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

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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	17.19	3.09	0	26.51
	EV	**3.72/4.98****	**15.66/15.87****	**2.76/2.76**	**0/0**	**22.14/23.61****
Permanent ROW wetland Disturbance (acres)	Total	3.13	10.82	2.18	0.01	16.14
	EV	**2.38/3.11****	**9.84/9.99****	**1.95/1.95**	**0/0**	**14.18/15.05****
Conversion of PFO/PSS to PEM (acres)	Total	1.60	5.32	1.01	0	7.93
	EV	**1.28/1.51****	**4.69/4.79****	**0.94/0.94**	**0/0**	**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:

County	Location	Identification Number	Type	Class	Area
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 review[1]. 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 wetlands[2] 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 miles[3] (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.

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[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.

Wetland Delineation Sheets	No-Access Mileposts	No-Access Miles	Discussion
Pipeline ROW			
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	53.55-54.72	1.17	Wild trout waters suggest **likely EV wetland** near MP 54.3
105-106	53.55-53.75		Hydric soils (AnA, AoB, BuB) are along about 1,500 linear feet of proposed pipeline; wetland delineated nearby
106-107	54.10-54.72		Hydric soils (AnA, AoB, BuB) are along about 1,225 linear feet; NWI wetland is near MP 54.3
110-111	55.97-56.76	0.79	Wild trout waters suggest **likely EV wetland** near MP 56.0
110	near 56.00		Hydric soil (BtA) and NWI wetland
111	56.7		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 (Fl) 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:

County	Location	Identification Number	Reason Not "Other"
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

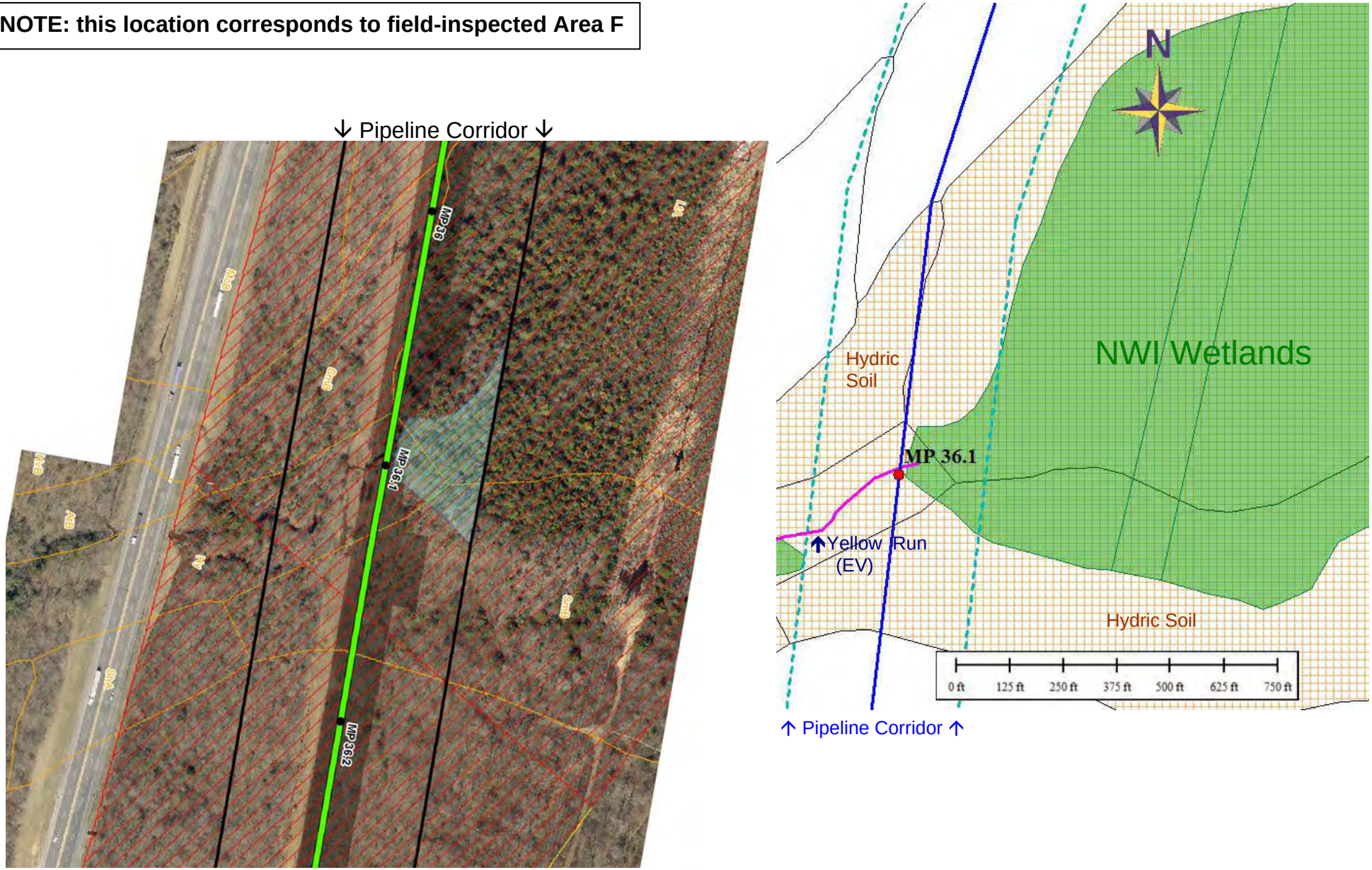

FIGURE 1. Example of wetlands "identified" near Milepost 36.1 of the proposed PennEast pipeline. At left is the applicant's wetland delineation map (Sheet 73) showing the pipeline corridor; only the western tip (light blue) of a very large NWI wetland (green in figure at right) is shown. Red diagonal 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 wide[4] 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 project[5].

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.

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[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".

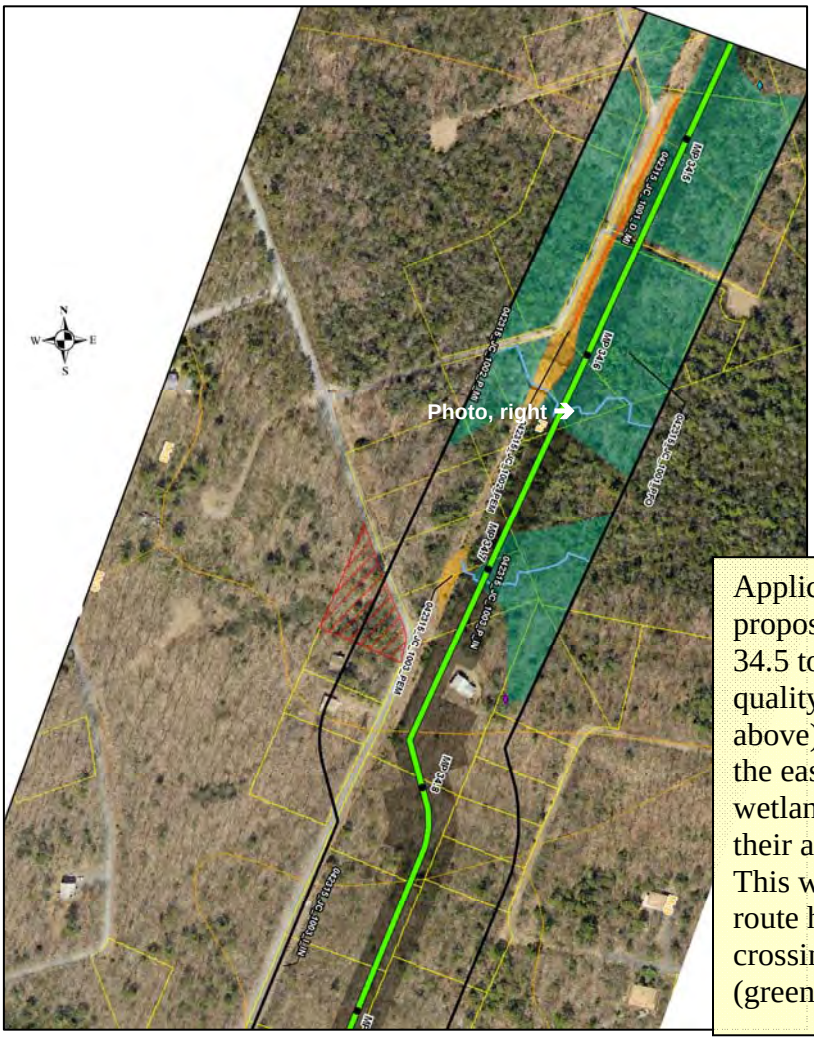
According to the PADEP Water Quality Antidegradation Implementation Guidance (page 60) limited activities that result in temporary and short-term changes in the water quality of Exceptional Value Waters can be allowed, but only if all practical means of minimizing such degradation will be implemented. 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.

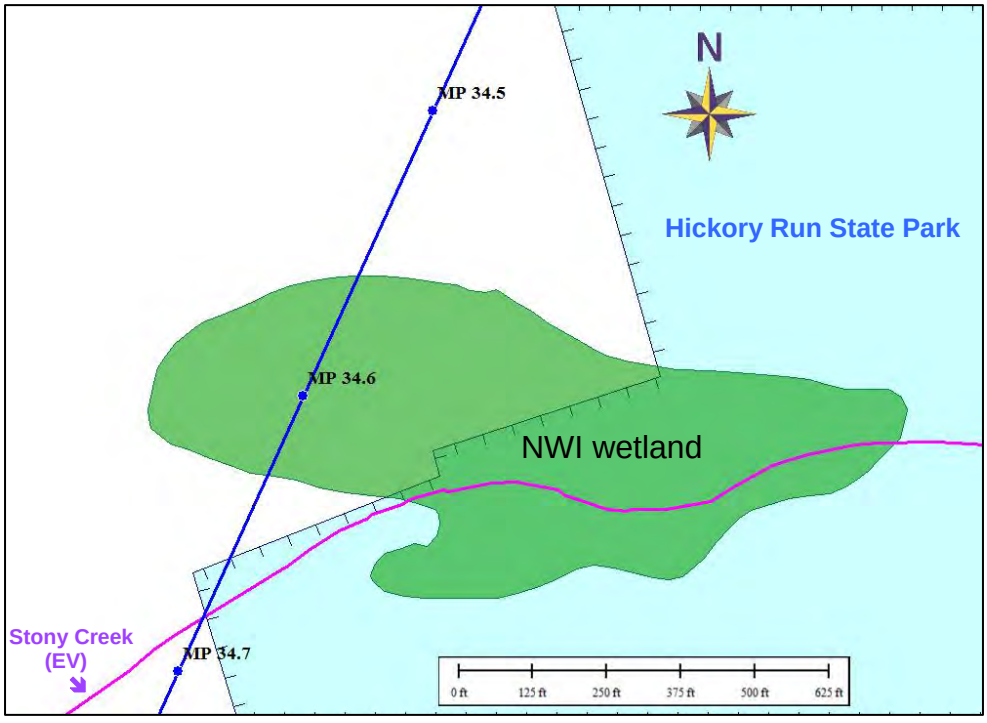
The use of Horizontal Directional Drilling (HDD) is a pipeline installation practice that can avoid or greatly minimize disturbances to sensitive resources on the ground surface by boring beneath them. HDD is proposed in only a few locations along the PennEast pipeline route. Of 100 proposed wetland 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 requested[6] 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 proposing[7].

