

SUNOCO PIPELINE L.P.

Pennsylvania Pipeline Project

Wetland Functions and Values Assessment

-Berks County

**Joint Permit Application for a
Pennsylvania Water Obstruction & Encroachment Permit and a U.S.
Army Corps of Engineers Section 404 Permit Application**

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TETRA TECH

Table of Contents

1.0	Introduction.....	3
2.0	Methods.....	3
3.0	Results and Impact Assessment.....	12
4.0	References.....	14

Attachment A – EV Wetland Highway Method Function and Value Evaluation Forms

Attachment B – Other Wetland Highway Method Function and Value Assessments

WETLAND FUNCTIONS AND VALUES ASSESSMENT

1.0 INTRODUCTION

Sunoco Pipeline's, L.P. (SPLP) is seeking Pennsylvania Department of Environmental Protection (PADEP) Chapter 105 Water Obstruction and Encroachment and U.S. Army Corps of Engineers (USACE) Section 404 permits to allow temporary impacts to aquatic resources associated with the installation and operation of the Pennsylvania Pipeline Project (Project). To support the Berks County Joint Application, and in accordance with *25 Pa Code §105.13(e)(3)*, a wetland functions and values assessment is required and has been prepared for the proposed wetland impacts. The USACE Highway Methodology (USACE 1999) was chosen as the assessment method as it is generally acceptable to the PADEP and the USACE.

SPLP has been diligent in siting and designing the Project to avoid and minimize adverse effects to environmental resources located along the approximately 300-mile route. As part of the application materials, an in-depth alternatives analysis is presented to demonstrate these efforts. Within that alternatives analysis it is apparent that the highest quality wetlands on the Project area being avoided through reroutes and use of horizontal directional drill (HDD) technology. Direct impacts to almost all forested wetlands, the majority of scrub-shrub wetlands, and all federally listed endangered species occupied wetlands are avoided. The remaining impacted wetlands are often small, man-made, palustrine emergent, and limited to occurring within existing rights-of-way. This functions and values assessment provides further characterization of the impacted wetlands to assist the PADEP in its evaluation of the Chapter 105 application.

2.0 METHODS

As stated, the USACE Highway Methodology (USACE 1999) was chosen as the assessment method as it is generally acceptable to the PADEP and the USACE. In accordance with the method the eight functions and five values listed below were assessed for each impacted wetland. A Wetland Function-Value Evaluation Form is provided within the method's workbook and was used in the assessment of this Project's exceptional value (EV) wetlands. As first step, descriptor information on the wetland or wetland complex is provided within the header portion of the form and allows for information in respect to surround landscape as well as the impacts to be entered. As a second step, the suitability of the wetland to provide the function is assessed. Those determined to not provide the function or value or provide it at an insignificant level were considered not to be providing the function and "No" was checked. The rationale for making the suitability decision and the considerations/qualifiers are then listed by code within the form in accordance with those listed in Table 1. Having a consideration/qualifier present did not automatically qualify the wetland as suitable for the function or value, but was a result of a combination of the presence and the evaluator's best professional judgment. Wetland delineation data sheets, pictures, topographical maps, soils maps, aerial maps, wetland and stream delineations, agency information (e.g., endangered species presence, designated exceptional value), other field survey information (e.g., threatened and endangered species), and best professional judgement were used during each evaluation. The third and final step, was to identify principle functions and values as those determined to be the most important. The objective of filling out the form is to document an unbiased record of the wetland, including

its location, function, appearance and relationship to its adjacent land use (USACE 1999). For non-exceptional value wetlands or “other wetlands” the same methodology was used but the results are presented in tabular format and lists only the principle functions provided.

GROUNDWATER RECHARGE/DISCHARGE — this function considers the potential for a wetland to serve as a groundwater recharge and/or discharge area. Recharge should relate to the potential for the wetland to contribute water to an aquifer. Discharge should relate to the potential for the wetland to serve as an area where groundwater can be discharged to the surface.

FLOODFLOW ALTERATION (Storage & Desynchronization) — This function considers the effectiveness of the wetland in reducing flood damage by attenuation of floodwaters for prolonged periods following precipitation events.

FISH AND SHELLFISH HABITAT — This function considers the effectiveness of seasonal or permanent waterbodies associated with the wetland in question for fish and shellfish habitat.

SEDIMENT/TOXICANT/PATHOGEN RETENTION — This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens.

NUTRIENT REMOVAL/RETENTION/TRANSFORMATION — This function relates to the effectiveness of the wetland to prevent adverse effects of excess nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries.

