). The availability of pipeline infrastructure to send natural gas from the Appalachian Basin to other parts of the country has a direct impact on the price of natural gas in those regions. Greater gas take-away capacity allows more natural gas to be produced, and an increase in supply will lead to a decline in price in those regions that receive additional gas. The improved access to higher priced markets via additional pipeline infrastructure will raise the price of natural gas in the producing region, which also will increase production.

Due to increased drilling in the Appalachian Basin, Pennsylvania is now the second largest gas-producing state behind Texas and accounted for 19 percent of total U.S. marketed gas production in 2017. Historical production for the top five gas-producing states is shown in Figure 1, below.



Figure 1. Natural gas production in selected states (2005-2019), billion cubic feet per day



Source: US EIA. *Natural Gas Gross Withdrawals and Production*. Available at: https://www.eia.gov/dnav/ng/ng_prod_sum_a_EPGO_VGM_mmc_f_a.htm.

The U.S. Energy Information Administration (EIA) notes that gas production in Pennsylvania has historically outpaced the growth in pipeline capacity to transport it out of the state. However, both permitting and gas drilling activity have increased in Pennsylvania as regional pipeline capacity has grown, enabling gas to be exported to market centers outside of production areas.¹ Two pipeline projects began operations in the fourth quarter of 2016: The Rockies Express Zone 3 expansion project moves gas west from southwest Pennsylvania and the Algonquin Incremental Market pipeline moves gas from northeastern Pennsylvania into New England. With the addition of the Rover Pipeline, the NEXUS Gas Transmission pipeline, and Phase II of the Atlantic Sunrise Pipeline, which entered service in 2018 with a combined capacity of more than five billion cubic feet per day (Bcf/d), EIA forecasted continued growth in gas production from the Appalachian Basin.²

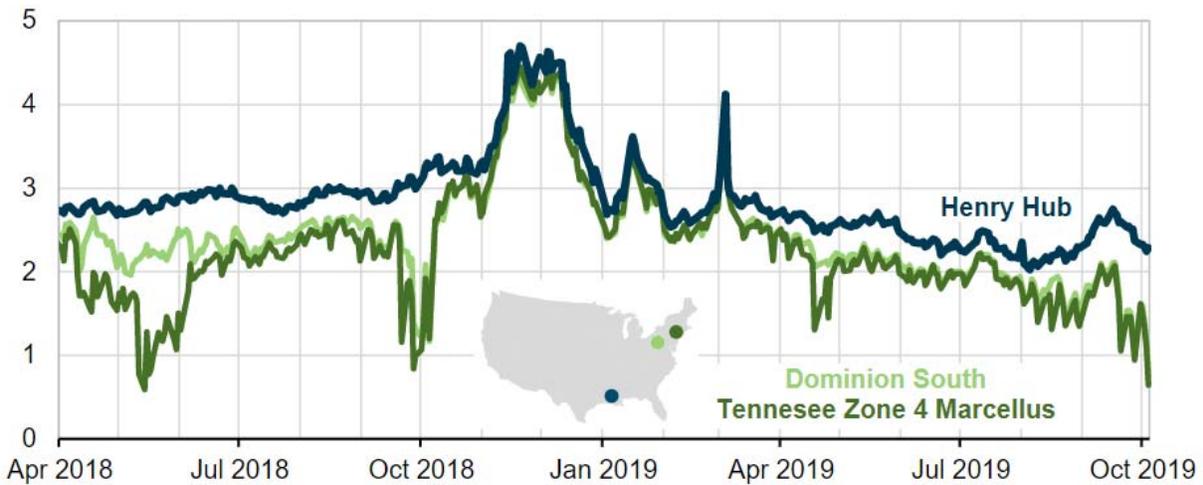
Towards the latter part of 2019, natural gas prices in the Appalachian Basin region dropped to \$0.65 per million British thermal unit (MMBtu), while Henry Hub prices remained above \$2 per MMBtu (Figure 2).³ This price differential indicates that the pipelines transporting natural gas out of the Appalachian Basin region have been filling up, and less gas is able to reach other parts of the country.

¹ U.S. Energy Information Administration (EIA). 2018. *Pennsylvania's natural gas production continues to increase*. Available at: <https://www.eia.gov/todayinenergy/detail.php?id=35892>.

² EIA. October 18, 2018. *Natural Gas Weekly Update*. Available at: https://www.eia.gov/naturalgas/weekly/archivenew_ngwu/2018/10_18/.

³ EIA. 2019. *Northeast natural gas spot prices fall as pipelines fill*. <https://www.eia.gov/todayinenergy/detail.php?id=41673>.

Figure 2. Marcellus shale gas spot prices relative to Henry Hub (\$/MMBtu)



Source: EIA. "Northeast natural gas spot prices fall as pipelines fill." Today in Energy. Daily natural gas prices for select trading hubs (Apr 1, 2018—Oct 4, 2019). Available at: <https://www.eia.gov/todayinenergy/detail.php?id=41673>.

In response to the sustained low natural gas prices over the past year, the largest shale gas producers in the Appalachian Basin region have reported plans to slow production. EQT Corporation, Cabot Oil & Gas Corporation, and Range Resources Corporation all have planned to cut their drilling budgets and natural gas production for the year 2020.^{4,5,6} Chesapeake Energy Corporation halted drilling in late 2019 and has been experiencing financial losses due to low gas prices.⁷ Cabot Oil & Gas stated that it and other regional operators have been eagerly seeking opportunities for transport of their produced gas, given that pipeline buildout has slowed in recent years. Should pipeline construction move forward, much of the overproduced natural gas would be able to hit the regional market, and drilling in the Appalachian Basin would likely resume its original pace.

⁴ Gough, P. January 2020. BizJournals.com. <https://www.bizjournals.com/pittsburgh/news/2020/01/07/range-resources-cuts-drilling-budget-drops.html>.

⁵ Gough, P. October 2019. BizJournals.com. <https://www.bizjournals.com/pittsburgh/news/2019/10/31/eqt-cuts-spending-on-natural-gas-drilling-in-2019.html>.

⁶ Cocklin, J. July 2019. Natural Gas Intel. <https://www.naturalgasintel.com/articles/119092-cabot-to-cut-spending-production-in-2020-as-natural-gas-market-weakens>.

⁷ Hiller, J. October 2019. Reuters. <https://www.reuters.com/article/us-usa-naturalgas-chesapeake-energy-idUSKBN1X92AN>.

2.2. PennEast and Adelpia Gateway Proposed Pipelines

In 2018 and 2019, the Federal Energy Regulatory Commission (FERC) approved eight pipeline projects to transport gas coming out of the Appalachian Basin, with six others still pending.^{8,9} Of the approved projects, two of the largest pipelines are the PennEast Pipeline and the Adelpia Gateway Pipeline. The remainder of this report focuses on these two pipelines.

PennEast

The PennEast pipeline received its Certificate of Public Convenience and Necessity (CPCN) from the FERC in January 2018. The project has a proposed capacity of 1,107,000 dekatherms per day (Dth/d) over 116 miles of 36-inch diameter pipeline across Pennsylvania and New Jersey. At the time of FERC approval, the pipeline had 990,000 Dth/d of service commitments for gas transport. Since receiving regulatory approval, the project has encountered delays in obtaining permits and property rights in New Jersey. As a result, PennEast is now requesting approval from the FERC to split the project into two phases. Phase 1 includes only facilities in Pennsylvania, including an interconnection with the Adelpia Gateway pipeline and the Columbia Gas Transmission pipeline in Northampton County, while Phase 2 includes the remaining facilities in New Jersey. Dividing the project into two phases would allow pipeline construction in Pennsylvania to move forward while the company awaits receipt of the necessary permits in New Jersey.

Table 1. Capacity and service commitments for the proposed phases of the PennEast pipeline

PennEast Phase	Gas Capacity (Dth/d)	Service Commitments (Dth/d)
Phase 1	650,000	340,000
Phase 2	457,000	-

Source: Abbreviated Application for Amendment to Certificate of Public Convenience and Necessity of PennEast Pipeline Company, LLC. Available at: https://elibrary.ferc.gov/IDMWS/file_list.asp?document_id=14832180.

Adelpia Gateway

The Adelpia Gateway pipeline project would purchase two existing oil and gas pipelines (currently owned by Interstate Energy Company) and build new natural gas pipeline infrastructure in southeastern Pennsylvania. The project is organized into three zones: Zone North A, Zone North B, and Zone South. Zones North A and B only include existing natural gas pipeline infrastructure—34.5 miles of 18-inch diameter pipeline and 4.4 miles of 20-inch diameter pipeline. Zone South would repurpose 50 miles of

⁸ Federal Energy Regulatory Commission. Approved Major Pipeline Projects. <https://www.ferc.gov/industries/gas/industry/pipelines/approved-projects.asp>.

⁹ Federal Energy Regulatory Commission. Major Pipeline Projects Pending. <https://www.ferc.gov/industries/gas/industry/pipelines/pending-projects.asp>.

an 18-inch diameter oil pipeline to instead transport natural gas.¹⁰ This newly converted Zone South pipeline would have a capacity of 250,000 Dth/d with a service commitment of 100,000 Dth/d.¹¹ All Adelpia Gateway calculations following in this memo include only the Zone South project, since the Zone North project would not develop additional pipeline capacity for natural gas.

3. POTENTIAL IMPACTS OF PENNEAST AND ADELPHIA GATEWAY

Given current pipeline capacity limitations to deliver gas to high-value markets, the economics do not favor increased drilling for natural gas. With additional transport capacity from pipelines like the PennEast and Adelpia Gateway, gas producers will again have an economic incentive to drill additional wells in the Appalachian Basin region. In addition to advancing new drilling, additional pipeline infrastructure will advance gas production in wells that have been drilled but from which the industry has not yet extracted gas due to a lack of available pipeline infrastructure.

3.1. Unconventional Gas Wells in Pennsylvania

As of early 2020, the state of Pennsylvania has 11,744 unconventional natural gas wells that have received a permit and are producing gas. Those wells are found largely in the counties located in the northeast and southwest regions of the state, which contain 85 percent of active wells. In the northeast region, near the start of the PennEast pipeline, four counties contain large volumes of producing gas wells: Bradford County (12 percent of producing wells in the state), Lycoming County (8 percent), Susquehanna County (15 percent), and Tioga County (7 percent). Figure 3 shows the distribution of the actively producing wells across the state.

Table 2. Unconventional gas wells in Pennsylvania by region

Region	Drilled	Proposed But Never Materialized	Operator Reported Not Drilled
Northeast	5,416	728	3,813
Southwest	4,575	1,120	1,258
Northwest	1,001	302	353
Central	752	315	649
Capital	0	0	0
Southeast	0	0	0
Total	11,744	2,465	6,073

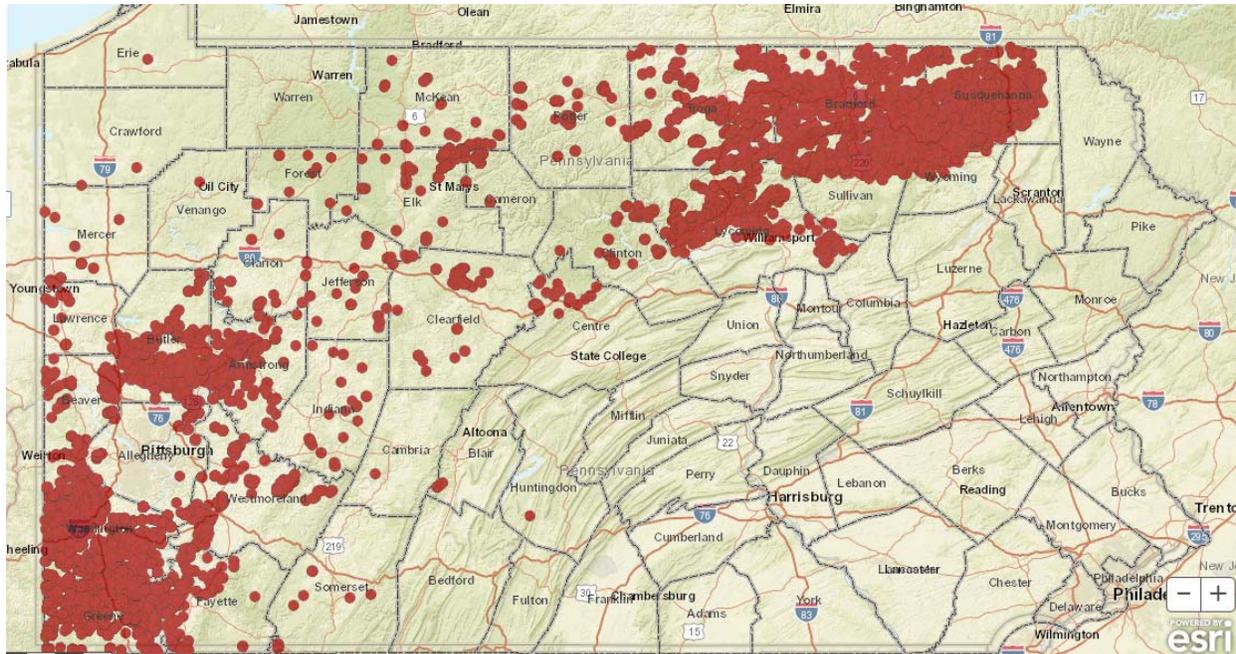
¹⁰ The Zone South portion of the Adelpia Gateway pipeline project also includes the construction of two new laterals (total of 4.65 miles), which would not increase the total gas capacity leaving Pennsylvania.

¹¹ Abbreviated Application of Adelpia Gateway, LLC for Certificates of Public Convenience and Necessity. Available at: <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14796855>.



Source: PA Geospatial Data Clearinghouse. Oil Gas Locations 2020. Dataset available online at: <http://www.pasda.psu.edu/uci/DataSummary.aspx?dataset=1088>.

Figure 3. Map of producing unconventional gas wells in Pennsylvania



Source: PA Department of Environmental Protection, Oil and Gas Mapping. Available at: <http://www.depgis.state.pa.us/PaOilAndGasMapping/OilGasWellsStrayGasMap.html>.

The state of Pennsylvania also tracks natural gas wells that are Proposed but Never Materialized (PBNM), in which a permit was issued but expired prior to the commencement of drilling, as well as Operator Reported Not Drilled (ORND), in which a permit was issued but the operator reported that the well was never drilled. These sites are logical and likely candidates for new drilling in Pennsylvania. A total of 2,465 wells are classified as PBNM and 6,073 wells are classified as ORND (Table 2). Like active wells, most of these undrilled well permits are in the northeast (53 percent) and southwest (28 percent) regions of Pennsylvania.

Given the large number of wells that have been permitted but not drilled, one can reasonably expect that new natural gas wells drilled as a result of the construction of the PennEast and Adelpia pipelines would most likely be in the northeast and southwest regions of Pennsylvania. Those counties with the highest number of wells that received permits but were never drilled are Bradford, Susquehanna, Greene, Washington, Tioga, and Lycoming. Bradford County contains the greatest percentage of undrilled permitted wells in the state—21 percent.

Complete counts of producing, PBNM, and ORND wells by county and region in Pennsylvania can be found in the Appendix.

Table 3. PBNM and ORND wells by county in Northeast and Southwest Pennsylvania.

Region/County	Proposed but Never Materialized (PBNM)	Operator Reported Not Drilled (ORND)
Northeast	728	3,813
Bradford	102	1,731
Carbon	0	0
Lackawanna	0	27
Luzerne	1	12
Lycoming	139	447
Monroe	0	0
Pike	0	0
Sullivan	21	226
Susquehanna	199	661
Tioga	236	484
Wayne	5	4
Wyoming	25	221
Southwest	1,120	1,258
Allegheny	54	66
Beaver	45	101
Bedford	1	0
Blair	2	0
Cambria	4	15
Fayette	86	38
Greene	404	292
Indiana	23	32
Somerset	3	15
Washington	375	537
Westmoreland	123	162

Source: PA Geospatial Data Clearinghouse. Oil Gas Locations 2020. Dataset available online at: <http://www.pasda.psu.edu/uci/DataSummary.aspx?dataset=1088>.

3.2. Impacts on Drilling Activity and Drilling-Related Emissions

If the PennEast and Adelpia Gateway pipelines move forward, a significant amount of existing shale gas production that has been curtailed would come online thereafter. At a minimum, permitted wells that were not previously completed would start producing gas for transport to New Jersey and Pennsylvania. This section of the memo estimates how many wells would likely come online as a result of each of the following pipeline projects: PennEast Phase 1, PennEast Phase 2, and the Adelpia Gateway Zone South. We also present results for the two following combinations of pipeline development: PennEast Phase 1 and Adelpia Zone South; PennEast Phases 1 and 2 and Adelpia Zone South.

The total number of wells induced by any given pipeline depends on the lifetime production, or estimated ultimate recovery (EUR), from a given well. EUR is typically measured in billion cubic feet (Bcf) per well. There is significant variability in EUR across wells in the state of Pennsylvania. As such, we have only included data from the counties where future drilling is most likely, based on the analysis above (Bradford, Susquehanna, Greene, Washington, Lycoming, and Tioga Counties). Further, there is additional variability due to increasing lateral lengths of horizontal wells in recent years, which have steadily been increasing average well EURs in the region.¹²

Our analysis begins with average EUR data by county in Pennsylvania and assumes each pipeline will have a lifetime of 40 years.¹³ Given that the EUR data is only available through 2014 and the amount that EURs have increased since then is uncertain, we present a low and high estimate of likely well additions (Table 4). The low estimate assumes that average EURs have not changed from 2008 to 2014, whereas the high estimate assumes that average EURs have increased about 60 percent from 2015 to 2018.¹⁴ The low and high estimates are both calculated using a weighted average based on the number of wells in each county. The resulting weighted average EURs (low and high) are 6.47 and 10.35 Bcf per well. Using this EUR range, we calculate the estimated number of new wells that will come online for each pipeline project in Table 4 below.

Table 4. Estimated number of future wells and drilling-related emissions (metric tons CO₂e), as a result of PennEast and Adelpia Gateway pipeline construction

Pipeline Project	Low Estimate of New Wells	High Estimate of New Wells	Low Estimate of Drilling-Related Emissions (mt CO ₂ e)	High Estimate of Drilling-Related Emissions (mt CO ₂ e)
PennEast Phase 1	917	1,466	1,254,641	2,007,425
PennEast Phase 2	644	1,031	882,109	1,411,374
Adelpia Zone South	353	564	482,554	772,086
PennEast Phase 1 + Adelpia Zone South	1,269	2,030	1,737,195	2,779,511
PennEast Phases 1 and 2 + Adelpia Zone South	1,913	3,061	2,619,303	4,190,885

If both the PennEast and Adelpia Gateway pipelines are constructed, between 1,900 and 3,100 new wells are likely to be drilled to fill the new capacity. These new wells will most likely be located in

¹² Westwood Energy. 2018. Super Laterals Trending in the US Northeast. Available at: <https://www.westwoodenergy.com/blog/super-laterals-trending-in-the-us-northeast>.

¹³ Swindell, G. 2018. Estimated Ultimate Recovery (EUR) Study of 5,000 Marcellus shale wells in Pennsylvania (February 2018 Update). Available at: http://www.gswindell.com/marcellus_eur_study.pdf.

¹⁴ Synapse communications.

northeast Pennsylvania (Bradford, Susquehanna, Tioga, and Lycoming Counties) and southwest Pennsylvania (Greene and Washington Counties).

The drilling and completion of these anticipated new wells will contribute to increased greenhouse gas emissions. Unconventional gas wells release CO₂ and CH₄ (methane) through combustion emissions, equipment leaks, and vented emissions from the wells themselves. To calculate the associated emissions from drilling these wells, we utilized an assessment from the U.S. EPA that reports the average emissions, in CO₂ equivalent (CO₂e), associated with unconventional natural gas drilling well pads, at 4,927 metric tons (Mt) per well pad.¹⁵ We converted this value into emissions per well¹⁶ using the total number of active unconventional gas well pads in Pennsylvania, reported at 3,263.¹⁷ This yields an average unconventional drilling emissions value for Pennsylvania of 1,369 Mt per well. This value was applied to the low and high estimates for new wells associated with each pipeline project. Results are shown in the fourth and fifth columns of Table 4. If both the PennEast and Adelpia Gateway pipelines are constructed, between 2.6 and 4.2 million Mt of CO₂e will be emitted into the atmosphere as a result of drilling and completion alone. The following section describes the CO₂e emissions associated with the combustion of the produced natural gas and the emissions associated with pipeline operations.

3.3. Impacts on Climate Damages

Climate damages associated with increasing greenhouse gas emissions can include, but are not limited to, property damage from floods, changes in agricultural productivity, extinction of endangered species, and loss of unique environments. These damages translate to increased health care costs, destruction of property, and increased food prices, which cost families and businesses billions of dollars. We calculated the social cost of the greenhouse gas emissions associated with the PennEast and Adelpia pipelines using the Social Cost of Carbon (SCC), as estimated by both the Obama and Trump administrations. The SCC is a value used to measure the climate damages—the monetized value of the net impacts—associated with carbon dioxide (CO₂) emissions. It values the incremental damages done by an additional ton of emitted CO₂ and discounts the sum of the total damages to the present value. These SCC estimates vary substantially because the Obama administration value (roughly \$50/ton of CO₂) includes global damages, while the Trump administration value (about \$7/ton of CO₂) only includes damages that occur within the United States.

¹⁵ The EPA assumed that drilling and completion of an unconventional gas well takes place early in the year with the well producing gas the remainder of the year with a full complement of common, higher process emissions equipment on the well pad, including a compressor, glycol dehydrator, gas pneumatic controllers, and condensate tank without vapor recovery. Furthermore, the EPA assumed that unconventional well completion does not employ "Reduced Emissions Completion" practices. Data taken from page 32 of https://www.epa.gov/sites/production/files/2015-05/documents/subpart-w_tsd.pdf.

¹⁶ A single well pad is a location which houses the wellheads for a number of horizontally drilled wells. The EPA reports average emissions per well pad, and here we estimate emissions per well.

¹⁷ Pennsylvania Department of Environmental Protection. Available at: http://www.depreportingservices.state.pa.us/ReportServer/Pages/ReportViewer.aspx?/Oil_Gas/Well_Pads.

First, we calculate the social cost of the carbon value, on a net present value basis, associated with the High and Low estimates of the drilling of new wells presented in Table 4, above. We make the conservative assumption that the drilling of new wells is evenly distributed over the 40-year assumed lifetime of the pipeline projects. The costs are shown in Table 5, below, for both the Low and High estimates of new wells drilled as a result of the pipeline projects under both Social Cost of Carbon values.

