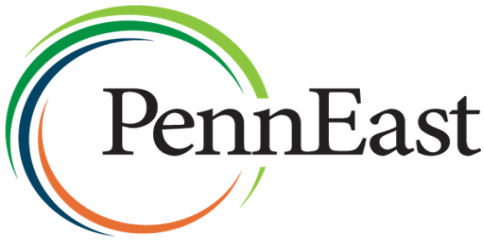

PennEast Pipeline Company, LLC

PENNEAST PIPELINE PROJECT

L3 - ENVIRONMENTAL ASSESSMENT MODULE 3

PROJECT IMPACTS

BUCKS COUNTY

REVISED OCTOBER 2019

Submitted by:

PennEast Pipeline Company, LLC

TABLE OF CONTENTS

TABLES

APPENDICES

Acronym List

ABACT	Antidegradation Best Available Combination of Technologies
ATV	All-Terrain Vehicles
ATW	Approved Trout Waters
BMP	best management practice
BO	Biological Opinion
CFR	Code of Federal Regulations
dbh	diameter at breast height
DRBC	Delaware River Basin Commission
EA Form	Environmental Assessment Form
EI	Environmental Inspector
E&SCP	Erosion and Sediment Control Plan
FERC	Federal Energy Regulatory Commission
FWCA	Fish and Wildlife Coordination Act
HDD	horizontal directional drill
ISMP	Invasive Species Management Plan
MBTA	Migratory Bird Treaty Act
MP	milepost
NMFS	National Marine Fisheries Service
PADCNR	Pennsylvania Department of Conservation and Natural Resources
PADEP	Pennsylvania Department of Environmental Protection
PaGWIS	Pennsylvania Groundwater Information System
PennEast	PennEast Pipeline Company, LLC
PFBC	Pennsylvania Fish and Boat Commission
PGC	Pennsylvania Game Commission
Plan	Upland Erosion Control, Revegetation, and Maintenance Plan
PNDI	Pennsylvania Natural Diversity Inventory
PNHP	Pennsylvania Natural Heritage Program
PPC	Preparedness, Prevention, and Contingency
Procedures	Wetland and Waterbody Construction and Mitigation Procedures
Project	PennEast Pipeline Project
ROW	right-of-way
RQBTS	Recognized Qualified Bog Turtle Surveyor
SGL	State Game Land
STW	Stocked Trout Waters
T&E	threatened and endangered
TSF	Trout Stocking Fishery
USEPA	U.S. Environmental Protection Plan
USFWS	U.S. Fish and Wildlife Service
WTS	Wilderness Trout Streams
WTW	Wild Trout Waters
WWF	Warmwater Fishes

Module S3: Identification and Description of Potential Project Impacts

In accordance with the requirements contained within the Pennsylvania Department of Environmental Protection's (PADEP's) Comprehensive Environmental Assessment of Proposed Project Impacts for Chapter 105 Water Obstruction and Encroachment Permit Applications Technical Guidance Document (TGD) (Document No. 310-2137-006) and the assessment criteria detailed in Module 3 of the Environmental Assessment Form (EA Form) Instructions (Document No. 3150-PM-BWEW0017, Revised 6/2017), PennEast Pipeline Company, LLC (PennEast) has developed a complete analysis and discussion of the anticipated impacts associated with development of the PennEast pipeline (Project) in Bucks County, Pennsylvania. This document follows the sequence of the requirements presented in the EA Form Instructions Module S3 Section.

S3.A Summary of Proposed Impacts

S3.A.1 Total Proposed Permanent Direct Impacts

Permanent impacts are defined as those areas that are affected by a water obstruction or encroachment resulting from the placement or construction of the obstruction or encroachment as well as the area necessary for the operation and maintenance of the obstruction or encroachment. For the Project, permanent impacts would include the proposed pipeline and its 30-foot maintained right of way (ROW), a new permanent access road that will result in permanent fill within a floodway and a new culvert installed within a watercourse, two permanent culvert replacements, permanent fill in approximately 0.036 acres of PEM wetlands and 0.024 acres of PFO wetland mosaic to construct and operate the Kidder Compressor Station in Carbon County.

Permanent impacts are categorized as direct or indirect impacts. Direct impacts include filling, draining, or converting a resource to another type. For the Project, direct impacts include the installation of temporary equipment bridges and wetland mats, replacement of two existing culverts, the installation of a new permanent culvert, fill within one floodway, and fill within approximately 0.036 acres of PEM wetlands and 0.024 acres of PFO wetland mosaic to construct and operate the Kidder Compressor Station in Carbon County. None of the culvert installations or wetland fill impacts would occur in Bucks County; therefore, there are no proposed permanent direct impacts in Bucks County. All proposed permanent impacts within Bucks County are categorized as permanent indirect impacts, described in Section S3.A.3A below.

S3.A.2 Total Proposed Temporary Direct Impacts

Temporary impacts are defined as those areas affected during the construction of a water obstruction or encroachment, but do not include areas that are required to operate and maintain the water obstruction or encroachment, which are considered permanent impacts as described in Section S3.A.1. For the Project, temporary impacts would include any workspace within a wetland, watercourse, or floodway that will be impacted during construction but that is outside of the 30-foot maintained ROW. Temporary impacts include workspace for spoil storage, equipment bridges, wetland matting, and other pipeline construction staging activities.

As described in Section S3.A.1, direct impacts include the installation of temporary equipment bridges and wetland mats, replacement of two existing culverts, the installation of a new permanent culvert, fill within one floodway, and fill within approximately 0.036 acres of PEM wetlands and 0.024 acres of PFO wetland mosaic to construct and operate the Kidder Compressor Station in Carbon County. Specifically, within Bucks County, direct impacts are limited to the installation of a temporary equipment bridge.

Therefore, within Bucks County, temporary direct impacts include the installation of a temporary equipment bridge across one watercourse. PennEast anticipates using 16-foot wide timber mats of other comparable structures to construct temporary bridges. Table BU-L3-1 presents the approximate acreages of temporary direct impacts associated with this equipment crossing. The impact may fall within the Project's 30-foot maintained ROW or the temporary workspace, which are accounted for within the permanent indirect and temporary indirect discussions in Sections S3.A.3 and S3.A.4 below. Therefore, the impacts presented in Table BU-L3-1 estimate the specific impacts for this activity, but they are not additive to the impact acreages present in Tables BU-L3-2 and BU-L3-3 in sections below.

Table BU-L3-1
Total Proposed Temporary Direct Impacts in Bucks County

Milepost[1]	Resource ID[2,3]	Resource Type	Temporary Direct Impacts (acres)[4]
PennEast Mainline Pipeline - Watercourse Impacts			
76.2	051515_JC_1004_E_MI	Watercourse-channel and watercourse floodway	0.033
77.6	052915_JC_1002_C_IN	Watercourse-channel and watercourse floodway	-
77.6	122315_DB_1001_P_MA	Watercourse-channel and watercourse floodway	-
Total Watercourse Impacts			**0.033**
PennEast Mainline Pipeline - Wetland Impacts			
None			

Notes:
1. All route deviations implemented after the FERC Certificate Application are denoted with an "R" and indicate a MP equation. MPs with an "R1" indicate route deviations implemented and provided to FERC prior to the issuance of the DEIS. MPs with an "R2" indicate route deviations implemented as part of the September 2016 Route Update. MPs with an "R3 indicate route deviations implemented post-FERC Certificate issuance. All MPs without an "R" indicate that the route has not changed since the Certificate Application.
2. In instances where a wetland is crossed by the proposed pipeline or workspace multiple times, crossing numbers (e.g. "-1", "-2") have been added to the Wetland ID.
3. Watercourse ID: P = perennial, I = intermittent, E = ephemeral, MA = major, IN = intermediate, MI = minor, C = canal, D = ditch
Wetland ID Key: PEM = palustrine emergent, PFO = palustrine forested, PSS = palustrine scrub shrub
4. A value of 0.00 denoted impact acreages less than 0.005 acres

S3.A.3 Total Proposed Permanent Indirect Impacts

As discussed in Section S3.A.1, permanent impacts are defined as those areas that are affected by a water obstruction or encroachment resulting from the placement or construction of the obstruction or encroachment as well as the area necessary for the operation and maintenance of the obstruction or encroachment. For the Project, permanent impacts would include the proposed pipeline and its 30-foot maintained ROW, a new permanent access road that will result in permanent fill within a floodway and a new culvert installed within a watercourse, two permanent culvert replacements, permanent fill in approximately 0.036 acres of PEM wetlands and 0.024 acres of PFO wetland mosaic to construct and operate the Kidder Compressor Station in Carbon County. Specifically, within Bucks County, permanent impacts are limited to the pipeline and its 30-foot maintained ROW.

Indirect impacts consist of altering the chemical, physical, or biological components of an aquatic resource that result in a functional change of the resource. The construction workspace within wetlands, watercourses, and floodways that is needed to construct the Project is considered an indirect impact. The area within the permanent ROW necessary to operate and maintain the Project is also an indirect impact.

Within Bucks County, the permanent indirect impacts are limited to the acreage of wetlands, watercourses, and floodways within the 30-foot maintained ROW. These impacts are presented in Table BU-L3-2.

Table BU-L3-2
Total Proposed Permanent Indirect Impacts in Bucks County

Milepost[1]	Resource ID[2,3]	Resource Type	Permanent Indirect Impacts (acres)[4]
PennEast Mainline Pipeline - Watercourse Impacts			
76.2	051515_JC_1004_E_MI	Watercourse-channel and watercourse floodway	0.124
77.6	052915_JC_1002_C_IN	Watercourse-channel and watercourse floodway	0.007
77.6	122315_DB_1001_P_MA	Watercourse-channel and watercourse floodway	0.029
Total Watercourse Impacts			**0.160**
PennEast Mainline Pipeline - Wetland Impacts			
77.5	110714_JC_001_PFO	Wetland	0.004
Total Wetland Impacts			**0.004**

Notes:
1. All route deviations implemented after the FERC Certificate Application are denoted with an "R" and indicate a MP equation. MPs with an "R1" indicate route deviations implemented and provided to FERC prior to the issuance of the DEIS. MPs with an "R2" indicate route deviations implemented as part of the September 2016 Route Update. MPs with an "R3 indicate route deviations implemented post-FERC Certificate issuance. All MPs without an "R" indicate that the route has not changed since the Certificate Application.
2. In instances where a wetland is crossed by the proposed pipeline or workspace multiple times, crossing numbers (e.g. "-1", "-2") have been added to the Wetland ID.
3. Watercourse ID: P = perennial, I = intermittent, E = ephemeral, MA = major, IN = intermediate, MI = minor, C = canal, D = ditch
Wetland ID Key: PEM = palustrine emergent, PFO = palustrine forested, PSS = palustrine scrub shrub
4. A value of 0.00 denoted impact acreages less than 0.005 acres

S3.A.4 Total Proposed Temporary Indirect Impacts

As discussed in Section S3.A.2, temporary impacts are defined as those areas affected during the construction of a water obstruction or encroachment, but do not include areas that are required to operate and maintain the water obstruction or encroachment. For the Project, temporary impacts would include any workspace within a wetland, watercourse, or floodway that will be impacted during construction but is outside of the 30-foot maintained ROW. Temporary impacts include workspace for spoil storage, equipment bridges, wetland matting, and other pipeline construction staging activities.