PRODUCTION EXPORT (Nutrient) — This function relates to the effectiveness of the wetland to produce food or usable products for humans or other living organisms.

SEDIMENT/SHORELINE STABILIZATION — This function relates to the effectiveness of a wetland to stabilize streambanks and shorelines against erosion.

WILDLIFE HABITAT — This function considers the effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with wetlands and the wetland edge. Both resident and/ or migrating species must be considered. Species lists of observed and potential animals should be included in the wetland assessment report.

RECREATION (Consumptive and Non-Consumptive) — This value considers the effectiveness of the wetland and associated watercourses to provide recreational opportunities such as canoeing, boating, fishing, hunting, and other active or passive recreational activities. Consumptive activities consume or diminish the plants, animals, or other resources that are intrinsic to the wetland, whereas non-consumptive activities do not.

EDUCATIONAL/SCIENTIFIC VALUE — This value considers the effectiveness of the wetland as a site for an “outdoor classroom” or as a location for scientific study or research.

UNIQUENESS/HERITAGE — This value relates to the effectiveness of the wetland or its associated waterbodies to produce certain special values. Special values may include such things as archaeological sites, unusual aesthetic quality, historical events, or unique plants, animals, or geologic features.

VISUAL QUALITY/AESTHETICS — This value relates to the visual and aesthetic qualities of the wetland.

THREATENED or ENDANGERED SPECIES HABITAT — This value relates to the effectiveness of the wetland or associated waterbodies to support threatened or endangered species.

Table 1 – Function-Value Considerations/Qualifiers

FUNCTION/VALUE	CONSIDERATIONS/QUALIFIERS
Groundwater Recharge/Discharge	<ol style="list-style-type: none"> 1. Public or private wells occur downstream of the wetland. 2. Potential exists for public or private wells downstream of the wetland. 3. Wetland is underlain by stratified drift. 4. Gravel or sandy soils present in or adjacent to the wetland. 5. Fragipan does not occur in the wetland. 6. Fragipan, impervious soils, or bedrock does occur in the wetland. 7. Wetland is associated with a perennial or intermittent watercourse. 8. Signs of groundwater recharge are present or piezometer data demonstrates recharge. 9. Wetland is associated with a watercourse but lacks a defined outlet or contains a constricted outlet. 10. Wetland contains only an outlet, no inlet. 11. Groundwater quality of stratified drift aquifer within or downstream of wetland meets drinking water standards. 12. Quality of water associated with the wetland is high. 13. Signs of groundwater discharge are present (e.g., springs). 14. Water temperature suggests it is a discharge site. 15. Wetland shows signs of variable water levels. 16. Other
Floodflow Alteration	<ol style="list-style-type: none"> 1. Area of this wetland is large relative to its watershed. 2. Wetland occurs in the upper portions of its watershed. 3. Effective flood storage is small or non-existent upslope of or above the wetland. 4. Wetland watershed contains a high percent of impervious surfaces. 5. Wetland contains hydric soils which are able to absorb and detain water. 6. Wetland exists in a relatively flat area that has flood storage potential. 7. Wetland has an intermittent outlet, ponded water, or signs are present of variable water level.

FUNCTION/VALUE	CONSIDERATIONS/QUALIFIERS
	8. During flood events, this wetland can retain higher volumes of water than under normal or average rainfall conditions. 9. Wetland receives and retains overland or sheet flow runoff from surrounding uplands. 10. In the event of a large storm, this wetland may receive and detain excessive flood water from a nearby watercourse. 11. Valuable properties, structures, or resources are located in or near the floodplain downstream from the wetland. 12. The watershed has a history of economic loss due to flooding. 13. This wetland is associated with one or more watercourses. 14. This wetland watercourse is sinuous or diffuse. 15. This wetland outlet is constricted. 16. Channel flow velocity is affected by this wetland. 17. Land uses downstream are protected by this wetland. 18. This wetland contains a high density of vegetation. 19. Other
Fish and Shellfish Habitat	1. Forest land dominant in the watershed above this wetland. 2. Abundance of cover objects present. STOP HERE IF THIS WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE 3. Size of this wetland is able to support large fish/shellfish populations. 4. Wetland is part of a larger, contiguous watercourse. 5. Wetland has sufficient size and depth in open water areas so as not to freeze solid and retain some open water during winter. 6. Stream width (bank to bank) is more than 50 feet. 7. Quality of the watercourse associated with this wetland is able to support healthy fish/shellfish populations. 8. Streamside vegetation provides shade for the watercourse. 9. Spawning areas are present (submerged vegetation or gravel beds). 10. Food is available to fish/shellfish populations within this wetland. 11. Barrier(s) to anadromous fish (such as dams, including beaver dams, waterfalls, road crossing) are absent from the stream reach associated with this wetland. 12. Evidence of fish is present. 13. Wetland is stocked with fish. 14. The watercourse is persistent. 15. Man-made streams are absent. 16. Water velocities are not too excessive for fish usage. 17. Defined stream channel is present. 18. Other
Sediment/Toxicant/Pathogen Retention	1. Potential sources of excess sediment are in the watershed above the wetland. 2. Potential or known sources of toxicants are in the watershed above the wetland. 3. Opportunity for sediment trapping by slow moving water or deepwater habitat are present in this wetland.

