TETRA TECH

June 29, 2020

Mr. John Hohenstein, P.E.
Environmental Program Manager
Pennsylvania Department of Environmental Protection
Waterways and Wetlands Program
Southeast Regional Office
2 East Main Street
Norristown, PA 19401-4915

Re: Sunoco Pipeline L.P. – Pennsylvania Pipeline Project (Mariner East II)
DEP File No. E15-862
Technical Deficiency Response
Major Modification – Installation Method Change to PA Turnpike/0280 HDD
APS No. 879047, AUTH ID 1087479
Upper Uwchlan Township
Chester County

Dear Mr. Hohenstein:

On behalf of Sunoco Pipeline LP (SPLP), Tetra Tech, Inc. provides the following responses to the Pennsylvania Department of Environmental Protection (Department) Technical Deficiency letter dated May 27, 2020. The supporting attachments represent additional information to be added to the original modification request. For ease of your review, each Department comment is set forth verbatim below, followed by a narrative response with supporting attachments where necessary.

Comments and Responses to May 27, 2020 Technical Deficiency Letter:

***GENERAL* ENVIRONMENTAL COMMENTS/RESPONSES:**

1. An Alternatives Analysis (AA) of the proposed amendments was included in the applicant's amendment request. The applicant assumed that the Meadow Creek wetlands (WL-Q76) were "Other wetlands" as defined in 25 Pa. Code § 105.17(2). However, in 2019 the PA Fish and Boat Commission (FBC) classified Marsh Creek and its tributaries as "Wild Trout" waters. 25 Pa. Code § 105.17(1) defines five factors, any one of which classifies a wetland as "Exceptional Value" (EV). 25 Pa. Code § 105.17(1)(ii) states that any wetlands that is hydrologically connected to or located within one-half mile of wetlands identified as habitat for threatened or endangered species are EV. In addition, 25 Pa. Code § 105.17(1)(iii) states that any wetlands located in or along the floodplain of a wild trout stream are EV. Therefore, WL-Q76 is classified as an EV wetland. The EV classification will necessitate several changes in the request.

Response: Thank you for the clarification. Wetland WL-Q76 will be referenced and evaluated as an EV wetland. Accordingly, the following permit modification attachments have been redlined and are provided in **Attachment I** of this response:

- *Attachment A – Project Description/Alternatives Analysis*
- *Attachment C – Environmental Assessment*
- *Attachment E – Site Plan and Aquatic Resource Impact Table*

Based on an assessment of the stream designation provided by the FBC (see response to #8), the section of stream crossed by the proposed reroute is not a tributary to the section of Marsh Creek that has a wild trout designation. As a result, a seasonal restriction would not apply to construction across stream S-Q83.

2. An approved bog turtle surveyor did not find suitable bog turtle habitat within the Limits of Disturbance (LOD) but the United States Fish and Wildlife Service (USFWS) was concerned that

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an occupied bog turtle habitat exists downstream (on the west side of the Pennsylvania Turnpike) and that Meadow Stream and wetland could serve as summer habitat. However, a December 18, 2019, field meeting (attended by the reviewer) found that a box culvert under the Pennsylvania Turnpike carrying Meadow Creek was elevated 6–8 inches above the stream level at the downstream end, thereby precluding access of bog turtles to the proposed work site. The USFWS stated that the project's proposed amendment would not likely affect bog turtles. But occupied bog turtle habitat does exist within one-half mile downstream and Meadow Creek likely provides hydrology to the habitat.

Response: Thank you for the comment.

3. An AA must assess the impacts to EV wetlands as stated and meet all the conditions in 25 Pa. Code § 105.18a(a)(1) through (7). Item (3) states, "There is no practicable alternative to the proposed project that would not involve a wetland or that would have less effect on the wetland and not have other significant adverse effects on the environment. An alternative is practicable if it is available and capable of being carried out after taking into consideration construction cost, existing technology and logistics. An area not owned by the applicant which could reasonably be obtained, utilized, expanded or managed to fulfill the basic purpose of the project shall be considered as a practicable alternative."

Response: The Alternatives Analysis (AA) presented in *Attachment A – Project Description/ Alternatives Analysis* has been revised and is included in **Attachment I** of this response. This AA fully assesses the impacts to EV wetlands, evaluates the practicability of alternatives, and demonstrates impacts to the subject EV wetland are in compliance with all applicable conditions in 25 Pa. Code § 105.18a(a)(1) through (7).

4. Alternatives such as rerouting around WL-Q76 to avoid the wetland, utilization of a boring method (other than HDD) under the stream and wetland, and any other impact avoidance and minimization measures must be fully assessed. Potential impacts to hydrologically connected streams and wetlands must also be assessed. Comparisons addressing the benefits and potential impacts of open trench, HDD and other boring methods and other avoidance methods also need to be assessed. The assessment needs to include assessing the practicability of boring under the Meadow Creek and the wetland. It is noted that the applicant's preferred method of road crossings, such as the Styer Road crossing, included in this amendment request, is hammer-boring.

Response: The Alternatives Analysis (AA) presented in *Attachment A – Project Description/ Alternatives Analysis* has been revised and is included in **Attachment I** of this response. This AA fully assesses the use of reroutes around WL-Q76, boring methods (other than HDD) under the subject stream and wetland, and open trench method across the subject and wetland, including a comparison of benefits and potential impacts of these methods; demonstrates why the alternative (to open trench) methods are neither technically feasible nor practicable taking into consideration existing technology, logistics, and safety; fully assesses other impact avoidance and minimization measures, including resultant potential impacts to downgradient/downstream hydrologically connected streams and wetlands; and demonstrates impacts to the subject EV wetland are in compliance will all applicable conditions in 25 Pa. Code § 105.18a(a)(1) through (7).

5. An Environmental Assessment (EA) and supporting documents were submitted, but a EA Form was not provided, nor were Level 2 functional assessments of Meadow Creek and WL-Q76 completed in accordance with Module S2, Item D of the EA Form which states, "Characterize the aquatic resources: riverine, wetland and lacustrine present on the project site that are proposed to be directly or indirectly affected by the project. Including, but not limited to, the following resource classification information, Level 2 rapid condition assessment results, discussion of resource functions, characterization of riparian properties and any other relevant information or studies conducted." Other sections of the EA need to be revised due to the Wild Trout status of Meadow Creek (S-Q83) and EV status of WL-Q76.

Response: An Environmental Assessment Form and Level 2 functional assessment have been prepared and are included in **Attachment I** of this response, as part of the revised permit modification application *Attachment C – Environmental Assessment*. In addition, the status of

wetland WL-Q76 has been modified throughout the application (please refer to Response No. 1 above).

Based on an assessment of the stream designation provided by the FBC (see response to #8), the section of stream crossed by the proposed reroute is not a tributary to the section of Marsh Creek that has a wild trout designation. As a result, a seasonal restriction would not apply to construction across stream S-Q83.

***SPECIFIC* ENVIRONMENTAL COMMENTS/RESPONSES:**

1. The applicant notes in various sections (such as third paragraph of page 1) that the applicant is proposing a 50-foot wide LOD across the stream and wetland. The 50-ft ROW was one factor that was stated in the E15-862 permit application documents.

Response: Consistent with the approved permit E15-862, SPLP is proposing a 50-foot-wide limit of disturbance across the resources identified in the permit modification. Based on experience, the requested LOD provides the minimum width necessary to conduct a safe and efficient crossing of the resources while minimizing impacts.

2. Bottom of page 1 states that the 16-in drill stem will be removed but does not state whether the abandoned bore hole will be filled. If not filled, what is the potential of and impacts of subsidence?

Response: On the northwest side of the abandoned HDD, all stem/casing was removed and the hole was grouted in December 2017. At the southeast side of the abandoned HDD, the 8-inch casing was left in place and filled with grout in February 2020. In both cases, the contractor pumped grout until it emerged within the HDD entry location. As such, the risk of subsidence at either end of the abandoned HDD is improbable.

Attachments A and C (Project Description/Alternatives Analysis and *Environmental Assessment*) have been updated to include this information and are presented in **Attachment I** of this response.

3. Bottom of page 13 refers to Goldfinch Lane/William Penn Avenue Reroute. This paragraph should be removed, and the discussion revised to reflect the current PNDI and agency consultations.

Response: The reference to Goldfinch Lane/William Penn Reroute has been removed and the PNDI and agency consultation text has been reviewed, and updated as necessary, to ensure it accurately reflects the Turnpike 280 modification. Changes associated with this comment are included in **Attachment I** of this response, as part of the revised permit modification application *Attachment C – Environmental Assessment*.

4. Pages 6 and 7 present discussions of threatened and endangered species issues that need to be updated to include the recent Wild Trout designation and USFWS's January 16, 2020, letter regarding the bog turtle. The EV wetland discussion on page 12 also needs to be revised. The reclassification of Marsh Creek as wild trout waters will likely establish a seasonal restriction which prohibits in-stream work from October 1 through December 31 to protect spawning of wild trout. Applicant must consult with FBC on this restriction. It should be noted that seasonal restrictions are set forth in Special Conditions VV through YY of Permit E15-862.

Response: The permit modification application has been thoroughly reviewed and updated to incorporate changes to the status of WL-Q76 and agency correspondence. Updates to the permit modification application associated with this comment are provided in **Attachment I** of this response, as part of the revised permit modification application *Attachment C – Environmental Assessment*.

Based on an assessment of the stream designation provided by the FBC (see response to #8), the section of stream crossed by the proposed reroute is not a tributary to the section of Marsh Creek that has a wild trout designation. As a result, a seasonal restriction would not apply to construction across stream S-Q83.

5. Page 10 of the amendment submittal refers to direct and indirect impacts as minor and temporary. It is questionable whether the impacts will be minor, and it is suggested that the applicant avoids using this term. The classification of minor and temporary needs to be based on monitoring after

the construction is completed and restoration is accomplished. Seasonal restrictions are described as not known by the applicant on page 10 and other sections of the amendment request. These references should be revised in accordance with Item 4, above.

Response:

"Minor" and "Temporary" Environmental Impact Assessment Terminology

It is standard procedure for any environmental impact assessment to first identify, assess (i.e., quantitative, qualitative), and characterize potential impacts on affected environmental and human environment resources to support final conclusions or determinations of impacts (i.e., adverse, significantly adverse). The environmental impact assessment process typically uses characterization terminology to addresses the context (geographic locale and nature, specific resource), type (direct, indirect), duration (temporary, permanent), and intensity (e.g., de minimus, minor, moderate, significant) of potential impacts. For instance, the Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) Guidelines (40 Code of Federal Regulations §§ 1500–1508) provide overarching guidelines for federal agencies to develop agency-specific NEPA implementing regulations for their regulatory programs, including procedures for the preparation of environmental assessments and impact statements, findings of no significant impact [40 CFR § 1508.13], assessment of the context [40 CFR § 1508.27(a)] and intensity or degree [40 CFR § 1508.27(b)] of impacts to support a significance determination, as well as definitions of impact characterization terminology such as "effects" including "direct" and "indirect" [40 CFR § 1508.8], and "significantly" [40 CFR § 1508.27].

The use of such characterization terminology to identify, assess, and determine impacts on environmental and human environment resources is included and inherent in the Department's regulations. Specifically applications for a Chapter 105 Water Obstruction and Encroachment Permit include Department regulations require, among other information, an Environmental Assessment (25 Pa. Code § 105.15) that in turn includes (*italics used for emphasis*), a summary of the *amount* and *type* of *resources present* and the *temporary and permanent impacts* proposed to those resources (Module S1: Project Summary, item B); identification of aquatic resource(s) *type* and *size* of resource(s) (Module S2: Resource Identification and Characterization, item B.); a *characterization* of the aquatic resources proposed to be *directly or indirectly affected* by the project (Module S2: Resource Identification and Characterization, item D); a summary table of the *proposed temporary and permanent direct and indirect impacts* for each affected resource category (Module S3: Identification and Description of Potential Project Impacts, item A); a *detailed discussion of potential impacts* to other sensitive or protected environmental resources (Module S3: Identification and Description of Potential Project Impacts, item B.); table(s) of proposed *temporary and permanent direct and indirect impacts* and subsurface details for all proposed water obstruction(s), encroachment activities, and dams (Module S2: Resource Identification and Characterization, item C.); and a *discussion of how the proposed subfacility(ies)* individually or in combination *directly and/or indirectly impact the identified resource(s)* and the *effects on the applicable resource functions* (Module S2: Resource Identification and Characterization, item C.).

The Department's regulations also require an application for a Chapter 105 Water Obstruction and Encroachment Permit include, among other information, an impacts analysis (25 Pa. Code § 105.13. Regulated activities—information and fees). Specifically (*italics used for emphasis*):

> (x) Impacts analysis. A *detailed analysis of the potential impacts*, to the extent applicable, of the proposed project on water quality, stream flow, fish and wildlife, aquatic habitat, Federal and State forests, parks, recreation, instream and downstream water uses, prime farmlands, areas or structures of historic significance, streams which are identified candidates for or are included within the Federal or State wild and scenic river systems and other relevant significant environmental factors.

In addition, the Department's regulations require applications for a Chapter 105 Water Obstruction and Encroachment Permit to include a practicable alternatives analysis supporting the determination of whether the proposed impacts to EV wetlands are "adverse" [25 Pa. Code. § 105.18a(a)(3)] and to "other" wetlands are "significantly adverse" [25 Pa. Code. § 105.18a(b)(3)].

Although the Department's regulations require an environmental assessment of "direct", "indirect", "temporary", and "permanent" impacts to support a determination of "adverse" and "significantly adverse" impacts on wetlands (as well as impact assessment on other protected or sensitive environmental and human environment resources), the Department's regulations do not provide a definition of "adverse" or "significantly adverse" (see 25 Pa. Code § 105.1. Definitions and elsewhere in § 105). Therefore, it is an inherent regulatory requirement that applications for a Chapter 105 Water Obstruction and Encroachment Permit include an environmental impact assessment that uses characterization terminology to identify, assess, and determine impacts on environmental and human environment resources and demonstrate compliance with the Department's regulations.

Given the lack of clear definition of "adverse" or "significantly adverse" in the Department's regulations, SPLP's environmental assessment, alternatives analysis, and other relevant assessments included in its original application and modification requests for a Chapter 105 Water Obstruction and Encroachment Permit address the context (geographic locale and nature, specific resource), type (direct, indirect), duration (temporary, permanent), and intensity (e.g., *de minimus*, minor, moderate, significant) of potential impacts to the degree defined and required in the Department's regulations and otherwise modeled after the CEQ NEPA Guidelines and other relevant federal regulations.

Definitions of "Minor" and "Temporary" Impacts

Within the context of SPLP's environmental assessment, alternatives analysis, and other relevant impact assessments included in its original application and modification requests for a Chapter 105 Water Obstruction and Encroachment Permit, and where not specifically defined in the Department's regulations, the characterizing terminologies "minor" and "temporary" follow the definitions and/or intent of the CEQ NEPA Guidelines and United States Army Corps of Engineers (USACE) regulations pursuant to Section 404 of the Clean Water Act (Section 404 CWA), as described below:

- A "minor" impact to wetlands and waterbodies (and other environmental or human environment resources) involves the avoidance and minimization of potential direct and indirect impacts to the extent practicable, and the restoration ("return of an ecosystem to a close approximation of its condition prior to disturbance" [USEPA 1992, *Restoration of Aquatic Ecosystems*]) of remaining temporary impacts. As summarized in the original Project-wide Alternatives Analysis: "The resultant impacts are not considered significant or adverse, and thus do not require compensatory mitigation."
- A "temporary" impact to wetlands and other waters of the United States (WOTUS) pursuant to Section 404 CWA involves any temporary dredge or fill activity (e.g., installation and removal of temporary access/bridges, trenching, backfilling) wherein adverse impacts to aquatic resources are avoided and minimized to the extent practicable.

Conclusion Regarding "Minor" and "Temporary" Impacts

The above describes Chapter 105 permit application requirements for impact assessment, definitions of impact assessment terminology, and demonstrates that impacts to aquatic resources will be avoided and reduced to the maximum extent practicable, further supporting the

following aquatic resource impact conclusions presented in the original Project-wide Alternatives Analysis:

- "As set forth in the Project Impact analyses (Attachment 11: Enclosure D, and Enclosure E, Part 2), implementation of the Project as proposed, including the proposed best management practices presented in the Impact Avoidance, Minimization, and Mitigation Procedures and Erosion & Sedimentation Control Plan, would result in temporary and minor impacts to wetlands and associated wetland functions and values….The resultant impacts are not considered significant or adverse, and thus do not require compensatory mitigation."

Seasonal Restrictions

Based on an assessment of the stream designation provided by the FBC (see response to #8), the section of stream crossed by the proposed reroute is not a tributary to the section of Marsh Creek that has a wild trout designation. As a result, a seasonal restriction would not apply to construction across stream S-Q83.

6. The applicant needs to install orange protective fencing along the boundaries of each wetland in or adjacent to the LOD.

Response: Sheet ES-6.25 of the Erosion and Sediment Control & Site Restoration Plan presented in *Attachment D* of the permit modification application has been revised to include orange protective fencing along the boundaries of wetland WL-I1. The revised sheet is included in **Attachment II** of this response, as part of the revised permit modification application *Attachment D – Applicable 102 Drawings*.

7. A benthic macroinvertebrate survey needs to be conducted prior to and after construction is completed. This survey will establish current and post construction data on the recovery of the stream's aquatic life.

Response: A benthic macroinvertebrate survey was conducted on May 30, 2020 and the results are being compiled and will be submitted to the Department by July 15, 2020. A benthic macroinvertebrate survey will also be conducted during the appropriate season post-construction. SPLP will notify the Department of the completion of the post-construction survey and will submit the results and recovery analysis within 45 days of completion of the survey.

8. Page 10 discusses impacts to aquatic species and states that impacts will be temporary. However, the sedimentation of trout redds could be a significant and long- term impact to wild trout spawning. A survey needs to be conducted to determine if any trout redds exist in Meadow Creek and Marsh Creek downstream of the project. If redds are found the applicant needs to consult with the FBC and develop plans to protect these spawning habitats. These sensitive habitats are subject to secondary impacts and are not discussed, but should be, on pages 15 and 16, "Potential Secondary Impact Evaluation".

Response: Tetra Tech has contacted Mr. Gregory Lech at the FBC and has received confirmation that the section of creek proposed to be crossed has no designation, stating the following:

> "*Marsh Creek's designation is listed as Headwaters to Marsh Creek Lake, with a Lower Limit Lat/Lon as: 40.089444 -75.731111. This limit looks identical to the TNR*. It appears S-H53/S-Q83 enters downstream of this limit so there would be no designation."

The June 18, 2019 email correspondence from Mr. Lech is provided in **Attachment III** of this response.

We have confirmed that 40.08944, -75.731111 occurs above the confluence of Meadow Creek (S-H53/S-Q83) and Marsh Creek. As a result, based on the FBC correspondence, trout spawning in Meadow Creek (S-Q83) and Marsh Creek downstream of the project is unlikely and trout redds

surveys would be not required.

Hard copies of this response will be provided to the Department upon request. Should you have questions regarding this correspondence, please do not hesitate to contact me at 716-860-7495 or via e-mail at brad.schaeffer@tetratech.com.

Sincerely,

Brad Schaeffer
Project Manager/Senior Biologist
Tetra Tech, Inc.

Enclosures: Attachments

cc: D. Caplan, U.S. Army Corps of Engineers, Pittsburgh District
N. Bryan, Energy Transfer
M. Styles, Energy Transfer
C. Embry, Energy Transfer
B. Schaeffer, Tetra Tech

Attachment I

ATTACHMENT A

Project Description and Alternative Analysis

Revised June 2020

Project Description

Sunoco Pipeline LP (SPLP) requests a major permit modification for a change in the route and installation method for both the 16- and 20-inch diameter pipelines. This modification request is from a Horizontal Directional Drill (HDD) to an open-trench installation across stream Q83 and wetland Q76, and conventional bore under Styer Road. Difficulties were encountered while drilling the permitted 16-inch pipeline on the original alignment. In 2018, SPLP performed additional geologic investigations and as a result of these analysis, believes that abandoning the HDD is the preferred alternative at this location.

SPLP proposes to reroute both pipelines around two wetlands and cross one perennial stream S-Q83 (Unnamed Tributary (UNT) to Marsh Creek) and an emergent wetland Q76. In addition, the requested reroute will cross the floodways of streams S-Q83, S-16r, and S-Q84. These stream, wetland, and floodway resources are located adjacent to one another in a single aquatic resource "crossing area" located approximately 0.5-mile northwest of Styer Road along the reroute alignment. Stream S-Q83 will be crossed utilizing one or more of the following open-trench excavation methods for installation of the pipelines across waterbodies (refer to the E&S Plan standard typical drawings for details):

- **Dry Open Cut** – Minor waterbodies with no flow at the time of construction may be crossed using the open-cut crossing method.
- **Dry Flume** – A flumed crossing directs and contains the stream flow through an alternate mechanism across the stream channel to allow for the trenching and pipe installation to occur in dry conditions. Where practical, this allows for drier trenching, pipe installation, and restoration while maintaining continuous downstream flow.
- **Dry Pump Bypass** – The dam and pump bypass method may be used for crossings of waterbodies where pumps can adequately transfer stream flow volumes around the workspace. Similar to the flume crossing, this method allows for drier trenching, pipe installation, and restoration while maintaining continuous downstream flow.
- **Dry Cofferdam** – The cofferdam method, typically used on large streams/rivers, involves the installation of a cofferdam to isolate and divert flow around the workspace in two phases. The first phase consists of the cofferdam installation on one of the banks and approximately halfway into the river to allow safe and dry installation of the pipeline across the river. The second phase involves the same process but from the opposite bank. This method allows continuous flow around the workspace and eliminates concerns about sensitive species passage.

The selected open-trench, dry stream crossing method will convey stream flow across the workspace and outlet downstream within the permitted limit-of-disturbance, such that work will be conducted in a dry stream channel. After the stream flow is contained and directed/conveyed across the work area, the trench will be excavated, and both the 16-inch and the 20-inch pipes will be installed via the open trench method through the stream and wetland in accordance with all permit conditions and requirements. In order to efficiently complete all construction activities and minimize resource impacts, SPLP is proposing a 50-foot-wide limit of disturbance (LOD) across both the perennial stream (S-Q83) and emergent wetland (Q76).

Timber mats will be placed along the travel lane through the wetland and a temporary bridge will be placed across the stream to avoid soil compaction, allow for trench excavation, and stream substrate and wetland topsoil segregation as well as stockpiling in adjacent upland areas. Once the pipes and appropriate trench plugs are installed, the trench will be backfilled, restored to pre-existing elevations and hydrology, and will be stabilized with native vegetation. All work will be conducted in accordance with permit conditions/requirements as well as the revised/updated Erosion & Sediment and Restoration plan (refer to *Attachment D* of this permit modification). The requested modification will reduce the number of wetland crossings and impacts, and will eliminate the risk of potential discharges associated with HDD inadvertent returns (IRs). In addition, the localized impacts are considered minor and temporary for this modification and will not result in any loss of water quality/quantity. The work completed to date for the 16-inch HDD

~~will be~~ has been abandoned: specifically, the drill stem ~~will be~~ was removed/pulled and grouted and all work areas restored in accordance with permit conditions/requirements.

Refer to *Attachment C - Environmental Assessment* for a discussion of existing conditions, potential impacts, mitigation/restoration, antidegradation compliance, and agency coordination associated with the requested reroute and open-trench installation method.

Alternatives Analysis

As noted in the original Project-wide Alternatives Analysis, the Department's regulations regarding the analysis of alternatives for proposed wetland impacts are principally set forth at 25 Pa. Code § 105.18a (a) and (b), depending upon whether the wetland is classified as an exceptional value wetland or an "other" wetland, respectively. Based on information provided by the Department in its technical deficiency letter dated May 27, 2020, the subject wetland Q76 (WL-Q76) is classified as an Exceptional Value (EV) wetland, and based on this assumption, the applicable regulation is 25 Pa. Code § 105.18a(a). A summary of alternatives analysis compliance with these regulations is presented at the end of this Alternatives Analysis.

Also as noted in the original Project-wide Alternatives Analysis, in its review of Section 105 permit applications, the Department also determines the unavailability of alternative locations, routes and designs as set forth in 25 Pa. Code § 105.14(b)(7):

> (7) The extent to which a project is water dependent and thereby requires access or proximity to or siting within water to fulfill the basic purposes of the project. The dependency must be based on the demonstrated unavailability of any alternative location, route or design and the use of location, route or design to avoid or minimize the adverse impact of the dam, water obstruction or encroachment upon the environment and protect the public natural resources of this Commonwealth.

The Department's regulations do not include a requirement for a practicable alternative analysis for streams. However, SPLP performed and herein presents a practicable alternative analysis for the subject stream Q83 (S-Q83) in response to the Department's technical deficiency comment letter dated May 27, 2020.

Water Dependency

The crossing of aquatic resources is unavoidable due to the linear nature of the proposed PPP Project and as described in the Environmental Assessment, S1.B – Water Dependency (refer to *Attachment C* of this permit modification).

Horizontal Directional Drill (HDD) Construction Method

Given the water dependency nature of the proposed PPP Project, to avoid direct impacts to aquatic resources, SPLP originally planned to HDD under a few wetlands and streams. However, during the HDD of the 16-inch pipe there were a number of loss of circulation (LOC) occurrences that significantly slowed the HDD progress. SPLP stopped work on this HDD and evaluated a number of different crossing alternatives, including a reroute further to the northeast and a change in construction method from HDD to open-trench. The existing HDD profile/plan for both the 16- and 20-inch pipelines is in proximity to the Marsh Creek State Park/Marsh Creek Lake Natural Heritage Area. Accordingly, SPLP wants to protect these sensitive areas from potential IRs associated with the continuation of HDD activities in the area based on the existing geology and difficulties experienced during the initial attempts to install the 16-inch pipe, as detailed in the Project Description above. As a result, SPLP has elected to install the pipelines through this area with an alternate installation method that eliminates the potential for IRs to impact Waters of the Commonwealth.

