



PennEast Pipeline Company, LLC

PENNEAST PIPELINE PROJECT

Wetland Delineation Report – Pennsylvania

DECEMBER 2018

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1.0 INTRODUCTION

This Wetland Delineation Report has been prepared as part of the environmental investigation conducted for the Pennsylvania Portion of PennEast Pipeline Company, LLC's (PennEast's) PennEast Pipeline Project (Project). PennEast has filed an application for a Certificate of Public Convenience and Necessity to the Federal Energy Regulatory Commission's (FERC's) Office of Energy Projects for authorization of the proposed development of the Project.

The Project consists of the following primary components in Pennsylvania:

- Approximately 115.0 miles of new 36-inch diameter mainline pipeline extending from Dallas Township in Luzerne County, Pennsylvania to Hopewell Township in Mercer County, New Jersey. Approximately 77.3 miles of the mainline route pipeline is located in Pennsylvania. Pennsylvania counties traversed include Luzerne, Carbon, Monroe, Northampton, and Bucks counties.
- The Blue Mountain Lateral: an approximately 0.5-mile new 4-inch diameter lateral constructed in Lower Towamensing Township, Carbon County, Pennsylvania to transport gas to an interconnection with UGI Central Penn Gas, Inc. (Blue Mountain);
- The Hellertown Lateral: an approximately 2.1-mile new 24-inch diameter lateral in Lower Saucon Township, Northampton County, Pennsylvania to transport gas to an interconnection with Columbia Gas Transmission, LLC (TCO) and UGI Utilities, Inc. (UGI-LEH);
- One new compressor station in Kidder Township, Carbon County, Pennsylvania; and
- Various associated aboveground facilities including interconnects, meter stations, mainline block valves, launchers, receivers, and appurtenances to support the pipeline system.

The Project is located in Dallas, Kingston, Jenkins, Plains, Bear Creek, and Buck Townships, and West Wyoming, and Wyoming Boroughs, Luzerne County; Kidder, Penn Forest, Towamensing, and Lower Towamensing Townships, Carbon County; Eldred Township, Monroe County; Moore, East Allen, Upper Nazareth, Lower Nazareth, Bethlehem, Lower Saucon, and Williams Townships, Bath Borough, and City of Easton, Northampton County; and Durham Township, and Riegelsville Borough, Bucks County, Pennsylvania (Figure 1 in Appendix A). Within New Jersey, the Project is located in Holland, Alexandria, Kingwood, Delaware, and West Amwell Townships, Hunterdon County, and Hopewell Township, Mercer County. The coordinates for the approximate north end of the Project are 41° 20' 48.22" N and 75° 56' 43.44" W, and the coordinates for the approximate south end of the Project are 40° 18' 56.92" N and 74° 46' 9.06" W.

The purpose of the wetland and waterbody delineation effort was to identify potentially regulated wetlands and waterbodies (including watercourses, ponds, and reservoirs) within the Project area. Data gathered during delineation efforts was used to aid in Project design in order to avoid or minimize disturbances to potentially regulated resources wherever feasible. However, construction of the Project will result in activities that have the potential to impact regulated waters, including wetlands of the Commonwealth of Pennsylvania, State of New Jersey, and the United States.

The environmental investigation encompasses the approximately 115.0-mile-long mainline and 5-mile-long laterals right-of-way (ROW), and includes an approximately 200-foot-wide buffer on both sides of the centerline, 25-feet on either side of proposed access roads, and all proposed workspace associated with the construction of the Project (Study Area). Several reroutes to avoid sensitive environmental resources, or per landowner requests were implemented over the development of the Project, which resulted in some instances where environmental investigations extended outside of the Study Area. The Study Area limits can be found in figures contained in Appendix A.

The results of the wetland and waterbody delineation effort for Project locations in New Jersey can be found in a separate report entitled, PennEast Pipeline Project Wetland Delineation Report – New Jersey. This Wetland Delineation Report contains the methodology and results of the wetland and waterbody investigations

performed in Pennsylvania. This report was prepared as part of the Water Quality Certification (WQC) Environmental Assessment (EA) being submitted to the Pennsylvania Department of Environmental Protection (PADEP) Northeast and Southeast Regional Offices to receive authorization under Section 401 of the Clean Water Act (CWA), and the information and figures provided within include data collected through December 7, 2018.