Table 5. Social cost of emissions of CO₂e associated with the drilling of new wells as a result of the pipeline projects

Pipeline Project	Total Costs (2019\$, Obama SCC)		Total Costs (2019\$, Trump SCC)	
	Low Wells	High Wells	Low Wells	High Wells
PennEast Phase 1	\$46,012,770	\$73,620,432	\$6,300,293	\$10,080,470
PennEast Phase 2	\$32,350,517	\$51,760,827	\$4,429,591	\$7,087,346
Adelphia Zone South	\$17,697,219	\$28,315,551	\$2,423,190	\$3,877,104
PennEast Phase 1 + Adelphia Zone South	\$63,709,989	\$101,935,982	\$8,723,483	\$13,957,573
PennEast Phases 1 and 2 + Adelphia Zone South	\$96,060,506	\$153,696,809	\$13,153,074	\$21,044,919

We find that the total climate damages resulting from the drilling of new gas wells using the Trump administration’s values range from \$13 million to \$21 million, on a net present value basis. Total climate damages using the values from the Obama administration range from \$96 million to \$153 million.¹⁸

The new capacity of the various components of this pipeline project could carry large quantities of natural gas, resulting in the potential release of enormous quantities of greenhouse gas emissions. In addition to emissions generated by combustion of the gas that flows through the pipeline, additional emissions result from pipeline operations (including gas consumed by compressor stations, leaks, and other sources). The results are shown in Table 6.

Table 6. Social cost of maximum potential carbon emissions associated with PennEast pipeline project

		PennEast Phase 1	PennEast Phase 2	Adelphia	Total
Total Costs (million 2019\$)	Obama Administration SCC	\$20,473	\$14,582	\$7,960	\$43,016
	Trump Administration SCC	\$2,803	\$1,997	\$1,090	\$5,890

¹⁸ According to the Institute for Policy Integrity, experts agree that the Obama administration’s central estimate of the social cost of carbon does not yet include all of the accepted economic impacts of climate change and is lower than the true cost of climate damages from greenhouse gases. Available at: <https://www.edf.org/sites/default/files/expertconsensusreport.pdf>

The present value cost over a projected lifetime of 40 years, discounted at 3 percent each year, ranges from a low of almost \$6 billion using the Trump administration’s values to a high of just over \$43 billion using the estimates developed by the Obama administration. These numbers are likely conservative, as studies have found that emissions leakage is up to 60 percent higher than U.S. EPA estimates.¹⁹ Valuation of increased leakage would increase the climate damages.

¹⁹ Alvarez, R., et al. Assessment of methane emissions from the U.S. Oil and gas supply chain. *Science* 361, 186-188 (2018).



Appendix A. PERMITTED WELLS IN PENNSYLVANIA

Region/ County	Drilled and Producing	PBNM	ORND	% Drilled and Producing	% PBNM	% ORND
Capital	0	0	0	0%	0%	0%
Adams	0	0	0	0%	0%	0%
Cumberland	0	0	0	0%	0%	0%
Dauphin	0	0	0	0%	0%	0%
Franklin	0	0	0	0%	0%	0%
Fulton	0	0	0	0%	0%	0%
Lancaster	0	0	0	0%	0%	0%
Lebanon	0	0	0	0%	0%	0%
Perry	0	0	0	0%	0%	0%
York	0	0	0	0%	0%	0%
Central	752	315	649	6%	13%	11%
Cameron	73	3	46	1%	0%	1%
Centre	31	19	110	0%	1%	2%
Clearfield	101	85	127	1%	3%	2%
Clinton	85	12	50	1%	0%	1%
Columbia	0	8	2	0%	0%	0%
Elk	202	26	132	2%	1%	2%
Huntingdon	1	1	1	0%	0%	0%
Jefferson	47	49	31	0%	2%	1%
Juniata	0	0	0	0%	0%	0%
McKean	119	51	55	1%	2%	1%
Mifflin	0	0	0	0%	0%	0%
Montour	0	0	0	0%	0%	0%
Northumberland	0	0	0	0%	0%	0%
Potter	93	61	95	1%	2%	2%
Snyder	0	0	0	0%	0%	0%
Union	0	0	0	0%	0%	0%
Northeast	5,416	728	3,813	46%	30%	63%
Bradford	1,414	102	1,731	12%	4%	29%
Carbon	0	0	0	0%	0%	0%
Lackawanna	0	0	27	0%	0%	0%
Luzerne	0	1	12	0%	0%	0%
Lycoming	968	139	447	8%	6%	7%
Monroe	0	0	0	0%	0%	0%
Pike	0	0	0	0%	0%	0%
Sullivan	149	21	226	1%	1%	4%
Susquehanna	1,753	199	661	15%	8%	11%



Region/ County	Drilled and Producing	PBNM	ORND	% Drilled and Producing	% PBNM	% ORND
Tioga	816	236	484	7%	10%	8%
Wayne	0	5	4	0%	0%	0%
Wyoming	316	25	221	3%	1%	4%
Northwest	1,001	302	353	9%	12%	6%
Armstrong	301	62	48	3%	3%	1%
Butler	591	110	258	5%	4%	4%
Clarion	38	22	25	0%	1%	0%
Crawford	2	3	0	0%	0%	0%
Erie	1	0	0	0%	0%	0%
Forest	12	14	13	0%	1%	0%
Lawrence	28	57	5	0%	2%	0%
Mercer	27	25	1	0%	1%	0%
Venango	1	3	3	0%	0%	0%
Warren	0	6	0	0%	0%	0%
Southeast	0	0	0	0%	0%	0%
Berks	0	0	0	0%	0%	0%
Bucks	0	0	0	0%	0%	0%
Chester	0	0	0	0%	0%	0%
Delaware	0	0	0	0%	0%	0%
Lehigh	0	0	0	0%	0%	0%
Montgomery	0	0	0	0%	0%	0%
Northampton	0	0	0	0%	0%	0%
Philadelphia	0	0	0	0%	0%	0%
Schuylkill	0	0	0	0%	0%	0%
Southwest	4,575	1,120	1,258	39%	45%	21%
Allegheny	183	54	66	2%	2%	1%
Beaver	157	45	101	1%	2%	2%
Bedford	0	1	0	0%	0%	0%
Blair	6	2	0	0%	0%	0%
Cambria	1	4	15	0%	0%	0%
Fayette	335	86	38	3%	3%	1%
Greene	1,539	404	292	13%	16%	5%
Indiana	36	23	32	0%	1%	1%
Somerset	16	3	15	0%	0%	0%
Washington	1,961	375	537	17%	15%	9%
Westmoreland	341	123	162	3%	5%	3%
Grand Total	11,744	2,465	6,073	100%	100%	100%

Source: PA Geospatial Data Clearinghouse. Oil Gas Locations 2020. Dataset available online at: <http://www.pasda.psu.edu/uci/DataSummary.aspx?dataset=1088>.



EXHIBIT C

The Effects of the
Proposed PennEast Pipeline
on Exceptional Value Wetlands
in Pennsylvania

Prepared for: The Delaware Riverkeeper Network
925 Canal Street
Bristol, Pennsylvania 19007
<http://www.delawariverkeeper.org>

Prepared by: Schmid & Company, Inc., Consulting Ecologists
1201 Cedar Grove Road
Media, Pennsylvania 19063-1044
(610) 356-1416
www.schmidco.com

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BACKGROUND

PennEast Pipeline Company, LLC (PennEast) proposes to construct, install, and operate approximately 114.6 miles of 36-inch diameter natural gas pipeline from Luzerne County, Pennsylvania to Mercer County, New Jersey. Of that total, 77.4 miles (68%) are proposed in Pennsylvania. Also proposed is an approximately 2.1-mile long new 24-inch diameter pipeline in Northampton County, PA (the Hellertown Lateral). A single new compressor station is proposed near Milepost 26.6 in Kidder Township, Carbon County, PA. The Kidder Compressor Station includes three gas turbine-driven units rated at 15,900 hp each. Additional aboveground facilities include meter stations, mainline valves, and pig launcher/receivers.

Approvals of the Pennsylvania section of the pipeline which will be needed include:

- a Federal Energy Regulatory Commission (FERC) certificate of public convenience and necessity (one application for entire project)
- a Pennsylvania Department of Environmental Protection (PADEP) Chapter 102 Erosion and Sediment Control General Permit (ESCGP-2) for Earth Disturbance Associated with Oil & Gas Exploration, Production, Processing, or Treatment Operations Facilities (separate applications for each county)
- a Joint Corps Clean Water Act Section 404/PADEP Chapter 105 Water Obstruction and Encroachment Permit (separate applications for each county), and
- a Clean Water Act Section 401 Water Quality Certification (one application to PADEP covering work in all counties).

Because it involves an interstate pipeline, the Federal Energy Regulatory Commission (FERC) is the designated lead federal agency for the project. FERC involvement means that the pipeline is supposed to be designed and constructed in accordance with FERC guidelines and specifications. On 24 September 2015, PennEast filed an application with the FERC for a Certificate of Public Convenience and Necessity (Certificate). As of 11 July 2016, the only water-related State approval that had been accepted by PADEP as administratively complete, and thus published as a public notice in the *Pennsylvania Bulletin*, was the Section 401 Water Quality Certification (WQ02-005, published 14 May 2016). As discussed at length below, the Section 401 Water Quality Certification application is substantially *incomplete* for regulatory decisionmaking, and will remain so until all of the required information has been provided.

On behalf of the Delaware Riverkeeper Network, Schmid & Company ecologists reviewed available project files regarding wetland delineations and impact assessments for the Pennsylvania portion of the proposed project. We also conducted field inspections at selected areas, in particular on publicly-owned and publicly-accessible lands, and private lands for which access permission was granted. Our primary focus was on the accuracy of delineated wetlands along the pipeline route in terms of their location, size, physical characteristics, classification as Exceptional Value Wetlands, and the applicant's assessment of potential impacts to those wetlands.

The subject of this analysis is the applicant's identification of Exceptional Value Wetlands and proposed impacts to them. Exceptional Value Wetlands are important for several reasons. In accordance with 25 Pa. Code Chapter 105, wetlands are "a valuable public natural resource", and any wetland that qualifies as an "Exceptional Value Wetland" is among the most sensitive and "deserves special protection". Exceptional Value Wetlands in Pennsylvania are defined at §105.17(1) as wetlands that exhibit one or more of the following characteristics:

- (i) Wetlands which serve as habitat for fauna or flora listed as "threatened" or "endangered" under the Endangered Species Act of 1973, the Wild Resource Conservation Act, 30 Pa. Code. (relating to the Fish and Boat Code), or 34 Pa. Code (relating to the Game and Wildlife Code).
- (ii) Wetlands that are hydrologically connected to or located within 1/2-mile of wetlands identified under subparagraph (i) and that maintain the habitat of the threatened or endangered species within the wetland identified under subparagraph (i).
- (iii) Wetlands that are located in or along the floodplain of the reach of a wild trout stream or waters listed as exceptional value under Chapter 93 (relating to water quality standards) and the floodplain of streams tributary thereto, or wetlands within the corridor of a watercourse or body of water that has been designated as a National wild or scenic river in accordance with the Wild and Scenic Rivers Act of 1968 or designated as wild or scenic under the Pennsylvania Scenic Rivers Act.
- (iv) Wetlands located along an existing public or private drinking water supply, including both surface water and groundwater sources, that maintain the quality or quantity of the drinking water supply.
- (v) Wetlands located in areas designated by the Department as "natural" or "wild" areas within State forest or park lands, wetlands located in areas designated as Federal wilderness areas under the Wilderness Act or the Federal Eastern Wilderness Act of 1975 or wetlands located in areas designated as National natural landmarks by the Secretary of the Interior under the Historic Sites Act of 1935.

Wetlands which qualify as "Exceptional Value Wetlands" in accordance with §105.17(1), by definition are Exceptional Value Waters in accordance with 25 Pa. Code Chapter 93 Water Quality Standards. Any water that is a "*surface water of exceptional ecological significance*" per §93.4b(b)(2) is an Exceptional Value Water. One specific example of a *surface water of exceptional ecological significance* as stated in Chapter 93 is:

Wetlands which are Exceptional Value Wetlands under §105.17(1).

Both Exceptional Value (EV) and High Quality (HQ) waters in Pennsylvania are entitled to Special Protection to prevent degradation when construction activities are being considered. Those waters identified as Exceptional Value Waters in Pennsylvania are *Tier 3 Outstanding National Resource Waters* in the terms of the federal Clean Water Act. Such waters are to receive the highest level of protection; *i.e.*, no degradation of their quantity and quality. This level of protection is even more stringent than that applied to High Quality waters, for which socioeconomic justification can be used as a rationale for allowing partial degradation. Exceptional Value Wetlands, because they are EV Waters, are to be afforded the same antidegradation "special protection" as streams that have been designated EV Waters, that is, no reduction of their water quality is to be allowed.

SUMMARY OF FINDINGS

The following issues, discussed in greater detail below, have been identified in conjunction with the proposed PennEast Pipeline project:

- The size (acreage) of some wetlands along the proposed pipeline was undermapped significantly.
- There are internal discrepancies in the reported acreage of many delineated wetlands in the PennEast application documents.
- Most wetlands within and along the proposed pipeline right-of way (ROW) are not visibly flagged in the field.
- Some wetlands which should be classified as "exceptional value" were incorrectly identified by the applicant as "other".
- Not all PADEP criteria for classifying Exceptional Value Wetlands were considered or applied.
- The required assessment of the functions and values of existing wetlands has not been done, and no evaluation of proposed impacts on the functions and values of wetlands has been done.
- Additional wetlands exist within approximately 19.4 miles of right-of-way (24% of the proposed pipeline Study Area) that have not been investigated because access was not (initially) granted. Impacts to those wetlands have not been acknowledged, calculated, or mitigated in the permit applications.
- No "existing use" analysis of affected streams has been done, possibly leading to an undercount of the number and extent of Exceptional Value Wetlands.
- Requests by resource agencies (e.g., PA-DCNR, USFWS) to identify sensitive resources and minimize impacts are not being followed.
- Bog turtle searches did not encompass the entire area requested by USFWS.
- Certain areas of suitable bog turtle habitat were not acknowledged by the applicant.

INTRODUCTION

The 77.4 miles of the 36-inch diameter mainline route of the proposed PennEast Pipeline Project that are within Pennsylvania pass through four counties: Luzerne, Carbon, Northampton, and Bucks. Additionally, 2.1-miles of new 24-inch diameter lateral are proposed near Hellertown, Northampton County, and a compressor station is proposed in Kidder Township, Carbon County, just north of Interstate Route 80.

The applicant reports that it identified 182 watercourses and 153 wetlands within the pipeline corridor Study Area in Pennsylvania. According to the application 58 streams to be crossed by the pipeline are designated as High Quality (HQ) and 11 streams to be crossed are designated as Exceptional Value (EV). The pipeline will cross 3 Class A Wild Trout Streams and 99 Wild Trout Waters, many of which also are either HQ or EV waters. The 153 delineated wetlands reportedly encompass about 135 acres within the Study Area. Most of the delineated wetlands (110 acres, or 81%) were classified by the applicant

as Exceptional Value Wetlands. More than half of the wetland impacts acknowledged by the applicant involve Exceptional Value Wetlands.

WETLAND DELINEATIONS AND IMPACTS

The field delineations of waterways and wetlands were performed on behalf of PennEast by representatives of AECOM and/or URS Corporation (the two companies merged in 2014). The delineations are reported to have been done "on multiple dates between September 2014 and August 2015" (Wetland Delineation Report - Pennsylvania, January 2016). Each delineated wetland was assigned a unique identification number by the applicant (e.g., 121814_JC_001_PEM). According to the Wetland Report, 151 wetlands were delineated within the pipeline route Study Area and 2 wetlands were delineated within the compressor station area. The total area of those delineated wetlands within the Study Area reportedly is 135 acres (**Table 1**).

Field Surveys

As noted above, the wetland delineations reportedly were conducted between September 2014 and August 2015. The boundaries of wetlands were reported to have been field-marked with surveyor's tape, and the flagged boundaries recorded with a handheld GPS unit. In our experience, such flagging typically persists in the field for several years at least, although pieces of some flags may become torn or lost and some markings may become illegible over time as a result of wind, rain, and general exposure to the elements. Upon field inspection during May 2016, the location of the proposed pipeline centerline, the pipeline corridor, and wetlands and streams within the pipeline corridor in general were found to be very poorly marked. We did not encounter a single wetland with delineation flags completely outlining it. At most we saw isolated, unnumbered pink flags pre-printed with "Wetland Delineation", or isolated numbered (or unnumbered) flags that did not connect in sequence with other numbered (or unnumbered) flags. Thus it was not possible to confirm with any precision in the field the accuracy of the wetlands depicted on the applicant's drawings. Occasionally we observed the banks or the centerlines of some, but not all, streams marked with either numbered or unnumbered blue flags. It is unlikely that all traces of the delineation flags were systematically removed by landowners or vandals, particularly given the somewhat remote locations we visited. The current lack of visible markings makes it difficult for agency regulators or the public to determine where the proposed project is on the ground and to identify what resources the applicant believes to be at risk. The lack of flagging should be corrected prior to agency field review.

Acreage Discrepancies

Each delineated wetland in the Study Area corridor was measured, categorized, and listed by milepost and by county in the "Delineation" table (in the Wetland Delineation Report). A subset of the delineated wetlands, those which the applicant acknowledges will be impacted by the pipeline project, is listed again in an "Impact" table (per Appendix G in the Water Quality Certification application), along with additional information about the nature

TABLE 1. PennEast Pipeline wetland details summarized. Except as noted, all data were provided by the applicant. These data do not include the additional wetlands and wetland impacts in the 19+ miles of pipeline ROW that have not yet been investigated/delineated. Numbers may not exactly equal totals due to rounding. **Boldface** indicates Exceptional Value Wetlands.

Issue	Luzerne	Carbon	Northampton	Bucks	TOTAL
Wetlands in Study Area (#)	75	56	21	1	153
EV Wetlands in Study Area (#)	43	34	15	0	92 (60% of total wetlands)
Wetlands in Study Area (acres)	27.63	95.10	11.61	0.33	134.67
EV Wetlands in Study Area (acres)	23.03	75.78	10.89	0	109.70 (81% of total wetlands)
Wetland impacts total (#)	43	41*	15	1	100
EV wetland impacts (#)					
Reported by applicant	16	27	11	0	54 (54% of total impacts)
Partially Corrected**	25	28	11	0	64 (64% of total impacts)
Applicant-reported wetland acreage greater in Impact Table than in Delineation Table					
Total number	7	9	0	0	16
Total acreage	7.60	15.76	0	0	23.36
Applicant-reported wetland acreage less in Impact Table than in Delineation Table					
Total number	8	11	3	0	22
Total acreage	1.26	5.87	0.06	0	7.19
Temporary ROW wetland Disturbance (acres)	Total 6.23 EV 3.72/4.98**	17.19 15.66/15.87**	3.09 2.76/2.76	0 0/0	26.51 22.14/23.61**
Permanent ROW wetland Disturbance (acres)	Total 3.13 EV 2.38/3.11**	10.82 9.84/9.99**	2.18 1.95/1.95	0.01 0/0	16.14 14.18/15.05**
Conversion of PFO/PSS to PEM (acres)	Total 1.60 EV 1.28/1.51**	5.32 4.69/4.79**	1.01 0.94/0.94	0 0/0	7.93 6.92/7.24**

* Includes 5 wetland impacts identified by the applicant at the proposed Kidder Compressor Station.

** Corrected by Schmid and Co. based on associations with designated EV Waters or Wild Trout Waters not acknowledged by applicant.

of each proposed impact. In total 153 Study Area wetlands are reported in the Delineation table, and 100 wetlands reportedly will be affected according to the Impact table. Table 1 summarizes relevant data about the wetlands reported for the PennEast Project.

At a minimum, every impacted wetland listed in the applicant's Impact table should also be listed in its Delineation table, but that is not the case. There are 7 wetlands that are listed as proposed to be affected by pipeline construction in the applicant's Impact table that are not listed in the Delineation table, as follows:

<u>County</u>	<u>Location</u>	<u>Identification Number</u>	<u>Type</u>	<u>Class</u>	<u>Area</u>
Luzerne	MP 19.7	121614_JC_001_PFO(2)	PFO	EV	0.583 ac.
Carbon	MP 26.5	102114_JC_001_PFO	PFO	Other	12.000 ac.
Carbon	MP 26.5	102114_JC_001A_PSS	PSS	Other	0.620 ac.
Carbon	MP 26.5	102114_JC_001_PEM	PEM	Other	2.880 ac.
Carbon	MP 26.5	082515_BT_003_PEM	PEM	Other	387.340 ac.
Carbon	MP 36.5	050615_JC_1002_PFO	PFO	EV	0.324 ac.
Northampton	MP 72.9	042815_JC_1002_PEM	PEM	EV	0.914 ac.

These 7 wetlands total more than 400 acres within the Study Area (that is *existing* acreage, not *impacted* acreage) if the reported areas are to be believed. Four of these wetlands are associated with the proposed compressor station at Milepost 26.5.

Other discrepancies between the applicant's Delineation table and the Impact table were noted. In addition to the 7 wetlands mentioned above, for which no acreage is provided in the Delineation table, 38 of the wetlands in the Impact table have a different total existing Study Area acreage than is reported for that wetland in the Delineation table. In 16 of those instances (a total of 23.36 acres), the reported acreage for a given wetland is greater according to the Impact table; in 22 instances (a total of 7.19 acres), the reported acreage is less according to the Impact table. Some are minor discrepancies that may be attributable to rounding errors (e.g., 2.10 vs. 2.094 acres), but others are significant (e.g., 2.05 vs. 5.655 acres, or 9.07 vs. 16.305 acres). Together these 38 wetlands represent an overall difference of more than 30 acres of reported wetlands in the Study Area (in addition to the more than 400-acre discrepancy for the 7 wetlands listed above). It is not clear, nor is it explained in the application, why these discrepancies exist, but they raise concerns about the quality and accuracy of the applicant's wetland delineation and assessment. These discrepancies must be eliminated prior to regulatory decisionmaking.

Extent of Regulated Wetlands

The applicant reported that there were 37 wetlands within the Study Area in Pennsylvania according to the National Wetlands Inventory (NWI) maps prepared by the US Fish & Wildlife Service (USFWS) using high-altitude aerial photographs. The applicant identified/delineated 153 wetlands in the Study Area (that number will increase once investigations have been completed in the approximately 19 miles of the ROW not yet examined by the applicant, see below). It is not unusual that the NWI maps identified only about one-quarter or fewer of the wetlands that were found during the applicant's field delineations --- in our experience, and as reported in the scientific literature, it is very

common that NWI maps significantly undermap the number and extent of regulated wetlands in Pennsylvania. The extent of forested wetlands often is not readily determined from high-altitude aerial photographs. Furthermore, NWI maps never were intended to be accurate enough to be used for project site-specific regulatory purposes.