Indirect impacts consist of altering the chemical, physical, or biological components of an aquatic resource that result in a functional change of the resource. The construction workspace within wetlands, watercourses, and floodways that is needed to construct the Project is considered an indirect impact. The area within the permanent ROW necessary to operate and maintain the Project is also an indirect impact.

Within Bucks County, the temporary indirect impacts include the acreage of wetlands, watercourses, and floodways within the construction workspace that are outside of the 30-foot maintained ROW. These impacts are presented in Table BU-L3-3.

Table BU-L3-3
Total Proposed Temporary Indirect Impacts in Bucks County

Milepost[1]	Resource ID[2,3]	Resource Type	Temporary Indirect Impacts (acres)[4]
PennEast Mainline Pipeline - Watercourse Impacts			
76.2	051515_JC_1004_E_MI	Watercourse-channel and watercourse floodway	0.199
77.6	052915_JC_1002_C_IN	Watercourse-channel and watercourse floodway	-
77.6	122315_DB_1001_P_MA	Watercourse-channel and watercourse floodway	-
Total Watercourse Impacts			**0.199**
PennEast Mainline Pipeline - Wetland Impacts			
None			

Notes:
1. All route deviations implemented after the FERC Certificate Application are denoted with an "R" and indicate a MP equation. MPs with an "R1" indicate route deviations implemented and provided to FERC prior to the issuance of the DEIS. MPs with an "R2" indicate route deviations implemented as part of the September 2016 Route Update. MPs with an "R3 indicate route deviations implemented post-FERC Certificate issuance. All MPs without an "R" indicate that the route has not changed since the Certificate Application.
2. In instances where a wetland is crossed by the proposed pipeline or workspace multiple times, crossing numbers (e.g. "-1", "-2") have been added to the Wetland ID.
3. Watercourse ID: P = perennial, I = intermittent, E = ephemeral, MA = major, IN = intermediate, MI = minor, C = canal, D = ditch
Wetland ID Key: PEM = palustrine emergent, PFO = palustrine forested, PSS = palustrine scrub shrub
4. A value of 0.00 denoted impact acreages less than 0.005 acres

S3.B Standard Information Responses

S3.B.1(i) National, State or Local Park, Forest or Recreation Areas

Within Bucks County, the proposed Project will result in the crossing of one state park and recreation area as detailed in Table BU-L3-4. These areas were identified by reviewing publically available websites and databases of federal, state and local agencies; public websites; and other sources of publically available information. Additional information was obtained through consultations with the relevant federal, state or local agencies; reviewing aerial photographs and maps of the Project area; a title search of lands crossed by the Project facilities, and through field surveys conducted from 2014 to 2018.

Federal Lands

Construction of the proposed Project in Bucks County will not result in the crossing of any federally managed properties; therefore, an evaluation of impacts to federal lands has not been provided.

State Lands

Management of state parks in Pennsylvania is implemented by the Pennsylvania Department of Conservation and Natural Resources (PADCNR), and state forests are managed by the Bureau of Forestry, which is a subdivision of PADCNR, while State Game Lands (SGLs) are managed by the Pennsylvania Game Commission (PGC). A discussion on the state lands crossed by the Project has been provided below and summary information including details on the location of the crossings by milepost (MP), length of crossing, and summary of land affected by construction and operation of the Project facilities has been included for review in Table BU-L3-4 below.

The PennEast pipeline crosses Delaware Canal State Park near MP 77.6 for an approximate crossing length of 0.04 mile in Bucks County, Pennsylvania. Approximately 0.1 acre of lands associated with Delaware Canal State Park will be affected by construction and operation of the Project.

The Delaware Canal State Park parallels the Delaware River between Easton and Bristol along the 60-mile historical towpath. The park includes a 90-acre pond, and many miles of shoreline and river islands (PADCNR, 2018). To minimize impacts to this location, PennEast is proposing use of a horizontal

directional drill (HDD) to cross the Delaware River and the adjacent park, which negates the potential for permanent impacts to the surface.

Table BU-L3-4
Federal and State Lands Crossed by the Project Facilities in Bucks County

Municipality[1]	Approximate Milepost	Recreation Area	Approximate Pipeline Crossing Length (miles)	Land Affected During Construction (acres)[2]	Acreage within the Permanent ROW[3]
Durham	77.6	Delaware Canal State Park	0.04	-	0.1

Notes:
1. Sources: PennDOT Pennsylvania municipality boundaries dated 1/2017. Available at www.pasda.psu.edu.
2. Acreage affected by construction represents the total amount of workspace within the limits of disturbance, including the acreage within the permanent ROW. A value of 0.00 denotes impact acreages less than 0.005 acres. A "-" denotes no impacts.
3. Not all permanent ROW will be maintained as herbaceous cover. In wetland or riparian areas, only a 30-foot wide ROW will be maintained. Where surface impacts are avoided by HDDs, the ROW will not be mechanically cleared during project construction or operation.

S3.B.1(ii) National Natural Landmarks

National Natural Landmarks designated by the U.S. National Park Service within Bucks County are limited to the Monroe Border Fault geologic feature, which is located along PA Route 611 and Lehnenberg Road in Durham Township, Pennsylvania (NPS, 2016). The proposed Project crosses PA Route 611 approximately 1 mile north of the Monroe Border Fault; therefore, impacts to this National Natural Landmark will not occur.

S3.B.1(iii) National Wildlife Refuge, or Federal, State, Local, or Private Wildlife or Plant Sanctuaries

No Federal, state, local, or private wildlife or plant sanctuaries are located within the Project area (USFWS, 2018).

S3.B.1(iv) State Game Lands

Management of SGLs in Pennsylvania is implemented by the PGC. To date, no SGLs or other state-owned hunting grounds will be impacted by the proposed Project in Bucks County.

S3.B.1(v) Areas Identified as Prime Farmland

Based on soil classifications, 28.4 acres of area classified as prime farmland or farmland of statewide importance will be located within the construction work area, which includes 18.4 acres in the temporary ROW. In addition, 10.0 acres of area classified as prime farmland or farmland of statewide importance will be located within the permanent ROW.

To minimize impacts to agricultural land, topsoil would be stripped to a depth of up to 12 inches and segregated away from subsoil to prevent mixing of soils in either the full work area or in the trench and subsoil storage area, unless the landowner or land management agency specifically approves otherwise. Full ROW topsoil stripping would avoid issues such as topsoil mixing from deep rutting and topsoil compaction. Topsoil would be stored in a windrow parallel to the pipeline trench in such a manner that it would not become intermixed with subsoil materials.

During the restoration phases of the Project, topsoil would be replaced. To avoid compaction and rutting, the subsoil would be plowed prior to replacing the segregated topsoil. During placement, topsoil and subsoil would be tested for compaction at regular intervals and compared to similar soil types in undisturbed areas to approximate preconstruction conditions. The entire ROW would then be disked. PennEast would utilize penetrometers or other appropriate devices to conduct the tests and would maintain detailed records of the test results. Additional plowing or tilling would be performed if further compaction occurs from subsequent construction and cleanup activities. Plowing/ripping and disking would be done at a time when the soil is dry enough for normal tillage operations to occur on undisturbed farmland adjacent to the areas to be ripped.

Following construction, all agricultural land would be properly restored and returned to pre-Project contours in accordance with Federal Energy Regulatory Commission's (FERC's) Upland Erosion Control, Revegetation, and Maintenance Plan (Plan) (FERC, 2013b) and Wetland and Waterbody Construction and Mitigation Procedures (Procedures). Additionally, PennEast would provide landowners with contact information to enable them to request certain land leveling activities should uneven settling or surface drainage problems develop. PennEast would provide such land leveling efforts within 45 days of such landowner requests weather and access permitting and to the extent such efforts do not violate any governmental agency permits or approvals. All fencing and gates removed for the installation of the pipeline shall be replaced or installed according to the landowner's specifications.

PennEast would employ third party Environmental Inspectors (EIs) to monitor all construction and restoration activities to maintain compliance with the Erosion and Sediment Control Plan (E&SCP), FERC order conditions, other environmental permits and approvals, and environmental requirements in landowner agreements. Active croplands temporarily disturbed by the proposed Project activities are expected to return to their original condition following the completion of the construction of the Project.

Following construction, pipeline operation would not prohibit the use of the Project ROW for agricultural purposes, or the use of heavy farm equipment within the permanent ROW. Therefore, Project related impacts to agricultural areas along the pipeline route would be limited to the Project construction period and the time required for vegetative regrowth after construction is completed.

PennEast would work with farmers to measure both pre-and post-construction crop yields until such time as yields have reached pre-construction levels. PennEast would compensate farmers for impacts to crop yields caused by the Project and would work diligently to eliminate the impact. Agricultural lands would be restored using approved, modern mitigation techniques designed to reestablish pre-existing productive use of the agricultural lands, which is typically within 3 years following Project completion.

S3.B.1(vi) Source for a Public Water Supply

As described in EA Module 2, PennEast used several data sources including public sources, consultations with public water suppliers, desktop assessments, and landowner outreach to identify public and private water supplies near the Project area. The data collection methods and the specified water supply search radii are detailed in EA Module 2 Section S2.A.5.

In Bucks County, nine private water supply wells have been identified within the well monitoring buffer; no public water supply wells have been identified in the well monitoring buffer. Within the PADEP-specified buffers at HDD locations, PennEast has identified one private water supply well within 1,000 feet of the HDD. No public water supply wells have been identified within 0.5 mile of the Delaware River HDD.

In accordance with its Well Monitoring Plan (Appendix BU-L-3G) and FERC Certificate conditions, PennEast will monitor all wells within 150 feet of the Project workspace (500 feet in karst areas and near proposed HDDs). The monitoring will require the approval of the landowner and will include both public and private water supplies.

PennEast will implement the notification protocol outlined in its HDD Inadvertent Returns and Contingency Plan (Appendix BU-L-3C), contacting landowners with public or private water supply wells, if drilling fluid losses occur during HDD operations.

S3.B.1(vii)Natural Wild or Scenic River or the Commonwealth's Scenic Rivers System

The PennEast pipeline route was carefully chosen such that no sections of river crossed by or located within 0.25 miles of the Project are included in the NWSRS (NWSRS, 2018) or are designated as PA Scenic Rivers (PADCNR, 2018).