1.1 Background

The Project is located within the U.S. Geological Survey (USGS) Kingston, Pittston, Avoca, Wilkes-Barre East, Pleasant View Summit, Hickory Run, Blakeslee, Pohopoco Mountain, Christmans, Palmerton, Kunkletown, Catasauqua, Nazareth, Hellertown, and Riegelsville, Pennsylvania 7.5-minute series topographical quadrangles (National Geographic Society, 2013).

The existing land uses crossed by the proposed pipeline are predominately comprised of forest/woodland (including upland and wetland forest or woodland). Other land uses crossed by the Project include agricultural consisting of active cropland, pasture, orchards, vineyards, and/or hay fields; open land comprised of non-forested lands, herbaceous and scrub-shrub wetlands and maintained utility ROW; industrial/commercial including electric power or gas utility stations, manufacturing or industrial plants, landfills, mines, quarries, commercial or retail facilities, and roads; residential land consisting of residential yards, residential subdivisions, and planned new residential developments; and open water. Table 1.1-1 lists the percentage of proposed alignment that is comprised of each land use.

**Table 1.1-1
Summary of Existing Land Uses within Pennsylvania**

Forest/Woodland	Agricultural	Open Land	Industrial / Commercial	Residential Land	Open Water
56%	24%	10%	7%	2%	1%

The Project is located within the Upper Susquehanna-Lackawanna, Lehigh, and Middle Delaware-Musconetcong, watersheds (8-digit Hydrologic Unit Code [HUC]).

Table B-1 in Appendix B lists each of the waterbodies within the Study Area, along with their Designated Use classification, unless PADEP has listed an Existing Use that differs from the Designated Use. The following waterbodies delineated within the Project Study Area have Pennsylvania Code, Title 25, Chapter 93 Designated Protected Aquatic Life Uses of *Cold Water Fishes (CWF)*: Trout Brook and its unnamed tributaries (UNT), Abrahams Creek and its UNT, UNT to Toby Creek, UNT to Susquehanna River, Gardner Creek and its UNT, Mill Creek and its UNT, White Oak Run and its UNT, Deep Creek and its UNT, Pohopoco Creek/Beltzville Lake and its UNT, UNT to Hunter Creek, Buckwha Creek, UNT to Indian Creek, Hokendauqua Creek and its UNT, UNT to Nancy Run, UNT to Lehigh River in Northampton County, Bull Run and its UNT, and UNT to East Branch Saucon Creek. The following waterbodies have Designated Protected Aquatic Life Uses of *High Quality (HQ)-CWF*: UNT to Little Bear Creek, Bear Creek and its UNT, Meadow Run and its UNT, Little Shades Creek and its UNT, Shades Creek and its UNT, Stony Run and its UNT, UNT to White House Run, UNT to Spring Run, portions of Lehigh River in Luzerne County and its UNT, Lime Hollow and its UNT, UNT to Black Creek, Porter Run and its UNT, UNT to Swamp Run, UNT to Hawk Run, UNT to Laurel Run, Mud Run and its UNT, Aquashicola Creek and its UNT, Monocacy Creek and its UNT, East Branch Monocacy Creek and its UNT, and Frya Run and its UNT. Susquehanna River, portions of Lehigh River in Northampton County, Lehigh Coal and Navigation Canal, Delaware River and its UNT, and Delaware Canal have Designated Protected Aquatic Life Uses of *Warm Water Fishes (WWF)*. UNT to Delaware River in Bucks County have Designated Protected Aquatic Life Uses of *Trout Stocking (TSF)*. Stony Creek and its UNT, Yellow Run and its UNT, Wild Creek/Beltzville Lake and its UNT, and

UNT to Cooks Creek have Designated Protected Aquatic Life Uses of *Exceptional Value (EV)* (Commonwealth of Pennsylvania, 2018a).