FUNCTION/VALUE	CONSIDERATIONS/QUALIFIERS
	4. Fine grained mineral or organic soils are present. 5. Long duration water retention time is present in this wetland. 6. Public or private water sources occur downstream. 7. The wetland edge is broad and intermittently aerobic. 8. The wetland is known to have existed for more than 50 years. 9. Drainage ditches have not been constructed in the wetland. STOP HERE IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE. 10. Wetland is associated with an intermittent or perennial stream or a lake. 11. Channelized flows have visible velocity decreases in the wetland. 12. Effective floodwater storage in wetland is occurring. Areas of impounded open water are present. 13. No indicators of erosive forces are present. No high water velocities are present. 14. Diffuse water flows are present in the wetland. 15. Wetland has a high degree of water and vegetation interspersion. 16. Dense vegetation provides opportunity for sediment trapping and/or signs of sediment accumulation by dense vegetation is present. 17. Other
Nutrient Removal/Retention/Transformation	1. Wetland is large relative to the size of its watershed. 2. Deep water or open water habitat exists. 3. Overall potential for sediment trapping exists in the wetland. 4. Potential sources of excess nutrients are present in the watershed above the wetland. 5. Wetland saturated for most of the season. Poned water is present in the wetland. 6. Deep organic/sediment deposits are present. 7. Slowly drained fine grained mineral or organic soils are present. 8. Dense vegetation is present. 9. Emergent vegetation and/or dense woody stems are dominant. 10. Opportunity for nutrient attenuation exists. 11. Vegetation diversity/abundance sufficient to utilize nutrients. STOP HERE IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE. 12. Waterflow through this wetland is diffuse. 13. Water retention/detention time in this wetland is increased by constricted outlet or thick vegetation. 14. Water moves slowly through this wetland. 15. Other
Production Export (Nutrient)	1. Wildlife food sources grow within this wetland. 2. Detritus development is present within this wetland 3. Economically or commercially used products found in this wetland. 4. Evidence of wildlife use found within this wetland. 5. Higher trophic level consumers are utilizing this wetland. 6. Fish or shellfish develop or occur in this wetland. 7. High vegetation density is present. 8. Wetland exhibits high degree of plant community structure/species diversity.

FUNCTION/VALUE	CONSIDERATIONS/QUALIFIERS
	9. High aquatic vegetative diversity/abundance is present. 10. Nutrients exported in wetland watercourses (permanent outlet present). 11. “Flushing” of relatively large amounts of organic plant material occurs from this wetland. 12. Wetland contains flowering plants that are used by nectar-gathering insects. 13. Indications of export are present. 14. High production levels occurring, however, no visible signs of export (assumes export is attenuated). 15. Other
Sediment/Shoreline Stabilization	1. Indications of erosion or siltation are present. 2. Topographical gradient is present in wetland. 3. Potential sediment sources are present up-slope. 4. Potential sediment sources are present upstream. 5. No distinct shoreline or bank is evident between the waterbody and the wetland or upland. 6. A distinct step between the open waterbody or stream and the adjacent land exists (i.e., sharp bank) with dense roots throughout. 7. Wide wetland (>10’) borders watercourse, lake, or pond. 8. High flow velocities in the wetland. 9. The watershed is of sufficient size to produce channelized flow. 10. Open water fetch is present. 11. Boating activity is present. 12. Dense vegetation is bordering watercourse, lake, or pond. 13. High percentage of energy-absorbing emergents and/or shrubs border a watercourse, lake, or pond. 14. Vegetation is comprised of large trees and shrubs that withstand major flood events or erosive incidents and stabilize the shoreline on a large scale (feet). 15. Vegetation is comprised of a dense resilient herbaceous layer that stabilizes sediments and the shoreline on a small scale (inches) during minor flood events or potentially erosive events. 16. Other
Wildlife Habitat	1. Wetland is not degraded by human activity. 2. Water quality of the watercourse, pond, or lake associated with this wetland meets or exceeds Class A or B standards. 3. Wetland is not fragmented by development. 4. Upland surrounding this wetland is undeveloped. 5. More than 40% of this wetland edge is bordered by upland wildlife habitat (e.g., brushland, woodland, active farmland, or idle land) at least 500 feet in width. 6. Wetland is contiguous with other wetland systems connected by a watercourse or lake. 7. Wildlife overland access to other wetlands is present. 8. Wildlife food sources are within this wetland or are nearby. 9. Wetland exhibits a high degree of interspersions of vegetation classes and/or open water.