As part of the HDD reevaluation process, SPLP evaluated potential reroute and construction method alternatives for the crossings of the subject aquatic resources, including WL-Q76 (a palustrine emergent

[PEM], EV wetland) and S-Q83 (a perennial UNT to Marsh Creek, classified as a High Quality-Trout Stocked Fishery [HQ-TSF], Migratory Fishery [MF] waterbody), as well as Chapter 105 floodway crossings of three streams (S-Q83, S-16r, and S-Q84), as discussed below.

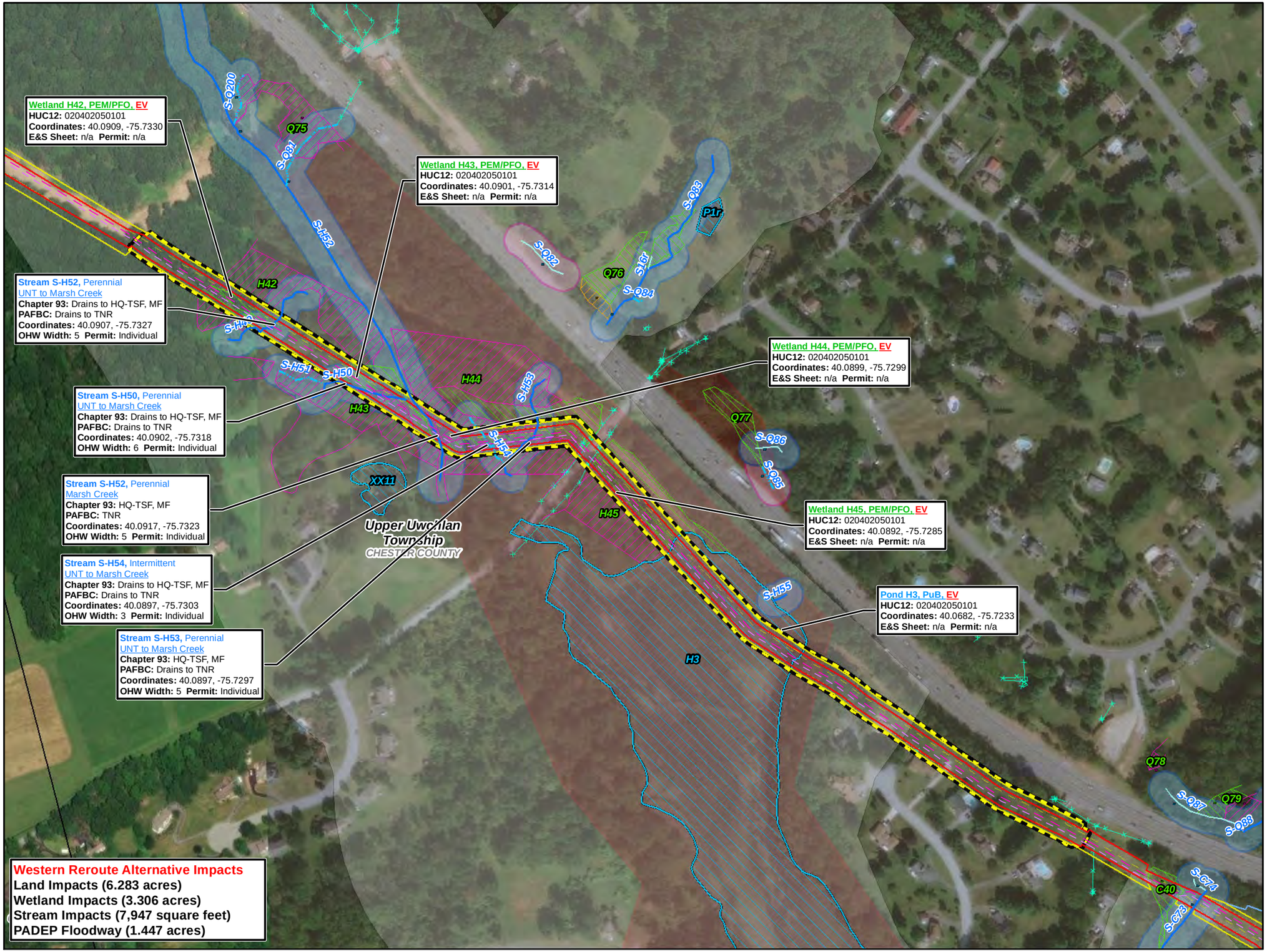
Alternative Construction Methods Along Original HDD Alignment

SPLP evaluated potential alternative construction methods to install the 16- and 20-inch pipelines along the existing permitted HDD right-of-way, including other trenchless construction methods (FlexBor, Direct Pipe Bore, conventional auger bore [CAB], jack/hammer bore) and the open cut construction method. However, due to the future expansion of Pennsylvania Turnpike 76/280 (PA Turnpike 76), none of these alternative construction methods would result in installed pipeline depths below the grade of the future expansion of PA Turnpike 76, meaning the installed pipelines would directly intersect and interfere with the expansion, and therefore would require rerouting to avoid PA Turnpike 76. Although these alternative construction methods may (or may not) be technically feasible, none are considered practicable due to the future need to abandon, remove, and replace the PPP Project pipelines (if installed along the HDD alignment) using an alternative reroute.

In addition, an open-trench installation of the 16- and 20-inch pipelines along the existing/permitted route would require impacting two wetlands and three streams, resulting in greater impacts to aquatic resources than the proposed reroute with open cut construction method, and, as noted above, would not be a practicable alternative as it would be located within the proposed build-out areas of PA Turnpike 76.

Reroutes

SPLP evaluated other (non-HDD alignment) routes that would potentially avoid or minimize environmental impacts and avoid potential future growth requirements of the PA Turnpike 76. These included a Western Reroute (**Figure 1**), an Eastern Reroute using the CAB construction method to cross the subject aquatic resources (Eastern Reroute-Bore Resources) (**Figure 2**), and the same Eastern Reroute using the open cut construction method to cross the subject aquatic resources (Eastern Reroute-Open Cut Resources) (**Figure 3**), as described and evaluated below. To ensure an commensurate ("apples-to-apples") comparison, each of these reroute alternatives have a common begin and end point; each reroute begins at the south side of the eastern trenchless crossing of PA Turnpike 76, and ends at the south side of the western trenchless crossing of PA Turnpike 76 where the proposed reroute intersects the existing 8-inch Mariner East 1 (ME1) pipeline right-of-way (see **Figures 1–3**). **Table 1** presents a summary quantitative impact comparison of these three reroute alternatives, including length, type of right-of-way, right-of-way requirements, aquatic resources, and other environmental and human environment resources.



Legend

- Southern Reroute LOD
- PPP 1
- PPP 2
- Permanent ROW
- Temporary ROW
- ATWS
- Utility Lines
- Pond
- PEM Wetland
- PFO Wetland
- PSS Wetland
- Ephemeral Stream
- Intermittent Stream
- Perennial Stream
- Chapter 105 Floodway
- Waived Floodway
- CNHI_Core
- State Parks
- 8" Centerline

0 50 100 200 300 400

1 inch = 300 feet

Figure 1. Western Reroute Alternative. Sunoco Pennsylvania Pipeline Project, Proposed 0280 HDD Installation Method Change, Chester County, PA.

Sheet 1 of 1

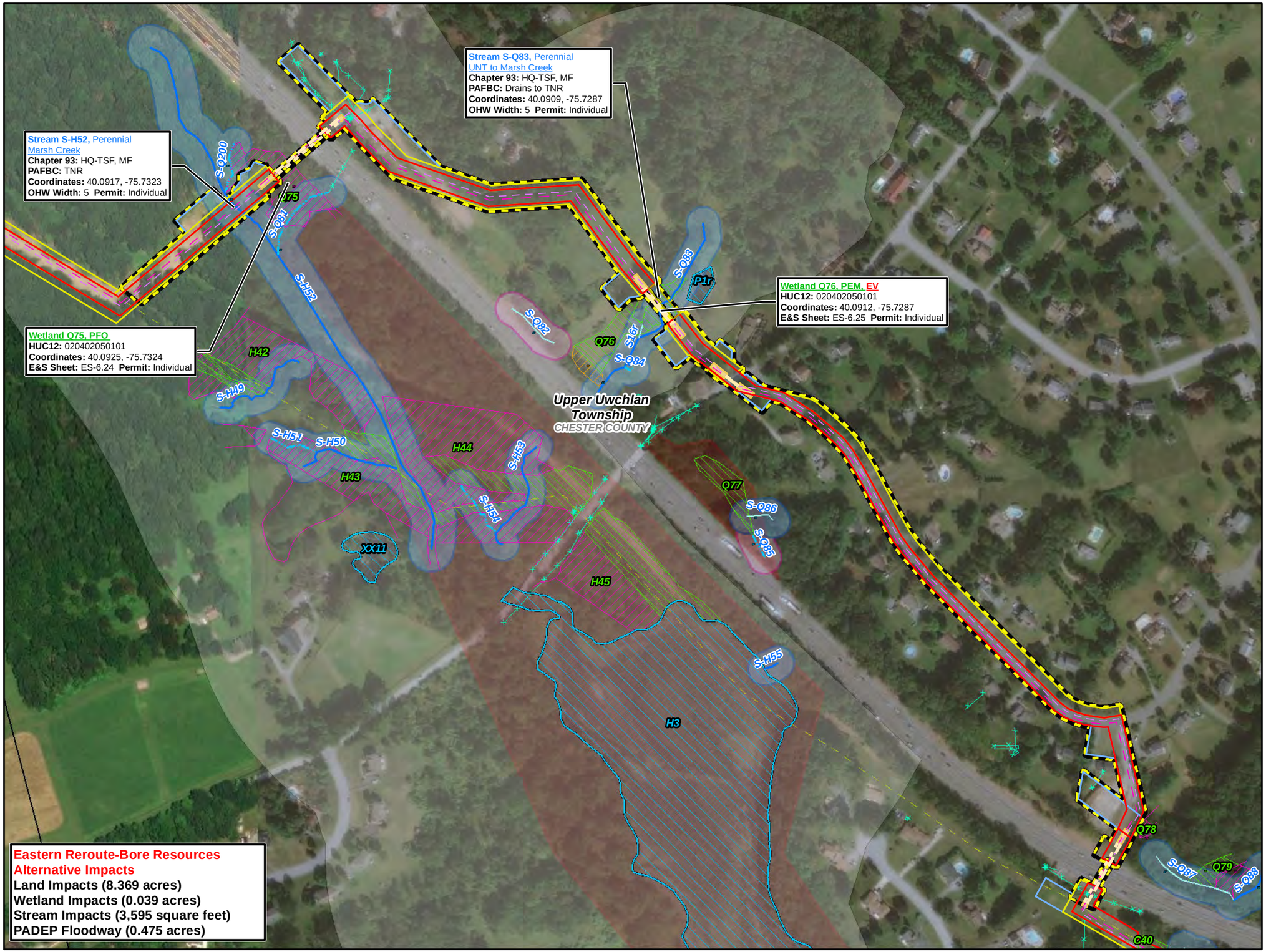
Prepared By: TETRA TECH

Date: 6/17/2020

Base Map: ESRI World Imagery 09/2019. Aquatics, TT 2013-2019.

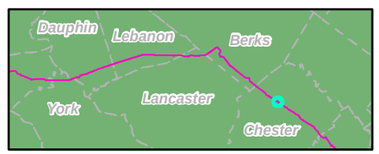
Coordinate System: NAD 83 Stateplane, PA South, Feet

E:\GIS\Projects\112C05958-PPPMXD\Liza\Figure 1 - Southern Reroute 0280.mxd LN



Legend

- Northern Reroute LOD, Bored Stream and Wetland
- PPP 1
- PPP 2
- PPP 1, Bore
- PPP 2, Bore
- Bore Pits
- Permanent ROW
- Temporary ROW
- ATWS
- Travel Lane
- Utility Lines
- Pond
- PEM Wetland
- PFO Wetland
- PSS Wetland
- Ephemeral Stream
- Intermittent Stream
- Perennial Stream
- Chapter 105 Floodway
- Waived Floodway
- CNHI_Core
- State Parks
- 8" Centerline



0 50 100 200 300 400

1 inch = 300 feet

Figure 2. Eastern Reroute-Bore Resources Alternative.
Sunoco Pennsylvania Pipeline Project, Proposed 0280 HDD Installation Method Change, Chester County, PA.
Sheet 1 of 1

Prepared By:	Date:
TETRA TECH	6/17/2020

Base Map; ESRI World Imagery 09/2019.
Aquatics, TT 2013-2019.

Coordinate System: NAD 83 Stateplane, PA South, Feet

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Stream S-Q83, Perennial
UNT to Marsh Creek
Chapter 93: HQ-TSF, MF
PAFBC: Drains to TNR
Coordinates: 40.0909, -75.7287
OHW Width: 5 **Permit:** Individual

Stream S-H52, Perennial
Marsh Creek
Chapter 93: HQ-TSF, MF
PAFBC: TNR
Coordinates: 40.0917, -75.7323
OHW Width: 5 **Permit:** Individual

Wetland Q76, PEM, EV
HUC12: 020402050101
Coordinates: 40.0912, -75.7287
E&S Sheet: ES-6.25 **Permit:** Individual

Wetland Q75, PFO
HUC12: 020402050101
Coordinates: 40.0925, -75.7324
E&S Sheet: ES-6.24 **Permit:** Individual

Upper Uwchlan Township
CHESTER COUNTY

Eastern Reroute-Open Cut Resources Alternative Impacts.
Land Impacts (8.461 acres)
Wetland Impacts (0.086 acres)
Stream Impacts (3,785 square feet)
PADEP Floodway (0.556 acres)

Legend

- Northern Reroute LOD
- PPP 1
- PPP 2
- PPP 1, Bore
- PPP 2, Bore
- Bore Pits
- Permanent ROW
- Temporary ROW
- ATWS
- Utility Lines
- Pond
- PEM Wetland
- PFO Wetland
- PSS Wetland
- Ephemeral Stream
- Intermittent Stream
- Perennial Stream
- Chapter 105 Floodway
- Waived Floodway
- CNHI_Core
- State Parks
- 8" Centerline

0 50 100 200 300 400
1 inch = 300 feet

Figure 3. Eastern Reroute-Open Cut Resources Alternative.
Sunoco Pennsylvania Pipeline Project, Proposed 0280 HDD Installation Method Change, Chester County, PA.
Sheet 1 of 1

Prepared By: TETRA TECH

Date: 6/17/2020

Base Map; ESRI World Imagery 09/2019.
Aquatics, TT 2013-2019.

Coordinate System: NAD 83 Stateplane, PA South, Feet

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Table 1. Summary Quantitative Impact Comparison of Reroute Alternatives.

Environmental Factor	Eastern Reroute – Open Cut Resources	Eastern Reroute – Bore Resources	Western Reroute
Total Length (miles)	0.92	0.92	0.71
Type of Right-of-Way (ROW)			
New ROW (miles)	0.58	0.58	-
Adjacent to Existing Pipeline ROW (miles)	-	-	0.71
Adjacent to Other Existing ROW (roads, utility, etc.) (miles)	0.34	0.34	-
Right-of-Way Requirements			
Construction ROW (acres)	8.46	8.37	6.28
Permanent ROW (acres)	4.20	4.40	4.26
Wetlands			
Herbaceous (PEM) Wetlands (acres)	0.086	0.039	1.426
Scrub-shrub (PSS) Wetlands (acres)	-	-	-
Forested (PFO) Wetlands (acres)	-	-	0.952
Freshwater Pond (PuB) Wetland (acres)	-	-	0.928
Waterbodies			
Stream Impacts (square feet)	3,785	3,595	7,947
PADEP Floodway Impacts (acres)	0.556	0.475	1.447
Total Perennial Waterbody Crossings (no.)	2	2	4
Major Waterbody Crossings (>100 feet) (no.)	-	-	1
Designated Natural and Scenic Rivers (no.)	-	-	-
Significant Fisheries (no.)	-	-	-
Ponds/Lakes (no.)	-	-	1
Federally-Listed Endangered or Threatened Species			
Habitat (miles)	-	-	0.26
Species or Critical Habitat (no.)	-	-	1
PADEP CNHI Core Habitat (miles)	0.45	0.45	0.58
Cultural Resources			
National Historic Landmarks (no.)	-	-	-
NRHP-listed properties (no.)	-	-	-
Land Use			
Forest (miles)	0.09	0.09	0.11
Agricultural (miles)	-	-	-
Open (miles)	0.38	0.38	0.34
Residential (miles)	0.11	0.11	0.15
Commercial/Industrial (miles)	-	-	-
Roadway (miles)	0.34	0.34	0.01
Open Water (miles)	-	-	0.10
Residences and Other Structures			
Within 50 feet of Construction Work Area (no.)	5	5	3
Federal Land			
National Forests (miles)	-	-	-
National Parks (miles)	-	-	-
Other (miles)	-	-	-
Indian Reservations (miles)	-	-	-
State Land			
State Forest/Parks (miles)	-	-	0.32
Wildlife Management Areas (miles)	-	-	-
Other (miles)	-	-	-

Western Reroute Alternative

SPLP evaluated a Western Reroute alignment that would be co-located with the existing 8-inch Mariner East 1 (ME1) pipeline right-of-way, which is located roughly parallel to and southwest of PA Turnpike 76 (see **Figure 1**). Of the three reroute alternatives evaluated, the Western Reroute has the shortest length (0.71 mile) and the greatest length/percentage co-located with existing rights-of-way (0.71 mile; 100%). However, assuming use of the open cut construction method, the Western Reroute has by far the greatest impact on wetlands (3.306 acres), streams (7,947 square feet), and floodways (1.447 acres) (see **Figure 1** and **Tables 2a and 2b**). Given the virtually continuous presence of adjacent wetland, stream, and floodway resources along this Western Reroute alignment (see **Figure 1**), the use of trenchless construction methods would have limited utility and practicability, as bore/entry pits intended to avoid one resource would be

placed directly in another adjacent resource, thus resulting in even greater impacts to individual aquatic resources and overall negating the resource avoidance intention of these construction methods. **Tables 2a and 2b** present the detailed quantitative aquatic resource impacts for the Western Reroute alternative.

Table 2a. Western Reroute Open Cut Alternative Impacts on Wetlands.

Wetland	Crossing Method	Cowardin Classification [1]	Exceptional Value (EV) Designation	Wetland Temp Impact (acres)	Wetland Perm Impact (acres)	PFO Cover Type Conversion [1,2] (acres)
H42	Open Cut	PEM	Yes	0.056	0.169	n/a
	Open Cut	PFO	Yes	0.074	0.098	0.098
H43	Open Cut	PEM	Yes	0.088	0.204	n/a
	Open Cut	PFO	Yes	0.066	0.122	0.122
H44	Open Cut	PEM	Yes	0.089	0.36	n/a
	Open Cut	PFO	Yes	0.213	0.214	0.214
H45	Open Cut	PEM	Yes	0.125	0.335	n/a
	Open Cut	PFO	Yes	0.084	0.081	0.081
H3	Open Cut	PuB	Yes	0.310	0.618	n/a

[1] PEM = palustrine emergent, PSS = palustrine scrub-scrub, PFO = palustrine forested, PuB = freshwater pond, n/a = not applicable.
[2] Permanent conversion of PFO cover type to PEM cover type due to maintenance of permanent ROW.

Table 2b. Western Reroute Open Cut Alternative Impacts on Waterbodies.

Stream	Crossing Method	Stream Dist. Length in Perm ROW (feet)	Stream Dist. Length in Temp ROW (feet)	Stream Perm Impact (square feet)	Stream Temp Impact (square feet)	Ch. 105 Perm Floodway Impact (acres)	Ch. 105 Temp Floodway Impact (acres)
S-H49	Dry Crossing	64	47	320	235	0.464	1.01
S-H50	Dry Crossing	163	54	384	324		
S-H52	Dry Crossing	111	68	2880	3060		
S-H53	Dry Crossing	78	29	320	145		
S-H54	Dry Crossing	67	29	192	87		

In addition, a reroute to the west would align the pipelines directly through the Marsh Creek State Park and Marsh Creek Lake Natural Heritage Area (0.32 mile), which would be generally inconsistent with the resource management objectives of these natural areas. These natural area crossings also include extensive areas of bog turtle habitat/wetlands (0.26 mile) and County Natural Heritage Inventory (CNHI) Core[1] habitat (0.58 mile), which would require additional agency consultation, habitat and species-specific surveys, impact avoidance and minimization planning, development and implementation of best management practices and restoration plans, and associated permitting to ensure avoidance of significant impacts to these other environmental resources.

Based on the results of this evaluation, use of the Western Reroute (with the use of the open trench construction method, but regardless of use of any non-HDD trenchless construction method), although potentially technically feasible, would not avoid or minimize impacts to wetlands, streams, floodways, and other environmental resources compared to the Eastern Reroute alignment, and therefore not to the

[1] CNHI Core habitat represents Core Habitat of Biological Diversity Areas identified through the County Natural Heritage Inventory program of the Pennsylvania Natural Heritage Program.

maximum extent practicable. Therefore, the Western Reroute alternative is not the preferred or selected alternative for the PA Turnpike 76 major modification area.

Eastern Reroute Alternative

SPLP evaluated an Eastern Reroute alignment that would be co-located with existing rights-of-way (entirely within the existing curb-to-curb paved area of Meadow Creek Lane), which is located roughly parallel to and northeast of PA Turnpike 76 (see **Figures 2 and 3**). The Eastern Reroute alignment was designed primarily to: 1) avoid and minimize impacts to aquatic resources and special land uses (Marsh Creek State Park and Marsh Creek Lake Natural Heritage Area) to the west and thus remains on the east side of PA Turnpike 76, 2) avoid the future PA Turnpike 76 expansion area, 3) accommodate the shortest practicable route by remaining as close as practicable to the 8-inch ME1 pipeline right-of-way and PA Turnpike 76, and 4) maximize use of existing, disturbed, permanent ROW by staying within the existing curb-to-curb paved area of Meadow Creek Lane to the extent practicable, and thus minimize the use of new ROW, crossings of aquatic resources, and impacts to sensitive land uses (residences, associated aboveground and buried infrastructure, vegetation clearing and associated potential visual impacts to residential areas), as well as avoid a buried natural gas pipeline located on the east side of the road. **Table 3** summarizes the Eastern Route alignment, segment lengths, and construction methods associated with the Eastern Reroute-Bore Resources and Eastern Reroute-Open Cut Resources alternatives; the alignment and construction methods of these two alternatives are identical, with the exception of the construction method (open cut versus bore) used to cross the aquatic resources "crossing area".

Table 3. Summary of Eastern Reroute Alternatives Alignment Segments (West to East) and Associated Construction Methods.

Location	Length (feet)	Eastern Reroute-Open Cut Resources Alternative	Eastern Reroute-Bore Resources Alternative
ME1 ROW Interconnect to West Side PA Turnpike 76 Bore	628	Open Cut	Open Cut
PA Turnpike 76 Bore	279	Bore	Bore
East Side PA Turnpike 76 Bore to North Side of Aquatic Resource "Crossing Area"	1,207	Open Cut	Open Cut
Aquatic Resource "Crossing Area" (S-Q86, WL-Q76, Floodways)	180	Open Cut	Bore
South Side of Aquatic Resources "Crossing Area" to North Side of Styer Road Bore-	205	Open Cut	Open Cut
Styer Road Bore	51	Bore	Bore
South Side of Styer Road Bore to East Side PA Turnpike 76 Bore	2,071	Open Cut	Open Cut
PA Turnpike 76 Bore	216	Bore	Bore
West Side of PA Turnpike 76 Bore to ME1 ROW Interconnect	28	Open Cut	Open Cut
TOTAL	**4,865**		

Of the two primary reroute alignments evaluated (Western Reroute and Eastern Reroute alignments), the Eastern Reroute has the greatest length (0.92 mile) and the least length/percentage co-located with existing rights-of-way (0.34 mile; 37%) (see **Table 1**). However, assuming use of the open cut construction method, the Eastern Reroute has by far less impact on wetlands (0.086 acre), streams (3,785 square feet), and floodways (0.556 acre) than the Western Reroute (see **Figures 2 and 3**, and **Table 1).** Specifically, the Eastern Reroute would reduce the number and acreage of open cut construction method aquatic resource crossings (in the aquatic resources "crossing area" located approximately 0.5-mile northwest of Styer Road) to one stream (S-Q83) and one wetland (WL-Q76), and the floodways of three streams (S-Q83, S-16r, and S-Q84). Furthermore, a reroute to the east would avoid impacts to the natural areas crossed by the Western Reroute (Marsh Creek State Park and Marsh Creek Lake Natural Heritage Area). In addition, a reroute in this area could utilize the existing road right-of-way of Meadow Creek Lane and avoid having to create a new "greenfield" corridor for the majority of the route.

Compared to the Western Reroute, the Eastern Reroute (regardless of construction method across the aquatic resources "crossing area") would further avoid or minimize impacts to wetlands, streams, floodways, and other environmental resources. **Therefore, the Eastern Reroute is the preferred or selected alternative reroute alignment for PA Turnpike 76 major modification area**.

Following selection of the Eastern Reroute alignment, SPLP further evaluated the use of trenchless (including boring) construction methods and the open cut construction method to cross the subject stream (S-Q83), wetland (WL-Q76), and floodway (S-Q83, S-16r, and S-Q84) resources, which are located adjacent to one another in a single aquatic resource "crossing area" located approximately 0.5-mile northwest of Styer Road along this alignment, as discussed below.

Other Trenchless Construction Methods

SPLP evaluated the use of other (non-HDD) trenchless construction methods, including the FlexBor, Direct Pipe Bore, Jack/Hammer Bore, and conventional auger bore (CAB), for the single aquatic resource "crossing area" located along the Eastern Reroute approximately 0.5-mile northwest of Styer Road along this alignment, but determined these alternative construction methods are not technically feasible, and therefore are considered not practicable taking into consideration existing technology and logistics, as discussed below.