White Oak Run and its UNT, and Hunter Creek and its UNT are both listed by the PADEP as having an Existing Use Classification that differs from their Designated Use (PADEP, 2018).

Mud Run, Buckwha Creek, Aquashicola Creek, Indian Creek, Hokendauqua Creek, and Monocacy Creek are listed by the Pennsylvania Fish and Boat Commission (PFBC) as Stocked Trout Waters. Stocked Trout Waters watercourse sections are waters that have significant portions that are open to public fishing and are stocked with trout by the PFBC (PFBC, 2018a). Upstream tributaries within 0.5 mile of a confluence of Stocked Trout Waters are also considered Stocked Trout Waters.

Table B-1 in Appendix B lists each of the waterbodies within the Study Area, along with their status related to Wild Trout Waters. The PFBC lists the following waterbodies as Wild Trout Waters: Trout Brook and its UNT, UNT to Toby Creek, UNT to Abrahams Creek, Mill Creek and its UNT, Deep Creek and its UNT, UNT to Little Bear Creek, Little Shades Creek and its UNT, Shades Creek and its UNT, Stony Run and its UNT, UNT to White House Run, UNT to Spring Run, portions of Lehigh River in Luzerne County and its UNT, Lime Hollow and its UNT, UNT to Black Creek, Porter Run and its UNT, UNT to Swamp Run, UNT to Hawk Run, UNT to Laurel Run, Mud Run and its UNT, Stony Creek and its UNT, Yellow Run and its UNT, Wild Creek/Beltzville Lake and its UNT, White Oak Run and its UNT, Pohopoco Creek/Beltzville Lake and its UNT, UNT to Hunter Creek, Buckwha Creek, Aquashicola Creek and its UNT, UNT to Indian Creek, Hokendauqua Creek and its UNT, Monocacy Creek and its UNT, East Branch Monocacy Creek and its UNT, UNT to Nancy Run, Bull Run and its UNT, Frya Run and its UNT, UNT to Cooks Creek, and UNT to East Branch Saucon Creek (PFBC, 2018b, 2018c, 2018d). Wild Trout Waters may include Wilderness Trout Streams, Wild Trout Waters-Natural Reproduction, or Class A Wild Trout Streams. Wilderness Trout Streams watercourse sections are based upon the provision of a wild trout fishing experience in a remote, natural, and unspoiled environment where man's disruptive activities are minimized. Wild Trout Waters-Natural Reproduction watercourse sections support naturally reproducing populations of trout, but may also be stocked with hatchery trout by PFBC. Class A Wild Trout Streams watercourse sections support a population of wild (natural reproduction) trout of sufficient size and abundance to support a long-term and rewarding sport fishery.

As stated in Pennsylvania Code, Title 25, Chapter 105.17 (Section 1, Paragraph iii), wetlands that are located in or along the floodplain of the reach of EV Waters and/or Wild Trout Waters and their tributaries are considered EV Wetlands (Commonwealth of Pennsylvania, 2018b).

According to the *2016 Pennsylvania Integrated Water Quality Monitoring and Assessment Report* the Lehigh River and the East Branch Monocacy Creek is listed as aquatic life impaired related to siltation (PADEP, 2016).

Prior to field surveys, a desktop analysis was performed to identify United States Fish and Wildlife Service (USFWS) National Wetlands Inventory wetlands within the Study Area. There are 44 National Wetlands Inventory (NWI) mapped wetlands within the Study Area (USFWS, 2018). These wetlands are classified as palustrine emergent (PEM), palustrine scrub-shrub (PSS); palustrine forested (PFO), palustrine unconsolidated bottom (PUB), palustrine open water (POW), riverine (RxUB), lake (LxUB), and other (PUS). During field surveys, a field assessment of existing conditions was completed on all mapped NWI wetlands to verify their presence or absence. All wetland and watercourse boundaries for the entire Project Study Area have been field verified by AECOM biologists. The results of the field surveys are discussed in Sections 1.3: Results – Wetlands, and 1.4: Results - Watercourses below.