The discrepancies discussed herein, regarding the location, extent, and nature of wetlands at various places along the proposed pipeline route, may be due to sloppy recording, incompetent field delineation, inconsistency among field delineators, or some combination of those factors. There is no excuse for inaccurate identification of wetlands on any project site, yet it happens more often than necessary, even where the wetland consultants have the "appropriate" credentials and claim to have followed the relevant criteria and guidelines for wetland delineation. The Army Corps of Engineers has an established, straightforward, no-fee process/procedure (known as a jurisdictional determination, or JD) for checking the accuracy of wetland delineations for federal regulatory purposes. PADEP uses the same methodology (25 Pa. Code 105.451). The importance of Corps of Engineers review was highlighted recently when a proposed coal mine application was undergoing PADEP permit review¹. In the 1,867-acre surface facilities area for the proposed mine in southwestern Pennsylvania, the applicant's wetland consultant identified 16 wetlands where the National Wetlands Inventory (NWI) had mapped only 2, a result which would seem to be more comprehensive. Following the Corps' JD field inspections, however, a total of 44 wetlands was confirmed at the mine site. If the Corps had not examined the consultant's wetland delineations, and if any of those additional 28 wetlands had been adversely affected by the mining project, those impacts would not have been recognized or mitigated. For the PennEast Pipeline project, we strongly recommend that the Corps of Engineers field inspect and confirm the accuracy of the proposed delineation of all wetlands after the limits of the wetlands and Study Area have been clearly flagged.

Classification of Exceptional Value Wetlands

Criterion "iii" [of the five criteria listed at §105.17(1) --- see "Background" above] was used by the applicant according to the Delineation table as the basis to classify almost all (91 of 92) Exceptional Value Wetlands in the Study Area. Criterion "iii" involves a wetland's association with EV Waters or wild trout waters. One wetland (in Carbon County near MP 27.0, #102314_JC__002_PSS) was judged to be exceptional value on the basis of both criterion "iii" and criterion "i" (threatened/endangered species habitat). Two of the wetlands we investigated in the field (Area C and Area E, see Appendix) may also qualify under criterion "i" (for possible bog turtle habitat); both already are listed by the applicant as Exceptional Value Wetlands because of their association with wild trout waters and/or EV waters, so their being bog turtle habitat would not change their designation but may warrant additional protective measures during construction.

We concur that none of the wetlands in the Study Area is likely to qualify as exceptional value in accordance with §105.17(1) criterion "v". There currently are no PADEP-designated "natural" or "wild" areas within the State Forest or State Park lands along the

¹ Schmid & Company, Inc. 2014. The illusion of environmental protection: permitting longwall coal mines in Pennsylvania. Prepared for Citizens Coal Council, Bridgeville PA. 138 p.

proposed route, nor are there any Federally-designated Wilderness Areas or National Natural Landmarks along the route.

There are likely to be wetlands within the Study Area, and proposed to be impacted, that qualify as exceptional value in accordance with §105.17(1) criterion "iv" [Wetlands located along an existing public or private drinking water supply, including both surface water and groundwater sources, that maintain the quality or quantity of the drinking water supply.] The proposed pipeline route passes through rural areas where many residents obtain their drinking water from onsite wells. One of the most widely recognized functions of wetlands² is their ability to absorb or filter pollutants such as nitrogen, phosphorus, and sediments and thereby to provide an important water quality benefit. When wetlands are located above or along private drinking water supplies, that water quality enhancement function is particularly significant. Any such wetlands along the PennEast Pipeline route would qualify as Exceptional Value Wetlands under criterion "iv". The application includes no discussion about this criterion, however, nor does it describe whether any of the wetlands in the Study Area are located above or along a public or private drinking water supply.

Significant Areas Not Delineated

Wetlands and waters within approximately 19.4 miles³ (24%) of the Study Area for the proposed pipeline in Pennsylvania had not been delineated as of mid-May 2016, reportedly because landowner permission had not been granted. According to the applicant's Environmental Assessment (page 1-23) "*remote sensing modeling and National Wetlands Inventory / National Hydrography Dataset data were used to identify wetlands and waterbodies on non-surveyed/no access parcels*". In some, but not all, places where access was not granted and NWI wetlands had been mapped by the USFWS, the applicant's maps depict some small wetlands. Reportedly, however, those are not included (even as estimates) in the calculations because only the wetlands actually field-delineated by the applicant are listed on the Delineation table and the Impact table.

There are county-mapped hydric soils in at least 15 locations where access for delineated wetlands was not obtained by the applicant (**Table 2**). In several of those locations there are USFWS-mapped NWI wetlands as well. In many of these areas, wetlands *were* delineated by the applicant just *outside* the "no access" areas, so it is not unreasonable to expect additional wetlands nearby where conditions are similar. If wetlands in fact exist in these 15 locations (which encompass approximately 6.4 miles of the overall pipeline route), at least 10 of them (highlighted in bold on the table) are already acknowledged or likely to be Exceptional Value Wetlands based on their direct association with wild trout waters or EV waters.

² PADEP Fact Sheet 3930-FS-DEP1434 (2003): *Wetlands: Functions at the Junctions*. <http://www.buckinghampa.org/media/4328/value-of-wetlands.pdf>

³ This estimate is based on our measurement and analysis of the "no access" areas identified on each of the 151 sheets that comprise the maps in the applicant's Wetland Delineation Report for Pennsylvania. The Environment Assessment for the Water Quality Certification application (page 1-23) claims that "*PennEast has conducted wetland and waterbody delineation surveys on approximately 78.6% (91.7 miles) of the Project pipeline routes in PA*"; however, the entire pipeline as currently proposed in Pennsylvania extends only 79.5 miles.)

TABLE 2. Areas that likely have wetlands within lands along the PennEast Pipeline route where property access reportedly was denied to the applicant.

<u>Wetland Delineation Sheets</u>	<u>No-Access Mileposts</u>	<u>No-Access Miles</u>	<u>Discussion</u>
<u>Pipeline ROW</u>			
66-67	32.15-32.72	0.57	Hydric soils (LtA, SmB) are near MP 32.5
72	35.21-35.28	0.04	Hydric soil (SmB) is near MP 35.21, wetland delineated nearby within same hydric soil map unit
73-74	35.61-36.43	0.82	Hydric soils (LtA, SmB, Hy) and NWI wetland are mapped near MP 36.1 (see Figure 1) --- would be EV wetland due to EV stream
82-83	40.71-41.70	0.99	Hydric soils (Hy) are near MP 41.6, wild trout waters and EV streams here suggest likely EV wetland
95	48.06-48.13	0.07	Hydric soil (Hy) near MP 48.1 is larger than delineated EV wetland (PSS)
98	48.87-49.10	0.23	Hydric soils (Hy, Pa) and NWI wetland are near MP 49.1; wetland delineated and acknowledged as EV
105-107 105-106 106-107	53.55-54.72 53.55-53.75 54.10-54.72	1.17	Wild trout waters suggest likely EV wetland near MP 54.3 Hydric soils (AnA, AoB, BuB) are along about 1,500 linear feet of proposed pipeline; wetland delineated nearby Hydric soils (AnA, AoB, BuB) are along about 1,225 linear feet; NWI wetland is near MP 54.3
110-111 110 111	55.97-56.76 near 56.00 56.7	0.79	Wild trout waters suggest likely EV wetland near MP 56.0 Hydric soil (BtA) and NWI wetland Hydric soil (BtB)
117	60.25-60.29	0.04	Hydric soil (Ho) and NWI wetlands are nearby along Monocacy Ck. (Class A Trout Stream), thus likely EV wetland
119	61.48-61.66	0.18	Hydric soil (BtA) near MP 61.48 larger than delineated PEM wetland nearby and in forest along creek, wild trout waters suggest likely EV wetland
136	70.89-71.04	0.15	Hydric soil (FI) is along north side of Lehigh River
137/142	71.90-72.46	0.56	Hydric soil (CaB) is larger than delineated EV wetland ; an NWI pond is nearby
145-146	73.59-74.37	0.78	Hydric soils (CnB, CaB); wetlands delineated nearby; wild trout waters suggest likely EV wetland
TOTAL		6.39 mi.	

In 4 of the 5 areas where both county-mapped hydric soils and NWI wetlands were shown on the applicant's drawings, the small section of the NWI-mapped wetland that extends into the Study Area corridor is shown, as for example in **Figure 1**, but no acreage of the NWI-mapped wetland was measured or estimated, no wetland impact was calculated, and the likely value of the wetland (as either "exceptional value" or "other") was not noted. In all cases where a NWI-mapped wetland is shown on project drawings in the "no-access" sections of the Study Area corridor, the actual wetland is likely to be larger (once field delineated and surveyed), given the typically undermapped extent of NWI wetlands and the generally much larger extent of county-mapped hydric soils.

In 2 instances where hydric soils, but not NWI wetlands, were mapped in the "no access" areas (Table 2), a field delineation of the wetland was performed by the applicant despite the stated lack of access (MP 48.1 and MP 72.2). In both cases, the delineated wetland was acknowledged to be an Exceptional Value Wetland. As for all of the areas already delineated, once access has been granted in the remaining sections of the PennEast Pipeline route, we strongly recommend that the Corps of Engineers field inspect the proposed wetland delineations and either confirm their accuracy or have the flagging and drawings adjusted as warranted by actual field conditions.

Impacts to Exceptional Value Wetlands

Of the 135 acres of wetlands within the Study Area reported in the applicant's Delineation table, most (110 acres, 81%) were classified by the applicant as Exceptional Value Wetlands. More than half (54) of the 100 wetlands to be disturbed during project construction according to the applicant's Impact table are Exceptional Value Wetlands (see Table 1). We believe that at least 64 Exceptional Value Wetlands will be impacted.

The applicant reports 16 impacts to Exceptional Value Wetlands in Luzerne County, 27 in Carbon County, 11 in Northampton County, and none in Bucks County, for a total of 54. At least 7 additional impacts listed by the applicant as affecting "other" (non-exceptional value) wetlands in Luzerne County, and 1 in Carbon County, in fact will affect Exceptional Value Wetlands (see listing below and **Table 3**). We identified two additional wetland impacts at Milepost 18.35 (see Area A, Appendix) in Luzerne County, where the wetland type and sizes are different than what was delineated by the applicant, and thus extend into the construction ROW. (We did not flag/survey/measure the difference.) Since our field inspections involved only limited spot-checking, there possibly could be similar discrepancies in areas we did not observe. Accordingly, there will be impacts to at least 64 (rather than 54) Exceptional Value Wetlands. Six of those wetlands are listed as Exceptional Value Wetlands in the applicant's Delineation table (but as "other" wetlands in the Impact table), while the others have been misclassified:

<u>County</u>	<u>Location</u>	<u>Identification Number</u>	<u>Reason Not "Other"</u>
Luzerne	MP 16.6 AR-031	081315_MK_026_PFO	criterion iii per Delin. Table
Luzerne	MP 16.6 AR-031	081315_MK_036_PSS	criterion iii per Delin. Table
Luzerne	MP 16.6 AR-031	081315_MK_035_PFO	criterion iii per Delin. Table
Luzerne	MP 16.6 AR-031	081415_MK_039_PSS	criterion iii per Delin. Table
Luzerne	MP 17.7	112014_JC_001_PEM	criterion iii per Delin. Table

NOTE: this location corresponds to field-inspected Area F

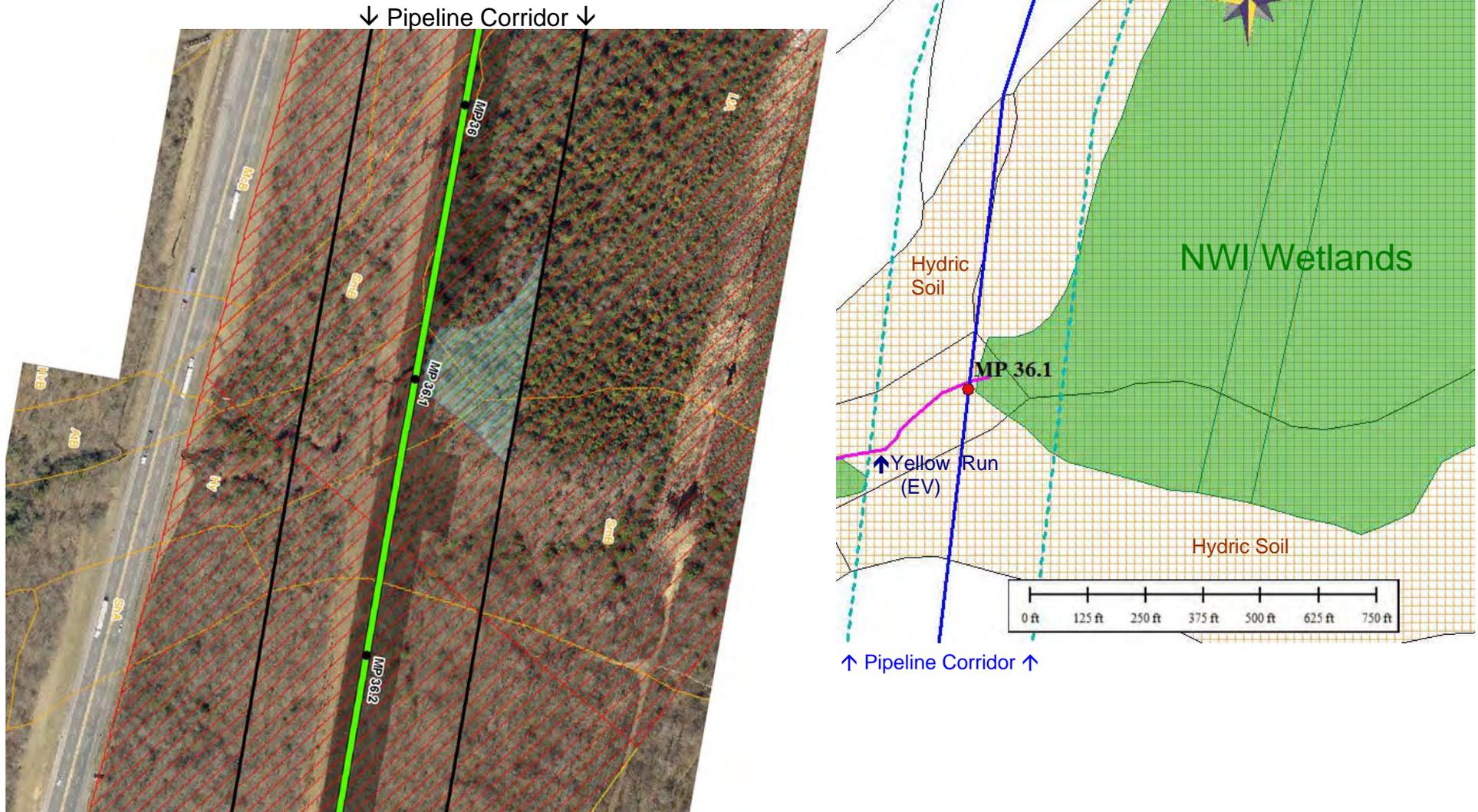


FIGURE 1. Example of wetlands "identified" near Milepost 36.1 of the proposed PennEast pipeline. At left is the applicant's wetland delineation map (Sheet 73) showing the pipeline corridor; only the western tip (light blue) of a very large NWI wetland (green in figure at right) is shown. Red diagonal hatching at left indicates property where permission for access had been denied to the applicant, and so no wetland field delineation was done. The extent of county-mapped hydric soils (orange crosshatch at right) is even more extensive than the NWI wetland. Existing Exceptional Value Wetlands, and wetland impacts, will be significant here, but are not included in the calculations or assessment for the pipeline permit applications.

TABLE 3. Impacts to Exceptional Value Wetlands, as reported in the applicant's Impact table. Column in blue identifies the wetland acreage reported in the applicant's Delineation table. Items highlighted in red denote either discrepancies in acreage (between Delineation and Impact tables) or in wetland value classification. The three wetlands whose ID numbers are in pink were not identified in the Delineation table. Note: subtotals and totals converted to acres.

Milepost	Wetland ID	Value Classification	Crossing Width (ft)	Square Feet Affected		Square feet of PFO and PSS Conversion Within 30-foot Maintained ROW	Acres in Survey Area	Acres Delineated	Impact Type T or P
				Const. ROW	Perm. ROW				
Luzerne County									
0.1	050715_JC_1001_PSS	EV	284	27180	15608	8756	1.794	1.79	P
3.1	011815_JC_002_PFO	EV	143	6152	5063	3054	1.248	1.36	P
13.1/13.2	121814_JC_004_PSS	EV	421	795	0	0	2.550	2.99	T
13.3, AR-029	081215_MK_020_PEM	EV	152	2210	0	0	0.080	0.08	T
14.1	111014_JC_002_PFO	EV	119	2485	834	258	0.173	0.17	P
14.9/15.0	043015_JC_1001_PFO	EV	124	9743	6542	3782	0.841	0.33	P
16	112114_JC_003B_PFO	EV	645	60918	40442	19119	5.655	2.05	P
16.1/16.2	112114_JC_003B_PSS	EV	5	526	382	161	1.984	0.24	P
16.2	112114_JC_003A_PSS	EV	331	12428	8238	4966	1.184	1.50	P
16.4	112114_JC_002_PSS	EV	83	6555	4081	2487	0.432	0.44	P
16.4	112114_JC_002_PEM	EV	60	223	39	0	0.073	0.08	T
16.6, AR-031	081315_MK_026_PFO	Other	444	3078	0	0	0.135	0.13	T
16.6, AR-031	081315_MK_036_PSS	Other	66	169	0	0	0.176	0.18	T
16.6, AR-031	081315_MK_035_PFO	Other	278	981	0	0	0.047	0.05	T
16.6, AR-031	081415_MK_039_PSS	Other	80	632	0	0	0.016	0.02	T
16.8	112014_JC_002_PEM	EV	321	78	31	0	0.011	0.34	T
16.8	112014_JC_002_PFO	EV	240	17855	12088	7073	2.732	2.07	P
17.7	112014_JC_001_PEM	Other	170	22613	15074	0	0.711	0.22	T
17.7	112014_JC_001_PFO	Other	336	26362	15983	10007	0.671	0.67	P
19.6	121614_JC_001_PFO (1)	EV	40	2704	1947	1150	0.583	0.60	P
19.7	121614_JC_001_PFO (2)	EV	170	12135	8552	5061	0.583	--	P
19.7	121614_JC_001_PEM	EV	37	64	0	0	0.716	0.72	T
22.7	102115_WA_003_PFO	Other	65	1030	395	112	0.114	0.11	P

Luzerne County Subtotal, Applicant EV only (acres) 3.72 2.38 1.28
Luzerne County Total, EV + Other (acres) 4.98 3.11 1.51

TABLE 3. Impacts to Exceptional Value Wetlands (continued).

Milepost	Wetland ID	Value Classification	Crossing Width (ft)	Square Feet Affected		Square feet of PFO and PSS Conversion Within 30-foot Maintained ROW	Acres in Survey Area	Acres Delineated	Impact Type T or P
				Const. ROW	Perm. ROW				
	Carbon County								
26.4	102114_JC_001B_PFO	EV	26	271	1117	793	0.050	0.05	P
26.4	102114_JC_001_PEM	EV	409	28819	18959	0	2.561	2.88	T
26.7	102114_JC_001A_PSS	EV	210	25733	1668	217	1.239	0.62	P
26.8	102314_JC_004_PEM	EV	367	16619	9211	0	1.605	1.68	T
26.9	102314_JC_002_PFO	EV	53	9527	2778	1577	0.501	0.33	P
26.9	102314_JC_002_PSS	EV	1624	123544	84488	49975	13.738	14.61	P
27.6	102214_JC_001_PEM	EV	136	2071	1408	0	0.125	0.12	T
29.5	050115_JC_1001_PFO	EV	850	65003	42800	25598	2.089	2.09	P
30.9	042415_JC_1001_PFO	EV	1702	121266	83595	51018	12.262	7.97	P
30.9	042415_JC_1002_PEM	EV	1051	5551	1370	0	1.088	1.16	T
33.1	042115_JC_1001_PSS	EV	37	932	277	0	0.236	0.26	T
33.5	042115_JC_1003_PFO	EV	287	27491	15304	3211	3.916	1.62	P
34.4	042315_JC_1001_PFO	EV	1722	134107	87680	30677	16.305	9.07	P
34.6	042315_JC_1002_PEM	EV	88	328	61	0	0.255	0.63	T
36.5	050615_JC_1002_PFO	EV	33	4019	2263	1137	0.324	--	P
36.6	050615_JC_1001_PFO	Other	136	8948	6416	3977	0.648	4.84	P
37.5	061615_DB_1001_PEM	EV	59	555	267	0	0.182	0.21	T
39.6	061615_DB_1004_PEM	EV	158	1381	631	0	0.151	0.15	T
39.6	061715_DB_1002_PFO	EV	39	3123	1737	1147	0.168	0.17	P
40.1	081915_MK_045_PEM	EV	0	435	257	0	0.029	0.03	T
44.2	061715_DB_1001_PSS	EV	13	0	1762	0	0.117	0.12	T
45	052915_JC_1001_PEM	EV	31	2888	1692	0	0.179	0.18	T
45.6	051115_JC_1001_PEM	EV	39	563	363	0	0.258	0.15	T
48.1	090914_WA_001_PSS	EV	53	2601	2286	1578	0.221	0.22	P
48.1	090914_WA_002_PSS	EV	22	1057	860	577	0.024	0.02	P
49	072315_JC_1001_PFO	EV	562	39279	27917	16840	3.416	3.56	P
49	072215_JC_1001_PSS	EV	546	59092	32969	17576	10.150	10.15	P
49.3	072215_JC_1002_PFO	EV	217	5927	4843	2564	0.419	0.42	P

Carbon County Subtotal, Applicant EV only (acres) 15.66 9.84 4.69
Carbon County Total, EV + Other (acres) **15.87 9.99 4.79**

TABLE 3. Impacts to Exceptional Value Wetlands (concluded).

Milepost	Wetland ID	Value Classification	Crossing Width (ft)	Square Feet Affected		Square feet of PFO and PSS Conversion Within 30-foot Maintained ROW	Acres in Survey Area	Acres Delineated	Impact Type T or P
				Const. ROW	Perm. ROW				
Northampton County									
59.2	090414_DB_008_PEM	EV	41	3239	2049	0	0.092	0.09	T
60.6	090314_DB_004_PEM	EV	60	4658	3222	0	0.129	0.13	T
61.5	111214_JC_003_PEM	EV	2	2	0	0	0.023	0.02	T
72.1	092614_GO_002_PFO	EV	78	9021	4799	2506	1.605	1.62	P
72.5	051415_JC_1002_PFO	EV	20	40	0	0	0.064	0.06	T
72.6	051415_JC_1001_PEM	EV	6	414	414	0	0.010	0.01	T
72.7	042815_JC_1001_PFO	EV	1162	59387	43641	27091	3.744	3.74	P
72.9	042815_JC_1002_PEM	EV	153	9808	7418	0	0.914	--	T
73.5	010615_JC_001_PFO	EV	381	26435	18166	11232	2.094	2.10	P
74.9	062415_BT_1002_PEM	EV	108	6592	4956	0	0.829	0.87	T
75.7	111314_JC_003_PFO	EV	57	718	457	111	0.191	0.19	P

Northampton County Subtotal, Applicant EV only (acres)	2.76	1.95	0.94
Northampton County Total, EV + Other (acres)	2.76	1.95	0.94

No Exceptional Value Wetland impacts proposed in Bucks County.