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 102[8]. 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.

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[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.

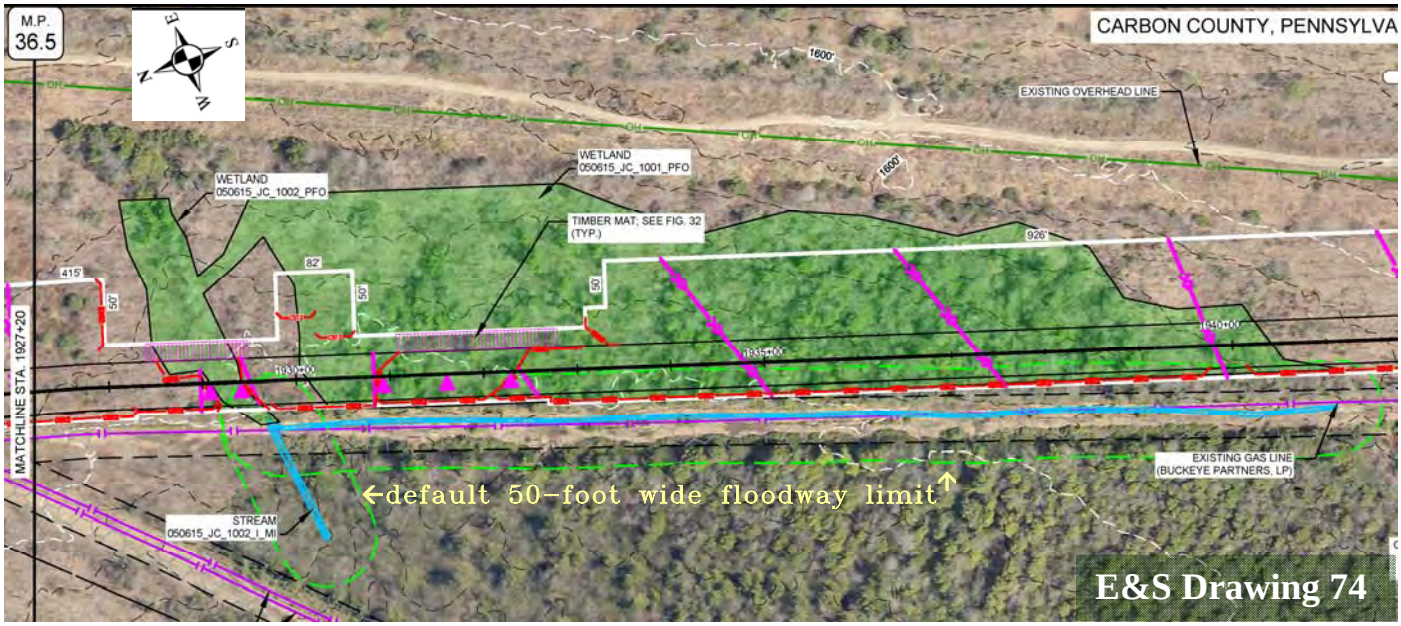
[7] It is unclear how relevant these E&S Plan Drawing Notes are for the PennEast Pipeline inasmuch as it states, on page 2 of 3 in the section entitled "Additional County Conservation District Notes" that "IN THE EVENT OF SINKHOLE DISCOVERY A PROFESSIONAL GEOLOGIST OR ENGINEER WILL BE CONTACTED CONCERNING 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 claims[9]

> *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.

Table 1.5-1
Ecological Functions of Wetlands and Waterbodies along the PennEast Pipeline

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

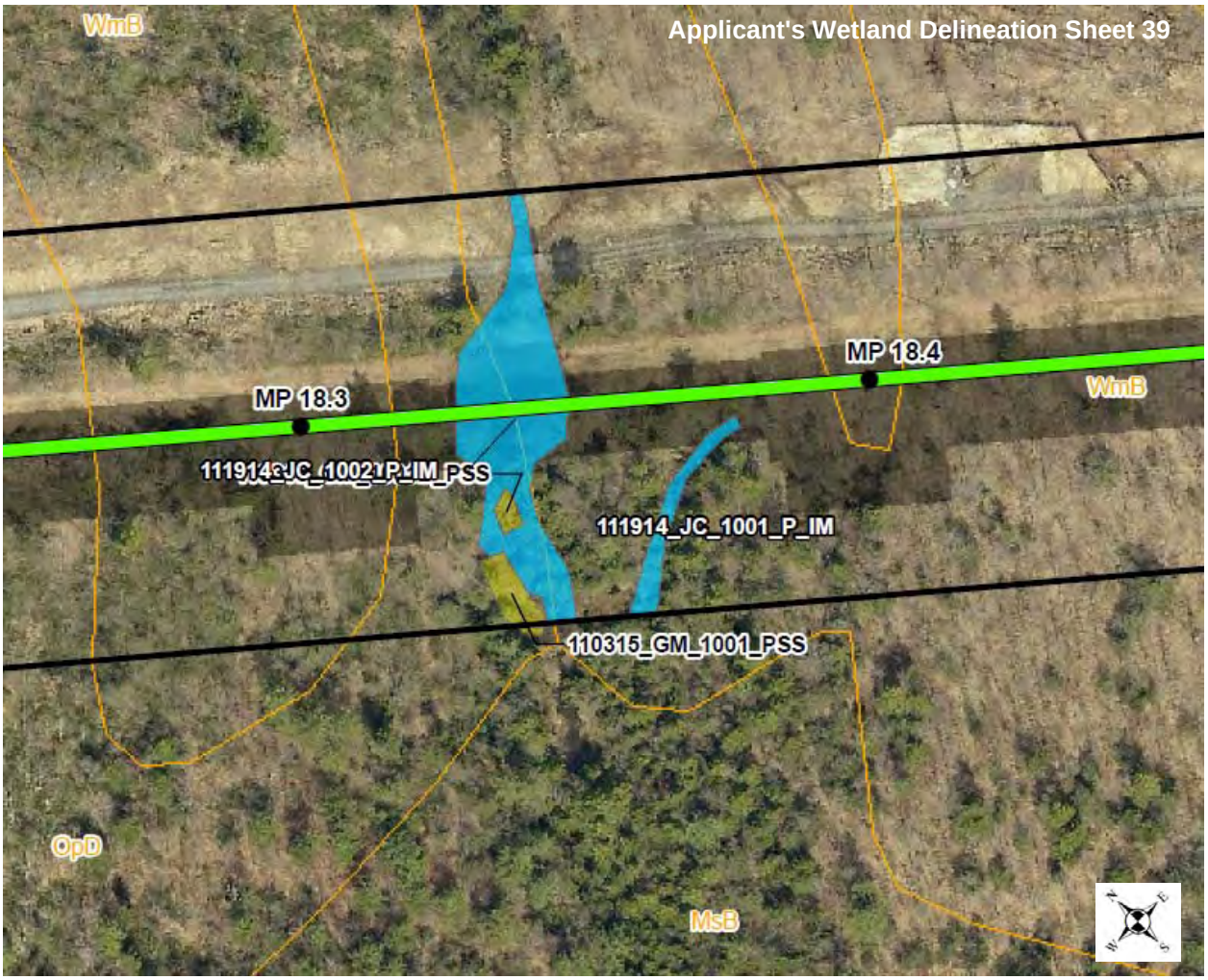
	Wetland Functions:	**Related info:**
☑	(1) Serves natural biological functions - food chain production	Little Shades Ck.
	- general habitat - nesting, spawning, rearing, and resting sites for aquatic or land species.	beaver
☑	(2) Provides areas for study of the environment or as sanctuaries or refuges.	SGL 91
☑	(3) Maintains natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, natural water filtration processes, current patterns or other environmental characteristics.	
☑	(4) Shields other areas from wave action, erosion, or storm damage.	Little Shades Ck.
☑	(5) Serves as a storage area for storm and flood waters.	Little Shades Ck.
☑	(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.	
☑	(8) Prevents pollution.	
☑	(9) Provides recreation.	SGL 91