Table B-2 in Appendix B contains a comprehensive list of soils map units located within the Study Area and lists their hydric ratings [National Resources Conservation Service (NRCS), 2018]. Soil map units are depicted in Figure 3 in Appendix A. Appendix C contains the Wetland Data Forms, Appendix D contains the Waterbody Data Forms; and Appendix E contains the Resource Photographs.

1.2 Methodology

This wetland and waterbody investigation was conducted on multiple dates between September 2014 and December 2018. The Study Area was subject to changes due to adjustments to the pipeline alignment and additional temporary work space(s) required which resulted in some instances where environmental investigations extended outside of the Study Area. Wetlands and waterbodies were identified and delineated as potentially regulated under the Pennsylvania Clean Streams Law and Dam Safety and Encroachment Act and the federal Clean Water Act (Commonwealth of Pennsylvania, 2018a and 2018b; Clean Water Act of 1972). The location of each identified wetland and/or waterbody was recorded using a high-precision, handheld global positioning system (GPS) receiver, and photographs were taken of each resource.

1.2.1 Methodology – Wetlands

Prior to field surveys, a desktop survey was completed using GIS, existing PennEast data, site base maps, environmental mapping resources including state wetland mapping, NWI maps, USGS National Hydrography Dataset (NHD) layers and topographic maps, NRCS County Soil Surveys, and aerial photography-based alignment maps to identify potentially regulated resources. The existing sources used for the desktop investigation included: the USGS Kingston, Pittston, Wilkes-Barre East, Pleasant View Summit, Hickory Run, Blakeslee, Pohopoco Mountain, Christmans, Palmerton, Kunkletown, Catasauqua, Nazareth, Hellertown, and Riegelsville, Pennsylvania 7.5-minute series topographical quadrangles, (National Geographic Society, 2018); the United States Department of Agriculture (USDA) NRCS Soil Survey Geographic (SSURGO) Database for Luzerne, Carbon, Monroe, Northampton, and Bucks Counties, Pennsylvania (NRCS, 2018); and the USFWS NWI polygon for Pennsylvania (USFWS, 2018). Table B-3 in Appendix B lists wetlands identified with the Study Area, along with their associated classification and size.

Wetland delineation desktop data review and critical issues analysis provided a basis for initial Project route selection and supported field investigation planning and execution. A field assessment of existing conditions was completed to provide ground verification of desktop survey findings. Information collected during the desktop review was used in conjunction with the field delineation data to identify regulated areas pursuant to the United States Army Corps of Engineers (USACE) Clean Water Act (Section 404) regulations and the PADEP Dam Safety and Encroachments Act (Commonwealth of Pennsylvania, 2018b).

Wetland habitats were identified and delineated in the Study Area using the Modified Routine Wetland Delineation Method as described in the USACE's *Wetland Delineation Manual, Technical Report Y-87-1* (Environmental Laboratory, 1987) and using wetland criteria detailed in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (Version 2.0), and *Northcentral and Northeast Region* (Version 2.0) (USACE, 2011 and 2012), as appropriate. During field investigations, data collected for each delineated wetland and adjacent upland sample point included dominant vegetation, soil characteristics, hydrology, and other information necessary to complete the USACE Wetland Determination Data Form (2011 and 2012).

Wetlands within the Study Area were classified according to the USFWS *Classification of Wetlands and Deepwater Habitats for the United States* (Cowardin et al., 1979). Wetland classifications were based upon vegetation type and dominance and include palustrine emergent (PEM), palustrine scrub-shrub (PSS), palustrine forested (PFO) and palustrine unconsolidated bottom (PUB). PEM wetlands are described as being “dominated by erect, rooted, herbaceous hydrophytes,” PSS wetlands are described as “dominated by woody vegetation less than 20 feet (6 meters) in height,” PFO wetlands are described as “dominated by woody vegetation greater than 20 feet (6 meters) in height,” and PUB wetlands are described as “wetland and deep water habitats with at least 25% cover of particles smaller than stones, and a vegetative cover less than 30%” (Cowardin et al., 1979). Dominant vegetation was evaluated on percent aerial cover for the following strata: trees, saplings/shrubs, herbaceous, and woody vines.