The below analysis of other trenchless construction methods assumes a standard design setback distance of each entry/exit (pilot hole, exit hole, bore pits) from aquatic resources as a best management practice to avoid or minimize encountering groundwater tables and associated concerns related to hole/pit dewatering and discharge, hole/pit collapse and safety, and resource integrity (maintenance of hydrology and avoidance of wetland subsidence and stream bed/bank collapse). A design setback distance of 50 feet from aquatic resources is strongly preferred wherever practicable, with increasing risk of encountering the above-listed concerns with decreasing setback distance. Given groundwater management issues associated with the failed HDD attempt adjacent to the Eastern Reroute alignment, a 50-foot setback distance is evaluated herein. Therefore, the below analysis is based on an approximately 180-foot-long aquatic resource crossing area (50-foot setback of north bore pit from northern wetland boundary, 80-foot-long combined crossing of WL-Q76 and S-Q83, and 50-foot setback of south bore pit from southern wetland boundary) for the installation of both the 16- and 20-inch pipelines within the proposed Eastern Reroute alignment permanent right-of-way.

FlexBor Alternative

SPLP evaluated the use of the FlexBor construction method for an approximately 180-foot-long aquatic resource crossing area for crossing of WL-Q76 and S-Q83 (for installation of both the 16- and 20-inch pipelines) within the proposed Eastern Reroute alignment permanent right-of-way, and determined this trenchless crossing alternative **is neither technically feasible nor practicable** due to the limitations of this existing technology, as discussed below.

FlexBor is a hybrid of HDD and auger boring that can be pit or surface launched and is designed to minimize inadvertent return potential during the reaming process. Water and pressurized air are used during pilot if drilled, or the pilot may be forwarded by a tracked/steered hydraulic tool. The FlexBor technology is specifically designed to not use bentonite in the reaming phase, which could introduce a foreign material in the event of an IR. Cuttings in the pilot phase return along annulus using air and water if drilled. Cuttings during the ream are returned inside a "casing" behind the reamer using high pressure air with water injection blown down the casing. As a result, IR potential during the ream is substantially reduced. A FlexBor can be employed using a small hydraulic powered unit or a converted standard HDD unit.

SPLP contractors have attempted three (3) FlexBors and partially completed two of these to replace HDDs on the PPP Project. One FlexBor failed in the pilot phase and was replaced with a conventional auger bore under a highway and open cut construction. The two partially successful FlexBors completed the pilot phases, but both had difficulties completing the reaming phase. SPLP's analysis is that this technology is not perfected for larger diameter bore attempts.

Based on the results of this evaluation, use of the FlexBor construction method for the subject aquatic resource crossing area: 1) is not a technically feasible alternative; and 2) therefore, is not a practicable alternative taking into consideration existing technology. Therefore, the FlexBor construction method is not the preferred or selected alternative for these crossing locations.

Direct Pipe Bore Alternative

SPLP evaluated the use of the Direct Pipe Bore construction method for an approximately 180-foot-long aquatic resource crossing area for crossing of WL-Q76 and S-Q83 (for installation of both the 16- and 20-inch pipelines) within the proposed Eastern Reroute alignment permanent right-of-way, and determined this trenchless crossing alternative **is neither technically feasible nor practicable** due to the limitations of this existing technology, as discussed below.

The Direct Pipe Bore method is also known as "microtunneling". This method of pipeline installation is a remote-controlled, continuously supported pipe jacking method. During the direct pipe installation, operations are managed by an operator in an above-ground control room alongside of the installation pit. Rock and soil cutting and removal occurs by drilling fluid injection through the cutting tool during rotation at the face of the bore, and the cuttings are forced into inlet holes in the crushing cone at the tool face for circulation to a recycling plant through a closed system. The entire operating system for this method of pipeline installation, including the cutting tool drive hydraulics, fluid injection, fluid return, and operating controls are enclosed inside the outside diameter bore pipe (or casing pipe) being installed. At the launching point/entry pit, the bore pipe is attached to a "jacking block" that hammers the bore pipe while the tool is cutting through the substrate or geology. The cutting tool face is marginally larger in diameter than the pipe to which it is attached. As a result, there is minimal annulus space, which minimizes the potential for drilling fluid returns or the production of groundwater returning back to the point of entry.

Insufficient Workspace

Insufficient workspace is available to setup a Direct Pipe Bore entry rig, associated pipe stringing behind the entry rig, and exit hole bore pit along the proposed Eastern Reroute alignment permanent right-of-way at the aquatic resource “crossing area” due to a number of constraints (discussed below), and therefore use of this construction method is not technically feasible due to insufficient workspace as well as public health (sanitary), safety, and other logistical concerns. Specifically, use of the Direct Pipe Bore construction method requires a minimum of a 50-foot-square area for the entry rig setup (in turn setback 50 feet from the aquatic resource boundary) that is excavated to install anchoring for the rig and the rig itself; substantive and unencumbered additional temporary workspace for ongoing movement and storage of construction equipment, materials, casing pipe sections, and spoil storage during the entire construction phase; and linear pipe string workspace slightly longer than the crossing length (to weld the full pipe string prior to installation) in a straight-line directly behind the entry rig. For the subject aquatic resource crossing area, the pipe string would consist two approximately 180-foot-long pipe strings, one for each the 16-inch and 20-inch pipelines (to be installed by welding onto the end of the pre-installed casing pipe of the same diameter which is installed one section at a time).

For the subject aquatic resource “crossing area,” the Direct Pipe Bore entry rig/bore pit, staging and stockpiling materials, and pipe stringing would ideally be setup on the south side of the crossing due to the south-to-north elevation gain across the crossing area profile. However, the Direct Pipe Bore entry rig/bore pit may not be setup on the south side of the crossing due to several workspace constraints. First, the entry rig and materials would be located directly on top of a septic system leach field where excavation would directly damage the leach field infrastructure and represent a public health (sanitary) and safety hazard (see Septic Systems/Leach Fields below). Second, the materials staging and stockpiling area would be constrained to the east and west by existing residences and associated aboveground and buried infrastructure. Finally, insufficient distance (length) is available between the back of the entry rig bore pit and Styer Road for the 180-foot-long, 16-inch and 20-inch pipe strings. Therefore, the south side of the crossing may only be used to stage smaller (light) equipment on mats (no excavation).

For the subject aquatic resource "crossing area," adequate workspace appears to be available to setup the Direct Pipe Bore entry rig, staging and stockpiling materials, and pipe stringing on relatively open land on the north side of the crossing. However, the Direct Pipe Bore exit holes (for the 16-inch and 20-inch pipeline installations) would be excavated on the south side of the "crossing area" within (located on top of and excavated into) the septic system leach field (which is not technically feasible). Therefore, use of this construction method is not technically feasible, and also is not preferred due to public health (sanitary), safety, and other logistical concerns.

Septic Systems/Leach Fields

The residential areas adjacent to Meadow Creek Lane are not connected to or served by a public sanitary sewer system, but instead have private buried septic systems (i.e., septic tanks and associated leach fields). Septic system leach fields (or drain fields) are subsurface wastewater disposal facilities used to remove contaminants and impurities from the liquid that emerges after anaerobic digestion in a septic tank. The septic tank typically is connected to the leach field consisting of an arrangement of trenches containing buried perforated pipes and porous material (e.g., gravel) covered by a layer of soil to prevent surface runoff and animals from reaching the wastewater distributed within the trenches. Because leach fields consist of relatively shallow buried infrastructure, construction activities (i.e., trenching, excavation, heavy equipment staging and transit) would directly damage these systems. In addition, because leach fields contain wastewater distributed within the trenches, construction activities (i.e., trenching, excavation, trench/pit dewatering and discharge) represent a surface water runoff and groundwater contamination hazard, as well as a human public health (sanitary) and safety hazard, both of which should be avoided.

In addition, due to the relatively shallow groundwater table in the subject aquatic resource crossing area (see Underlying Geology and Groundwater Management Concerns below), the groundwater encountered during excavation and operation of trenchless crossing bore pits would likely be contaminated with septic system leach field wastewater, also representing a human public health (sanitary) and safety hazard.

Unsuitable Elevation Profile and Bore Pit Depths

The elevation profile across the aquatic resource "crossing area" is unsuitable to accommodate the safe excavation, maintenance (integrity), and use of entry rig and exit hole bore pits. Specifically, the bore pits would require depths of at least 15 feet (resource side) and 18–20 feet (back side) to accommodate the Direct Pipe Bore equipment and to achieve at least 5 feet of cover beneath S-Q93 For comparison purposes, the typical bore/receiving pit depth on the PPP Project and generally considered technically feasible ranges from 10 to 15 feet, thus the required bore pit depths would be unacceptable from both a technical and safety perspective without site-specific engineered design. Even with the use of shoring or sheet pile for the bore pits, the back slopes to each side of the bore are required to be cut back at 1:0.75 slopes for worker safety. Therefore, large areas of additional temporary workspace (ATWS) would be required outside of (typically adjacent to) the bore pits for temporary storage of excavated spoil, which may not be accommodated (technically feasible) at the south exit hole due to the workspace constraints previously discussed. In addition, as previously discussed, the Direct Pipe Bore exit holes (for the 16-inch and 20-inch pipeline installations) would be excavated on the south side of the "crossing area" within (located on top of and excavated into) the septic system leach field (which is not technically feasible). Therefore, use of this construction method is not technically feasible due to public health (sanitary) and safety concerns, may not be technically feasible due to workspace (ATWS) constraints, and also is not preferred due to unsuitable bore pit depths and associated worker safety and other logistical concerns.

Upgradient Pond

An existing, stream-fed, manmade pond (P1r) is located approximately 30 feet east of the Eastern Reroute alignment construction right-of-way and approximately 45 feet east of the eastern edge of the (15- to 20-foot deep) exit hole bore pit on the south side of the aquatic resources "crossing area." The manmade pond also is located upgradient of (at a higher elevation than) the construction right-of-way. The subsurface profile (angle of repose) of the downslope pond wall is unknown, such that the supporting wall structure

may extend into the construction right-of-way. As a result, excavation of a deep exit hole bore pit may encounter the downslope pond wall and compromise the structural integrity of the pond, resulting in downslope seepage or flooding of pond water (and upstream feed waters) into the bore pit, thereby causing a risk to worker safety, integrity (collapse) of the bore pit walls, and ultimately failure of the bore. Boring activities cause vibration, as well as require bore pit dewatering using well points to dewater the surrounding groundwater table that may in turn support the downslope pond wall, both of which may compromise the integrity of the downslope pond wall. As a result, use of the Direct Pipe Bore construction method is not preferred due to the risks (worker safety, seepage or flooding, integrity of bore pit walls, bore failure) associated with the upgradient manmade pond.

Underlying Geology and Groundwater Management Concerns

If sufficient workspace were available, use of the Direct Pipe Bore construction method (where the casing supports the bore hole during the boring process) presents a potential but likely limited risk of failure and IRs, even with the native soils having poor structure that are fragile and unstable (see CAB construction method for additional detail on native soils). However, due to the position of the Direct Pipe Bore entry/exit holes in relation to the subject aquatic resources (even with a 50-foot setback), upgradient pond, and septic system leach field, it is highly likely that the bore pits will be saturated (below the water table) and require ongoing trench water dewatering and discharge during the entire period of construction, as was experienced during the nearby failed HDD attempt adjacent to PA Turnpike 76, which in turn represents a significant risk of bore hole collapse, safety hazards, and risk of failure. As a result, use of the Direct Pipe Bore construction method is not practicable taking into consideration existing technology (requirement for bore holes) and logistics (groundwater management, safety hazards, and risk of failure).

Conclusion

Based on the results of this evaluation, although there are additional considerations that present significant to substantive risks of failure (i.e., geology, groundwater) and further reduce practicability (i.e., additional logistical concerns, cost), use of the Direct Pipe Bore construction method for the aquatic resources "crossing area": 1) is not a technically feasible alternative; and 2) therefore, is not a practicable alternative taking into consideration existing technology and logistics. Therefore, the Direct Pipe Bore construction method is not the preferred or selected alternative for this crossing location.

Jack Bore/Hammer Bore Alternative

SPLP evaluated the use of the jack or hammer bore construction methods for an approximately 180-foot-long aquatic resource crossing area for crossing of WL-Q76 and S-Q83 (for installation of both the 16- and 20-inch pipelines) within the proposed Eastern Reroute alignment permanent right-of-way, and determined this trenchless crossing alternative **is neither technically feasible nor practicable** due to the limitations of this existing technology, as discussed below.

Jack or hammer bores are a non-steerable pit launched horizontal or directional means of pushing casing pipe using repeated percussive blows using a ramming tool powered by hydraulic forces to install pipes, conduits, or cables. The hydraulic tool (jack or hammer) uses water, synthetic fluid, or compressed air to push the tool and casing through the subsurface. The exterior of the casing is lubricated during operations by water, or a bentonite/water slurry to prevent binding or sticking to the surrounding subsurface. The cuttings are contained in the casing and removed by gravity and vibration or after pull back of the pipe, conduit, or cable. Like conventional auger bores, jack or hammer bores are subject to deflection by rock geology, rocks/boulders in the subsurface, or other unknown hard objects in the bore path.

The jack bore or hammer bore construction methods are specifically designed, or intended to be used, for boring hard rock substrates, such as bedrock, rock, or boulders, as well as under existing structures, such as roads or railroads. Use of the jack bore or hammer bore construction methods generally are not suitable (technically feasible) for boring through continuous soft soils with poor structure, as are present at the aquatic resource "crossing area" (see CAB Alternative). Therefore, the jack bore or hammer bore construction methods are not the preferred or selected alternative for this crossing location.

Conventional Auger Bore (CAB) Alternative

SPLP evaluated the use of the CAB construction method for an approximately 180-foot-long aquatic resource crossing area for crossing of WL-Q76 and S-Q83 (for installation of both the 16- and 20-inch pipelines) within the proposed Eastern Reroute alignment permanent right-of-way, and determined this trenchless crossing alternative **is neither technically feasible nor practicable** due to the limitations of this existing technology, as discussed below.

As previously noted, the Eastern Reroute generally has by far less impact on wetlands, streams, and floodways than the Western Reroute (see **Figures 2 and 3**, and **Table 1).** Specifically, the Eastern Reroute would reduce the number and acreage of open cut construction method aquatic resource crossings (in the aquatic resources "crossing area" located approximately 0.5-mile northwest of Styer Road) to one stream (S-Q83), one wetland (WL-Q76), and the floodways of three streams (S-Q83, S-16r, and S-Q84). Compared to the Eastern Reroute-Open Cut Resources alternative, the CAB construction method would slightly further reduce impacts to wetlands (0.047-acre reduction), streams (190-square foot reduction), and floodways (0.081-acre reduction). **Tables 4a and 4b** present the detailed quantitative aquatic resource impacts for the Eastern Reroute-Bore Resources alternative.

Table 4a. Eastern Reroute-Bore Resources Alternative Impacts on Wetlands.

Wetland	Crossing Method	Cowardin Classification [1]	Exceptional Value (EV) Designation	Wetland Temp Impact (acres) [3]	Wetland Perm Impact (acres) [3]	PFO Cover Type Conversion [1,2] (acres)
Q76	Bore	PEM	Yes[4]	0 (0.039)	0 (0.006)	n/a
Q76	Bore	PFO	Yes	0 (0)	0 (0)	0.004

[1] PEM = palustrine emergent, PSS = palustrine scrub-scrub, PFO = palustrine forested, n/a = not applicable.
[2] Permanent conversion of PFO cover type to PEM cover type due to maintenance of permanent ROW.
[3] Use of the CAB construction method avoids direct wetland impacts; therefore, impacts are denoted as zero ("0"). Parentheses denote PADEP impact calculations for the area of pipeline installed beneath the wetlands.
[4] In its technical deficiency letter dated May 27, 2020, the Department noted that WL-Q76 is classified as an EV wetland.

Table 4b. Eastern Reroute-Bore Resources Alternative Impacts on Waterbodies.

Stream	Crossing Method	Stream Dist. Length in Perm ROW (feet)	Stream Dist. Length in Temp ROW (feet)	Stream Perm Impact (square feet)[1]	Stream Temp Impact (square. feet) [1]	Ch. 105 Perm Floodway Impact (acres) [1]	Ch. 105 Temp Floodway Impact (acres) [1]
S-Q83	Bore	0	26	15	130	0.008	0.107
S16r	Bore Floodway	n/a	n/a	n/a	n/a		
S-Q81	Open Cut Floodway	n/a	n/a	n/a	n/a	0.170	0.169
S-Q200	Open Cut Floodway	n/a	n/a	n/a	n/a		
S-H52	Dry Crossing	51	26	2,295	1,170		

[1] Use of the CAB construction method avoids direct stream impacts; therefore, impacts are denoted as zero ("0"). Parentheses denote PADEP impact calculations for the area of pipeline installed beneath the streams and clearing workspaces that impacts the streams' floodways.

However, as discussed above for the Direct Pipe Bore construction, use of the CAB construction method would be subject to the same constraints and hazards, including but not limited to: insufficient workspace, public health (sanitary) and safety hazards associated with the septic system/leach field, unsuitable elevation profile and bore pit depths, potential intersection with upgradient pond wall and resulting flooding/safety hazards, and underlying geology and groundwater management concerns. Therefore, use of this construction method is not technically feasible at the aquatic resource "crossing area."

In addition, use of the CAB construction method uses an auger that excavates the soil/rock ahead of the pipe casing and then the casing is pushed into the bored hole, meaning the casing does not support the hole as it is bored (in contrast to the Direct Pipe Bore construction method where the casing supports the bore hole). Therefore, soils will poor structure that are fragile and unstable present a significant risk of not only IRs, but also bore hole collapse and in turn subsidence of the soil and features above the bore hole. Based on the nearby failed HDD construction method attempt, the aquatic resource "crossing area" native soils primarily consist of unconsolidated materials (e.g., fine sand, sand, fine gravel, cobble) and as a result have very poor structure. Therefore, use of the CAB construction method across these aquatic resources (with a bore hole at much shallower depth than the failed HDD) presents a significant risk of IRs, bore hole collapse, and feature subsidence or collapse, as was experienced during the attempted but failed HDD construction method (at much greater depth). This represents a particular risk for stream bed collapse, as was experienced at WL-C6 (Spread 5, Wyomissing County) which ultimately was converted to a dam-and-pump bypass construction method. In addition, use of the CAB construction method in these poor structure soils presents a significant risk for the loss of auger bore tooling and downward drifting of the bore hole below the targeted trajectory, and ultimate failure of the attempted bore. Therefore, use of the CAB construction method presents a significant risk for failure, bore hole collapse, and aquatic feature collapse, that would not only result in increased environmental impacts to WL-Q76 and S-Q83 compared to use of the open cut construction method, but also is not considered a practicable alternative taking into consideration existing technology.

Finally, due to the position of the CAB bore holes in relation to the subject aquatic resources (even with a 50-foot setback), it is highly likely that the bore pits will be saturated (below the water table) and require ongoing trench water dewatering and discharge during the entire period of construction, as was experienced during the failed HDD attempt, which in turn represents a significant risk of bore hole collapse, safety hazards, and risk of failure. As a result, use of the CAB construction method is not practicable taking into consideration existing technology (requirement for bore holes) and logistics (groundwater management, safety hazards, and risk of failure).

Based on the results of this evaluation, although there are additional considerations that present significant to substantive risks of failure (i.e., geology, groundwater) and further reduce practicability (i.e., additional logistical concerns), use of the CAB construction method for the aquatic resources "crossing area": 1) is not a technically feasible alternative; and 2) therefore, is not a practicable alternative taking into consideration existing technology and logistics. Therefore, the CAB construction method is not the preferred or selected alternative for this crossing location.

Open Cut Construction Method Alternative

SPLP evaluated the use of the open cut construction method with dam and pump bypass stream crossing for an approximately 180-foot-long aquatic resource "crossing area" of WL-Q76 and S-Q83 (for installation of both the 16- and 20-inch pipelines) within the proposed Eastern Reroute alignment permanent right-of-way, and determined this trenchless crossing alternative **is technically feasible and practicable** based on the requirements of this existing technology and site-specific design considerations, as discussed below.

As previously noted, the Eastern Reroute generally has by far less impact on wetlands, streams, and floodways than the Western Reroute (see **Figures 2 and 3**, and **Table 1).** Specifically, the Eastern Reroute would reduce the number and acreage of open cut construction method aquatic resource crossings (in the aquatic resources "crossing area" located approximately 0.5-mile northwest of Styer Road) to one stream (S-Q83), one wetland (WL-Q76), and the floodways of three streams (S-Q83, S-16r, and S-Q84). Compared to the Eastern Reroute-Bore Resources alternative, the open cut construction method would have virtually identical, but slightly increased, impacts to wetlands (0.047-acre increase), streams (190-square foot increase), and floodways (0.081-acre increase). **Tables 5a and 5b** present the detailed quantitative aquatic resource impacts for the Eastern Reroute-Open Cut Resources alternative.

Table 5a. Eastern Reroute-Open Cut Resources Alternative Impacts on Wetlands.

Wetland	Crossing Method	Cowardin Classification [1]	Exceptional Value (EV) Designation	Wetland Temp Impact (acres)	Wetland Perm Impact (acres)	PFO Cover Type Conversion [1,2] (acres)
Q76	Open Cut	PEM	Yes[3]	0.002	0.084	n/a
Q76	Bore	PFO	Yes	0	0 (0.004)	0

[1] PEM = palustrine emergent, PSS = palustrine scrub-scrub, PFO = palustrine forested, n/a = not applicable.
[2] Permanent conversion of PFO cover type to PEM cover type due to maintenance of permanent ROW.
[3] In its technical deficiency letter dated May 27, 2020, the Department noted that WL-Q76 is classified as an EV wetland.

Table 5b. Eastern Reroute-Open Cut Resources Alternative Impacts on Waterbodies.

Stream	Crossing Method	Stream Dist. Length in Perm ROW (feet)	Stream Dist. Length in Temp ROW (feet)	Stream Perm Impact (square feet)	Stream Temp Impact (square feet)	Ch. 105 Perm Floodway Impact (acres)	Ch. 105 Temp Floodway Impact (acres)
S-Q83	Dry Crossing	64	0	320	0	0.158	0.069
S16r	Open Cut Floodway	n/a	n/a	n/a	n/a		
S-Q81	Open Cut Floodway	n/a	n/a	n/a	n/a	0.170	0.169
S-Q200	Open Cut Floodway	n/a	n/a	n/a	n/a		
S-H52	Dry Crossing	51	26	2,295	1,170		

Moreover, the open cut construction method is technically feasible for use for the aquatic resource "crossing area", including the implementation of SPLP's Project-wide and site-specific impact avoidance and minimization measures (see Other Impact Avoidance and Minimization Measures). Specifically, although somewhat constrained by aboveground and buried infrastructure (as discussed for the Other Trenchless Construction Methods), sufficient workspace is available within the proposed Eastern Reroute alignment permanent right-of-way to support construction equipment and materials, travel lanes (across WL-Q76 and S-Q83), equipment bridge (across S-Q83), and additional temporary workspace located outside of aquatic resource boundaries. Due to the nature of the open trench construction method, which uses direct excavation from the ground surface and avoids boring/drilling methods that use drilling fluids, this method avoids potential risks of IRs and bore hole collapse, and minimizes the potential for aquatic feature subsidence or collapse, as was experienced during the nearby attempted but failed HDD construction method (at much greater depth). Due to the relatively shallow excavation depth of the open trench construction method compared to the depth of trenchless construction method bore/entry pits, use of this method is likely to encounter less groundwater and require a lower volume and/or frequency of trench dewatering and discharge. Although additional caution is required to ensure a clear trench excavation path to avoid the septic system leach field, the open cut construction method uses more controlled direct excavation from the ground surface along the proposed pipeline alignments to be placed parallel to and offset from the known location of the leach field.

With the implementation of SPLP's Project-wide and site-specific impact avoidance and minimization measures (see Other Impact Avoidance and Minimization Measures), use of the open cut construction method with dam and pump bypass stream crossing will result in impacts to WL-Q76 and S-Q83 that will be minor and temporary, and are considered not significant or adverse, as well as avoid or minimize impacts on wetland, stream, other environmental, and human environment resources to the maximum extent practicable within the proposed alignment right-of-way.

As an additional level of precaution and best management practice, SPLP proposes to excavate a single trench for installation of both the 16- and 20-inch pipelines, including for the proposed dam and pump bypass crossing of S-Q83, if subsurface geological and soil conditions allow. In this case, to minimize

workspace requirements, the two pipes will be installed in parallel in the single trench with the minimum separation distance required. In any event, the stream crossing will be the last activity conducted in the "crossing area" as a tie-in with the adjacent interconnecting pipelines. Construction (trench excavation) of the stream crossing will not begin until both the 16- and 20-inch pipeline strings are completely welded in an adjacent upland area, and once installed the crossing will be immediately tied-in, backfilled, restored to original contours, stabilized, and all materials (equipment bridge, timber mats, etc.) removed to complete and clean up the crossing area. This site-specific plan will minimize the duration of in-stream construction activities and expedite post-construction restoration of the stream, wetland, and adjacent upland areas.

Conclusion

Based on the results of this evaluation, SPLP determined the use of the open cut construction method is a technically feasible alternative within the proposed Eastern Reroute alignment construction right-of-way. In fact, given other (non-HDD) trenchless construction methods were determined to be not technically feasible, the open cut construction method is the only technically feasible alternative within the proposed Eastern Reroute alignment permanent right-of-way taking into consideration existing technology and logistics. SPLP also designed the site-specific open cut construction method to avoid or minimize impacts on environmental and human environment resources, and determined this method is the most effective and practicable means for installing the pipelines taking into consideration existing technology and logistics.

Other Impact Avoidance and Minimization Measures

In its technical deficiency letter dated May 27, 2020, the Department stated that the alternative analysis must full assess other impact avoidance and minimization measures. As presented in the original Chapter 105 and Chapter 102 permit applications, associated plans and procedures, and the Project-wide Alternatives Analysis, SPLP incorporated numerous programmatic routing/siting, over 40 wetland crossing, and over 60 waterbody crossing industry-standard and agency required or recommended impact avoidance and minimization best management practices (construction and restoration procedures or measures), which have been applied on a programmatic, project-wide, and site-specific basis on the PPP Project. These applications and associated best management practices (measures) are incorporated herein by reference, and include, but are not necessarily limited to, the measures and associated resultant impact avoidance and minimization effects presented below.