Pennsylvania PennEast Pipeline Route, Total

Applicant EV only (acres)	22.14	14.18	6.92
EV + Other (acres)	23.61	15.05	7.24

NOTE: The eight "Other" wetlands highlighted in red above actually are Exceptional Value Wetlands, but were misclassified by the applicant, see text.

Luzerne	MP 17.7	112014_JC_001_PFO	criterion iii per Delin. Table
Luzerne	MP 22.7	102115_WA_003_PFO	wild trout waters, criterion iii
Carbon	MP 36.6	050615_JC_1001_PFO	wild trout waters, criterion iii
Luzerne	MP 18.35	PEM not identified - see Area A in Appendix	wild trout waters, criterion iii
Luzerne	MP 18.35	PFO not identified - see Area A in Appendix	wild trout waters, criterion iii

The applicant reports a total of 26.51 acres of temporary wetland disturbance in the Pennsylvania section of the pipeline ROW, see Table 1. Most of that disturbance involves Exceptional Value Wetlands: 22.14 acres (according to the applicant's acknowledged Exceptional Value Wetlands) or 23.61 acres according to our partial corrections which include 8 applicant-identified wetlands in the list above (see also Table 3).

Similarly, the applicant reports a total of 16.14 acres of permanent ROW wetland disturbance in Pennsylvania (see Table 1). Most of that disturbance involves Exceptional Value Wetlands: 14.18 acres (according to the applicant's acknowledged Exceptional Value Wetlands) or 15.05 acres according to our partial corrections which include 8 applicant-identified wetlands in the list above (see also Table 3).

The applicant reports a total of 7.93 acres of permanent conversion of woody wetland vegetation (either forest or scrub) to herbaceous wetland in the 30-foot wide⁴ section of the ROW to be maintained permanently (see Table 1). Here again, most of that impact involves Exceptional Value Wetlands: 6.92 acres (according to the applicant's acknowledged Exceptional Value Wetlands) or 7.24 acres according to our partial corrections which include 8 applicant-identified wetlands in the list above (see also Table 3). For a more comprehensive discussion of the effects of converting wetlands from woody to herbaceous vegetation, please see our 2014 report prepared as part of a review of another pipeline project⁵.

All of the above Exceptional Value Wetland impact numbers must be viewed as provisional. They do not account for the 32 instances (in red on Table 3) where the applicant's reported acreage differs between its Delineation table and its Impact table, so the totals likely could be higher. The total impacts to Exceptional Value Wetlands undoubtedly will be higher once wetlands have been field-delineated in the 19+ miles of the PennEast Pipeline route that have not yet been examined by the applicant (see above).

The currently-acknowledged impacts to Exceptional Value Wetlands are significant:

- 22 to 24 acres of temporary ROW clearing/disturbance
- 14 to 15 acres of permanent ROW maintenance
- about 7 acres of permanent conversion from woody to herbaceous vegetation.

⁴ In some parts of the PennEast applications, the permanently-maintained section of the 50-foot ROW easement is claimed to be limited to 10 feet in width in wetlands (page 80, Joint Permit Application Alternatives Analysis, February 2016), but elsewhere it is noted to be 30 feet in width (wetland Impact table, Appendix G, Water Quality Certification application). **This discrepancy must be resolved by PADEP.**

⁵ Schmid & Company, Inc. 2014. The effects of converting forest or scrub wetlands to herbaceous wetlands in Pennsylvania. Prepared for the Delaware Riverkeeper Network, Bristol PA. Media PA. 48 p.

None of the proposed impacts to Exceptional Value Wetlands (which as discussed above are also EV Waters) has been evaluated by the applicant in terms of compliance with the Pennsylvania antidegradation requirements prescribed at 25 Pa. Code Chapter 93. According to the PADEP Water Quality Antidegradation Implementation Guidance (Technical Guidance Document 391-0300-002; 29 November 2003; page 39) existing uses must be maintained and protected whenever an activity (including construction) is proposed which may affect a surface water. Before it issues any permit, the PADEP must ensure that none of the impacts to EV Waters (including Exceptional Value Wetlands) will result in any degradation of water quality.

After a permit is issued, the cited Technical Guidance Document (on page 65) says "*If degradation is detected, the discharger will be required to implement corrective actions....*". However, unless full biological inventory first has been recorded prior to permitting, followed by permit condition-required post-construction monitoring and reporting, there can be no mechanism to implement this regulatory claim that actual degradation will be even recognized, much less "corrected".

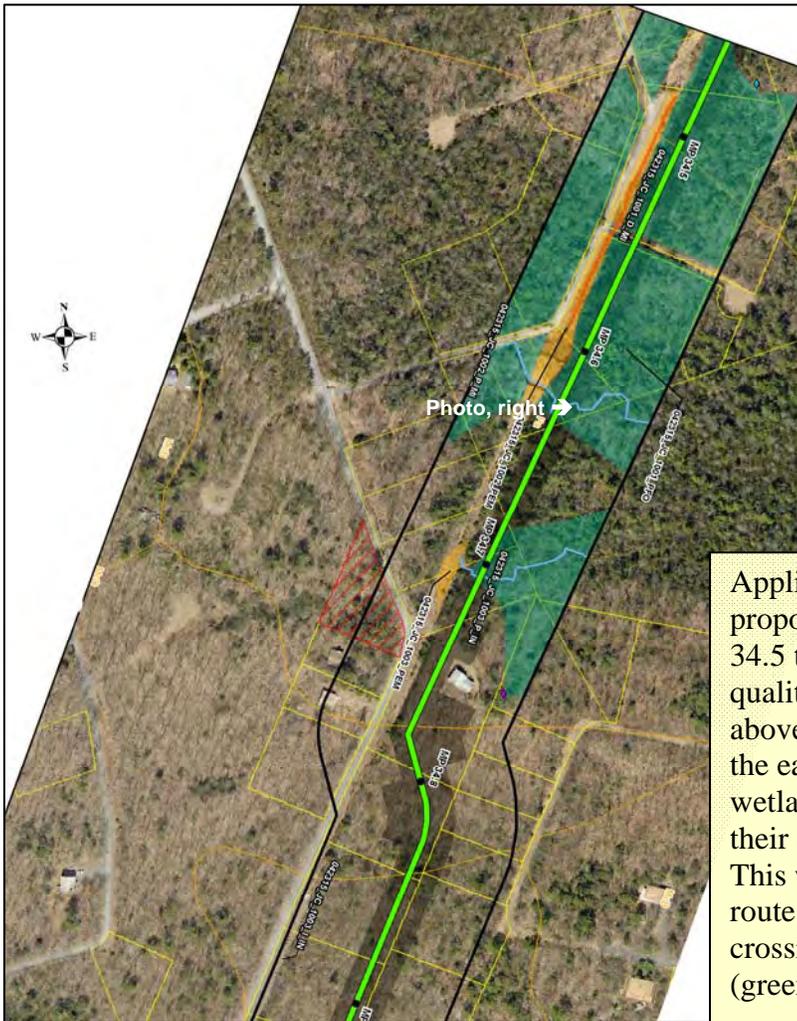
According to the PADEP Water Quality Antidegradation Implementation Guidance (page 60) limited activities that result in temporary and short-term changes in the water quality of Exceptional Value Waters can be allowed, but only if all practical means of minimizing such degradation will be implemented. It is not clear that all of the proposed PennEast Pipeline impacts to Exceptional Value Wetlands have been avoided or minimized to the maximum extent possible.

There are at least two common practices currently used by proponents of pipeline projects in Pennsylvania to avoid or minimize impacts to Exceptional Value Wetlands, neither of which has been proposed in the PennEast application. One is to simply route the pipeline around Exceptional Value Wetlands in order to avoid them. While avoidance of wetlands is mentioned as a general consideration in the pipeline siting and alternatives analysis, specific areas where identified Exceptional Value Wetlands were avoided is not discussed.

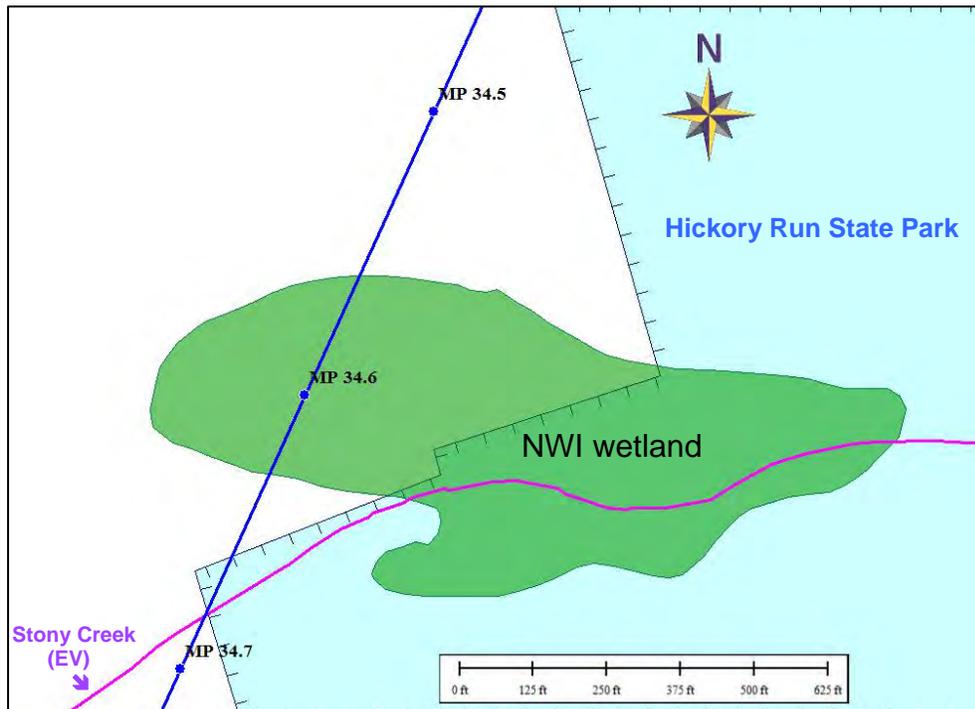
The use of Horizontal Directional Drilling (HDD) is a pipeline installation practice that can avoid or greatly minimize disturbances to sensitive resources on the ground surface by boring beneath them. HDD is proposed in only a few locations along the PennEast pipeline route. Of 100 proposed wetland impacts listed on the applicant's Impact table, only 3 involve use of the HDD method. Of the 54 proposed impacts to Exceptional Value Wetlands on the applicant's Impact table, only 2 involve use of the HDD method. Similarly, only 6 of the 76 stream impacts proposed will involve HDD, and only 1 of them (out of 11) involves an Exceptional Value Water.

One of the longest proposed wetland crossings involves an Exceptional Value Wetland associated with EV-designated Stony Creek near the western edge of Hickory Run State Park (**Figure 2**, see also Area E in Appendix). The length of wetlands to be crossed at this location might be reduced if the proposed pipeline were to be sited to the west, rather than to the east, of the existing pipeline. This impact also might be reduced if the HDD method were to be used, rather than as an "open cut" as proposed. Before it issues any permit,

FIGURE 2. Proposed crossing of Exceptional Value Wetlands at Area E (see Appendix) near Milepost 34.6, where the impact possibly could be reduced by a minor shift in the alignment or by use of the HDD method instead of an open cut.



Applicant's Wetland Sheet 71 (left) shows the proposed pipeline (light green line) from about MP 34.5 to MP 34.9, where a long crossing of a very high quality forested wetland (dark green, see also photo above) and emergent wetland (orange) is proposed on the east side of the existing pipeline ROW. The wetlands are Exceptional Value Wetlands based on their association with EV-designated Stony Creek. This wetland impact could be minimized by siting the route here to the west of the existing pipeline and crossing a smaller section of the large NWI wetland (green, below), or by use of HDD.



the PADEP must ensure that all proposed impacts to Exceptional Value Wetlands and Waters have been avoided or minimized to the maximum extent possible.

The Pennsylvania Department of Conservation and Natural Resources (DCNR) had requested⁶ that the applicant's wetland delineations be extended additional distances beyond the typical 400-foot wide Study Area in lands controlled by the State where county-mapped hydric soils or USFWS-mapped NWI wetlands exist; they requested that in those areas additional wetland delineations should extend 200 feet beyond the proposed limit of disturbance. Those additional areas of wetland do not appear to have been delineated --- see for example **Figure 3**, where county-mapped hydric soils (LtA, SmB) extend a considerable distance beyond both sides of the ROW, but the applicant's wetland delineation ends very near the limit of disturbance, particularly to the west. Before it issues any permit, the PADEP must ensure that these and similar concerns of DCNR and the other resource agencies have been adequately addressed.

None of the notes on the E&S Plan drawings mentions any special measures to be employed in or near EV or HQ waters or Exceptional Value Wetlands. The only mention of buffers at all is the general note: "AT STREAM CROSSINGS, 50' BUFFER AREAS SHOULD BE MAINTAINED", but even that is not especially informative regarding the sort of "maintenance" that the applicant is proposing⁷.

The applicant acknowledges that perennial and intermittent waters in Exceptional Value and High Quality ("Special Protection") watersheds have 150-foot wide riparian buffers regulated in accordance with Pa. Code Chapter 102⁸. Yet project drawings do not identify any existing or proposed riparian buffers around any EV or HQ waters. Project drawings depict a line drawn 50 feet from the edge of each waterway showing the "approximate 100-year floodway", which simply identifies the default floodway around all watercourses regardless of their Special Protection status (see Figure 3). The applicant notes that pipeline construction is an allowable activity per §102.14(f)(2)(ii), and that it intends to comply with the applicable requirements, but offers no specifics. Since the applicant does not even *identify* riparian buffers on its project drawings, it clearly has no intention of protecting them or attempting to minimize impacts within them. Before it issues any permit, the PADEP must ensure that all wetlands, and especially Exceptional Value Wetlands, located within Chapter 102 riparian buffers of HQ and EV waters are protected to the maximum extent practicable.

⁶ Summary of Initial Concerns For a Pre-Survey Meeting March 18, 2015, PennEast Pipeline Project, Pennsylvania Department of Conservation and Natural Resources, 14 pages.

⁷ It is unclear how relevant these E&S Plan Drawing Notes are for the PennEast Pipeline inasmuch as it states, on page 2 of 3 in the section entitled "Additional County Conservation District Notes" that "IN THE EVENT OF SINKHOLE DISCOVERY A PROFESSIONAL GEOLOGIST OR ENGINEER WILL BE CONTACTED CONCERNING MITIGATION. ADDITIONALLY, THE **LEHIGH COUNTY** CONSERVATION DISTRICT WILL BE MADE AWARE OF THE SINKHOLE DISCOVERY IMMEDIATELY." [Boldface added for emphasis.] The PennEast Pipeline does not pass through Lehigh County.

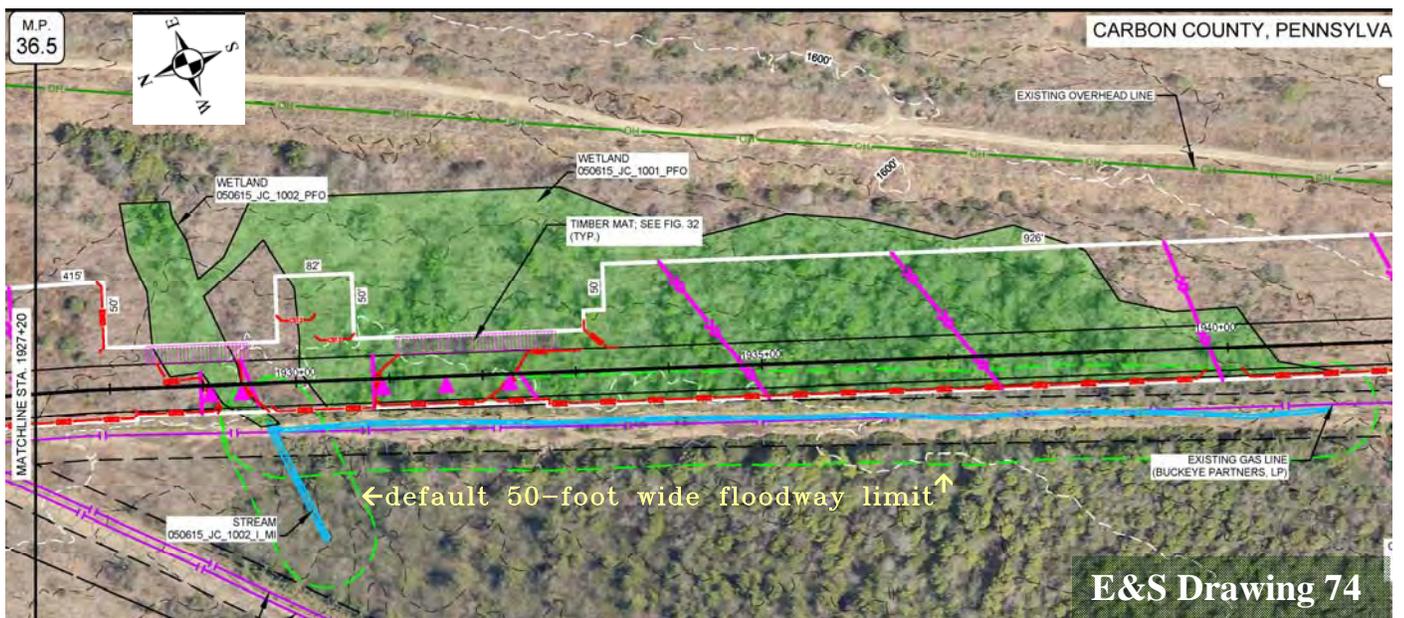
⁸ Erosion and Sediment Control Plan Narrative, PennEast Pipeline Project, Application for PA Chapter 102 Erosion and Sediment Control General Permit - 2, February 2016, 120 pages.

FIGURE 3. Example of major discrepancies regarding Exceptional Value Wetlands near Milepost 36.6 of the proposed PennEast Pipeline project in Weiser State Forest.



The drawing above, from the applicant's wetland delineation report, identifies two small and separately-numbered PFO wetlands. The applicant's E&S plan drawing below shows the same area, but with the two small wetlands connected and the one to the right (south) significantly larger [note, too, that mapped hydric soils LtA and SmB encompass an even larger area, but the delineation of wetlands has not been extended to 200 feet beyond the limit of disturbance (white lines in figure below) as requested by DCNR]. The applicant's impact calculations apparently were prepared based on the drawing above, because only two very short (33' and 136') wetland crossings are acknowledged when in fact the crossing here will total about 1,000 feet in length. (Properties where access was not granted to the applicant are denoted by red cross-hatching, as in the lower left of the figure above.)

NOTE: This location corresponds with field-inspected Area G.



The applicant claims⁹

it was not possible to protect, convert, or establish a riparian buffer or riparian forest buffer to satisfy the antidegradation requirements of §102.4(b)(6) for the proposed earth disturbances

because it does not own the land on which the pipeline will be constructed and because the existing landowners would not accept deed restrictions, conservation easements, or other mechanisms to protect the buffers into the future. No support for these claims is provided, and they appear to be gross generalizations that are unlikely to apply to every landowner along the 79.5-mile route in Pennsylvania. The PADEP should request documentation of these statements. Furthermore, while we recognize the applicant's claimed need to maintain a narrow (10 or 30 feet wide, see footnote 4 above), permanently-cleared area above the pipeline, the PADEP should require, as a condition of permit approval, that PennEast reestablish a forested riparian buffer wherever an existing one must be removed temporarily to allow construction, and to maintain that forested riparian buffer within its ROW in order to protect and enhance the quality of the associated Special Protection waters.

Impacts to Exceptional Value Wetland Functions

According to Pa. Code Chapter 105.13(e)(3), an application for a project that will affect an Exceptional Value wetland or more than 1 acre of wetlands must include, among other things, "*an assessment of the wetland function and values*". No such assessment was included in the Chapter 105 permit applications for the PennEast Pipeline, despite the fact that the applicant acknowledges more than 14 acres of permanent disturbance to Exceptional Value Wetlands, including nearly 7 acres of permanent conversion of woody to herbaceous wetland vegetation.

The definition of "wetland functions" at §105.1 is as follows:

Wetland functions --- Include, but are not limited to, the following:

- (1) Serving natural biological functions, including food chain production; general habitat; and nesting, spawning, rearing and resting sites for aquatic or land species.
- (2) Providing areas for study of the environment or as sanctuaries or refuges.
- (3) Maintaining natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, natural water filtration processes, current patterns or other environmental characteristics.
- (4) Shielding other areas from wave action, erosion or storm damage.
- (5) Serving as a storage area for storm and flood waters.
- (6) Providing a groundwater discharge area that maintains minimum baseflows.
- (7) Serving as a prime natural recharge area where surface water and groundwater are directly interconnected.
- (8) Preventing pollution.
- (9) Providing recreation.

⁹ Section 8.1.4 in Erosion and Sediment Control Plan Narrative, see footnote above.

In the PennEast Environmental Assessment Table 1.5-1 (reproduced below), the applicant lists various ecological functions of the wetlands and waterbodies it delineated along the pipeline route. The wetland functions listed by the applicant do not correspond exactly with the nine functions listed in §105, so we have added a column (numbers in blue) to relate the two.

Ecological Function	^{per} §105 ↓	Emergent Wetlands	Forested Wetlands	Scrub-Shrub Wetlands	Intermittent Streams	Perennial Streams
Food Chain Support	1	X	X	X	X	X
Nesting Habitat	1	X	X	X		X
Spawning Habitat	1					X
Rearing Habitat	1	X	X	X		X
Migratory Habitat	1	X	X	X		X
Feeding Habitat	1	X	X	X	X	X
Escape Cover	2	X	X	X	X	X
Protected Species Habitat	2	X	X			
Groundwater Discharge	6	X	X	X	X	X
Groundwater Recharge	7	X	X	X		
Stormwater Control	4,5	X	X	X	X	
Floodwater Control	3,8	X	X	X	X	
Pollution prevention	3	X	X	X		
Water Filtration	3,8	X	X	X		
Sedimentation Control	3	X	X	X		
Salinity Distribution	3	N/A	N/A	N/A	N/A	N/A
Recreation Opportunities	9	X	X	X		X

According to the applicant, none of the three wetland types (PEM, PFO, and PSS) provides "spawning habitat" (part of §105 function #1) or "salinity distribution" (part of §105 function #3). Otherwise, all of the listed functions except for one ("protected species habitat", for PSS) is checked for all of the wetland types. Presumably, *each* of the applicant-delineated wetlands provides *all* of the applicant-noted functions equally, because nothing to the contrary is mentioned by the applicant and the individual applicant-delineated wetlands are not separately characterized by function.