Outside of the Project corridor, a portion of the Lehigh River located to the southwest of the Project and downstream of the Francis E. Walter Dam near MP 23.0 is designated as a Pennsylvania Scenic River. Additionally, portions of the Delaware River beyond 0.25 miles to the north and south of the Project where it crosses the Delaware River near MP 77.6 are included in the NWSRS.

S3.B.1(viii) Designated Federal Wilderness Areas

No registered wilderness areas designated under the Wilderness Act would be crossed or located within 0.25 mile of the Project (Wilderness.net, 2018).

S3.C Subfacility Details Table

Please see Appendix BU-L-3A for a Table with subfacility details including an identifier, code, description, affected resource, coordinates, and required details.

S3.D Resource Function Effects

S3.D.1 Unique Project Subfacility Identifier

The Project impacts have been categorized into the following PADEP-defined subfacilities:

CULV: Culvert. This subfacility is used for new culverts and culvert replacements. As described in Section S3.A.1, the proposed Project includes the installation of one new culvert and the replacement of two existing culverts in Pennsylvania. Within Bucks County, this subfacility is not used to categorize any impacts.

FLACT: Floodway Activity. This subfacility is used for permanent impacts within in floodways. For the overall Project, this includes floodway impacts associated with the installation of one new culvert and the replacement of two existing culverts in Pennsylvania. Within Bucks County, this subfacility is not used to categorize any impacts.

PIPE: Pipeline or Conduit. This subfacility is used for all pipeline and associated permanent ROW impacts. The Project mainline pipeline is 36 inches in diameter, the Blue Mountain Lateral is 4 inches in diameter, and the Hellertown Lateral is 24 inches in diameter. The maintained ROW width for each pipeline is 30 feet. The pipeline will be installed a minimum of five feet below each watercourse and three feet below each wetland. Per PADEP guidelines, the pipeline and its ROW is considered a permanent impact to wetlands, watercourses, and floodways. Pre-construction contours will be restored, and watercourse and floodway cross-sectional areas will not be altered as a result on the pipeline installation.

TMPWI: Temporary Wetland Impact. This subfacility is used for direct and indirect impacts to wetlands that occur on a temporary basis. This subfacility is used to categorize temporary workspace and is inclusive of the 30-foot maintained ROW that is also categorized as the subfacility PIPE.

WTDIM: Direct Wetland Impact. This subfacility is used for all direct permanent wetland impacts. This type of impact is limited to permanent fill within PEM and PFO mosaic wetlands associated with the Kidder Compressor Station in Carbon County. Therefore, this subfacility is used for the Project, but not to describe impact types within Bucks County.

S3.D.2 Impact Types

S3.D.2(i) Hydrologic Impacts

Water Quantity and Streamflow

A discussion of the Project's potential impacts on various water quantity and streamflow functions, such as: drainage patterns, flushing characteristics, current patterns, groundwater discharge, natural ground and surface water recharge, and storm and floodwater storage and control is detailed below.

Natural Drainage Patterns

Construction of the proposed Project will have a temporary impact on natural drainage patterns for one of the three watercourses crossed by the Project in Bucks County. Natural drainage patterns may be affected by the use of heavy equipment, the removal of vegetation, the grading of the ROW, the open cut trenching of a watercourse, and the use of diversion devices to direct surface flows away from exposed soils. PennEast will employ the procedures contained within the E&SCP (JPA Section M) to minimize impacts to drainage patterns during construction and to ensure proper restoration of surface contours and elevations during restoration. Best management practices (BMPs) specific to the preservation of natural drainage patterns include:

1. The use of timber equipment bridges across watercourses;
2. Expediting construction across watercourses such that the duration of open trench is limited to the minimum time necessary to safety install the pipeline and disturbed locations are quickly returned to their pre-construction condition;
3. Necking the construction ROW down to a width of 75 feet compared to 100 feet to further minimize impacts at watercourse crossings;
4. Unless deemed necessary and approved by FERC, not siting additional temporary workspaces within 50 feet of wetland and watercourse crossings;
5. The use of trench plugs at the watercourse crossing to avoid the disruptions of natural drainage flows;
6. Re-establishing natural surface grades and contours following backfilling operations to maintain existing flow patterns within watercourses; and
7. The use of structural and non-structural BMPs to limit erosion and quickly re-establish vegetation cover.

The construction and restoration procedures described above are anticipated to minimize impacts during construction and adequately restore the direction and flow rates to pre-construction conditions during restoration. As a result, no significant impacts to natural drainage patterns are anticipated in Bucks County.

Flushing Characteristics

Construction of the Project is not anticipated to have a substantial impact on the flushing characteristics of the three watercourses crossed in Bucks County. Two of the watercourses will be crossed under using the HDD crossing method, avoiding surface impacts. A dry crossing technique (see Section 1.1 of Module 4) will be employed for the other ephemeral watercourse crossing. If there is in any streamflow at the time of construction, flow will be maintained either through the use of dam and pump, or flume pipes; therefore, no substantial loss of flow will occur during installation of the pipeline facilities. The extent of clearing, stumping and trenching at the watercourse crossing will be limited to the dimensions necessary to install the pipeline. Watercourse substrate will be segregated and reinstalled following installation of the pipeline and to the extent practicable, all drainage patterns, surface contours and bed and bank formations will be returned to their pre-construction condition. The ephemeral watercourse crossing will be completed within 24 hours, and immediate floodplain locations will be stabilized with structural and non-structural BMPs to ensure proper restoration. Additionally, there are no watercourse relocations, enclosures or channel deepening/dredging activities proposed in conjunction with the Project's three

watercourse crossings in Bucks County that could alter flushing characteristics in the Project area. As a result, no significant impacts to flushing characteristics are anticipated in Bucks County.

Current Patterns

Similar to the analysis provided for natural drainage patterns and flushing characteristics above, construction of the Project is not anticipated to have a substantial impact on the current patterns associated with the one wetland and three watercourses crossed in Bucks County. PennEast will implement the BMPs detailed within the E&SCP (JPA Section M) to minimize impacts during construction and ensure proper restoration, resulting in the return of pre-construction surface contours and elevations within wetlands and watercourse channels. Additionally, there are no watercourse relocations, enclosures or channel deepening/dredging activities proposed in conjunction with the Project's three watercourse crossings in Bucks County that could alter current patterns in the Project area. As a result, significant impacts to wetland and watercourse current patterns within Bucks County are not anticipated to occur.

Groundwater Discharge for Baseflow

As discussed in the Section S2.D.2 of Module 2, the potential for groundwater discharge for baseflow to watercourses that are crossed by the Project is anticipated to be low. Irrespective of this, PennEast will minimize impacts to groundwater resources by implementing the construction and restoration procedures found within the E&SCP (JPA Section M). Groundwater management BMPs to be employed during construction includes the following:

1. Discharging of trench water to filtration devices positioned in vegetated areas to allow for the natural infiltration of water back into the local groundwater column;
2. The use of trench plugs at the enter and exit points of wetland and watercourse crossings to maintain the existing wetland hydrology, drainage patterns and avoid draining of the resource area back into the Project workspace;
3. The use of PennEast's Preparedness, Prevention, and Contingency (PPC) Plan (Appendix BU-L-3B) to minimize and mitigate for the unexpected discharge of fuels, oils or other chemicals to the ground or water surface during construction, along with use of the HDD Inadvertent Returns and Contingency Plan (Appendix BU-L-3C) to address potential impacts associated with an inadvertent release of drilling fluid during trenchless crossings;
4. The directing of storm water off the construction ROW to vegetated areas to allow for natural groundwater infiltration and recharge;
5. The return of segregated topsoil, natural surface elevations, drainage patterns and contours upon completion of construction; and
6. Restoration and monitoring of the pipeline ROW per federal and state requirements to ensure successful revegetation of the ROW.

Use of the BMPs described above, combined with complete revegetation of the Project ROW, is expected to minimize impacts to groundwater during construction and operation of the Project such that groundwater discharges that may contribute to the baseflow supply to watercourses or wetland hydrology are unaffected by the Project.

Natural Recharge Area for Ground and Surface Water

Natural recharge for ground and surface waters did not appear to be present within the delineated wetland in Bucks County. The pipeline will be installed using a HDD, and the bore path would be approximately 74 feet below the surface at the wetland. Therefore, natural recharge will be unaffected by the Project in Bucks County.

Storm and Floodwater Storage and Control

Given the linear nature of the proposed Project, temporary impacts within areas subject to flooding are unavoidable and as a result of the proposed activities, approximately 0.09 acres of temporary earth disturbance in Bucks County will occur within the 100-year floodplain. As noted in Section S2.D.2 of Module 2, one wetland and three watercourses within Bucks County are anticipated to provide various levels of flood storage and control functions. There are no proposed surface impacts to two of the watercourses and one wetland. The ephemeral watercourse that will be impacted during construction will incur a temporary reduction in its capacity to manage storm water and flood flows. To mitigate for temporary disturbances, PennEast will implement the BMPs and construction procedures detailed in the E&SCP (JPA Section M) and summarized below.

- When working in floodway locations, PennEast will make every effort to expedite construction and will remove equipment and construction materials immediately following restoration of the workspace;
- During construction, PennEast will monitor the local weather forecast and watercourse flow conditions and will implement the necessary measures such as the removal or securing of construction materials or equipment in the event that a high-water occurrence is anticipated;
- PennEast will ensure all flows are maintained at watercourse crossing locations and sufficient mechanisms and procedures are in place to accommodate unexpected increases in watercourse flow;
- The watercourse crossing will be completed within 24 hours and immediate floodplain locations will be stabilized with structural and non-structural BMPs to ensure proper restoration;
- PennEast will divert storm water off the ROW to vegetated locations and install and maintain necessary water diversions such as trench breakers and water bars to control and slow storm water movement along the ROW; and
- PennEast will restore the watercourse crossing to its preconstruction surface grades and contours and will monitor revegetation to minimize or avoid permanent impacts on vegetated floodway areas.

The procedures identified above are anticipated to allow for the safe installation of the Project, while minimizing impacts to floodway locations. Additionally, all permanent components of the Project located in floodway areas will be installed at a minimum of three feet below surface grade. No permanent structures will be located in floodway areas. As a result, operation and construction of the Project is anticipated to have no significant impact on the ability of the affected wetland and watercourses to provide storm and floodwater storage and control functions.

S3.D.2(ii) Biogeochemical Impacts

Water Quality

The following sections provide a summary of the Project's potential impacts on several water quality characteristics, such as: preventing pollution, sedimentation control and patterns, salinity distribution and natural water filtration.

