Jacobs

Environmental Assessment

Texas Eastern Transmission, LP
Schuylkill River HDD Project
June 2023

Jacobs Project Management Group

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Acronyms and abbreviations

ABACT	Antidegradation best available combination of technologies
BMPs	Best Management Practices
E&SCP	Erosion and Sediment Control Plans
EV	Exceptional Value
HDD	Horizontal directional drill
LOD	Limits of disturbance
MF	Migratory fish
PEM	Palustrine emergent
PFO	Palustrine forested
PSS	Palustrine scrub-shrub
PA Code	Pennsylvania Code
DCNR	Pennsylvania Department of Conservation and Natural Resources
PADEP	Pennsylvania Department of Environmental Protection
PFCB	Pennsylvania Fish & Boat Commission
Project	Schuylkill River HDD Project
Texas Eastern	Texas Eastern Transmission, LP
UNT	Unnamed tributary
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WWF	Warm Water Fishery

S1: Project Summary

S1.A Project Description

Texas Eastern Transmission, LP (Texas Eastern) is proposing the Schuylkill River HDD Project (Project) to maintain their existing natural gas pipeline system. The Project is in Spring City and Upper Providence Townships, Chester and Montgomery Counties, Pennsylvania, and is within the Phoenixville USGS 7.5 Quadrangle.

At this location, Texas Eastern has two parallel existing pipeline systems which cross under the Schuylkill River: Line 1, a 20-inch diameter pipeline, and Line 2, a 36-inch diameter pipeline. The existing easement ranges from approximately 75 feet to 110 feet in width. Texas Eastern during a routine survey conducted in 2020, identified an approximately 18-foot exposure of the Line 1 pipeline in the Schuylkill River.

The Project proposes to install a new 20-inch diameter pipe with a horizontal directional drill (HDD) of approximately 1,111 linear feet. The new pipeline will be parallel and offset approximately 20 feet from the existing Line 1 within the existing easement. Additionally, the existing 20-inch diameter Line 1 pipeline will be removed. Temporary workspace consists of the existing easement and additional temporary workspace parallel to the easement. Access to the site will be along existing roads.

Texas Eastern proposes to begin HDD construction activities in mid-January 2024 with an in-service date of late April 2024. The removal of Line 1 will occur following the HDD activities.

Line 1 HDD Impacts

S1-1 (Schuylkill River) –Temporary Impacts

- No impacts proposed with the HDD. Texas Eastern has developed and will implement an Inadvertent Return Contingency Plan.
- Approximately 398 feet by 215 feet of the river is included in the workspace
- Floodplain: approximately 990 feet by 215 feet is included in the workspace
    - Approximately 520 feet on the north side
    - Approximately 470 feet on the south side

W1-1 Wetland (PEM) – Temporary Impacts:

- HDD entry pit, excavation 6 feet by 6 feet

W1-2 Wetland (PEM) – Temporary impacts

- Identified Workspace with the potential to use timber mats 372 feet by 61 feet = 22,692 square feet (0.52 acre)

W1-4 Wetland (PFO) – Permanent Indirect Impacts (PADEP):

- Identified Workspace with the potential to use timber mats 188 feet by 181 feet = 34,028 square feet (0.78 acre)

Line 1 Removal Impacts

Upon successful completion of the HDD and tie in between the new and old piping system, crew activities will transition to the out of service line removal. Prior to any additional cuts on the pipeline a launcher and receiver will be installed on either end to perform additional cleaning and purging runs to ensure the pipeline is free of potential liquid products or debris. A series of poly and foam pigs will be moved with nitrogen at a slow rate to push product/debris to the receiver at which time it will be captured in a vacuum truck and disposed of in accordance with environmental permits.

Excavation will be performed on both sides of the river from tie in point to riverbank, and the decommissioned segment of pipe removed on either side up to the river, eliminating the field bends down into the river.

A pull head will then be welded onto the end segment of one side of the crossing and the drill rig will be attached. The drill rig will then extract the existing segment from the instream river in a similar manner as to how the HDD product pipe is pulled through.

In the event the drill rig is unable to break the suction and friction forces holding in the decommissioned segment in place a large air hammer will be installed over the opposite end, and both push/pull forces will be applied until the static friction force is broke free.

If river bottom contours are disturbed during removal activities an amphibious excavator can be utilized to perform minor regrading back to existing elevations.

S1-2 (Schuylkill River) – Temporary Impacts

- Approximately 398 feet stream x 20-inch pipeline = 663 square feet
- Approximately 398 feet by 215 feet of the river is included in the workspace
- Floodplain: approximately 990 feet by 215 feet is included in the workspace
    - Approximately 520 feet on the north side
    - Approximately 470 feet on the south side

W1-3 Wetland (PEM) – Temporary Impacts:

- Trench excavation, 327 feet by maximum 20 feet wide = 6,540 square feet (0.15 acre)

W1-2 Wetland (PEM) – Temporary impacts (duplicate of HDD impacts)

- Identified Workspace with the potential to use timber mats 372 feet by 61 feet = 22,692 square feet (0.52 acre)

W1-4 Wetland (PFO) – Permanent Indirect Impacts (PADEP) (duplicate of HDD impacts):

- Identified Workspace with the potential to use timber mats 188 feet by 181 feet = 34,028 square feet (0.78 acre)

S1.B Additional Information

Purpose and Need

The purpose and need of the project is the partially exposed Line 1 pipeline in the Schuylkill River. The Project's maintenance and replacement activities are necessary towards providing adequate cover over the pipeline.

The project activities propose to temporarily affect Exception Value (EV) wetlands and Other wetlands as described under §105.18a. Since the Project proposes a maintenance activity within the existing Texas Eastern pipeline easement, there are no other reasonable alternatives to safely and efficiently update the Line 1 pipeline to current standards and conditions outside of the existing easement location. The Project is necessary to abate a substantial threat to the public health or safety. The conditions of §105.18a(c) and the requirements of subsection §105.18a(b)(2) - (7) are met.

Water Dependency

As the purpose of the Project is to address the exposure concerns of the Line 1 pipeline crossing under the Schuylkill River, work will occur within the Schuylkill River (Stream S1) itself. Additionally, wetlands were identified within and adjacent to the existing Texas Eastern easement and will be temporarily impacted by the Project activities. An existing valve setting and railroad prevent moving construction activities out of the wetland on the north side of the river. Project activities will take place within and in close proximity to these water features.

Summary Water Resources Table

Refer to Module S2.B for wetland and water resources located at the Project site.

Summary Impact Table

Refer to S1.A. Project Description for a summary of impacts.

S2: Resource Identification and Characterization

S2.A Standard Resource Identification Information

Qualifications

Jacobs Project Management Group
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Keith D'Angiolillo, PWS
Keith.DAngiolillo@jacobs.com

Project work completed: Wetland Delineation and Phase 1 Bog Turtle Survey

Keith has more than 20 years of diverse experience in environmental policy and permitting for a wide range of clients in the northeast. He is a Professional Wetland Scientist and a United States Fish and Wildlife Service (USFWS) Qualified Bog Turtle Surveyor.

Rei-Hua Wang
ReiHua.Wang@jacobs.com

Project Work completed: Wetland Delineation

Ms. Wang has 10 years of technical experience in environmental permitting, impact assessments, natural resource inventory surveys, wetland delineations, and habitat assessments for various linear and large scale projects throughout the northeast region.

Jack Harper

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Project work completed: Wetland Delineation and Phase 1 Bog Turtle Survey

Jack has more than 2 years of experience in environmental permitting, wetland delineations, habitat assessments, and ecological restoration for a variety of projects throughout the northeast region.

Wetlands and Watercourses

Jacobs conducted wetland delineations for the Project on November 18, 2022, and on March 31, 2023. A total of three wetlands and two watercourses were identified during these field surveys. Wetlands included: W1 a combination palustrine emergent (PEM) and palustrine forested (PFO) wetland, W2 a PFO wetland, and W3 a palustrine scrub/shrub (PSS) wetland while watercourses included: one perennial (stream S1) and one ephemeral (S2).

Refer to the enclosed Wetland and Waterbody Delineation Technical Memorandum and Addendum (Appendix A to this EA) for field data sheets, photos, sample locations, size of wetlands, brief narrative of the delineation process, and supporting materials. The features identified were within an environmental survey area which is larger than the overall Project workspaces where impacts will occur.

The Schuylkill River (stream S1) is mapped as a State Scenic River, River Segment 4, Modified Recreational. Jacobs reached out to the Pennsylvania Department of Conservation and Natural Resources (DCNR) to confirm that the segment of the Schuylkill River is classified as a State Scenic River under the Pennsylvania Scenic River Act. Refer to Appendix B of this EA for the email coordination between Jacobs and DCNR.

In reviewing PADEP's eMap and coordination with the PADEP Southeast Regional Office – Safe Drinking Water group, the Schuylkill River (stream S1) is noted as a public water supply. There are two public water intake structures located downstream of the Project area: the Phoenixville Water Department structures (ID: 1150077) located 1.39 miles and 2.0 miles downstream.

Location Map

Refer to mapping within the Wetland and Waterbody Delineation Technical Memorandum (Appendix A).

S2.B Aquatic Resources On-site

Watercourses

Stream S1 (Schuylkill River) is a perennial stream that is designated by Pennsylvania Code (PA Code) Chapter 93 as a warm water fishery (WWF), migratory fish (MF) water, a PA Historic Stream, and a State Scenic River.

- Channel length within the Project workspace: 215 feet
- Channel width (average ordinary high-water mark): 387 feet
- Floodplain: Zone AE (100 year floodplain)

Stream S2 is a small, ephemeral unnamed tributary (UNT) to the Schuylkill River (Stream S1), and therefore is designated as a WWF and MF water.

- Channel length within the Project workspace: 0 feet
- Channel width (average ordinary high-water mark): 2 feet
- Floodplain: Within the floodplain of Stream S1

Wetlands

Wetland W1 consisted of a combination of PEM and PFO wetland and is characterized as a wetland complex. The PEM wetland is located within the existing utility easement while the PFO wetland is located in the forested area adjacent to and on both sides of the utility easement. Both PFO wetland features are open ended and extend outside the project workspace and the surveyed area. Wetland W1 is located in the northeast extent of the project area, on the northern side of the Schuylkill River. The PFO wetland vegetation included red maple (*Acer rubrum*, FAC) and silver maple (*Acer saccharinum*, FACW). The PEM wetland vegetation included Pennsylvania smartweed (*Polygonum pensylvanicum*, FACW), switchgrass (*Panicum virgatum*, FAC), and common reed (*Phragmites australis*, FACW). Wetland hydrology indicators included microtopographic relief, drainage patterns, water marks and moss trim lines. Hydric soil characteristics observed consisted of low chroma soils with redox features. Wetland W1 is considered an Exceptional Value (EV) wetland, as it within the corridor of the Schuylkill River (Stream S1) which is designated as scenic under the Pennsylvania Scenic Rivers Act (32 P. S. § § 820.21—820.29)

Wetland W2 is a PFO wetland that receives water from the Schuylkill River during flooding events. It is located southwest of the Schuylkill River and eventually drains back into the Schuylkill River. Wetland W2 is open ended and extends outside the surveyed area to the southeast. The PFO wetland vegetation included silver maple (*Acer saccharinum*, FACW) and red maple (*Acer rubrum*, FAC). Wetland hydrology indicators included water marks, moss trim lines, and sparsely vegetated concave surface. Hydric soil characteristics observed consisted of low chroma soils with redox features. Wetland W2 is considered an EV wetland, as it within the corridor of the Schuylkill River (Stream S1) which is designated as scenic under the Pennsylvania Scenic Rivers Act (32 P. S. § § 820.21—820.29).

Wetland W3 is a PSS wetland, located southwest of the Schuylkill River trail. This concave wetland feature is between the paved trail and a gravel lot to the south, collecting drainage from both areas. Wetland W3 is open ended and extends outside the surveyed area to the southeast, adjacent to the paved Schuylkill River Trail. The PSS wetland vegetation included silky dogwood (*Cornus amomum*, FACW) and American elm saplings (*Ulmus americana*, FACW). The PEM wetland vegetation included flat-top goldentop (*Euthamia graminifolia*, FAC). Wetland hydrology indicators included high water table, saturation, water-stained leaves, and microtopographic relief. Hydric soil characteristics observed consisted of low chroma soils with redox features.

S2.C Threatened and Endangered Species

A PNDI (receipt 776177) review was completed for the Project. The PNDI review resulted in potential species under the jurisdiction of the USFWS, and requested additional information, a Bog Turtle Habitat Phase I survey. A USFWS-qualified bog turtle surveyor, Keith D'Angiolillo of Jacobs, conducted Phase I habitat surveys on behalf of Texas Eastern. The wetlands identified on the Project site were determined not to be potential bog turtle habitat. Since the Bog Turtle Phase 1 habitat surveys were conducted by a qualified bog turtle assessor, no letter response is provided from the USFWS for negative survey results.

Additionally, the PNDI review resulted in potential species under the jurisdiction of Pennsylvania Fish and Boat Commission (PFBC), and requested additional information, a habitat assessment for the state threatened, Northern Red-bellied Cooter (*Pseudemys rubriventris*). A qualified biologist, who possesses the necessary Scientific Collector's Permit issued by the PFBC conducted a habitat assessment. The Northern Red-bellied Cooter Survey Report has been provided to the PFBC. Coordination with the PFBC is ongoing.

The PNDI review receipt and Phase I Bog Turtle Habitat Survey Report – Negative Results are provided in the JPA package as item e.

S2.D Aquatic Resource Characterization

Riverine Resources

Stream S1 (Schuylkill River) has a gradient class of 1 (low gradient) with slopes ranging below 0.5 percent and a watershed size 4 (large stream/river) with a drainage area of approximately 2,000 square miles. Due to the small size of Stream S2 and its location within the floodplain of Stream S1, it is not characterized separately.

The Schuylkill River is listed in the 2022 Pennsylvania Integrated Water Quality Report as impaired (Category 5-waters impaired for one or more uses by a pollutant that requires the development of a TMDL) for aquatic life. Impairment sources include urban runoff, municipal point source discharges, and agriculture.

PA Riverine Condition Level 2 Rapid Assessment

Jacobs scientists conducted a Riverine Condition Level 2 Rapid Assessment on the Schuylkill River (Stream S1) to assess the aquatic resource condition. The assessment encompasses the stretch of the Schuylkill River within the Project workspace. The Riverine Condition Index (RCI) score is 0.55. Stream S2 is an ephemeral stream feature, therefore, does not require a Riverine Condition Level 2 Rapid Assessment. The results of the assessment including the datasheets and riparian condition maps are provided in Appendix C.

2. Wetland Resources

Wetland W1 is the only wetland that will be temporarily impacted by Project activities. Refer to Appendix A for the Wetland Delineation Technical Memorandum and Addendum, which provides datasheets, photographs, and a detailed description of the wetland features delineated in the project area. Table 1 details the wetland resource characteristics of each wetland.

Table 1. Wetland Resources

Wetland ID	HGM Classification[1]	Cowardin Classification[2]	Palustrine Community Classification	PA Wetland Condition Level 2 Assessment Protocol	Wetland Conditions
Wetland W1	RIVERENE	PEM/PFO	Red Maple – Elm – Willow	Overall Condition Index Score: 0.76	Wetland W1 is located within the floodplain of the Schuylkill River. Wetland W1 receives water from groundwater flow

			Floodplain Forest	(Refer to **Appendix C** for Assessment form and mapping. Refer to **Appendix A** for additional information on wetland feature)	and occasional flooding events of the Schuylkill River. Since Wetland W1 has the diversity of PEM and PFO wetland cover types and is in close proximity to the Schuylkill River, it likely provides habitat for mammals, birds, reptiles, amphibians, and invertebrates.
Wetland W2	RIVERINE	PEM	Red Maple – Elm – Willow Floodplain Forest	Wetland W2 will not be impacted by project activities, therefore, this assessment does not apply.	Wetland W2 is located within the floodplain of the Schuylkill River. Wetland W2 likely receives water from rain events and occasional flooding events of the Schuylkill River. Since Wetland W2 is in close proximity to the Schuylkill River, it likely provides habitat for a variety mammals, birds, reptiles, amphibians, and invertebrates.
Wetland W3	DEPRESS	PSS	Circumneutral Mixed Shrub Wetland	Wetland W3 will not be impacted by project activities, therefore, this assessment does not apply.	Wetland W3 is a concave wetland feature located between the paved Schuylkill River Trail and a gravel lot to the south, collecting drainage from both areas. Wetland W3 is significantly disturbed, as it was likely created from previous construction activities of the trail and parking area. Wetland W3 may provide habitat for small rodents, reptiles, amphibians, and invertebrates; however, likely on a small scale.
1 RIVERINE = characterized by a water source of overbank flow from a channel; DEPRESS = characterized by a water source consisting of return flow from groundwater and interflow with primarily vertical hydrodynamics. 2 Defined by Cowardin et al 1979					

Lacustrine Resources

There are no lacustrine resources associated with the Project.

Other Environmental Factors

No additional studies or surveys were undertaken for the Project.

S3: Identification and Description of Potential Project Impacts

S3.A Summary Table of Impacts

Refer to the Aquatic Resources Impact Table in JPA item h.

S3.B Standard Information Responses

The Schuylkill River (S1) is classified as State Scenic River, River Segment 4, Modified Recreational and additionally, the entire stretch of the Schuylkill River is considered a public water supply. No direct impacts to the Schuylkill River are proposed with the Project's HDD activities. Texas Eastern has developed and will implement an Inadvertent Return Contingency Plan. Construction activities associated with the removal of the Line 1 pipeline within the Schuylkill River will temporarily impact the channel bed and banks and result in localized turbidity. Best management practices (BMP) such as turbidity curtains will be implemented and the duration of construction will be minimized to the extent possible.

An Aid to Navigation (ATON) will be received from the PFBC to help minimize impact to the Schuylkill River's recreational activities.

S3.C Subfacility Details Table(s)

Refer to Subfacility Details Tables provided in Appendix D.

S3.D Resource Function Effects

Hydrologic/Biogeochemical

Construction activities that will impact the Schuylkill River (Stream S1) include the replacement of Line 1 (Subfacility type: PIPE, Pipe Conduit Type: DB) via a 1,111 ft HDD. No impacts to the Schuylkill River are proposed with the Project's HDD activities. Texas Eastern has developed and will implement an Inadvertent Return Contingency Plan to mitigate any potential impacts during the HDD (provided in Appendix E). The removal of the pipeline will result in temporary impacts to the channel of Stream S1 (Subfacility type: PIPE, Pipe Conduit Type: TRNC) through pulling of the pipe out of the river. These construction activities are not intended to impair the hydrologic and biogeochemical conditions of the river stretch. During construction, it is expected that there would be a short-term, temporary increase in turbidity that would temporarily impact water quality by increasing the amount of suspended solids. To minimize impacts to water quality, BMPs will be implemented including a turbidity curtain within the river and compost filter sock along the banks. Following construction activities and establishment of vegetation, water quality is anticipated to return to pre-construction conditions.

As a result of the Line 1 replacement activities, there will be temporary wetland impacts (Subfacility type: TMPWI) to Wetland W1. The TMPWI subfacility types are broken up into two impact categories: Wetland W1 PEM Impacts (0.52 acres) and Wetland W1 PFO Impacts (0.78 acres). The combined temporary impacts of Wetland W1 (PEM/PFO) is 1.3 acres. The total 1.3 acres of temporary impacts to Wetland W1 includes the potential placement of timber matts throughout the workspace, the HDD entry pit, and trench excavation for the removal of Line 1. These construction activities are not intended to impair the hydrologic and biogeochemical conditions of the wetland. During construction, it is expected that there will be a temporary impact to the drainage patterns of the wetland. To minimize impacts to drainage patterns, BMPs will be implemented including timber mats and compost filter socks . Following construction activities with grading to pre-construction conditions and establishment of vegetation, Wetland W1 is anticipated to return to pre-construction conditions.

Aquatic Habitat

The Schuylkill River is WWF and MF (PA Code). Wetland W1 is an EV wetland, due to its proximity and connection to the Schuylkill River. It is expected that the Project would temporarily impact aquatic habitat due to short-term increased turbidity during construction activities (Subfacility types: PIPE and TMPWI). BMPs will be implemented including a turbidity curtain during pipe removal to minimize these temporary disturbances.

Riparian Habitat

During construction, riparian habitat and vegetation along the Schuylkill River and Wetland W1 within the workspace would be impacted (Subfacility types: PIPE and TMPWI). Most impacts to vegetation are expected to be minor and short-term. Clearing of woody shrubs and trees will have more significant, longer term impacts, because shrubs and trees take longer to re-establish than herbaceous vegetation. Post-construction, disturbed areas will be seeded and mulched following the Project's Erosion & Sediment Control Plans (E&SCP) (JPA item k). In addition, trees will be planted within the forested area of wetland W1.