In addition to the USFWS *Classification of Wetlands and Deepwater Habitats for the United States* classifications, a category classified as vernal (seasonal) pool was added. For the purposes of this Project,

vernal pools are defined based on four distinguishing features: surficial hydrologic isolation, periodic drying, small size and shallow depth, and distinctive biological community [Environmental Protection Agency (EPA), 2018].

Each plant species was assigned an indicator status based on the *National Wetland Plant List* (Lichvar et al., 2014 and 2016). The following indicator statuses were assigned: obligate (OBL), facultative wet (FACW), facultative (FAC), facultative upland (FACU), upland (UPL), no status (NS), or not indicated (NI).

At each wetland, a three-inch Dutch-tip auger or shovel was used to excavate soil to a depth of 16-inches below ground surface, or until refusal, for inspection of the soil profile. Soil horizon depths, in inches below ground surface, were measured and recorded. Each distinct horizon in the soil profile was also examined for hue, value, and chroma using a *Munsell Soil Color Chart* (Munsell Color, 2009). In addition, the texture, physical characteristics, and redoximorphic features of each horizon were noted, if present. This information was used to evaluate the indicators of hydric soil conditions that meet USACE criteria.

Once biologists determined that an area met wetland criteria, photos were taken of the wetland, and the boundaries were field-marked with surveyor's tape. A high-precision, handheld, GPS receiver (model GeoXH handheld, Trimble) was used to record the flagged boundaries of each wetland. Data collected were post-processed with the latest version of Trimble GPS Pathfinder Office software, which uses cataloged reference data from base stations and differential correction technology to increase the accuracy of the boundary flag and data point locations. Data points were evaluated using a quality assurance and quality control process. Following any necessary revisions, final files were incorporated into the Project's GIS for mapping and Project design purposes.

1.2.2 Methodology – Waterbodies

Waterbodies include any natural or artificial watercourse, river, or drainage with perceptible flow at the time of crossing and other permanent waterbodies such as ponds and lakes. To identify and delineate waterbodies, an on-site evaluation was performed based on whether the feature exhibited typical watercourse characteristics such as a defined streambed and streambanks, an exclusion of terrestrial vegetation, hydrologically-sorted substrate material, and the presence of an ordinary high water mark. These waterbodies were identified and classified as regulated under the Clean Water Act of 1972 as Waters of the United States. In Pennsylvania, waterbodies were further evaluated under The Pennsylvania Code, Title 25 and Chapter 105, as Regulated Waters of this Commonwealth (Commonwealth of Pennsylvania, 2018a and b).

Watercourse types include perennial, intermittent, and ephemeral. Watercourse type determinations were made based on channel definition (i.e., having a defined bed and bank) and by determination of watercourse flow at the time of survey using geomorphic, hydrological and biological indicators. Per guidance from the PADEP, the North Carolina Division of Water Quality (NCDWQ) (2010) identification methods were used as guidelines (Mackowski, personal comm., 2012). Perennial watercourses are described in the NCDWQ methods as a "well-defined channel that contains water year round during a year of normal rainfall with the aquatic bed located below the water table for most of the year." Intermittent watercourses are defined as "a well-defined channel that contains water for only part of the year, typically during winter and spring when the aquatic bed is below the water table." Ephemeral watercourses are described as "a feature that carries only stormwater in direct response to precipitation with water flowing only during and shortly after large precipitation events." FERC's Wetland and Waterbody Construction and Mitigation Procedures (2013) further classifies waterbodies as being minor, including all waterbodies less than or equal to 10 feet wide at the water's edge at the time of crossing; intermediate, which includes all waterbodies greater than 10 feet wide, but less than or equal to 100 feet wide at the water's edge at the time of crossing; or major, which includes all waterbodies greater than 100 feet wide at the water's edge at the time of crossing. The extent of each waterbody was recorded with a GPS unit and photographs were taken of each waterbody.