Preventing Pollution

Land use cover types associated with the Project in Bucks County are comprised of agricultural (84%), commercial/industrial (1%), forest/woodland (12%), open land (1%), open water (1%), and residential (1%) land. The majority of the Project crosses rural areas, where pollution is generally minimal. There will be no surface impacts to wetlands within Bucks County, so any pollution control or treatment functions that the wetland may provide would not be diminished by Project construction. PennEast will implement a PPC Plan (Appendix BU-L-3B) to minimize and mitigate for the unexpected discharge of fuels, oils or other hazardous chemicals to the ground or water surface during construction, along with the HDD Inadvertent Returns and Contingency Plan (Appendix BU-L-3C) to address potential impacts associated with an inadvertent release of drilling fluid during HDD crossings. The construction and restoration procedures detailed herein are expected to allow for installation of the Project facilities while minimizing the potential for pollution.

Sedimentation Control and Patterns

As identified in Section S2.D.2 of Module 2, wetlands within the Project area may possess the ability to provide sediment retention; however, due to the rural landscape and limited surface disturbances noted, minimal sedimentation retention by wetlands is expected to occur in Bucks County. Regardless, PennEast will utilize the BMPs detailed within the E&SCP (JPA Section M) to minimize the potential for sedimentation into wetlands and watercourses during construction, and will fully restore affected wetlands and watercourses (to the extent practicable) to their pre-construction condition. All Project activities related to the installation and maintenance of sediment control devices will be conducted in accordance with the procedures contained within the PADEP Manual as well as the provision contained with the PADEP Chapter 102 Rules and Regulations (25 Pa. Code Chapter 102). The construction and restoration methods identified for the Project are anticipated to minimize and avoid impacts related to sedimentation.

Salinity Distribution

All surface waters crossed by the Project in Bucks County consist of freshwater resources and are free of any naturally occurring or artificial sources of salinity; therefore, impacts pertaining to potential salinity distribution were not evaluated for the Project.

Natural Water Filtration

Though it may not be the principal function, the wetland crossed by the Project in Bucks County is anticipated to provide some level of natural water filtration for existing ground and surface water systems. The Project will not result in surface impacts to the wetland, thereby preserving the ability to function as a natural water filtration medium.

Food Chain Production

As noted in Section S2.D of Module 2, PennEast has determined that one wetland and three watercourses crossed by the proposed Project in Bucks County are considered to have varying levels of potential for food chain production, and as a result, support all trophic levels including producers and primary and secondary consumers. Because two of the watercourses and the wetland will be crossed under using the HDD method, food chain production impacts would be avoided within these resources. Temporary impacts to food chain production are unlikely to occur within and surrounding the ephemeral watercourse. Because the ephemeral watercourse only flows in direct response to precipitation, there is not sufficient hydrology to support aquatic vegetation and benthic communities. Downstream sedimentation may occur; however, given the required timelines for construction completion (24 hours), limited impacts associated with drifted sediments are anticipated. The BMPs for watercourse crossings proposed for the Project (i.e., use of dry construction methods, segregation of watercourse substrate, re-establishment of contours, replanting of vegetation and use of erosion control blankets as well as other structural BMPs) are anticipated to fully restore the affected watercourse such that impacts remain localized and temporary in nature.

S3.D.2(iii) Habitat Impacts

General Habitat Provision

The following sections provide a description of the associated environmental impacts on each aquatic resource area in terms of its post-construction ability to continue to provide: food chain production, general habitat, nesting capabilities, spawning, rearing, resting, migration, feeding, escape cover and other characteristic it might offer.

Nesting

Migratory birds are protected under regulations including the Migratory Bird Treaty Act (MBTA) and to a lesser extent, provisions contained within the Fish and Wildlife Coordination Act (FWCA). In consultation with the USFWS, the Ecological Field Office in Pennsylvania requested adherence to their Adaptive Management Practices for Conserving Migratory Birds. PennEast has committed to adhere to the Adaptive Management Practices wherever feasible. These conservation measures include:

- Co-locating the pipeline and associated facilities with existing roads and other disturbed areas. A significant portion of the pipeline within Pennsylvania – 30.7 miles– is proposed to be co-located with existing utility ROW.

- Minimizing the width of the temporary construction ROW, and avoid grubbing where possible to encourage the re-establishment of woody vegetation. Typical construction workspace for the Project will range from 75 feet to 125 feet wide.

- Minor hand clearing between HDD entry and exit points includes branch and low sapling/shrub clearing to maintain line of sight in between pipeline marker posts, typically the width of a walking trail. There will be no cutting of mature trees for line of sight or marker posts. Minimizing the width of the permanent, maintained ROW to only that which is absolutely necessary to maintain the integrity of the pipeline. The operational easement will be 30-feet wide, except when near wetlands and watercourse crossings. A 10-foot wide operational easement centered on the pipeline will be maintained in an herbaceous or scrub/shrub vegetative state in emergent or scrub-shrub wetlands. A 30-foot wide operational easement centered on the pipeline will be maintained in an herbaceous or scrub/shrub vegetative state in forested wetlands. No large trees would be allowed within 15-feet of the proposed pipeline. The remaining temporary corridor would revert to its pre-construction land use/land cover once construction is complete.

- Maximizing the rotation of mowing and/or clearing along that maintained ROW to allow for the establishment of more beneficial wildlife habitat.

- Adhering to tree clearing restrictions, felling trees between November 1 and March 31.

- Performing any future mowing and/or clearing along the maintained ROW between September 11 and March 14 to prevent impacts to grassland bird species.

- Using seed mixes for restoration that will minimize competition with native woody plant species.

As discussed in Section S2.D.2 of Module 2, the one wetland's habitat crossed by the Project is estimated to provide nesting opportunities for various songbirds, raptors, waterfowl and grassland species. Since this wetland will be crossed under using the HDD crossing method, there will be no clearing or placement of equipment mats over wetland vegetation, and nesting habitat within the Bucks County wetland will not be impacted. To minimize clearing impacts, PennEast has sited approximately 86 percent of the Project in Bucks County within existing open areas, such as agricultural fields.

Following installation of the pipeline facilities, nesting opportunities for bird species requiring interior forest locations or dense tree canopies will be permanently reduced in upland locations and temporarily reduced in wetland areas; however, the nesting possibilities for species requiring edge habitats or nest sites near or at the ground surface will be increased. The revegetation procedures proposed for the Project combined with PennEast's commitment to adhere to the MBTA timing restrictions for clearing operations is expected to minimize impacts to nesting habitat such that long-term adverse impacts within Bucks County are not anticipated to occur.

Spawning

Spawning opportunities for Warmwater Fishes (WWF) are predicted to be present in the two perennial watercourses crossed by the Project, but is not predicted to be present in the ephemeral watercourse

crossed by the Project due to absence of seasonal or year-round flow. Seasonal amphibian breeding habitat (vernal pools) may be found in the wetland crossed by the Project in Bucks County. Direct impacts to watercourse spawning activities will be avoided through use of HDD crossing methods. To minimize the potential for post-construction disturbances to the ephemeral watercourse, PennEast will implement the BMPs found within the E&SCP (JPA Section M) which include, but are not limited to: the use of dry construction methods, segregation and replacement of watercourse substrate, re-establishment of pre-construction contours, replanting of vegetation, use of erosion control banks as well as other structural BMPs and the post-construction monitoring of the restored watercourse. Direct impacts to vernal pools will not occur since the wetland will be crossed using the HDD crossing method. As a result, significant impacts to spawning activities are unlikely to occur within Bucks County.

Rearing

As discussed in Section S2.D.2 of Module 2, wildlife rearing opportunities are anticipated to be moderate to high within the undisturbed forested portions of the proposed Project ROW. During construction of the Project, one forested wetland will be crossed via HDD crossing methods, thereby avoiding impact to available habitat for wildlife rearing opportunities in the Project area. Additionally, the forested upland area adjacent to this wetland will also be crossed by HDD, which will avoid aboveground forested impacts. Therefore, immediate or long-term significant effects on aquatic environments utilized for wildlife rearing are not anticipated to occur.

Resting

As noted in Section S2.D.2 of Module 2, the single wetland crossed by the Project in Bucks County contains habitat that has the potential to be used for resting by a variety of birds, amphibian, reptile, and mammal species. However, similar to the analysis provided above for wildlife rearing, resting behaviors are anticipated to occur more frequently in areas free of human disturbance, which offer more protection and cover for resting activities. As a result, impacts to aquatic habitats functioning as wildlife resting locations will occur within forested segments of the Project. During construction of the Project, one forested wetland will be crossed via HDD crossing methods, therefore avoiding impact to available habitat for wildlife resting opportunities in the Project area. Species resting in these locations will not be displaced during construction. Therefore, immediate or long-term significant effects on aquatic environments utilized for wildlife resting are not anticipated to occur.

Migration

As identified in Section S2.D.2 of Module 2, the one wetland crossed by Project in Bucks County contains habitat that has the potential to be used during migration periods by a variety of raptors, waterfowl, songbirds, amphibians, and reptiles. However, similar to the analysis provided for wildlife rearing and resting above, temporary use by wildlife for cover, resting or feeding activities is anticipated to be more prevalent in areas absent of land disturbances. During construction of the Project, one forested wetland will be crossed via HDD crossing methods, therefore avoiding impact to available habitat that may be used during migration periods in the Project area. The revegetation procedures proposed for the Project, combined with PennEast's commitment to adhere to the MBTA timing restrictions for tree

clearing, is expected to minimize impacts to wildlife, such that long-term adverse impacts within Bucks County are not anticipated to occur.

Seasonal migration of anadromous fishes is likely to occur within perennial watercourses crossed by the Project in Bucks County, but is not likely to occur in the ephemeral watercourse crossed by the Project due to absence of seasonal or year-round flow. Direct impacts to migration activities will be avoided through use of the HDD crossing method for the perennial watercourses. Additionally, PennEast will implement the BMPs found within the E&SCP (JPA Section M) which include, but are not limited to: the use of dry construction methods, segregation and replacement of watercourse substrate, re-establishment of pre-construction contours, replanting of vegetation, use of erosion control blankets as well as other structural BMPs and the post-construction monitoring of restored wetlands and watercourses. These BMPs are expected to restore affected watercourses following installation of the pipeline facilities. Therefore, significant effects on aquatic environments during periods of seasonal migration are not anticipated to occur.

Feeding

PennEast has determined that one wetland and three watercourses crossed by the proposed Project in Bucks County are considered to have varying levels of potential for feeding. Feeding opportunities within the wetland habitat will not be directly impacted by clearing or excavation activities due to crossing via HDD method.