The various habitats within the riparian areas support a variety of widespread and tolerant mammals, birds, reptiles, amphibians, and invertebrates, likely at low densities. Direct and indirect impacts to wildlife resources are anticipated to be minor and limited mostly to temporary impacts on food, cover, and water resources during construction. Clearing and grading of the construction area will result in loss of vegetative cover and may result in the mortality of less mobile fauna, such as small rodents, reptiles, and invertebrates. Construction disturbance will likely cause the temporary displacement of more mobile wildlife from the construction workspace and adjacent areas. Disruption of habitat will be temporary in nature. Post-construction, the individuals will be able to utilize the area in subsequent seasons. Impacts to the riparian habitat will be temporary during construction and the area will reseeded.

Recreation

During Project construction activities, there may be temporary impacts to recreational activities within the Project stretch of the Schuylkill River. The Schuylkill River is classified as a State Scenic River, River Segment 4, Modified Recreational (DCNR). A PFBC Access Area is located approximately 0.5 miles northwest of the Project area. Texas Eastern will notify PFBC about timing of in-water construction activities. An ATON will be received from the PFBC to help minimize impact to the Schuylkill River's recreational activities. No long-term impacts to recreation are expected, as the construction activities involve replacing the pipeline under the Schuylkill River.

S3.E Antidegradation Analysis

As discussed in section S2.B, Wetlands W1 and W2 are designated as EV wetlands. Wetland W2 will not be impacted by the Project. Wetland W1 will be temporarily impacted by the Project, therefore, antidegradation practices are required to minimize accumulated erosion and sedimentation during earth disturbance activities and limit the change from pre-development to post-development in runoff volume, rate, and pollutant concentration. Antidegradation best available combination of technologies (ABACT) erosion and sediment controls will be implemented throughout construction including compost filter sock, timber matting, protection of wetland vegetation where possible, and immediate stabilization following construction activities.

S3.F Alternatives Analysis

As discussed in Sections S1.A and S1.B, the purpose and need of the Project is the partially exposed Line 1 pipeline in the Schuylkill River. The Project's maintenance and replacement activities are necessary towards providing adequate cover over the pipeline.

Under a no-action alternative, Texas Eastern would not replace the existing Line 1. The no-action alternative would avoid the temporary/short-term environmental impacts but would not provide the permanent/long-term benefits associated with the work. Under a no-action alternative, Texas Eastern would not be able to meet the objectives of the Project of providing adequate cover over the pipeline and updating to current

standards and conditions. This no-action alternative would not resolve the deficiencies of the 18-feet of exposure along the pipeline within the Schuylkill River which pose a threat to the integrity of the pipeline system. For these reasons, the no-action alternative was not considered.

Route alternatives were not considered for the Project since the work is to occur on an existing natural gas pipeline system. Utilizing the existing easement keeps the majority of impacts to previously disturbed areas and minimizes environmental impacts.

System alternatives, alternatives that are able to meet the objectives of the Project but use different methods of addressing the proposed work, were considered.

Cover in Place. One potential system alternative to address the exposed Line 1 is to cover the exposed areas of the pipe. This method would involve adding soil and rock around the exposed areas to fully cover the pipeline. This is not a preferred method, as it would only temporarily mitigate the exposure. Since the Schuylkill River is a large perennial waterbody with significant flow and frequent flooding events, it is likely that scouring of Line 1 would continue in the future. Additionally, providing sufficient cover of 3-feet of soil/rock over the pipeline would create a mound on the channel bed. This alternative was rejected from further consideration.

Open-Cut Wet-Ditch. Another potential system alternative to address the exposed Line 1 is replacement of the pipeline using an Open-Cut Wet-Ditch method within the Schuylkill River. This method would involve excavating a trench around the existing pipeline in the bottom of the Schuylkill River, removing the existing pipeline, laying the new Line 1 pipe bank to bank, and then backfilling the trench. For this method, equipment would be required to work in the river and potential sedimentation and turbidity within the river would be a concern. Additionally, removing and installing the pipeline within the same trench would require an extended outage on the natural gas system. This alternative was rejected from further consideration.

Due to the need to keep the outage limited, the installation of the new pipe and removal of the existing pipe were separated. The HDD was determined the preferred alternative for the installation to minimize potential environmental impacts. Further alternatives were considered for the removal of the existing pipe.

Abandon in Place. A system alternative considered for the existing Line 1 was to fill the pipe with grout within the segment, cap the pipeline on either side of the Schuylkill River, and abandon it in place. Due to the exposure of the pipeline in the river, this alternative was rejected for safety and the recreational use of the river.

Open-Cut Dry Ditch/Portadams. Another potential system alternative to address the removal of Line 1 would be using portadams to create a dry ditch within the Schuylkill River. Due to the width of the Schuylkill River, the work would need to occur in two phases, each installing portadams from each bank. This method would involve installation of a portadam along a portion of the pipeline and diverting the flow of water around that work area. Once flow is diverted, the area inside the dam would be pumped out and work commenced. While the work within the portadams would occur in the dry, having to install two phases would extend the time work occurs within the river and some sediment disturbance would occur. For these reasons, the alternative was considered but rejected from further consideration.

For these reasons identified above, Texas Eastern has determined that the HDD installation method and removing the existing pipe by pulling with a rig are the preferred alternatives for this Project. The HDD installation avoids impacts to the Schuylkill River and the majority of wetland W1. The removal of the existing Line 1 with an open cut on land and by pulling with a rig in the Schuylkill River minimizes impacts by decreasing the duration of construction and limiting excavation to the previously disturbed trench area.

S3.G Potential Secondary Impact Evaluation

The Project is limited to the temporary workspace along the existing Texas Eastern pipeline. Adjacent land outside the Project workspace will remain undisturbed and will not be affected by the Project. Perimeter BMPs will be implemented to minimize potential indirect impacts.

A short term increase in turbidity during construction could temporarily impact the Schuylkill River downstream of the Project. Given the size and flow of the river, it is anticipated that turbidity will dissipate relatively quickly. In-water work will be completed as quickly as possible limiting the time turbidity may be an issue. No long-term adverse effects on the river downstream are anticipated. The Project will not have a negative impact on stream hydraulics.

S3.H Cumulative Impacts to Wetland Resource

The Project proposes temporary impacts to wetlands. It will not result in a major impairment of the Commonwealth's wetland resources.

S4 Mitigation Plan

S4.A Avoidance and Minimization

The Project activities include the removal of the existing pipeline and installation of a replacement pipeline where the Line 1 system crosses under the Schuylkill River (Stream S1). The existing pipeline is partially exposed within the river, therefore, completely avoiding impacts to the waterbody will not be an option. However, installation of the new pipeline will be completed via an HDD which does avoid impacts to the Schuylkill River (S1). To minimize impacts to the river during the removal process, Texas Eastern proposes to pull the pipeline and attached weights with the HDD rig. Pulling the pipeline reduces the amount of time work occurs within the river and disturbs channel sediments only once.

In addition to the Schuylkill River, a wetland (W1) is located within and adjacent to the existing Texas Eastern easement. Additionally, an existing valve setting and railroad located to the north of the workspace prevent moving construction activities out of the wetland, therefore, avoiding impacts to this wetland will not be possible. During the HDD, excavation within the wetland will be minimized to the entry pit (6 feet by 6 feet) and during the removal of the pipeline, excavation will be limited to the previously disturbed trench area. For the remainder of the wetland located within the workspace, timber mats will be placed to minimize impacts to the wetland.

During construction Texas Eastern will implement BMP's and construction practices per the E&SCP including rock construction entrances, compost filter socks, and erosion control blankets to reduce the potential for movement of sediments within and from the workspace.

S4.B Repair, Rehabilitation, or Restorative Activities

Following the installation and removal of the pipelines the workspace will be restored per Texas Eastern's E&SCP, including grading to pre-construction contours, seeding, and mulching or installation of erosion control blanket.

Forested wetland W1 will be allowed to revert to preconstruction conditions, natural succession of the forest. To aid in restoration of the forested wetland, Texas Eastern will plant trees in disturbed temporary workspace that was identified as forested wetland. Species selection will be based on the composition of the adjacent forested areas such as red maple (*Acer rubrum*), silver maple (*Acer saccharinum*), and box elder (*Acer negundo*). Density of planting will be based on 400 stems per acre, with a maximum of 312 trees (0.78 acre x 400 stems).

S4.C Compensatory Mitigation

No compensatory mitigation is proposed for the Project as impacts are temporary.

Appendix A. Wetland and Waterbody Delineation Technical Memorandum and Addendum

Jacobs

Memorandum

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Subject	**Wetland Delineation Technical Memorandum** **Schuylkill River HDD Project in Chester and Montgomery Counties**
Attention	Angie Chmiel/Enbridge
From	Sara Hayes, Rei-Hua Wang, Jack Harper/Jacobs Engineering Group, Inc.
Date	December 06, 2022

1. Introduction

Jacobs Engineering Group, Inc. (Jacobs), on behalf of Enbridge Inc. (Enbridge) for Texas Eastern Transmission, LP (Texas Eastern), conducted a wetland delineation on November 18, 2022, for the Schuylkill River HDD Project (Project). The Project is located in Spring City and Upper Providence Townships, Chester and Montgomery Counties, Pennsylvania (**Attachment A, Figure 1**). The purpose of the delineation was to assess the presence or absence of wetlands or other waters that may be impacted by the Project.

To update the existing natural gas pipeline to current standards and conditions, the Project is proposing the following activities:

- A horizontal directional drill (HDD) with a 20-inch diameter pipe below the Schuylkill River. Two options are currently under design consideration including (1) an HDD of approximately 1200 linear feet or (2) an HDD of approximately 2100 linear feet and installation of a relocated valve site.
- Open cut installation of pipe and fittings for tie-in to existing Line 1 pipeline.
- Removal of existing Line 1 pipeline below the river.

The Environmental Survey Area (ESA) encompasses the existing Texas Eastern easement and proposed temporary workspace adjacent to the easement.

2. Background Information

Before conducting the wetland and waterbody delineation, Jacobs reviewed the following publicly available resources to identify potential locations and extent of wetlands and waterbodies within the ESA:

- United States Geological Survey (USGS) topographic map (USGS,1984);
- USGS National Hydrography Dataset (NHD) (USGS, 2022);
- United States Fish and Wildlife Service (USFWS), National Wetlands Inventory (NWI) (USFWS, 2014);
- United States Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS) Web Soil Survey (NRCS, 2022);
- Pennsylvania Department of Environmental Protection (PADEP) eMap (PADEP, 2022) and
- Aerial photography (PADEP, 2022).

USGS Topographic and NHD maps were used to identify the location of waterbodies within the ESA. The Schuylkill River is located within the ESA which is located within the Mingo Creek-Schuylkill River Watershed [Hydrological Unit Code (HUC) 020402031006].

NWI maps are used as a guide to indicate potential presence of wetlands. According to NWI mapping, there are no wetlands present within the ESA. The Schuylkill River is noted as a riverine feature (R2UBH) which crosses perpendicularly the existing pipeline easement (**Attachment A, Figure 2**).

The USDA NRCS soil survey indicates the location of soil map units. Drainage classes refer to the frequency and duration of wet periods in conditions in which the soil formed. Hydric soil ratings with a "yes" or "no" indicate whether the map unit component is classified as hydric soils or not. Mapped soil units identified within the ESA are presented in **Table 2** and are also presented in **Attachment 1, Figure 3.**

Table 1 – USDA NRCS Mapped Soil Units within the ESA

Map Unit Symbol	Soil Map Unit Name	Drainage Class	Hydric Soil Rating
Gc	Gibraltar silt loam	Well drained	No
Bo	Bowmansville-Knauers silt loams	Somewhat poorly drained (Bowmansville) - Poorly drained (Knauers)	Yes (Bowmansville)-No (Knauers)
Gb	Gibraltar silt loam	Well drained	No
UrxB	Urban land-Penn complex, 0 to 8 percent slopes	Well Drained	No
UrxD	Urban land-Penn complex, 8 to 25 percent slopes	Well Drained	No
W	Water	None	No
ReA	Readington silt loam, 0 to 3 percent slopes	Moderately well drained	No
PeC	Penn silt loam, 8 to 15 percent slopes	Well Drained	No
PeB	Penn silt loam, 3 to 8 percent slopes	Well drained	No

Aerial photography is reviewed to identify land uses within the vicinity of the ESA and potential wetlands and water features. A review of the aerial photography shows the general land uses within the ESA are vegetated fields, forested areas, commercial and residential buildings, and existing utility right-of-way (ROW). There is evidence of saturation and inundation observed in the northeast extent of the ESA. A mapped NWI pond feature (PUBHh) and large wetland complex is visible adjacent to the ESA in the northeast extent.

3. Survey Methods

Wetlands and waterbodies, if present, were delineated within the ESA in accordance with applicable federal and state regulations and guidance. Wetland boundaries were field-delineated according to the routine onsite methodology described in the 1987 U.S. Army Corps of Engineers (USACE) Wetlands Delineation Manual (Environmental Laboratory, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (April 2012).

The United States Environmental Protection Agency (USEPA) and the USACE issued a joint guidance document describing waters that are regulated under the Clean Water Act (CWA). According to this guidance, wetlands and waterbodies that are adjacent to or have a significant nexus to Traditionally Navigable Waterways (TNW) are regulated under Sections 401 and 404 of the CWA (USACE and USEPA, 2008). A significant nexus must meet a number of criteria that indicate the wetland provides biological, physical, or chemical benefits to the TNW. Typically, a significant nexus requires a surface water connection to the TNW or to a relatively permanent water (RPW) that is a tributary to the TNW. Each identified waterbody within the ESA was evaluated for significant nexus to RPWs according to these guidelines. Wetlands with no apparent surface nexus to an RPW or TNW are considered isolated and are likely to be considered non-jurisdictional by the USACE.

Preliminary jurisdictional evaluations of wetland and water features, if identified, are based on desktop evaluation of hydrologic or other connection to TNWs and then field verified during the field survey. The preliminary jurisdictional evaluations constitute as Jacobs's opinion only. The USACE and/or PADEP are responsible for making final official determinations of jurisdiction.

4. Results

Wetlands and waterbodies delineated within the ESA are depicted in **Attachment A, Figure 4**. Data forms are provided in **Attachment B** and a photograph log including representative photographs within the ESA is included in **Attachment C.**

4.1 Waterbodies

Two waterbodies were delineated within the ESA. Waterbodies are further described below and summarized in **Table 2**.

Stream S1, Schuylkill River, was identified crossing the ESA. The Schuylkill River is a PA Code Chapter 93 designated warm water fishery (WWF), migratory fish (MF) water, a PA Historic Stream, and a State Scenic River. The Schuylkill River is a TNW, therefore, is considered jurisdictional by the USACE.

Stream S2 is an ephemeral located southwest of the Schuylkill River. The feature originated from a concrete headwall. No outfall was observed; however, due to the deteriorated condition of the headwall, the outfall appears to have been buried and likely originates from the Municipal Public Works building adjacent to the ROW. Stream S2 drains into the Schuylkill River, a TNW, and therefore is likely to be considered jurisdictional by the USACE.

Table 2 – Stream Summary Table

Stream ID	Waterbody Name	Flow Regime[1]	Linear Feet within ESA	TNW, RPW or Non-RPW[2]	Water Classification[3]	TNW Connection
Stream S1	Schuylkill River	Perennial	445.60	TNW	WWF, MF	N/A
Stream S2	UNT to Schuylkill River	Ephemeral	172.43	Non-RPW	WWF, MF	Schuylkill River

Abbreviations:
Non-RPW = non relatively permanent water
RPW = relatively permanent water
ID = identification
NA = not applicable
TNW = traditional navigable water
UNT = unnamed tributary

Notes:
[1] Flow regime is defined as perennial, intermittent, or ephemeral. This determination was interpreted using field observations and USGS topographic maps.
[2] Intermittent and perennial streams were recorded as RPWs; ephemeral streams were recorded as non-RPWs.
[3] Designated water uses and water quality criteria as defined by 25 Pa. Code 93.1 (1979). WWF = Warm Water Fishery, MF = migratory fishes

4.2 Wetlands

Two wetlands were delineated within the ESA. Delineated wetlands are further described below and summarized in **Table 3**.

Wetland W1 is located in the northeast extent of the ESA. As defined by Cowardin et al. 1979, Wetland W1 consisted of a combination of palustrine emergent (PEM) and palustrine forested (PFO) wetland cover types. The PEM wetland is located within the existing utility ROW of the ESA. The PFO wetland is located in the forested area on both sides of the utility ROW. Both PFO wetland features are open ended and extend outside the ESA. The PFO wetland vegetation included red maple (*Acer rubrum*, FAC) and silver maple (*Acer saccharinum*, FACW). The PEM wetland vegetation included Pennsylvania smartweed (*Polygonum pensylvanicum,* FACW), switchgrass (*Panicum virgatum*, FAC), and common reed (*Phragmites australis*, FACW). Wetland hydrology indicators included microtopographic relief, drainage patterns, water marks and moss trim lines. Hydric soil characteristics observed consisted of low chroma soils with redox features.

Wetland W2 is located within the ESA, southwest of the Schuylkill River. As defined by Cowardin et al. 1979, Wetland W2 consists of a PFO wetland cover type. Wetland W2 is open ended and extends outside the ESA to the southeast. The PFO wetland vegetation included silver maple (*Acer saccharinum*, FACW) and red maple (*Acer rubrum*, FAC). Wetland hydrology indicators included water marks, moss trim lines, and sparsely vegetated concave surface. Hydric soil characteristics observed consisted of low chroma soils with redox features.

Table 3 – Wetlands Identified within the ESA

Wetland ID	Upland ID	Cowardin Class[1]	Size within ESA (acres)	Waters Type[2]	HGM Code[3]
W1-PFO	W1-UPL	PFO	1.06	RPWWN	DEPRESS
W1-PEM		PEM	0.52		
W2-PFO	W2-UPL	PFO	0.03	RPWWN	DEPRESS
Abbreviations: ID = identification PEM = palustrine emergent					
[1] Defined by Cowardin et al 1979 [2] RPWWN = wetlands adjacent to but not directly abutting RPWs [3] RIVERINE = characterized by a water source of overbank flow from a channel; DEPRESS = characterized by a water source consisting of return flow from groundwater and interflow with primarily vertical hydrodynamics.					

5. Conclusion

This Wetland Technical Memorandum summarizes the results of a wetland and waterbody delineation conducted by Jacobs for the proposed Schuylkill River HDD Project in Chester and Montgomery Counties, Pennsylvania. On November 18, 2022, Jacobs identified one perennial waterbody (Schuylkill River), and one ephemeral water within the ESA. Jacobs also identified two wetlands, one PEM / PFO wetland northeast of the Schuylkill River and one PFO wetland southwest of the Schuylkill River. The features noted are likely to be considered jurisdictional Waters of the U.S.

6. References

Cowardin, L.M. 1979. Classification of wetlands and deepwater habitats of the United State. Washington, D.C. Fish and Wildlife Service, U.S. Department of the Interior.

Environmental Laboratory. 1987. Corps of Engineers Wetland Delineation Manual. Wetlands Research Program Technical Report Y-87-1 (online edition). http://www.wes.army.mil/el/wetlands.pdfs/wlman87.pdf. U.S. Army Corps of Engineers, Wetlands Research Program, Waterways Experiment Station, Vicksburg, Mississippi.