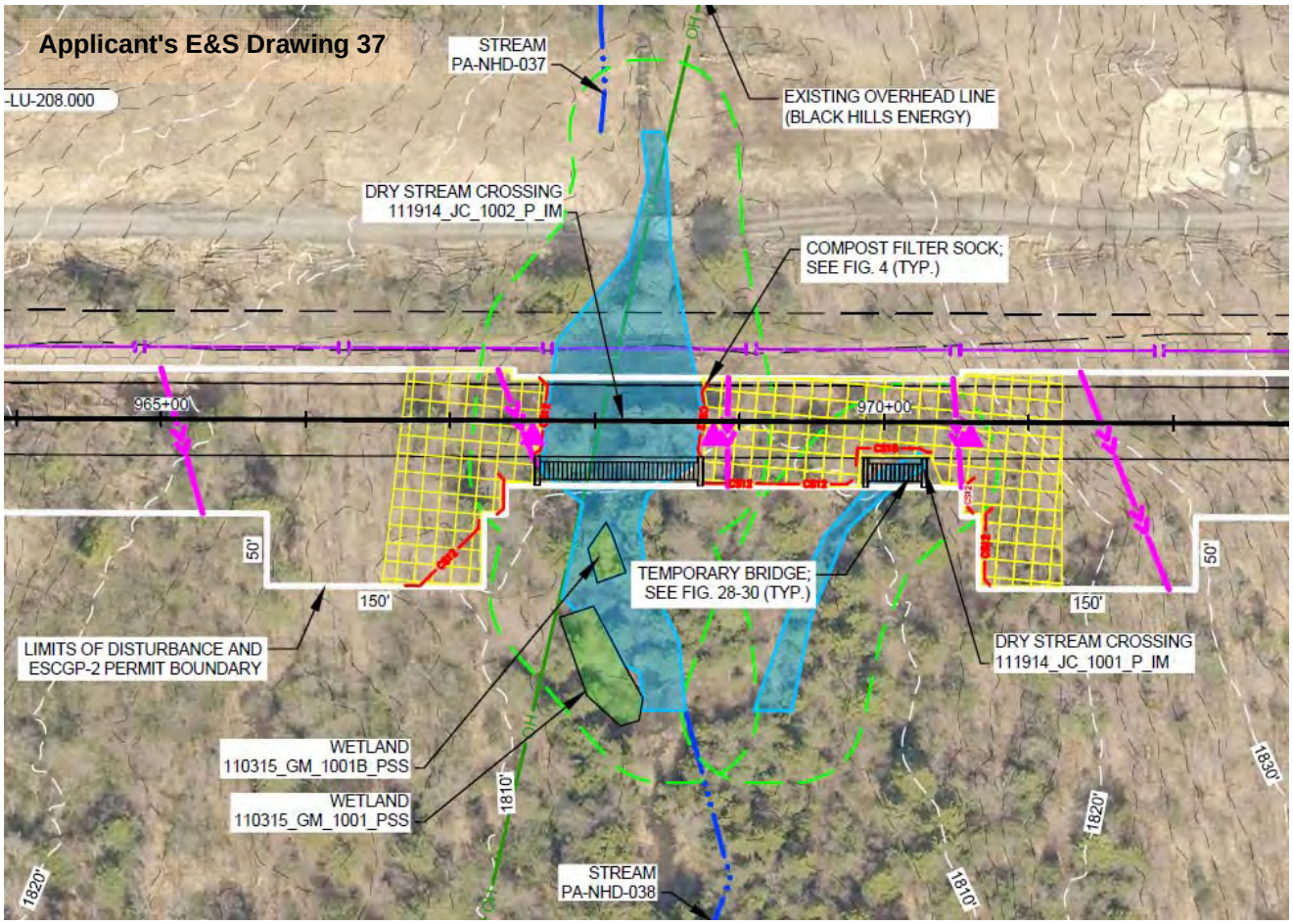
Each of these ☑ functions will be diminished by the temporary disturbance of an estimated 0.25 acre of Exceptional Value Wetlands, by the permanent disturbance of an estimated 0.10 acre of Exceptional Value Wetlands, and by the permanent conversion/maintenance of 0.05 acre of forested Exceptional Value 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' x 145' = 0.25 ac. So the permanent 50-foot wide ROW would be 50' x 145' = 0.10 ac. The PFO to PEM conversion in the 30-foot ROW would be 30' x 145" = 0.05 ac.]

AREA A


Applicant's Wetland Delineation Sheet 39
WmB
MP 18.3
MP 18.4
WmB
111914_JC_1001_P_IM_PSS
111914_JC_1001_P_IM
110315_GM_1001_PSS
OpD
MsB


Applicant's E&S Drawing 37
STREAM PA-NHD-037
EXISTING OVERHEAD LINE (BLACK HILLS ENERGY)
DRY STREAM CROSSING 111914_JC_1002_P_IM
COMPOST FILTER SOCK; SEE FIG. 4 (TYP.)
965+00
970+00
50'
150'
TEMPORARY BRIDGE; SEE FIG. 28-30 (TYP.)
LIMITS OF DISTURBANCE AND ESCGP-2 PERMIT BOUNDARY
DRY STREAM CROSSING 111914_JC_1001_P_IM
WETLAND 110315_GM_1001B_PSS
WETLAND 110315_GM_1001_PSS
STREAM PA-NHD-038
1810'
1820'
1830'

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).

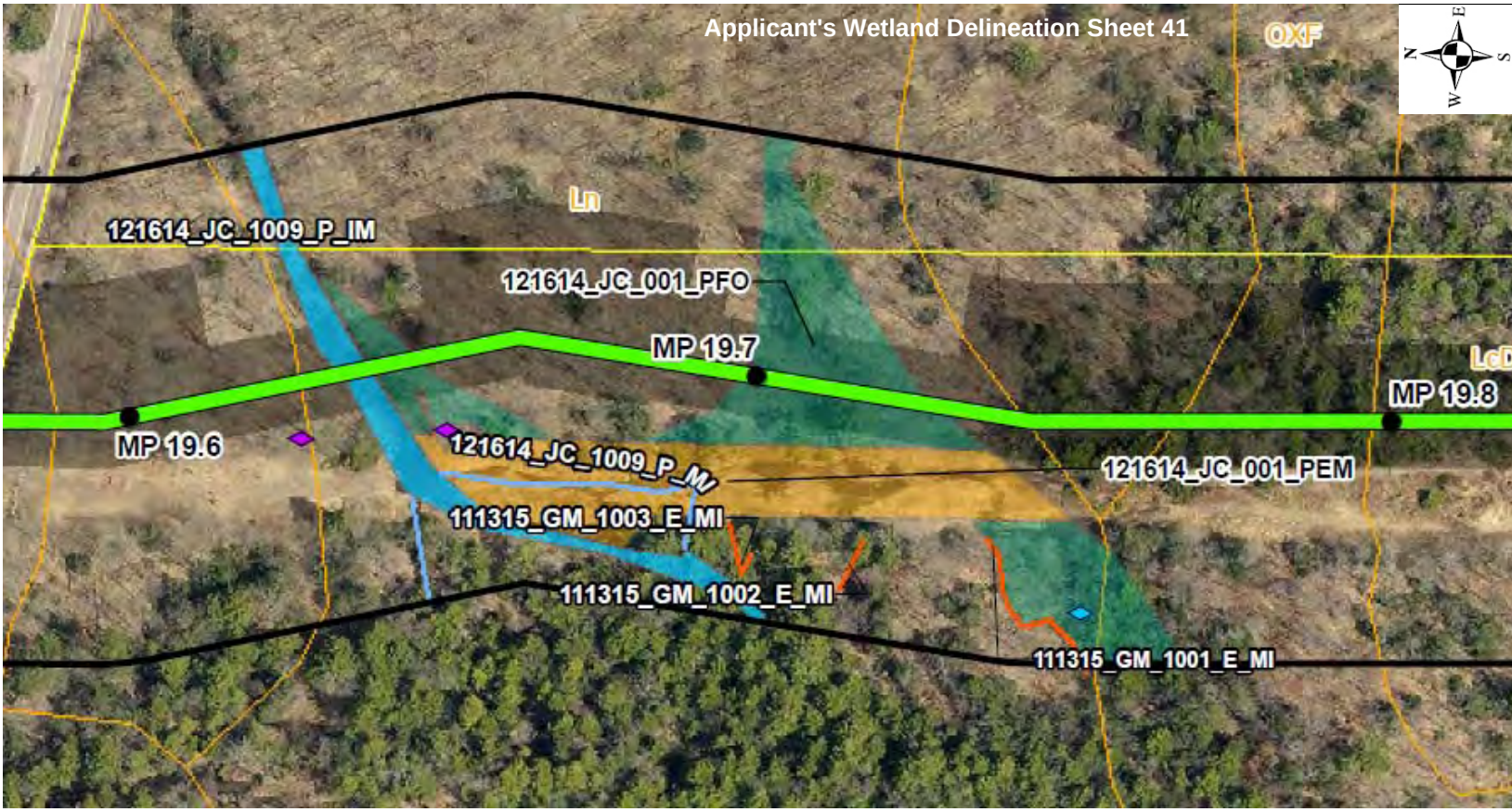
Three wetland crossing impacts are identified on the drawings - two of the PFO wetland, and one of the PEM wetland. All of them are acknowledged as being Exceptional Value Wetland impacts. The PEM impact appears to be overstated