Project-Wide Programmatic Impact Avoidance and Minimization Measures

As part of its initial Project-wide programmatic planning and routing approach, SPLP adopted the following programmatic impact avoidance and minimization measures, as detailed in the original Project-wide Alternatives Analysis (see Section 3.0), and used these same procedures when developing the PA Turnpike 76/280 HDD reroute.

Best Management Practice (Measure)	**Impact Avoidance and Minimization**
Initial/Detailed Pipeline Routing – Initial and detailed route selection co-located (abut and/or overlap) an existing SPLP right-of-way or other existing utility corridors (in accordance with the Governor's Pipeline Infrastructure Task Force Report, USFWS, and other federal, state, and local agency recommendations).	• Major means to **avoid** environmental impacts and impacts to sensitive resources and communities. • Major means to **minimize** the site-specific and cumulative environmental impacts arising from the Project.
Major Route Alternatives – Initial and detailed evaluation and adoption of major route alternatives in areas of obvious constraints and impacts (congested areas with major infrastructure, communities, and sensitive resources.	• Major means to **avoid** significant, and further **avoid** and **minimize,** impacts on environmentally sensitive resources, such as large population centers, scenic areas, wildlife management areas, or cultural/historically significant resources proposed to be crossed by the Project, and/or improve public health and safety.
Programmatic Impact Reduction Measures – Incorporation of the following programmatic impact avoidance and minimization measures into the Baseline Route Alternative:	As presented in the original Project-wide Alternatives Analysis, Table 1, adoption of these Programmatic Impact Reduction Measures into the Baseline Route

• Reduction of pipeline construction right-of-way from 100-foot-wide to 75-foot-wide in upland areas. • Narrowing of pipeline construction right-of-way from 100-foot-wide to 50-foot-wide at wetland and waterbody crossings. • Change from conventional wet open cut construction method to dry open cut construction methods across all wetlands and waterbodies. • Proposed Route Alternative – adoption of Minor Route Variations and Trenchless Construction Methods across the Baseline Route Alternative. • Cumulative Impact Reduction – the resultant cumulative impact reduction from the Baseline Route Alternative to the Proposed Route Alternative.	Alternative, where practicable, resulted in a cumulative avoidance and minimization of Project-wide impacts on: • EV wetland crossings (reduced by 43 crossings or 23.8%); • EV wetland areal extent (reduced by 20.9 acres or 65.1%); • Other wetland areal extent (reduction by 61.3 acres or 70.6 percent); • PFO wetland areal extent (reduction by 33.7 acres or 95.7 percent); • HQ and EV stream crossings (reduction by 20,622 linear feet or 58.9 percent); • Non-HQ and EV stream crossings (reduction by 50,817 linear feet or 56.8 percent); • Cumulative impact reduction to wetlands by 69.1 percent and to streams by 57.3 percent.

As further stated in the original Project-wide Alternatives Analysis (see Section 4.0), constructing and operating a natural gas liquids pipeline is not, per se, a water-dependent project. However, because of Pennsylvania's abundant water and wetland resources, any project which travels approximately 300 miles east-west across the Commonwealth requires the crossing of, and therefore access to, waters and wetlands. The Project requires access and proximity to and siting in, on, over or under waters and wetlands in order to achieve its primary purpose to transport natural gas liquids from Houston, Washington County to SPLP's existing facility in Marcus Hook, Delaware County. Therefore, the linear nature and approximately 300-mile length of the Project across 17 counties east-west in Pennsylvania makes the Project water-dependent.

Following SPLP's initial Project-wide programmatic planning and routing approach and SPLP adoption of the above programmatic impact avoidance and minimization measures, the analysis set forth in the original Project-wide Alternatives Analysis concluded that there is no practicable alternative to each of the crossings to waters and wetlands that would have less effect on each water or wetland, and not have other significant adverse effects on the environment, taking into consideration construction costs, existing technology and logistics.

Given the water dependency of the Project, SPLP proposed and incorporated over 40 wetland crossing and over 60 waterbody crossing industry-standard and agency required or recommended impact avoidance and minimization best management practices (construction and restoration procedures or measures) to further avoid or minimize impacts to these aquatic resources on a programmatic, project-wide, and site-specific basis on the PPP Project. These measures include, but are not necessarily limited to, those detailed in the original Chapter 105 permit application's Impact Avoidance, Minimization, and Mitigation Procedures (Attachment 11: Enclosure E, Part 4), Erosion & Sedimentation Control Plan (Attachment 12), and other plans and procedures incorporated herein by reference. The following sections provide a summary of the Impact Avoidance, Minimization, and Mitigation Procedures related to wetlands and waterbodies that SPLP is committed to implementing on the proposed reroute.

Project-Wide Wetland Crossing Impact Avoidance and Minimization Measures

The following Impact Avoidance, Minimization, and Mitigation Procedures (see Section 9.0) apply to use of the open trench construction method across wetlands on a programmatic, project-wide, and site-specific basis.

Best Management Practice (Measure)	**Impact Avoidance and Minimization**
Expedited Construction – Expedite construction in and around wetlands by implementing the construction methods itemized within Section 9.2 of the Impact Avoidance, Minimization, and Mitigation Procedures. The duration of construction in wetlands will vary	Expediting wetland construction activities to the shortest duration practicable **minimizes all potential direct and indirect impacts** associated with the crossing, including but not limited to: establishment of travel lane with timber mats, in-wetland construction equipment, soil

depending on the length of the wetland, whether it will be tied in with an associated stream crossing (in which case the crossing duration will be the same as that stream crossing), or whether it will be constructed as part of the mainline construction process (in which case spoil will typically not be sidecast in wetlands for more than 30 days, in accordance with the standard USACE requirements), and other factors.	compaction, trenching, maintenance of segregated topsoil and subsoil, sidecasting of trench spoil, dewatering, discharge of trench water, backfiling, return and stabilization of pre-construction contours and hydrology, and restoration and revegetation.
Timing Restrictions – There are no noted timing restriction windows on crossing any of the wetland areas on the Project.	Not applicable.
Wetland Construction Methods (Open Cut) – The following is a list of construction methods generally applicable for all wetland crossings that will be open-cut:	
• Mark the limits of the wetland with high visible flagging and post "Protected Resource" and "No Refueling" signs within 100 feet of wetlands.	• **Avoids** treating the wetland as an upland. • Clearly demarcates wetland boundaries to **avoid** potential encroachment of construction activities in wetlands. • **Avoids** contamination in wetland soils from construction equipment fuels. • **Minimizes** the potential for secondary impacts to wetlands from construction activities.
• Place orange safety fence between the limit of disturbance (LOD) and adjacent wetlands.	• **Avoids** treating the wetland as an upland. • Clearly demarcates wetland boundaries to **avoid** potential encroachment of construction activities in wetlands. • **Minimizes** the potential for secondary impacts to wetlands from construction activities.
• Stabilize wetland travel lane approaches.	• **Avoids** sedimentation and erosion in wetlands, thereby **minimizing** efforts to achieve post-construction restoration to pre-construction contours.
• Material storage areas shall be located at least 100 feet away from the wetland edge.	• **Minimizes** the potential for debris and contaminants from storage areas to reach wetlands.
• Attempt to use no more than two layers of timber mats to stabilize the construction ROW.	• **Avoids** direct rutting of wetland soils and **minimizes** wetland soil compaction, thereby **minimizing** efforts to achieve post-construction restoration to pre-construction contours.
• Cut vegetation off at ground level leaving existing root systems in place and remove cut vegetation from the wetland for disposal.	• Allows for continued stabilization of soil by existing root systems to **minimize** erosion/loss of native soils. • **Minimizes** efforts to achieve post-construction restoration to pre-construction contours.
• Limit pulling of tree stumps and grading activities to directly over the trench line unless safety concerns require the removal of stumps from the working-side of the construction ROW.	• Allows for continued stabilization of soil adjacent to the trench line to **minimize** erosion/loss of native soils. • **Minimizes** efforts to achieve post-construction restoration to pre-construction contours. • **Avoids** creating a safety hazard from destabilized ground adjacent to the trench line.
• Segregate the topsoil from the area disturbed by trenching in unsaturated wetlands.	• **Avoids** loss of topsoil, native plant seedbank in topsoil, and native plant root structures, thereby allowing replacement of topsoil and **minimizing** efforts to achieve post-construction revegetation.
• Install temporary timber mats along the travel lane. Equipment will work from the mats.	• **Avoids** direct rutting of wetland soils and **minimizes** wetland soil compaction, thereby **minimizing** efforts to achieve post-construction restoration to pre-construction contours.
• Spread Professional Geologist will advise on maintaining the hydrology of adjacent areas through installation of drains/flumes and/or pumps if seeps essential to adjacent area hydrology are encountered.	• **Avoids** adverse impacts to adjacent wetland hydrology. • **Minimizes** effort to achieve successful restoration by maintaining post-construction wetland hydrology in areas temporarily impacted by pipeline construction.

• Assemble pipe in upland areas unless wetland is dry enough to adequately support skids and pipe.	• **Avoids** and/or **minimizes** the need for equipment traffic in wetland. • **Minimizes** duration of construction activities in wetland. • **Avoids** rutting of wetland soils and/or placement of timber mats in wetlands, thereby **minimizing** temporary disturbance in the wetland.
• If streams are present implement dry crossing methods.	• **Avoids** altering stream flow during construction by maintain flow via dam and pump, flume, etc. • Isolate construction area and thereby **minimize** downstream sedimentation, erosion, and turbidity during excavation/installation of pipeline.
• Restoration activities within wetlands (See typical wetland restoration) shall begin immediately after backfilling, weather permitting.	• **Minimizes** the duration of destabilized areas that could contribute to sedimentation and erosion in wetland. • **Minimizes** the time necessary for successful restoration.
• No soil amendments such as agricultural lime or fertilizer will be used within the wetland areas.	• **Avoids** altering wetland soil and water chemistry which could impede successful restoration. • **Avoids** the potential for water quality degradation in wetland that could change plant and aquatic fauna composition. • **Avoids** the potential for downstream water quality degradation.
• Restore wetlands to the original contours and surface flow.	• **Avoids** impacts to wetland hydrology, thereby **minimizing** the potential for unsuccessful restoration.
• Bulldozers will not be used for clearing. Trees and brush will be cut by hand at ground level by chain saws or low ground pressure equipment or with equipment that does not cause excessive rutting of topsoil or with equipment supported by mats (timber mats, high-density polyethylene [HDPE] composite or similar).	• **Avoids** direct rutting of wetland soils and **minimizes** wetland soil compaction, thereby **minimizing** efforts to achieve post-construction restoration to pre-construction contours.
• The minimum clearing necessary to safely construct the pipeline will be done. Mats or pads may be placed over the top of existing vegetation, including shrubs, where possible.	• **Minimizes** disturbance to soils. • **Minimizes** disturbance to wildlife that use vegetation. • Mats or pads **avoid** direct rutting of wetland soils and **minimizes** wetland soil compaction, thereby **minimizing** efforts to achieve post-construction restoration.
• All cut timber and brush will be removed from the wetlands. Grindings will be removed as much as practical. Debris and stumps will not be buried.	• **Avoids** inadvertent fill in wetland which could impede restoration. • **Avoids** burying of debris and stumps, thereby avoiding significant soil disturbance that could impede restoration efforts. • **Minimizes** the potential for introduction of nuisance or exotic species that benefit from disturbed areas such as cut timber and brush piles. • **Avoids** habitat alteration that could make the wetland less suitable for wildlife use.
• Contractors shall be required to install completed mat travel lane for pipeline construction during the time Contractor's clearing crew (does not mean tree felling) is performing its work.	• **Avoids** direct rutting of wetland soils and **minimizes** wetland soil compaction, thereby **minimizing** efforts to achieve post-construction restoration to pre-construction contours. • Limits temporary impacts from construction equipment ingress/egress to a defined travel lane instead of numerous random travel lanes, thereby **minimizing** impacts to wetlands.
• Prior to grading, topographic elevations shall be recorded so that original contours can be achieved during restoration. Unnatural features and unstable	• Ensures original contours can be achieved, thereby **minimizing** efforts to achieve post-construction restoration to pre-construction contours.

grades shall be noted by the Environmental Inspector (EI).	• **Minimizes** the potential for unsuccessful restoration.
• Orange fencing, compost filter stock (CFS), and erosion control measures shall be installed prior to grading at all wetland crossings.	• **Minimizes** the potential for erosion and sedimentation in wetlands during construction.
• Grading will be limited to the areas directly over the trench line except where topography requires additional grading for safety reasons. When grading is required, topsoil with the root mass will be stripped, segregated and returned as an even layer to all graded areas.	• **Minimizes** the amount of grading necessary to achieve post-construction restoration to pre-construction contours. • **Avoids** loss of topsoil and native plant root structure/seedbank in topsoil, thereby allowing replacement of topsoil and **minimizing** efforts to achieve post-construction revegetation.
• Permanently stabilizing upland areas near wetlands shall occur as soon as possible after backfilling.	• **Avoids** erosion and sedimentation in wetlands. • **Minimizes** the duration of destabilized areas to contribute to erosion or sedimentation in wetlands.
• Before and during trenching the Spread's Professional Geologist will be consulted in regards to the presence of groundwater confining layers (e.g., rock, clay, fragipan) and the presence of groundwater seeps and drains. Segregation of the confining layers is to be conducted and, if necessary and practicable to maintain the hydrology of adjacent areas, seeps and drains are to be temporarily flumed. Confining layer conditions are to be restored to the original condition to the maximum extent under guidance of the spread hydrogeologist.	• **Avoids** adverse impacts on wetland hydrology. • **Minimizes** effort to achieve successful restoration by maintaining post-construction wetland hydrology in areas temporarily impacted by pipeline construction.
• Erosion Control Blanket (ECB) shall be installed 50 feet from wetland edge in non-special protection waters and 100 feet in Special Protection waters.	• **Avoids** erosion and sedimentation in wetlands, thereby **minimizing** efforts to achieve post-construction restoration to pre-construction contours.
• Waterbars are to be placed 50 feet from the top of bank except as noted on site specific plan drawings.	• Diverts potential stormwater overland flow from adjacent disturbed upland slopes to **avoid** erosion and **minimizes** potential discharge of turbidity and suspended sediment to adjacent or nearby wetland.
• Mark the top of streambank with high visible flagging and post resource and no refueling signs within 100 feet of top of streambank.	• Clearly demarcates streambank boundaries to **avoid** potential encroachment of construction activities in streams. • **Avoids** contamination in surface waters and soils of streams.
• Material storage areas shall be located at least 100 feet away from wetland edge.	• **Minimizes** the potential for debris and contaminants from storage areas to reach streams.
• Any excess fill material must be removed and not spread within the wetland.	• **Avoids** alteration of wetland grade and hydrology that could convert the wetland to an upland or reduce the functions provided by the wetland. • **Minimizes** the potential for unsuccessful restoration. • **Minimizes** efforts to achieve post-construction restoration to pre-construction contours.
Wetland Restoration Methods (Open Cut) – The following is a list of restoration methods generally applicable for all wetland crossings that will be open-cut:	
• Backfill trench; where soils were segregated, replace in order of removal (consult Spread Professional Geologist prior to and during backfilling).	• **Avoids** loss of topsoil, native plant seedbank/root structures, and soil composition thereby **minimizing** efforts to achieve post-construction revegetation.
• At wetlands determined to require confining layer restoration, the spread Professional Geologist will be on-site during wetland backfilling to ensure proper soil layer restoration. The hydrogeologists will advise on bentonite sandbag layering along the entire or portions of the trench line at the appropriate height.	• **Avoids** impacts to wetland hydrology, thereby **minimizing** the potential for unsuccessful restoration. • Ensures topsoil with native plant seedbank/root structure is restored, thereby **minimizing** effort to achieve post-construction revegetation.

• Once backfilling is complete, remove temporary timber matting and all construction debris and restore original grades.	• **Minimizes** efforts to achieve post-construction restoration to pre-construction contours.
• Restoration activities shall begin immediately after backfilling. Temporarily revegetate all impacted wetlands in accordance with plan sheet ES-0.05 to allow rapid stabilization and deter invasive species.	• **Minimizes** the duration of temporary disturbances to the wetland. • **Avoids** erosion of topsoil with native plant seedbank/root structures. • **Minimizes** the potential for establishment of invasive and exotic species in the wetland.
• Permanently revegetate impacted palustrine emergent (PEM) wetlands in accordance with plan sheet ES-0.05 that calls for Ernst Conservation Seed Mix No. ERNMX-122 Facultative Wet (FACW) Meadow Mix. Plant during the recommended planting season.	• **Minimizes** the duration of temporary disturbances to the wetland. • **Minimizes** the potential for erosion of topsoil with native plant seedbank/root structures. • **Minimizes** the potential for establishment of invasive and exotic species in the wetland.
• Temporary or permanent revegetation is not necessary in areas of standing water.	• **Avoids** transport of temporary or permanent vegetation to downstream areas where establishment of vegetation might not be appropriate.
• No soil amendments, lime, fertilizer or binding agents are to be used in wetland areas.	• **Avoids** altering wetland soil and water chemistry which could impede successful restoration. • **Avoids** the potential for water quality degradation in wetland that could change plant and aquatic fauna composition. • **Avoids** the potential for downstream water quality degradation.
• Impacted palustrine scrub-shrub (PSS) wetland areas where noted on plan sheets will be planted with shrub species in accordance with ES-0.05. Plant during the recommended planting season.	• **Minimizes** the duration of temporary disturbances to the wetland. • **Minimizes** the potential for establishment of invasive and exotic species in the wetland.
• Impacted PSS wetland areas where the root system was not removed (e.g., matted over) do not require replanting.	• In-tact root system **avoids** erosion and sedimentation.
• Impacted palustrine forested (PFO) wetlands areas where noted on plan sheets for restoration will be planted with the tree species in accordance with ES-0.05.	• **Minimizes** the duration of temporary disturbances to the wetland. • **Minimizes** the potential for establishment of invasive and exotic species in the wetland.
• PSS and PFO restoration areas will be protected with "no-mow" signs or other restrictive barriers as determined by SPLP.	• **Avoids** conversion of restored shrub or forested wetlands to herbaceous wetlands. • Prevents mowing from occurring within these areas, to **avoid** habitat disturbance in the restored shrub and forested wetlands.
• Monitor all wetlands for successful restoration.	• Ensures successful restoration in wetlands, thereby **minimizing** the duration of temporary disturbances to wetlands and **avoiding** loss of wetland cover type values and functions.

Project-Wide Waterbody Crossing Impact Avoidance and Minimization Measures

The following Impact Avoidance, Minimization, and Mitigation Procedures apply to use of the open trench construction method across streams on a programmatic, project-wide, and site-specific basis.

Best Management Practice (Measure)	**Impact Avoidance and Minimization**
Expedited Construction – SPLP will generally complete in-stream work in minor waterbodies (<10 feet wide) within 24 hours, and in major waterbodies (10 to 100 feet wide) within 48 hours. These timeframes will not be affected by hydrostatic testing, since the trenches do not remain open during hydrostatic testing. Backfilling of trenches and completion of construction in	• Expediting waterbody construction activities to the shortest duration practicable **minimizes all potential direct and indirect impacts** associated with the crossing, including but not limited to: establishment of temporary equipment bridge and travel lane, in-stream bed/bank/bed trenching (excavation), segregation of native stream materials, dewatering, discharge of

waterbodies will occur per the timeframes indicated and well in advance of hydrostatic testing which occurs once the mainline pipeline per spread is completely installed in one contiguous linear segment (i.e., in ground, backfilled to adjacent grade). The durations of the stream crossings are indicated within the E&S Plan notes/details.	trench water, backfiling, return and stabilization of pre-construction contours and hydrology, and restoration and revegetation.
Timing Restrictions – The time of year of in-stream work at waterbody crossings shall be restricted in accordance with correspondences with the PAFBC. All of the most current trout stream restrictions assembled directly from these correspondences are noted on the E&S Plans and aerial site plans.	• Compliance with agency-required time of year in-stream restrictions **avoids and/or minimizes** potential in-stream and downstream direct and indirect impacts on protected trout species and other aquatic life.
In accordance with these correspondences, temporary bridges with disturbances below the ordinary high water mark may be constructed, left in place, and used during the restriction period, if the bridge is installed prior to the restriction period and removed after the restriction period. This includes the installation of in-stream bridge supports.	• **Avoids and/or minimizes** potential in-stream and downstream direct and indirect impacts on protected trout species and other aquatic life.
Equipment bridges installed with limiting the disturbance to above the ordinary high water mark can be installed, used, and removed during the restriction period, however installation and removal is preferred to be conducted outside of the restriction period.	• **Avoids and/or minimizes** in-stream and downstream direct and indirect impacts on protected trout species and other aquatic life.
Dry Waterbody Construction Methods (Open Cut) – The following is a list of dry crossing construction methods generally applicable for all stream crossings that will be open-cut:	
• Dry crossing construction methods will be used at every open cut stream crossing on the PPP Project. Dry stream crossing methods involve in-stream excavation and continuous water flow in the stream, but construction techniques allow the water to be isolated and conveyed cleanly downstream, either through or around the construction area.	• **Avoids** in-stream construction under wet open trench conditions Project-wide and **minimizes** potential downstream turbidity and suspended sediment and potential resultant temporary and minor (not significant or adverse) indirect impacts on the aquatic environment associated with the wet open trench construction method.
• Dry crossing methods include the Pump Bypass, Flume, Cofferdam, or Dry Open-cut crossing methods. Selection of which dry method will be used will be determined in the field at the time of crossing, by the Contractor and SPLP's Environmental Inspector as conditioned below. The method selected will be the method that is best suited to the physical stream conditions, provides the least disturbance, and ensures the most expedient crossing to minimize overall impact.	• Ensures selection and use of the most applicable dry crossing construction method based on site-specific stream hydrography conditions at the time of construction, and thereby **avoids and minimizes** in-stream disturbance and **minimizes** the duration of the construction period.
• A utility line crossing of a stream channel 10 feet in bottom width or less shall generally be completed within 24 hours from the start to finish including trench backfill, stabilization of stream banks and stabilization of the area 50 feet back from the top of each stream bank. • A utility line crossing of a stream channel between 10 feet and 100 feet in bottom width shall be completed within 48 hours from start to finish including trench backfill, stabilization of stream banks and stabilization of the area 50 feet back from the top of each stream bank.	• Expediting waterbody construction activities to the shortest duration practicable based on stream channel width **minimizes all potential direct and indirect impacts** associated with the crossing.
• Facilities for removing sediment from pumped water should be available at the stream crossing site before trenching commences and maintained until trench	• **Minimizes** potential downstream turbidity and suspended sediment and potential resultant temporary and minor (not significant or adverse) indirect impacts

backfilling is completed. Assembly areas, temporary equipment and non-hazardous material storage areas shall be located at least 50 feet back from the top of any bank.	on the aquatic environment associated with the pumped water. • **Avoids** deleterious materials from assembly areas, temporary equipment, and non-hazardous material storage areas from contaminating streambeds/banks.
• Install temporary equipment crossings at streams and temporary timber mats at wetland crossings in accordance with notes and details	• **Avoids and/or minimizes** use of equipment in streams, thereby **avoiding/minimizing** rutting of streambed/banks, soil compaction, and potential turbidity and suspended sediment and resultant temporary and minor (not significant or adverse) indirect impacts on the aquatic environment. • **Avoids** direct rutting of wetland soils and **minimizes** wetland soil compaction, thereby **minimizing** efforts to achieve post-construction restoration to pre-construction contours.
• For dry stream crossings, install pump bypass, dry flume, or cofferdam in accordance with notes and details.	• **Avoids** altering stream flow during construction by maintaining downstream flow and avoids potential restricted flow impacts on resident aquatic life. • Isolate construction area, thereby **minimizing** potential suspended sediment and turbidity during excavation/installation of pipeline.
• Water from the excavation shall be pumped to a sediment filter bag. Where possible, excavation shall be conducted from the top of the stream bank.	• **Minimizes** potential downstream turbidity and suspended sediment and potential resultant temporary and minor (not significant or adverse) indirect impacts on the aquatic environment associated with the pumped water.
• Waterbars shall be placed 50 feet from top of bank except as noted on E&S Plan site-specific plan drawings.	• Diverts potential stormwater overland flow from adjacent disturbed upland slopes to **avoid** erosion and **minimize** potential discharge of turbidity and suspended sediment to adjacent or nearby stream and associated impacts on resident aquatic life.
• Mark the top of streambank with highly visible flagging and post “Protected Resource” and “No Refueling” signs within 100 feet of top of streambank.	• Clearly demarcates streambank boundaries to **avoid** potential encroachment of construction activities in streams. • **Avoids** contamination in surface waters and soils of streams.
• Material storage areas shall be located at least 100 feet back from top of streambank.	• **Minimizes** the potential for debris and contaminants from storage areas to reach streams.
• Grubbing shall not take place within 50 feet of top of bank prior to stream installation with the exception of the travel lane until all materials required to complete crossing are on site and pipe is ready for installation.	• **Minimizes** the duration of soil disturbance and **minimizes** stormwater event overland flow from adjacent riparian areas from discharging turbidity and sedimentation to the stream. • **Minimizes** alteration of adjacent riparian area grade, hydrology, and vegetation root stock. • **Minimizes** the potential for unsuccessful restoration in riparian areas and **minimizes** efforts to achieve post-construction restoration of riparian area pre-construction contours and vegetation.
• Construct dams with sand bags, jersey barriers, or similar material with an impervious liner extended to the stream bottom and secured with sandbags (ES-0.07 of the E&S Plan).	• Use of prefabricated materials **minimizes** the duration of in-stream dam construction activities to the shortest duration practicable and thereby **minimizes** potential direct and indirect turbidity and sedimentation impacts associated with these activities. • Use of impervious liner **avoids** stream bottom disturbance and associated turbidity and sedimentation during in-stream activities.
• Natural stream bed material will be stripped and segregated from subsurface material for final stream bed restoration. Excavation portion of native stream beds comprised of rock, cobble or gravel are to	• **Minimizes** loss of native stream be material, **avoids** need for foreign fill and associated potential introduction of invasive species, contamination, or incompatible materials to the stream bed, thereby

stripped and segregated and used during stream restoration.	**minimizing** efforts to achieve post-construction restoration.
• All excess excavated material shall be removed from the stream floodway prior to permanently stabilizing stream banks.	• **Avoids** potential transport of excavated material from floodway into stream and associated in-stream and downstream turbidity and suspended sediment. • **Avoids** alteration of floodway contours and associated floodway functions (flood water transport, storage, desynchronization, etc.).
• All disturbed areas within 50 feet of top of bank and 100 feet in special protection watersheds should be blanketed or matted within 24 hours of initial disturbance for minor streams or 48 hours of initial disturbance for major streams unless otherwise authorized. Appropriate stream bank protection shall be provided within the channel.	• **Minimizes** the duration of disturbed and exposed soils in riparian areas and stream banks to the shortest duration practicable and thereby **minimizes** potential direct and indirect turbidity and sedimentation impacts associated with in-stream construction activities. • Avoids and/or minimizes the potential for unsuccessful restoration in riparian areas and stream banks and **minimizes** efforts to achieve post-construction stabilization and restoration of pre-construction contours and vegetation.
• Remove all construction material and structures from the waterbody after pipeline installation.	• **Avoids** permanent impacts to in-stream hydrography and flow conditions, **avoids** potential indirect impacts to resident aquatic life, and **minimizes** efforts to achieve post-construction stabilization and restoration of stream bed and bank pre-construction contours and vegetation.
• Keep lime and fertilizers out of the stream.	• **Avoids** potential alteration of in-stream water quality conditions (pH, artificial nutrification, algal blooms, etc.) and associated impacts on resident aquatic life.
• Stabilize channel excavation and stream banks prior to redirecting stream flow in the stream.	• **Avoids and/or minimizes** potential in-stream turbidity and suspended sediment and associated impacts on resident aquatic life. • **Avoids** permanent impacts to in-stream hydrography and flow conditions, **avoids** potential indirect impacts to resident aquatic life, and **minimizes** efforts to achieve post-construction stabilization and restoration of stream bed and bank pre-construction contours and vegetation.
Additional Dam and Pump Bypass Method Measures – A dam and pump crossing involves construction of a dam on the upstream end of the trench work area, from which a pump and pipe or hose are used to convey stream flow around the work area and discharge the water downstream of the work area, and is often used in streams with curved or meandering channels where effective placement of a straight flume pipe is not feasible. Additional impact avoidance, minimization, and mitigation measures for the dam and pump bypass method include:	• **Avoids** in-stream construction under wet open trench conditions and **minimizes** potential downstream turbidity and suspended sediment and potential resultant temporary and minor (not significant or adverse) indirect impacts on the aquatic environment associated with the wet open trench construction method.
• Construct waterbody crossings as perpendicular to the axis of the waterbody channel as engineering and routing conditions allow.	• **Avoids or minimizes** areal extent of construction right-of-way and in-stream activities to the minimum practicable to construct the crossing. • **Minimizes** all potential direct and indirect impacts associated with the crossing.
• The pump should have twice the pumping capacity of the anticipated flow.	• **Avoids or minimizes** potential interruption of ambient downstream flow volumes and potential associated impacts on resident aquatic life and downstream water users.
• Contractor shall ensure that a sufficient number of backup pumps are available at the site to maintain twice the pumping capacity of anticipated flow.	• **Avoids** potential interruption of ambient downstream flow volumes and potential associated impacts on resident aquatic life and downstream water users.