The one ephemeral watercourse crossed by the Project in Bucks County is not considered to have a significant potential for feeding due to absence of seasonal or year-round hydrology. The two perennial watercourses crossed by the Project in Bucks County may have varying levels of potential for feeding, but will not be impacted at the watercourse crossing location, nor will they result in indirect impacts downstream of the workspace due to use of the HDD crossing method. Immediate impacts to aquatic vegetation and benthic communities are also avoided. Downstream sedimentation may occur in the ephemeral watercourse; however, given the required timelines for competition (24 hours) and use of dry crossing techniques, limited impacts associated with drifted sediments are anticipated. The BMPs for watercourse crossings proposed for the Project are anticipated to fully restore the affected aquatic communities such that impacts to feeding remain localized and temporary in nature.

Escape Cover

As noted in Section S2.D.2 of Module 2, the one wetland crossed by Project in Bucks County contains habitat that has the potential to be used for escape cover by a variety of birds and mammal species. However, similar to the analysis provided above for wildlife rearing and resting behaviors, opportunities for escape cover are anticipated to occur more frequently in areas free of human disturbance. The wetland will be crossed via the HDD crossing method, therefore avoiding impact to available habitat that may be used for escape cover in the Project area. Therefore, significant effects on aquatic environments utilized for wildlife escape cover are not anticipated to occur.

Other Habitat

No other general habitat considerations were identified during the wetland and watercourse delineations or threatened and endangered species surveys in Bucks County.

Habitat for Threatened and Endangered Plant and Animal Species

Requests for information regarding the potential presence of federal and state listed threatened and endangered (T&E) species within the Project area were sent to the USFWS Pennsylvania Field Office, National Marine Fisheries Service (NMFS), Pennsylvania Fish and Boat Commission (PFBC), PGC, and PADCNR. Each agency evaluated the potential for the Project to affect T&E species under their jurisdiction. Table BU-L2-5 in Module 2 lists the survey and reporting status of the plant and animal species identified through consultations with the federal and state agencies as threatened, endangered, candidate, or of concern in Bucks County. Within Bucks County, the species that may be impacted by the Project include the northern long-eared bat (*Myotis septentrionalis,* federal threatened), bog turtle (*Glyptemys muhlenbergii,* federal threatened), and eastern redbelly turtle (*Pseudemys rubriventris,* state threatened).

Northern Long-Eared Bat

In its Biological Opinion (BO), the USFWS concluded that tree removal within 0.25 mile of northern long-eared bat hibernacula is not likely to adversely affect the species, and vibrations generated by heavy machinery are not anticipated to result in micro-climatic or structural changes to hibernacula. However, the USFWS also concludes that tree removal within 150 feet of maternity roosts is likely to adversely affect northern long-eared bat individuals with maternity colonies close to the Project. Tree removal will occur outside of the restricted pup season window, so this take is not prohibited by the 4(d) rule. To minimize impacts to the species, PennEast will implement the following conservation measures in Bucks County:

- PennEast will only clear trees ≥5 inches diameter at breast height (dbh) between November 1 and March 31.
- PennEast will only clear trees ≥3 inches dbh between November 15 and March 31 within known fall swarming habitat areas.
- PennEast will not blast within 0.25-mile of known northern long-eared bat hibernacula.
- PennEast will work with the USFWS to conduct vibration, and/or temperature and humidity monitoring within subterranean features found at Tunnel 34 prior to, during, and after construction as long as landowner access continues to be granted.
- Prior to construction, PennEast will file with the FERC Secretary, for review and written approval by the Director of Office of Energy Projects, a list of locations by milepost where, in accordance with the BO, the USFWS is requiring tree clearing restrictions that are specifically applicable to federally listed bat species.

Bog Turtle

The wetland that was delineated in Bucks County was assessed by a Recognized Qualified Bog Turtle Surveyor (RQBTS). During the Phase 1 assessment, the RQBTS determined that the wetland did not meet minimum criteria for suitable bog turtle habitat. Based on this assessment, no impacts to bog turtles are expected within Bucks County. However, Bucks County is included in the amount of take permitted by the USFWS' BO for the Project.

Eastern Redbelly Turtle

Because PennEast will cross the Delaware River via HDD technologies, no impact to the redbelly turtle is expected for that crossing. PennEast biologists conducted nesting habitat assessments on workspace within 1,000 feet of the Delaware River, which included one access road and portions of the HDD drilling site. Based on survey results, the PFBC concluded that the Project was not likely to adversely affect the eastern redbelly turtle.

Environmental Study Areas

Sanctuaries

As noted in Section S2.A.4 of Module 2, PennEast has determined there are no wildlife, bird, fish, or plant sanctuaries that would be crossed by the proposed Project in Bucks County; therefore, an evaluation of this resource was not provided.

Refuges

PennEast has determined there are no USFWS National Wildlife Refuges crossed by the proposed Project in Bucks County; therefore, an evaluation of this resource was not provided.

Other

The USFWS Pennsylvania Field Office did not identify any federal-owned or protected natural communities, including officially designated wilderness areas or wildlife preserves, or National Wildlife Refuges in the vicinity of the Project in Pennsylvania.

The Pennsylvania Natural Heritage Program (PNHP) recognizes "natural communities of special concern" and tracks the location of natural community types that are designated as NatureServe State rank of S1 (critically imperiled), S2 (imperiled) or S3 (vulnerable) (PNHP, 2017). The PNHP has inventoried locations by county where plant species and natural communities of special concern have been documented as "Natural Areas." Based on the Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review, the Project will not impact any designated Natural Areas.

S3.D.2(iv) Recreation Impacts

Section S3.B includes a summary table of federal, state, county and municipal public lands crossed by the Project facilities in Bucks County (Table BU-L3-4). The sections below provide a summary of the

anticipated impacts associated with construction and operation of the Project across publicly available properties utilized for game and non-game hunting, fishing, hiking, wildlife viewing opportunities, other recreational uses and estimated impacts to properties located up and downstream of the Project in Bucks County.

Game Species

No portion of the proposed Project in Bucks County will result in the crossing of SGLs or other known public or privately managed hunting grounds. As a result, affects to known hunting areas that are occupied by game species are anticipated to be negligible.

Given the number of privately owned land tracts crossed by the Project and the extent of hunting that commonly occurs in Pennsylvania, installation of the Project facilities may result in short-term disturbances to hunting activities occurring on private properties during periods of active construction. Considering the timeline and extent of the Project, it is anticipated that site activities have the potential to overlap with state-established seasons for specific game species and therefore, may limit hunting opportunities in and within the vicinity of the ROW. PennEast will coordinate with affected landowners to minimize potential conflicts with hunting and will follow any work limitations provided by the landowners, to the greatest extent practicable. No impacts to populations of game species or hunting opportunities will occur following completion of the Project, nor will the operation of the Project facilities have any forthcoming impacts on hunting.

Non-Game Species

Non-consumptive wildlife recreation activities such as viewing, studying and photographing wildlife may be available within aquatic communities on numerous public and private properties crossed by the Project; however, the extent to which these activities occur on specific properties affected by the Project is unknown. Table BU-L3-4 in Section S3.B provides a summary of federal, state, county and municipal public conservation areas traversed by the Project in Bucks County. Temporary impacts related to the interruption of non-consumptive recreational wildlife activities may occur during construction of the Project, as standard health and safety protocols for pipeline construction prohibit access of non-Project personnel to the ROW during active construction. PennEast will coordinate with the affected land managing agencies to ensure the safety of the public and to confirm sufficient signage and public notice of construction activities is published. No impacts to non-consumptive recreational wildlife activities will occur following completion of the Project nor will operation of the Project facilities have any future impacts on wildlife viewing, studying or photographing during operation of the pipeline facilities.

Fishing

Watercourses supporting trout populations (either native or stocked) or providing trout habitat are afforded the following classifications by PFBC: Approved Trout Waters (ATW), Class A Trout Waters, Special Regulation Areas, Stream Sections that Support Natural Reproduction of Trout (including upstream tributaries), and Wilderness Trout Streams (WTS). ATW are those watercourses which contain segments open to public fishing and are stocked with trout (PFBC, 2018). Special Regulation Areas refers to anglers. Class A Trout Waters and watercourse sections that Support Natural Reproduction of

Trout are defined as watercourses that support a population of naturally produced trout of sufficient size and abundance to support a long-term fishery; however, Class A watercourses are not stocked with trout. The WTS designation is based on the provision of a wild trout fishing experience in a remote, natural and unspoiled environment (PFBC, 2018).

Trout-Stocking Fisheries (TSFs) in Pennsylvania are those fisheries that are managed by PFBC for the maintenance of stocked trout from March 1 through June 15 as well as for the maintenance and propagation of fish species and additional flora and fauna that are indigenous to coldwater habitats. No ATW/Stocked Trout Waters (STW) or Wild Trout Waters (WTW) will be impacted by the Project in Bucks County.

Two of the three watercourses that are crossed by the Project in Bucks County will be crossed under using the HDD method. Recreational fishing will not be affected during Project construction at the crossings. The third watercourse is an ephemeral watercourse that would not be used for recreational fishing. As a result significant impacts to watercourses crossing locations that provide recreational fishing are not expected to occur in Bucks County.

Hiking

The Project crosses public land that may provide opportunities for hiking in Bucks County; however, the proposed HDD will avoid surface impacts to the Delaware River State Park and associated trail. As a result, no impacts to hiking opportunities are anticipated to occur in Bucks County.

Wildlife Observation

Recreational wildlife viewing opportunities may be available on the public property crossed by the Project in Bucks County. Installation of the pipeline on adjacent properties may result in the temporary disruption and displacement of resident and migratory wildlife species. Following final restoration of the Project ROW, it is anticipated the affected species will return to the Project area and as a result, significant long-term impacts to public lands providing recreational wildlife viewing opportunities are not anticipated to occur in Bucks County.

Other Recreation Impacts

The public lands crossed by the Project in Bucks County are anticipated to provide a number of potential recreational activities, including biking, picnicking, horseback riding, canoeing, kayaking, boating, rafting, and cross-country skiing. Similar to the protocols and procedures detailed for properties providing hunting, hiking, fishing and wildlife viewing opportunities, PennEast will obtain all necessary approvals from the applicable land managing agencies to conduct site activities on public lands. PennEast will coordinate with agencies to ensure proper public notice is published in advance of construction activities and adequately posted at points of public access to ensure the safety of non-project personnel. PennEast will continue to work with agencies to identify suitable measures to minimize disturbance to the recreational area and its visitors.

S3.D.3 Subfacility Effect on Resource

The general nature of construction of pipeline projects is that it is temporary in nature. The open cut method allows pipelines to be installed in watercourses and wetlands in a short period of time, typically two days. During this time, topsoil is stockpiled and segregated during construction. The pipeline is then installed at a predetermined depth, backfilled to original contours, and completed by replacing the segregated topsoil Wetland seed mixture is applied to help promote restoration. Watercourse crossings are conducted "in the dry" as to not create sediment pollution in the watercourse. As a result, there is very minimal effect to the overall regime and ecology of the watercourse or wetland. Additionally, water quality, streamflow, fish and wildlife, aquatic habitat, and instream and downstream uses are minimally impacted. As a result, subfacilities CULV, FLACT, PIPE, TWPWI, and WTDIM, will have very minimal effect on these environmental factors.