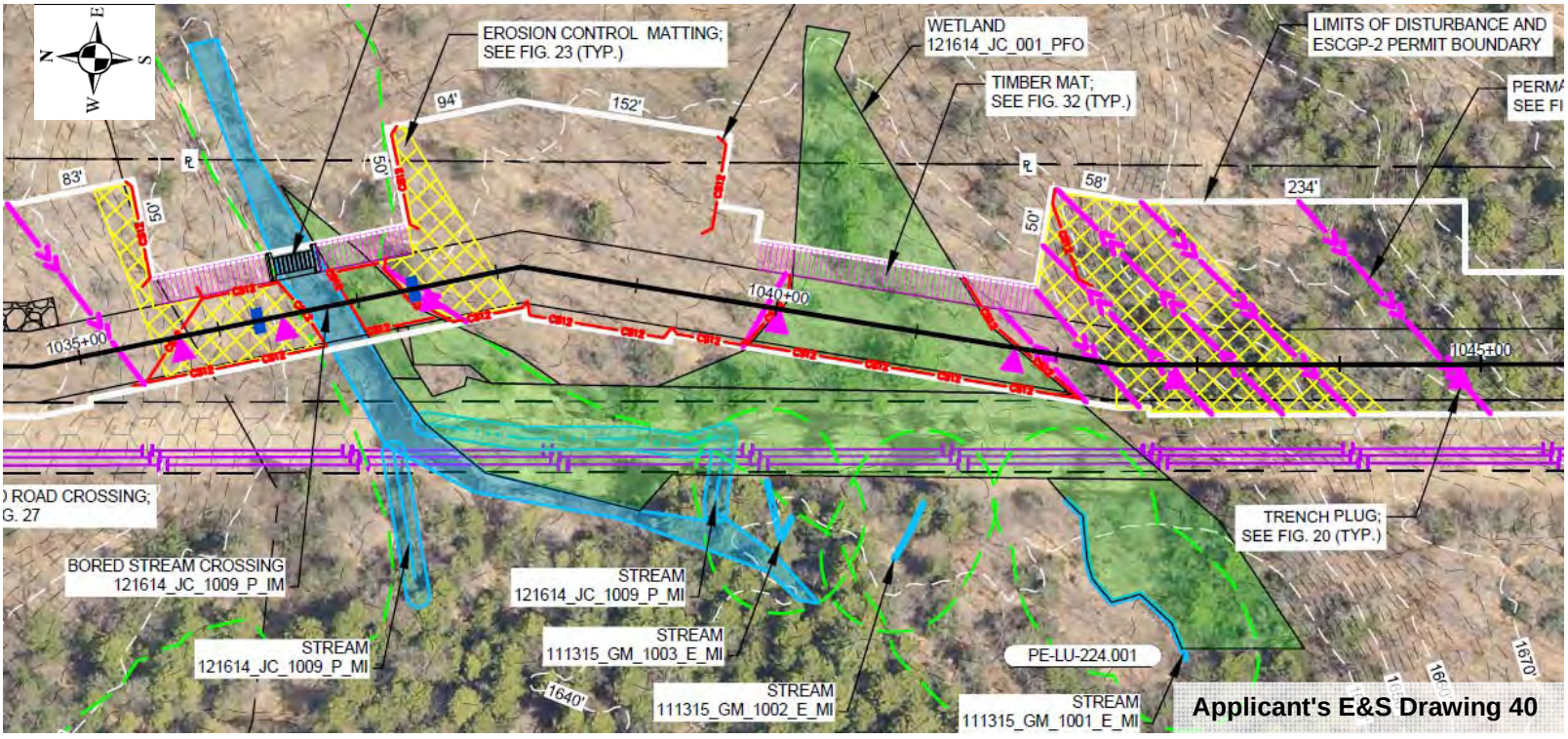
Area B

Wetland Functions:	Related info:
☑ (1) Serves natural biological functions - food chain production - general habitat - nesting, spawning, rearing, and resting sites for aquatic or land species.	Shades Ck.
☑ (2) Provides areas for study of the environment or as sanctuaries or refuges.	NLT "Bear Creek Preserve"
☑ (3) Maintains natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, natural water filtration processes, current patterns or other environmental characteristics.	
☑ (4) Shields other areas from wave action, erosion, or storm damage.	Shades Ck.
☑ (5) Serves as a storage area for storm and flood waters.	Shades Ck.
☑ (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.	
☑ (8) Prevents pollution.	
☑ (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
Ln
121614_JC_1009_P_IM
121614_JC_001_PFO
MP 19.7
MP 19.8
MP 19.6
121614_JC_1009_P_M
121614_JC_001_PEM
111315_GM_1003_E_MI
111315_GM_1002_E_MI
111315_GM_1001_E_MI


EROSION CONTROL MATTING; SEE FIG. 23 (TYP.)
WETLAND 121614_JC_001_PFO
TIMBER MAT; SEE FIG. 32 (TYP.)
LIMITS OF DISTURBANCE AND ESCGP-2 PERMIT BOUNDARY
94'
152'
83'
50'
58'
234'
1040+00
1035+00
1045+00
TRENCH PLUG; SEE FIG. 20 (TYP.)
BORED STREAM CROSSING 121614_JC_1009_P_IM
STREAM 121614_JC_1009_P_MI
STREAM 121614_JC_1009_P_MI
STREAM 111315_GM_1003_E_MI
STREAM 111315_GM_1002_E_MI
STREAM 111315_GM_1001_E_MI
PE-LU-224.001
1640'
1670'
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.

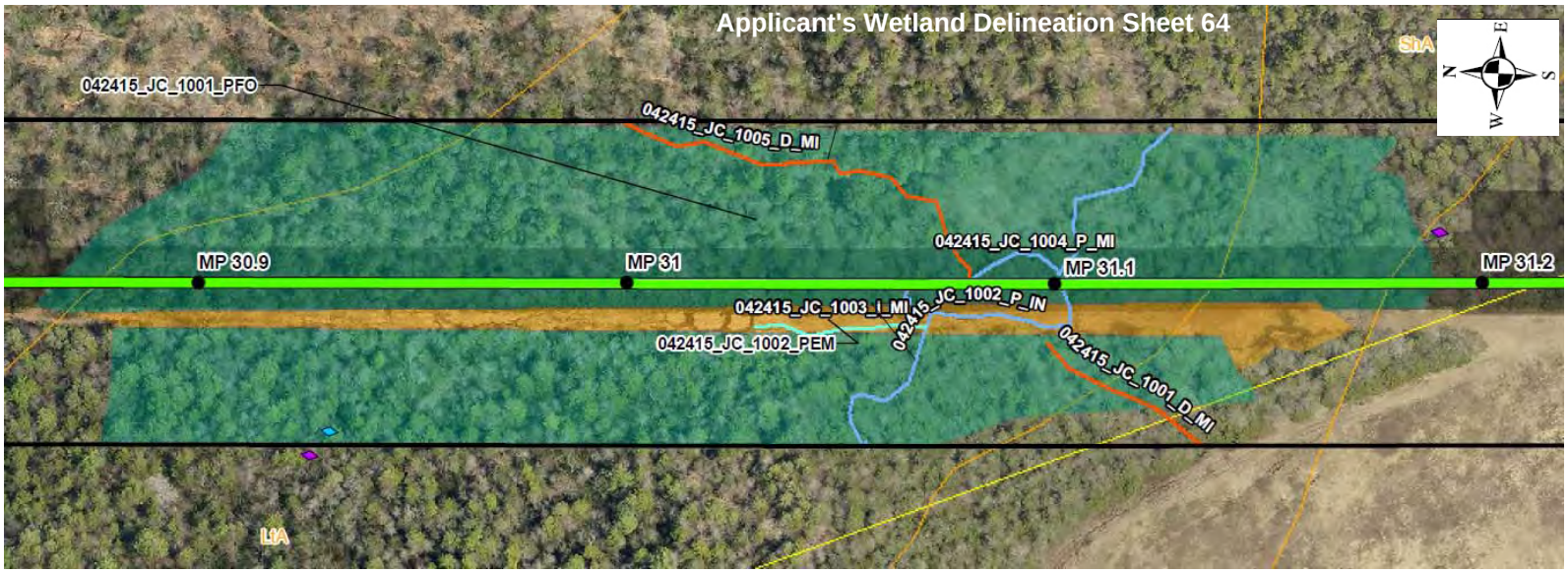
The large wetland complex that encompasses the pipeline construction corridor here actually may be considerably larger, based on mapped hydric soils which continue about 0.75 mile to the north beyond the delineated limit of this wetland. Also, there are areas of soft mucky substrate in the wetland in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

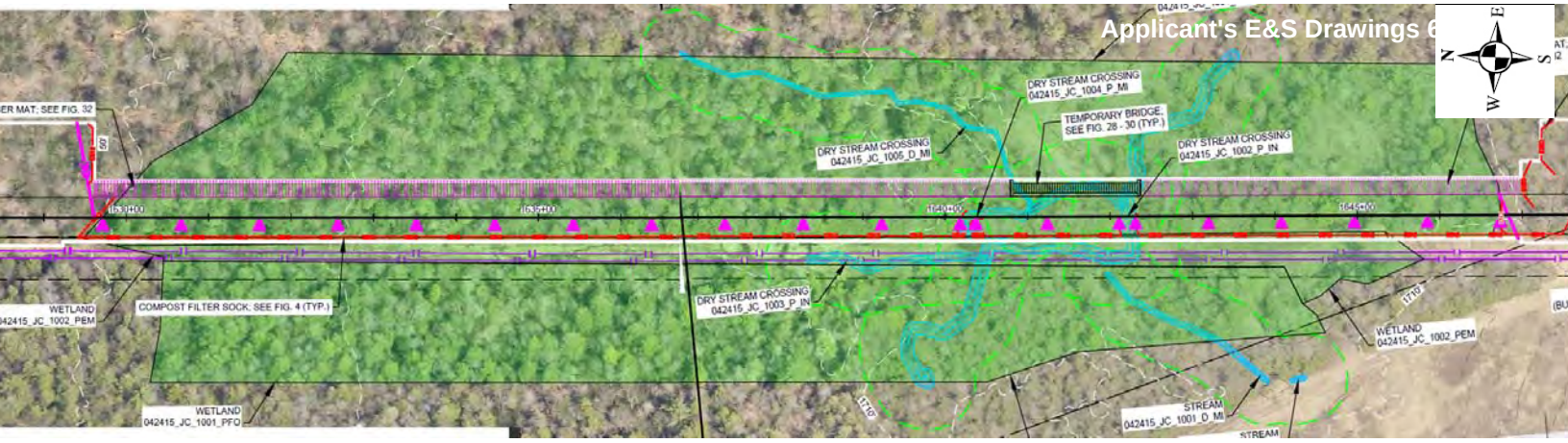
Area C

	Wetland Functions:	Related info:
☑	(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
☑	(2) Provides areas for study of the environment or as sanctuaries or refuges.	Hickory Run SP
☑	(3) Maintains natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, natural water filtration processes, current patterns or other environmental characteristics.	
☑	(4) Shields other areas from wave action, erosion, or storm damage.	Laurel Run/Hawk Run
☑	(5) Serves as a storage area for storm and flood waters.	Laurel Run/Hawk Run
☑	(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.	
☑	(8) Prevents pollution.	
☑	(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


Applicant's Wetland Delineation Sheet 64
042415_JC_1001_PFO
042415_JC_1005_D_MI
042415_JC_1004_P_MI
MP 30.9
MP 31
MP 31.1
MP 31.2
042415_JC_1003_I_MI
042415_JC_1002_P_IN
042415_JC_1002_PEM
042415_JC_1001_D_MI
StA
LtA


Applicant's E&S Drawings 6
DRY STREAM CROSSING
042415_JC_1004_P_MI
TEMPORARY BRIDGE
SEE FIG. 28 - 30 (TYP.)
DRY STREAM CROSSING
042415_JC_1005_D_MI
DRY STREAM CROSSING
042415_JC_1002_P_IN
COMPOST FILTER SOCK, SEE FIG. 4 (TYP.)
DRY STREAM CROSSING
042415_JC_1003_P_IN
WETLAND
042415_JC_1002_PEM
WETLAND
042415_JC_1001_PFO
STREAM
042415_JC_1001_D_MI

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.