Pennsylvania Department of Environmental Protection (PADEP). 2022. PA DEP GIS. Accessed December 06, 2022 at URL https://gis.dep.pa.gov/emappa/

Soil Survey Staff, Natural Resources Conservation Service (NRCS), U.S. Department of Agriculture (USDA). Web Soil Survey. Accessed December 06, 2022 at URL http://websoilsurvey.sc.egov.usda.gov/

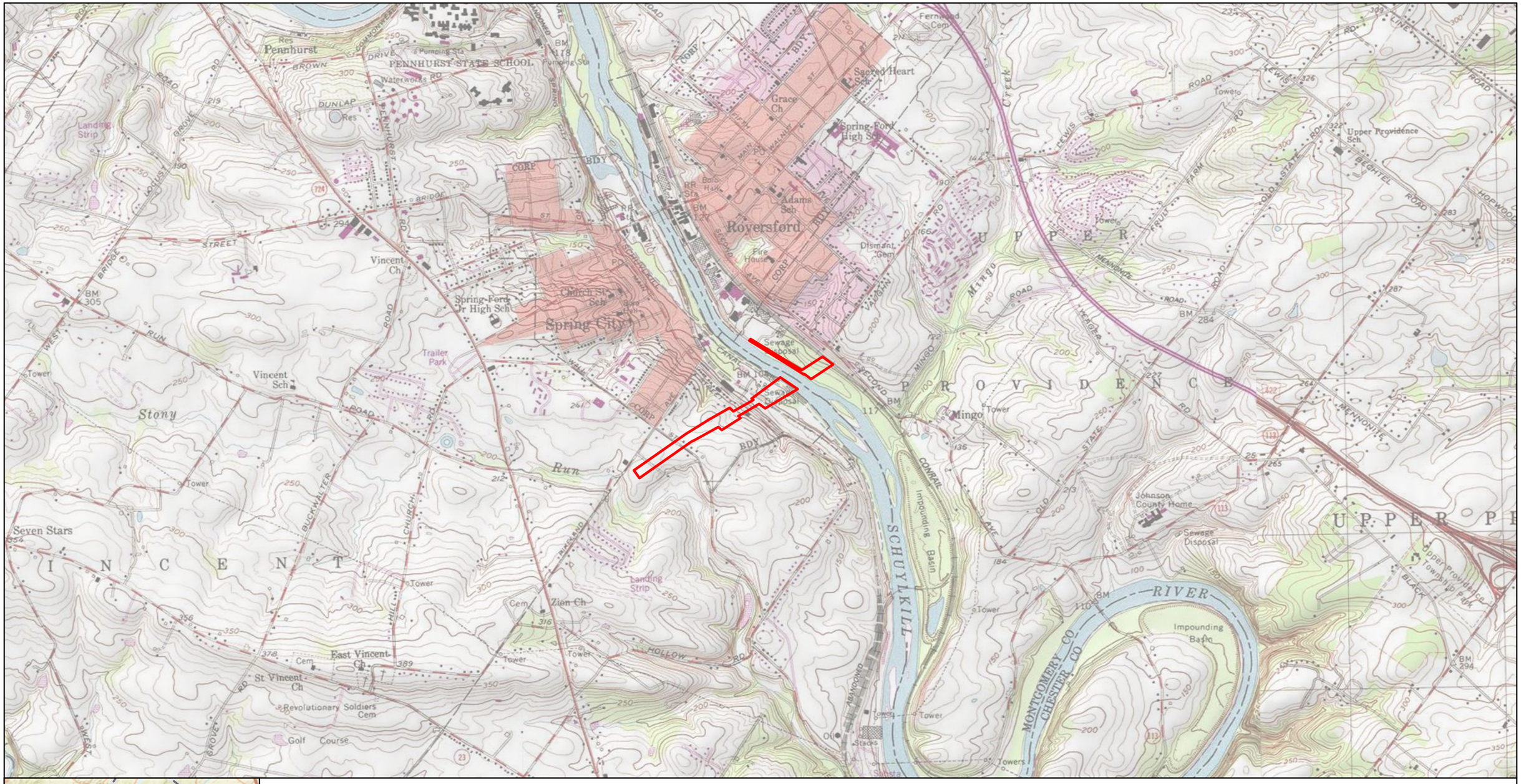
United States Army Corps of Engineers (USACE). 2012. "Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)", ERDC/EL TR-12-9, U.S. Army Engineer Research and Development Center, Vicksburg, MS. April 2012.

U. S. Fish and Wildlife Service (USFWS). May 2014. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands/

United Stated Geological Survey (USGS). 1984. USGS 7.5 minute topographic quadrangles: Phoenixville, PA (Published 1984).

USGS. 2022. USGS TNM Hydrography (NHD). Accessed December 06, 2022 at URL https://apps.nationalmap.gov/services/

Attachment A - Figures



Legend

Survey Area

N

0 3,000 6,000

Feet

Source:
Imagery: ESRI USA Topo Maps online mapping service.
USGS 7.5 minute topographic quadrangles:
Phoenixville, PA (Published 1984)

Figure 1
USGS Topographic Map
Texas Eastern Transmission, LP
Schuylkill River HDD Project
Chester and Montgomery Counties, Pennsylvania

Jacobs

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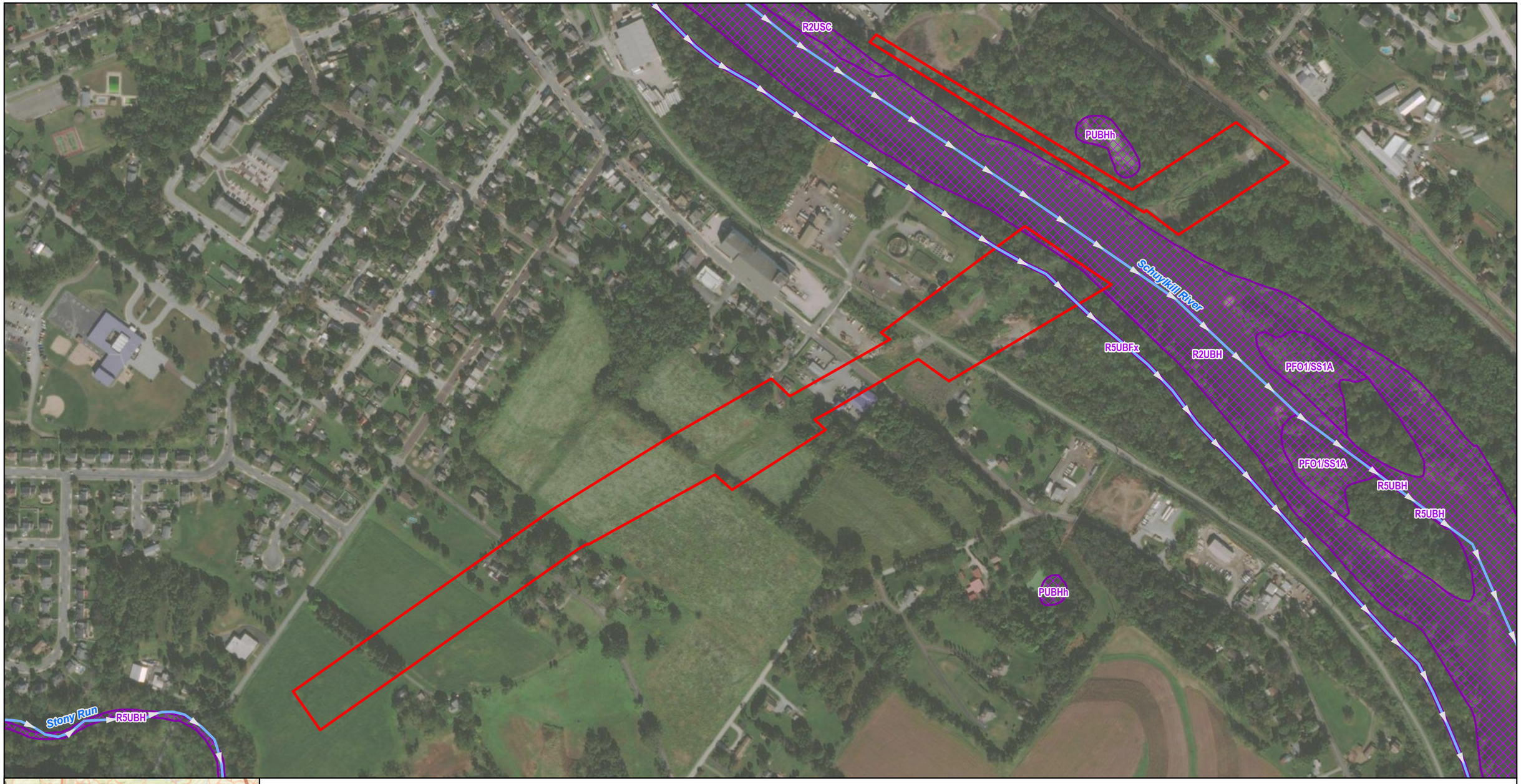


Legend

- NHD Stream
- NWI Wetland
- Survey Area

N

0 450 900

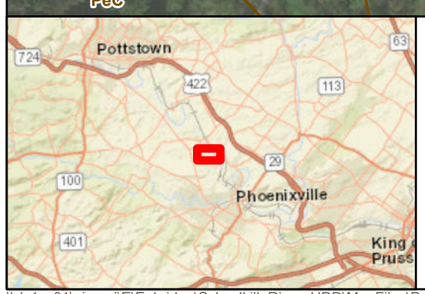
Feet

Source:
Imagery: ESRI World Imagery online mapping service.

Figure 2
National Wetlands Inventory (NWI) and
National Hydrography Dataset (NHD) Map
Texas Eastern Transmission, LP
Schuylkill River HDD Project
Chester and Montgomery Counties, Pennsylvania

Jacobs

Soil Map Unit	Description
Bo	Bowmansville-Knauers silt loams
Gb	Gibraltar silt loam
Gc	Gibraltar silt loam
PeB	Penn silt loam, 3 to 8 percent slopes
PeC	Penn silt loam, 8 to 15 percent slopes
ReA	Readington silt loam, 0 to 3 percent slopes
Ura	Urban land, occasionally flooded
UrxB	Urban land-Penn complex, 0 to 8 percent slopes
UrxD	Urban land-Penn complex, 8 to 25 percent slopes
W	Water



Legend

- Soil Map Unit
- Survey Area

N

0 500 1,000

Feet

Source:
Imagery: ESRI World Imagery online mapping service.

Figure 3
Natural Resources Conservation Service (NRCS) Soils Map
Texas Eastern Transmission, LP
Schuylkill River HDD Project
Chester and Montgomery Counties, Pennsylvania

Jacobs

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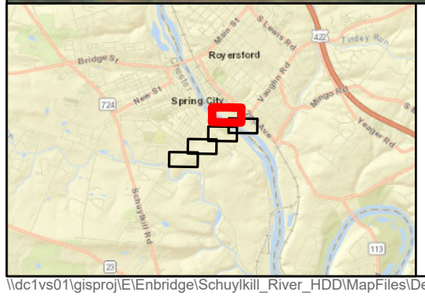

Legend
- Photo Location and Direction

Comment
- Wetland Plot Point
- Upland Point
- Delineated Stream
- Open Ended Feature

Type
- PEM
- PFO
- Survey Area

N

0 150 300

Feet

Source:
Imagery: ESRI World Imagery online mapping service.

Figure 4
Delineated Features - Sheet 1 of 5
Texas Eastern Transmission, LP
Schuylkill River HDD Project
Chester and Montgomery Counties, Pennsylvania

Jacobs

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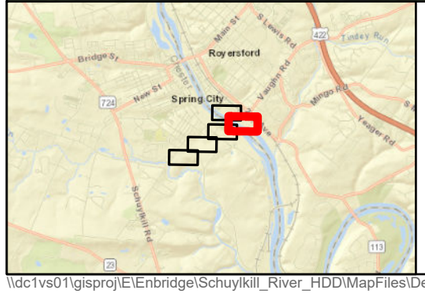

Legend
- Photo Location and Direction

Comment
- Wetland Plot Point
- Upland Point
- Delineated Stream
- Open Ended Feature

Type
- PEM
- PFO
- Survey Area

N

0 150 300

Feet

Source:
Imagery: ESRI World Imagery online mapping service.

Figure 4
Delineated Features - Sheet 2 of 5
Texas Eastern Transmission, LP
Schuylkill River HDD Project
Chester and Montgomery Counties, Pennsylvania

Jacobs

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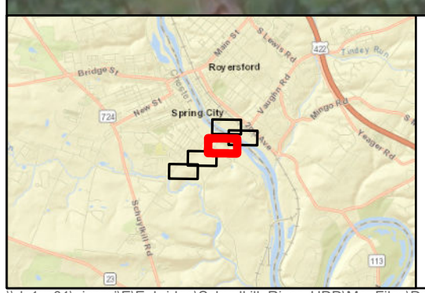

Legend
- Photo Location and Direction

Comment
- Wetland Plot Point
- Upland Point
- Delineated Stream
- Open Ended Feature

Type
- PEM
- PFO
- Survey Area

N

0 150 300

Feet

Source:
Imagery: ESRI World Imagery online mapping service.

Figure 4
Delineated Features - Sheet 3 of 5
Texas Eastern Transmission, LP
Schuylkill River HDD Project
Chester and Montgomery Counties, Pennsylvania

Jacobs

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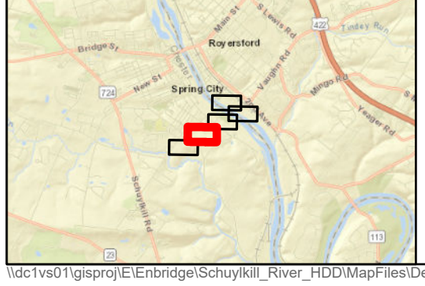

Legend
- Photo Location and Direction

Comment
- Wetland Plot Point
- Upland Point
- Delineated Stream
- Open Ended Feature

Type
- PEM
- PFO
- Survey Area

N

0 150 300

Feet

Source:
Imagery: ESRI World Imagery online mapping service.

Figure 4
Delineated Features - Sheet 4 of 5
Texas Eastern Transmission, LP
Schuylkill River HDD Project
Chester and Montgomery Counties, Pennsylvania

Jacobs

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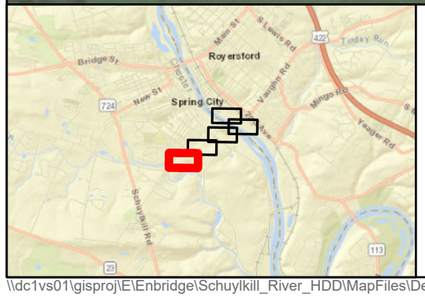

Legend
- Photo Location and Direction

Comment
- Wetland Plot Point
- Upland Point
- Delineated Stream
- Open Ended Feature

Type
- PEM
- PFO
- Survey Area

N

0 150 300

Feet

Source:
Imagery: ESRI World Imagery online mapping service.

Figure 4
Delineated Features - Sheet 5 of 5
Texas Eastern Transmission, LP
Schuylkill River HDD Project
Chester and Montgomery Counties, Pennsylvania

Jacobs

Attachment B – Data Forms

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region
See ERDC/EL TR-12-9; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Schuylkill HDD City/County: Upper Providence/Montgomery Sampling Date: 11/18/2022

Applicant/Owner: Enbridge State: PA Sampling Point: W1-PEM

Investigator(s): Rei-Hua Wang, Jack Harper Section, Township, Range: Upper Providence Township

Landform (hillside, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR or MLRA): LRR S, MLRA 148 Lat: 40.173101 Long: -75.533622 Datum: NAD83

Soil Map Unit Name: Bowmansville-Knauers silt loams NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W1-PEM

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 5)			
1. *Panicum virgatum*	75	Yes	FAC
2. *Polygonum pensylvanicum*	10	No	FACW
3. *Phragmites australis*	10	No	FACW
4. *Artemisia vulgaris*	3	No	UPL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	98 =Total Cover		
50% of total cover: 49	20% of total cover: 20		
Woody Vine Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	20	x 2 =	40
FAC species	75	x 3 =	225
FACU species	0	x 4 =	0
UPL species	3	x 5 =	15
Column Totals:	98 (A)		280 (B)

Prevalence Index = B/A = 2.86

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W1-PEM

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	95	7.5YR 3/3	5	C	M	Loamy/Clayey	Silt Loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **(MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (F21) **(outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

We were only able to bore to a depth of 12 inches due to Enbridge ground disturbance protocol.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region
See ERDC/EL TR-12-9; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Schuylkill HDD City/County: Upper Providence/Montgomery Sampling Date: 11/18/2022

Applicant/Owner: Enbridge State: PA Sampling Point: W1-PFO

Investigator(s): Rei-Hua Wang, Jack Harper Section, Township, Range: Upper Providence Township

Landform (hillside, terrace, etc.): toeslope Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR or MLRA): LRR S, MLRA 148 Lat: 40.173347 Long: -75.533530 Datum: NAD83

Soil Map Unit Name: Bowmansville-Knauers silt loams NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- X Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- X Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? Yes ____ No X Depth (inches): ____
(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W1-PFO

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	70	Yes	FAC
2. *Acer saccharinum*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	90	=Total Cover	
50% of total cover: 45		20% of total cover:	18

Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Woody Vine Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	20	x 2 =	40
FAC species	70	x 3 =	210
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	90 (A)		250 (B)

Prevalence Index = B/A = 2.78

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W1-PFO

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/1	95	7.5YR 3/3	5	C	M	Loamy/Clayey	Distinct redox concentrations
5-12	10YR 2/1	95	10YR 3/3	5	C	M	Loamy/Clayey	High organic content

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **(MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (F21) **(outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

We were only able to bore to a depth of 12 inches due to Enbridge ground disturbance protocol.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region
See ERDC/EL TR-12-9; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Schuylkill HDD City/County: Upper Providence/Montgomery Sampling Date: 11/18/2022

Applicant/Owner: Enbridge State: PA Sampling Point: W1-UPL

Investigator(s): Rei-Hua Wang, Jack Harper Section, Township, Range: Upper Providence Township

Landform (hillside, terrace, etc.): terrace Local relief (concave, convex, none): convex Slope (%): 1

Subregion (LRR or MLRA): LRR S, MLRA 148 Lat: 40.172985 Long: -75.534061 Datum: NAD83

Soil Map Unit Name: Bowmansville-Knauers silt loams NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W1-UPL

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer saccharinum*	20	Yes	FACW
2. *Quercus rubra*	10	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	30	=Total Cover	
50% of total cover: 15		20% of total cover: 6	

Sapling/Shrub Stratum (Plot size: 15)			
1. *Rosa multiflora*	10	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	10	=Total Cover	
50% of total cover: 5		20% of total cover: 2	

Herb Stratum (Plot size: 5)			
1. *Poa*	70	Yes	FAC
2. *Artemisia vulgaris*	20	Yes	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90	=Total Cover	
50% of total cover: 45		20% of total cover: 18	

Woody Vine Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	20	x 2 =	40
FAC species	70	x 3 =	210
FACU species	20	x 4 =	80
UPL species	20	x 5 =	100
Column Totals:	130 (A)		430 (B)

Prevalence Index = B/A = 3.31

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W1-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100					Loamy/Clayey	Silty Loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **(MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (F21) **(outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

We were only able to bore to a depth of 12 inches due to Enbridge ground disturbance protocol.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region
See ERDC/EL TR-12-9; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Schuylkill HDD City/County: Spring City/Chester Sampling Date: 11/18/2022

Applicant/Owner: Enbridge State: PA Sampling Point: W2-PFO

Investigator(s): Rei-Hua Wang, Jack Harper Section, Township, Range: Borough of Spring City

Landform (hillside, terrace, etc.): toeslope Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR or MLRA): LRR S, MLRA 148 Lat: 40.172180 Long: -75.535410 Datum: NAD83

Soil Map Unit Name: Gibraltar silt loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- X Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ True Aquatic Plants (B14)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- X Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W2-PFO

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer saccharinum*	50	Yes	FACW
2. *Acer rubrum*	30	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	80	=Total Cover	
50% of total cover: 40		20% of total cover:	16

Sapling/Shrub Stratum (Plot size: 15)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Herb Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Woody Vine Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	50	x 2 =	100
FAC species	30	x 3 =	90
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80 (A)		190 (B)

Prevalence Index = B/A = 2.38

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W2-PFO

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/1	95	7.5YR 3/3	5	C	M	Loamy/Clayey	Silt Loam
5-12	10YR 2/1	95	10YR 3/3	5	C	M	Loamy/Clayey	High Organic

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **(MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- X Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (F21) **(outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

We were only able to bore to a depth of 12 inches due to Enbridge ground disturbance protocol.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region
See ERDC/EL TR-12-9; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Schuylkill HDD City/County: Spring City/Chester Sampling Date: 11/18/2022

Applicant/Owner: Enbridge State: PA Sampling Point: W2-UPL

Investigator(s): Rei-Hua Wang, Jack Harper Section, Township, Range: Borough of Spring City

Landform (hillside, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 3

Subregion (LRR or MLRA): LRR S, MLRA 148 Lat: 40.172183 Long: -75.535313 Datum: NAD83

Soil Map Unit Name: Gibraltar silt loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: W2-UPL

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus americana*	30	Yes	FACU
2. *Ailanthus altissima*	25	Yes	FACU
3. *Acer rubrum*	15	Yes	FAC
4.			
5.			
6.			
7.			
	70	=Total Cover	
50% of total cover: 35		20% of total cover: 14	

Sapling/Shrub Stratum (Plot size: 15)			
1. *Lonicera tatarica*	20	Yes	FACU
2. *Lonicera japonica*	15	Yes	FACU
3. *Rosa multiflora*	10	Yes	FACU
4.			
5.			
6.			
7.			
8.			
9.			
	45	=Total Cover	
50% of total cover: 23		20% of total cover: 9	

Herb Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Woody Vine Stratum (Plot size: 5)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 16.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	100	x 4 =	400
UPL species	0	x 5 =	0
Column Totals:	115 (A)		445 (B)

Prevalence Index = B/A = 3.87

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W2-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	95	7.5YR 3/3	5	C	M	Loamy/Clayey	Silt Loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **(MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (F21) **(outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

We were only able to bore to a depth of 12 inches due to Enbridge ground disturbance protocol.