Without an identification of the individual wetland functions (which typically would be found in Enclosure C of the Environmental Assessment), the applicant cannot assess (and has not assessed) the effects of project activities on the wetlands, and particularly on the Exceptional Value Wetlands (the assessment of impacts typically would be found in Enclosure D of the Environmental Assessment). Furthermore, without an identification and assessment of individual wetland functions impacted by the proposed project, there is no rational basis for determining the appropriateness of any proffered wetland mitigation to offset the wetland losses. For each wetland we inspected (see Appendix) we discuss its wetland functions and the effects of the proposed PennEast Pipeline project on those functions.

EXISTING USES OF STREAMS

The Pennsylvania Department of Environmental Protection is required by 25 Pa. Code §93.4c(a)(1)(i) to protect the existing uses of surface waters and is required by 25 Pa. Code §93.4c(a)(1)(iv) to make a final determination of existing use protection for surface waters as part of every final permit or approval action. According to the PADEP Chapter 105 permit application for the PennEast Project (Environmental Assessment Enclosure C, page 2-28), 58 of the streams within the Study Area currently are *designated* as HQ and 11 are *designated* as EV. Some of those designated as HQ, particularly those which are first or second order streams and which are in undisturbed forested condition, may actually be attaining EV *existing* use, and if so, they must be protected at that higher use. Enclosure C of the applicant's Environmental Assessment (page 2-8) notes that applicant's reported existing uses of streams were based on an online review of GIS data published by PADEP and the Pennsylvania Fish & Boat Commission, and thus not on any detailed original macroinvertebrate studies conducted in streams to be crossed by the proposed pipeline project.

There is no indication that the applicant conducted any analysis of the existing use of any of the HQ-designated streams to be impacted by the approved activities. If any of those HQ-designated streams in fact have EV existing uses, any wetlands within their floodplains are Exceptional Value Wetlands. It is the PADEP's responsibility to make the existing use determinations of streams, based at least in part on information provided by the applicant. In this case, the applicant has failed to provide the information necessary for timely decisionmaking by the PADEP.

POTENTIAL BOG TURTLE HABITAT

In Pennsylvania, the bog turtle is listed as "endangered", the category of rare species accorded the highest level of concern (Pa. Code Title 34, Chapter 21).

In its letter to the applicant dated 30 September 2014, the USFWS noted:

The project is within the known range of the bog turtle (*Clemmys muhlenbergii*), a species that is federally listed as threatened. Particularly for this project, the species may be found in Bucks, Northampton, and Carbon Counties.

USFWS further directed the applicant to identify, at minimum:

... all wetlands in, and within 300 feet of, the project area. The project area includes all areas that will be permanently or temporarily affected by any and all project features...

This was not done. Wetlands were delineated within a 400-foot wide (total) study corridor centered on the proposed centerline of the pipeline, meaning 200 feet in each direction from the proposed pipeline. Additionally, proposed construction areas extend out from that centerline, in some cases encompassing the entire width of the study corridor. To have complied with the USFWS directive, wetlands should have been delineated within 300 feet of the edge of any limit of proposed disturbance.

During our field examination of wetlands, which primarily focused on publicly-owned or accessible properties, we observed at least two wetlands that appear to consist of habitat suitable for bog turtle (both in Carbon County, see Area C and Area E in Appendix). As noted above, both of those wetlands already have been classified by the applicant as exceptional value on the basis of other criteria, so the existence of bog turtle would not change that classification, although it could (indeed, *should*) increase the level of their protection. It is possible, however, that there are additional areas of bog turtle habitat, or other threatened or endangered species of plants or animals, within the 16.88 miles of the proposed pipeline route in Carbon, Northampton, and Bucks counties which have not yet been investigated by the applicant.

SUMMARY

PennEast Pipeline Company, LLC proposes to construct, install, and operate 79.5 miles of natural gas pipeline and associated facilities in Luzerne, Carbon, Northampton, and Bucks counties in eastern Pennsylvania. Information provided by the applicant regarding the existence of and potential impact to Exceptional Value Wetlands within the proposed Study Area was examined for this report. Based on a review of that information, supplemented by our own field inspection of specific publicly-available areas along the proposed pipeline route, we have identified numerous issues of concern regarding wetlands, and in particular, Exceptional Value Wetlands.

Some of the wetlands within the Study Area appear to have been incorrectly delineated or identified in terms of size, cover type, or resource classification. Reported acreages of wetlands differ, sometimes significantly, between different parts of the permit application. All of the relevant criteria for classifying wetlands as "exceptional value" have not been considered or applied. Study Area wetlands are not clearly flagged in the field and are not ready for inspection by agency personnel. The applicant has not extended its wetland delineations in additional areas within 200 feet of proposed disturbances, as requested by PADCNR for State Parks and State Forests.

A significant omission in this application is the absence of any inventory characterization of the functions and values of each wetland in the pipeline Study Area, or at minimum of each wetland to be impacted. Moreover, there is no evaluation or assessment of the proposed impacts on the functions and values of wetlands to be disturbed, including Exceptional Value Wetlands.

Approximately 19.4 miles (24%) of the proposed pipeline Study Area had not been investigated as of mid-May 2016, and there is a high probability that additional wetlands exist in those areas, some of which are Exceptional Value Wetlands. Even in areas where delineations already have been done there may be additional Exceptional Value Wetlands, but they have not been identified as such because no "existing use" analysis of streams has been done. Additional bog turtle determinations need to be made, at minimum in the 16.88 miles of the proposed pipeline route that have yet to be investigated in the 3 counties where potential bog turtle habitat are known to exist. Each of these concerns needs to be addressed by the regulatory agencies before any permits are issued.

AUTHORSHIP

This report was prepared by Stephen P. Kunz with the assistance of James A. Schmid. Both are senior ecologists with Schmid & Company, Inc. Mr. Kunz has worked full-time as a private sector ecological consultant since receiving a degree in human ecology from Rutgers University in 1977. Dr. Schmid is a biogeographer with more than 40 years of experience in ecological consulting. He received his BA from Columbia College and his MA and PhD from the University of Chicago. Both Mr. Kunz and Dr. Schmid are certified as *Senior Ecologists* by the Ecological Society of America and as *Professional Wetland Scientists* by the Society of Wetland Scientists.

Mr. Kunz and Dr. Schmid offer outstanding credentials as experts in ecology, wetlands, environmental regulation, and impact assessment. They have analyzed the environmental impacts of many kinds of proposed development activities in numerous states, including pipeline facilities, coal mining projects, industrial facilities, transportation facilities, commercial developments, and residential developments. They have written Environmental Impact Statements under contract to the US Environmental Protection Agency, Army Corps of Engineers, Interstate Commerce Commission, various agencies of State and local governments, and a diverse array of private sector entities. They also have commented on and prepared analyses of state and federal environmental regulations.

APPENDIX

PennEast Pipeline

Field-Inspected Areas

On 9 May and 12 May 2016, experienced ecologists from Schmid and Company, Inc. conducted field inspections at selected areas along the proposed PennEast pipeline route in Pennsylvania. The purpose of the inspections was to spot-check the accuracy of the applicant's delineations of wetlands within the pipeline corridor Study Area.

Each of the nine locations investigated (**Areas A through I**, see **Figure 4**) is presented on the following pages. For each Area, a listing of certain relevant facts provided by the applicant is given first, followed by a discussion of our observations. Also provided is a listing of the nine §105 wetland functions with those associated with the subject wetlands identified and the impacts summarized. Finally, each Area is shown in a graphic excerpted from the applicant's Wetland Delineation Report and one from its E&S Plan.

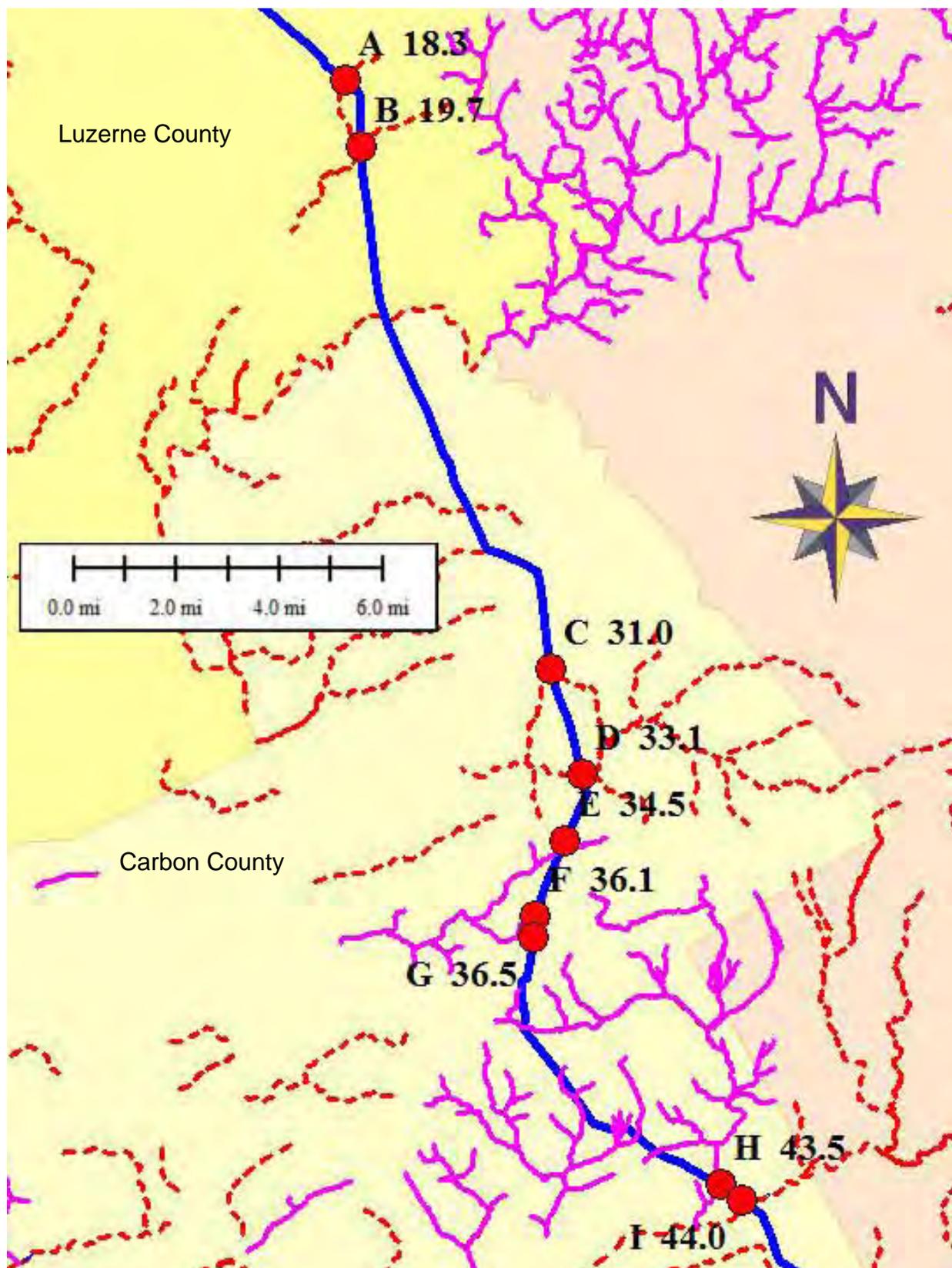


FIGURE 4. Locations of **Areas A** through **I** (with associated Milepost noted) along the proposed PennEast Pipeline where field inspections were made for this report, May 2016. Streams outlined in pink are EV streams. Stream segments shown by red dash lines are Class A or Wild Trout Waters. Other categories of streams are not shown. Stream data obtained from Pennsylvania Spatial Data Access (<http://www.pasda.psu.edu/>)

Area A Little Shades Creek, Bear Creek Township, Luzerne County

Facts:

- between MP 18.3 and 18.4
- Applicant's 1/5/2016 Wetland Sheet 39 of 151, Applicant's 02/2016 E&S Dwg 37
- south of PA Route 2038
- within State Game Lands #91
- Little Shades Creek -- perennial stream
 - designated HQ-CWF
 - designated Wild Trout Stream (naturally reproducing wild trout)
- second delineated perennial stream (UNT to Little Shades Creek)
- both streams to be crossed/impacted per map
- two small wetlands are delineated (as PSS) within Study Area, but not within the disturbance area -- both are listed as EV (associated with Little Shades Creek).

Wetlands identified in Study Area by applicant:

110315-GM-1001-PSS 0.05 ac. per delin. table. No impact proposed.

110315-GM-1001b-PSS 0.01 ac. per delin. table. No impact proposed.

Total applicant-reported wetland disturbance: None.

Observations:

Wetlands here have been under-identified and mischaracterized. The wetlands identified as PSS in fact are PFO wetlands, and they extend into the proposed areas of disturbance. The soils mapped along the Creek at the proposed crossing (WmB and OpD) are map units with known inclusions of hydric soils. The proposed pipeline is located south of and adjacent to an existing petroleum pipeline, and both of the pipelines are located to the southwest of and adjacent to a recently-installed PPL electric transmission line. The applicant-mapped width of Little Shades Creek here --- more than 100 feet wide at the proposed crossing --- is considerably wider than it is in areas just upstream and downstream. This is because much of what is mapped as waterbody should in fact be classified as PEM wetland. Creek water has spread out as a result of beaver dam building activity. The beaver dam is very leaky, however, so water flow is retarded, but not blocked altogether. This has caused the standing water to expand beyond the normal channel of the Creek and create shallow-water PEM wetlands. These wetlands have not been acknowledged as wetlands by the applicant.

The application identifies no wetland impacts at this location, but does acknowledge 2 stream crossings (one 105' in length, the other 19' in length). The applicant-calculated *permanent* impact associated with the longer stream crossing is 10 times as much (0.120 ac. vs. 0.012 ac.) as the applicant-calculated *temporary* impact. The E&S drawing shows a 75-foot wide disturbance area at the stream crossings (105' x 75' = 7,875 SF, 0.181 ac.); the impact shown on the drawing (0.181 acre) is larger than the 0.120 acre impact acknowledged by the applicant.

The proposed stream/wetland crossing will destroy the existing beaver dam. More significantly, the existing wetlands along the southeastern side of the Creek that have not been delineated will be impacted by the proposed crossing. These wetlands, and in particular those within at least 50 feet from the edge of the Creek, are Exceptional Value Wetlands per PA Code Chapter 105 (association with designated wild trout waters), which makes them EV waters per PA Code Chapter 93. The apparent impacts to these Exceptional Value Wetlands, about 0.25 acre, have not been recognized by the applicant or by PADEP.

Area A

Wetland Functions:

- | | |
|--|-------------------|
| <input checked="" type="checkbox"/> (1) Serves natural biological functions
- food chain production
- general habitat
- nesting, spawning, rearing, and resting sites
for aquatic or land species. | Little Shades Ck. |
| <input checked="" type="checkbox"/> (2) Provides areas for study of the environment
or as sanctuaries or refuges. | beaver
SGL 91 |
| <input checked="" type="checkbox"/> (3) Maintains natural drainage characteristics,
sedimentation patterns, salinity distribution,
flushing characteristics, natural water filtration processes,
current patterns or other environmental characteristics. | |
| <input checked="" type="checkbox"/> (4) Shields other areas from wave action, erosion, or storm damage. | Little Shades Ck. |
| <input checked="" type="checkbox"/> (5) Serves as a storage area for storm and flood waters. | Little Shades Ck. |
| <input checked="" type="checkbox"/> (6) Provides a groundwater discharge area
that maintains minimum baseflows. | Little Shades Ck. |
| (7) Serves as a prime natural recharge area where surface water
and groundwater are directly interconnected. | |
| <input checked="" type="checkbox"/> (8) Prevents pollution. | |
| <input checked="" type="checkbox"/> (9) Provides recreation. | SGL 91 |

Each of these functions will be diminished by the temporary disturbance of an estimated 0.25 acre of Exceptional Value Wetlands, by the permanent disturbance of an estimated 0.10 acre of Exceptional Value Wetlands, and by the permanent conversion/maintenance of 0.05 acre of forested Exceptional Value Wetlands to herbaceous wetlands.

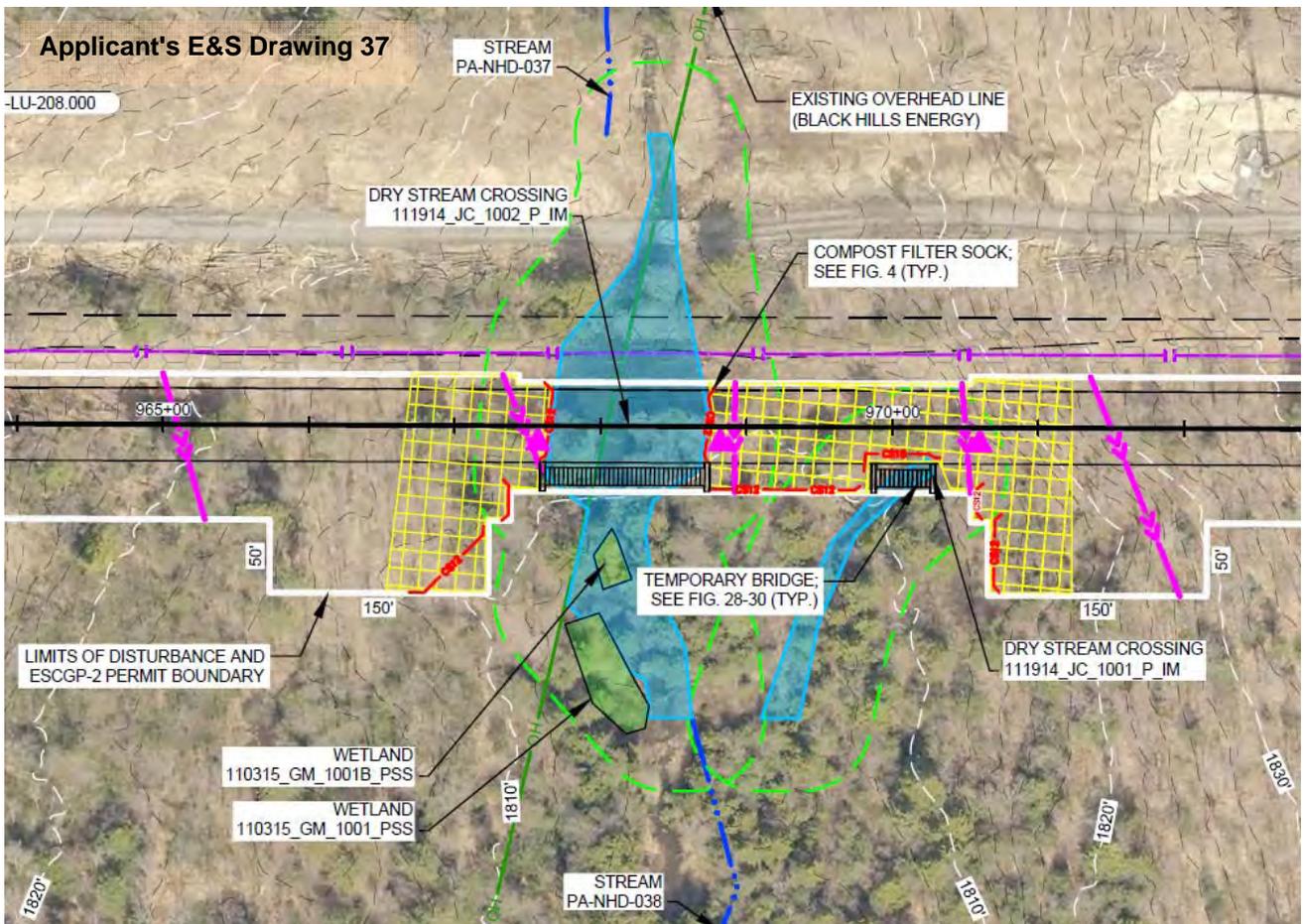
[Note, calculations thus:

Start with estimated 0.25 acre disturbed. Temp. disturbance in 75' ROW means it would need to be a 145' crossing: $75' \times 145' = 0.25 \text{ ac}$. So the permanent 50-foot wide ROW would be $50' \times 145' = 0.10 \text{ ac}$. The PFO to PEM conversion in the 30-foot ROW would be $30' \times 145' = 0.05 \text{ ac}$.]

AREA A



Applicant's E&S Drawing 37



Area B Shades Creek, Bear Creek Township, Luzerne County

Facts:

- between MP 19.6 and 19.8
- Applicant's 1/5/2016 Wetland Sheet 41, Applicant's 02/2016 E&S Dwg 40
- south of Route 115 (Bear Creek Boulevard)
- within Natural Lands Trust "Bear Creek Preserve"
- Shades Creek -- perennial stream (just upstream from its confluence with Little Shades Creek)
 - designated HQ-CWF
 - designated Class A Wild Trout Stream
- several other delineated streams (UNT) flowing into it
- existing PFO and PEM (in existing pipeline ROW) wetlands delineated nearby - two impacts identified to PFO wetlands for proposed crossing
- Summary table classifies the 2 wetlands here as PEM (0.72 ac, 0.60 ac), both listed as EV

Wetlands identified in Study Area by applicant:

- 121614-JC-001-PFO 0.60 ac. per delin. table. The impact table shows two crossings of the wetland here: PFO (1) and PFO (2), each listed as 0.58 ac.
- 121614-JC-001-PEM 0.72 ac. per both the delineation table and the impact table

Total reported wetland disturbance: 0.34 ac.
Perm. ROW wetland disturbance reported: 0.24 ac.
Conversion PFO to PEM reported: 0.14 ac.

Observations:

The PFO wetland is incorrectly identified as having a PEM wetland cover type in the delineation table.

The existing extent of the identified wetlands appears to be accurately mapped here. The Ln (Linden) soil type which encompasses this area has known component inclusions of Holly soil, a hydric soil.

The construction corridor/LOD is proposed to be reduced to 50 feet in width where it crosses the wetlands and stream here (elsewhere nearby it is 100 feet in width).