PIPE and TMPWI: Pipeline and Temporary Wetland Impact. These subfacilities are used for pipeline and associated workspace within the temporary and permanent ROW. The pipeline will be installed a minimum of five feet below each watercourse and three feet below each wetland.

Open-cut pipeline installation will be utilized for one ephemeral watercourse crossing, and HDD installation is proposed for one wetland and two watercourse crossings. If there is streamflow at the time of crossing, PennEast proposes to use dam and pump crossing technique for the open-cut ephemeral watercourse crossing, and downstream flows will be maintained by pumping water around the isolated workspace, thereby minimizing impacts to streamflow, fish and wildlife, aquatic habitat, and instream and downstream uses.

Permanent trench plugs will be installed at the watercourse boundary to restore pre-construction hydrology. After the pipeline is installed, native streambed material will be replaced, thus allowing disturbed features to return to original condition. Pre-construction contours will be restored, and watercourse and floodway cross-sectional areas will not be altered as a result of the pipeline installation. PennEast will seed riparian areas with conservation seed mixes and replant temporarily impacted forested riparian buffers with trees and shrubs. Additional restoration detail is provided in the Wetland and Riparian Reforestation Plan in JPA Section L4-A.

Although there may be temporary impacts during construction, the impacts are anticipated to be minor and short-lived. Watercourse crossings are generally completed in 24 to 48 hours, allowing recovery of resources to begin rapidly. No processes or communities that are ecologically important to food chain production will be impacted for longer than one growing season as a result of the proposed Project.

These subfacilites are not anticipated to affect the overall regime and ecology of wetlands, watercourses, or floodways.

S3.D.4 Property and Riparian Rights

The construction and restoration BMPs identified for the Project are expected to provide adequate protection to wetlands, watercourses and their associated riparian corridors during installation of the

pipeline facilities through restoration of the Project ROW. Temporary disturbances within riparian locations will be limited to short-term impacts to site-specific crossing areas, for one ephemeral watercourse only, which are not expected to result in significant modifications to the affected feature's water quality, quantity or velocity flows. The proposed Project will not result in the increase, diminution, or direction of flow; therefore the property rights of landowners upstream, downstream, or adjacent to the Project would not be affected by the Project.

S3.E Antidegradation Analysis

The Antidegradation Analysis is attached as Appendix BU-L-3E.

S3.F Alternative Analysis

The Alternatives Analysis is provided in JPA Section S.

S3.G Secondary Impact Evaluation

As described under 25 Pa. Code Section 105.14, the review of applications by the PADEP requires a detailed assessment of the proposed activity with respect to its ability to demonstrate consistency and compliance with other applicable state and federal regulatory requirements, as well as an evaluation of the activity's potential impacts on multiple resources, including residual disturbances, resulting from secondary impacts. The criteria for determining the significance of indirect impacts is detailed under 25 Pa. Code Section 105.14(b)(12) as: *Secondary impacts associated with, but not the direct result of the construction or substantial modification of the dam or reservoir, water obstruction or encroachment in the area of the project and in areas adjacent thereto and future impacts associated with dams, water obstructions or encroachments, the construction of which would result in the need for additional dams, water obstructions or encroachments to fulfill the project purpose.*

When defining secondary impacts, the PADEP defers to the U.S. Environmental Protection Agency (USEPA) Regulations (40 Code of Federal Regulations [CFR] 230.11) which defines secondary (indirect) impacts as effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material. As described throughout the application, PennEast has selected the proposed pipeline route to avoid and minimize effects to wetlands and watercourses to the greatest extent practicable. When impacts cannot be avoided, PennEast will implement the BMPs found in the E&SCP (JPA Section M) to minimize impacts during construction and to the extent practicable, return affected areas to their pre-construction condition during restoration. PennEast will make every effort to contain Project impacts to the approved limit of disturbances; however, secondary impacts may also occur as a result of the Project. The following sections provide an overview of the Project's potential secondary impacts to aquatic areas, evaluating the possibility of indirect impacts to adjacent areas as well as potential future impacts on watercourses and wetlands.

Watercourses

Construction of the Project within Bucks County will result in three watercourse crossings. The sections below provide a summary of the potential secondary impacts to watercourses with a specific review of the Project's potential secondary affects to aquatic resources including aquatic habitats, riparian areas, water quantity and water quality.

Aquatic Habitat

Typical pipeline installation activities across watercourses will involve the clearing of vegetation and the excavation of the watercourse bed and banks following the installation of the selected conventional dry-ditch construction crossing method of the one ephemeral watercourse. PennEast will implement their E&SCP (JPA Section M) at the watercourse location to ensure the crossing is conducted in the "dry," adequate downstream flows are maintained during instream work via the installed watercourse bypass systems, and disturbed segments of the watercourse are restored to their pre-construction condition. PennEast's E&SCP (JPA Section M) will be utilized to minimize the potential for secondary impacts resulting from construction; however, in some instances, residual disturbances to aquatic resources may be unavoidable.

Clearing of the proposed ROW is expected to result in disruptions related to noise from construction equipment as well as noise from the removal of vegetation. Riparian vegetation removal at the one ephemeral watercourse that will be open cut may result in secondary impacts including the displacement of wildlife that is utilizing areas for nesting, spawning, rearing, resting, migration, feeding and escape cover. Secondary impacts resulting from clearing activities will be partially mitigated through adherence to the MBTA timing restrictions for clearing operations that have been identified by the USFWS. Secondary impacts to adjacent areas that cannot be mitigated through implementation of seasonal clearing timing restriction are anticipated to be short-term in nature, as impacted ROW locations will be revegetated and allowed to revert to their pre-existing condition. Additionally, post-construction disturbances to the construction ROW that have the potential to affect adjacent locations will be limited to the periodic maintenance of vegetation (i.e., mowing) which will be conducted in accordance with PennEast's post-construction ROW maintenance plan. The general procedures contained within the plan include the following provisions:

- Routine vegetation mowing or clearing practices adjacent to watercourses will consist of maintaining a riparian strip that measures 25 feet back from the mean high water mark. This riparian area will be allowed to permanently revegetate with native plant species across the entire ROW;
- Routine vegetation mowing or clearing over the full width of the ROW in wetlands is prohibited;
- To facilitate periodic corrosion and leak surveys at wetlands and watercourses, a 10-foot wide corridor centered on the pipeline may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state. Trees and shrubs that are located within 15 feet of the pipeline that have roots that could compromise the integrity of the pipeline coating may be cut and removed from the ROW. Do not conduct any routine vegetation mowing or clearing in riparian areas that are between HDD entry and exit points;

- Herbicides or pesticides will not be sprayed anywhere along the maintained permanent ROW; and
- In no case shall routine vegetation mowing or clearing occur during the migratory bird nesting season between April 15 and August 1 of any year unless specifically approved in writing by the responsible land management agency or the USFWS.

Similar to clearing operations, noise associated with earth disturbance activities within the proposed ROW has the potential to disrupt adjacent wildlife; therefore, temporarily affecting a number of critical ecological functions within the general Project area. Adjacent impacts related to the displacement of wildlife will be minimal and limited to the duration of active construction. Additional secondary impacts related to surface disturbances that have the possibility to occur include the drift of sediments or silt-laden material from the disturbed construction ROW, downstream to adjacent aquatic communities. The sedimentation of watercourses has the ability to affect numerous ecological functions, specifically activities related to feeding and spawning. To some degree, sedimentation of adjacent downstream watercourse locations may be unavoidable during specific phases of construction; however, PennEast will utilize the construction and restoration BMPs found in the E&SCP (JPA Section M) to limit disturbances until restoration is complete. Silt-laden material may drift from the watercourse crossing location immediately following the installation of the watercourse bypass system or directly following the return of natural watercourse flow within the restored channel. Additional sources of sedimentation may include suspended sediments resulting from frequent equipment travel over or adjacent to watercourse crossing locations during periods of surface saturation, as well as the drift of material originating from failed or overburdened soil erosion and sediment control devices installed within the ROW. To minimize the potential of secondary impacts to spawning activities as well as other ecological functions, PennEast has committed to the installation of pipeline facilities during the allowable instream construction period identified by the PFBC. Within Bucks County, the one watercourse crossing location will be completed within 24 hours to limit the duration of disturbance. Several restoration BMPs will be installed at each crossing location to ensure revegetation of the adjacent locations and proper restoration of the affected watercourse channel.

Riparian Areas

Riparian areas associated with watercourses provide multiple functions associated with the overall quality of a watercourse. During high-flow and flood events, riparian areas provide protection to watercourse banks while also minimizing flow velocities and erosive forces caused by increased flow velocities. Additionally, riparian areas aid in the retention of excess sediment, provide nutrient removal, and offer both terrestrial and aquatic habitat. While herbaceous riparian buffers offer the benefits of decreasing floodwater velocities, sediment retention, and nutrient removal, forested and scrub-shrub riparian buffers additionally offer woody debris, greater terrestrial and aquatic habitat quality, and overhead cover. These additional benefits result in an overall higher water quality for the watercourses associated with forested and scrub-shrub riparian buffers. As such, PennEast has performed the following riparian buffer evaluations and will implement the specific measures outlined below to reduce the extent and duration of impacts to riparian buffers within the Project limits. As a result, no secondary impacts to the surrounding riparian areas are anticipated to occur.

PennEast has completed an evaluation of the riparian areas associated with each proposed watercourse crossing in Bucks County based on the PADEP Rapid Assessment Protocol (RAP) procedure. This approach combines a desktop and field assessment of the riparian vegetation condition at each watercourse crossing. In addition to the vegetation evaluation, the RAP procedure included an assessment of the channel and floodplain, instream habitat, and channel alteration for each watercourse. A condition category was then assigned for each evaluated watercourse characteristic and the results were recorded on the PADEP Riverine Assessment Form 1. The results of the watercourse RAP evaluations can be found in Module 2 (L-2D and L-2E). The recorded data will be used as a baseline by PennEast to evaluate the effectiveness of post-construction restoration for each crossed watercourse and will serve to minimize impacts to each watercourse and the surrounding riparian areas.