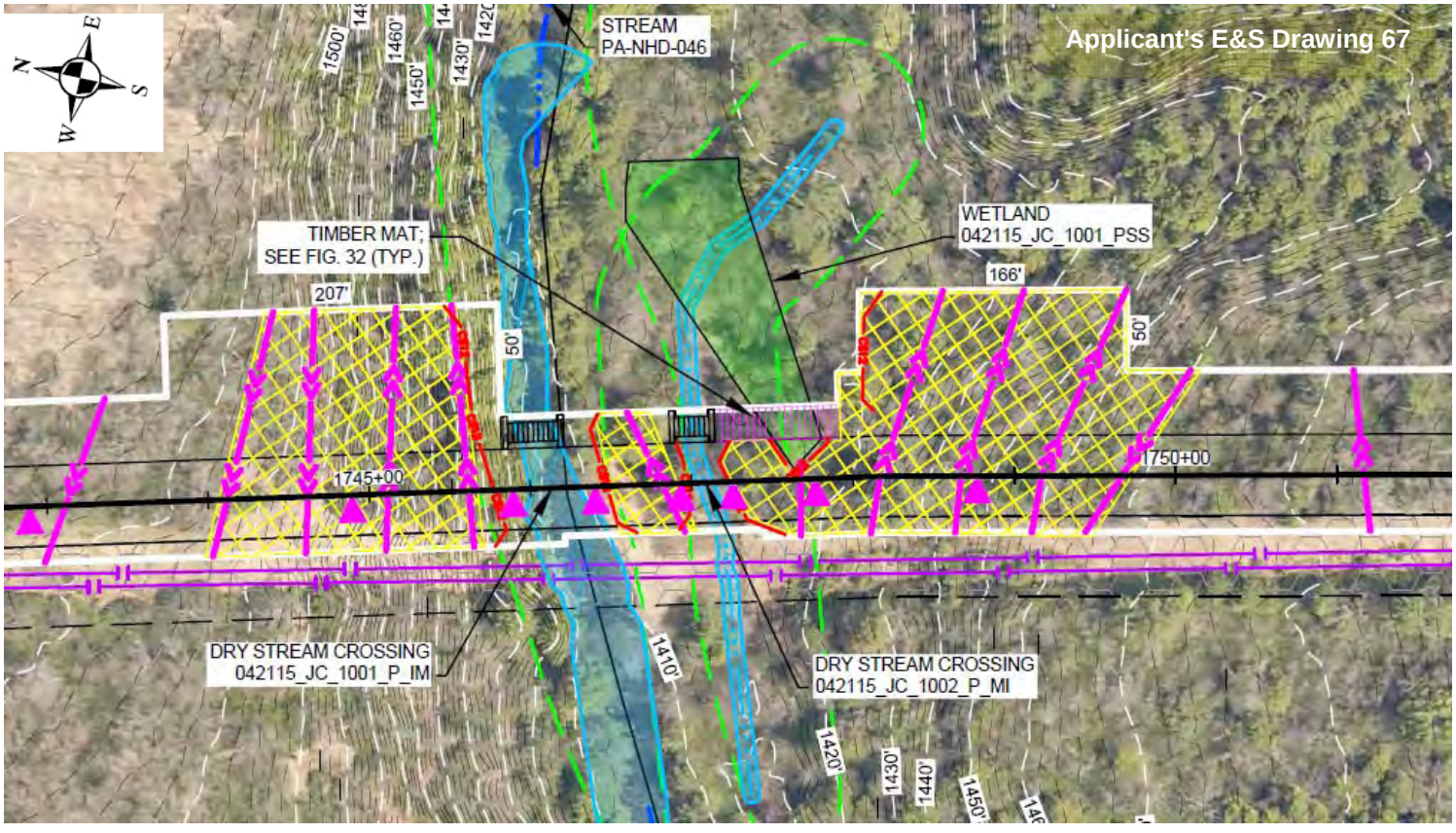
Area D

	Wetland Functions:	**Related info:**
☑	(1) Serves natural biological functions - food chain production - general habitat - nesting, spawning, rearing, and resting sites for aquatic or land species.	Mud Run
☑	(2) Provides areas for study of the environment or as sanctuaries or refuges.	Hickory Run SP
☑	(3) Maintains natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, natural water filtration processes, current patterns or other environmental characteristics.	
☑	(4) Shields other areas from wave action, erosion, or storm damage.	Mud Run
☑	(5) Serves as a storage area for storm and flood waters.	Mud Run
☑	(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.	
☑	(8) Prevents pollution.	
☑	(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


Hy
Applicant's Wetland Delineation Sheet 68
042115_JC_1001_P_IN
042115_JC_1002_P_MI
042115_JC_1001_PSS
MP 33
KvF
MP 33.1


Applicant's E&S Drawing 67
STREAM
PA-NHD-046
TIMBER MAT;
SEE FIG. 32 (TYP.)
WETLAND
042115_JC_1001_PSS
207'
166'
50'
50'
1745+00
1750+00
DRY STREAM CROSSING
042115_JC_1001_P_IM
DRY STREAM CROSSING
042115_JC_1002_P_MI
1500'
1460'
1450'
1430'
1410'
1420'
1440'

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.

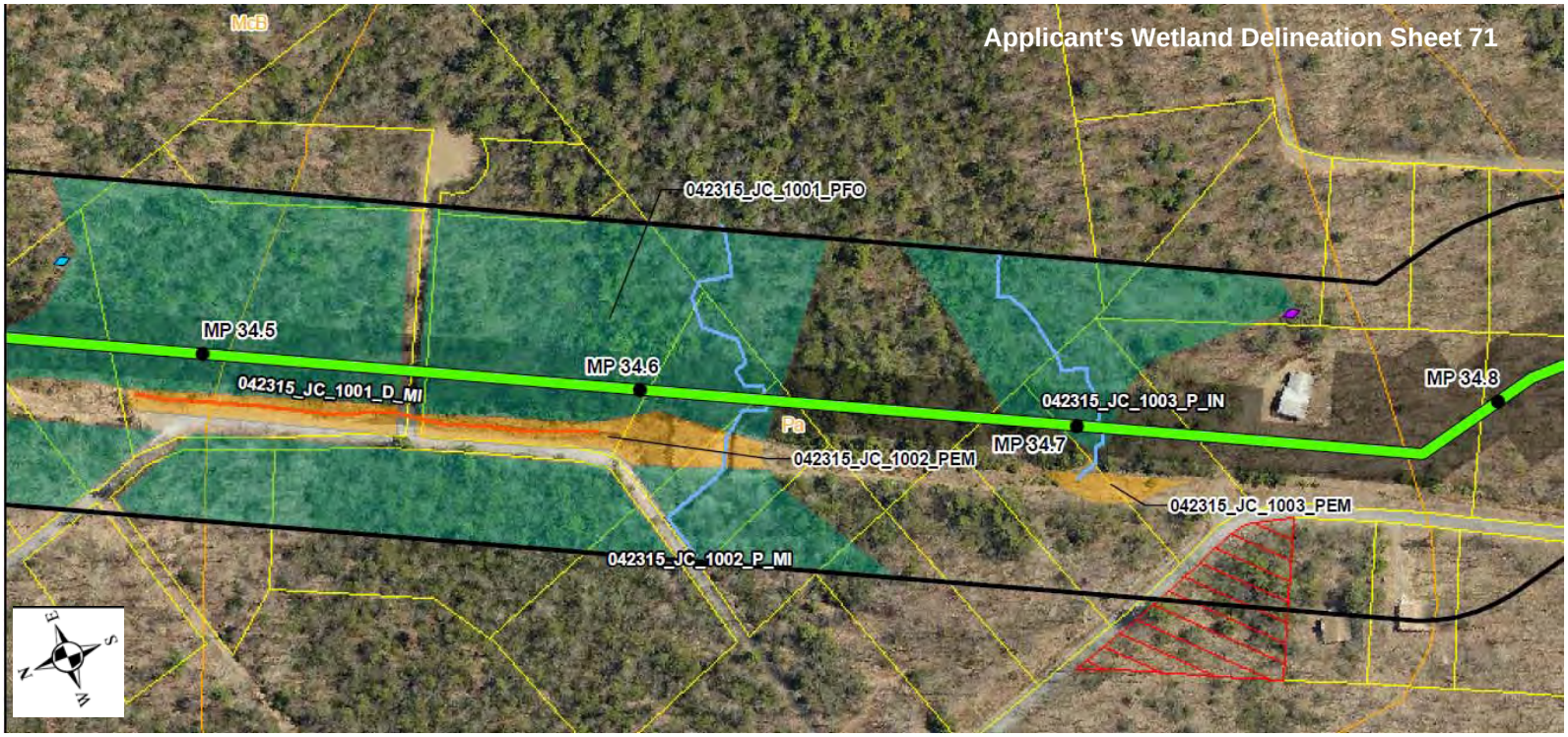
Impact avoidance/minimization by rerouting or use of HDD are not proposed or discussed.