1.3 Results – Wetlands

A total of 286 wetlands were field-identified and delineated within the Study Area in Pennsylvania (Table 1.3-1). In instances where a wetland complex had multiple cover classifications, each cover classification has been listed as a separate occurrence, even though it is part of the same complex. A total of 192.5 acres of wetlands were identified during delineations in Pennsylvania, including 28.5 acres of PEM wetlands, 41.1 acres of PSS wetlands, 121.8 acres of PFO wetlands, 1.0 acre of PUB / POW wetlands and 0.1 acre of vernal pools. A total of 118 of the wetlands identified within the Study Area are considered EV due to their proximity to wild trout watercourses and/or EV watercourses. Locations of the field-identified wetlands within the Study Area are depicted on Figure 3 in Appendix A. Data forms for the individual wetlands and waterbodies are included in Appendix C and Appendix D, respectively. Photographs of these resources are included in Appendix E. Typical wetland vegetation, soil characteristics, and hydrology identified within the delineated wetland resources are discussed below. Refer to Table B-3 in Appendix B for classifications and sizes of the field-identified wetlands. These wetlands are summarized by county in Table 1.3-1.

**Table 1.3-1
Summary of Field Identified Wetlands within Pennsylvania**

County ¹	PEM	PSS	PFO	PUB / POW	Vernal Pools	Total Wetlands
Luzerne	51	19	21	2	-	93
Carbon	35	19	37	3	2	96
Monroe	-	-	-	-	-	-
Northampton	52	13	27	4	-	96
Bucks	-	-	1	-	-	1
Total	138	51	86	9	2	286

¹ Source: PennDOT Pennsylvania county boundaries, dated 7/2018. Available at www.pasda.psu.edu.

1.3.1 Wetlands – Luzerne County, Pennsylvania

A total of 93 wetlands were delineated within Luzerne County, Pennsylvania. Of the 93 wetlands in Luzerne County, there were 51 PEM wetlands, 19 PSS wetlands, 21 PFO wetlands, and 2 PUB wetlands. No POW wetlands or vernal pools were identified within the Study Area in Luzerne County. The landform/geomorphic settings of these wetlands included hillside seep/springs and closed topographic depressions/isolated systems.

Vegetation

The most common dominant tree species identified within PFO wetlands in Luzerne County consisted of red maple (*Acer rubrum*), gray birch (*Betula populifolia*), and eastern hemlock (*Tsuga canadensis*). The most common dominant shrub species identified within PSS wetlands in Luzerne County consisted of black willow (*Salix nigra*), white meadowsweet (*Spiraea alba*), and highbush blueberry (*Vaccinium corymbosum*). The most common dominant herbaceous species identified within PEM wetlands in Luzerne County consisted of fringed sedge (*Carex crinita*), grass-leaved goldenrod (*Euthamia graminifolia*), soft rush (*Juncus effusus*), giant goldenrod (*Solidago gigantea*), wrinkle-leaf goldenrod (*S. rugosa*), and cinnamon fern (*Osmundastrum cinnamomeum*).

Soils

Wetland soils varied by wetland, but some generalizations can be made. In Luzerne County, the most common matrix hue was 10YR with low chroma (≤ 2) and values between 4 and 6 with redox concentrations.

Depleted Matrix (F3) was the most common hydric soil indicator observed. The most common soil texture observed was silt loam.

Hydrology

The most common primary indicators of hydrology observed within the identified wetlands in Luzerne County were High Water Table (A2), Saturation (A3), and Oxidized Rhizospheres on Living Roots (C3). The most common secondary indicators observed were Drainage Patterns (B10) and FAC-Neutral Test (D5). The primary sources of hydrology differed between wetland types. Groundwater and surface water runoff collection were the primary sources of hydrology observed.

1.3.2 Wetlands – Carbon County, Pennsylvania

A total of 96 wetlands were delineated in Carbon County, Pennsylvania. Of the 96 wetlands, there were 35 PEM wetlands, 19 PSS wetlands, 37 PFO wetlands, 3 PUB wetlands, and 2 vernal pools. No POW wetlands were identified within the Study Area in Carbon County. The landform/geomorphic settings of these wetlands included hillside seep/springs and closed topographic depressions/isolated systems.