Three wetland crossing impacts are identified on the drawings - two of the PFO wetland, and one of the PEM wetland. All of them are acknowledged as being Exceptional Value Wetland impacts. The PEM impact appears to be overstated

Area B

Wetland Functions:

- | | |
|--|--|
| <input checked="" type="checkbox"/> (1) Serves natural biological functions
- food chain production
- general habitat
- nesting, spawning, rearing, and resting sites
for aquatic or land species. | Related info:

Shades Ck. |
| <input checked="" type="checkbox"/> (2) Provides areas for study of the environment
or as sanctuaries or refuges. |

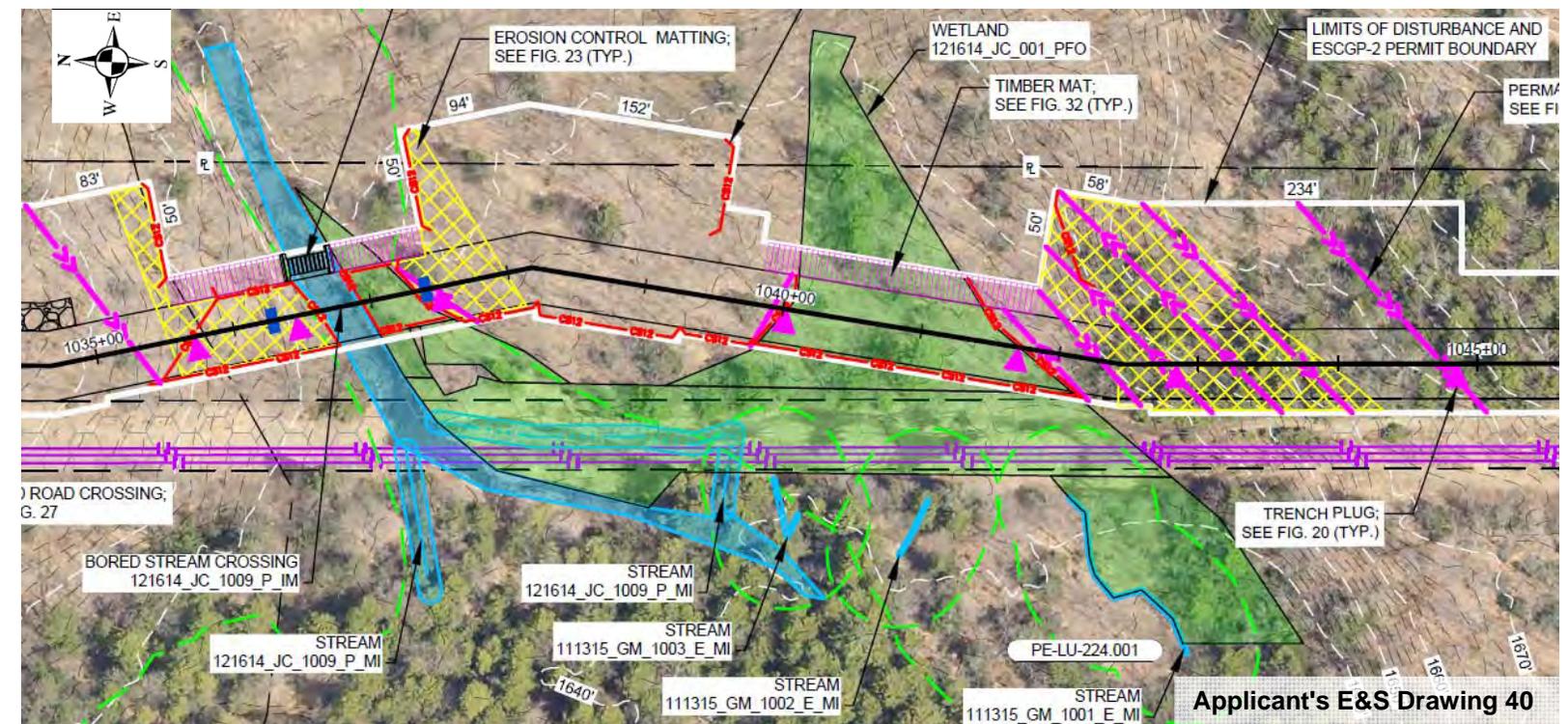
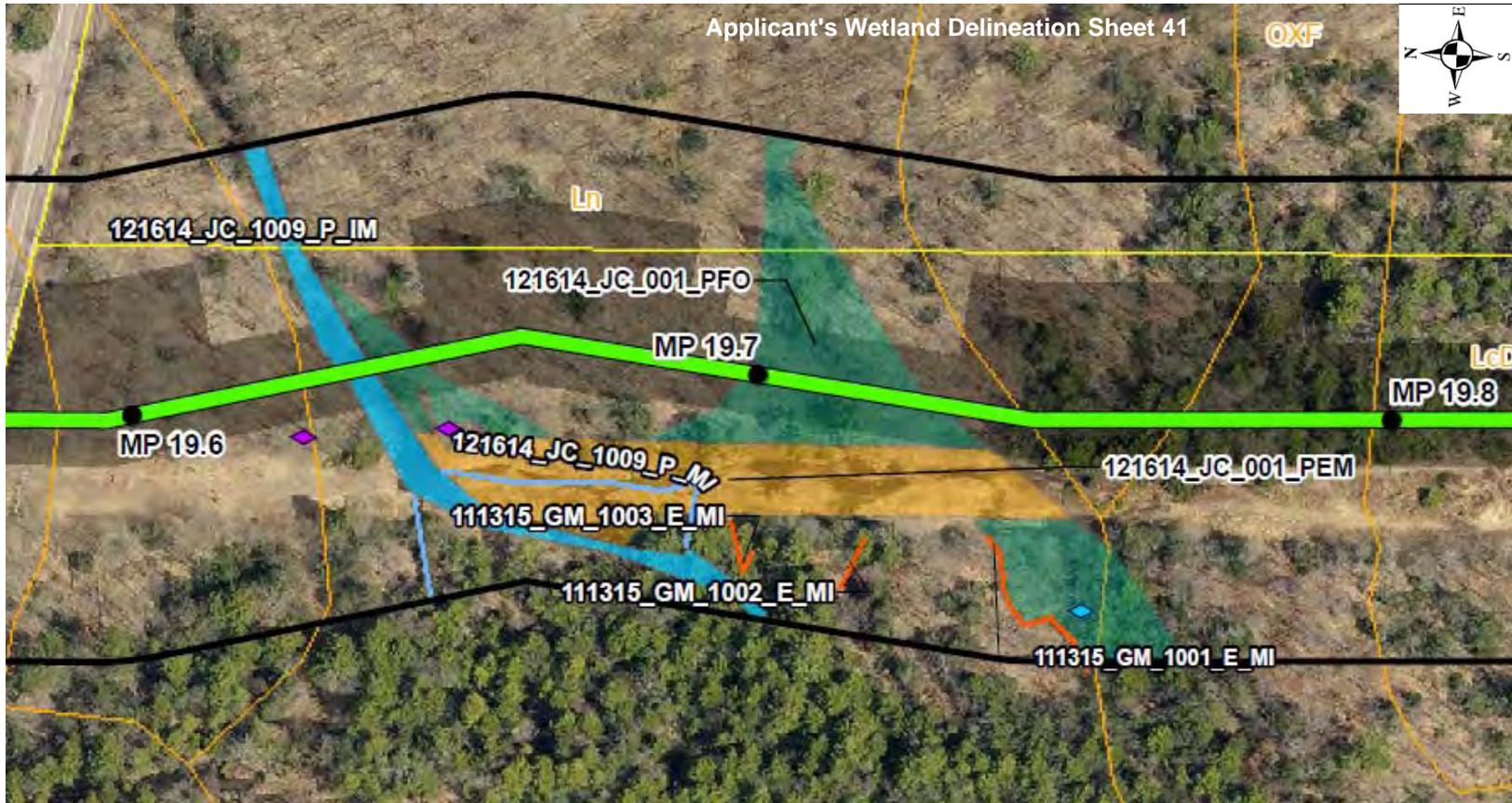
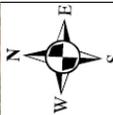
NLT "Bear Creek Preserve" |
| <input checked="" type="checkbox"/> (3) Maintains natural drainage characteristics,
sedimentation patterns, salinity distribution,
flushing characteristics, natural water filtration processes,
current patterns or other environmental characteristics. | |
| <input checked="" type="checkbox"/> (4) Shields other areas from wave action, erosion, or storm damage. | Shades Ck. |
| <input checked="" type="checkbox"/> (5) Serves as a storage area for storm and flood waters. | Shades Ck. |
| <input checked="" type="checkbox"/> (6) Provides a groundwater discharge area
that maintains minimum baseflows. |
Shades Ck. |
| (7) Serves as a prime natural recharge area where surface water
and groundwater are directly interconnected. | |
| <input checked="" type="checkbox"/> (8) Prevents pollution. | |
| <input checked="" type="checkbox"/> (9) Provides recreation. |
NLT "Bear Creek Preserve" |

Each of these functions will be diminished by the temporary disturbance of 0.34 acre of forested Exceptional Value Wetlands, by the permanent disturbance of 0.24 acre of forested Exceptional Value Wetlands, and by the permanent conversion/maintenance of 0.14 acre of forested Exceptional Value Wetlands to herbaceous wetlands.

AREA B

Applicant's Wetland Delineation Sheet 41

OXF



Applicant's E&S Drawing 40

Area C Laurel Run/Hawk Run, Kidder Township, Carbon County

Facts:

- between MP 30.8 and 31.2
- Applicant's 1/5/2016 Wetland Sheet 64, Applicant's 02/2016 E&S Dwgs 62-63
- north of Route 534
- within Hickory Run State Park
- delineated streams in wetland in ROW are headwaters of Laurel Run (to the east) and Hawk Run (to the west) - both designated HQ-CWF
 - Hawk Run is a designated Class A Wild Trout Stream
 - Laurel Run is a designated Wild Trout Stream (naturally reproducing wild trout)
 - very large delineated PFO wetland (7.97 ac) EV
 - PEM wetland in existing pipeline ROW (1.16 ac) EV

Wetlands identified in Study Area by applicant:

042415-JC-1001-PFO **7.97** ac. per delin. table; **12.26** ac. per impact table

042415-JC-1002-PEM **1.16** ac. per delin. table; **1.09** ac. per impact table

Total reported wetland disturbance: 2.91 ac.
Perm. ROW wetland disturbance reported: 1.95 ac. (permanent ROW apparently 50' wide)
Conversion PFO to PEM reported: 1.17 ac.

Observations:

There are discrepancies in the acreage of the two wetlands between that reported in the Study Area per the wetland Delineation table and per the wetland Impact table --- a very significant discrepancy for the PFO wetland (7.97 acres vs 12.26 acres, although they look to be the same size and configuration on the Delineation drawing and the E&S drawing). Both the PFO and PEM wetlands are acknowledged by the applicant to be Exceptional Value Wetlands.

The construction corridor/LOD is proposed to be reduced to 50 feet in width where it crosses the wetlands and stream here (elsewhere nearby it is 100+ feet in width).

The wetland delineation extends only 100' (to the east) and 125' (to the west) of the limit of disturbance (total Study Area corridor is less than 300 feet wide).

Two wetland crossing impacts are identified on the drawings - one of the PFO wetland, and one of the PEM wetland. Both of them are acknowledged as being Exceptional Value Wetland impacts.

The large wetland complex that encompasses the pipeline construction corridor here actually may be considerably larger, based on mapped hydric soils which continue about 0.75 mile to the north beyond the delineated limit of this wetland. Also, there are areas of soft mucky substrate in the wetland in the existing ROW, and in nearby woods, which appear to consist of bog turtle habitat.

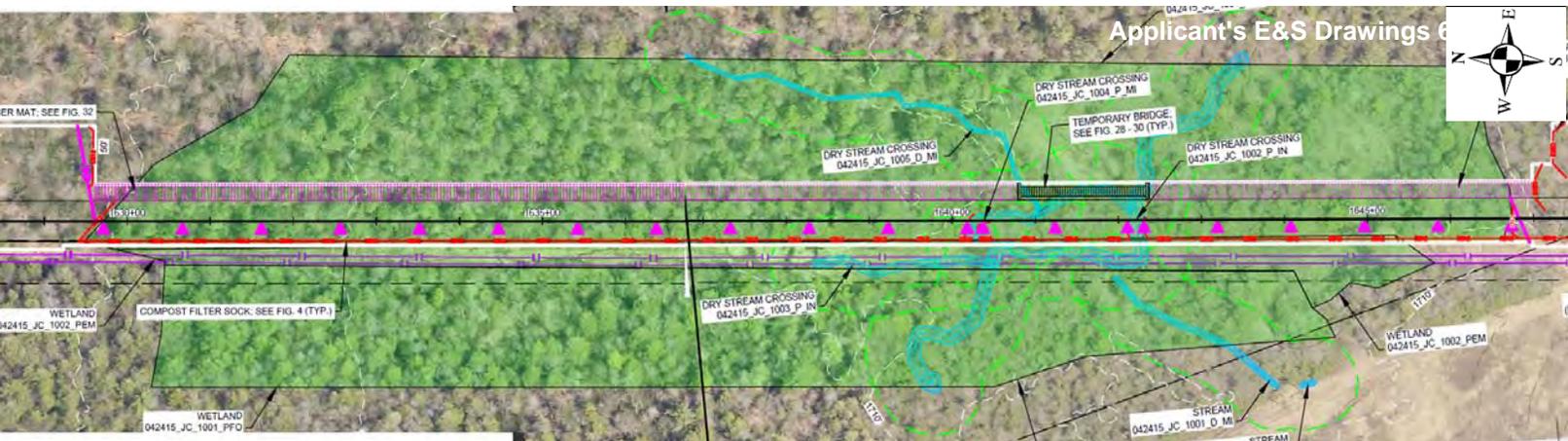
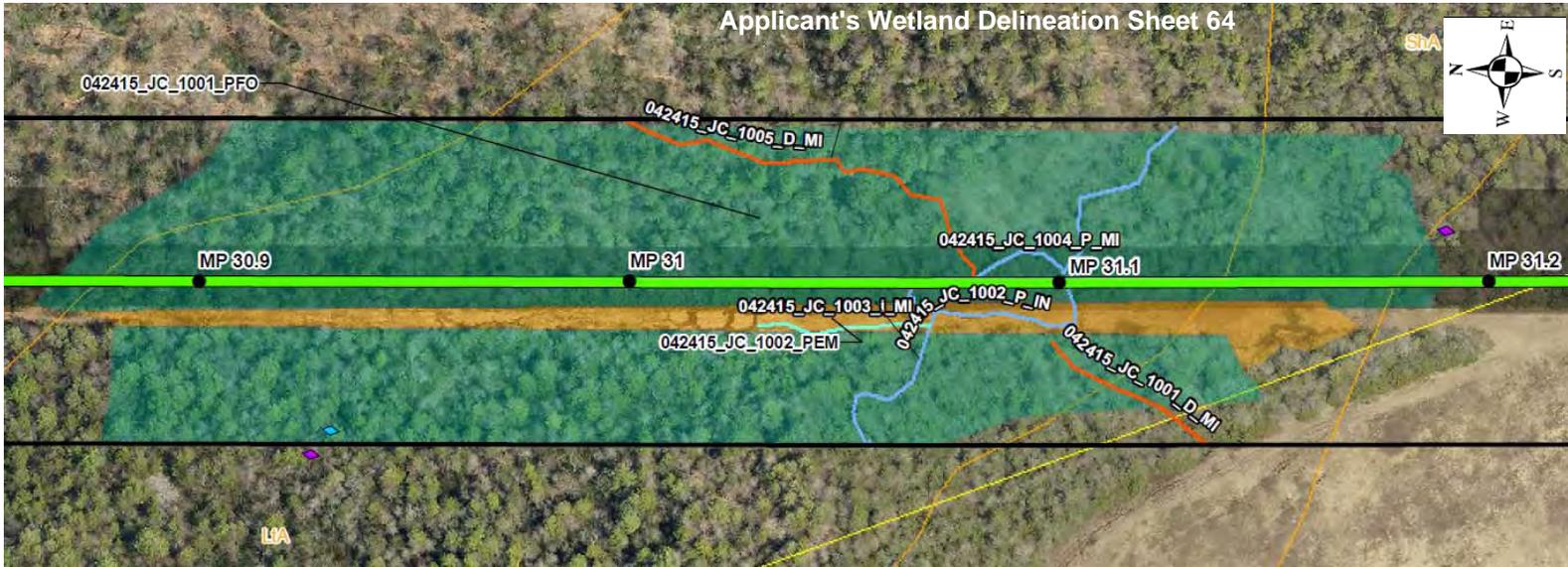
Area C

Wetland Functions:

- | | |
|--|---------------------|
| <input checked="" type="checkbox"/> (1) Serves natural biological functions
- food chain production
- general habitat
- nesting, spawning, rearing, and resting sites
for aquatic or land species. | Laurel Run/Hawk Run |
| <input checked="" type="checkbox"/> (2) Provides areas for study of the environment
or as sanctuaries or refuges. | Hickory Run SP |
| <input checked="" type="checkbox"/> (3) Maintains natural drainage characteristics,
sedimentation patterns, salinity distribution,
flushing characteristics, natural water filtration processes,
current patterns or other environmental characteristics. | |
| <input checked="" type="checkbox"/> (4) Shields other areas from wave action, erosion, or storm damage. | Laurel Run/Hawk Run |
| <input checked="" type="checkbox"/> (5) Serves as a storage area for storm and flood waters. | Laurel Run/Hawk Run |
| <input checked="" type="checkbox"/> (6) Provides a groundwater discharge area
that maintains minimum baseflows. | Laurel Run/Hawk Run |
| (7) Serves as a prime natural recharge area where surface water
and groundwater are directly interconnected. | |
| <input checked="" type="checkbox"/> (8) Prevents pollution. | |
| <input checked="" type="checkbox"/> (9) Provides recreation. | Hickory Run SP |

Each of these functions will be diminished by the temporary disturbance of 2.91 acres of forested Exceptional Value Wetlands, by the permanent disturbance of 1.95 acres of forested Exceptional Value Wetlands, and by the permanent conversion/maintenance of 1.17 acres of forested Exceptional Value Wetlands to herbaceous wetlands.

AREA C



Area D Mud Run, Penn Forest Township, Carbon County

Facts:

- MP 33.1
- Applicant's 1/5/2016 Wetland Sheet 68, Applicant's 02/2016 E&S Dwg 67
- north of Route 903, near Weiler Road
- within Hickory Run State Park
- Mud Run (HQ-CWF) is designated Wild Trout Stream (naturally reproducing wild trout)
- UNT to Mud Run delineated just south of Mud Run does not appear to be a wild trout water.
- PSS wetland is delineated along UNT to Mud Run (0.26 ac), listed as EV

Wetlands identified in Study Area by applicant:

042115-JC-1001-PSS 0.26 ac. per delin. table; 0.24 ac. per impact table

Total reported wetland disturbance: 0.02 ac.
Perm. ROW wetland disturbance reported: 0.01 ac.
Conversion PSS to PEM reported: 0.00 ac.

Observations:

The PSS wetland appears to be accurately delineated and is identified as being to an Exceptional Value Wetland.

No other wetlands are apparent along either side of Mud Run here.

Several ephemeral streams or ditches were delineated along the slope between Route 903 and Mud Run - none of them appears to be associated with Exceptional Value Wetlands.

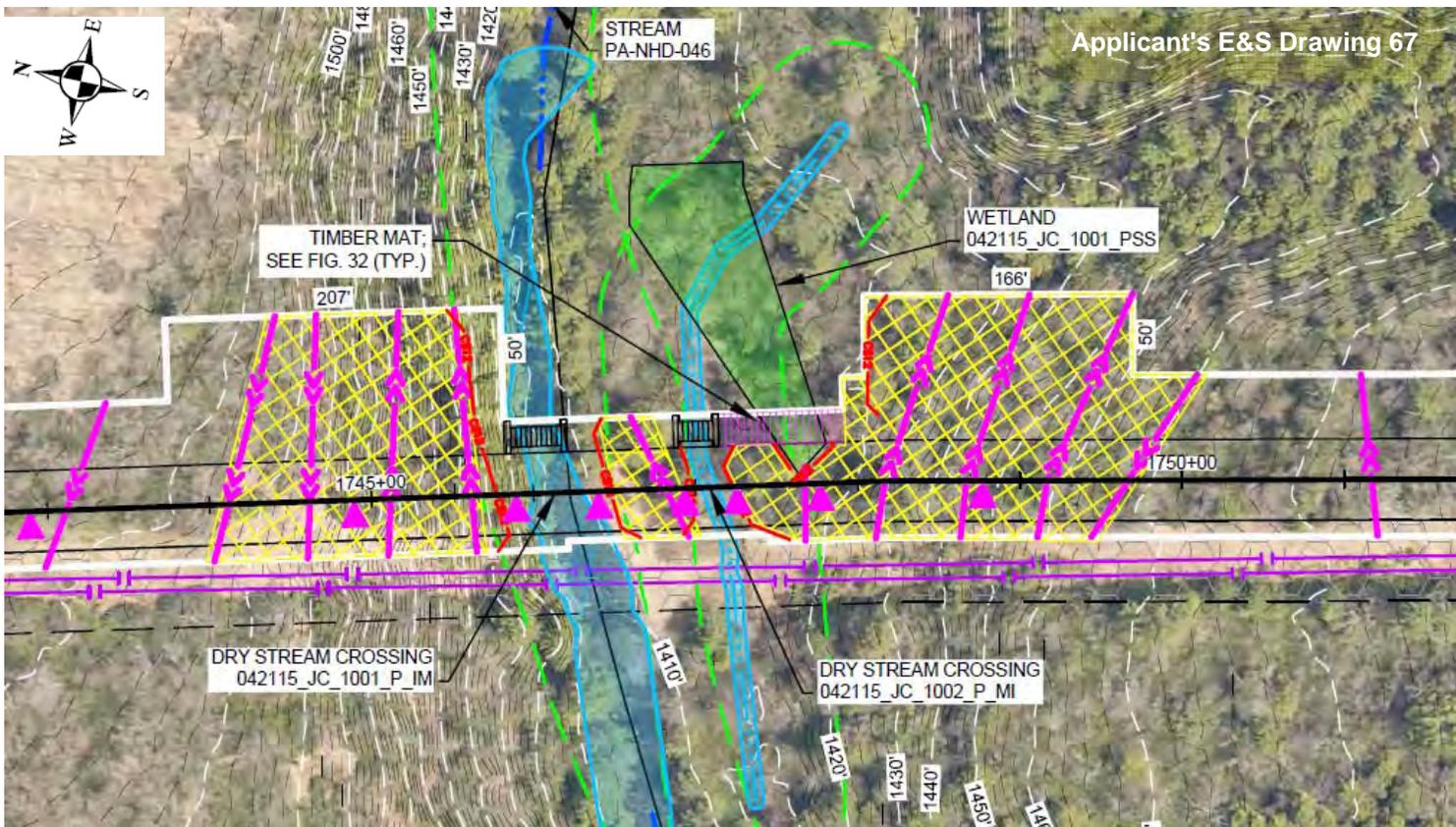
Area D

Wetland Functions:

- | | Related info: |
|---|----------------------|
| <input checked="" type="checkbox"/> (1) Serves natural biological functions
- food chain production
- general habitat
- nesting, spawning, rearing, and resting sites for aquatic or land species. | Mud Run |
| <input checked="" type="checkbox"/> (2) Provides areas for study of the environment or as sanctuaries or refuges. | Hickory Run SP |
| <input checked="" type="checkbox"/> (3) Maintains natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, natural water filtration processes, current patterns or other environmental characteristics. | |
| <input checked="" type="checkbox"/> (4) Shields other areas from wave action, erosion, or storm damage. | Mud Run |
| <input checked="" type="checkbox"/> (5) Serves as a storage area for storm and flood waters. | Mud Run |
| <input checked="" type="checkbox"/> (6) Provides a groundwater discharge area that maintains minimum baseflows. | Mud Run |
| (7) Serves as a prime natural recharge area where surface water and groundwater are directly interconnected. | |
| <input checked="" type="checkbox"/> (8) Prevents pollution. | |
| <input checked="" type="checkbox"/> (9) Provides recreation. | Hickory Run SP |

Each of these functions will be diminished by the temporary disturbance of 0.02 acre of scrub Exceptional Value Wetlands, and by the permanent disturbance of 0.01 acre of scrub Exceptional Value Wetlands.