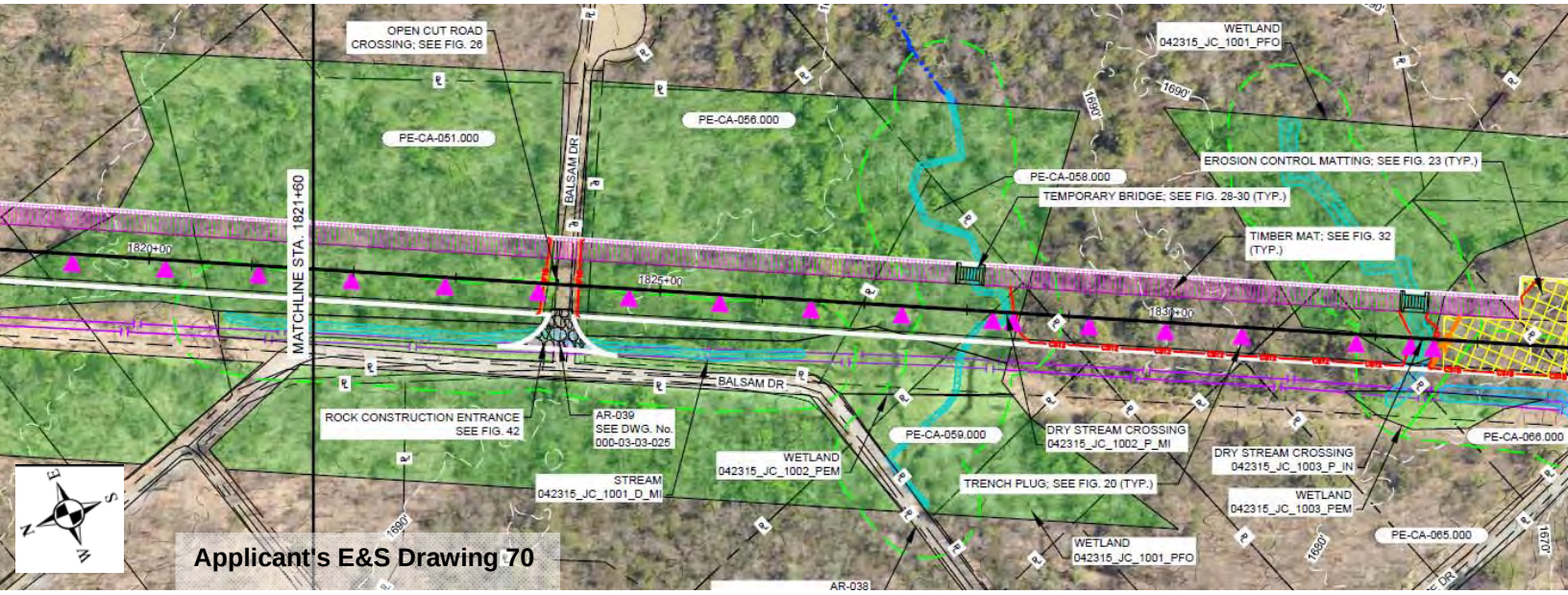
Area E

Wetland Functions:	Related info:
☑ (1) Serves natural biological functions - food chain production - general habitat - nesting, spawning, rearing, and resting sites for aquatic or land species.	Stony Creek
☑ (2) Provides areas for study of the environment or as sanctuaries or refuges.	Hickory Run SP
☑ (3) Maintains natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, natural water filtration processes, current patterns or other environmental characteristics.	
☑ (4) Shields other areas from wave action, erosion, or storm damage.	Stony Creek
☑ (5) Serves as a storage area for storm and flood waters.	Stony Creek
☑ (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.	
☑ (8) Prevents pollution.	
☑ (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


Applicant's Wetland Delineation Sheet 71
McB
042315_JC_1001_PFO
MP 34.5
MP 34.6
042315_JC_1001_D_MI
MP 34.8
042315_JC_1003_P_IN
Pa
MP 34.7
042315_JC_1002_PEM
042315_JC_1003_PEM
042315_JC_1002_P_MI


OPEN CUT ROAD CROSSING; SEE FIG. 26
PE-CA-051.000
PE-CA-056.000
BALSAM DR
MATCHLINE STA. 1821+00
1820+00
1825+00
1830+00
WETLAND 042315_JC_1001_PFO
EROSION CONTROL MATTING; SEE FIG. 23 (TYP.)
PE-CA-058.000
TEMPORARY BRIDGE; SEE FIG. 28-30 (TYP.)
TIMBER MAT; SEE FIG. 32 (TYP.)
ROCK CONSTRUCTION ENTRANCE SEE FIG. 42
AR-039 SEE DWG. No. 000-03-03-025
STREAM 042315_JC_1001_D_MI
WETLAND 042315_JC_1002_PEM
PE-CA-059.000
DRY STREAM CROSSING 042315_JC_1002_P_MI
TRENCH PLUG; SEE FIG. 20 (TYP.)
DRY STREAM CROSSING 042315_JC_1003_P_IN
WETLAND 042315_JC_1003_PEM
PE-CA-066.000
PE-CA-065.000
WETLAND 042315_JC_1001_PFO
AR-038
Applicant's E&S Drawing 70

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.

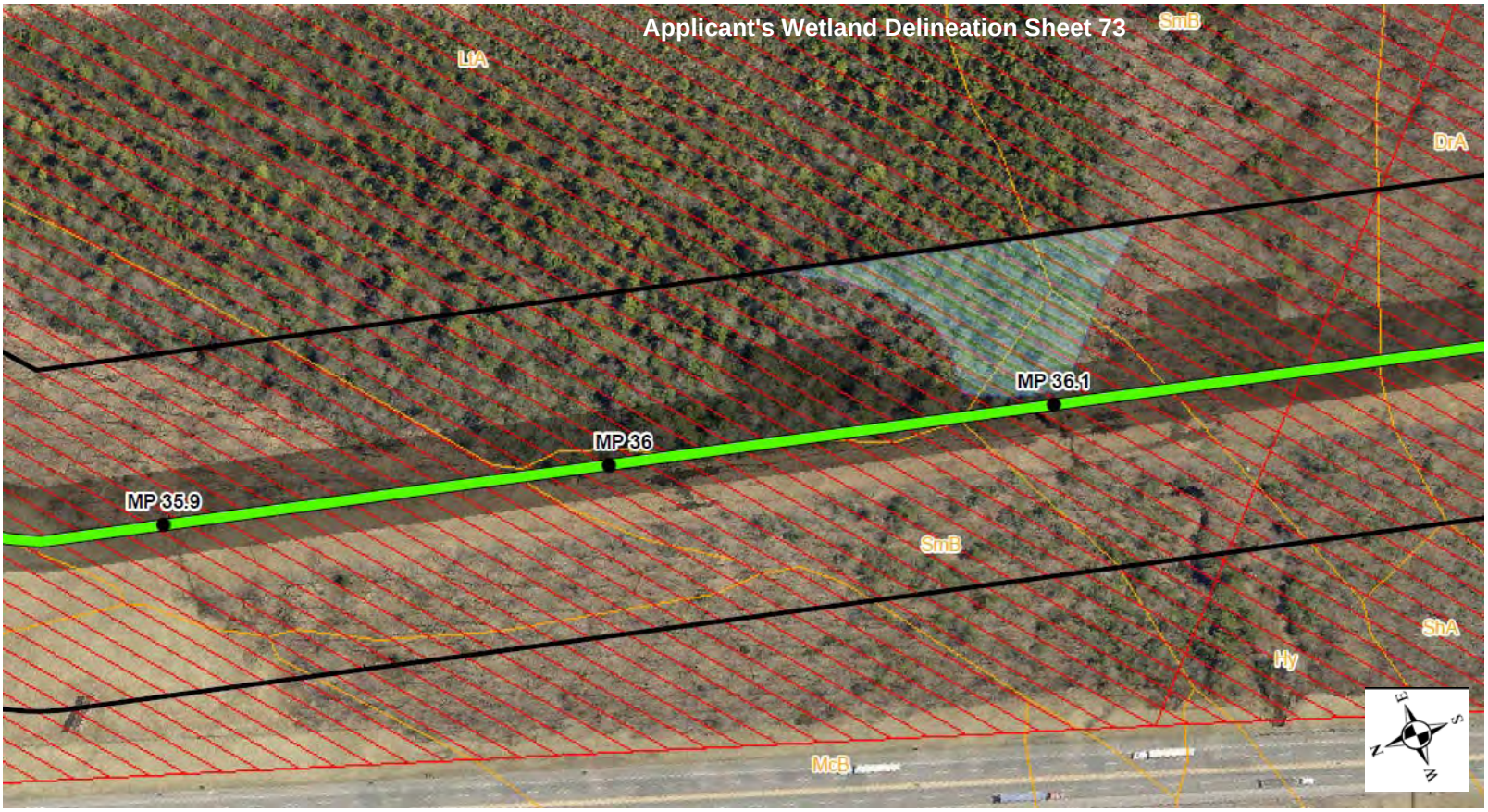
Area F

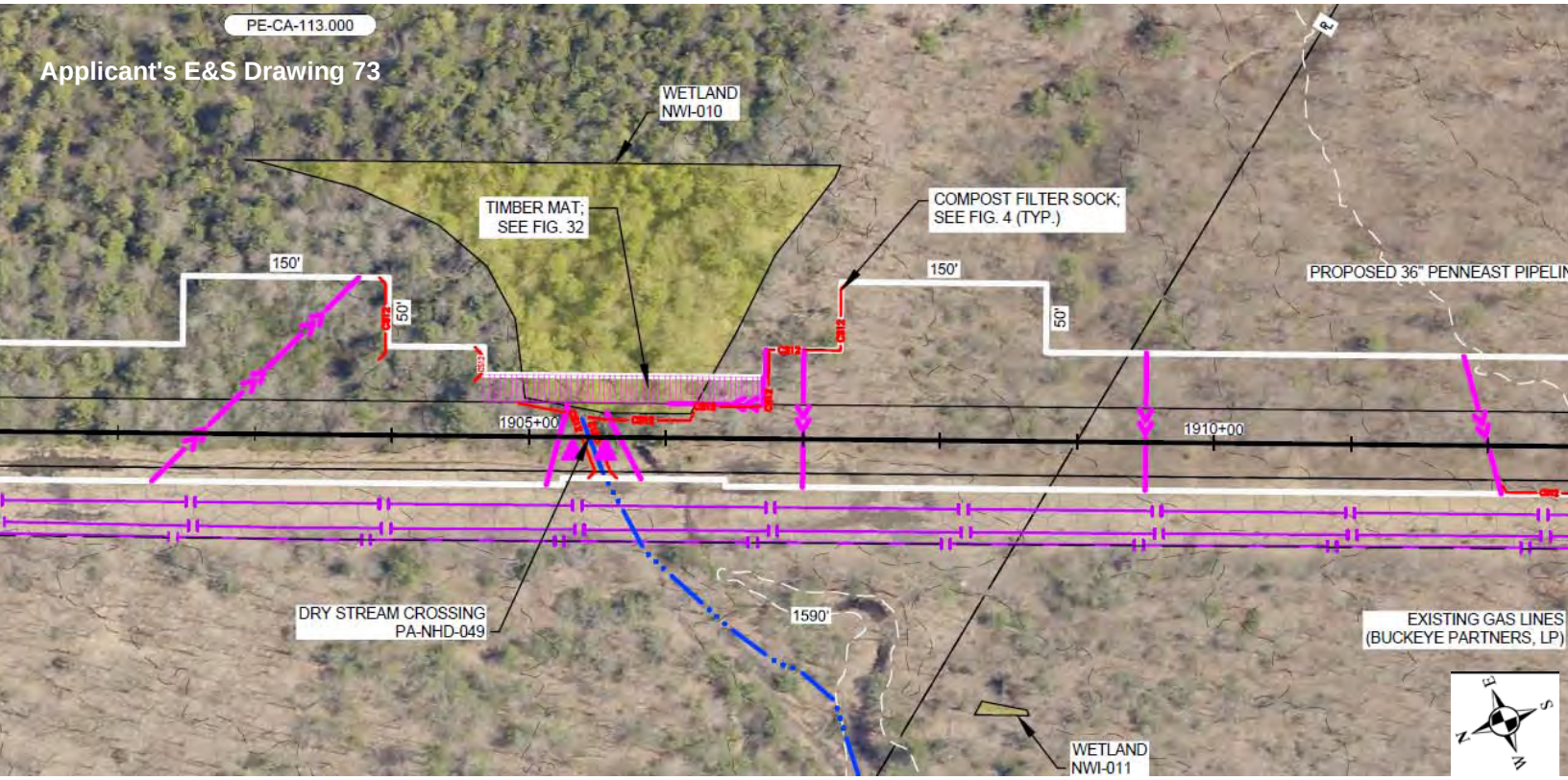
	Wetland Functions:	**Related info:**
☑	(1) Serves natural biological functions - food chain production - general habitat - nesting, spawning, rearing, and resting sites for aquatic or land species.	Yellow Run
	(2) Provides areas for study of the environment or as sanctuaries or refuges.	
☑	(3) Maintains natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, natural water filtration processes, current patterns or other environmental characteristics.	
☑	(4) Shields other areas from wave action, erosion, or storm damage.	Yellow Run
☑	(5) Serves as a storage area for storm and flood waters.	Yellow Run
☑	(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.	
☑	(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