• Install upstream dam and then downstream dam. Keep pump running to maintain stream flow (see Detail 13 ES-0.07).	• **Avoids or minimizes** potential interruption of ambient downstream flow volumes and potential associated impacts on resident aquatic life and downstream water users.
• Bypass pump intakes shall be screened and maintained a sufficient distance from the stream bottom to prevent pumping of channel bottom materials and aquatic life.	• **Avoids** incidental disturbance to native stream bed materials and associated turbidity and suspended sediment, and incidental impacts to resident marcoinvertebrates and other aquatic life. • **Avoids** incidental entrainment and impingement of resident fish and other macro aquatic life.
• An energy dissipater is required at the discharge of the bypass pumps.	• **Avoids** incidental scouring of native stream bed materials, direct scouring impacts to resident aquatic life, and indirect turbidity and suspended sediment and associated impacts on resident aquatic life. • **Avoids** loss of native stream bed materials and **minimizes** efforts to achieve post-construction stabilization and restoration of stream bed and bank pre-construction contours
• Restore stream channels and bottoms to their preconstruction contours or better, and stabilize channel prior to re-establishing flow.	• **Avoids and/or minimizes** potential in-stream turbidity and suspended sediment and associated impacts on resident aquatic life. • **Avoids** permanent impacts to in-stream hydrography and flow conditions, **avoids** potential indirect impacts to resident aquatic life, and **minimizes** efforts to achieve post-construction stabilization and restoration of stream bed and bank pre-construction contours and vegetation.
Waterbody Restoration Methods (Open Cut) – The following is a list of restoration methods generally applicable for all waterbody crossings that will be open-cut:	
• Stream restoration activities are detailed in the various stream crossing methodologies indicated in Section 8.2 of the Procedures.	• See above stream restoration measures under **Additional Dam and Pump Bypass Method Measures.**
• Native stream bed material will be separated from other spoil for reinstallation after restoration.	• **Minimizes** loss of native stream be material, **avoids** need for foreign fill and associated potential introduction of invasive species, contamination, or incompatible materials to the stream bed, thereby **minimizing** efforts to achieve post-construction restoration.
• An evaluation was completed for sheer stress of stream flow against restored native stream bed material. If the evaluation indicated that the stream will not be stable with native material, then rip rap will be used. Site specific waterbody crossing and restoration plans providing direction for the installation of rip rap at these streams are included within the E&S Plans provided in Attachment 12. In these cases where rip rap is used and the stream bed is composed of rock, cobble, or gravel, then the native stone will be used for the top six inches of rip rap. Every effort will be made to segregate the entire top layer of native stone in streams with less than six inches of native stone where rip rap is proposed.	• **Avoids or minimizes** permanent impacts to stream bed and bank contours, hydrography, and flow. • **Avoids or minimizes** potential for long-term or permanent bed and bank instability, generation of turbidity and sedimentation, and associated impacts on resident aquatic life. • Use of native and clean rip rap materials **avoids** the use of foreign fill that may introduce invasive species, contamination, or incompatible materials to the stream bed, thereby **minimizing** efforts to achieve post-construction restoration.
• For open-cut crossings, stabilize waterbody banks and install temporary sediment barriers within 24 hours of completing instream construction activities.	• **Avoids and/or minimizes** potential in-stream turbidity and suspended sediment and associated impacts on resident aquatic life. • **Avoids** permanent impacts to in-stream hydrography and flow conditions, **avoids** potential indirect impacts to resident aquatic life, and **minimizes** efforts to achieve post-construction stabilization and restoration

	of stream bed and bank pre-construction contours and vegetation.
• For dry-ditch crossings, complete stream bed and bank stabilization before returning flow to the waterbody channel.	• **Avoids and/or minimizes** potential in-stream turbidity and suspended sediment and associated impacts on resident aquatic life. • **Avoids** permanent impacts to in-stream hydrography and flow conditions, **avoids** potential indirect impacts to resident aquatic life, and **minimizes** efforts to achieve post-construction stabilization and restoration of stream bed and bank pre-construction contours and vegetation.
• Natural stream bed material shall be stripped and segregated from subsurface material for final stream bed restoration. Excavation portion of native stream beds comprised of rock, cobble, or gravel are to be stripped and segregated and used during stream restoration.	• **Minimizes** loss of native stream be material, **avoids** need for foreign fill and associated potential introduction of invasive species, contamination, or incompatible materials to the stream bed, thereby **minimizing** efforts to achieve post-construction restoration.
• Return waterbody banks to preconstruction contours or to a stable angle of repose as approved by the EI.	• **Avoids** permanent impacts to in-stream hydrography and flow conditions by stabilizing stream banks, **avoids** potential indirect impacts to resident aquatic life, and **minimizes** efforts to achieve post-construction stabilization and restoration of stream bed and bank pre-construction contours and vegetation.
• Install erosion control fabric or a functional equivalent on waterbody banks at the time of final bank recontouring. Do not use synthetic monofilament mesh/netted erosion control materials in areas designated as sensitive wildlife habitat unless the product is specifically designed to minimize harm to wildlife. Anchor erosion control fabric with staples or other appropriate devices.	• **Avoids** permanent impacts to in-stream hydrography and flow conditions by stabilizing stream banks, and **minimizes** efforts to achieve post-construction stabilization and restoration of stream bank pre-construction contours and vegetation. • Use of suitable bank stabilization materials **avoids** incidental entrapment and mortality of sensitive wildlife species (amphibians, reptiles, small mammals) along stream banks.
• Application of rip rap for bank stabilization must comply with site specific drawings included within the E&S Plan provided in Attachment 12. Rip rap will be used to the minimum extent necessary to stabilize the stream bank, which is typically no more than 12 inches above the normal flow depth often evidenced by a lack of vegetation or a strand line. Stream banks above this elevation will be stabilized with erosion control blanket and revegetated.	• **Avoids or minimizes** permanent impacts to stream bed and bank contours, hydrography, and flow. • **Avoids or minimizes** potential for long-term or permanent bed and bank instability, generation of turbidity and sedimentation, and associated impacts on resident aquatic life. • Use of the minimum extent of rip rap necessary **minimizes** the duration and areal extent of in-stream bank stabilization activities and potential associated impacts on the in-stream environment, water quality, and resident aquatic life. • Use of native and clean rip rap materials **avoids** the use of foreign fill that may introduce invasive species, contamination, or incompatible materials to the stream bed, thereby **minimizing** efforts to achieve post-construction restoration.
• Revegetate disturbed riparian areas with native species as set forth in the E&S Plan.	• Revegetation and associated stabilization of adjacent disturbed riparian areas **minimizes** potential temporary and **avoids** potential permanent erosion of upland soils and associated in-stream turbidity and suspended sediment. • Revegetation with native species **minimizes** the potential for establishment of invasive and exotic species in the riparian area.
• If rip-rap is used, natural streambed material is to be restored throughout and overtop the rip-rap where feasible.	• Overtopping clean rip rap materials with native materials **avoids** the use of foreign fill that may introduce invasive species, contamination, or incompatible materials to the stream bed, thereby

	minimizing efforts to achieve post-construction restoration.
• Install a permanent slope breaker across the construction ROW at the base of slopes greater than 5 percent that are less than 50 feet from the waterbody, or as needed to prevent sediment transport into the waterbody. In addition, install sediment barriers as outlined in the E&S Plan (Appendix B).	• Diverts potential stormwater overland flow from adjacent disturbed upland slopes to **avoid** erosion and **minimize** potential discharge of turbidity and suspended sediment to adjacent or nearby stream and associated impacts on resident aquatic life.
• In some areas, with the approval of the EI, an earthen berm might be suitable as a sediment barrier adjacent to the waterbody	• With EI inspection and authorization, diverts potential stormwater overland flow from adjacent disturbed upland slopes to **avoid** erosion and **minimize** potential discharge of turbidity and suspended sediment to adjacent or nearby stream and associated impacts on resident aquatic life.
• Some stream banks might be atypical (e.g., vertical banks, low banks, eroding banks). In such circumstances, these stream banks will be graded to preconstruction contours or to a stable angle of repose as approved by the EI. Site-specific crossing and cross-sectional drawings have been provided in the E&S Plans and are to be followed and referenced to aid in the restoration of the existing contours.	• **Avoids** permanent impacts to in-stream hydrography and flow conditions by stabilizing stream banks, **avoids** potential indirect impacts to resident aquatic life, and **minimizes** efforts to achieve post-construction stabilization and restoration of stream bed and bank pre-construction contours and vegetation.

Resultant Programmatic Impacts Not Significant or Adverse

As presented in the original Project-wide Alternatives Analysis (see Section 5.3), and as set forth in the Chapter 105 permit application Project Impact analyses (Attachment 11: Enclosure D, and Enclosure E, Part 2), implementation of the Project as proposed, including the proposed best management practices presented in the Impact Avoidance, Minimization, and Mitigation Procedures and Erosion & Sedimentation Control Plan, would result in temporary and minor impacts to wetlands and associated wetland functions and values, as well as to streams, including downgradient (wetland) and downstream (stream) hydrologically connected resources. The resultant direct, indirect, and downgradient/downstream impacts are not considered significant or adverse, and thus do not require compensatory mitigation. This conclusion applies to the PA Turnpike 76/280 HDD Reroute as well.

Additional Site-Specific Impact Avoidance and Minimization Measures

As presented in the major modification request revised Erosion & Sedimentation Control Plans (ES-6.24 through ES-6.26), SPLP proposes to use an open cut construction method at WL-Q76 and an open cut construction method with a dam and pump bypass at S-Q83, both with the implementation of the applicable best management practices (measures) summarized above.

As an additional level of precaution and best management practice, SPLP proposes to excavate a single trench for installation of both the 16- and 20-inch pipelines, including for the proposed dam and pump bypass crossing of S-Q83, if subsurface geological and soil conditions allow. In this case, to minimize workspace requirements, the two pipes will be installed in parallel in the single trench with the minimum separation distance required. In any event, the stream crossing will be the last activity conducted in the "crossing area" as a tie-in with the adjacent interconnecting pipelines. Construction (trench excavation) of the stream crossing will not begin until both the 16- and 20-inch pipeline strings are completely welded in an adjacent upland area, and once installed the crossing will be immediately tied-in, backfilled, restored to original contours, stabilized, and all materials (equipment bridge, timber mats, etc.) removed to complete and clean up the crossing area. This site-specific plan will minimize the duration of in-stream construction activities and expedite post-construction restoration of the stream, wetland, and adjacent upland areas.

Conclusion

In conclusion, the subsurface geology at this particular location is not considered suitable for an HDD crossing based on the difficulties experienced during the 16-inch HDD. In addition, an open-trench installation through this area is not desirable due to resource impacts and potential future PA Turnpike 76 development plans. An alternative route to the west (Western Reroute) of the proposed crossing would result in more environmental (forested areas, wetlands, parks, NHA) impacts than an alternative route to the east. The Eastern Reroute alignment was developed and selected as a technically feasible reroute that would result in less impacts to wetland, stream, floodway, and other environmental resources than the Western Reroute, and therefore was selected as the proposed reroute alignment. Further evaluation of other (non-HDD) trenchless construction methods along the Eastern Reroute alignment aquatic resources "crossing area" determined these methods to be not technically feasible due to the limitations of these existing technologies and logistics. Further evaluation of the use of the open cut construction method along the Eastern Reroute alignment aquatic resources "crossing area" determined this method to be technically feasible. Furthermore, with the implementation of SPLP's Project-wide and site-specific impact avoidance and minimization measures, use of the open cut construction method with dam and pump bypass stream crossing will result in impacts to WL-Q76 and S-Q83 that will be minor and temporary, and are considered not significant or adverse, as well as avoid or minimize impacts on wetland, stream, other environmental resources to the maximum extent practicable within the proposed Eastern Reroute alignment permanent right-of-way. Consequently, it is the professional opinion of the HDD Reevaluation Team, consisting of the Geotechnical Evaluation Leader, Professional Geologists, Professional Engineers, and other construction specialists that a reroute to the east using the open-trench, dry construction method for the stream and wetland crossing will have the least impact, as the work area and wetland/stream construction will be managed in accordance with all permit conditions and can be completed in the most efficient and timely manner, including restoration/stabilization of the aquatic resources. Moreover, use of the open cut construction method is the only technically feasible, and therefore the only practicable, alternative within the proposed Eastern Reroute alignment right-of-way taking into consideration existing technology and logistics, including safety.

Alternatives Analysis Compliance Summary

Use of the proposed open cut construction method (and dam and pump bypass stream crossing) with the implementation of SPLP's Project-wide and site-specific impact avoidance and minimization measures will result in impacts to WL-Q76 (and S-Q83) that will be minor and temporary, and are considered not significant or adverse, and will further avoid or minimize impacts to the wetland (and stream) environment to the maximum extent practicable along the proposed reroute alignment and be in compliance with applicable alternatives analysis regulations.

Specifically, the subject wetland WL-Q76 is classified as an E V wetland, therefore the applicable regulation is 25 Pa. Code § 105.18a(a). The following table provides a summary of how the proposed open cut construction method crossing of WL-Q76 complies with these regulations.

Applicable Regulation	**Compliance Statement**
25 Pa. Code § 105.18a(a): *Exceptional value wetlands*. Except as provided for in subsection (c), the Department will not grant a permit under this chapter for a dam, water obstruction or encroachment located in, along, across or projecting into an exceptional value wetland, or otherwise affecting an exceptional value wetland, unless the applicant affirmatively demonstrates in writing and the Department issues a written finding that the following requirements are met:	
(1) The dam, water obstruction or encroachment will not have an adverse impact on the wetland, as determined in accordance with §§ 105.14(b) and 105.15 (relating to review of applications; and environmental assessment).	The implementation of SPLP's Project-wide and site-specific impact avoidance and minimization measures will result in no significant or adverse impact on WL-Q76, as demonstrated by evaluation of the following factors:
(2) The project is water dependent. A project is water-dependent when the project requires access or proximity to or siting within the wetland to fulfill the basic purposes of the project.	The crossing of aquatic resources is unavoidable due to the linear nature of the proposed PPP Project and as described in the Environmental Assessment, S1.B –

	Water Dependency (refer to Attachment C of this permit modification).
(3) There is no practicable alternative to the proposed project that would not involve a wetland or that would have less effect on the wetland, and not have other significant adverse effects on the environment. An alternative is practicable if it is available and capable of being carried out after taking into consideration construction cost, existing technology and logistics. An area not presently owned by the applicant which could reasonably be obtained, utilized, expanded or managed to fulfill the basic purpose of the project shall be considered as a practicable alternative.	Use of the proposed open cut construction method is the only technically feasible, and therefore the only practicable, alternative taking into consideration existing technology and logistics for the crossing of WL-Q76 within the proposed reroute alignment right-of-way.
(4) The project will not cause or contribute to a violation of an applicable State water quality standard.	As summarized in **Other Impact Avoidance and Minimization Measures**, SPLP incorporated numerous programmatic routing/siting and over 40 industry-standard and agency required or recommended impact avoidance and minimization best management practices (construction and restoration procedures or measures) for wetland crossings, which have been applied on a programmatic, project-wide, and site-specific basis on the PPP Project. Implementation of these measures will result in impacts that are minor and temporary, considered not significant or adverse, and will not cause or contribute to a violation of an applicable State water quality standard.
(5) The project will not cause or contribute to pollution of groundwater or surface water resources or diminution of the resources sufficient to interfere with their uses.	As summarized in **Other Impact Avoidance and Minimization Measures**, SPLP incorporated numerous programmatic routing/siting and over 40 industry-standard and agency required or recommended impact avoidance and minimization best management practices (construction and restoration procedures or measures) for wetland crossings, which have been applied on a programmatic, project-wide, and site-specific basis on the PPP Project. Implementation of these measures will result in impacts that are minor and temporary, considered not significant or adverse, and will not cause or contribute to pollution of groundwater or surface water resources or diminution of the resources sufficient to interfere with their uses.
(6) The cumulative effect of this project and other projects will not result in a major impairment of this Commonwealth's wetland resources.	As demonstrated in the original Chapter 105 permit application's Cumulative Impacts Analysis, based on the aggregate (i.e., cumulative) impacts of the PPP Project and other potential or existing SPLP projects and other projects evaluated within the Cumulative Impact Analysis Area, the wetland impacts associated with all the Chapter 105 applications related to this Project, in consideration of interrelated wetland areas (inclusive of adjacent streams), will not result in the impairment of the Commonwealth's EV wetland resources or a major impairment of the Commonwealth's other wetland resources.
(7) The applicant will replace the affected wetlands to compensate for unavoidable impacts, in accordance with § 105.20a.	The proposed WL-Q76 wetland crossing will not involve permanent dredge/fill activities (loss) or the permanent conversion of PFO wetland cover type, and therefore does not require compensatory mitigation.

ATTACHMENT C

Environmental Assessment

Revised June 2020

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATERWAYS ENGINEERING AND WETLANDS

CHAPTER 105 ENVIRONMENTAL ASSESSMENT FORM

			Item Included	Item Location
Note: The Department may waive a specific information requirement in writing, at the request of the Applicant, during the pre-application review process if the Department determines the information is not necessary to complete the review.				
Module S1: Project Summary				
This module is intended to organize information in order to present an overall summary of the project scope, certain key information requirements and when applicable, a comprehensive view of the overall project and related projects.				
A. Provide an overall project description and If the answer to the question below is **YES**, address CEA requirements; otherwise proceed to **S1.B** Comprehensive Environmental Assessment (CEA) when applicable. Answer the following question:			☒	S.1.A; Att. A
Does the "overall" project require more than one Ch. 105 permit in more than one county or will the project be completed in more than one phase?	☒ Yes	☐ No		
B. Provide information related to the project purpose, need, water dependency and summarize the amount and type of resources present and the temporary and permanent impacts proposed to those resources.			☒	Mod S1.B
Module S2: Resource Identification and Characterization				
This module is intended to organize information related to the identification of the resources present on the project site and to characterize those resources that may be affected by the proposed project.				
A. Provide the standard resource identification information, location map, wetland determination or delineation reports; watercourse reports; identification and qualifications of preparers; location map, and answer the related questions.			☒	App. S2.A-1; S2.A-2
Is the site located within or adjacent to any of the following; or within 100 feet of items vii or viii?				
i. National, state or local park, forest or recreation area	☐ Yes	☒ No		
ii. National natural landmark	☐ Yes	☒ No		
iii. National wildlife refuge, or Federal, state, local or private wildlife or plant sanctuaries	☒ Yes	☐ No		Mod S3.B
iv. State Game Lands	☐ Yes	☒ No		
v. Areas identified as prime farmland	☒ Yes	☐ No		Mod S3.B
vi. Source for a public water supply	☒ Yes	☐ No		PWS identified within 0.5 mile; Mod S2.A/S3.B
vii. A National Wild or Scenic River or the Commonwealth's Scenic Rivers System	☐ Yes	☒ No		
viii. Designated Federal wilderness area	☐ Yes	☒ No		
B. Identify all aquatic resources present on the project site and provide an identifier, the resource type; size of the resource(s); fishery designations, Ch. 93 uses and special protection status; and Exceptional Value (EV) wetland analysis.			☒	Mod S2.B/S2.D Att. E
C. Provide the following information related to habitat for Federal threatened and endangered (T&E) plant and animal species or State T&E species or species of special concern - copies of search forms or search receipts; identification of avoidance and minimization efforts taken to resolve identified conflicts.			☒	Mod S2.C
Did the PNDI search or agency coordination identify any potential conflicts?	☒ Yes	☐ No		Att. G
If the above is answered **YES**; answer the following two questions related to PNDI Coordination:				
a. *Is the applicant utilizing a sequential review of the PNDI coordination?*	☒ Yes	☐ No		Att. G
b. *Is the applicant utilizing a concurrent review of the PNDI coordination?*	☐ Yes	☒ No		Att. G
D. Characterize the aquatic resources: riverine, wetland and lacustrine present on the project site that are proposed to be directly or indirectly affected by the project. Including but not limited to the following, resource classification information, Level 2 rapid condition assessment results, discussion of resource functions, characterization of riparian properties and any other relevant information or studies conducted.			☒	Mod S2.B/S2.D; App S2.D-2
Module S3: Identification and Description of Potential Project Impacts				

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATERWAYS ENGINEERING AND WETLANDS

*This module is intended to organize and present information concerning the potential impacts or effects of the proposed project **in this** application. Impacts related to the "over all" project that are proposed under related but separate application(s) should be addressed as part of the CEA Policy response under **S1.A**.*		
A. Provide a summary table of the proposed temporary and permanent direct and indirect impacts for each effected resource category (e.g. riverine, wetlands and lacustrine resources).	☒	Mod S3.A
B. If any questions from **S2.A** Standard Information Response questions were answered YES, discuss in detail any potential impacts to those resource(s).	☒	Mod S3.B
***IMPORTANT NOTE**: If either item vii or viii from S2.A is answered YES, the project is not eligible as a "Small Project Application" type. Complete all applicable sections of the EA form for the standard application type unless an item was otherwise waived by the Department in writing (see previous Note on waiving of information requirements).*		N/A

	Included	Item Location
C. Provide a table(s) of all proposed water obstruction(s), encroachment activities and dams (e.g. subfacility codes) and provide an identifier, the subfacility code and description, resource identifier from **S2.B**, latitude and longitude, the proposed temporary and permanent direct and indirect impacts and subfacility details.	☐	N/A
D. Provide a discussion of how the proposed subfacility(ies) individually and in combination directly and/or indirectly impact the identified resource(s) and the effects on the applicable resource functions: hydrologic, biogeochemical, habitat, recreation, any other environmental impacts and the effects on the property or riparian rights of owners upstream, downstream or adjacent to the project.	☐	N/A
E. **Antidegradation Analysis** - The applicant should demonstrate consistency with State antidegradation requirements as described in the Water Quality Antidegradation Implementation Guidance Policy Document Number 391-0300-002. Project application information provided below in **S3.F, G and H** may be cross-referenced.	☒	Mod S3.E
F. **Alternatives Analysis** - The scope and extent of this analysis should be commensurate with the size and scope of the proposed project impacts *in this* application, information provided in **S4.A** below, related to avoidance and minimization efforts, may be cross-referenced.	☒	Mod S3.F; Att. A
G. **Potential Secondary Impact Evaluation** - Identify and describe environmental impacts on adjacent land and water resources associated with but not that direct result of the project.	☒	Mod S3.G
H. Identify and evaluate the potential cumulative environmental impacts of this project and other potential or existing projects like it, and the impacts that may result through numerous piecemeal changes to the wetland resource.	☒	Mod S3.H
Module S4: Mitigation Plan		
*This module is intended to organize and present information concerning actions undertaken in accordance with the definition of **Mitigation** in Title 25 Pa. Code Chapter 105 - §105.1, 105.16, 105.18a(a)(3), 105.18a(b)(7), 105.20a, and 105.21 as related to the potential impacts or effects of the proposed project **in this** application.*		
A. Identify and discuss any measures taken that resulted in avoiding or minimizing unavoidable resource impacts, provide detailed responses for individual proposed impact area(s) **and** the project as a whole.	☒	Mod S4.A
B. Identify and discuss any repair, rehabilitation or restorative actions taken to rectify an impacted resource, provide detailed responses for individual proposed impact area(s) and the project as a whole. Identify and discuss any proposed preservation and maintenance operations that will be taken to reduce or eliminate an impact during the life of the project.	☒	Mod S4.B
C. Identify and discuss any actions undertaken to provide compensatory mitigation including the purchase of credits from an approved provider, a detailed discussion of proposed compensation actions and how they will offset the lost resource functions. Provide detailed plans including performance standards and success criteria.	☐	N/A
Answer the following question. If the answer to the question is **YES**, provide the information regarding the mitigation credit provider; otherwise provide a detailed mitigation plan. If the application proposes to utilize both mitigation bank credits and conduct permittee responsible mitigation; both the credit provider and mitigation plan information shall be submitted.	☐	N/A
Does the applicant propose to utilize an approved mitigation bank to provide all or a portion of the compensation? ☐ Yes ☒ No		
D. When applicable, provide a plan to monitor the identified actions proposed in **S4.B** and/or **S4.C** compensatory mitigation area. Applicants should utilize the Department's Design Criteria and the USACE's RGL 08-03 -(http://www.usace.army.mil/Portals/2/docs/civilworks/RGLS/rgl08_03.pdf) to develop monitoring plans for compensatory mitigation proposals. The plan should include performance standards/success criteria, duration and timeframes of monitoring, monitoring report template, and template remedial action or adaptive management plan.	☒	Mod S4.D; Att D
Note: All or portions of this Module may apply to "Small Project" type applications under case specific circumstances and should be discussed during any pre-application meetings or prior to application submittal.		
CERTIFICATION		
I certify that the above statements, attachments including those labeled and identified as Enclosures, and all conclusions are true, correct, and based upon current environmental principles and science, to the best of my knowledge and belief.		
Robin Dingl (Signature)	6/10/2020 (Date)	

Environmental Assessment (E.A. Form) Rev. 6/2017

~~*July 2019*~~
Revised June 2020

Note: The EA provided herein provides information relevant to the major permit modification required at the Pennsylvania Turnpike/0280 HDD Reroute in Upper Uwchlan Township, Chester County, Pennsylvania, and includes specific excerpts and information previously submitted by Sunoco Pipeline, L.P. as part of the approved Pennsylvania Pipeline Project (PPP) Chapter 105 Joint Permit (E15-862).