Attachment C – Photograph Log

PHOTO NO.	
1	
SITE NAME	
Schuylkill River HDD	
PHOTO LOCATION	
40.173382, -75.532491	
DIRECTION	**DATE**
SW	Nov. 18, 2022
DESCRIPTION: View of PFO Wetland W1 in the northeast extent of the environmental survey area (ESA). Photo is facing west towards the ROW.	

PHOTO NO.	
2	
SITE NAME	
Schuylkill River HDD	
PHOTO LOCATION	
40.172824, -75.533724	
DIRECTION	**DATE**
NE	Nov. 18, 2022
DESCRIPTION: View of PEM Wetland W1 in the northeast extent of the ESA. Photo is taken from the existing ROW and shows the existing Texas Eastern valve site in the distance.	

PHOTO NO.	
3	
SITE NAME	
Schuylkill River HDD	
PHOTO LOCATION	
40.173553, -75.535499	
DIRECTION	**DATE**
SE	Nov. 18, 2022

DESCRIPTION:
Photo is taken from the access route to the ROW on the northeast side of the Schuylkill River. No wetlands or waterbodies were delineated along the access route.

PHOTO NO.	
4	
SITE NAME	
Schuylkill River HDD	
PHOTO LOCATION	
40.172351, -75.535447	
DIRECTION	**DATE**
NE	Nov. 18, 2022

DESCRIPTION:
View of the Schuylkill River (Stream S1) from the ROW.

PHOTO NO.	
5	
SITE NAME	
Schuylkill River HDD	
PHOTO LOCATION	
40.172455, -75.535898	
DIRECTION	**DATE**
W	Nov. 18, 2022
DESCRIPTION: View of Stream S2 located north of the ROW. Stream S2 is an ephemeral feature that flows into the Schuylkill River.	

PHOTO NO.	
6	
SITE NAME	
Schuylkill River HDD	
PHOTO LOCATION	
40.172181, -75.535384	
DIRECTION	**DATE**
SE	Nov. 18, 2022
DESCRIPTION: View of PFO Wetland W2. Wetland W2 is a depressional area located south of the ROW.	

Jacobs

Memorandum

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Subject	**Addendum to the Wetland Delineation Technical Memorandum** **Schuylkill River HDD Project in Chester and Montgomery Counties**
Attention	Joe McGaver/Enbridge
From	Sara Hayes, Keith D'Angiolillo, Jack Harper
Date	April 7, 2023

1. Introduction

Jacobs Project Management Group (Jacobs), on behalf of Enbridge Inc. (Enbridge) for Texas Eastern Transmission, LP (Texas Eastern), conducted a wetland delineation on March 31, 2023 for the Schuylkill River HDD Project (Project). Jacobs previously conducted a delineation on November 18, 2022 for the Project. Since that time, additional temporary workspace (ATWS) areas were added to the Project area and a previously inaccessible property became accessible. The Project is located in Spring City and Upper Providence Townships, Chester and Montgomery Counties, Pennsylvania (**Attachment A, Figure 1**). The purpose of the delineation was to assess the presence or absence of wetlands or other waters that may be impacted by the Project.

The Project consists of the maintenance and replacement of the existing Line 1 natural gas pipeline to update it to current standards and conditions. The construction activities propose to remove the existing 20-inch diameter pipeline and replace with a new 20-inch diameter pipe through an horizontal directional drill (HDD) of approximately 1400 linear feet. Additionally, the activities include an open cut installation of the pipe and fittings to tie-in to the existing Line 1 pipeline.

The Environmental Survey Area (ESA) for the addendum encompasses the ATWS areas and the property that Jacobs previously did not have access to during the November 2022 delineation.

2. Background Information

Before conducting the wetland and waterbody delineation, Jacobs reviewed the following publicly available resources to identify potential locations and extent of wetlands and waterbodies within the ESA:

- United States Geological Survey (USGS) topographic map (USGS,1984);
- USGS National Hydrography Dataset (NHD) (USGS, 2022);
- United States Fish and Wildlife Service (USFWS), National Wetlands Inventory (NWI) (USFWS, 2014);
- United States Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS) Web Soil Survey (NRCS, 2022);
- Pennsylvania Department of Environmental Protection (PADEP) eMap (PADEP, 2022) and
- Aerial photography (PADEP, 2022).

USGS Topographic and NHD maps were used to identify the location of waterbodies within the ESA. No waterbodies were located within the ESA. The ESA is located in the Mingo Creek-Schuylkill River Watershed [Hydrological Unit Code (HUC) 020402031006].

NWI maps are used as a guide to indicate potential presence of wetlands. According to NWI mapping, there are no wetlands present within the ESA (**Attachment A, Figure 2**).

The USDA NRCS soil survey indicates the location of soil map units. Drainage classes refer to the frequency and duration of wet periods in conditions in which the soil formed. Hydric soil ratings with a "yes" or "no" indicate whether the map unit component is classified as hydric soils or not. Mapped soil units identified within the ESA are presented in **Table 1** and are also presented in **Attachment 1, Figure 3.**

Table 1 – USDA NRCS Mapped Soil Units within the ESA

Map Unit Symbol	Soil Map Unit Name	Drainage Class	Hydric Soil Rating
Ura	Urban land, occasionally flooded	Excessively drained	No
UrxB	Urban land-Penn complex, 0 to 8 percent slopes	Well Drained	No
UrxD	Urban land-Penn complex, 8 to 25 percent slopes	Well Drained	No

Aerial photography is reviewed to identify land uses within the vicinity of the ESA and potential wetlands and water features. A review of the aerial photography shows the general land uses within the ESA are vegetated fields, commercial and residential buildings, and paved and gravel parking lots. The aerial photos did not display any evidence of saturation and inundation within the ESA.

3. Survey Methods

Wetlands and waterbodies, if present, were delineated within the ESA in accordance with applicable federal and state regulations and guidance. Wetland boundaries were field-delineated according to the routine onsite methodology described in the 1987 U.S. Army Corps of Engineers (USACE) Wetlands Delineation Manual (Environmental Laboratory, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (April 2012).

According to current guidance, wetlands and waterbodies that are adjacent to or have a significant nexus to Traditionally Navigable Waterways (TNW) are regulated under Sections 401 and 404 of the Clean Water Act (CWA). A significant nexus must meet a number of criteria that indicate the wetland provides biological, physical, or chemical benefits to the TNW. Typically, a significant nexus requires a surface water connection to the TNW or to a relatively permanent water (RPW) that is a tributary to the TNW. Each identified waterbody within the ESA was evaluated for significant nexus to RPWs according to these guidelines. Wetlands with no apparent surface nexus to an RPW or TNW are considered isolated and are likely to be considered non-jurisdictional by the USACE.

Preliminary jurisdictional evaluations of wetland and water features, if identified, are based on desktop evaluation of hydrologic or other connection to TNWs and then field verified during the field survey. The preliminary jurisdictional evaluations constitute as Jacobs's opinion only. The USACE and/or PADEP are responsible for making final official determinations of jurisdiction.

4. Results

Wetlands and waterbodies delineated within the ESA are depicted in **Attachment A, Figure 4**. Data forms are provided in **Attachment B** and a photograph log including representative photographs within the ESA is included in **Attachment C.**

4.1 Waterbodies

No waterbodies were delineated within the ESA.

4.2 Wetlands

One wetland was delineated during this survey.

Wetland W3 is located southwest of the Schuylkill River trail. The concave area is between the gravel trail and a gravel lot to the south, collecting drainage from both areas. As defined by Cowardin et al. 1979, Wetland W3 consists of a Palustrine Scrub/Shrub (PSS) wetland cover type. Wetland W3 is open ended and extends outside the ESA to the southeast, adjacent to the paved Schuylkill River Trail. The PSS wetland vegetation included silky dogwood (*Cornus amomum*, FACW) and American elm saplings (*Ulmus americana*, FACW). The PEM wetland vegetation included flat-top goldentop (*Euthamia graminifolia*, FAC). Wetland hydrology indicators included high water table, saturation, water-stained leaves, and microtopographic relief. Hydric soil characteristics observed consisted of low chroma soils with redox features.

5. Conclusion

This Addendum to the Wetland Technical Memorandum for the Schuylkill HDD Project summarizes the results of a wetland and waterbody delineation conducted by Jacobson March 31, 2023. Jacobs identified one wetland southwest of the Schuylkill River Trail. Based on a the field visit and an desktop evaluation, the feature notedis likely to be considered a jurisdictional Water of the U.S.

6. References

Cowardin, L.M. 1979. Classification of wetlands and deepwater habitats of the United State. Washington, D.C. Fish and Wildlife Service, U.S. Department of the Interior.

Environmental Laboratory. 1987. Corps of Engineers Wetland Delineation Manual. Wetlands Research Program Technical Report Y-87-1 (online edition). http://www.wes.army.mil/el/wetlands.pdfs/wlman87.pdf. U.S. Army Corps of Engineers, Wetlands Research Program, Waterways Experiment Station, Vicksburg, Mississippi.

Pennsylvania Department of Environmental Protection (PADEP). 2022. PA DEP GIS. Accessed April 06, 2023 at URL https://gis.dep.pa.gov/emappa/

Soil Survey Staff, Natural Resources Conservation Service (NRCS), U.S. Department of Agriculture (USDA). Web Soil Survey. Accessed April 06, 2023 at URL http://websoilsurvey.sc.egov.usda.gov/

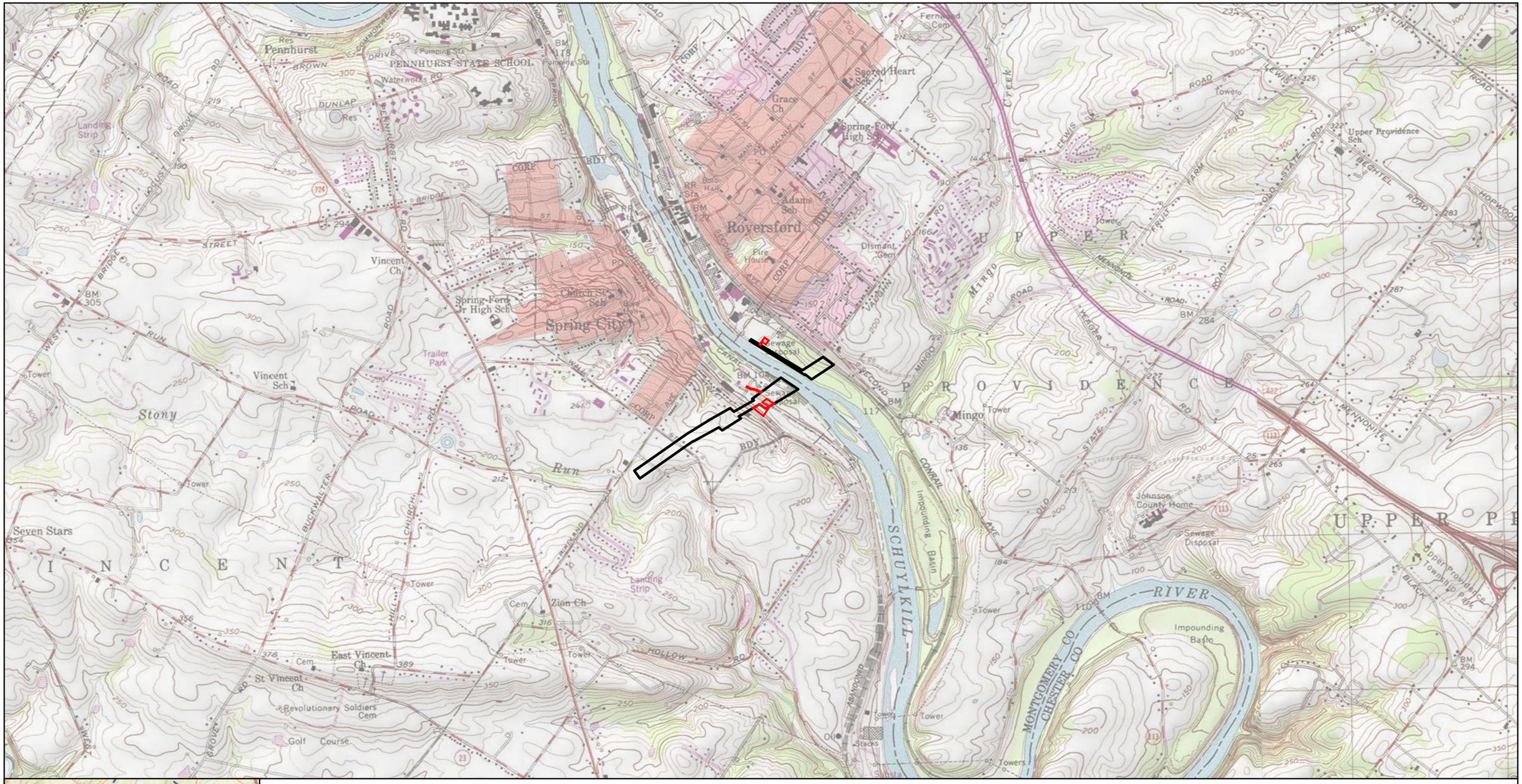
United States Army Corps of Engineers (USACE). 2012. "Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)", ERDC/EL TR-12-9, U.S. Army Engineer Research and Development Center, Vicksburg, MS. April 2012.

U. S. Fish and Wildlife Service (USFWS). May 2014. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands/

United Stated Geological Survey (USGS). 1984. USGS 7.5 minute topographic quadrangles: Phoenixville, PA (Published 1984).

USGS. 2022. USGS TNM Hydrography (NHD). Accessed April 06, 2023 at URL https://apps.nationalmap.gov/services/

Attachment A - Figures



Legend

- November 2022 Survey Area
- March 2023 Survey Area (Addendum)

N

0 3,000 6,000

Feet

Source:
Imagery: ESRI USA Topo Maps online mapping service.
USGS 7.5 minute topographic quadrangles:
Phoenixville, PA (Published 1984)

Figure 1
USGS Topographic Map
Texas Eastern Transmission, LP
Schuylkill River HDD Project
Chester and Montgomery Counties, Pennsylvania

Jacobs

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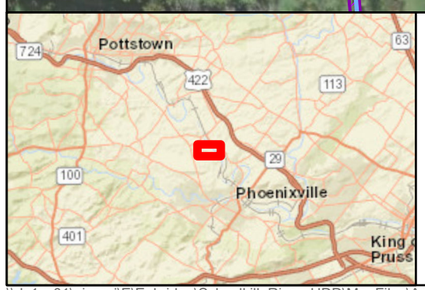

Legend

- March 2023 Survey Area (Addendum)
- NHD Stream
- NWI Wetland
- November 2022 Survey Area

N

0 450 900

Feet

Figure 2
National Wetlands Inventory (NWI) and
National Hydrography Dataset (NHD) Map
Texas Eastern Transmission, LP
Schuylkill River HDD Project
Chester and Montgomery Counties, Pennsylvania

Source:
Imagery: ESRI World Imagery online mapping service.
Wetland: National Wetland Inventory (NWI) US Fish and Wildlife Service 11/2022
Streams: National Hydrology Dataset (NHD) US Geological Survey 11/2022

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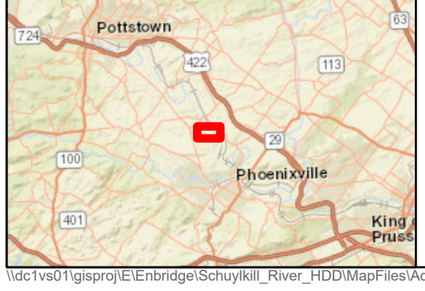
Soil Map Unit	Description
Bo	Bowmansville-Knauers silt loams
Gb	Gibraltar silt loam
Gc	Gibraltar silt loam
PeB	Penn silt loam, 3 to 8 percent slopes
PeC	Penn silt loam, 8 to 15 percent slopes
ReA	Readington silt loam, 0 to 3 percent slopes
Ura	Urban land, occasionally flooded
UrxB	Urban land-Penn complex, 0 to 8 percent slopes
UrxD	Urban land-Penn complex, 8 to 25 percent slopes
W	Water



Legend

- November 2022 Survey Area
- March 2023 Survey Area (Addendum)
- Soil Map Unit

N

0 500 1,000

Feet

Source:
Imagery: ESRI World Imagery online mapping service.
Soils: NRCS Web Soil Survey 11/2022

Figure 3
Natural Resources Conservation Service (NRCS) Soils Map
Texas Eastern Transmission, LP
Schuylkill River HDD Project
Chester and Montgomery Counties, Pennsylvania

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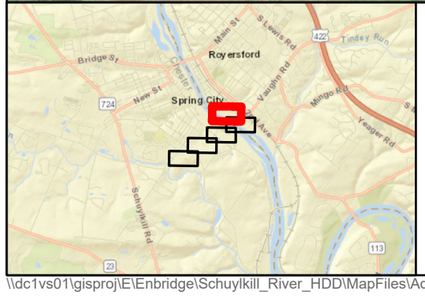

Legend

- Photo Location and Direction
- Wetland Plot Point
- Upland Point
- Delineated Stream
- Open Ended Feature
- Delineated PEM Wetland
- Delineated PFO Wetland
- Delineated PSS Wetland
- March 2023 Survey Area (Addendum)
- November 2022 Survey Area

N

0 150 300

Feet

Source:
Imagery: ESRI World Imagery online mapping service.

Figure 4
Delineated Features - Sheet 1 of 5
Texas Eastern Transmission, LP
Schuylkill River HDD Project
Chester and Montgomery Counties, Pennsylvania

Jacobs

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Wetland W1

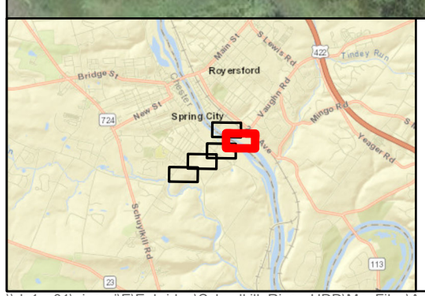
Wetland W1

Stream S1

Stream S1

Stream S2

Wetland W2



Legend

- Photo Location and Direction
- Wetland Plot Point
- Upland Point
- Delineated Stream
- Open Ended Feature
- Delineated PEM Wetland
- Delineated PFO Wetland
- Delineated PSS Wetland
- March 2023 Survey Area (Addendum)
- November 2022 Survey Area

N

0 150 300

Feet

Source:
Imagery: ESRI World Imagery online mapping service.

Figure 4
Delineated Features - Sheet 2 of 5
Texas Eastern Transmission, LP
Schuylkill River HDD Project
Chester and Montgomery Counties, Pennsylvania

Jacobs

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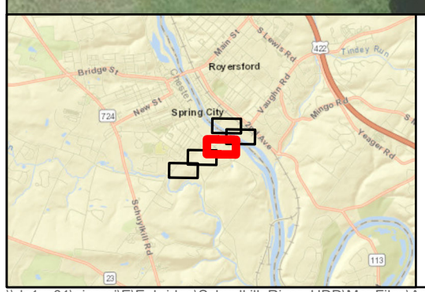

Legend

- Photo Location and Direction
- Wetland Plot Point
- Upland Point
- Delineated Stream
- Open Ended Feature
- Delineated PEM Wetland
- Delineated PFO Wetland
- Delineated PSS Wetland
- March 2023 Survey Area (Addendum)
- November 2022 Survey Area

N

0 150 300

Feet

Source:
Imagery: ESRI World Imagery online mapping service.

Figure 4
Delineated Features - Sheet 3 of 5
Texas Eastern Transmission, LP
Schuylkill River HDD Project
Chester and Montgomery Counties, Pennsylvania

Jacobs

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Legend

- Photo Location and Direction
- Wetland Plot Point
- Upland Point
- Delineated Stream
- Open Ended Feature
- Delineated PEM Wetland
- Delineated PFO Wetland
- Delineated PSS Wetland
- March 2023 Survey Area (Addendum)
- November 2022 Survey Area

N

0 150 300

Feet

Source:
Imagery: ESRI World Imagery online mapping service.

Figure 4
Delineated Features - Sheet 4 of 5
Texas Eastern Transmission, LP
Schuylkill River HDD Project
Chester and Montgomery Counties, Pennsylvania

Jacobs

\\dc1vs01\gisproj\E\Enbridge\Schuylkill_River_HDD\MapFiles\Additional Delineation Mapping.aprx MCCLELC1 4/10/2023 10:41 AM

Legend

- Photo Location and Direction
- Wetland Plot Point
- Upland Point
- Delineated Stream
- Open Ended Feature
- Delineated PEM Wetland
- Delineated PFO Wetland
- Delineated PSS Wetland
- March 2023 Survey Area (Addendum)
- November 2022 Survey Area

N

0 150 300

Feet

Source:
Imagery: ESRI World Imagery online mapping service.