Complete avoidance of riparian corridors is not feasible due to the linear nature of the pipeline Project. Installation of the pipeline facilities will result in temporary vegetation removal as well as surface disturbances within one riparian area associated with the ephemeral watercourse that will be impacted by the Project in Bucks County. In order to minimize this temporary disturbance, PennEast has employed multiple measures to reduce the extent and duration of Project impacts to riparian communities which include, but are not limited to:

- The siting of Project facilities within areas classified as open land, agricultural land and commercial/industrial land (86 percent within Bucks County) to avoid the clearing of forested upland and wetlands;
- The reduction of Project workspace within wetlands and across watercourses to limit clearing and surface disturbances;
- Limiting the removal of stumps in wetlands and along watercourses to the trench line and what is necessary to safely install the equipment crossings to promote natural revegetation and surface stabilization;
- Utilization of the identified erosion control devices, BMPs and revegetation procedures to restore riparian communities following pipeline installation; and
- Limiting the width of the permanent maintained ROW to locations 10 feet in width centered over the pipe in herbaceous and/or scrub-shrub wetlands and 30 feet centered over the pipe in forested wetlands. The remaining locations will be allowed to revert back to their preconstruction land use/condition.

As a result of performing the riparian area evaluations and implementing the above measures, PennEast will avoid and minimize impacts to forested and scrub-shrub riparian areas, to the greatest extent practicable, within the limits of the Project. By minimizing impacts to riparian buffers within the Project limits, no secondary impacts to the surrounding riparian areas are anticipated to occur.

Water Quantity

As detailed in Section S3.D.2(i) above, construction of the proposed Project is estimated to have no significant long-term effect on water quantity within the Project area. As a result, the potential for significant secondary effects to water quantity resulting from Project activities are perceived to be low. Potential short-term secondary impacts to water quantity could result from the following:

- A reduction or increase of hydrology to adjacent areas resulting from temporary alterations of the natural drainage patterns within the ROW;
- Possible temporary changes to the watercourse's flow velocities, volumes and flow patterns in response to the immediate installation of the watercourse bypass system or during the decommissioning of the installed system; therefore, resulting in secondary effects to upstream and downstream watercourse locations;
- Conceivable short-term fluctuations in the local groundwater supply altering the discharge or recharge abilities for both local and adjacent surface water sources;
- The consumptive use of water supply volumes from surface water resources to conduct hydrostatic testing of the pipeline as well as trenchless crossings and dust control measures, resulting in potential changes in available surface water volumes or elevations; and
- The temporary increase in watercourse hydrology and flow resulting from the discharge of water supply volumes following hydrostatic testing operations.

As mitigation for the potential direct and indirect secondary impacts to water quantities, PennEast will employ the construction and restoration measures found in the E&SCP (JPA Section M). Any secondary impacts to the local watercourse hydrology are expected to be short-term in nature, as post-construction ROW conditions will be revegetated and restored to pre-existing contours and elevations, thus allowing the return of natural drainage patterns to the affected Project areas.

Possible secondary impacts to upstream or downstream flow velocities, volumes or flow patterns resulting from the installation or removal of watercourse bypass systems will be limited to the duration of the one physical ephemeral instream construction crossing (24 hours in Bucks County). All natural flow conditions will be returned to pre-construction condition following the restoration of the affected watercourse channel, and therefore, secondary impacts will be resolved shortly after restoration of the watercourse crossing.

Possible short-term fluctuations in the adjacent groundwater supply resulting from trenching or trench-dewatering operations will also be limited to the duration of active open trench construction. PennEast will employ BMPs such as the use of trench plugs at the ephemeral watercourse crossing location and will utilize dewatering filtration devices such that potential effects to adjacent groundwater resources are minimize during construction and unaffected during operation of the Project.

The consumptive use of water supply volumes for hydrostatic test water dust control measures and trenchless operations that may result in secondary effects to surface water elevations and flow characteristics will be managed and mitigated through receipt of water withdrawal and discharge permits from the Delaware River Basin Commission (DRBC) and the PADEP. Additionally, any secondary impacts that occur as a result of withdrawal and discharge applications will be localized and short-term in nature, such that long-term secondary effects to water quantity would not occur.

Water Quality

As noted in Section S3.D.2(ii) above, secondary impacts related to the loss of water quality to adjacent locations have the opportunity to occur during construction and restoration of the Project. Surface disturbances related to grading and excavation activities expose soils, resulting in the increased potential

for sediment and silt transport during storm events to surface water systems. Trench dewatering operations also provide the opportunity for the release of silt-laden water to unaffected adjacent locations, which could result in the overland flow to undisturbed watercourses. Additional sources of turbidity that may also result in secondary impacts include the generation of silt-laden material immediately following the installation of the watercourse crossing/bypass system or directly following the decommissioning of the equipment crossing or return of natural watercourse flow within the restored channel. Frequent equipment travel over or adjacent to watercourse crossing locations during periods of precipitation, along with the potential release of suspended sediments from failed or overburdened structural or non-structural soil erosion and sediment control devices also have the potential to affect the water quality of adjacent surface water systems. The accidental release of hazardous chemicals during refueling operations, the failure of equipment hydraulics or lubricant systems, and the inadvertent release of drilling fluids during trenchless crossings also possess the ability to result in secondary impacts to water quality. Lastly, until permanent stabilization of watercourse crossing locations is achieved, the post-construction condition of the restored watercourse banks may be subject to subsidence or erosion following high flow events, thus leading to the transport of eroded bank material downstream.

As mitigation for the potential direct and indirect secondary impacts to water quality, PennEast will employ the construction and restoration measures found in the E&SCP (JPA Section M). BMPs such as the use of compost filter socks, limiting the removal of stumps, temporary seeding, straw bales and mulch, and temporary trench plugs and waterbars will be employed during construction activities to minimize disturbances resulting from earthwork adjacent to watercourses. During final restoration of the ROW, surface contours and pre-existing surface elevations will be returned to the greatest extent practicable, and permanent BMPs and revegetation protocols will be implemented such that secondary effects resulting in water quality impacts to adjacent resources are not anticipated to be significant.

Given the depths necessary to install the pipeline, the likelihood of trench dewatering occurring within areas that are adjacent to unaffected surface water resources is relatively high. PennEast will follow the protocols detailed in the E&SCP (JPA Section M) to confirm that trench water is properly discharged to energy dissipation/sediment filtration devices, such as geotextile filter bags or straw bale structures that are situated in vegetated locations, away from surface waters to prevent silt-laden water from flowing into adjacent surface water locations.

As noted above, silt-laden material may drift from the watercourse crossing location immediately following the installation of the watercourse bypass system or directly following the return of the natural watercourse flow within the restored channel. BMPs such as the use of siltation curtains and the return of native watercourse substrate to the affected crossing area will be employed to minimize impacts to downstream locations. Secondary impacts resulting from these activities that could affect adjacent surface water systems are anticipated to be localized and short-term in nature, such that overall turbidity levels are insignificant and no significant loss of water quality occurs.

The release of turbid waters or silt-laden material off the ROW to unaffected adjacent resources due to failed or overburdened erosion and sediment control devices has the potential to occur during construction and restoration of the Project. To minimize the potential of this occurrence, PennEast will ensure EIs are present during the installation of erosion and sediment control devices so that BMPs are installed per E&SCP requirements. Installed BMPs will be subject to period inspections by EIs prior to the

notification of a significant storm event, daily in areas of active construction and subsequent to snow melt or precipitation events to verify proper function and protection to resources until permanent stabilization is achieved.

To minimize the potential of secondary effects to water quality resulting from the release of hazardous materials, PennEast will maintain a minimum 100-foot buffer from wetlands to refuel vehicles, store or transfer liquid hazardous materials, and coat pipeline segments with concrete, unless otherwise approved by the EI and secondary containment is implemented. PennEast's PPC Plan (Appendix BU-L-3B) will be implemented throughout the duration of the Project to reduce risks of spills or leaks to the ground or watercourse surface and to provide the necessary mitigation measure to properly contain, cleanup and document a spill. Secondary impacts resulting from the inadvertent release of drilling fluids to adjacent surface waters will be managed and mitigated through employment of PennEast's HDD Inadvertent Returns and Contingency Plan (Appendix BU-L-3C). This plan establishes the operational procedures and responsibilities for the prevention, containment and clean-up of drilling fluids in the event a release occurs to the ground surface or within a watercourse during trenchless operations.

Until permanent restoration is achieved, the post-construction condition of the restored watercourse crossing may be susceptible to subsidence or erosion following flooding events, human related disturbances such as unauthorized All-Terrain Vehicle (ATV) activity, or agricultural impacts from livestock movement or the passage of farm equipment. Significant erosion could lead to the degradation of the watercourse bank and the transport of eroded materials downstream. In accordance with federal and state requirements, PennEast will conduct post-construction monitoring of the restored ROW, with specific focus on the revegetation and stabilization efforts following installation of the Project facilities. Overall ROW monitoring will occur during the growing season for a minimum of 3 years. Impacted wetland and watercourses will be monitored for five growing seasons after completion of construction. Wetland and watercourse locations failing to meet the federal or state restoration standards or locations in need of immediate remedial actions will be identified during ROW monitoring surveys and corrected accordingly. All post-construction monitoring reports documenting the success, failures and restoration efforts will be submitted to the applicable federal and state agencies at the end of each monitoring period for review and comment.

Wetlands

Construction of the Project within Bucks County will result in one wetland crossing. The sections below provide a summary of the potential secondary impacts to wetlands with a specific review of the Project's potential secondary effects to aquatic resources including aquatic habitats, water quantity and water quality.

Aquatic Habitat

Similar to the analysis provided in Section S3.D.2(iii) above, installation of the proposed Project may result in temporary secondary impacts to adjacent aquatic environments. Within Bucks County, pipeline installation activities across the wetland will be conducted by HDD. The secondary effects associated from typical open cut installation, which involves clearing of vegetation, the removal of topsoil over the trench line, and excavation of subsoil, is not anticipated. PennEast's E&SCP will be utilized to minimize

the potential for secondary impacts resulting from construction; however, in some instances, residual disturbances to adjacent aquatic resources may be unavoidable.

Noise disturbances associated with clearing of the proposed ROW outside of the HDD areas have the potential to result in secondary impacts related to the immediate displacement of wildlife that is utilizing adjacent locations for nesting, spawning, rearing, resting, migration, feeding or escape cover. Wildlife that may have occupied the affected aquatic environment due to specific species composition or vegetation densities may relocate from the general Project area due to the loss of specific habitat needs. The temporary loss of vegetation within the construction corridor may also result in secondary impacts to the local food chain production, as the loss of producers within the affected ROW may result in the forced relocation of primary and secondary consumers that were previously occupying adjacent aquatic communities. Impacts resulting in the alteration of species composition from the unintentional introduction of invasive plant species also have the potential to occur during construction. Construction equipment and materials that are not properly cleaned after working in locations populated with invasive vegetation have the potential to spread seeds, roots, or other viable invasive plant materials to locations free of non-native plant species. The colonization of invasive vegetation can result in numerous ecological effects to aquatic environments resulting in permanent impacts to specific habitat functions if infestations are not controlled. Since vegetation will not be cleared where the HDD is proposed, the forested area within and adjacent to the wetland crossing will remain in place, where colonization of invasive vegetation is less likely to occur due to existing vegetation.