Module S1: Project Summary

S1.A Overall Project Description

Sunoco Pipeline L.P. (SPLP) requests a major permit modification for a change in the route and installation method for both the 16 and 20-inch diameter pipelines. This modification request is from a Horizontal Directional Drill (HDD) to an open-trench installation across stream Q-83 and wetland Q76, and conventional bore under Styer Road. Difficulties were encountered while drilling the permitted 16-inch pipeline on the original alignment. In 2018, SPLP performed additional geologic investigations and as a result of these analysis, believes that abandoning the HDD is the preferred alternative at this location. Based on the number of difficulties that SPLP experienced and the potential for inadvertent returns (IRs) in proximity to the Marsh Creek State Park/Marsh Creek Lake Natural Heritage Area, SPLP evaluated a number of different options, including a reroute further to the northeast and a change in construction method from HDD to open-trench.

SPLP proposes to reroute both pipelines around two wetlands and cross one perennial stream S-Q83 (Unnamed Tributary (UNT) to Marsh Creek) and a palustrine emergent (PEM) wetland Q76. In addition, the requested reroute will cross the floodways of streams S-Q83, S-16r, and S-Q84. These stream, wetland, and floodway resources are located adjacent to one another in a single aquatic resource "crossing area" located approximately 0.5-mile northwest of Styer Road along the reroute alignment. Stream S-Q83 will be crossed utilizing one or more of the following open-trench excavation methods for installation of the pipeline across waterbodies (refer to the E&S Plan standard typical drawings for details):

- **Dry Open Cut** – Minor waterbodies with no flow at the time of construction may be crossed using the open-cut crossing method.
- **Dry Flume** – A flumed crossing directs and contains the stream flow through an alternate mechanism across the stream channel to allow for the trenching and pipe installation to occur in dry conditions. Where practical, this allows for drier trenching, pipe installation, and restoration while maintaining continuous downstream flow.
- **Dry Pump Bypass** – The dam and pump bypass method may be used for crossings of waterbodies where pumps can adequately transfer stream flow volumes around the workspace. Similar to the flume crossing, this method allows for drier trenching, pipe installation, and restoration while maintaining continuous downstream flow.
- **Dry Cofferdam** – The cofferdam method, typically used on large streams/rivers, involves the installation of a cofferdam to isolate and divert flow around the workspace in two phases. The first phase consists of the cofferdam installation on one of the banks and approximately halfway into the river to allow safe and dry installation of the pipeline across the river. The second phase involves the same process but from the opposite bank. This method allows continuous flow around the workspace and eliminates concerns about sensitive species passage.

The selected open-trench, dry stream crossing method will convey stream flow across the workspace and outlet downstream within the permitted limit-of-disturbance, such that work will be conducted in a dry stream channel. After the stream flow is contained and directed/conveyed across the work area, the trench will be excavated, and both the 16-inch and the 20-inch pipes will be installed via the open trench method through the stream and wetland in accordance with

all permit conditions and requirements. In order to efficiently complete all construction activities and minimize resource impacts, SPLP is proposing a 50-foot-wide limit of disturbance (LOD) across both the perennial stream (S-Q83) and PEM wetland (Q76).

Timber mats will be placed along the travel lane through the wetland and a temporary bridge will be placed along the travel lane where the stream is crossed to avoid soil compaction, allow for trench excavation, and stream substrate and wetland topsoil segregation and stockpiling in adjacent upland areas. Once the pipe and appropriate trench plugs are installed, the trench will be backfilled, restored to pre-existing elevations and hydrology, and will be stabilized with native vegetation. All work will be conducted in accordance with permit conditions/requirements as well as the revised/updated Erosion & Sediment and Restoration plan (refer to *Attachment D* of this permit modification). The requested modification will reduce the number of wetland crossings and impacts and will eliminate the risk of potential discharges associated with HDD IRs. In addition, the localized impacts are considered minor and temporary for this modification and will not result in any loss of water quality/quantity. The work completed to date for the 16-inch HDD ~~will be~~ has been abandoned: specifically, the drill stem ~~will be~~ was removed/pulled and grouted and all work areas restored in accordance with permit conditions/requirements.

CEA Requirements

Per PADEP Technical Policy Guidance Document No. 310-2137-006, a Comprehensive Environmental Assessment that analyzes the alternatives, impacts, mitigation and antidegradation for all structures and activities associated with the overall Project was included with the original PPP Chapter 105 Joint Permit Application submitted to PADEP (E15-862; APS 879047). Specifically, Attachment 11 EAF, Enclosure E Part 3 addresses alternatives; Part 2 includes impacts; Part 4 identifies impact avoidance minimization and mitigation; and, Part 5 discusses antidegradation.

Information applicable to this specific permit modification request are presented in this submittal as follows:

- Alternatives – Module S3, S3.F
- Impacts – Module S3, S3.B
- Avoidance, Minimization, and Mitigation – Module S4
- Antidegradation – Module S3, S3.E

S1.B Project Purpose, Need, Water Dependency, and Summary of Resources and Impacts

Project Purpose & Need

As presented in the original PPP Chapter 105 Joint Permit (E15-862), the overall Project will provide transportation service of natural gas liquids (NGLs) with the combined pipelines from the Utica and Marcellus Shale formations for both domestic and international markets. NGLs are separated from the natural gas stream before consumer ready (dry) natural gas is shipped on the natural gas pipeline network. Upstream shippers are currently limited by the shortage of NGL transport systems. In addition, the Project will provide various delivery points to local Pennsylvania distributors for supply of needed propane supplies, at affordable prices, for use as heating and/or cooking fuel by consumers in Pennsylvania and neighboring states, increasing access to this fuel access and supply during peak demand periods when supplies would otherwise become short. Butane will also be shipped to local markets as a component of gasoline to ensure gasoline suppliers can meet seasonal vapor pressure restrictions.

Water Dependency

As presented in the original PPP Chapter 105 Joint Permit (E15-862), constructing and operating a natural gas liquids pipeline is not, per se, a water-dependent project. However, because of Pennsylvania's abundant water and wetland resources, any project which travels approximately 300 miles west-east across the Commonwealth requires the crossing of, and therefore access to, waters and wetlands. The overall Project requires access and proximity to and siting in, on, over or under waters and wetlands in order to achieve its primary purpose to transport natural gas liquids from Houston, Washington County to SPLP's existing facility in Marcus Hook, Delaware County. Therefore, the linear nature and approximately 300-mile length of the Project across 17 counties west-east in Pennsylvania makes the Project water-dependent.

Summary of Resources & Impacts

The impacts associated with the open-trench and timber mat travel lanes across Wetland Q76 will total approximately 0.08 acre of permanent and 0.002 acre of temporary wetland impacts. In addition, installation of the pipes and temporary bridge across Stream S-Q83 (including floodway) and the floodways of Streams S-Q84 and S16r will result in approximately 0.007 acre of permanent and no temporary stream impacts as the 50-foot-wide right-of-way will be maintained for operation of the pipelines, and approximately 0.158 acre of permanent and 0.069 acre of temporary floodway impacts. Note: Streams S-Q84 and S16r will not be crossed by the pipeline (i.e., not excavated) but their floodways are located in the requested limits-of-disturbance (LOD) and have been included in the floodway impacts. Although PADEP defines operation and maintenance activities as permanent impacts, the impacts are considered minor/localized and temporary as most of the disturbed areas of the streams will be restored to their preconstruction condition (i.e., elevation, flow, stream substrate, stream banks, hydrologic conditions). In addition, the wetland soils will be segregated during construction (double ditching) to maintain the native seed bank/composition and the PEM wetland will be reseeded with native wetland species following construction. Furthermore, the resource crossings will not involve any permanent fill, the streams will not be relocated, and there will be no permanent loss of stream or wetland habitat or permanent loss of functions and values associated with this modification request. Please refer to *Attachment E* of this permit modification request packet for the updated Aquatic Resource Impact Table.

Stream S-Q84 is designated under the Pennsylvania Code, Title 25, Chapter 93, § 93.9h as High Quality (HQ) – Trout Stocked Fishes (TSF) and migratory fishes (MF) stream. There is currently no seasonal timing restriction on this stream; however, SPLP will work with the appropriate agencies to avoid and minimize potential impacts to trout/spawning/migrating fish and will comply with any new restrictions or timing limitations.

In addition, an updated Pennsylvania Natural Diversity Index (PNDI) review (PNDI-677023) was submitted for the requested reroute area. Please refer to *Section 2.C in Module S2* of this EA.

Module S2: Resource ID & Characterization

S2.A Location Map & Wetland Delineation Report.

The original location of the Project is provided in the Location Map prepared and submitted for the Project's Chapter 105 Joint Permit Application for Chester County. The applicable page from the original application is provided in Appendix S2.A-1 and has been modified to reflect the location of the PA Turnpike/0280 HDD reroute, and the stream has been labeled on the map to show the location of the resource crossings.

Similarly, an *Aquatic Resources Report* for Chester County was prepared in July 2015 and submitted as part of the PPP Chapter 105 Joint Permit Application. The Aquatic Resources Report presents the results and conclusions of wetland and stream identification activities completed for the entire Project right-of-way. In January 2019, an additional wetland and stream delineation survey was conducted for this permit modification request. Another field survey was conducted in July 2019 to reassess the limits of wetland Q76 during the growing season and resulted in an extension of the wetland area across the proposed LOD. A supplemental Aquatic Resources Report (prepared in February 2019) including information on Stream S-Q83 and another supplemental Aquatic Resources Report (prepared in July 2019) are included as Appendix S2.A-2.

The Project site is approximately 167 feet from the boundary of Marsh Creek State Park, situated on the northwest side of the PA Turnpike. The main publicly accessible portion of Marsh Creek State Park and Marsh Creek Lake are located on the opposite or south side of the PA Turnpike from the requested reroute. The Project reroute crosses approximately 2.41 acres of the Marsh Creek Lake Natural Heritage Area (NHA), which is part of Marsh Creek State Park, but also includes surrounding housing developments and agricultural fields. There are numerous streams and wetlands within the area that provide habitat for a variety of plant and animal species. Stream S-Q83 and wetland Q76 are located within this NHA.

One public water supply (PWS) groundwater well was identified within 0.5 mile of the Turnpike/0280 reroute at the former Upattinas School. Because of the distant location of the well relative to the requested reroute, the proposed open -trench construction method through this area is not expected to impact this well. The Upattinas School was closed to the public in 2014 and is now owned by Warwick Land Development, Inc.

S2.B Aquatic Resources

SPLP identified all aquatic resources present within the overall Project area in Attachment 11 Enclosure A of SPLP's Chapter 105 Joint Permit Application by County and in Appendix S2.A-2 of this EA. For this permit modification request, the resources that would be affected include Stream S-Q83 (including floodway), as well as the floodways of Streams S-Q84 and S16r. ~~No wetlands~~ One (1) wetland identified in the ~~January~~ July 2019 survey will be impacted by the requested modification.

Wetland Q76 is associated with the floodplain of stream S-Q83 and is considered an Exceptional Value (EV) wetland. At the time of the survey (July 2019), the depth to the water table was 6 inches and the soils were saturated at a depth of 3 inches. Hydric soils were present to a depth of 16 inches and dominant vegetation consisted of Japanese stiltgrass (*Microstegium vimineum*), false nettle (*Boehmeria cylindrica*), and American tearthumb (*Persicaria sagittata*).

Stream S-Q83 is identified as a perennial tributary to Marsh Creek. The stream channel is approximately 5 feet in width with a bank height of 1.5 feet. At the time of the field investigation (January 2019), the stream exhibited an average water depth of 6 inches. The stream bed consisted of a mix of boulder, cobble, and gravel substrates.

Based on review of eMapPA maintained by the PADEP and a review of Drainage List A of Pennsylvania Code, Title 25, Chapter 93, SS 93.9h, the designated/protected uses and fisheries classification for Stream S-Q83 is High Quality (HQ) – Trout Stocked Fishes (TSF) and migratory fishes (MF) stream. Activities within the stream are considered jurisdictional by the USACE and are considered activities in the waters of the U.S.

S2.C PNDI T&E plant and animal species or State T&E Species or Species of Special Concern Agency Coordination and Search Receipts

For this permit modification, a new request was submitted to the PNDI on February 20, 2019 (PNDI-677023). Based on the results of this search, the PFBC identified a Threatened Species and has requested further review of the proposed reroute, and the USFWS also requested further review of the proposed reroute. Accordingly, SPLP provided the requested information regarding the proposed Turnpike/0280 Reroute to both the PFBC and USFWS. The PFBC provided a response on March 26, 2019 that requested a habitat assessment for the Eastern redbelly turtle (*Pseudemys rubriventris*) be conducted and the results submitted to the agency.

In a telephone conversation on March 29, 2019 between Mr. Robert Anderson of the USFWS and Mr. Pat Green of Tetra Tech, the USFWS confirmed that the species of concern identified in the PNDI receipt was the bog turtle (*Glyptemys muhlenbergii*) and requested that a licensed bog turtle surveyor assess the stream and surrounding habitat to identify if the area is suitable transient habitat for adjacent, known populations of bog turtles. Accordingly, surveys were conducted by qualified experts during the appropriate season for both the Eastern redbelly turtle and bog turtle (May 6th): the results/recommendations from these surveys are presented below.

- No potential permanent habitat for the eastern redbelly turtle was identified during the survey, but it is possible that pond P1r provides transient or temporary habitat for individuals. Due to this potential, SPLP has committed to using super-silt fence as a wildlife barrier to the workspace near pond P1r.

- No potential habitat for the bog turtle was identified during the survey, and it is unlikely that stream S-Q83 provides transient habitat for bog turtles.

The survey reports and results were submitted to the PFBC and USFWS on July 18, 2019 and copies of all information and agency coordination was provided to the PADEP and USACE as well. The PFBC ~~has~~ reviewed the report and agrees that the reroute will not adversely impact the Eastern redbelly turtle and the proposed silt fence should be implemented during construction (refer to Attachment G for a copy of this response). ~~The USFWS has not yet provided any formal response to the survey results.~~ The USFWS also reviewed the results of the survey and concurred with the findings in their letter dated January 16, 2020. As discussed therein, potential bog turtle habitat is not present in Wetland Q76 and the proposed Project modifications are not likely to adversely affect bog turtles.

S2.D Resource Classification Information; Level 2 Rapid Condition Assessment Results, Resource Function, Riparian properties and any other relevant studies.

This permit modification request is for a change in route and installation method of the 16- and 20-inch diameter pipelines from HDD to conventional open-trench crossing methodology. Due to the proposed reroute and aquatic resources that would be directly or in directly impacted, a brief description of the stream and wetland are provided below for this permit modification request. As discussed above, the aquatic resources present within the surveyed LOD of the proposed reroute that would be directly or indirectly impacted include Stream S-Q83, its floodway, and the floodways of S-Q84 and S16r, and wetland Q76.

The wetlands and streams identified for the PA Turnpike/0280 Reroute are located within the physiographic province of the Piedmont Upland section. The surrounding land uses include state park land and an NHA, which includes natural resource and recreational areas; single family residences; roads (including the PA Turnpike), existing pipeline ROW; and forested areas. There are existing trees or shrubs in the riparian buffers (refer to *Attachment B* of this permit modification for current photographs of the resource crossings).

Stream S-Q83, an UNT to Marsh Creek, is identified as a perennial stream providing potential habitat for seasonal spawning of game and non-game fish species. The stream also has the potential to be used for resting by a variety of birds and mammals. However, wildlife is likely to utilize more remote and secluded areas that offer more protection/cover for resting. As this is a perennial stream, it supports a continuous flow of water with moderate rates of flushing and residence times.

Because the stream is classified as HQ - TSF, seasonal migration of trout during spawning would likely occur in Stream S-Q83 based on its perennial flow characteristics. Similarly, the potential for anadromous fish migration is also likely to occur in Stream S-Q83. SPLP is not aware of any timing window restrictions associated with this stream; however, SPLP will abide by seasonal restrictions set forth in Special Conditions VV through YY of Permit E15-862, as applicable, and work with the appropriate agencies to avoid/minimize potential impacts to the stream's trout resources and comply with any agency restrictions or limitations.

Both Wetland Q76 and Stream S-Q83 provide a food source for invertebrates, birds, reptiles, amphibians, and mammals. Growth of herbaceous plants constitute the food chain base that supports primary consumers such as invertebrates and small mammal herbivores. Secondary and tertiary consumers are supported by the diversity and abundance of prey in the stream ecosystems. In addition, the stream may support photosynthetic algae, overhanging woody vegetation, and/or small aquatic vascular plants that support invertebrate herbivores. Such invertebrates are consumed by small reptiles and fish that can inhabit a stream. The stream likely supports aquatic insects or amphibians that meet specific prey requirements of birds and mammals with an affinity for stream habitats such as raccoon (*Procyon lotor*). The stream is also likely utilized by a variety of wildlife species as a source of drinking water.

The water quality of the stream is considered good, as evidenced by its classification as HQ-TSF and MF classifications. However, based on the size and location of the stream it is unlikely that it is utilized for recreational or sport fishing opportunities.

EV Wetlands

As Wetland Q-76 is located within ½ mile of pond P1r, an area identified as potential transient or temporary habitat for the eastern redbelly turtle, in accordance with 25 PA Code § 105.17(1)(ii), Wetland Q-76 has been re-classified as an "Exceptional Value" wetland since the initial submittal of this permit application.

Wetland Functions & Values

An assessment of the functions and values for Wetland Q-76 was conducted using the USACE Highway Methodology (USACE 1999) and is presented in Appendix S2.D-2 of this Attachment. Based on the methodology, Wetland Q-76 displays suitability for various functions and values at varying levels including for groundwater recharge/discharge; floodflow alteration; fish and shellfish habitat; sediment/toxicant retention; nutrient removal; production export; sediment/shoreline stabilization; and wildlife habitat. Its *principal* functions consist of:

> *Floodflow Alteration* – This wetland satisfies the criteria for floodflow alteration due to its adjacency to stream S-Q83 (Meadow Creek) and as it receives overland sheet flow from upland areas.
>
> *Sediment/Shoreline Stabilization* - Wetland Q76 is densely populated with riparian vegetation consisting of shrubs and forbs

Pennsylvania Riverine Condition Level 2 Rapid Assessment Results

As required by PADEP, an evaluation of stream S-Q83 was conducted in accordance with Pennsylvania Riverine Condition Level 2 Rapid Assessment Protocols, totaling 686 ft. in length in the Project ROW. The overall Riverine Condition Index Score for the stream was 0.63 with the Channel Alteration and Instream Habitat Condition scores generally high at 0.80 and 0.90, respectively; but the Riparian Zone of Influence and Riparian Vegetation conditions scoring the lowest at 0.42 and 0.43, respectively. The Channel/Floodplain condition was categorized as marginal scoring 0.60.

An evaluation of Wetland Q-76 was also conducted in accordance with the Pennsylvania Wetland Condition Level 2 Rapid Assessment Protocol. The Assessment Area totaled 0.76-acre with the average overall Wetland Condition Index score for the wetland as 0.68; overall condition index scores ranged from 0.25 to 1. The Roadbed Presence score was the lowest at 0.25 affected by the three (3) paved lanes and proximity of the roads within the ZOIs, especially the two-and four-lane highways near the Project area. The Wetland Zone of Influence was marginal with a condition index score of 0.41. The Vegetation Condition Index Score of 0.43 is due to the greater than 50% presence of invasive species identified within the AA and vegetation stressors such as mowing, right-of-way clearing, and/or clear cutting or brush cutting occurrences identified within the AA boundary. No presence of Hydrologic Modification stressors, Sediment Stressors, or Water Quality stressors were identified within the wetland (with these conditions scoring 1.00 for all three indices). The detailed Pennsylvania Riverine Condition Level 2 Rapid Assessment data forms conducted for the streams and wetlands for the Project are provided in Appendix S2.D-2 of this Attachment.

Module S3: Identification and Description of Potential Project Impacts

S3.A Impact Summary

Table S3.A-1 Summary of Project Impacts
Permit Modification Request for PA Turnpike/0280 Reroute
Open-Trench Crossing Method

Resource Category	Corps 404		PADEP/105	
	Temporary (acres)	Permanent (acres)	Temporary (acres)	Permanent (acres)
Wetlands (Q76)	0.086	0	0.002	0.084
Streams (S-Q83)	0.011	N/A	0.000	0.007
Floodways (S-Q84 and S16r)	N/A	N/A	0.158	0.069*

* Floodway disturbance includes the stream impacts within the calculations, i.e. the floodway disturbance is the total proposed disturbance according to Chapter 105 regulations.

S3B. Standard Information Responses

The requested permit modification for the Turnpike/0280 Reroute will not impact any resources identified in Module S2, Part A with the exception of Marsh Creek Lake NHA and Prime Farmland soils.

The requested modification workspace area is located approximately 167 feet from the boundary of Marsh Creek State Park, situated on the northwest side of the PA Turnpike. The larger, publicly accessible portion of Marsh Creek State Park and Marsh Creek Lake are located on the opposite or south side of the PA Turnpike from the requested reroute. Marsh Creek State Park is not directly crossed and any impacts associated with the permit modification request in the vicinity of the park are considered a minor, temporary disturbance to the surrounding landscape, wildlife, and recreational activities in the general area. No permanent impacts to Marsh Creek State Park are anticipated.

Marsh Creek Lake NHA

The Project reroute will cross approximately 2.41 acres of the Marsh Creek Lake NHA, which covers a total of 500 acres. While most of this NHA is a part of the Marsh Creek State Park, its boundary also encompasses surrounding housing developments and agricultural fields. The NHA is reported to support two butterfly species of concern, mulbery wing (*Poanes Massasoit*) and black dash (*Euphyes conspicuous*), a plant species of concern, Nuttall's tick trefoil (*Desmodium nuttalii*), and a sensitive species of concern (not specified). While this area would have previously been crossed via the HDD method, the portion of the NHA crossed represents approximately 0.4% or a nominal amount of the entire NHA area and the proposed reroute is not anticipated to result in direct or long-term impacts to the purpose/functions of this area and its habitats as there would be no change in existing land use. Stream S-Q83 is located within this NHA; please refer to Section S3.D for discussion of direct and indirect impacts to Stream S-Q83.

Prime Farmland

The proposed reroute would cross a small amount of designated prime farmland soils. Specifically, this modification would impact 1.129 acres of mapped prime farmland soils. However, while the reroute crosses prime farmland soils, the area is residential, with no agricultural activities currently occurring. Nevertheless, SPLP will take precautions during construction and restoration to protect these unique soils. Potential short-term impacts to prime farmland soils associated with construction of the Project may include increased soil erosion and sedimentation due to the removal of vegetation; compaction of soils caused by construction vehicles and equipment; and, poor revegetation. However, SPLP will prevent and minimize impacts on prime farmland soils by utilizing the required BMPs to avoid and minimize sedimentation and erosion or runoff, and soil compaction where needed. Specifically, SPLP will employ, as needed general, stabilization and structural controls to divert stormwater flows, convey runoff, prevent sediments from moving off-site, and reduce the erosive forces of runoff waters. Compost filter socks and other structural controls will be utilized during construction activities. The proposed modification would not have long-term impacts on Prime Farmland soils.