Applicant's Wetland Delineation Sheet 73
LIA
SmB
DrA
MP 36.1
MP 36
MP 35.9
SmB
ShA
Hy
McB


PE-CA-113.000
Applicant's E&S Drawing 73
WETLAND
NWI-010
TIMBER MAT;
SEE FIG. 32
COMPOST FILTER SOCK;
SEE FIG. 4 (TYP.)
150'
50'
150'
50'
PROPOSED 36" PENNEAST PIPELIN
1905+00
1910+00
DRY STREAM CROSSING
PA-NHD-049
1590'
EXISTING GAS LINES
(BUCKEYE PARTNERS, LP)
WETLAND
NWI-011

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.

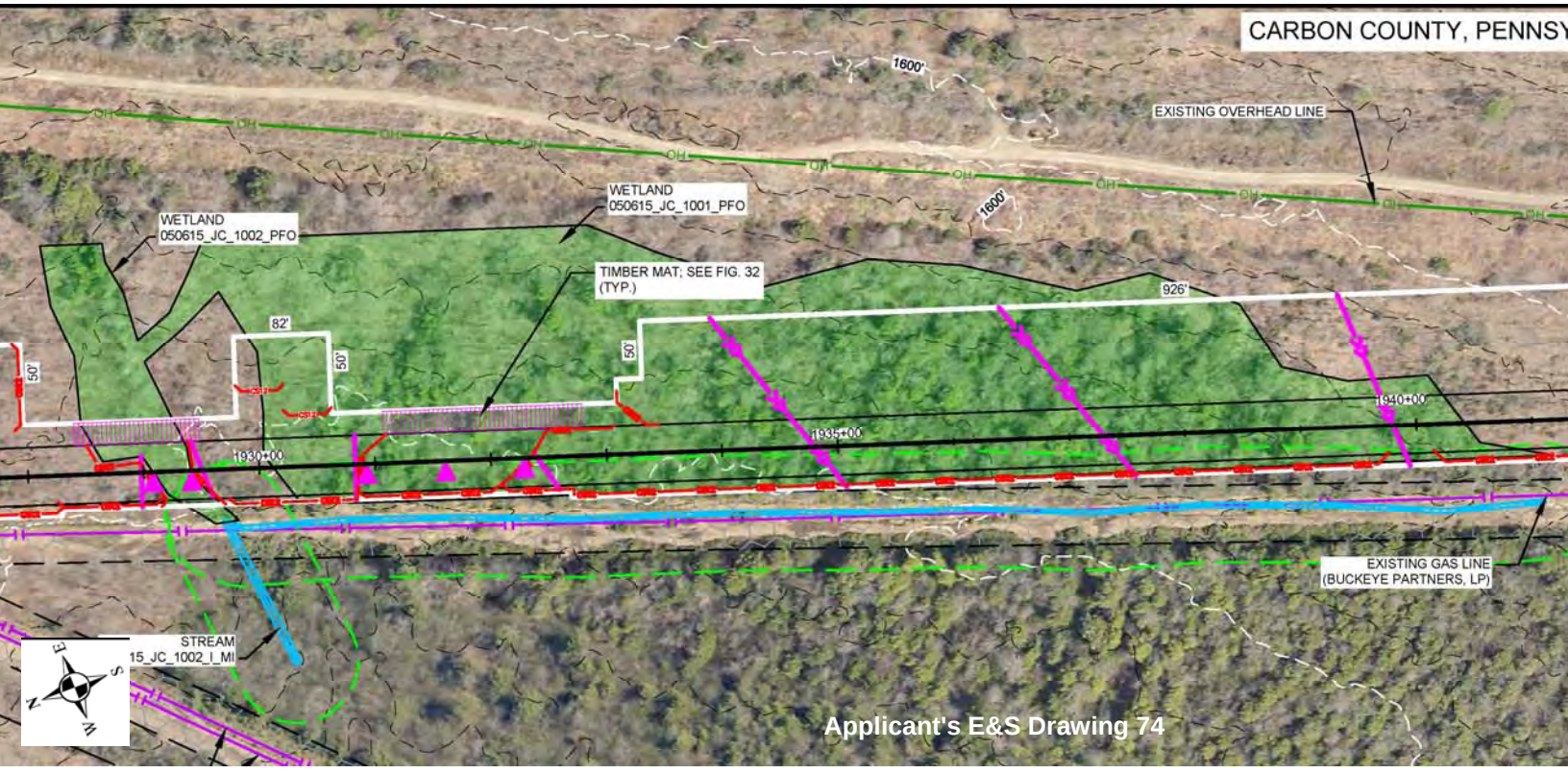
Area G

Wetland Functions:	Related info:
☑ (1) Serves natural biological functions - food chain production - general habitat - nesting, spawning, rearing, and resting sites for aquatic or land species.	Yellow Run
☑ (2) Provides areas for study of the environment or as sanctuaries or refuges.	Wiser State Forest
☑ (3) Maintains natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, natural water filtration processes, current patterns or other environmental characteristics.	
☑ (4) Shields other areas from wave action, erosion, or storm damage.	Yellow Run
☑ (5) Serves as a storage area for storm and flood waters.	Yellow Run
☑ (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.	
☑ (8) Prevents pollution.	
☑ (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


Applicant's Wetland Delineation Sheet 74
SmB
SmB
050615_JC_1001_PFO
050615_JC_1002_PFO
MP 36.5
MP 36.6
MP 36.7
050615_JC_1002_I_MI
LOD


CARBON COUNTY, PENNSY
EXISTING OVERHEAD LINE
WETLAND
050615_JC_1001_PFO
WETLAND
050615_JC_1002_PFO
TIMBER MAT; SEE FIG. 32
(TYP.)
1600'
926'
82'
50'
50'
50'
1930+00
1935+00
1940+00
EXISTING GAS LINE
(BUCKEYE PARTNERS, LP)
STREAM
15_JC_1002_I_MI
Applicant's E&S Drawing 74

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.

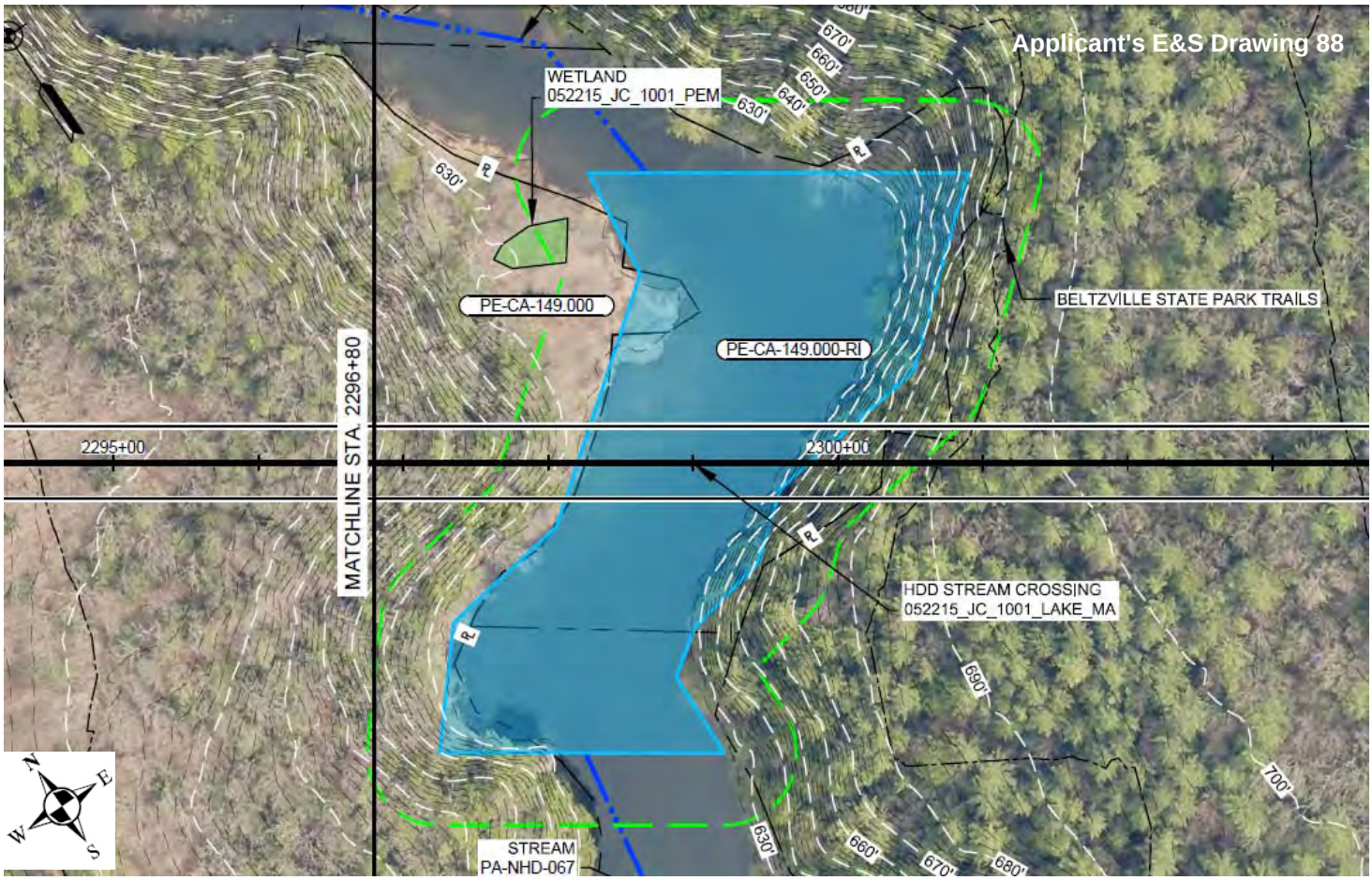
No impact proposed.