Figure 4
Delineated Features - Sheet 5 of 5
Texas Eastern Transmission, LP
Schuylkill River HDD Project
Chester and Montgomery Counties, Pennsylvania

Jacobs

\\dc1vs01\gisproj\E\Enbridge\Schuylkill_River_HDD\MapFiles\Additional Delineation Mapping.aprx MCCLELC1 4/10/2023 10:41 AM

Attachment B – Data Forms

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region

See ERDC/EL TR-12-9; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Schuylkill River HDD City/County: Spring City/Chester Sampling Date: 03/31/2023

Applicant/Owner: Enbridge/Texas Eastern State: PA Sampling Point: W3-WET

Investigator(s): Keith D'Angiolillo, Jack Harper Section, Township, Range: Spring City Borough

Landform (hillside, terrace, etc.): toeslope Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR or MLRA): LRR S, MLRA 148 Lat: 40.171164 Long: -75.536889 Datum: NAD83

Soil Map Unit Name: Urban land-Penn complex, 0 to 8 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Refer to report for detailed description of wetland.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 5
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 3

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Located adjacent to old gravel lot and paved walking trail (receives surface water run-off from these adjacent areas).

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W3-WET

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Malus sylvestris*	10	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
	10	=Total Cover	
50% of total cover: 5		20% of total cover:	2
Sapling/Shrub Stratum (Plot size: 15)			
1. *Cornus amomum*	40	Yes	FACW
2. *Ulmus americana*	10	No	FACW
3. *Rosa multiflora*	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
	55	=Total Cover	
50% of total cover: 28		20% of total cover:	11
Herb Stratum (Plot size: 5)			
1. *Euthamia graminifolia*	55	Yes	FAC
2. *Apocynum cannabinum*	10	No	FACU
3. *Dipsacus laciniatus*	5	No	FACU
4. *Lythrum salicaria*	5	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	75	=Total Cover	
50% of total cover: 38		20% of total cover:	15
Woody Vine Stratum (Plot size: 5)			
1. *Lonicera japonica*	5	Yes	FACU
2.			
3.			
4.			
5.			
	5	=Total Cover	
50% of total cover: 3		20% of total cover:	1

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	55	x 2 =	110
FAC species	55	x 3 =	165
FACU species	25	x 4 =	100
UPL species	10	x 5 =	50
Column Totals:	145 (A)		425 (B)

Prevalence Index = B/A = 2.93

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W3-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR 3/2	100					Loamy/Clayey	
5-12	7.5YR 3/2	90	5YR 4/4	10	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **(MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (F21) **(outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

We were only able to bore to a depth of 12 inches due to Enbridge ground disturbance protocol.

U.S. Army Corps of Engineers

WETLAND DETERMINATION DATA SHEET – Eastern Mountains and Piedmont Region

See ERDC/EL TR-12-9; the proponent agency is CECW-CO-R

OMB Control #: 0710-0024, Exp:11/30/2024
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Schuylkill River HDD City/County: Spring City/Chester Sampling Date: 03/31/2023

Applicant/Owner: Enbridge/Texas Eastern State: PA Sampling Point: W3-UPL

Investigator(s): Keith D'Angiolillo, Jack Harper Section, Township, Range: Spring City Borough

Landform (hillside, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 2

Subregion (LRR or MLRA): LRR S, MLRA 148 Lat: 40.171120 Long: -75.537035 Datum: NAD83

Soil Map Unit Name: Urban land-Penn complex, 0 to 8 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W3-UPL

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Malus sylvestris*	30	Yes	UPL
2. *Juniperus virginiana*	20	Yes	FACU
3. *Ulmus americana*	15	Yes	FACW
4.			
5.			
6.			
7.			
	65	=Total Cover	
50% of total cover: 33		20% of total cover:	13
Sapling/Shrub Stratum (Plot size: 15)			
1. *Lonicera maackii*	20	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	20	=Total Cover	
50% of total cover: 10		20% of total cover:	4
Herb Stratum (Plot size: 5)			
1. *Apocynum cannabinum*	5	Yes	FACU
2. *Dipsacus laciniatus*	5	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	10	=Total Cover	
50% of total cover: 5		20% of total cover:	2
Woody Vine Stratum (Plot size: 5)			
1. *Lonicera japonica*	10	Yes	FACU
2.			
3.			
4.			
5.			
	10	=Total Cover	
50% of total cover: 5		20% of total cover:	2

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 14.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	0	x 3 =	0
FACU species	40	x 4 =	160
UPL species	50	x 5 =	250
Column Totals:	105 (A)		440 (B)

Prevalence Index = B/A = 4.19

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody Vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: W3-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR 3/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Mucky Mineral (F1) **(MLRA 136)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 122, 136)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147, 148)**

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Red Parent Material (F21) **(outside MLRA 127, 147, 148)**
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

We were only able to bore to a depth of 12 inches due to Enbridge ground disturbance protocol.

Attachment C – Photograph Log

PHOTO NO.	
1	
SITE NAME	
Schuylkill River HDD	
PHOTO LOCATION	
40.175110, -75.536902	
DIRECTION	**DATE**
SW	March 31, 2023
DESCRIPTION: View of additional temporary workspace (ATWS) area located north of the access road, on the northern side of the Schuylkill River. No wetland or waterbody features were delineated in the ATWS.	

PHOTO NO.	
2	
SITE NAME	
Schuylkill River HDD	
PHOTO LOCATION	
40.172007, -75.537981	
DIRECTION	**DATE**
E	March 31, 2023
DESCRIPTION: View of ATWS area, west of the Texas Eastern pipeline easement. No wetland or waterbody features were delineated in the ATWS.	

PHOTO NO.	
3	
SITE NAME	
Schuylkill River HDD	
PHOTO LOCATION	
40.172052, -75.538439	
DIRECTION	**DATE**
W	March 31, 2023
DESCRIPTION: Alternate view of ATWS area, west of the Texas Eastern pipeline easement. Photo is facing towards Gay Street.	

PHOTO NO.	
4	
SITE NAME	
Schuylkill River HDD	
PHOTO LOCATION	
40.171326, -75.537269	
DIRECTION	**DATE**
SE	March 31, 2023
DESCRIPTION: View of PSS Wetland W3, southwest of the Schuylkill River Trail. Photo shows dominant PSS wetland vegetation of silky dogwood (*Cornus amomum*, FACW).	

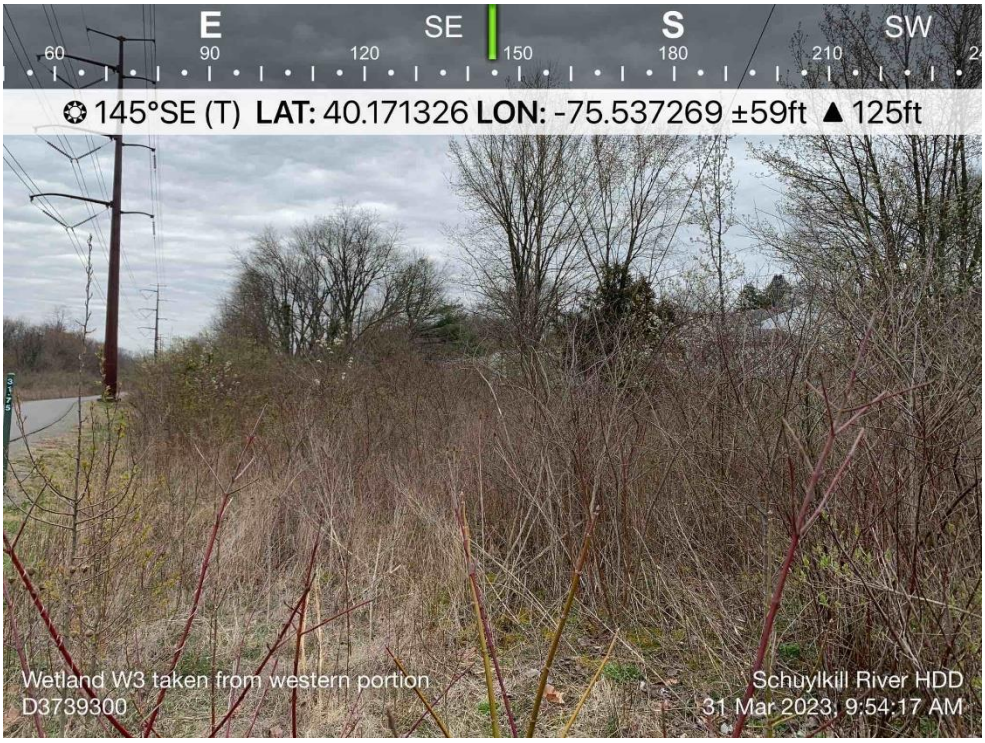

PHOTO NO.	
5	
SITE NAME	
Schuylkill River HDD	
PHOTO LOCATION	
40.171206, -75.537060	
DIRECTION	**DATE**
W	March 31, 2023

DESCRIPTION:

Alternate view of PSS Wetland W3, taken from the southeastern extent of the survey area.

PHOTO NO.	
6	
SITE NAME	
Schuylkill River HDD	
PHOTO LOCATION	
40.171034, -75.537111	
DIRECTION	**DATE**
SW	March 31, 2023

DESCRIPTION:

View of the ATWS, southwest of the Schuylkill River Trail. This area consists of an abandoned gravel parking lot.

Appendix B. DCNR Correspondence

From: Edenbo, Vallie
To: Harper, Jack
Subject: RE: [External] State Scenic River Protections Question - Schuylkill River
Date: Tuesday, March 7, 2023 11:41:57 AM

Hi Jack,
All of the river segments designated as part of the state scenic river system are subject to elevated DEP permit coordination regardless of the category (scenic vs pastoral vs recreational, etc). The Pennsylvania Scenic River Act would require coordination with DCNR as part of the permitting process on this segment.

Thank you,
Vallie

Vallie Edenbo| Recreation and Conservation Advisor
Department of Conservation and Natural Resources
Bureau of Recreation and Conservation
400 Market St, 5th Floor | Harrisburg, PA 17101-2301
Phone: 717.783.4736| Fax: 717.787.9577
http://www.dcnr.pa.gov | www.ExplorePAtrails.com

***Grant management is now all electronic!*
*Access our new **Customer Services Portal***
*and login to manage your project.***

From: Harper, Jack <Jack.Harper@jacobs.com>
Sent: Monday, March 6, 2023 9:57 AM
To: Edenbo, Vallie <vedenbo@pa.gov>
Subject: RE: [External] State Scenic River Protections Question - Schuylkill River

Hi Vallie,

Drew Gilchrist recently provided me with your contact information. I was wondering if you could help me out with a question regarding the State Scenic River protections of the Schuylkill River.

The Schuylkill River, near Spring City, Chester County, PA (approximate location: 40.172614, -75.534671), is mapped as a "State Scenic River, River Segment 4, Modified Recreational". From conversations with PADEP, they thought since the classification is "Modified Recreational", not specifically scenic, this stretch may not have permitting protections under "National or State Wild or Scenic River in accordance with the National Wild and Scenic Rivers Act of 1968 or the Pennsylvania Scenic Rivers Act (32 P.S. §§820.21-820.29)".

Would you be able to confirm if the classification of "Modified Recreational" kicks this river segment out of having permitting protections under State Wild or Scenic River?

Feel free to reach out via phone/email if you have any additional questions.

Thank you,

Jack Harper | Jacobs | Early Career Natural Resources Professional
M:440.318.4625 | Jack.Harper@jacobs.com
2001 Market Street, Suite 900 | Philadelphia, PA 19103

From: Gilchrist, Andrew <agilchrist@pa.gov>
Sent: Monday, March 6, 2023 8:05 AM
To: Harper, Jack <Jack.Harper@jacobs.com>
Cc: Hayes, Sara <Sara.Hayes@jacobs.com>
Subject: RE: [External] State Scenic River Protections Question - Schuylkill River

Hi Jack:
Vallie Edenbo is our River Specialist at DCNR-BRC. She can help you. She can be reached at Edenbo, Vallie vedenbo@pa.gov or at 717-783-4736

Drew Gilchrist| Regional Advisor
Department of Conservation and Natural Resources
Bureau of Recreation and Conservation
Evansburg State Park, BOF Field Office
3539 Water Street Road
Collegeville, PA 19426
Phone 267-252-3751
email: agilchrist@pa.gov
www.dcnr.pa.gov

From: Harper, Jack <Jack.Harper@jacobs.com>
Sent: Friday, March 3, 2023 12:12 PM
To: Gilchrist, Andrew <agilchrist@pa.gov>
Cc: Hayes, Sara <Sara.Hayes@jacobs.com>
Subject: [External] State Scenic River Protections Question - Schuylkill River

Hi Drew,

I was wondering if you could help me out with a question regarding the State Scenic River protections of the Schuylkill River within your region.

The Schuylkill River, near Spring City, Chester County, PA (approximate location: 40.172614, -75.534671), is mapped as a “State Scenic River, River Segment 4, Modified Recreational”. From conversations with PADEP, they thought since the classification is “Modified Recreational”, not specifically scenic, this stretch may not have permitting protections under “National or State Wild or Scenic River in accordance with the National Wild and Scenic Rivers Act of 1968 or the Pennsylvania Scenic Rivers Act (32 P.S. §§820.21-

820.29)".

Would you be able to confirm if the classification of "Modified Recreational" kicks this river segment out of having permitting protections under State Wild or Scenic River?

Please let me know if there's someone else I should contact regarding this question. Feel free to reach out via phone/email if you have any additional questions.

Thank you,

Jack Harper | Jacobs | Early Career Natural Resources Professional
M:440.318.4625 | Jack.Harper@jacobs.com
2001 Market Street, Suite 900 | Philadelphia, PA 19103

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Appendix C. Riverine and Wetland Condition Level 2 Rapid Assessment

Riverine Assessment Form 1

Pennsylvania Riverine Condition Level 2 Rapid Assessment Protocol (Document No. 310-2137-003)

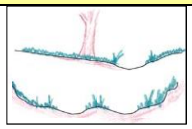
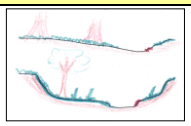
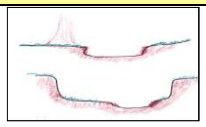
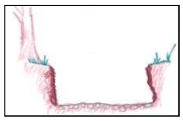
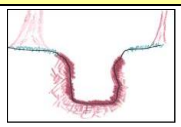
Pennsylvania Department of Environmental Protection

For use in intermittent or perennial watercourses with drainage areas ≤ 2,000 square mile drainage areas.

Project #	Project Name		Locality	Date	Ch 93 Classification		AA Id	Length
D3739300	Schuylkill River HDD Project		Upper Providence and Spring City, PA	11/18/22	Designated: WWF, MF	Existing:	Stream S1	~446 feet
Latitude	40.172628	Longitude	-75.534669	FGM Level 1 Channel Classification				

Evaluator(s)	Stream Name and Information	Notes:
RW, JH	Schuylkill River	

1. CHANNEL/FLOODPLAIN: Assess the cross-section of the stream and prevailing conditions along the AA.

	Condition Category				
	Optimal	**Suboptimal**	**Marginal**	**Poor**	**Severe**
Channel / Floodplain	 **Channel Geometry:** These channels show very little incision or widening and little or no evidence of active erosion. Anastomosing channels may be present. **Channel Stability:** Visual indicators include: 1) the banks are not eroding along greater than 5% of the reach; 2) natural vegetative or rock stability features are present along greater than 80% of the banks; 2) stable point bars and bankfull benches may be present; 3) mid-channel bars and transverse bars are rare and if transient channel sediment deposition is present, it covers less than or equal to 10% of the stream bottom; 4) baseflow is connected to the rooting depths of vegetation in the active floodplain. **Active Floodplain Connection:** The bankfull stream flows have frequent access to the active floodplain and fully developed point bars or bankfull benches that are accessed at most flows greater than baseflow.	 **Channel Geometry:** These channels are slightly incised or overwidened and contain a few areas of active erosion. **Channel Stability:** Visual indicators include: 1) the banks are actively eroding along less than 25% of the reach; 2) depositional features such as point bars and bankfull benches are present and stable during high flows and occur along greater than 50% of the reach; 3) natural bank protection like vegetation or rock is providing stability along greater than 50% of the reach; 4) baseflow is connected to vegetated point bars and bankfull benches. **Active Floodplain Connection:** The bankfull stream flows frequently access bankfull benches, or point bars along portions of the reach and may frequently inundate the active floodplain.	 **Channel Geometry:** These channels are over-widened or incised, but to a lesser degree than the Severe and Poor channel conditions. **Channel Stability:** Visual indicators include: 1) the banks are eroding or severely undercut along greater than 25% and less than or equal to 50% of the reach; 2) depositional features like point bars or bankfull benches occur along greater than 25% and less than or equal to 50% of the reach; 3) the stream banks may consist of some vertical or undercut banks or nick points associated with head cuts; **Active Floodplain Connection:** The bankfull stream flows have infrequent connection to the active floodplain.	 **Channel Geometry:** These channels are over-widened or incised and eroding vertically and/or laterally. **Channel Stability:** Visual indicators include: 1) the banks are eroding or severely undercut along greater than 50% of the reach; 2) active or recent bank sloughing is present along greater than 50% of the reach; 3) natural bank protection like vegetation is not preventing bank erosion along the reach; 4) depositional features, such as point bars and bank full benches, are absent from the reach or newly developing along less than 25% of the reach; 5) bank full benches and point bars frequently scour during high flows; 6) baseflow is disconnected from plant rooting depths and the active floodplain. **Active Floodplain Connection:** The bankfull stream flows are not connected to the active floodplain.	 **Channel Geometry:** These channels are deeply incised and actively eroding vertically and/or laterally. Over widened channels may contain sections of unstable braided channels from aggradation. **Channel Stability:** Visual indicators include: 1) the banks are actively eroding or being undercut along greater than 80% of the reach; 2) active or recent bank sloughing is occurring along greater than 80% of the reach; 3) natural bank protection like vegetation is not preventing bank erosion or sloughing; 4) depositional features such as point bars and bankfull benches are absent; 5) flood flows are disconnected from the active floodplain. **Active Floodplain Connection:** The bankfull stream flows are never connected to the active floodplain.
SCORE	20 19 18 17	16 15 14 13	12 11 10 **9**	8 7 6 5	4 3 2 1

Comments:

CI = (Score)/20		CI
SCORE	9	0.45

2. RIPARIAN VEGETATION: Assess the floodplain along the entire AA (Visual estimates of areal coverage from aerial photos with field verification acceptable).

	Condition Category					
	Optimal	**Suboptimal**		**Marginal**		**Poor**
		High Suboptimal: Riparian area vegetation consists of a tree stratum (dbh > 3 inches) present, with greater than or equal to 30% and less than 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian area vegetation consists of a tree stratum (dbh > 3 inches) present, with greater than or equal to 30% and less than 60% tree canopy cover with a maintained understory.	**High Marginal:** Riparian area vegetation consists of non-maintained, dense herbaceous vegetation with either a shrub layer or a tree stratum (dbh > 3 inches) present, with less than 30% tree canopy cover.	**Low Marginal:** Riparian area vegetation consists of non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, areas of hay production, and ponds or open water areas (< 10 acres). If trees are present, tree stratum (dbh > 3 inches) present, with less than 30% tree canopy cover with maintained	**High Poor:** Riparian area vegetation consists of lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, pervious trails, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Riparian area consists of impervious surfaces; mine spoil lands, denuded surfaces, row crops, active feed lots, impervious trails, or other comparable conditions.
Riparian Vegetation (Floodplain)	Riparian area vegetation consists of a tree stratum present (diameter at breast height (dbh) > 3 inches) with greater than or equal to 60% tree canopy cover. Areas comprised of stream channels, wetlands (regardless of classification or condition) and lacustrine resources ≥ 10 acres are scored as optimal.						
		High	**Low**	**High**	**Low**	**High**	**Low**
SCORE	20 19 18 17 16	15 14 13	12 11	10 9 8	7 6	5 4 3	2 1

Comments: Refer to Riparian Condition Map below. Refer to Appendix A of EA report for Riverine photographs, notes, and detailed description of features.