Vegetation

The most common dominant tree species identified within the PFO wetlands in Carbon County consisted of red maple, yellow birch (*Betula alleghaniensis*), green ash (*Fraxinus pennsylvanica*), eastern hemlock, and black tupelo (*Nyssa sylvatica*). The most common dominant shrub species identified within the PSS wetlands in Carbon County consisted of silky dogwood (*Cornus amomum*), sheep laurel (*Kalmia angustifolia*), tamarack (*Larix laricina*), and highbush blueberry. The most common dominant herbaceous species identified within the PEM wetlands in Carbon County consisted of tussock sedge (*Carex stricta*), spotted touch-me-not (*Impatiens capensis*), soft rush, Japanese stilt grass (*Microstegium vimineum*), sensitive fern (*Onoclea sensibilis*), and reed canary grass (*Phalaris arundinacea*).

Soils

Wetland soils varied by wetland, but some generalizations can be made. In Carbon County, the most common matrix hue was 10YR with low chroma (≤ 2) and values between 4 and 6 with redox concentrations. Depleted Matrix (F3) was the most common hydric soil indicator observed. The most common soil texture identified was silt loam.

Hydrology

The most common primary indicators of hydrology observed within the identified wetlands in Carbon County were High Water Table (A2), Saturation (A3), and Water-Stained Leaves (B9). The most common secondary indicators observed were Drainage Patterns (B10) and FAC-Neutral Test (D5). The primary sources of hydrology differed between wetland types. Groundwater and surface water runoff collection were the primary sources of hydrology observed.

1.3.3 Wetlands – Monroe County, Pennsylvania

No wetlands were delineated in Monroe County, Pennsylvania.

1.3.4 Wetlands – Northampton County, Pennsylvania

A total of 96 wetlands were located and identified within the Study Area in Northampton County, Pennsylvania. Of the 96 wetlands in Northampton County, there were 52 PEM wetlands, 13 PSS wetlands, 27 PFO wetlands, 3 PUB wetlands, and 1 POW wetland. No vernal pools were identified within the Study Area in Northampton County. The landform/geomorphic settings of these wetlands included hillside seep/springs and closed topographic depressions/isolated systems.

Vegetation

The most common dominant tree species identified within the PFO wetlands in Northampton County consisted of red maple, green ash, and black tupelo. The most common dominant shrub species identified within PSS wetlands in Northampton County consisted of spicebush (*Lindera benzoin*), black willow, and highbush blueberry. The most common dominant herbaceous species identified in PEM wetlands in Northampton County consisted of tussock sedge, spotted touch-me-not, sensitive fern, skunk-cabbage (*Symplocarpus foetidus*), and Japanese stilt grass.

Soils

Wetland soils varied by wetland, but some generalizations can be made. In Northampton County, the most common matrix hue was 10YR with low chroma (≤ 2) and values between 4 and 6 with redox concentrations. Depleted Matrix (F3) was the most common hydric soil indicator observed. The most common soil texture was silt loam.

Hydrology

The most common primary indicators of hydrology observed within the identified wetlands were High Water Table (A2), Saturation (A3), and Hydrogen Sulfide (C1). The most common secondary indicators observed were Drainage Patterns (B10) and FAC-Neutral Test (D5). The primary sources of hydrology differed between wetland types. Groundwater and surface water runoff collection were the primary sources of hydrology observed.

1.3.5 Wetlands – Bucks County, Pennsylvania

One wetland was delineated in Bucks County, Pennsylvania. This wetland was a PFO wetland. No PEM, PSS, PUB, or POW wetlands or vernal pools were identified within the Study Area in Bucks County. The landform/geomorphic setting of this wetland was agricultural field pothole.

Vegetation

The dominant tree species identified within the PFO wetland in Bucks County consisted of silver maple (*Acer saccharinum*).