As discussed throughout Module 3, primary and secondary impacts resulting from clearing activities within aquatic habitats will not result from the wetland crossing in Bucks County due to its crossing via HDD. Secondary impacts resulting from the removal of vegetation, partially mitigated through adherence of the timing restrictions associated with the MBTA as well as clearing restrictions identified by the USFWS for sensitive bat species, will not apply to the wetland crossing in Bucks County. Additionally, post-construction disturbances to the construction ROW outside of the HDD area that have the potential to affect adjacent locations will be limited to the periodic maintenance of vegetation (i.e., mowing) which will be conducted in accordance with PennEast's post-construction ROW maintenance plan. Secondary impacts involving the establishment of invasive plant species will be mitigated through employment of PennEast's Invasive Species Management Plan [(ISMP), Appendix BU-L-3I]. The BMPs and procedures contained within the ISMP will be implemented during all phases of construction. Requirements of the ISMP will be identified to contractors during the required preconstruction environmental training and education will include:

- The identification of invasive plant species and locations along the ROW that contain invasive vegetation;
- Procedures for working in areas populated with invasive plants;
- Approved methods for cleaning materials and equipment prior to demobilizing from locations colonized with invasive plant species; and
- Monitoring procedures and (if necessary) control measures to ensure restored ROW locations do not become dominated by invasive plant species.

Similar to the discussion provided above, noise associated with earth disturbance activities within the proposed ROW has the potential to disrupt adjacent wildlife, therefore temporarily affecting a number of

critical ecological functions within the general Project area as detailed in the sections above. Additional secondary impacts related to surface disturbances outside of the HDD area include the transport of sediments or silt-laden material from the disturbed construction ROW, downgradient to unaffected aquatic communities. The sedimentation of wetlands has the ability to affect numerous ecological functions, including the alteration of substrate, which can lead to the modification of species composition and vegetation densities, resulting in negative effects to other ecological functions. Additional sources of sedimentation may include suspended sediments resulting from frequent equipment travel over wetland crossing locations during periods of surface saturation, as well as the transport of material originating from a failed or overburdened soil erosion and sediment control device installed within the ROW. To minimize the potential of secondary impacts to the ecological functions found in adjacent communities, PennEast will implement the BMPs found in the E&SCP (JPA Section M). BMPs such as the use of compost filter sock, the segregation of topsoil, the use of temporary seeding, straw mulch and bales and temporary trench plugs and waterbars will be employed during construction activities to minimize disturbances resulting from earthwork and adjacent to wetlands. During final restoration of the ROW, surface contours and pre-existing surface elevations will be returned and permanent BMPs and revegetation protocols will be implemented such that secondary effects resulting in discharge of sediments to adjacent resources are not anticipated to be significant.

Water Quantity

As discussed above, construction of the proposed Project is estimated to have no significant long-term effects on water quantity within the Project area. As a result, the potential for significant secondary effects to water quantity resulting from Project activities are perceived to be low. Potential short-term secondary impacts to the water quantity of adjacent wetland areas could result from the following:

- A reduction or increase in hydrology to adjacent areas resulting from temporary alterations of the natural drainage patterns of up-gradient locations within the active construction corridor;
- Potential compaction of soils from the use of heavy construction equipment outside the HDD area, or the temporary storage of trench spoils resulting in the loss of local groundwater recharge and infiltration capabilities; and
- Conceivable short-term fluctuations in the local groundwater supply altering the discharge or recharge abilities for both local and adjacent aquatic communities.

As mitigation for the potential direct and indirect secondary impacts to water quantities, PennEast will employ the construction and restoration measures found in the E&SCP (JPA Section M). Secondary impacts to adjacent wetland hydrology occurring as a result of the increase or decrease of the available upgradient contributing drainage area are expected to be short-term in nature, as post-construction ROW conditions will be revegetated and restored to pre-existing contours and elevations, thus allowing the return of natural drainage patterns to the affected Project areas.

Possible secondary impacts to drainage patterns downgradient of the construction ROW will be limited to the physical duration of open trench construction. Since the one wetland will not be impacted by open cut trenching and dewatering, significant long-term affects to surface drainage patterns are not expected to occur.

PennEast will not require the use of equipment mats for the wetland crossing, which is typically used to aid in the distribution of weight and reduce the potential need for soil decompaction during restoration of the Project workspace. Soil compaction concerns that are not mitigated through use of the BMPs described above will be addressed during decompaction procedures during the final cleanup and restoration phases of the Project.

Possible short-term fluctuations in the adjacent groundwater supply should not result, since trenching or trench-dewatering operations will not be required at the wetland crossing.

Water Quality

As noted in Section S3.D.2(ii) above, secondary impacts related to the loss of water quality to adjacent wetland locations could occur during construction and restoration of the Project outside of the HDD area. Surface disturbances from equipment use during clearing, grading and excavation activities remove vegetation and expose soils resulting in the increased potential for sediment and silt transport during storm events to downgradient adjacent wetland communities. Trench dewatering operations could also result in the release of silt-laden water to unaffected adjacent locations, potentially leading to the overland flow of turbid waters to undisturbed wetland communities. Additional sources of turbidity that may also result in secondary impacts include the generation of silt-laden material from the installation, use or removal of equipment crossings, specifically during periods of precipitation, along with the potential release of suspended sediments from failed or overburdened soil erosion and sediment control devices. The accidental release of hazardous chemicals during refueling operations, the failure of equipment hydraulics or lubricant systems and the inadvertent release of drilling fluids during trenchless crossings also provide the opportunity for secondary impacts to water quality within adjacent wetlands. In addition, until permanent stabilization and revegetation of the Project area is achieved, the post-construction condition of the restored ROW may be subject to erosion resulting from flooding events, human related disturbances, such as unauthorized ATV activity or agricultural impacts related to livestock movement or the passage of farm equipment.

As mitigation for the potential direct and indirect secondary impacts to water quality from earth disturbance activities, PennEast will employ the construction and restoration measures found in the E&SCP (JPA Section M). Temporary BMPs such as the use of compost filter socks, diversion swales, trench breakers and waterbars will be installed to minimize the potential for upgradient areas to discharge to downgradient or adjacent to wetland communities. During final restoration of the ROW, surface contours and pre-existing surface elevations will be returned and permanent BMPs and revegetation protocols will be implemented, such that secondary effects to water quality resulting from earth disturbances activities are minimized to the extent practicable.

To reduce the possible secondary effects trench dewatering activities may have on adjacent aquatic communities, PennEast will follow the protocols detailed in the E&SCP (JPA Section M) to minimize the potential release of turbid waters to adjacent aquatic resources. Trench dewatering activities will be conducted under the direct supervision of the on-site EI to confirm that trench water is being properly discharged to energy dissipation/sediment filtration devices, such as geotextile filter bags or straw bale structures. Receiving structures will be secured in upland vegetated locations, away from wetlands and

surface water systems to prevent silt-laden water from flowing into adjacent wetland communities. As a result, significant adjacent impacts from trench dewatering activities are not anticipated to occur.

As noted above, silt-laden material may appear along equipment crossings during installation, use and removal. Minor adjacent disturbances have the potential to occur as a result of the following:

- The removal of rocks or stumps to level travel ways during installation or the grading of previously imbedded equipment mat locations following use;
- The "pumping" of substrate during or subsequent to travel by heavy equipment during saturated site conditions; and
- The settling or flushing-out of tracked mud and sediments from the equipment mats following rain events.

PennEast will implement the necessary BMPs such as the use of additional erosion control measures, the periodic cleaning of equipment mats, and the grading and stabilizing of impacted locations following use. Secondary impacts resulting from these activities that could affect adjacent surface water systems are anticipated to be localized and short-term in nature, such that overall turbidity levels are insignificant and no substantial loss of water quality occurs.

The release of turbid waters or silt-laden material off the ROW to unaffected adjacent resources due to failed or overburdened erosion and sediment control devices have the potential to occur during construction and restoration of the Project. To minimize the potential of this occurrence, PennEast will ensure EIs are present during the installation of erosion and sediment control devices so that BMPs are installed per E&SCP requirements. Installed BMPs will be subject to periodic inspections by EIs prior to a significant storm event, daily in areas of active construction, and subsequent to snow melt or precipitation events to verify proper function and protection to resources until permanent stabilization is achieved.

To minimize the potential of secondary effects to water quality resulting from the release of hazardous materials, PennEast will maintain a minimum 100-foot buffer from wetlands to refuel vehicles, store or transfer liquid hazardous materials, and conduct concrete coating activities, unless otherwise approved by the EI, and secondary containment is implemented. PennEast's PPC Plan (Appendix BU-L-3B) will be implemented throughout the duration of the Project to reduce risks of spills or leaks to surface locations and to provide the necessary mitigation measure to properly contain, cleanup and document a spill. Secondary impacts resulting from the inadvertent release of drilling fluids to adjacent surface waters will be managed and mitigated through employment of PennEast's HDD Inadvertent Returns and Contingency Plan (Appendix BU-L-3C). This plan establishes the operational procedures and responsibilities for the prevention, containment, and clean-up of drilling fluids in the event a release occurs to the ground surface within a watercourse, wetland, or an upland location during trenchless operations.

In accordance with federal and state requirements, PennEast will conduct post-construction monitoring of the restored ROW, with specific focus on the revegetation and stabilization efforts following installation of the Project facilities. ROW monitoring will occur once annually during the growing season for a minimum of 3 years. Wetland and watercourse locations failing to meet the federal or state restoration standards, or locations in need of immediate remedial actions, will be identified during ROW monitoring

surveys and corrected accordingly. Although not exclusive to Bucks County, for the purposes of this Project, restoration areas will be considered successful when the following criteria have been met:

- The affected wetland satisfies the current federal definition for a wetland (i.e., soils, hydrology and vegetation);
- Vegetation is at least 80 percent of either the cover documented for the wetland prior to construction, or at least 80 percent of the cover in adjacent wetland areas that were not disturbed by construction;
- If natural rather than active revegetation was used, the plant species composition is consistent with early successional wetland plant communities in the affected ecoregion; and
- Invasive species and noxious weeds are absent, unless they are abundant in adjacent areas that were not disturbed by construction of the Project.

All post-construction monitoring reports documenting the success, failures and restoration efforts will be submitted to the applicable federal and state agencies at the end of each monitoring period for review and comment.

S3.H Cumulative Impact Analysis

The Cumulative Impact Analysis is attached as Appendix BU-L-3F.

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