1. Identify Condition Category areas along the floodplain using the descriptors above.
2. Estimate the % area within each condition category.
3. Enter the % Riparian Area in in decimal form (0.00) and Score for each category in the blocks below. Ensure the sum of the % Riparian Area Blocks equal 100

	Condition Category							Side Sub-Index	
Right Side	% Riparian Area:	9%	5%	26%	60%	0%	0%	**0.58**	**Side Sub-Index = SUM(%Areas*Scores)/20**
	Score:	1	4	7	16	0	0		
	Total Sub-score:	**0.09**	**0.19**	**1.82**	**9.58**	**0.00**	**0.00**		
	Condition Category								
Left Side	% Riparian Area:	12%	2%	17%	3%	66%	0%	**0.61**	**CI = (Left Side CI + Right Side CI)/2**
	Score:	2	5	6	7	16	0		**CI**
	Total Sub-score:	**0.24**	**0.10**	**1.02**	**0.21**	**10.56**	**0.00**		**0.60**

Riverine Assessment Form 1 - Page 2

2/4/2017

3. RIPARIAN ZONE OF INFLUENCE: Assess land cover along both sides, 100 feet from edge of floodplain into the upland along the entire AA. (rough measurements of length & width may be acceptable)

	Condition Category						
	Optimal	**Suboptimal**		**Marginal**		**Poor**	
Riparian ZOI	Riparian ZOI area vegetation consists of a tree stratum present (diameter at breast height (dbh) > 3 inches) with greater than or equal to 60% tree canopy cover. Areas comprised of stream channels, wetlands (regardless of classification or condition) and lacustrine resources ≥ 10 acres are scored as optimal.	**High Suboptimal:** Riparian ZOI area vegetation consists of a tree stratum (dbh > 3 inches) present, with greater than or equal to 30% and less than 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian ZOI area vegetation consists of a tree stratum (dbh > 3 inches) present, with greater than or equal to 30% and less than 60% tree canopy cover with a maintained understory.	**High Marginal:** Riparian ZOI area vegetation consists of non-maintained, dense herbaceous vegetation with either a shrub layer or a tree stratum (dbh > 3 inches) present, with less than 30% tree canopy cover.	**Low Marginal:** Riparian ZOI area vegetation consists of non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, areas of hay production, and ponds or open water areas (< 10 acres). If trees are present, tree stratum (dbh > 3 inches) present, with less than 30% tree canopy cover with	**High Poor:** Riparian ZOI area vegetation consists of lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, pervious trails, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Riparian ZOI area consists of impervious surfaces; mine spoil lands, denuded surfaces, row crops, active feed lots, impervious trails, or other comparable conditions.
		High	Low	High	Low	High	Low
SCORE	20 19 18 17 16	15 14 13	12 11	10 9 8	7 6	5 4 3	2 1

Comments: This condition index does not apply, as the Schuylkill River has a drainage area of greater than 100 square miles.

1. Identify Condition Category areas along the floodplain using the descriptors above.
2. Estimate the % area within each condition category.
3. Enter the % Riparian Area in decimal form (0.00) and Score for each category in the blocks below.

Ensure the sums of % Riparian ZOI Blocks equal 100

	Condition Category							Side Sub-Index
Right Side	% Riparian Area:	0%	0%	0%	0%	0%	0%	**0.00**
	Score:	0	0	0	0	0	0	
	Total Sub-score:	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
	Condition Category							
Left Side	% Riparian Area:	0%	0%	0%	0%	0%	0%	**0.00**
	Score:	0	0	0	0	0	0	
	Total Sub-score:	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	

Side Sub-Index = SUM(%Areas*Scores)/20

CI = (Left Side CI + Right Side CI)/2	CI
	0.00

4. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths, woody and leafy debris, stable substrate, low embeddedness, shade, undercut banks, root mats, SAV, macrophytes, emergent vegetation, riffle-pool complexes, stable features.

	Condition Category			
	Optimal	**Suboptimal**	**Marginal**	**Poor**
Instream Habitat/ Available Cover	Physical Elements that enhance a stream's ability to support aquatic organisms are present in greater than or equal to 50% of the reach. Substrate is favorable for colonization by a diverse and abundant epifaunal community, and there are many suitable areas for epifaunal colonization and/or fish cover.	Physical Elements that enhance a stream's ability to support aquatic organisms are present in greater than or equal to 30% and less than 50% of the reach. Conditions are mostly desirable and are generally suitable for full colonization by a moderately diverse and abundant epifaunal community.	Physical Elements that enhance a stream's ability to support aquatic organisms are present in greater than or equal to 10% and less than 30% of the reach. Conditions are generally suitable for partial colonization by epifaunal and/or fish communities.	Physical Elements that enhance a stream's ability to support aquatic organisms are present in less than 10% of the reach. Conditions are generally unsuitable for colonization by epifaunal and/or fish communities. The reach.
SCORE	20 19 18 17 **16**	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1

Comments: Large, low-gradient river. Wood and leaf debris present in river and overhanging trees provide shade protection on banks.

CI = (Score)/20		CI
SCORE	16	**0.80**

5. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel/channelization, embankments, spoil piles, constrictions, etc.

	Condition Category					
	Negligible	**Minor**		**Moderate**		**Severe**
Channel Alteration	Channel alterations listed above are absent in the SAR. The stream has unaltered pattern or has normalized.	**Minor High:** Less than or equal to 20% of the stream reach is disrupted by any of the channel alterations listed above. Alteration or channelization present, usually adjacent to structures, (such as bridge abutments or culverts); evidence of past alteration, (i.e., channelization) may be present, but stream pattern and stability have recovered; recent alteration is not present	**Minor Low:** Greater than 20% and less than or equal to 40% of the stream reach is disrupted by any of the channel alterations listed above. Alteration or channelization present, usually adjacent to structures, (such as bridge abutments or culverts); evidence of past alteration, (i.e., channelization) may be present, but stream pattern and stability have recovered; recent alteration is not	**Moderate High:** Greater than 40% and less than or equal to 60% of reach is disrupted by any of the channel alterations listed above. If the stream has been channelized, normal stable stream meander pattern has not recovered.	**Moderate Low:** Greater than 60% and less than or equal to 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If the stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed above. Greater than 80% of banks shored with gabion, riprap, or concrete.
		High	Low	High	Low	
SCORE	20 19 **18** 17 16	15 14 13	12 11	10 9 8	7 6	5 4 3 2 1

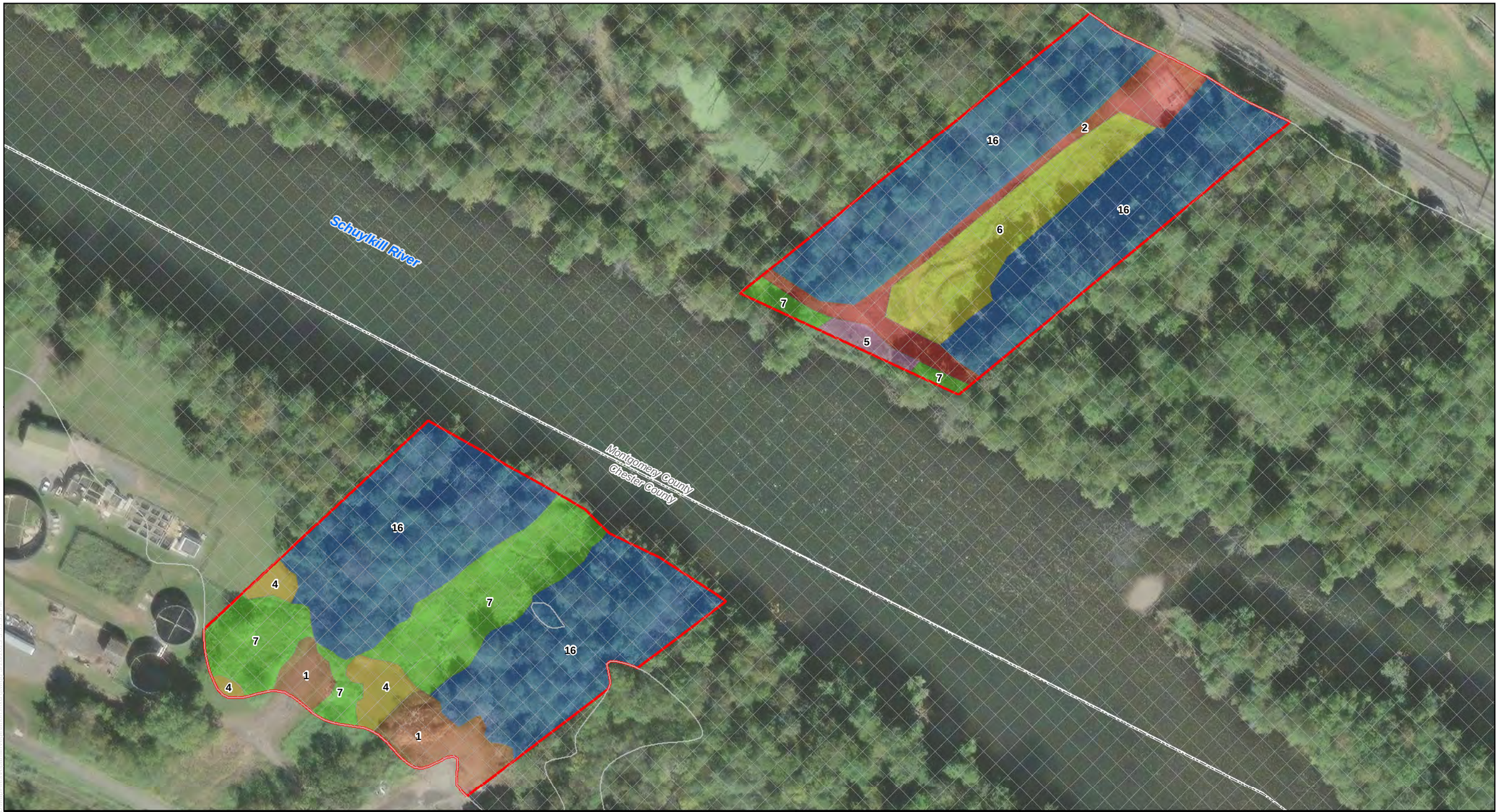
Comments: Large river with unaltered pattern within the AA.

CI = (Score)/20		CI
SCORE	18	**0.90**

RIVERINE CONDITION INDEX (RCI)		RCI
NOTE: **The CIs and RCI should be rounded to 2 decimal places.**	**RCI = (Sum of all CI's)/5**	**0.55**

If a CI is not applicable (e.g. due to use on intermittent watercourse or >100 sq. mile drainage area) in order to utilize the auto calculator feature the user will need to modify the RCI formula or enter the maximum score for that CI to achieve a CI of 1.0 which will offset the divisor difference.

General Comments:



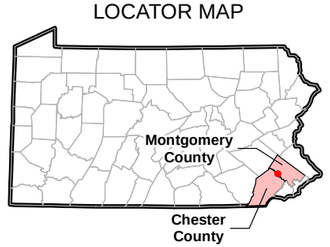
LEGEND:

- 100-Year Floodplain
- Assessment Area (AA)
- County Boundary

Condition Categories

- Low Poor - 1
- Low Poor - 2
- High Poor - 4
- Low Poor - 5
- Low Marginal - 6
- Low Marginal - 7
- Optimal - 16

LOCATOR MAP



BASE MAP SOURCE:
ESRI World Imagery

0 120 240

SCALE IN FEET

ENBRIDGE

Schuylkill River HDD
Montgomery and Chester Counties, PA

Figure 1
Riparian Condition

PN: D3666000	DATE: 3/28/2023
CREATED BY: GT	Jacobs
REVIEWED BY: JH	

Wetland Condition Assessment Form

Pennsylvania Wetland Condition Level 2 Rapid Assessment (Document No. 310-2137-002)

Pennsylvania Department of Environmental Protection

For use in all wetland classifications found within Pennsyvlania except those found within the banks of a watercourse.

Project #	Project Name	Date	Proposed Impact Size (acres)	AA #	AA Size (acres)	
D3739300	Schuylkill River HDD Project	05/24/2023	1.3	Wetland W1	1.3	

Name(s) of Evaluator(s)	Lat (dd)	Long (dd)	Notes:
Jack Harper	40.173156	-75.532785	

General Comments:

1. Wetland Zone of Influence Condition Index

	Condition Category					
	Optimal	Suboptimal		Marginal		Poor	
Wetland Zone of Influence (300 foot area around AA perimeter)	ZOI area vegetation consists of a tree stratum present (diameter at breast height (dbh) > 3 inches) with greater than or equal to 60% tree canopy cover. Areas comprised of stream channels, wetlands (regardless of classification or condition) and lacustrine resources ≥ 10 acres are scored as optimal.	**High Suboptimal:** ZOI area vegetation consists of a tree stratum (dbh > 3 inches) present, with greater than or equal to 30% and less than 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** ZOI area vegetation consists of a tree stratum (dbh > 3 inches) present, with greater than or equal to 30% and less than 60% tree canopy cover with a maintained understory.	**High Marginal:** ZOI area vegetation consists of non-maintained, dense herbaceous vegetation with either a shrub layer or a tree stratum (dbh > 3 inches) present, with less than 30% tree canopy cover.	**Low Marginal:** ZOI area vegetation consists of non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, areas of hay production, and ponds or open water areas (< 10 acres). If trees are present, tree stratum (dbh > 3 inches) present, with less than 30% tree canopy cover with maintained understory.	**High Poor:** ZOI area vegetation consists of lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, pervious trails, recently seeded and stabilized, or other comparable condition.	**Low Poor:** ZOI area vegetation consists of impervious surfaces; mine spoil lands, denuded surfaces, row crops, active feed lots, impervious trails, or other comparable conditions.	CI = Total Score/20
SCORE	20 19 18 17 16	15 14 13 12 11		10 9 8 7 6		5 4 3 2 1	

1. Identify all applicable Condition Category areas within the wetland zone of influence using the descriptors above.
2. Estimate the % area within each condition category. Calculators are provided for you below.
3. Enter the % ZOI Area in decimal form (0.00) and Score for each category in the blocks below.

Total Score = SUM(%Areas*Scores)

	Condition Category:							
Scoring:	% ZOI Area:	10%	5%	10%	**75%**	**0%**	**0%**	**Total Score:**
	Score:	2	5	7	**18**	**0**	**0**	
	Total Sub-score:	0.20	0.25	0.70	13.45	0.00	0.00	**14.60**

0.73

Comments: Refer to Wetland ZOI Condition Category Map below. Refer to Appendix A of EA report for Wetland photographs.

2. Roadbed Presence Index

	Condition Categories					
	Optimal	Suboptimal		Marginal		Poor	
a. Roadbed Presence (within 0 - 100 foot Wetland ZOI distance)	**High Optimal:** No roadbeds present within 100 feet of the AA boundary	**Low Optimal:** Roadbed presence score within 0-100 feet of the AA boundary equal to or less than 2.	**High Suboptimal:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than to 2 but equal to or less than 4.	**Low Suboptimal:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than to 4 but less than or equal to 6.	**High Marginal:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than to 6 but less than or equal to 8.	**Low Marginal:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than to 8 but less than or equal to 10.	**High Poor:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than 10 but less than or equal to 12.	**Low Poor:** Roadbed presence score within 0-100 foot distance of the AA boundary is greater than 12.
SCORE	20 19 18 17 16	15 14 13 12 11		10 9 8 7 6		5 4 3 2 1	

Comments:

	Condition Categories					
	Optimal	Suboptimal		Marginal		Poor	
b. Roadbed Presence (within 100 - 300 foot Wetland ZOI distance)	**High Optimal:** No roadbeds present within 100 - 300 feet of the AA boundary	**Low Optimal:** Roadbed presence score within 100 - 300 feet of the AA boundary equal to or less than 2.	**High Suboptimal:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than to 2 but equal to or less than 4.	**Low Suboptimal:** Roadbed presence score within 100 - 300 feet AA boundary is greater than to 4 but less than or equal to 6.	**High Marginal:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than to 6 but less than or equal to 8.	**Low Marginal:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than to 8 but less than or equal to 10.	**High Poor:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than to 10 but less than or equal to 12.	**Low Poor:** Roadbed presence score within 100 - 300 feet of the AA boundary is greater than 12.
SCORE	20 19 18 17 16	15 14 13 12 11		10 9 8 7 6		5 4 3 2 1	

	Condition Score	Weighting	Sub-Scores
a. Roadbed 0-100:	11	* (0.67)	7
b. Roadbed 100-300:	16	* (0.33)	5
		Total Score:	13

0.63

Comments:

Wetland Condition Assessment Form

Pennsylvania Wetland Condition Level 2 Rapid Assessment (Document No. 310-2137-002)

Pennsylvania Department of Environmental Protection

For use in all wetland classifications found within Pennsylvania except those found within the banks of a watercourse.

3. Vegetation Condition Index

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
a. Invasive Species Presence	**High Optimal:** No invasives present.			**Low Optimal:** <5% of the total AA contains invasive species.		**High Suboptimal:** >5% but less than 10% of the total AA contains invasive species.			**Low Suboptimal:** >10% but less than 20% of the total AA contains invasive species.		**High Marginal:** >20% but less than 30% of the total AA contains invasive species.			**Low Marginal:** >30% but less than 50% of the total AA contains invasive species.		> 50% of the total AA contains invasive species.					
SCORE	20	19	18	17	16	15	14	13	12	11	10	**9**	8	7	6	5	4	3	2	1	

Comments:

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
b. Vegetation Stressor Presence	**High Optimal:** No vegetation stressors present within the AA boundary.			**Low Optimal:** One vegetation stressor present within the AA boundary.		**High Suboptimal:** Two vegetation stressors present within the AA boundary.			**Low Suboptimal:** Three vegetation stressors present within the AA boundary.		**High Marginal:** Four vegetation stressors present within the AA boundary.			**Low Marginal:** Five vegetation stressors present within the AA boundary.		Greater than five vegetation stressors present within the AA boundary.					**CI = Total Score/40**
SCORE	20	19	18	17	16	15	14	13	**12**	11	10	9	8	7	6	5	4	3	2	1	

Comments:

a. Invasive Sub-Score:	9	**Total Score**	**0.53**
b. Vegetation Sub-Score:	12	**21**	

4. Hydrologic Modification Index

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
Hydrologic Modification Stressor Presence	**High Optimal:** No hydrologic stressors present within the AA boundary.			**Low Optimal:** One hydrologic stressor present within the AA boundary.		**High Suboptimal:** Two hydrologic stressors present within the AA boundary.			**Low Suboptimal:** Three hydrologic stressors present within the AA boundary.		**High Marginal:** Four hydrologic stressors present within the AA boundary.			**Low Marginal:** Five hydrologic stressors present within the AA boundary.		Greater than five hydrologic stressors present within the AA boundary.					**CI = Total Score/20**
SCORE	20	19	18	17	16	**15**	14	13	12	11	10	9	8	7	6	5	4	3	2	1	

Comments:

Score:	**15**	**0.75**

5. Sediment Stressor Index

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
Sediment Stressor Presence	**High Optimal:** No sediment stressors present within the AA boundary.			**Low Optimal:** One sediment stressor present within the AA boundary.		**High Suboptimal:** Two sediment stressors present within the AA boundary.			**Low Suboptimal:** Three sediment stressors present within the AA boundary.		**High Marginal:** Four sediment stressors present within the AA boundary.			**Low Marginal:** Five sediment stressors present within the AA boundary.		Greater than five sediment stressors present within the AA boundary.					**CI = Total Score/20**
SCORE	20	**19**	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	

Comments:

Score:	**19**	**0.95**

6. Water Quality Stressor Index

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
a. Eutro-phication Stressor Presence	No eutrophication stressors present within the AA boundary.					One eutrophication stressors present within the AA boundary.					Two eutrophication stressors present within the AA boundary.					Three eutrophication stressors present within the AA boundary.					
SCORE	20	**19**	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	

Comments:

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
b. Contaminant / Toxicity Stressor Presence	No contaminant / toxicity stressors present within the AA boundary.					One contaminant / toxicitystressors present within the AA boundary.					Two contaminant / toxicity stressors present within the AA boundary.					Three contaminant / toxicity stressors present within the AA boundary.					**CI = Total Score/40**
SCORE	20	**19**	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	

Comments:

a. Eutrophication Score	19	**Total Score:**	**0.95**
b. Contaminant Score	19	**38**	

Overall Wetland Level 2 Condition Score: Sum all six of the Condition Indexes and divide by 6 to calculate the overall condition score.	**Overall Condition Index:**	**0.76**

Pennsylvania Wetland Condition Level 2 Rapid Assessment

(Document No. 310-2137-002)
Pennsylvania Department of Environmental Protection

Roadbed Worksheet

Project Name / Identifier			Date	Name(s) of Evaluator(s)
Schuylkill River HDD Project			05/24/2023	Jack Harper
Resource Identifier	**AA #**	**Lat (dd)**	**Long (dd)**	**Notes:**
Wetland W1		40.173156	-75.532785	

Roadbeds: Record the number of occurrences by roadbed type and distance category. Multiply the number of occurrences by the weighting factors for each roadbed type and distance category then sum the total score for each distance category. The total scores for each distance category are then compared to the condition category descriptions.