Public Water Supply – Former Upattinas School

As noted above, no potential impacts are anticipated to the former Upattinas School well as a result of this permit modification request.

S3.C Subfacility Details

Information related to the proposed water obstruction, encroachment activities, and temporary/permanent impacts associated with the requested permit modification to open-trench S-Q83 (an UNT to Marsh Creek) and associated floodways, and wetland Q76 was provided in the original PPP Chapter 105 Joint Permit Application (E15-862; APS 879047) and is summarized within this Environmental Assessment, as well as the other Attachments comprising this permit modification packet.

S3.D Direct and Indirect Impacts

As discussed above, direct and indirect impacts for the overall Project were presented in Attachment 11, Enclosure E (Part 2) of the PPP Chapter 105 Joint Permit Application (E15-862; APS 879047). Excerpts from the submittal relevant to this permit modification request are discussed below.

The proposed open cut/trench crossing of wetland Q76 will result in approximately 0.084 acre of permanent and 0.002 acre of temporary wetland impacts. As defined by PADEP, permanent impacts include direct and indirect effects resulting from the placement or construction of the pipeline and impacts to those areas necessary for the long-term operation and maintenance of the pipeline. Temporary impacts include areas affected during the construction of the Project that will be restored when construction is completed. All physical/ecological impacts are considered minor and temporary: wetland will be restored to its original condition (i.e., wetland soils, hydrophytic vegetation, elevation, flow, stream substrate, hydrologic conditions, etc.). SPLP will not maintain the ROW through the wetland area (i.e., no mowing); therefore, the pre-and post-construction conditions of the wetland will remain the same. In addition, the Project would not involve any permanent fill or conversion of wetland cover type/vegetation, change in wetland functions and values, and there would be no permanent loss of wetlands or streams associated with the permit modification.

Wetland Q76 is classified as an EV emergent wetland and is located in the floodplain of stream S-Q83. The open cut/trench construction method through this wetland would be a temporary disturbance to the wetland's vegetation, hydrology, soils, and functions and values. In order to reduce impacts, SPLP has reduced the construction workspace width to 50-feet. SPLP will separate topsoil during construction and replace the wetland soil to its original horizon and elevation to maintain the natural seed bed and facilitate revegetation of the disturbed wetland area. Based on implementation of these avoidance, minimization, and mitigation measures, effects of the requested open cut/trench crossing are likely to be minimal. As previously noted, SPLP will restore the disturbed wetland area to its pre-existing condition such that surface water hydrology is restored and the re-establishment of hydrophytic vegetation is facilitated. SPLP will also implement ABACT E&S BMPs to ensure the functions and values of EV Wetland Q76 incur nominal impacts. Similarly, temporary and minor impacts would occur to the food chain, nesting/resting, and feeding activities within the wetland. Additional detail regarding wetland construction methods were provided in the Project' Chapter 105 Joint Permit Application in Attachment 11 Enclosure E Part 2.

The open-trench crossing of Stream S-Q83 and the LOD located within the floodways of Streams S-Q84 and S16r will result in approximately 0.007 acre of permanent and no temporary stream impacts, and 0.158 acre of permanent and 0.069 acre of temporary floodway impacts. PADEP defines permanent impacts as direct and indirect impacts resulting from the placement or construction of the pipeline and to those areas necessary for the long-term operation and maintenance of the pipeline. Temporary impacts include areas affected during construction of the Project that will be restored when construction is completed. All physical/ecological impacts are considered minor and temporary as the stream will be restored to its original condition (i.e., elevation, flow, stream substrate, hydrologic conditions, etc.). SPLP will not maintain the ROW through the stream (i.e., no mowing); therefore, the pre-and post-construction conditions of the stream will remain the same. In addition, the Project would not involve any permanent fill and there would be no permanent loss of stream associated with the Project.

Impacts to Stream S-Q83 would occur as a result of in-stream construction activities and would result in a temporary localized increase in turbidity levels and downstream sediment deposition. Sediments that become suspended during the short period of in-stream disturbance (i.e., installation of the dam and pump) are expected to settle out of the water column relatively quickly.

Temporary impacts would occur to aquatic life in Stream S-Q83 at or downstream from the construction site (pipe crossing), including potential degradation of benthic habitat due to direct disturbance to the bottom substrate in the trench zone, and associated disturbances to aquatic vegetation and invertebrates within the construction right-of-way. Indirect impacts from sedimentation may affect areas downstream, but generally conditions would be expected to resolve relatively quickly (e.g., dry crossing methods involving in-stream excavation would have a limited effect on downstream sedimentation for a period of 1 to 3 days).

Indirect, long-term impacts to fish spawning/migration could occur to Stream S-Q83 if substantial changes to stream substrate or current patterns result from Project construction. However, substantial changes to stream substrate and current patterns are not anticipated because the native stream substrate will be replaced, and stream bed and banks will be restored as closely as possible to the original contours following construction. SPLP is not aware of any timing window restriction associated with this stream crossing; however, SPLP will work with the appropriate agencies to avoid/minimize potential impacts to the stream's trout resources and comply with any

agency restrictions or limitations, if required. No impacts to fish migration are anticipated during Project operations.

Project construction will result in the clearing of areas located 100-150 feet landward of the HQ stream (i.e., riparian buffer area), but the impacts have been minimized to the maximum extent practicable while allowing safe installation of the pipeline. In addition, riparian buffers and stream banks will be revegetated (seeded/planted) following construction as soon as practicable to facilitate vegetative growth along the stream channel in accordance with the included E&S Plan (*Attachment D* of this permit modification packet). For more information please refer to Attachment 11, Enclosure E (Part 4) Impact Avoidance, Minimization and Mitigation Procedures of PPP's Chapter 105 Joint Permit Application.

In addition to the above, no fill, aboveground facilities or alteration of surface elevations/contours are proposed within the streams' floodways as they will be restored to pre-construction conditions. As such, the Project would not result in long-term impacts to the associated floodways.

Construction of the proposed Project is not expected to affect the flushing characteristics of the stream. SPLP has sited the right-of-way such that the stream crossing is generally perpendicular and thereby of minimal impact. In addition, the Project will not alter the volume of water or flow rates that the stream typically/naturally experiences. Furthermore, the stream channel will be restored to pre-construction contours, thereby restoring pre-existing flushing characteristics and patterns within the stream crossed. Similarly, operation of the Project would not have any impact on natural drainage patterns.

Construction of the proposed Project is not expected to affect groundwater discharge that may be important for supporting stream baseflow. Trench plugs will be installed in the trench at the entry and exit of the wetland/stream crossing to prevent draining of the resources along the trench line. In addition, there are no groundwater control features or interceptor structures incorporated into the Project design. Topographic contours and drainage patterns will be restored following construction of the Project and impacts to groundwater discharge are not anticipated.

There are no proposed aboveground facilities associated with this permit modification request. Therefore, construction is not expected to negatively impact the ability of the stream and wetland to either store or control storm and flood waters.

SPLP has designed the Project to avoid and minimize impacts to aquatic resources to the greatest extent possible. SPLP will conduct all activities in accordance with the Chapter 102 Permit requirements and will implement erosion and sediment control best management practices (BMPs) and ABACT measures, as necessary. Thus, this requested permit modification will not cause long-term degradation of water quality, alter flow volumes, or change the direction of flow.

S3.E Antidegradation Analysis

An Antidegradation Analysis was prepared for the overall Project and submitted as part of the PPP Chapter 105 Joint Permit Application (E15-862) in Attachment 11, Enclosure E (Part 5). The Antidegradation Analysis was prepared in accordance with 25 Pa. Code § 105.14(b)(11). Specifically, SPLP's Joint Permit Application for a Pennsylvania Water Obstruction and Encroachment Permit Application and U.S. Army Corps of Engineers (USACE) Section 404 Permit Application for the Project needed to ensure consistency with State antidegradation requirements contained in Chapters 93, 95 and 102 (relating to water quality standards;

wastewater treatment requirements; and erosion and sediment control) and the Clean Water Act (CWA) (33 U.S.C.A. § § 1251—1376).

PADEP has implemented an Antidegradation Program to promote the maintenance and protection of existing water quality for High Quality (HQ) and Exceptional Value (EV) waters, and the protection of existing uses for all surface waters (PADEP 2003). The stream crossed by the proposed Turnpike/0280 reroute is classified as HQ-TSF and MF. Therefore, the antidegradation requirements applicable to this permit modification include protection of the existing water uses (93.4a(b)) and water quality (93.4a(c)) of HQ streams. Wetland Q76 ~~is not classified~~ has been classified as an EV wetland; therefore, the protection of existing water use and quality of EV wetlands (93.4a(d)) is ~~not~~ applicable to this reroute.

Resource	HQ/ EV	Cover Type Conversion	Antidegradation Requirement		ABACT Measure	Justification	E & S Sheet No.
			Non-Discharge	ABACT			
Stream S-Q83	HQ	Yes		X	Compost filter socks, immediate stabilization, PPC plan & Erosion Control Blanket	Procedural BMPs such as immediate stabilization and the PPC plan are implemented for areas requiring ABACT and throughout the project. Compost filter sock and erosion control blanket for 100' from the top of stream bank are all approved ABACT measures to manage the potential for an increase in stormwater discharge during construction. The combination of these technologies ensures that when implemented properly the stormwater discharge will be a non-degrading discharge.	ES-6.25
Wetland Q76	EV	No	X		Compost filter socks, immediate stabilization, PPC plan, RCE with Wash Rack & Erosion Control Blanket	Procedural BMPs such as immediate stabilization and the PPC plan are implemented for areas requiring ABACT and throughout the project. Compost filter sock, rock construction entrances with wash racks, and erosion control blanket for 100' from the resource are all approved ABACT measures to manage the potential for an increase in stormwater discharge during construction. The combination of these technologies ensures that when implemented properly the stormwater discharge will be a non-degrading discharge.	ES-6.25

Note: the red text indicates the changes associated with the requested reroute and associated permit modification.

- **Section 93.4a(b)** states that "Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected." In order to reduce water use impacts, SPLP has reduced the construction right-of-way (ROW) to the extent possible; limited the land disturbance to the excavated trench line, and temporary minor grading of the stream banks at the travel lane crossing, as required; limited the time/duration of in-stream construction (typically less than 2 days); designed the crossings such that the pipeline will be 5 feet under the streams, as compared to the PADEP 3 foot

depth requirement; and, implemented erosion and sediment control measures for all land disturbances in accordance with PADEP's Erosion and Sediment Pollution Control Program Manual (PADEP 2012) as demonstrated throughout the Project's ESCGP Permit applications. With the proper implementation and maintenance of these protective measures, construction-related Project impacts to water quality such as increased turbidity related to sedimentation and in-stream construction will be minor, temporary, and localized and will not adversely impact or degrade the water resources. Specifically, the water quality and designated/existing uses of Stream S-Q83, including floodway, and the floodways of Streams S-Q84 and S16r will be maintained and protected post-construction.

- **93.4a(c): Protection for High Quality Waters** states that **"**The water quality of High Quality Waters shall be maintained and protected". The proposed Project will protect and maintain the existing/designated stream uses and water quality of the HQ stream crossed by this requested permit modification. Specifically, SPLP has reduced the construction right-of-way (ROW) to the extent possible; limited the land disturbance to the excavated trench line and minor grading of the stream banks at the travel lane crossing, as required; limited the time/duration of in-stream construction (typically less than 2 days); planned a dry construction method for the pipes' crossing; designed the crossings such that the pipelines will be 5 feet under the stream, as compared to PADEP's 3 foot depth requirement; and, will implement erosion and sediment control measures for all land disturbances in accordance with PADEP's Erosion and Sediment Pollution Control Program Manual (PADEP 2012) as demonstrated throughout the Project's ESCGP Permit applications.

  In addition, SPLP has incorporated ABACT BMPs into their E&S Plan to further reduce potential erosion and sediment impacts to the HQ stream crossing. Specifically, standard and ABACT BMPs that SPLP will implement to control/manage erosion and sedimentation within the Project area include:

  - Use of wash racks at rock construction entrances;
  - Placement of compost filter socks on the downgradient side of the filter bags and/or dewatering structure;
  - Application of erosion control blanket within 100 feet of receiving waters and on slopes 3:1 (H:V) or steeper;
  - Installation of compost filter socks at slope breaker outlets to provide additional filtration prior to discharge to surface waters;
  - Installation of berms and trenches to promote infiltration and manage flow rate;
  - Implementation of the PPC Plan; and,
  - Application of permanent seeding for site restoration.

  As previously stated, Project impacts to the stream, including the HQ resources, will be minor, temporary, and localized. As further demonstrated above, Project implementation of the requested crossing method, PADEP-approved ABACT BMPs identified above, and the revised 102 drawings (Attachment D of this permit modification request packet) will ensure the maintenance and protection of the overall water quality of the HQ stream by reducing/controlling turbidity associated with sedimentation and in-stream construction activities.

- **93.4a(d): Protection for Exceptional Value Waters** states that "the water quality of Exceptional Value Waters shall be maintained and protected." The proposed Project will protect and maintain the existing/designated water quality of the EV wetland (Q76) impacted by this requested permit modification. Specifically, SPLP has reduced the construction right-of-way (ROW) to the extent possible; limited the land disturbance to the excavated trench line and minor grading at the travel lane crossing, as required; limited the time/duration of construction; designed the crossings such that the pipelines will be 5 feet under the wetland, as compared to PADEP's 3 foot depth requirement; and, will implement erosion and sediment control measures for all land disturbances in accordance with PADEP's Erosion and Sediment Pollution Control Program Manual (PADEP 2012) as demonstrated throughout the Project's ESCGP Permit applications.

  In addition, SPLP has incorporated ABACT BMPs into their E&S Plan to further reduce potential impacts to this EV wetland by reducing/controlling turbidity associated with sedimentation and construction activities. Specifically, standard and ABACT BMP measures that SPLP will implement to control/manage erosion and sedimentation within the Project area include:

  - Use of wash racks at rock construction entrances;
  - Placement of compost filter socks on the downgradient side of the filter bags and/or dewatering structure;
  - Application of erosion control blanket within 100 feet of receiving HQ/EV waters/wetlands and on slopes 3:1 (H:V) or steeper;
  - Installation of compost filter socks at slope breaker outlets to provide additional filtration prior to discharge to surface waters;
  - Installation of berms and trenches to promote infiltration and manage flow rate;
  - Implementation of the PPC Plan; and,
  - Application of permanent seeding for site restoration.

  As previously stated, Project impacts to EV wetlands will be minor, temporary, and localized. However, as demonstrated through implementation of the selected alternative (refer to Enclosure E, Part 3 – Alternatives Analysis); PADEP-approved ABACT BMPs identified above and in the Project ESCGP-2 Applications, Attachments 4 (E&S Narrative, Section 3.2) and 3 (PCSM Narrative, Section 3.1); the PPC, Inadvertent Return, and Void Mitigation Plans (Attachment 12); and, the Project avoidance, minimization, and mitigation procedures (refer to Enclosure E, Part 4) the Project will maintain and protect the overall water quality of the EV wetland. In addition, the area around and in the EV wetland will be restored to pre-construction conditions following construction such that water quality is further protected and maintained post-construction.

Chapter 93.4c(a)(2) requires the protection of endangered or threatened species if PADEP has confirmed the presence, critical habitat, or critical dependence of endangered or threatened Federal or Pennsylvania species in or on a surface water. As noted above (Section S2.C), ~~no species of concern or suitable habitat have been~~ no permanent habitat for the Eastern redbelly turtle or bog turtle was identified within the LOD survey limits of the proposed reroute modification. However, some transient or temporary habitat may be available for the eastern redbelly turtle in pond P1r. Therefore, SPLP has committed to installation of a super-silt fence as a wildlife barrier

to the workspace near pond P1r. With implementation of this mitigation, measure, the PFBC has indicated that the Project would not adversely impact the Eastern redbelly turtle. Similarly, as no habitat for the bog turtle was identified the USFWS concurred that no adverse effect would occur from the proposed Project modification. ~~a new PNDI search review did not identify any T&E species or Special Species of Concern associated with the Goldfinch Lane/William Penn Avenue Reroute.~~ Please refer to Module 2, S2.C of this Environmental Assessment and *Attachment G* of this permit modification request packet for additional information.

Chapter 93.6 states that a project will not introduce/discharge any substance "in concentrations or amounts sufficient to be inimical or harmful to the water uses to be protected or to human, animal, plant, or aquatic life," including actions that could produce turbidity. The requested permit modification will result in minor, temporary, and localized impacts to surface waters of the Commonwealth primarily associated with increased turbidity during construction activities. The requested permit modification does not involve any permanent structures/facilities that will discharge any treated or created industrial wastewater, nor will it alter the existing natural conditions (chemical, biological, or physical) of the water resources crossed by the Project. In addition, the Project does not involve the addition or discharge of any toxic (Section 93.8a) or harmful substances into the waters of the Commonwealth. All water resources will be restored to their pre-existing conditions following Project construction such that their designated/existing water uses are not impacted by the Project. Accordingly, the proposed Project does not have the potential to alter water quality such that the existing water use or aquatic life of HQ resources will be affected.

Please refer to the complete *Antidegradation Analysis* in Attachment 11, Enclosure E (Part 5) of the PPP Chapter 105 Joint Permit Application (E15-862) for additional details/information.

S3.F Alternatives Analysis

An Alternatives Analysis (AA) was prepared and submitted as part of the PPP Chapter 105 Joint Permit Application (E15-862) in Attachment 11, Enclosure E (Part 3). In addition, an Alternatives Analysis specific to this permit modification request has been conducted and is presented in Attachment A of this modification request application. This AA fully assesses the use of reroutes around WL-Q76, boring methods (other than HDD) under the subject stream and wetland, and open trench method across the subject and wetland, including a comparison of benefits and potential impacts of these methods; demonstrates why the alternative (to open trench) methods are neither technically feasible nor practicable taking into consideration existing technology, logistics, and safety; and, fully assesses other impact avoidance and minimization measures, including resultant potential impacts to downgradient/downstream hydrologically connected streams and wetlands. In addition, the AA fully assesses the impacts to EV wetlands, evaluates the practicability of alternatives, and demonstrates impacts to the subject EV wetland are in compliance with all applicable conditions in 25 Pa. Code § 105.18a(a)(1) through (7).

The crossing of aquatic resources is unavoidable due to the linear nature of the proposed PPP Project and as described in the Environmental Assessment, S1.B – Water Dependency (refer to *Attachment C* of this permit modification). Therefore, to avoid direct impacts to these resources, SPLP originally planned to HDD under a few wetlands and streams. However, during the HDD of the 16-inch pipe there were a number of loss of circulation (LOC) occurrences that significantly slowed the HDD progress. SPLP stopped work on the 16-inch HDD and evaluated a number of different options.

The existing HDD profile/plan for both the 16 and 20-inch pipelines is in proximity to the Marsh Creek State Park/Marsh Creek Lake Natural Heritage Area. Accordingly, SPLP wants to protect these sensitive areas from potential IRs associated with the continuation of HDD activities in the area based on the difficulties experienced during the initial attempts to install the 16-inch pipe. An open-trench installation along the existing/permitted route would require impacting two wetlands and 3 streams and is located within the potential build-out areas of Pennsylvania Turnpike 76.

SPLP evaluated other routes that would minimize environmental impacts and avoid potential future growth requirements of the PA Turnpike 76. A reroute to the west would align the pipelines directly through the Marsh Creek State Park and Marsh Creek Lake Natural Heritage Area. A reroute to the east would minimize impacts to these areas and reduce the number of aquatic resource crossings to one stream, its floodway, and the floodways of 2 other streams. In addition, a reroute in this area could utilize the existing road right-of-way of Meadow Creek Lane and avoid having to create a new "greenfield" corridor for the majority of the route.

In conclusion, the subsurface geology at this particular location is not considered suitable for an HDD crossing based on the difficulties experienced during the 16-inch HDD. In addition, an open-trench installation through this area is not desirable due to resource impacts and potential future PA Turnpike 76 development plans. An alternative route to the west (Western Reroute) of the proposed crossing would result in more environmental (forested areas, wetlands, parks, NHA) impacts than an alternative route to the east. The Eastern Reroute alignment was developed and selected as a technically feasible reroute that would result in less impacts to wetland, stream, floodway, and other environmental resources than the Western Reroute, and therefore was selected as the proposed reroute alignment. Further evaluation of other (non-HDD) trenchless construction methods along the Eastern Reroute alignment aquatic resources "crossing area" determined these methods to be not technically feasible due to the limitations of these existing technologies and logistics. Further evaluation of the use of the open cut construction method along the Eastern Reroute alignment aquatic resources "crossing area" determined this method to be technically feasible. Furthermore, with the implementation of SPLP's Project-wide and site-specific impact avoidance and minimization measures, use of the open cut construction method with dam and pump bypass stream crossing will result in impacts to WL-Q75 and S-Q83 that will be minor and temporary, and are considered not significant or adverse, as well as avoid or minimize impacts on wetland, stream, other environmental resources to the maximum extent practicable within the proposed Eastern Reroute alignment permanent right-of-way. Consequently, it is the professional opinion of the HDD Reevaluation Team, consisting of the Geotechnical Evaluation Leader, Professional Geologists, Professional Engineers, and other construction specialists that a reroute to the east using the open-trench, dry construction method for the stream and wetland crossing will have the least impact, as the work area and wetland/stream construction will be managed in accordance with all permit conditions and can be completed in the most efficient and timely manner, including restoration/stabilization of the aquatic resources. Moreover, use of the open cut construction method is the only technically feasible, and therefore the only practicable, alternative within the proposed Eastern Reroute alignment right-of-way taking into consideration existing technology and logistics, including safety.

S3.G Potential Secondary Impact Evaluation

A Resource ID and Project Impacts Report was prepared and submitted as part of the PPP Chapter 105 Joint Permit Application (E15-862; APS 879047) in Attachment 11, Enclosure E (Part

2). Potential secondary impacts to wetlands/streams and their aquatic habitat, water quantity, and water quality resulting from the Project were discussed in Section 4.1 of that report. Excerpts applicable to the proposed permit modification and additional pertinent information are discussed below.

Potential secondary impacts to wetland/stream habitats could result from the Project including short-term release of sediments into waterways and vegetation clearing, that could result in the temporary displacement of wildlife to adjacent areas. These short-term impacts adjacent to and downgradient of the LOD could temporarily alter substrate and make it less suitable for spawning and foraging, and may create temporary turbidity that could alter the feeding habits of local wildlife. In addition, the clearing of vegetation reduces the shelter and buffer capacity to adjacent habitats and creates new edge habitat when located through greenfield areas. SPLP has mitigated for these potential secondary impacts by reducing the area of disturbance and clearing, minimizing the duration of construction activities in the wetland/stream area, implementing the E&S BMPs (Attachment D) and appropriate ABACT measures, and restoring the disturbed areas with vegetation to avoid impacts off the ROW.

Other potential secondary impacts such as the introduction of invasive or exotic vegetation will be avoided by topsoil segregation of trench material, which maintains the native seed source, and the prompt establishment of native or temporary cover immediately following construction. In addition, restoration of stream bank and wetland areas by planting native shrub vegetation will avoid secondary impacts to adjacent habitat caused by changes in vegetative community or establishment of invasive or exotic vegetation.

Potential secondary impacts on adjacent wetland and stream habitat functions could result from the short-term release of turbid waters and vegetation clearing, resulting in the temporary displacement of wildlife that use adjacent areas for spawning, foraging, nesting, rearing, and resting. However, the potential secondary impacts from the release of turbid waters, at most, will be negligible in nature given the short duration of in-stream construction, and through implementation of temporary and permanent erosion and sediment (E&S) controls (refer to Attachment D of this permit modification packet). Restoration of the resource areas with native plant species will avoid potential secondary impacts to adjacent habitat from changes in vegetation communities as well as the establishment of invasive or exotic vegetation.

Potential secondary impacts on water quantity or the hydrology of streams could result from changes in natural/current drainage patterns and alteration in flow and water levels from construction. However, the Project does not involve any stream relocations, enclosures, channel deepening/dredging activities, and addition of structures or impervious surfaces. Given that the Project does not involve direct impacts to natural and current drainage patterns, the Project will likewise not result in secondary impacts to natural and current drainage patterns. Temporary dam and flow bypass methods will be used to maintain a continuous downstream flow during construction.

Potential secondary impacts to stream water quality beyond the Project's limit of disturbance could result from: release of sediments/turbid waters from trenching, dewatering, clearing and grading of adjacent land and stream banks, and post-construction stream bank subsidence; and, release of pollutants from construction equipment or activities adjacent to waters. However, in accordance with the Chapter 102 E&S requirements, trench dewatering will be monitored and directed into appropriate receiving structures located in well-vegetated uplands to allow for filtration. Released water will naturally infiltrate to prevent secondary impacts to water quality of

streams outside the ROW. Potential secondary impacts from stream bank subsidence will be avoided by leaving roots/stumps in place, except for over the trench, and by stabilizing/revegetating stream banks as soon as possible after construction. Post-construction monitoring will ensure that successful restoration occurs, or necessary corrective actions are implemented to result in successful restoration, thereby avoiding potential secondary impacts from stream bank subsidence/subsequent downstream erosion and sedimentation. Additionally, aerial and ground inspections during Project operation will identify stream bank subsidence and soil erosion issues which will be rectified by repairs or installation of temporary erosion control devices until permanent erosion control measures become effective.

Potential secondary impacts to adjacent resources will be avoided and minimized to the extent possible such that there is no loss of aquatic habitat, water quantity, or water quality.

S3.H Potential Cumulative Impacts

A Cumulative Impact Analysis (CIA) was prepared for the overall Project and submitted as part of the PPP Chapter 105 Joint Permit Application (E15-862) in Attachment 11, Enclosure E (Part 6). The CIA addresses the cumulative impact for the entire Project and other potential or existing SPLP projects, and other oil and gas projects within the Cumulative Impact Assessment Area (CIAA) of the Project.