AREA D



Area E Stony Creek, Penn Forest Township, Carbon County

Facts:

- MP 34.4 to 34.7
- Applicant's 1/5/2016 Wetland Sheet 71, Applicant's 02/2016 E&S Dwg 70
- near Route 903, just east of N. Sycamore Drive
- within Hickory Run State Park
- Stony Creek is designated EV
- Stony Creek is designated Wild Trout Stream (naturally reproducing wild trout)
- another stream delineated (UNT to Stony Creek) also appears to be EV
- large PFO wetland (9.07 ac) listed as EV
- two PEM wetlands identified in this vicinity (0.63 ac, 0.10 ac) both listed EV

Wetlands identified in Study Area by applicant:

042315-JC-1001-PFO **9.07** ac. per delin. table; **16.31** ac. per impact table
042315-JC-1002-PEM **0.63** ac. per delin. table; **0.26** ac. per impact table
042315-JC-1003-PEM 0.10 ac. per delin. table (no impact proposed)

Total reported wetland disturbance: 3.09 ac.
Perm. ROW wetland disturbance reported: 2.01 ac.
Conversion PFO to PEM reported: 0.70 ac.

Observations:

This wetland crossing is one of the longest (1,810 linear feet, counting both the PFO and the PEM) of Exceptional Value Wetlands along the Pennsylvania section of the proposed PennEast Pipeline route. This crossing also is one of the largest in terms of wetland acreage affected (3.09 acres). These wetlands are acknowledged by the applicant to be Exceptional Value Wetlands (per Chapter 105); thus they also are EV Waters (per Chapter 93). For two of the wetlands in the Study Area (see above) there are significant discrepancies in the applicant's reported acreage between the wetland Delineation table and the wetland Impact table --- a discrepancy of more than 7 acres for the PFO wetland.

The wetlands here appear to be of very high quality (see Figure 2) and are accurately identified as Exceptional Value Wetlands/waters. The wetlands appear to be accurately mapped on the applicant's wetland delineation and E&S drawings. The smaller of the two PEM wetlands is just outside the proposed pipeline construction ROW. The larger PEM wetland and the nearby sections of the wooded (PFO) wetland appear to have soft mucky areas suitable as bog turtle habitat.

The wetland crossing here is almost entirely wooded. The applicant's estimate of 0.70 acre of conversion of PFO to PEM wetlands appears too low; it appears to assume a permanently cleared corridor 18 feet wide, but elsewhere that corridor is proposed to be 30 feet wide. Using 30 feet, the conversion would be 1.19 acres.

Stony Creek is both a designated EV Water and a Wild Trout Stream. It and its associated Exceptional Value Wetlands will be impacted by the proposed pipeline crossing.

The UNT to Stony Creek also is an EV Water. It and its associated Exceptional Value Wetlands also will be impacted.

Impact avoidance/minimization by rerouting or use of HDD are not proposed or discussed.

Area E

Wetland Functions:

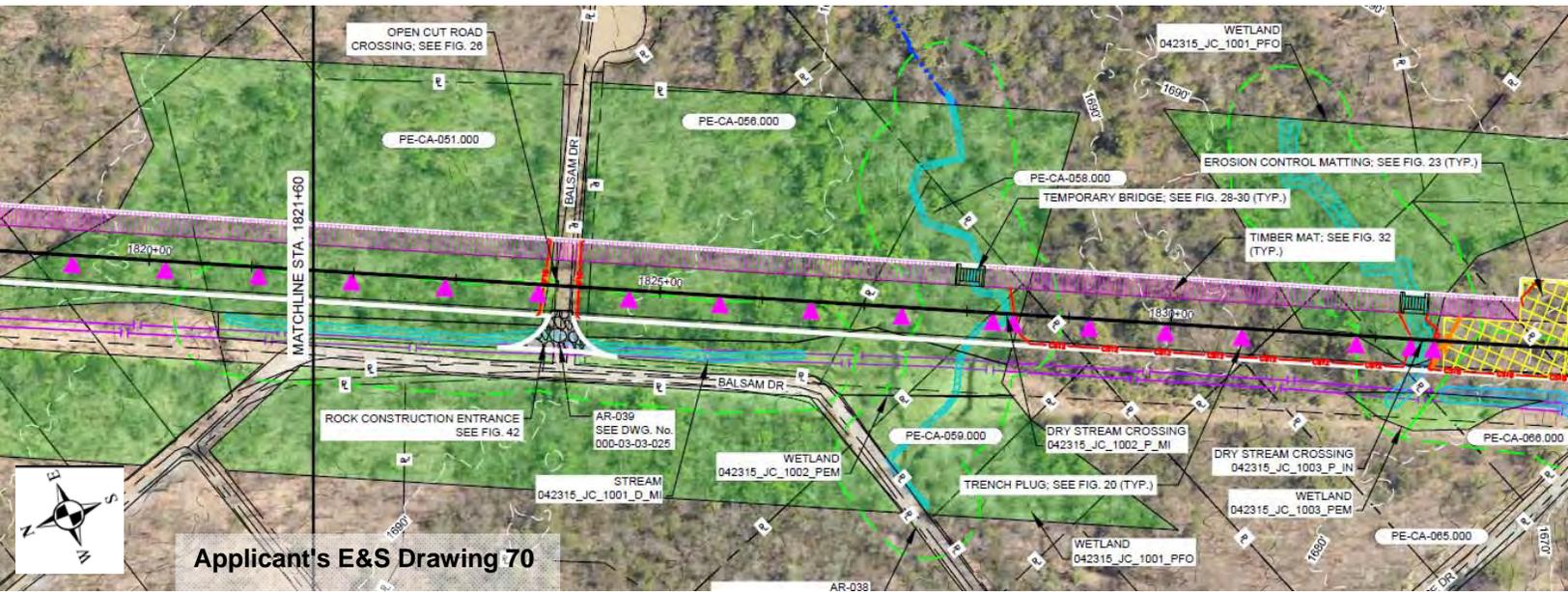
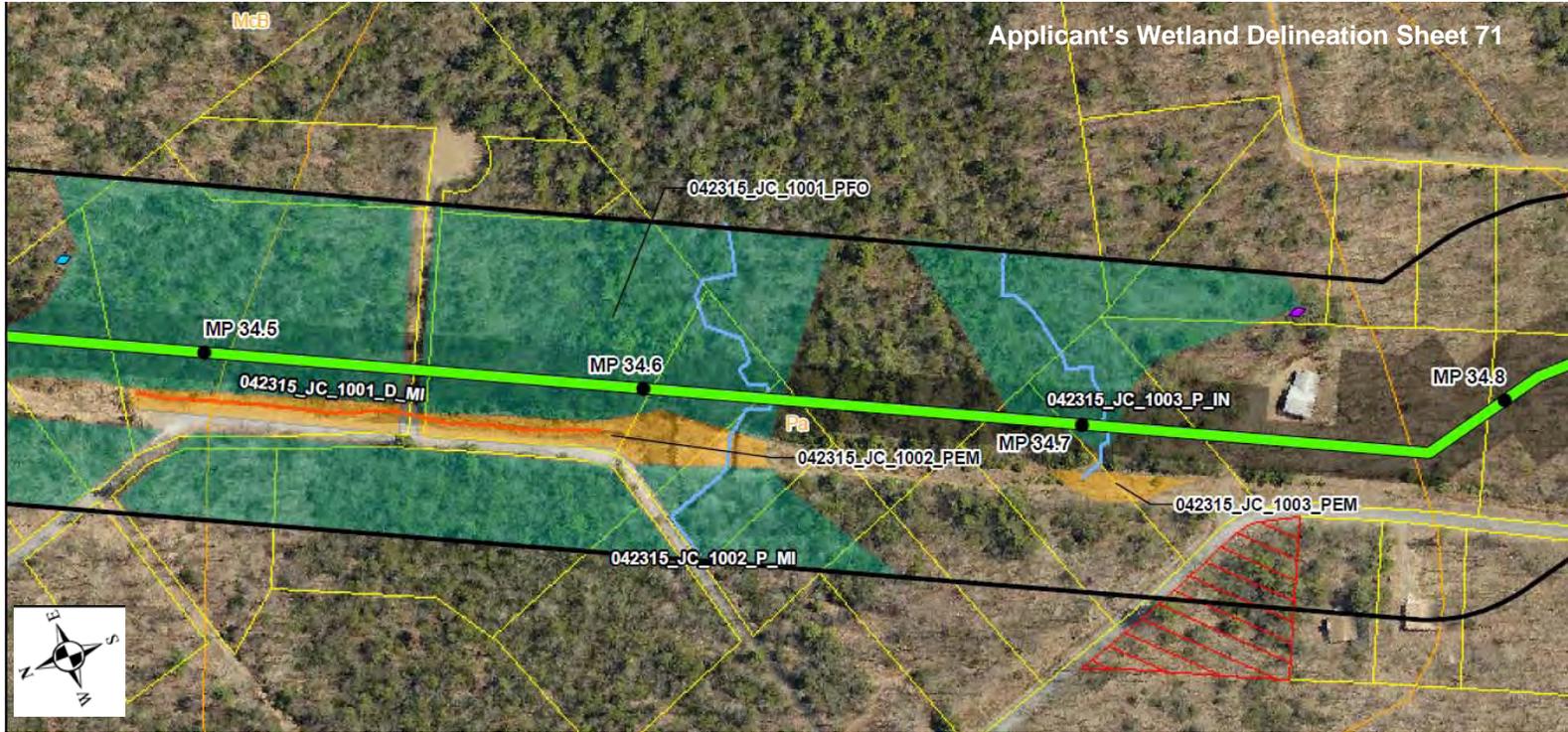
- | | |
|--|---|
| <input checked="" type="checkbox"/> (1) Serves natural biological functions
- food chain production
- general habitat
- nesting, spawning, rearing, and resting sites
for aquatic or land species. | Related info:

Stony Creek |
| <input checked="" type="checkbox"/> (2) Provides areas for study of the environment
or as sanctuaries or refuges. |

Hickory Run SP |
| <input checked="" type="checkbox"/> (3) Maintains natural drainage characteristics,
sedimentation patterns, salinity distribution,
flushing characteristics, natural water filtration processes,
current patterns or other environmental characteristics. | |
| <input checked="" type="checkbox"/> (4) Shields other areas from wave action, erosion, or storm damage. | Stony Creek |
| <input checked="" type="checkbox"/> (5) Serves as a storage area for storm and flood waters. | Stony Creek |
| <input checked="" type="checkbox"/> (6) Provides a groundwater discharge area
that maintains minimum baseflows. | Stony Creek |
| (7) Serves as a prime natural recharge area where surface water
and groundwater are directly interconnected. | |
| <input checked="" type="checkbox"/> (8) Prevents pollution. | |
| <input checked="" type="checkbox"/> (9) Provides recreation. | Hickory Run SP |

Each of these functions will be diminished by the temporary disturbance of 3.09 acres of Exceptional Value Wetlands, by the permanent disturbance of 2.01 acres of Exceptional Value Wetlands, and by the permanent conversion/maintenance of 1.19 acres of forested Exceptional Value Wetlands to herbaceous wetlands.

AREA E



Area F Yellow Run, Penn Forest Township, Carbon County

Facts:

- MP 36.1
- Applicant's 1/5/2016 Wetland Sheet 73, Applicant's 02/2016 E&S Dwg 73
- just southeast of Hickory Run Service Plaza of PA TPK (but on the opposite side of PA TPK)
- Yellow Run is designated EV (not shown on all PennEast maps)
- Yellow Run also is designated Wild Trout Stream (naturally reproducing wild trout)
- small PFO wetland shown (per NWI) in construction ROW

Wetlands delineated in Study Area by applicant:

None.

Total reported wetland disturbance: None

Observations:

No wetland or waterway impacts are delineated here because access was not granted to the applicant. As depicted on its drawings, the NWI-mapped wetland will be impacted by a crossing approximately 130 feet long and 25 feet wide (0.07 ac.), although even this impact has not been calculated or added to the acknowledged impact totals. In fact, the wetland here is significantly larger than what is shown on the NWI map. The PFO wetland shown on the applicant's drawings is actually just the tiny edge of a very large (60 acres) NWI-mapped wetland, which itself is enveloped by an even larger area of mapped hydric soils (see Figure 1). The EV stream Yellow Run flows through the wetland to the east of the pipeline crossing, flows across the existing ROW, and continues westward. The wetlands at this crossing thus would be Exceptional Value Wetlands.

Based on our field inspection, we estimate that the existing wetland complex extends approximately 900 feet in total length along the (assumed) 75-foot wide construction corridor here. Thus, the apparent but unacknowledged Exceptional Value Wetland impact here is approximately 1.5 acres (900' x 75') with 1.03 acres of permanent disturbance (900' x 50') and 0.31 acre of conversion of woody to herbaceous wetland (900' x 30' x .5).

The Limit of Disturbance (LOD) shown on the E&S drawing is 75 feet wide where it crosses the NWI wetland, but then expands to as much as 150 feet in width in the adjacent "uplands". Once the wetland here has been accurately field-delineated, the width of the LOD will need to be adjusted accordingly; otherwise the impacts will be even more extensive than what we estimate based on a 75-foot wide LOD.

Area F

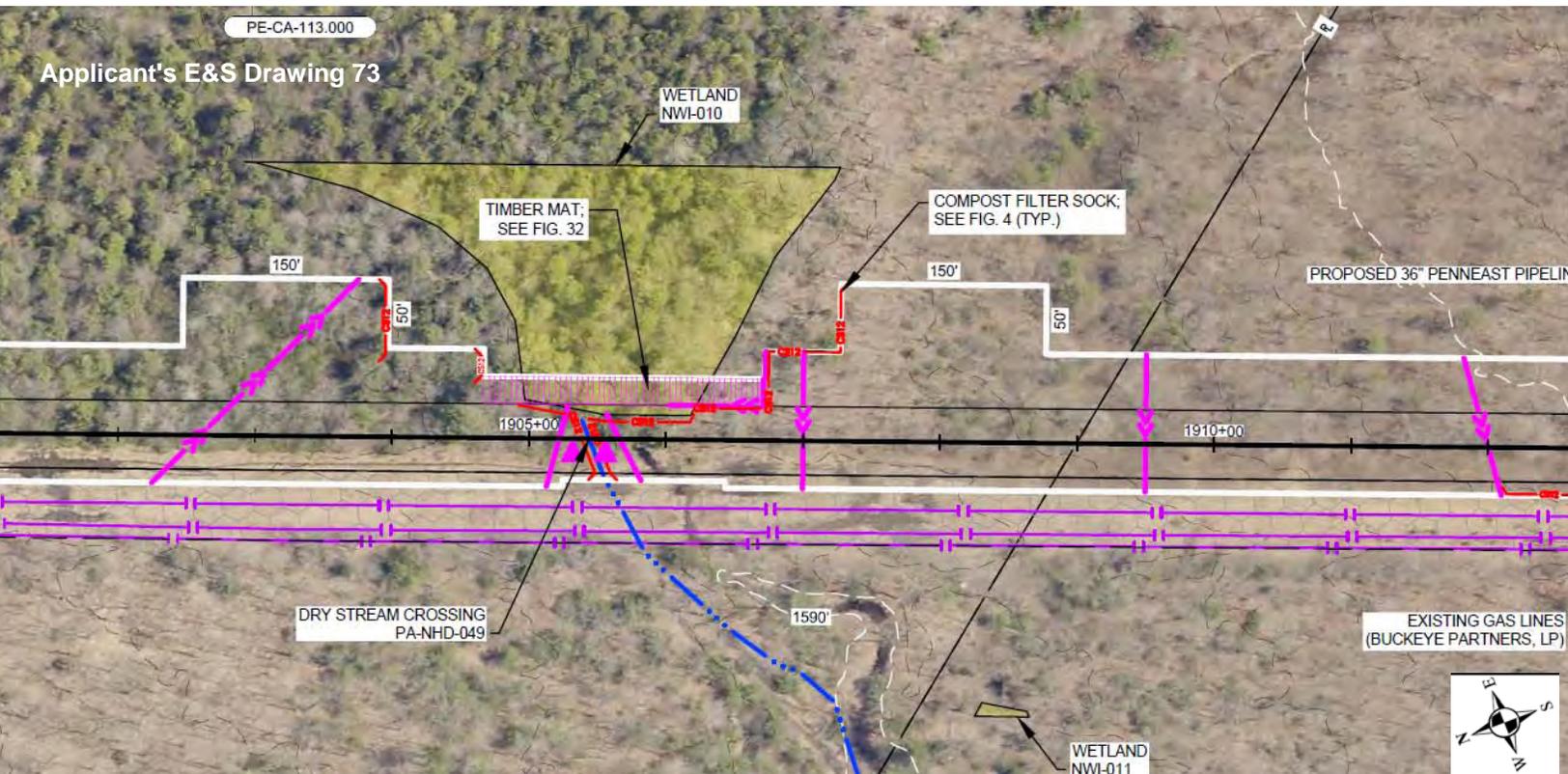
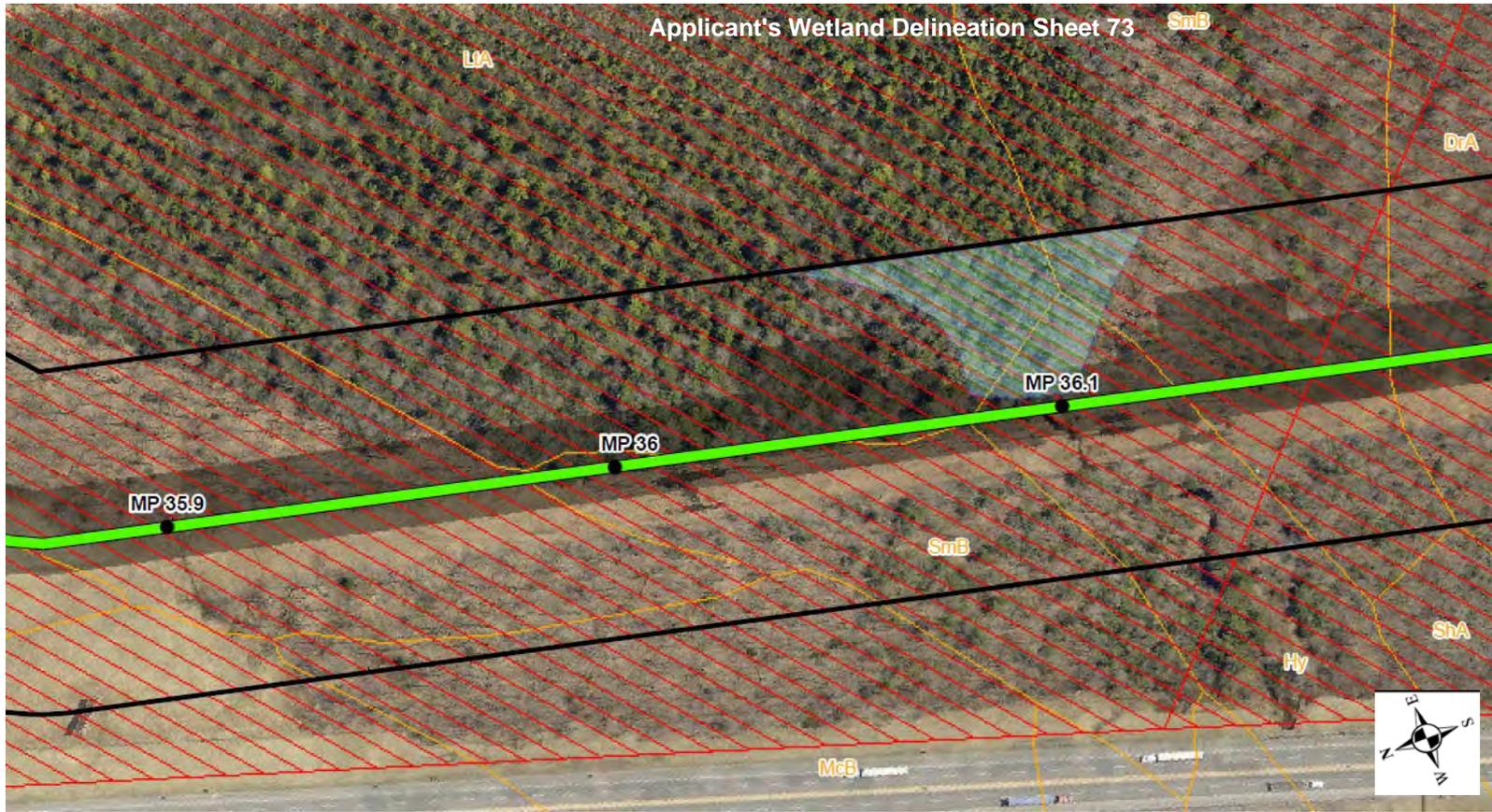
Wetland Functions:

- | | |
|--|------------|
| <input checked="" type="checkbox"/> (1) Serves natural biological functions
- food chain production
- general habitat
- nesting, spawning, rearing, and resting sites for aquatic or land species.
(2) Provides areas for study of the environment or as sanctuaries or refuges. | |
| <input checked="" type="checkbox"/> (3) Maintains natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, natural water filtration processes, current patterns or other environmental characteristics. | |
| <input checked="" type="checkbox"/> (4) Shields other areas from wave action, erosion, or storm damage. | Yellow Run |
| <input checked="" type="checkbox"/> (5) Serves as a storage area for storm and flood waters. | Yellow Run |
| <input checked="" type="checkbox"/> (6) Provides a groundwater discharge area that maintains minimum baseflows. | Yellow Run |
| (7) Serves as a prime natural recharge area where surface water and groundwater are directly interconnected. | |
| <input checked="" type="checkbox"/> (8) Prevents pollution. | |
| (9) Provides recreation. | |

Each of these functions will be diminished by the temporary disturbance of 1.5 acres of Exceptional Value Wetlands, by the permanent disturbance of 1.03 acres of Exceptional Value Wetlands, and by the permanent conversion/maintenance of 0.31* acre of forested Exceptional Value Wetlands to herbaceous wetlands.

* It appears that about half of the pipeline corridor may be herbaceous wetland now.

AREA F



Area G Trib. to Yellow Run, Penn Forest Township, Carbon County

Facts:

- MP 36.5
- Applicant's 1/5/2016 Wetland Sheet 74, Applicant's 02/2016 E&S Dwg 74
- just southeast of Hickory Run Service Plaza of PA TPK
- within Weiser State Forest; all streams nearby are EV
- two very small PFO wetlands (per wetland map), but one large PFO wetland (per E&S plan map)

Wetlands identified in Study Area by applicant

050615-JC-1001-PFO **4.84** ac. per delin. table; **0.65** ac. per impact table.