Roadbed Type	Distance	Occurrences	Weighting Factor	Score	Distance	Occurrences	Weighting Factor	Score
≥ 4 Lane Paved	0-100 ft.		4	0	100-300 ft.		4	0
2 Lane Paved	0-100 ft.		2	0	100-300 ft.		2	0
1 Lane Paved	0-100 ft.		1	0	100-300 ft.		1	0
Gravel Road	0-100 ft.		1	0	100-300 ft.		1	0
Dirt Road	0-100 ft.	2	2	4	100-300 ft.		2	0
Railroad	0-100 ft.		2	0	100-300 ft.	1	2	2
Other Roadbeds	0-100 ft.	1	1, 2 or 4	2	100-300 ft.		1, 2 or 4	
Total Scores:	0-100 ft.	6			100-300 ft.	2		

Road Comments: *Dirt Road (0-100 ft)* - A dirt access road runs parallel with the Schuylkill River along the northeast bank (southwest of Wetland W1). Additionally, a dirt access road runs in-between the two wetland polygons of Wetland W1. *Other Roadbeds (0-100ft)* - A small pipeline station yard is located northeast of Wetland W1. This area is comprised of gravel, therefore, has a weighting factor of 1. *Railroad (100-300ft)* - A railroad is located northeast of Wetland W1.

Pennsylvania Wetland Condition Level 2 Rapid Assessment

(Document No. 310-2137-002)

Pennsylvania Department of Environmental Protection

STRESSOR WORKSHEET

2/4/2017

Occurrence in AA

	Y	#'s	N
Vegetation Alteration			
Mowing			X
Moderate livestock grazing (within one year)			X
Crops (annual row crops, within one year)			X
Selective tree harvesting/cutting (>50% removal, within 5 years)			X
Right-of-way clearing (mechanical or chemical)	X		
Clear cutting or Brush cutting (mechanized removal of shrubs and saplings)	X		
Removal of woody debris	X		
Aquatic weed control (mechanical or herbicide)			X
Excessive herbivory (deer, muskrat, nutria, carp, insects, etc.)			X
Plantation (conversion from typical natural tree species, including orchards)			X
Other:			X
Total Number:	**3**		
Hydrologic Modification			
Ditching, tile draining, or other dewatering methods			X
Dike/weir/dam			X
Filling/grading	X		
Dredging/excavation			X
Stormwater inputs (culvert or similar concentrated urban runoff)			X
Microtopographic alterations (e.g., plowing, forestry bedding, skidder/ATV tracks)	X		
Dead or dying trees (trunks still standing)*			X
Stream alteration (channelization or incision)			X
Other:			X
Total Number:	**2**		
Sedimentation			
Sediment deposits/plumes			X
Eroding banks/slopes			X
Active construction (earth disturbance for development)			X
Active plowing (plowing for crop planting in past year)			X
Intensive livestock grazing (in one year, ground is >50% bare)			X
Active selective forestry harvesting (within one year)			X
Active forest harvesting (within two years, includes roads, borrow areas, pads, etc.)			X
Turbidity (moderate concentration of suspended solids in the water column, obvious sediment discharges)			X
Other:			X
Total Number:	**0**		
Eutrophication			
Direct discharges from agricultural feedlots, manure pits, etc.			X
Direct discharges from septic or sewage treatment plants, fish hatcheries, etc.			X
Heavy or moderately heavy formation of algal mats			X
Other:			X
Total Number:	**0**		
Contaminant/Toxicity			
Severe vegetation stress (source unknown or suspected)			X
Obvious spills, discharges, plumes, odors, etc.			X
Acidic drainages (mined sites, quarries, road cuts)			X
Point discharges from adjacent industrial facilities, landfills, railroad yards, or comparable sites			X
Chemical defoliation (majority of herbaceous and woody plants affected, within one year)			X
Fish or wildlife kills or obvious disease or abnormalities observed			X
Excessive garbage/dumping			X
Other:			X
Total Number:	**0**		

**** Dead or dying trees attributed to beaver activity or emerald ash borer (or other identifiable insect infestation) should not be recorded as a stressor present. The assessor is responsible for recording observations in the comment section concerning presence of these conditions.***

Pennsylvania Wetland Condition Level 2 Rapid Assessment
(Document No. 310-2137-002)
Pennsylvania Department of Environmental Protection

Invasive Species Presence Worksheet

Are invasive species (from list) present at the site in any layer? **YES** **NO**

If listed species present, enter the percent areal coverage for each species below:

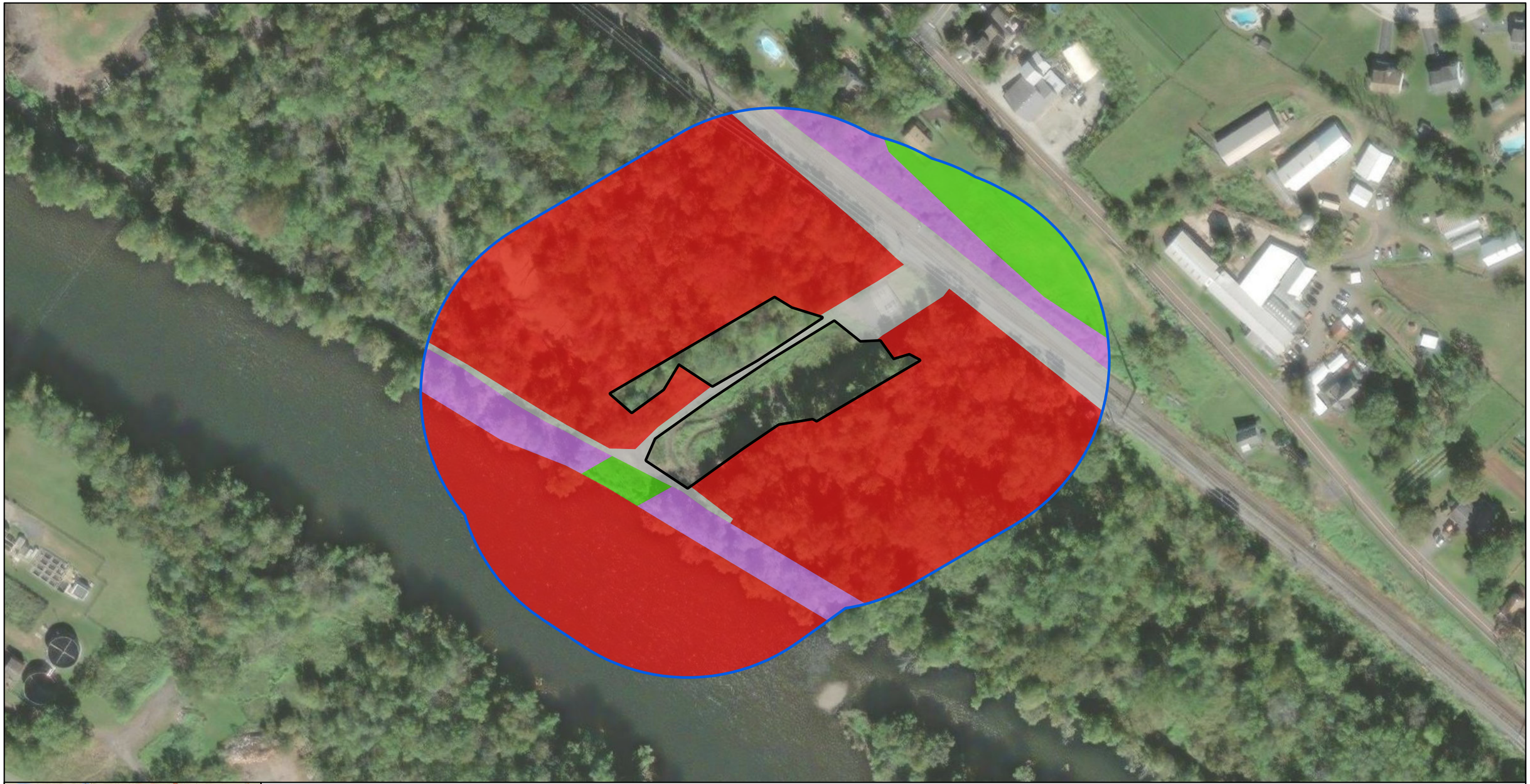
Species Code	<5%	≥ 5-20%	≥ 20 - 50%	≥ 50%	*Species Code*	<5%	≥ 5-20%	≥ 20 - 50%	≥ 50%
phau7	**3%**								
romu		5%							
Common Mugwort (*Artemisia vulgaris*)		15%							

Total % relative cover of all invasives, collectively on site: **23** **%**

Comments:

Common Invasives/Aggressives List

Code	Common Name	*Scientific*	Status	Code	Common Name	*Scientific*	Status
aggi2	Redtop	*Agrostis gigantea*	FACW	luhe	Water primrose	*Ludwigia hexapetala*	OBLW
algl2	European Alder	*Alnus glutinosa*	FACW	lyvu	Garden loosestrife	*Lysimachia vulgaris*	OBLW
arhi3	Carpetgrass	*Arthraxon hispidus*	FAC-	lysa2	Purple loosestrife	*Lythrum salicaria*	FACW
beth	Japanese barberry	*Berberis thunbergii*	FACW	maqu	European waterclover	*Marsilea quadrifolia*	OBLW
bevu	European barberry	*Berberis vulgaris*	FACW	mivi	Japanese stiltgrass	*Microstegium vimineum*	FAC
butom	Flowering Rush	*Butomus umbellatus*	OBLW	nami2	Water cress	*Nasturtium officinale*	OBLW
calli6	Pond water-starwort	*Callitriche stagnalis*	OBLW	pelo	Low smartweed	*Persicaria longiseta*	FACW
egde	Brazilian waterweed	*Egeria densa*	OBLW	phar	Reed canary grass	*Phalaris arundinacea*	FACW
elan	Russian olive	*Elaeagnus angustifolia*	FACU	phau7	Common Reed	*Phragmites australis*	OBLW
elum	Autumn olive	*Elaeagnus umbellata*	FACU	potr	Rough bluegrass	*Poa trivialis*	FACW
ephi	Hairy willow-herb	*Epilobium hirsutum*	FACW	pocu6	Japanese knotweed	*Polygonum (Faloia) cuspidatum*	FAC-
eppa5	Willow-herb	*Epilobium parviflorum*	FACW	pgpf	Mile-a-minute	*Polygonum perfoliatum*	FAC-
fasa	Giant knotweed	*Fallopia sachalinensis*	OBLW	puera	Kudzu-vine	*Pueraria lobata*	FAC-
gldi	Mudmats	*Glossostigma diandrum*	OBLW	pysp1	Apple/crabapple/pear	*Pyrus sp.*	FAC?
hola	Velvetgrass	*Holcus lanatus*	FAC	rhfr	Glossy Buckthorn	*Rhamnus frangula*	FAC-
huja	Japanese Hops	*Humulus japonicus*	FACU	romu	Multiflora rose	*Rosa multiflora*	FACU
loja	Japanese honeysuckle	*Lonicera japonica*	FAC-	tyan	Cattail (hybrid)	*Typha angustifolia*	OBLW
lomo	Morrow's honeysuckle	*Lonicera morrowii*	NI	tygl	Hybrid cattail	*Typha x glauca*	OBLW
lota	Tartarian honeysuckle	*Lonicera tatarica*					



Legend

Wetland Zone of Influence (ZOI)

Assessment Area (AA)

Condition Category

2 - Low Poor

5 - High Poor

7 - Low Marginal

18 - Optimal

N

0 150 300

Feet

Source:
Imagery: ESRI World Imagery online mapping service.

Wetland ZOI Condition Category
Texas Eastern Transmission, LP
Schuylkill River HDD Project
Chester and Montgomery Counties, Pennsylvania

Jacobs

Appendix D. Subfacility Details Tables

Subfacility Type	PIPE	Pipe or Conduit			
Id	L1	Line 1 Pipeline			
County	Chester/Montgomery	**Municipality**		Spring City/Upper Providence Twp	
Latitude Degrees	40	**Latitude Minutes**	10	**Latitude Seconds**	22.25
Longitude Degrees	75	**Longitude Minutes**	32	**Longitude Seconds**	3.27
Pipe Conduit Type	DB	Directional Bore/Drill		**Attached Water Obstruction?**	Yes
Product	PETRO	Petroleum, Nat Gas, Oil, etc			
Diameter	20 inches	**ROW Width**	110	**Pipe Length**	1,111 feet
Cover Depth	5-10 feet	**Line Encased**	No	**Shut off Controls**	Yes

S3.C Subfacility Details Table(s)

Subfacility Type	PIPE	Pipe or Conduit			
Id	L1	Line 1 Pipeline			
County	Chester/Montgomery	**Municipality**		Spring City/Upper Providence Twp	
Latitude Degrees	40	**Latitude Minutes**	10	**Latitude Seconds**	24.02
Longitude Degrees	75	**Longitude Minutes**	31	**Longitude Seconds**	59.31
Pipe Conduit Type	TRNC	Open Trench		**Attached Water Obstruction?**	Yes
Product	PETRO	Petroleum, Nat Gas, Oil, etc			
Diameter	20 inches	**ROW Width**	110	**Pipe Length**	327 feet
Cover Depth	5-10 feet	**Line Encased**	No	**Shut off Controls**	Yes

S3.C Subfacility Details Table(s)

Subfacility Type	TMPWI	Temporary Wetland Impact			
Id	W1-2	Wetland 1 (PEM)			
County	Chester/Montgomery	**Municipality**		Spring City/Upper Providence Twp	
Latitude Degrees	40	**Latitude Minutes**	10	**Latitude Seconds**	23.63
Longitude Degrees	75	**Longitude Minutes**	31	**Longitude Seconds**	59.78
Impact Area	0.52 acres	**Classification**	PEM	Palustrine Emergent	
Reg Classification	EV	Exceptional Value			

Subfacility Type	TMPWI	Temporary Wetland Impact			
Id	W1-4	Wetland 1 (PFO)			
County	Chester/Montgomery	**Municipality**		Spring City/Upper Providence Twp	
Latitude Degrees	40	**Latitude Minutes**	10	**Latitude Seconds**	23.27
Longitude Degrees	75	**Longitude Minutes**	31	**Longitude Seconds**	59.10
Impact Area	0.78 acres	**Classification**	PFO	Palustrine Forested	
Reg Classification	EV	Exceptional Value			

Appendix E. Best Practices Plan for Horizontal Directional Drill Operations

Best Practices Plan for Horizontal Directional Drill Operations

Drill Procedures and Monitoring; Inadvertent Return Monitoring, Response and Cleanup; and Contingency Plan Implementation

Schuylkill River HDD Project

Chester and Montgomery Counties, Pennsylvania

Texas Eastern Transmission, LP

May 2023

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1.0 INTRODUCTION

Texas Eastern Transmission, LP, (Texas Eastern) is using their blanket authorization from the Federal Energy Regulatory Commission (FERC) pursuant to Section 157 of the Natural Gas Act (NGA) to construct and operate the Schuylkill River HDD Project (Project) located in Chester and Montgomery Counties, Pennsylvania. The Horizontal Directional Drill (HDD) pipeline installation method is proposed for the Project. Texas Eastern has developed this Best Practices Plan for HDD Operations (Plan) for planning and personnel involved in HDD operations. While the HDD pipe installation method is a proven technology, use of an HDD has potential adverse implications for its success to avoid and minimize impacts to sensitive environmental resources and may not be successful due to unknown subsurface obstructions or geological conditions. The HDD procedures listed in this Plan describe some of the items in FERC's "*Guidance for Horizontal Directional Drill Monitoring, Inadvertent Return Response, and Contingency Plans"* (FERC HDD Guidance [FERC2019]). The components of the FERC HDD Guidance in this Plan include personnel training, responsibilities, work processes and procedures; stakeholder notification procedures; monitoring and reporting procedures; response procedures for inadvertent returns (IR) of drilling fluid; and contingency plans if the HDD is determined to be unsuccessful. In addition to this Plan, Texas Eastern will implement Permit Conditions from the Pennsylvania Department of Environmental Protection (PADEP) Water Obstruction and Encroachment Permit ("Chapter 105 Permit") and U.S. Army Corps of Engineers permit.

This Plan is to be used in conjunction with the Project's HDD Design Report that was developed during the planning and design stages of the Project. The HDD Design Report details known geological conditions, pipe bend specifications, and feasibility determinations.

HDD activities during construction will be managed in accordance with this Plan and will be kept on-site during construction, available to and implemented by the responsible parties and personnel described in Section 2.2.1 below. Section 1.1 describes the typical HDD installation method procedures. These procedures may be modified to adjust to site-specific conditions.

1.1 General HDD Installation Method Procedures

The HDD pipe installation method is a trenchless method that avoids disturbance to the earth's surface along the majority of its length. HDD is typically used in areas where trenching is not feasible due to availability of workspace, avoidance of subsurface utilities, roadways and railroads, and sensitive resources. An HDD always involves establishing Construction ROW staging areas at both ends of the HDD. Equipment and operations within the Construction ROW include the drilling equipment, control cab, tool storage trailers, power generators, bentonite storage, bentonite slurry mixing equipment, slurry pump,

cuttings separation equipment, cuttings return/settlement pit, water trucks and water storage, slurry containment pit, cuttings return/settlement pit, cuttings separation and slurry reclamation equipment, drill string pipe storage, and the heavy construction equipment necessary to support the operation.

The HDD process commences with the drilling of a pilot hole into the ground beneath the obstruction or sensitive resource and then enlarging the hole with one or more passes using reamer tools and swab passes until the hole is the necessary diameter to facilitate the pull-back (i.e., installation) of the pipe. Conditions can be present where the HDD contractor chooses an underground intersect drilling and reaming operation (HDD Intersect). An HDD Intersect is conducted by placing drilling equipment at both drill extents and drilling toward one another until the drill heads meet. The drill pipe then forms a continuous connection between the two drills. Once this connection occurs, reaming equipment can be both pushed and pulled simultaneously to reduce pipe stress.

Throughout the drilling and reaming process, a pressurized slurry drilling fluid is circulated through the equipment to lubricate the equipment; support the hole's structure and minimize the potential for collapse; and to remove earthen material cuttings from the hole. Once the reaming and swab passes are complete, prefabricated pipe segments (i.e., pipe stings) are pulled through the hole to complete the installation. Additional welding between segments is required to connect the pipe segments and complete a continuous pipeline.

IRs occur when the slurry drilling fluid inadvertently migrates to the surface or subsurface cavities through rock fractures and fissures. The slurry drilling fluid is a mixture of primarily water and bentonite clay. Water used for the HDD operation is typically sourced from a local water purveyor and is potable. Surface water extractions for HDD operation are tested to ensure no contaminates are present. If contaminates are present, the water source will not be used or could be treated prior to use. Bentonite clay is classified as non-toxic to the aquatic environment and is a non-hazardous substance. Additives may be mixed into the drilling fluid as needed depending on the anomaly they are proposed to solve. IR drilling fluids typically contain a lower concentration of bentonite clay than what was originally mixed as the movement of the drilling fluid is filtered as its passes through the earthen material before its surface release.

2.0 BEST AVAILABLE DRILLING PRACTICES

Texas Eastern proposes to use one HDD to install the new section of pipeline. This HDD was designed using known geological conditions, pipe bend specifications, and avoidance measures required by permitting entities. Texas Eastern has developed an HDD Design Report that details this information. The HDD plan and profile drawings are located within the HDD Design Report. Details regarding the HDD are presented below.

Schuylkill River HDD

The Schuylkill River HDD proposed length is approximately 1,111 feet and extends between stations 1+00 and 12+66 on the proposed realignment of the existing Line 1 pipeline in Upper Providence Township and Spring City Borough, east and west of the Schuylkill River. The proposed HDD is designed to avoid impacts to the Schuylkill River. The HDD process is anticipated have a duration of approximately 35 days.

HDD Tie-in Connections

The two ends of the HDD will tie into the existing Line 1 using short sections of conventional trenched pipeline construction methods on the east and west side of the Schuylkill River. Temporary workspace areas at the location of the western tie-in will provide adequate Construction ROW for pipe staging, stringing and pullback.

2.1 Pre-Construction Activities

2.1.1 Personnel

Texas Eastern and its HDD contractor will employ qualified personnel prior to the start of HDD operations that have responsibilities in their field. These personnel and responsibilities include the following:

Chief Inspector – Texas Eastern will designate a Chief Inspector (CI) for the Project. The CI will have overall authority for construction activities that occur on the Project, including the HDD.

Environmental Inspector – One Environmental Inspector (EI) will be assigned during active construction or restoration. The EI will have peer status with all other activity inspectors and will report directly to the Texas Eastern Construction Chief who has overall authority on the Construction ROW. The EI will have the authority to stop activities that violate the environmental conditions of the FERC Certificate (if applicable), other federal and state permits, or landowner requirements and to order corrective action.