The cumulative impacts to the stream and wetland identified in the surveyed portion of the reroute and associated with the open-trench crossing methodology would be limited to the aggregate impacts of the Project (and other potential or existing SPLP projects, and other evaluated projects within the CIAA) on waterbodies. As reported in the CIA, implementation of the Project, including the addition of impacts associated with the requested modification for the open-trench method, and other potential or existing SPLP projects, and other projects evaluated within the CIAA will result in a cumulative wetland/waterbody disturbance of approximately 64,996 linear feet. These disturbances will result in no loss of waters or long-term water-quality and quantity. As documented in the CIA, with the implementation of each potential or existing project in compliance with best management practices and permit conditions, all the disturbances to the wetland and stream are (existing projects) or are anticipated to be (potential projects) minor and temporary; therefore, no more than minimal and temporary individual and cumulative adverse environmental effects are anticipated.

Module S4: Mitigation Plan

S4.A Avoidance, Minimization and Unavoidable Impacts

The crossing of aquatic resources is unavoidable due to the linear nature of the proposed PPP Project and as described in the Environmental Assessment, S1.B – Water Dependency (refer to Attachment C of this permit modification). To avoid direct impacts to these resources, SPLP originally planned to HDD under the wetland/stream complex. However, as described in Project Description (Attachment A of this permit modification request packet) SPLP has evaluated a number of different crossing alternatives, including a reroute further to the northeast and a change in construction method from HDD to open-trench.

The existing HDD profile/plan for both the 16 and 20-inch pipelines is in proximity to the Marsh Creek State Park/Marsh Creek Lake Natural Heritage Area. Accordingly, SPLP wants to protect these sensitive areas from potential IRs associated with the continuation of HDD activities in the area based on the difficulties experienced during the initial attempts to install the 16-inch pipe. An open-trench installation method along the existing/permitted route would require impacting two wetlands and 3 streams and is located within the potential build-out areas of Pennsylvania Turnpike 76.

SPLP evaluated other routes that would minimize environmental impacts and avoid potential future growth requirements of the PA Turnpike 76. A reroute to the west would align the pipelines directly through the Marsh Creek State Park and Marsh Creek Lake Natural Heritage Area. A reroute to the east would minimize impacts to these areas and reduce the number of aquatic resource crossings to one stream and one wetland, and the floodways of 3 other streams. In addition, a reroute in this area could utilize the existing road right-of-way of Meadow Creek Lane and avoid having to create a new “greenfield” corridor for the majority of the route.

The subsurface geology at this particular location is not considered suitable for an HDD crossing based on the difficulties experienced during the 16-inch HDD. An alternative route to the west of the proposed crossing would result in more environmental (forested areas, wetlands, parks, NHA) impacts. Consequently, it is the professional opinion of the HDD Reevaluation Team, consisting of the Geotechnical Evaluation Leader, Professional Geologists, Professional Engineers, and other construction specialists that a reroute to the east using the open-trench, dry construction method for the one stream crossing will have the least impact, as the work area and stream flow will be managed in accordance with all permit conditions and can be completed in the most efficient and timely manner, including restoration/stabilization of the stream.

To minimize impacts to the stream’s water quality during the open-trench crossing, the stream will be crossed while dry and the workspace will be reduced to the extent possible. In addition, the proposed open-trench crossing of stream resources does not propose any permanent fill or loss of stream, and the impacts to the wetland and stream resources are considered minor and temporary. The wetland, stream and adjacent buffers will be restored in accordance with the revised/updated E&S Plan (refer to *Attachment D* of this permit modification request packet) that dictates the restoration of the existing topography, stream bed substrate, hydrology, and vegetation.

As demonstrated within SPLP’s Chapter 105 Joint Permit Application, SPLP has avoided and minimized potential impacts to waters from the Project. In so doing, there is no practicable alternative to each of the crossings that would have less effect on each waterbody, and not have

other significant adverse effects on the environment, taking into consideration construction costs, existing technology, safety, and logistics. Those remaining unavoidable impacts are outlined within the resource impact tables located within the Impact Avoidance, Minimization, and Mitigation Procedures provided in Attachment 11, Enclosure E, Part 4 of the PPP Chapter 105 Joint Permit Application (E15-862) and *Attachment E* of this permit modification request.

S4.B Repair, Rehab, and Restoration Actions/Proposed Preservation and Maintenance Operations

SPLP will construct the requested permit modification in accordance with the Chapter 102 Permit requirements and will implement erosion and sediment control BMPs and ABACT measures (HQ stream), as required and presented throughout this permit modification request, during all construction and restoration activities. Please refer to *Attachment D* of this permit modification request packet for the updated E&S and Restoration plans specific to the requested open-trench dry crossing of Stream S-Q83, Wetland Q76, and the floodways of Streams S-Q83, S-Q84 and S16r.

In addition, SPLP will implement all protective and/or preventative requirements required by the agencies with regard to trout resources.

S4.C Compensatory Mitigation

This permit modification request for a Project reroute and construction methodology change to a conventional open-trench dry crossing of one stream and one wetland would result in minor, short-term, and temporary impacts. No permanent fill of wetlands/streams and/or relocation of these resources would occur. The stream, wetland, and floodways would be restored to their original conditions and there will be no loss of resource function; therefore, no compensatory mitigation is required or offered.

S4.D Project Monitoring Plan

Utility Inspection Program & Environmental Compliance Program

All aspects of construction, operation, and maintenance of the PPP Project are supervised by SPLP personnel. Utility or “Craft” inspectors working on behalf of SPLP are staffed throughout all phases of construction to ensure the facilities are constructed and installed in accordance with SPLP, state, local, and federal specifications and standards.

Supplemental to their Utility Inspection Program, SPLP has implemented a comprehensive Environmental Compliance Program (ECP). The ECP encompasses highly integrated and essential program elements designed to ensure compliance with the requirements of the E&S Plan, permit conditions, and approved mitigation measures and conditions. The primary elements of the ECP are environmental training; environmental inspection; biological and cultural resource monitoring/training; and, agency and Project team notification and documentation requirements. Each of these elements is incorporated into the single integrated ECP organization structure and execution plan.

Post-Construction Monitoring

Wetland Q76, Stream S-Q83, including its floodway, and the floodways of S-Q84 and S16r will be temporarily impacted and restored to original grade, stabilized, and vegetated in accordance with the E&S Plan (refer to *Attachment D* of this permit modification request packet). Post-

construction, the wetland and stream will be monitored in accordance with the Project's Impact Avoidance, Minimization, and Mitigation Procedures provided in Attachment 11, Section E, Part 4 of the PPP Chapter 105 Joint Permit Application (E15-862) as well as all applicable permits and clearances.

Attachment S2.A-1

Location Map

Previously Provided – No Change

Attachment S2.A-2

Supplemental Aquatic Resources Reports

Previously Provided – No Change

Attachment S2.D-2

Level 2 Rapid Condition Assessment Data Forms

Wetland Function-Value Evaluation Form

Total area of wetland 0.76 ac. Human made? No Is wetland part of a wildlife corridor? No or a "habitat island"? No

Adjacent land use Residential, highway, forest Distance to nearest roadway or other development 40 ft.

Dominant wetland systems present PEM/PSS Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Upper

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Q76

Latitude 40.091254 Longitude -75.728528

Prepared by: K. B. Date 6/3/2020

Wetland Impact:
Type HDD Area

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y / N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	Y	2,7,9		
Floodflow Alteration	Y	1,2,3,6,9,10,11,13,14,18	X	Adjacent to stream S-Q83 (Meadow Creek), receives overland sheet flow from uplands
Fish and Shellfish Habitat	Y	4,8,14,15,16,17		
Sediment/Toxicant Retention	Y	2,6,10,13		
Nutrient Removal	Y	1,4,8		
Production Export	Y	7		
Sediment/Shoreline Stabilization	Y	2,3,4,7,12,14	X	Dense riparian vegetation of shrubs and forbs
Wildlife Habitat	Y	5,6,7		
Recreation	N			
Educational/Scientific Value	N			
Uniqueness/Heritage	N			
Visual Quality/Aesthetics	N			
ES Endangered Species Habitat	N			
Other				

Notes:

* Refer to backup list of numbered considerations.

Riverine Assessment Form 1

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

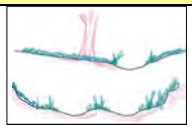
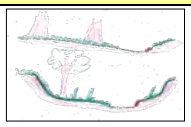
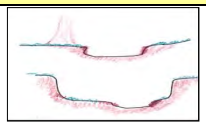
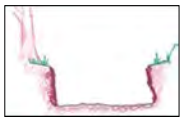
Pennsylvania Department of Environmental Protection

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
	PPP-Mariner East II		Chester County, PA	6/3/2020	Designated: X	Existing:	S-Q83	686 ft.
Latitude	40.091166	Longitude	-75.728333	FGM Level 1 Channel Classification				

Evaluator(s)	Stream Name and Information	Notes:
K. Berend	S-Q83 (Meadow Creek)	

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	12	0.60

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					
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 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.			
						High					High					High					Low
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1		

Comments:

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	Forest	Scrub-shrub	Lawn	Pond	Residential		Side Sub-Index	
Right Side	% Riparian Area:	5%	10%	75%	5%	5%	0%	0.33	Side Sub-Index = SUM(%Areas*Scores)/20
	Score:	15	10	5	15	5	0		
	Total Sub-score:	**0.75**	**1.00**	**3.75**	**0.75**	**0.25**	**0.00**		
	Condition Category								
Left Side	% Riparian Area:	45%	25%	30%	0%	0%	0%	0.54	CI = (Left Side CI + Right Side CI)/2
	Score:	15	10	5	15	5	0		CI: 0.43
	Total Sub-score:	**6.75**	**2.50**	**1.50**	**0.00**	**0.00**	**0.00**		

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				Comments:
	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	

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	Forest	Scrub-shrub	Lawn	Residential	Paved		Side Sub-Index	
Right Side	% Riparian Area:	5%	10%	78%	5%	2%	0%	**0.30**	**Side Sub-Index = SUM(%Areas*Scores)/20**
	Score:	15	10	5	5	1	0		
	Total Sub-score:	**0.75**	**1.00**	**3.90**	**0.25**	**0.02**	**0.00**		
Left Side	Condition Category								
	% Riparian Area:	50%	18%	30%	0%	2%	0%	**0.54**	**CI = (Left Side CI + Right Side CI)/2** → **CI 0.42**
	Score:	15	10	5	5	1	0		
	Total Sub-score:	**7.50**	**1.80**	**1.50**	**0.00**	**0.02**	**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				Comments:	
	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.		
					CI = (Score)/20	**CI**
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1	**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				Comments:	
	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		**CI = (Score)/20**	**CI**
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1	**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**	**0.63**

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:

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.

Project #	Project Name	Date	Proposed Impact Size (acres)	AA #	AA Size (acres)	
	PPP-Mariner East II	6/3/2020		Q76	0.76	

Name(s) of Evaluator(s)	Lat (dd)	Long (dd)	Notes:
K. Berend	40.091254	-75.728528	

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:	Immature forest	Scrub-shrub	Lawn	Pond	Residential	Road	Total Score:	
Scoring:	% ZOI Area:	15%	30%	35%	5%	5%	10%		
	Score:	15	10	5	15	5	1		**0.41**
	Total Sub-score:	2.25	3.00	1.75	0.75	0.25	0.10	**8.10**	

Comments:

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.		**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**

	Condition Score	Weighting	Sub-Scores	
a. Roadbed 0-100:	4	*** (0.67)**	3	
b. Roadbed 100-300:	7	*** (0.33)**	2	**0.25**
		Total Score:	**5**	

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 Pennsyvlania 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.				
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

CI = Total Score/40

Comments:

a. Invasive Sub-Score:	5	**Total Score**
b. Vegetation Sub-Score:	12	**17**

0.43

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.				
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

CI = Total Score/20

Comments:

Score:	**20**

1.00

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.				
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

CI = Total Score/20

Comments:

Score:	**20**

1.00

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.				
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1

CI = Total Score/40

Comments:

a. Eutrophication Score	20	**Total Score:**
b. Contaminant Score	20	**40**

1.00

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:**	**0.68**

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)
PPP-Mariner East II			6/3/2020	K. Berend
Resource Identifier	**AA #**	**Lat (dd)**	**Long (dd)**	**Notes:**
Q76	Q76	40.091254	-75.728528	

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.	1	4	4	100-300 ft.	1	4	4
2 Lane Paved	0-100 ft.		2	0	100-300 ft.	1	2	2
1 Lane Paved	0-100 ft.		1	0	100-300 ft.	1	1	1
Gravel Road	0-100 ft.		1	0	100-300 ft.		1	0
Dirt Road	0-100 ft.		2	0	100-300 ft.		2	0
Railroad	0-100 ft.		2	0	100-300 ft.		2	0
Other Roadbeds	0-100 ft.		1, 2 or 4		100-300 ft.		1, 2 or 4	
Total Scores:	0-100 ft.		4		100-300 ft.		7	

Road Comments:

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:			
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:			
Total Number:	**0**		
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:			
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:			
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:			
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%
mivi				X					

Total % relative cover of all invasives, collectively on site: 60 %

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*					

ATTACHMENT E

Updated Site Plan
Aquatic Resource Impact Table
Revised June 2020

Stream S-Q83, Ch. 106 area
UNT to Marsh Creek
Coordinates: 40.0909, -75.7287
Perm. Floodplain Impact: 0.028 acres
Temp. Floodplain Impact: 0.019 acres
Crossing Type: Open Cut

Stream S-Q83, Perennial
UNT to Marsh Creek
Chapter 93: HQ-TSF, MF
PAFBC: n/a
Coordinates: 40.0909, -75.7287
Stream Impact: 320ft^2 **E&S Sheet:** ES-6.25
Perm. Floodway Impact: 0.158 acres
Temp. Floodway Impact: 0.069 acres
Crossing Type: Dry Crossing
OHW Width: 5 **Permit:** Individual

Wetland Q76, PEM, EV
HUC12: 020402050101
Coordinates: 40.0912, -75.7287
Perm. Impact: 0.084 acres
Temp. Impact: 0.002 acres
Crossing Type: Open Cut
E&S Sheet: ES-6.25 **Permit:** Individual

Stream S16r, Ephemeral
UNT to Marsh Creek
Chapter 93: Drains to HQ-TSF, MF
PAFBC: n/a
Coordinates: 40.0912, -75.7284
Stream Impact: 0ft^2 **E&S Sheet:** ES-6.25
Perm. Floodway Impact: 0.158 acres
Temp. Floodway Impact: 0.069 acres
Crossing Type: Floodway Only
OHW Width: 1 **Permit:** Individual

Stream S-Q84, Intermittent
UNT to Marsh Creek
Chapter 93: Drains to HQ-TSF, MF
PAFBC: n/a
Coordinates: 40.0909, -75.7285
Stream Impact: 0ft^2 **E&S Sheet:** ES-6.25
Perm. Floodway Impact: 0.158 acres
Temp. Floodway Impact: 0.069 acres
Crossing Type: Floodway Only
OHW Width: 2 **Permit:** Individual

Wetland Q76, PSS
Crossing Type: No Longer Proposed

Stream S-Q83, Perennial
UNT to Marsh Creek
Chapter 93: HQ-TSF, MF
Coordinates: 40.0909, -75.7287
Stream Impact: 15ft^2 **E&S Sheet:** ES-6.25
Perm. Floodway Impact: 0.007 acres
Temp. Floodway Impact: 0 acres
Crossing Type: HDD
OHW Width: 5 **Permit:** Individual

Wetland Q77, PEM
Crossing Type: No Longer Proposed

Stream S-Q86, Ephemeral
UNT to Marsh Creek
Crossing Type: No Longer Proposed

Stream S-Q83, Ch. 106 area
UNT to Marsh Creek
Coordinates: 40.0909, -75.7287
Perm. Floodplain Impact: 0.001 acres
Temp. Floodplain Impact: 0 acres
Crossing Type: HDD

Stream S-Q84, Intermittent
UNT to Marsh Creek
Chapter 93: Drains to HQ-TSF, MF
Coordinates: 40.0909, -75.7285
Stream Impact: 0ft^2 **E&S Sheet:** ES-6.25
Perm. Floodway Impact: 0.007 acres
Temp. Floodway Impact: 0 acres
Crossing Type: HDD Floodway
OHW Width: 2 **Permit:** Individual

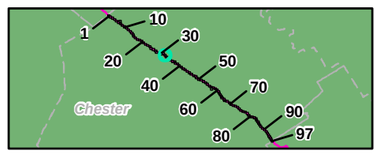
Stream S-Q85, Intermittent, **PA Waived**
UNT to Marsh Creek
Crossing Type: No Longer Proposed

Upper Uwchlan Township
CHESTER COUNTY

EAST/WEST TURNPIKE

Legend

- Sheet Boundary
- PPP 1
- PPP 2
- PPP 1, Bore
- PPP 1, HDD
- PPP 1, FlexBor
- PPP 2, Bore
- PPP 2, HDD
- PPP 2, FlexBor
- Pullback String
- Permanent Easement (no surface disturbance)
- Permanent ROW
- Temporary ROW
- ATWS
- Permanent Access Road
- Temporary Access Road
- ROW-Travel LOD
- ROW-Travel and Clearing LOD
- Existing Block Valve
- New Block Valve
- Block Valve Setting LOD
- Station LOD
- Bore Pits
- PEM Wetland
- PFO Wetland
- PSS Wetland
- Pond
- Ephemeral Stream
- Intermittent Stream
- Perennial Stream
- Chapter 105 Floodway
- Waived Floodway
- Ch. 106 Floodplain Fringe



N

0 25 50 100 150 200

1 inch = 100 feet

Site Plan for the Sunoco Pennsylvania Pipeline Project, Chester County, PA.
Sheet 32 of 98

Prepared By: TETRA TECH

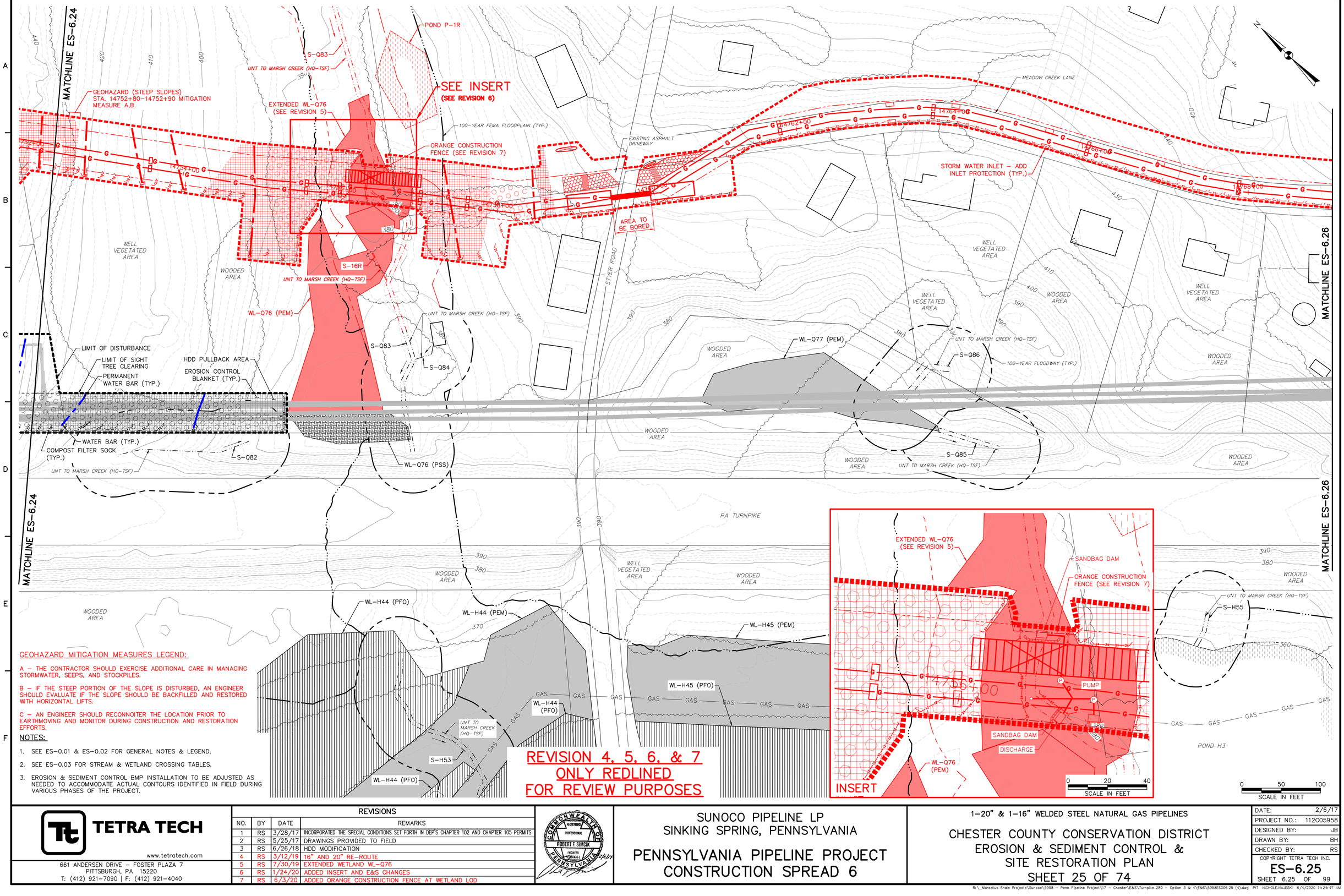
Date: 06/2020

Base Map; SPLP 2014-2016, Roads from NRCS Geo-spatial Data Giveaway, 100-Year Floodplain from FEMA NFHL, downloaded 9/2016. Aquatics, TT 2013-2016.

Coordinate System: NAD 83 Stateplane, PA South, Feet

P:\GIS\Projects\112\C5958-PPP\MXD\Permits\CountyPermits\ChesterCountySitePlan_Rev5

Attachment II



GEOHAZARD MITIGATION MEASURES LEGEND:

A – THE CONTRACTOR SHOULD EXERCISE ADDITIONAL CARE IN MANAGING STORMWATER, SEEPS, AND STOCKPILES.

B – IF THE STEEP PORTION OF THE SLOPE IS DISTURBED, AN ENGINEER SHOULD EVALUATE IF THE SLOPE SHOULD BE BACKFILLED AND RESTORED WITH HORIZONTAL LIFTS.

C – AN ENGINEER SHOULD RECONNOITER THE LOCATION PRIOR TO EARTHMOVING AND MONITOR DURING CONSTRUCTION AND RESTORATION EFFORTS.

NOTES:

1. SEE ES-0.01 & ES-0.02 FOR GENERAL NOTES & LEGEND.
2. SEE ES-0.03 FOR STREAM & WETLAND CROSSING TABLES.
3. EROSION & SEDIMENT CONTROL BMP INSTALLATION TO BE ADJUSTED AS NEEDED TO ACCOMMODATE ACTUAL CONTOURS IDENTIFIED IN FIELD DURING VARIOUS PHASES OF THE PROJECT.

REVISION 4, 5, 6, & 7
ONLY REDLINED
FOR REVIEW PURPOSES

TETRA TECH
www.tetratech.com
661 ANDERSEN DRIVE – FOSTER PLAZA 7
PITTSBURGH, PA 15220
T: (412) 921-7090 | F: (412) 921-4040

REVISIONS

NO.	BY	DATE	REMARKS
1	RS	3/28/17	INCORPORATED THE SPECIAL CONDITIONS SET FORTH IN DEP'S CHAPTER 102 AND CHAPTER 105 PERMITS
2	RS	5/25/17	DRAWINGS PROVIDED TO FIELD
3	RS	6/26/18	HDD MODIFICATION
4	RS	3/12/19	16" AND 20" RE-ROUTE
5	RS	7/30/19	EXTENDED WETLAND WL-Q76
6	RS	1/24/20	ADDED INSERT AND E&S CHANGES
7	RS	6/3/20	ADDED ORANGE CONSTRUCTION FENCE AT WETLAND LOD

COMMONWEALTH OF PENNSYLVANIA – REGISTERED PROFESSIONAL ENGINEER – ROBERT F. SIMCIK – 072344-E

SUNOCO PIPELINE LP
SINKING SPRING, PENNSYLVANIA

PENNSYLVANIA PIPELINE PROJECT CONSTRUCTION SPREAD 6

1-20" & 1-16" WELDED STEEL NATURAL GAS PIPELINES

CHESTER COUNTY CONSERVATION DISTRICT
EROSION & SEDIMENT CONTROL &
SITE RESTORATION PLAN
SHEET 25 OF 74

DATE:	2/6/17
PROJECT NO.:	112C05958
DESIGNED BY:	JB
DRAWN BY:	BH
CHECKED BY:	RS

ES-6.25
SHEET 6.25 OF 99

R:_Marcellus Shale Projects\Sunoco\5958 – Penn Pipeline Project\17 – Chester\E&S\Turnpike 280 – Option 3 & 4\E&S\5958ES006.25 (4).dwg PIT NICHOLE.NAJESKI 6/4/2020 11:24:47 AM

Attachment III

From: Lech, Gregory <glech@pa.gov>
Sent: Thursday, June 18, 2020 10:17 AM
To: Green, Pat <Pat.Green@tetratech.com>
Subject: RE: [External] RE: Another Stream Trout Class verification

Hi Pat,

Thanks for the reminder. Your best bet is our **Wild Trout Waters (Natural Reproduction** list, in which Marsh Creek's designation is listed as Headwaters to Marsh Creek Lake, Lower Limit Lat/Lon as: 40.089444 -75.731111. This limit looks identical to the TNR.

It appears S-H53/S-Q83 enters downstream of this limit so there would be no designation.

Gregory Lech | Fisheries Biologist
PA Fish & Boat Commission | Division of Environmental Services
P.O. Box 356 | Revere, PA 18953
Phone: 610.847.8772
www.fishandboat.com