Soils

The matrix hue was 10YR with low chroma (≤ 2) and a value of 5 with redox concentrations. Depleted Matrix (F3) was the hydric soil indicator observed. The soil texture was silt loam.

Hydrology

The primary indicators of hydrology observed within the identified wetland were Water Marks (B1), and Water-Stained Leaves (B9). The secondary indicators observed were Sparsely Vegetated Concave Surface (B8), Drainage Patterns (B10) and FAC-Neutral Test (D5). Surface water runoff collection was the primary source of hydrology observed.

1.4 Results – Waterbodies

A total of 273 waterbodies were identified within the Study Area in Pennsylvania. Watercourses, a subdivision of waterbodies, were classified by flow regime as follows: 103 perennial (PER), 104 intermittent (INT), and 57 ephemeral (EPH) watercourses. The remaining waterbodies identified included 5 ponds, 2 lakes (Beltzville Lake), 1 canal (Delaware Canal), and 1 ditch. Table B-3 in Appendix B contains the local name, flow regime, top of bank width, overall depth, Chapter 93 Designated/Existing Use Classification, and PFBC trout water classifications of waterbodies identified within the Study Area in Pennsylvania. Locations of the

identified waterbodies are depicted in Figure 3 of Appendix A. Data forms for the individual waterbodies are included in Appendix D. Waterbodies are summarized by county in Table 1.4-1.

**Table 1.4-1
Summary of Field Identified Waterbodies within Pennsylvania**

County ¹	Watercourses			Pond	Lake	Canal	Ditch	Total
	Perennial	Intermittent	Ephemeral					
Luzerne	36	34	28	3	-	-	-	100
Carbon	30	36	11	-	2	-	1	79
Monroe	-	1	-	-	-	-	-	1
Northampton	36	33	17	2	-	-	-	88
Bucks	1	-	1	-	-	1	-	3
Total	103	104	57	5	2	1	1	273

¹ Source: PennDOT Pennsylvania county boundaries, dated 7/2018. Available at www.pasda.psu.edu.

These waters also include intermittent or perennial watercourses in Pennsylvania that have PADEP designated classifications of WWF, CWF, TSF, HQ-CWF, and EV waters (Commonwealth of Pennsylvania, 2018a). Some of these water features are designated as Wild Trout Waters, or Trout Stocked Waters (PFBC, 2018a-d). Wild Trout Waters include those watercourses with naturally reproducing trout populations and Class A trout watercourses. There are no Wilderness Trout Streams within the Project's Study Area.

Detailed waterbody information is provided on individual waterbody data forms in Appendix D. Photographs of each waterbody are provided in Appendix E.

1.5 Summary

Environmental investigations were conducted on multiple dates between September 2014 and December 2018 for the Project. Field surveys were performed within Dallas, Kingston, Jenkins, Plains, Bear Creek, and Buck Townships, and West Wyoming, Wyoming and Laflin Boroughs, Luzerne County; Kidder, Penn Forest, Towamensing, and Lower Towamensing Townships, Carbon County; Eldred Township, Monroe County; Moore, East Allen, Upper Nazareth, Lower Nazareth, Bethlehem, Lower Saucon, and Williams Townships, and City of Easton, Northampton County; and Durham Township, and Riegelsville Borough, Bucks County, Pennsylvania. These field efforts resulted in the delineation of 286 wetlands and 273 waterbodies within the area of the PennEast Project. The results of this investigation will be utilized during the final design of the Project to minimize impacts to wetlands and waterbodies to the greatest extent practicable.

1.6 Statement of Limitations

- This investigation was limited to areas within the Study Area depicted in Figure 3 of Appendix A. No information is provided regarding the presence or absence of regulated wetlands and watercourses outside of the Study Area, except in instances where surveys were conducted outside of the Study Area due to reroutes, or threatened and endangered species surveys.

- This investigation was conducted on the dates indicated herein. Human-induced or natural changes within the Study Area may occur after submittal of this Wetland Delineation Report resulting in changes to the presence and extent of regulated wetlands and waterbodies.

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