HDD Superintendent – The HDD Superintendent will be the senior on-site representative of the HDD

contractor and will have the overall responsibility for implementing this Plan on behalf of the HDD contractor. The HDD Superintendent will be familiar with all aspects of the drilling activities, the contents of the Plan, and the conditions of approval under which the activity is permitted to take place. The HDD Superintendent will make a copy of this Plan available at the drill site and will distribute it to the appropriate construction personnel. The HDD Superintendent will ensure that workers are properly trained and familiar with the necessary procedures for response to an IR.

HDD Operator – The HDD Operator will be responsible for operating the drilling equipment and mud pumps, monitoring circulation back to the entry and exit locations, and monitoring annular pressures during pilot- hole drilling. In the event of loss of circulation or higher than expected annular pressures, the HDD Operator must communicate the event to the HDD Superintendent and HDD contractor field crews, as well as the on-site Texas Eastern inspection staff. The HDD Operator is responsible for stoppage or changes to the drilling program in the event of observed or anticipated IR.

HDD Contractor Personnel – During HDD installation, field crews will be responsible for monitoring the HDD alignment along with the Texas Eastern's field representatives. Field crews, in coordination with the EI, will be responsible for timely notifications and responses to observed releases in accordance with this Plan. The EI ultimately must sign-off on the action plan for mitigating the release.

2.1.2 Training

Consistent with the FERC guidelines, environmental training will be given to Project personnel and to contractor personnel whose activities may impact the environment during pipeline and aboveground facilities construction. The level of training will be commensurate with the type of duties of the personnel. All construction personnel will be given the appropriate level of environmental training. The training will be given prior to the start of construction and throughout the construction process, as needed. The training program will cover the FERC Plan and Procedures, job-specific permit conditions, company policies, cultural resource procedures, threatened and endangered species restrictions, the Project Erosion and Sediment Control Plan (E&SCP), the Spill Prevention Control and Countermeasure and Preparedness, Prevention, and Contingency Plan (SPCC and PPC Plan), and any other pertinent information related to the job. In addition to the EIs, all other construction personnel are expected to play an important role in maintaining strict compliance with all permit conditions to protect the environment during construction.

2.1.3 Site Inspection

The HDD contractor and Texas Eastern representatives will conduct a site visit prior to movement of equipment into the workspace to assess the current conditions and document any changes or discrepancies

observed that are not presented on the construction plans. The site visit will take place to observe locations where access is restricted and to ensure access and notification requirements are understood. Observations of new obstructions in the drill and monitoring path will be assessed and a resolution of the issues will be conducted with the appropriate Project representatives including ROW agents as needed. Any required modifications will be incorporated into the Plan prior to the start of HDD operations, and variances for federal and state and local permit modifications will be obtained as applicable. Updated documents will be provided to the involved personnel, and environmental training updates will take place as needed.

2.1.4 Notification Procedures

Agency Notification

Applicable PADEP resource management divisions, the Chester and Montgomery County Conservation Districts, Spring City Township and Upper Providence Township will be notified in advance of relative activities according to permit requirements.

Land Owner Notification

Texas Eastern will notify landowners in writing prior to the start of construction. This notice will include:

- A description of the proposed work;
- The name and phone number of the Texas Eastern ROW Agent that the landowner can contact if there are any questions or concerns regarding the proposed work;
- A toll-free phone number to contact Texas Eastern can be used as an alternative to contacting the ROW Agent; and
- A toll-free phone number to contact FERC in the event that the landowner believes that Texas Eastern has not resolved their concerns.

3.0 HDD MONITORING AND MITIGATION PROCEDURES.

3.1 HDD Process and Procedures

HDD activities can be characterized by three operating conditions:

- Normal Drilling (full drilling fluid circulation);
- Loss of Drilling Fluid Circulation; and
- Inadvertent Returns.

Monitoring procedures for each operational condition, response actions that could be taken in the event of significant or complete loss of drilling fluid circulation, and confirmation of an IR are described below. Prior to HDD pipeline installation operations, site-specific HDD operation procedures will be prepared by the HDD contractor. If deviations from operations described here-in occur, this Plan will be updated and provided to each Project representative described below that is involved with HDD operations.

3.2 Drilling Fluids

The HDD pipeline installation process uses drilling fluids to facilitate many of the HDD operations. Drilling fluid is a slurry composed of water and bentonite clay (typically 95 percent water) intended to maintain hole stability, lubricate the drilling head, remove cuttings and reduce soil friction. Bentonite clay (sodium montmorillonite) is a naturally occurring clay which is extremely hydrophilic and can absorb up to ten times its weight in water. Bentonite is non-toxic to the aquatic environment and is a non-hazardous substance. At this time, Texas Eastern anticipates using municipal water as the source of drilling water for the Project. The HDD contractor will be responsible for obtaining the required water volumes. The composition of the drilling fluids and its engineering properties would be formulated to be suitable for the given subsurface conditions encountered to ensure a successful HDD installation. The drilling fluid is formulated to:

- Stabilize the bore hole against collapse, stabilize formations, and prevent fluid loss;
- Lubricate, cool, and clean the tooling cutters and cool guidance electronics;
- Transport cuttings by suspension to enable flow to the surface at entry/exit points for recycling;
- Produce lubrication for drill string and downhole assembly while drilling, thereby reducing friction forces from the formation and pull loads;
- Produce hydrostatic fluid pressure in the bore hole to offset ground formation/groundwater pressure; and
- Drive downhole drill motor for rock drilling.

The HDD contractor will maintain fluid performance through sampling, testing, and recording the fluid properties during drilling operations. The HDD contractor also analyzes, adjusts, and maintains the fluids as necessary to afford the most efficient drilling fluid rheology (i.e., deformation and flow of matter) to adapt to various geological conditions. Depending on subsurface conditions encountered, lost circulation materials (LCMs) and special polymers would also be introduced in the drilling fluid mixture. Lost circulation materials would be used during IR events and/or in certain cases when drilling fluid circulation is diminishing. An LCM could be used in an attempt to seal around the borehole and prevent drilling fluid from escaping into the formation and allow for the reestablishment of drilling fluid returns to the entry and/or exit pits if voids are encountered. A drilling fluid specialist would be employed by the HDD contractor to determine the fluid properties required to prevent an IR from occurring or to maintain hole stability for successful completion of the HDD. The HDD contractor will describe the frequency of this monitoring and the documentation that will be maintained.

3.2.1 Drilling Fluid Additive Lists

In accordance with 25 Pa. Code Chapter 78a, Section 68a(f), drilling fluid additives other than bentonite and water shall be approved by PADEP prior to use. Approved horizontal directional drilling fluid additives will be listed on the Department's web site.
https://www.dep.pa.gov/Business/Energy/OilandGasPrograms/OilandGasMgmt/IndustryResources/InformationResources/Pages/default.aspx#:~:text=HDD%20additives%20which%20are%20certified%20for%20conformance%20with,manner%20indicated%20in%20the%20certification%20of%20the%20additive.
Use of a preapproved horizontal directional drilling fluid additive does not require separate PADEP approval.

Once the HDD contractor has selected additives that will be needed for the Project, the additive must be listed in the *Table I – Material and Waste Inventory of the SPCC and PPC Plan*. Material Safety Data Sheets (MSDS) must be added to *Appendix B of the SPCC and PPC Plan* prior to the additive's use.

3.2.2 Drilling Fluid Disposal

Drilling fluid disposal will comply with the FERC's Upland Erosion Control, Revegetation and Maintenance Plan (FERC Plan) at section III.E and applicable federal, state and local requirements. Drilling fluid would be tested to determine potential contaminates if suspected. Drilling fluid could be reused at other locations if feasible or disposed of at an applicable commercial facility. In accordance with 25 Pa. Code Chapter 78a, Section 68a(k), HDD fluid returns and drilling fluid discharges shall be managed in accordance with Subpart D, Article IX (relating to residual waste management).

3.3 HDD Working Procedures

Prior to drilling operations, site-specific HDD procedures will be prepared by the HDD contractor and submitted to Texas Eastern for review and approval. Procedures for potential loss of circulation, annular pressure or release mitigation and hole collapse are presented below.

3.3.1 Loss of Circulation, Annular Pressure or Release Mitigation

When a drilling fluid discharge within a jurisdictional wetland or waterbody is discovered, the discharge shall be *immediately* reported to PADEP, and an emergency permit under § 105.64 (relating to emergency permits) may be required, if necessary for emergency response or remedial activities to be conducted (refer to contacts listed in Attachment A). If loss of circulation of drilling fluid occurs or drilling pressure is lost, the EI and/or Texas Eastern Construction Inspector shall immediately investigate the drilling pathway and surrounding area for an inadvertent return. If an inadvertent return is discovered, drilling shall immediately cease (refer to Section 4.0 of this Plan for additional information). If an IR is not discovered, the driller has the following options (or any combination of these options):

- Decrease pump pressure;
- Decrease penetration rate;
- Temporarily cease drilling operations and shut down mud pump;
- Re-start pump and stroke bore hole to restore circulation ("swab" the hole);
- Introduce additional flow along the borehole using "weeper" subs; and
- Modify the drilling fluid with a change in viscosity and/or lost circulation additives.

3.3.2 Hole Collapse

In general, hole collapse is a phenomenon that occurs in loose, cohesionless soils when the positive pressure exerted by drilling fluid is not enough to provide stabilization, resulting in loose debris caving into the drilled hole. In most cases however, this is not detrimental, since the reamed hole need not be fully open for installation by HDD to be successful. In many cases, the agitation of the reaming tool, coupled with the injection of drilling fluid reduces the shear stress of the material to such a degree that the pipe can be pulled through it. In some cases, however, particularly when there is significant coarse granular material (i.e., gravel, cobbles, boulders), additional reaming passes would be performed to clean out the debris, or a temporary steel surface casing could be installed to stabilize the hole and serve as an open conduit for HDD operations.

It is anticipated that the subsurface conditions are amenable to HDD installation. In the event of collapse, the areas will either be re-reamed as necessary to open the hole, or temporary surface casing could be

installed so that HDD operations can be conducted through the open casing.

3.4 HDD Contingency Plans

In the unlikely event the proposed HDD is unsuccessful on the first attempt, the contractor will perform additional attempts by adjusting the drills depth and horizontal configuration to minimize contact with problematic formational zones encountered. The drilling data collected during each attempt will be utilized to create a new alignment. Potential alignment changes assume that each attempt can be performed within the existing Construction ROW and will not breach landowner agreements. If the additional attempts require new Construction ROW, Texas Eastern will request landowner approval and applicable state and federal clearances and authorizations. If each attempt proves unsuccessful and an HDD method is determined not to be feasible, alternative construction methods and alternative route alignment would be required. A permit modification from PADEP will be required prior to commencing an alternate crossing method.

3.5 Monitoring During HDD Activities

Company personnel detailed in Section 2.1.1 will be dispatched to monitor the area in the vicinity of the drilled path for potential IRs. If IRs are observed on the ground surface along portions of the alignment that are accessible, containment and recovery operations will be completed in accordance with the procedures discussed in Section 4.0. Monitoring and reporting actions during the HDD operation will be as follows:

- Visually monitor the ground surface and waters of the Commonwealth that are located within the vicinity of the HDD while drilling operations are occurring (i.e., the Schuylkill River and nearby wetlands). This monitoring shall include walking, wading, and use of a boat, as necessary, to effectively observe and monitor for the return of materials associated with HDD activities to the surface or to waters of the Commonwealth.
    - Refer to Section 3.6 regarding accessibility and safety considerations during monitoring.
- If the HDD Operator observes an increase in annular fluid pressure or loss of circulation, the Operator will notify the HDD Superintendent and field crews of the event and approximate position of the tooling;
- Where practical, a member of the field crew will visually inspect the ground surface near the position of the cutting head;
- If an inadvertent release is observed:
    - Field crew will notify the HDD Operator;
    - The HDD Operator will immediately cease pumping of the drilling fluid and notify the HDD Superintendent and CI;

- The CI will notify and coordinate a response with the EI (see Section 4.0); and
- The EI will notify the Enbridge Environment Lead whowill notify appropriate permit authorities, as necessary, and provide information regarding the proposed IR response, proposed mitigation and cleanup, and potential impacts.

- The CI will prepare a report that summarizes the incident.

Texas Eastern will notify landowners of the IR if their land incurs potential impacts.

3.6 Monitoring Obstructions and Access Procedures

The Schuylkill River is a potential monitoring obstruction along the HDD path. Monitoring of the drill path shall be completed from the riverbanks, using binoculars, as needed, to complete a visual assessment of the entire river width. Safety must be considered in and near the watercourse before pedestrian monitoring for IRs can occur. Close coordination with and notification to site supervisors and safety personnel is required during pedestrian monitoring events. This typically involves monitoring of recent and forecasted precipitation and current and anticipated flow conditions to determine if it is safe to be within proximity to the waterbody at a given time. Proximity limitations will be placed by the site supervisor that must be adhered to during the pedestrian monitoring event. The banks of the Schuylkill River will be the safest position from which to monitor the HDD path. Beyond the Schuylkill River, the remainder of the HDD route is easily accessible from the proposed workspace and public roadways.

3.7 Documentation and Record Keeping

Documentation will be maintained during HDD activities. This documentation will include the items listed in Table 3.7-1 below.

Table 3.7-1
Documentation to be Maintained for Schuylkill River Project HDD Activities

Procedure	Documentation
Employee Training	Record of employee training detailing when training was conducted, material covered, and employees in attendance. Refer to Section 2.1.2 for additional information on training.
HDD Visual and Pedestrian Monitoring	The personnel monitoring the HDD alignment, location along the HDD alignment visually inspected, time of the examination, and observations of the personnel shall be logged following each inspection.

Procedure	Documentation
HDD Instrument Logs	The HDD contractor shall maintain instrumentation logs that document pilot hole progression, drill string axial and torsional loads, drilling fluid discharge rate and pressure, and down-hole annular pressure monitoring during drilling of the pilot hole (or provide alternative monitoring methods and/or best drilling practices to ensure that the drilled and bored [reamed] holes do not become plugged with drill cuttings leading to hydrofracture and IR.
Drilling Fluid Composition	Use of loss control materials and other drilling fluid additives, including the quantity, timing, and location of use.
	Monitoring logs of drilling fluid physical properties throughout drilling activities (e.g., fluid weight, viscosity, sand content, additives, and pH).
	A clear description of the intent to reuse drilling fluid between HDD locations, as well as documented consultation with local and state agencies for such reuse. Laboratory results of sampled drilling fluid/source water for any inorganic and organic environmental contaminants should also be retained.
Public and Agency Inquiries/Comments	A record of communication with the public and agencies that has occurred during HDD activities. This record shall include inquiries and comments, as well as response actions.

4.0 RESPONSE TO INADVERTENT RETURNS

Typically, IRs are detected near the drill entry or exit points when the pilot bore is at shallow depths, above bedrock, and/or is in permeable/porous soils. For these reasons, equipment and materials required to contain an IR will be available at each HDD Construction ROW**.** A spill kit, sediment control devices, vacuum units, and adequate containers shall be readily available. If the site is not accessible by a vacuum truck, a pump with sufficient power to convey the released fluids must be available, including an adequate amount of hose, filter bags, straw bales, sand bags, silt fence, and compost filter sock.

An IR will be assessed by the HDD Superintendent, EI, and CI to determine an estimated volume and footprint. Section 4.1 details the response actions for an IR in an upland location, and Section 4.2 describes response actions for an IR in a wetland or waterbody location.

The HDD Superintendent will assess the drilling parameters (depth, annular pressures, fluid flow rate, and drill fluid characteristics) and incorporate appropriate strategies to mitigate the IR effectively at operation control. At the IR, containment could be achieved by excavating a small sump pit and surrounding the IR with hay bales, silt fence, and/or sandbags. Once contained, the drilling fluid would be collected by vehicle vacuum trucks or pumped back to the mud recycle unit for reuse or other methods. Personnel and equipment access to the IR could affect the methods used for containment and disposal. The site-specific response will follow the guidelines presented below.

4.1 Upland Location Inadvertent Return Response

- If an inadvertent return is discovered, drilling shall immediately cease.
- If an inadvertent return is within a jurisdictional wetland or waterbody, Texas Eastern will notify the PADEP immediately. Contacts are provided in Attachment A.
- Evaluate the IR location, volume, footprint and determine if HDD operation measures and proposed containment measures will effectively mitigate IR impacts.
- Implement the proposed mitigation measures.
- Remove the drilling fluid as needed to not overwhelm the containment structure and dispose or reuse the drilling fluids as applicable.
- Perform final clean-up (see Section 5.0).

4.2 Wetland/Waterbody Location Inadvertent Return Response

The Schuylkill River HDD crosses one waterbody and is adjacent to wetlands. There is a potential for an IR to occur in or near wetlands or waterbodies outside of the proposed Construction ROW. In the event of an IR in a jurisdictional wetland or waterbody:

- If an inadvertent return is discovered, drilling shall immediately cease.
- Texas Eastern will notify the PADEP immediately. Contacts are provided in Attachment A.
- In the event of an inadvertent return or release of sediment into a body of water, PFBC Bureau of Law Enforcement Regional Office must be notified within 24 hours.
- Texas Eastern will notify any other applicable agencies.

The following steps will be taken if an IR has the potential to impact a wetland or waterbody:

- Inadvertent returns that impact or discharge to streams, floodways, or wetlands during the HDD operations shall be remediated in compliance with the Preparedness Prevention Control Plans (PPC Plans) including the HDD Contingency Plan (i.e., this Plan). If clean-up operations differ from the submitted plans, prior approval from the PADEP will be necessary.
- Evaluate the IR location, volume, footprint and determine if HDD operation measures and proposed containment measures will effectively mitigate IR impacts. If the release is within 100 feet of a wetland or waterbody or upslope at a greater distance, install silt fence and/or hay bales downslope of the IT between the IR and the wetland or waterbody.
- Implement the proposed mitigation measures. If the proposed IR containment and recovery measures have the potential to result in cumulative disturbance to the resource, alternative measures will be implemented on a case-by-case basis that minimize the overall disturbance and will include suspension of equipment use activities. An example of this would be an IR with minimal fluid release.
- Remove the drilling fluid as needed to not overwhelm the containment structure and dispose or reuse the drilling fluids as applicable.
- Perform final clean-up (see Section 5.0).

5.0 CLEAN-UP

Site-specific clean-up measures will be developed and implemented by the CI and HDD Superintendent, in accordance with the SPCC and PPC Plan, for approval by the EI after an IR is observed. Potential secondary impacts caused by clean-up activities will be evaluated, and cumulative adverse impacts will be mitigated to the extent practicable. The following measures and activities will be implemented during IR cleanup:

- Drilling fluid will be removed from the containment structures. The recovered drilling fluid would be recycled or disposed of at an approved commercial facility. No recovered drilling fluid will be disposed of in wetlands, waterbodies, or storm drains;
- Containment structures and access paths will be removed and the ground surface prepared for stabilization measures. Soil stabilization will be consistent with the surrounding area. Where vegetation is present seeding and mulching will occur. If gravel or pavement is present these materials will be replaced.

6.0 NEXT STEPS

If an inadvertent return occurs within regulated waters of the Commonwealth, the HDD shall only resume after:

a. A Registered Professional Geologist or Registered Professional Engineer inspects and evaluates the site for the likelihood of another inadvertent return; and

b. The permittee consults with and receives written approval from PADEP.

In addition, as noted above, for those HDD sites that experience an inadvertent return and do not have an approved contingency crossing method, the permittee shall submit a permit modification to PADEP for review and approval prior to commencing an alternate crossing method.

7.0 REFERENCES

Federal Energy Regulatory Commission (FERC). 2019. Guidance for Horizontal Directional Drill Monitoring, Inadvertent Return Response, and Contingency Plans. October 2019. Available at: https://www.ferc.gov/natural-gas/environmental-overview/guidance-horizontal-directional-drill-monitoring-inadvertent-return-response-and-contingency-plans

Attachment A - Agency Contact List

Agency	Contact Name	Phone Number	Notes
U.S. Army Corps of Engineers Philadelphia District Regulatory Branch	TBD		Contact for IRs that affect the Schuylkill River and/or wetland .
Pennsylvania Department of Environmental Protection Regional Permit Coordination Office	TBD		Contact for IRs that affect the Schuylkill River and/or wetland
Pennsylvania Department of Environmental Protection Southeast Regional Office	24-hour Emergency Reporting	800-541-2050	24 hours per day – for afterhours notifications
Pennsylvania Fish and Boat Commission Southeast Regional Office	Law Enforcement Officer	(717) 626-0486	Contact for IRs or sediment release into the Schuylkill River