050615-JC-1002-PFO **Not identified** in delin. table; **0.32** ac. per impact table.

Total reported wetland disturbance: 0.30 ac.
Perm. ROW wetland disturbance reported: 0.20 ac.
Conversion PFO to PEM reported: 0.12 ac.

Observations:

There are significant discrepancies in the reported acreage and the mapped extent of the wetlands at this location (see Figure 3). Consequently, there are significant under-calculations of the proposed wetland impacts.

The wetland Impact table identifies two separate PFO wetlands in the Study Area here: 050615-JC-1002-PFO listed as "EV" and 050615-JC-1001-PFO listed as "other". The wetland delineation map likewise shows two small PFO wetlands that appear to match those reported sizes. The table that accompanies the wetland delineation report, however, identifies only one wetland (050615-JC-1001-PFO), reports its size as 4.84 acres within the Study Area, and classifies it as "other". The E&S drawing shows one large PFO wetland here (the two small ones connected and greatly expanded in size to the south), although it maintains the two separate numbers as on the wetland map. The 4.84 acres reported in the delineation report appear to correspond with this much larger wetland. These are very serious and significant discrepancies.

The wetland Impact table reports a crossing length of 33 feet for the smaller wetland, which appears to be accurate.

For the larger wetland (050615-JC-1001-PFO) the wetland Impact table reports a crossing length of 136 feet, which is not consistent with what is shown on the E&S plan --- that plan depicts a 1,000-foot long wetland crossing. A much longer crossing impact is consistent with the NWI map, which shows a 17-acre PFO wetland here which would be crossed by 1,000 feet of proposed pipeline (if the extent of mapped hydric soil here was an accurate depiction of the wetland's size, the pipeline would cross about 1,700 linear feet of wetland). The temporary wetland disturbance in the construction ROW reported as 8,948 square feet actually should be about 75,000 square feet (1,000' x 75'), or 1.72 acres. The reported permanent wetland impact in the ROW of 6,416 square feet actually should be about 50,000 square feet (1,000' x 50'), or 1.15 acres. The reported conversion of forest to herbaceous wetland (3,977 square feet) actually should be about 30,000 square feet (1,000' x 30'), or 0.69 acre.

This large wetland impact should be reported as an Exceptional Value Wetland impact, inasmuch as the wetlands are directly associated with and within 50 feet of waterbodies flowing to Yellow Run, which has a basin-wide designation of EV.

Area G

Wetland Functions:

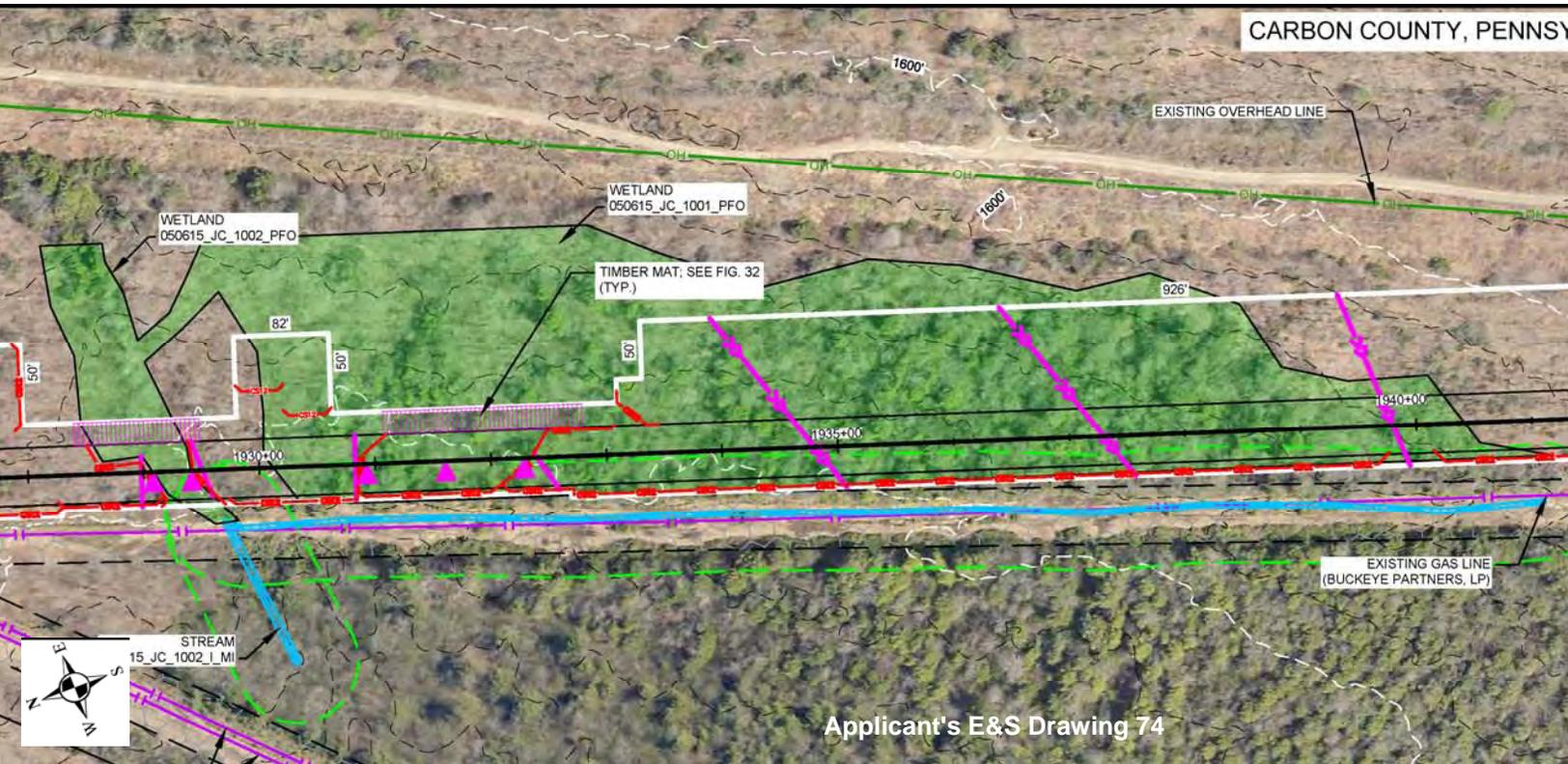
- | | |
|--|--|
| <input checked="" type="checkbox"/> (1) Serves natural biological functions
- food chain production
- general habitat
- nesting, spawning, rearing, and resting sites
for aquatic or land species. | Related info:

Yellow Run |
| <input checked="" type="checkbox"/> (2) Provides areas for study of the environment
or as sanctuaries or refuges. |

Weiser State Forest |
| <input checked="" type="checkbox"/> (3) Maintains natural drainage characteristics,
sedimentation patterns, salinity distribution,
flushing characteristics, natural water filtration processes,
current patterns or other environmental characteristics. | |
| <input checked="" type="checkbox"/> (4) Shields other areas from wave action, erosion, or storm damage. | Yellow Run |
| <input checked="" type="checkbox"/> (5) Serves as a storage area for storm and flood waters. | Yellow Run |
| <input checked="" type="checkbox"/> (6) Provides a groundwater discharge area
that maintains minimum baseflows. |
Yellow Run |
| (7) Serves as a prime natural recharge area where surface water
and groundwater are directly interconnected. | |
| <input checked="" type="checkbox"/> (8) Prevents pollution. | |
| <input checked="" type="checkbox"/> (9) Provides recreation. |
Weiser State Forest |

Each of these functions will be diminished by the temporary disturbance of 1.72 acres of Exceptional Value Wetlands, by the permanent disturbance of 1.15 acres of Exceptional Value Wetlands, and by the permanent conversion/maintenance of 0.69 acre of forested Exceptional Value Wetlands to herbaceous wetlands.

AREA G



Area H Wild Creek, Towamensing Township, Carbon County

Facts:

- between MP 43.5 and 43.6
- Applicant's 1/5/2016 Wetland Sheet 87, Applicant's 02/2016 E&S Dwg 88
- within Beltzville State Park
- Wild Creek is designated EV
- small PEM wetland (0.03 ac) delineated along west side of Creek

Wetlands identified and impacts proposed/acknowledged by applicant:

052215-JC-1001-PEM 0.03 ac. per delin. table.

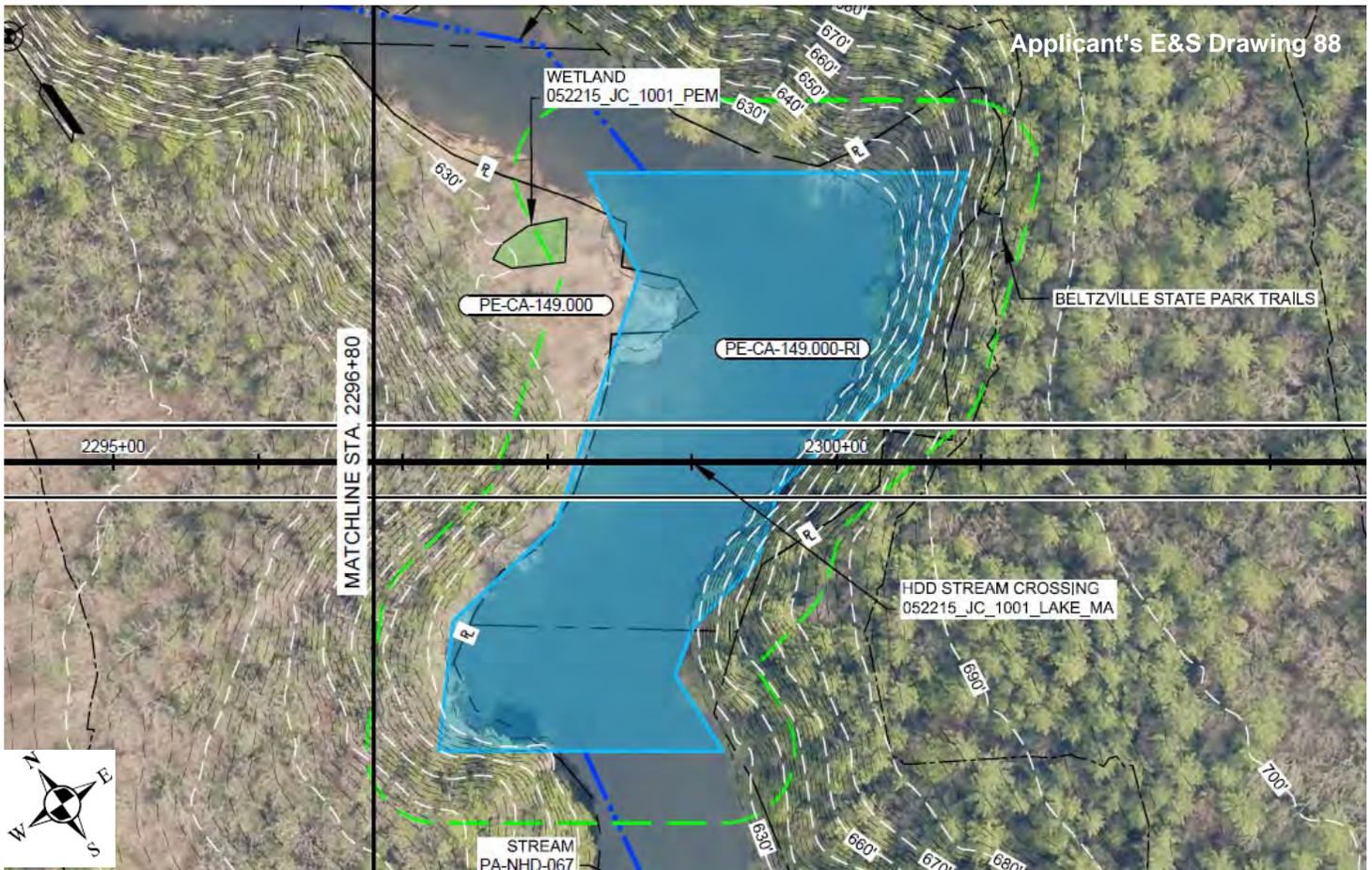
No impact proposed.

Observations:

The PEM wetland should be classified as Exceptional Value Wetland, not "other", because it is within the floodplain of an EV waterbody. There likely will be no impact to this wetland, as reported by the applicant, because the crossing is to be done by HDD and the wetland is outside of the construction corridor of the pipeline.

No loss of wetland functions associated with this crossing.

AREA H



Area I Pohopoco Creek, Towamensing Township, Carbon County

Facts:

- between MP 43.9 and 44.1
- Applicant's W1/5/2016 etland Sheet 88, Applicant's 02/2016 E&S Dwg 88
- within Beltzville State Park, south of a cleared ROW with an underground water tunnel belonging to the Bethlehem Water Authority
- Pohopoco Creek is designated Wild Trout Stream (naturally reproducing wild trout)
- small PFO wetland delineated along west side of Creek (0.09 ac)

Wetlands identified and impacts proposed/acknowledged by applicant:

052215-JC-1002-PFO 0.09 ac. per delin. table.

No impact proposed.

Observations:

The PFO wetland, at least that part of it within the floodplain of the Creek, should be classified as Exceptional Value Wetland and not as "other".

There is a narrow band of additional wetlands along the northern edge of Pohopoco Creek, which are included on the drawings as being part of the Creek itself, but which instead should be identified separately as Exceptional Value Wetlands.

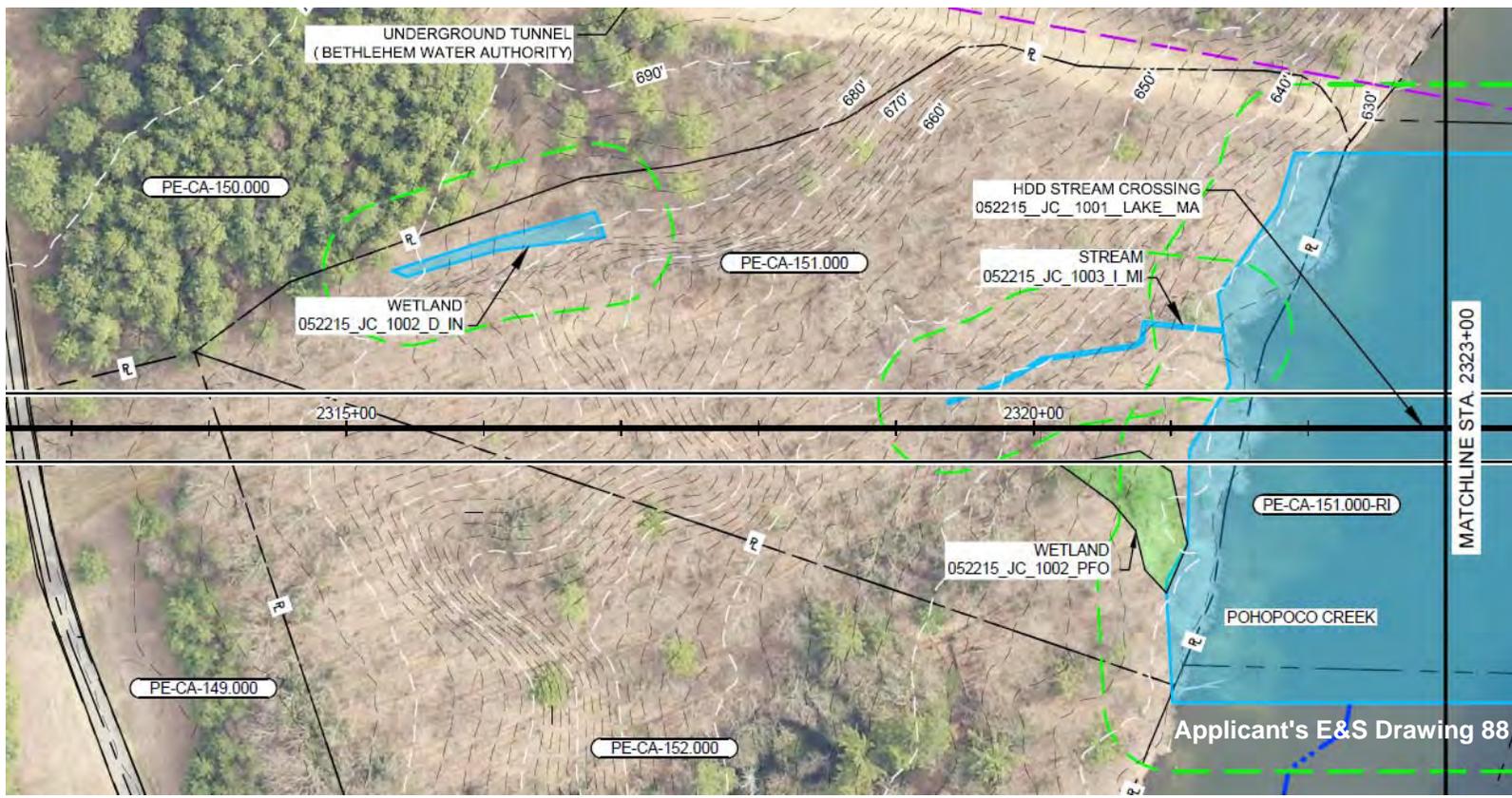
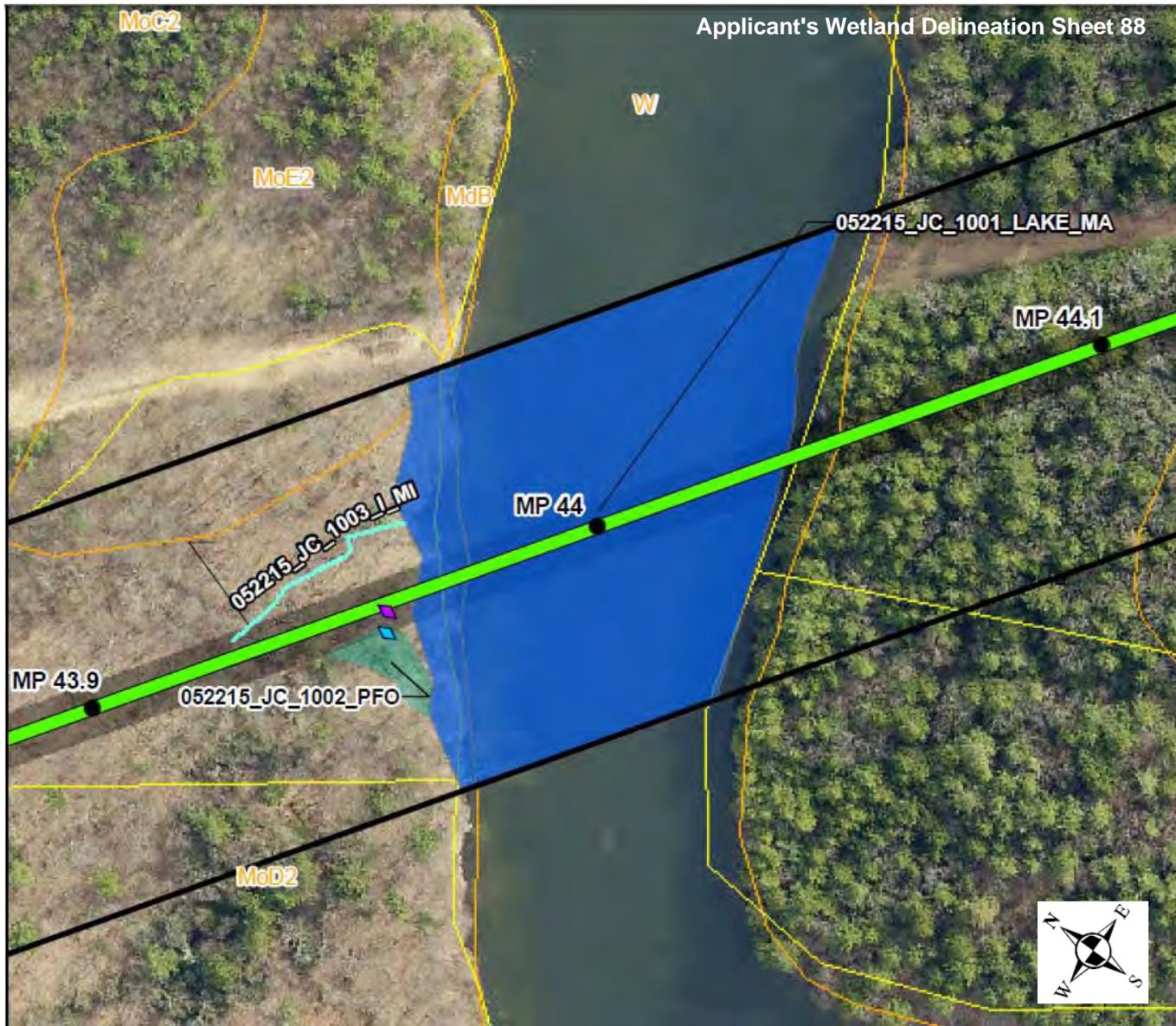
There is a small wetland at the upper end of a small tributary to Pohopoco Creek (which tributary is identified as 052215-JC-1003-I-MI) which has not been acknowledged or delineated. If a permanent ROW is to be cleared and maintained above the proposed pipeline, this wetland will be impacted.

There is a small ephemeral watercourse (delineated as a ditch) to the northwest of Pohopoco Creek (052215-JC-1002-D-IN) which is incorrectly labeled "wetland" on the E&S drawing (#88). It is outside the construction corridor and unlikely to be impacted.

The FERC Application (Resource Report 8, September 2015, page 8-105) mentions a 3-acre bore pad off Penn Forest Road South, between Wild Creek ("H") and Pohopoco Creek ("I"), but no such work area is identified on the "Waterbody Site Specific" drawing nor on the E&S drawings.

No loss of wetland functions associated with this crossing, provided there will be no permanent ROW to be cleared and maintained above the proposed pipeline.

AREA I



Summary of Exceptional Value Wetland Function Impacts
Field-Inspected Areas A through I
(in acres)

Area	Total Disturbance		Permanent Disturbance		Conversion PFO to PEM	
	<u>Applicant</u>	<u>Schmid</u>	<u>Applicant</u>	<u>Schmid</u>	<u>Applicant</u>	<u>Schmid</u>
A	0.00	0.25	0.00	0.10	0.00	0.05
B	0.34	0.34	0.24	0.24	0.14	0.14
C	2.91	2.91	1.95	1.95	1.17	1.17
D	0.02	0.02	0.01	0.01	0.00	0.00
E	3.09	3.09	2.01	2.01	0.70	1.19
F	ND	1.50	ND	1.03	ND	0.31
G	0.30	1.72	0.20	1.15	0.12	0.69
H	0.00	0.00	0.00	0.00	0.00	0.00
I	0.00	0.00	0.00	0.00	0.00	0.00
TOTALS	6.66	9.83 (+3.17)	4.41	6.49 (+2.08)	2.13	3.55 (+1.42)

ND = no delineation

Note: **boldface** indicates a discrepancy between what has been reported/acknowledged by the applicant and Schmid & Company's evaluation.