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


Applicant's Wetland Delineation Sheet 87
MoE2
MdB
MoE2
052215_JC_1001_LAKE_MA
052215_JC_1001_PEM
MP 43.5
MP 43.6
N
E
W
S


Applicant's E&S Drawing 88
WETLAND
052215_JC_1001_PEM
670'
660'
650'
640'
630'
630'
PE-CA-149.000
PE-CA-149.000-RI
BELTZVILLE STATE PARK TRAILS
2295+00
MATCHLINE STA. 2296+80
2300+00
HDD STREAM CROSSING
052215_JC_1001_LAKE_MA
690'
700'
630'
660'
670'
680'
STREAM
PA-NHD-067
N
E
W
S

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.

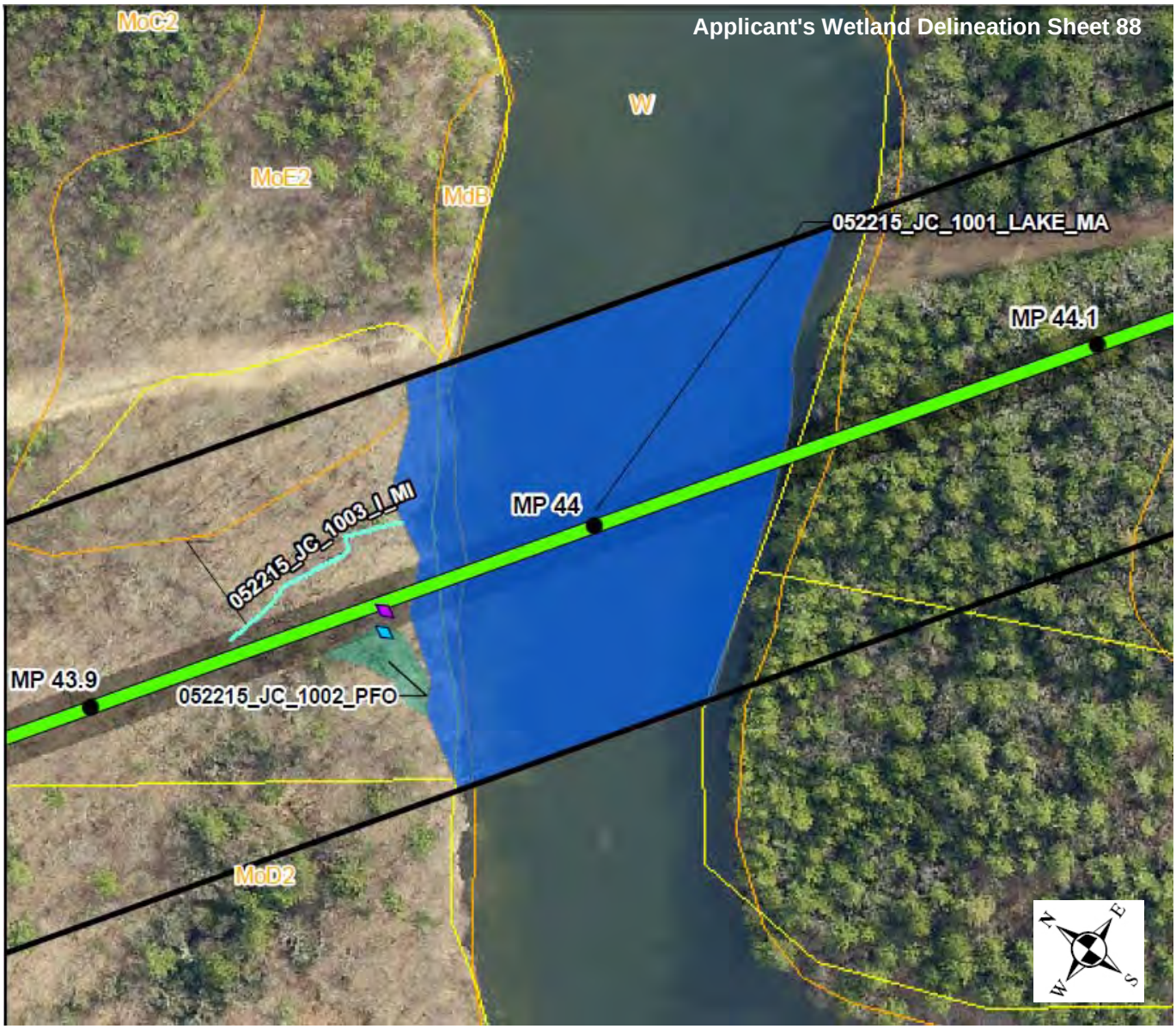
There is a small wetland at the upper end of a small tributary to Pohopoco Creek (which tributary is identified as 052215-JC-1003-I-MI) which has not been acknowledged or delineated. If a permanent ROW is to be cleared and maintained above the proposed pipeline, this wetland will be impacted.

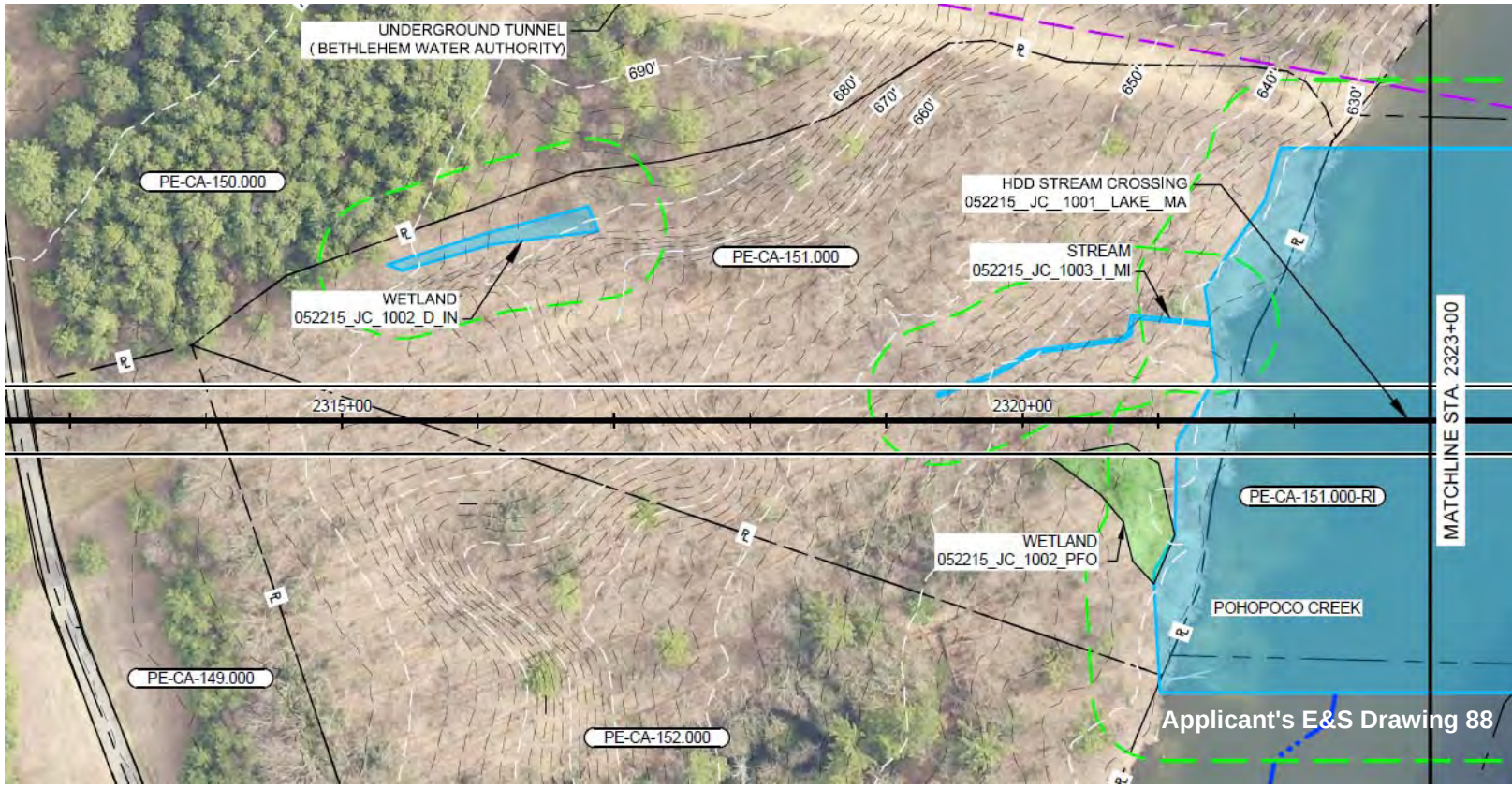
There is a small ephemeral watercourse (delineated as a ditch) to the northwest of Pohopoco Creek (052215-JC-1002-D-IN) which is incorrectly labeled "wetland" on the E&S drawing (#88). It is outside the construction corridor and unlikely to be impacted.

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


Applicant's Wetland Delineation Sheet 88
MoC2
W
MoE2
MdB
052215_JC_1001_LAKE_MA
MP 44.1
MP 44
052215_JC_1003_I_MI
MP 43.9
052215_JC_1002_PFO
MoD2
N
E
S
W


UNDERGROUND TUNNEL
(BETHLEHEM WATER AUTHORITY)
690'
680'
670'
660'
650'
640'
630'
PE-CA-150.000
HDD STREAM CROSSING
052215_JC_1001_LAKE_MA
PE-CA-151.000
STREAM
052215_JC_1003_I_MI
WETLAND
052215_JC_1002_D_IN
2315+00
2320+00
MATCHLINE STA. 2323+00
PE-CA-151.000-RI
WETLAND
052215_JC_1002_PFO
POHOPOCO CREEK
PE-CA-149.000
PE-CA-152.000
Applicant's E&S Drawing 88

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

Area	Total Disturbance		Permanent Disturbance		Conversion PFO to PEM	
	Applicant	**Schmid**	Applicant	**Schmid**	Applicant	**Schmid**
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.