FUNCTION/VALUE	CONSIDERATIONS/QUALIFIERS
	<ol style="list-style-type: none"> 10. Two or more islands or inclusions of upland within the wetland are present. 11. Dominant wetland class includes deep or shallow marsh or wooded swamp. 12. More than three acres of shallow permanent open water (less than 6.6 feet deep), including streams in or adjacent to wetland, are present. 13. Density of the wetland vegetation is high. 14. Wetland exhibits a high degree of plant species diversity. 15. Wetland exhibits a high degree of diversity in plant community structure (e.g., tree/shrub/vine/grasses/mosses) 16. Plant/animal indicator species are present. (List species for project) 17. Animal signs observed (tracks, scats, nesting areas, etc.) 18. Seasonal uses vary for wildlife and wetland appears to support varied population diversity/abundance during different seasons. 19. Wetland contains or has potential to contain a high population of insects. 20. Wetland contains or has potential to contain large amphibian populations. 21. Wetland has a high avian utilization or it's potential. 22. Indications of less disturbance-tolerant species are present. 23. Signs of wildlife habitat enhancement are present (birdhouses, nesting boxes, food sources,
Recreation	<ol style="list-style-type: none"> 1. Wetland is part of a recreation area, park, forest, or refuge. 2. Fishing is available within or from the wetland. 3. Hunting is permitted in the wetland. 4. Hiking occurs or has potential to occur within the wetland. 5. Wetland is a valuable wildlife habitat. 6. The watercourse, pond, or lake associated with the wetland is unpolluted. 7. High visual/aesthetic quality of this potential recreation site. 8. Access to water is available at this potential recreation site for boating, canoeing, or fishing. 9. The watercourse associated with this wetland is wide and deep enough to accommodate canoeing and/or non-powered boating. 10. Off-road public parking available at the potential recreation site. 11. Accessibility and travel ease is present at this site. 12. The wetland is within a short drive or safe walk from highly populated public and private areas. 13. Other
Education/Scientific Value	<ol style="list-style-type: none"> 1. Wetland contains or is known to contain threatened, rare, or endangered species. 2. Little or no disturbance is occurring in this wetland. 3. Potential educational site contains a diversity of wetland classes which are accessible or potentially accessible. 4. Potential educational site is undisturbed and natural.

FUNCTION/VALUE	CONSIDERATIONS/QUALIFIERS
	<ol style="list-style-type: none"> 5. Wetland is considered to be a valuable wildlife habitat. 6. Wetland is located within a nature preserve or wildlife management area. 7. Signs of wildlife habitat enhancement present (bird houses, nesting boxes, food sources, etc.). 8. Off-road parking at potential educational site suitable for school bus access in or near wetland. 9. Potential educational site is within safe walking distance or a short drive to schools. 10. Potential educational site is within safe walking distance to other plant communities. 11. Direct access to perennial stream at potential educational site is available. 12. Direct access to pond or lake at potential educational site is available. 13. No known safety hazards exist within the potential educational site. 14. Public access to the potential educational site is controlled. 15. Handicap accessibility is available. 16. Site is currently used for educational or scientific purposes. 17. Other
<p>Uniqueness/Heritage</p>	<ol style="list-style-type: none"> 1. Upland surrounding wetland is primarily urban. 2. Upland surrounding wetland is developing rapidly. 3. More than 3 acres of shallow permanent open water (less than 6.6 feet deep), including streams, occur in wetlands. 4. Three or more wetland classes are present. 5. Deep and/or shallow marsh or wooded swamp dominate. 6. High degree of interspersed vegetation and/or open water occur in this wetland. 7. Well-vegetated stream corridor (15 feet on each side of the stream) occurs in this wetland. 8. Potential educational site is within a short drive or a safe walk from schools. 9. Off-road parking at potential educational site is suitable for school buses. 10. No known safety hazards exist within this potential educational site. 11. Direct access to perennial stream or lake exists at potential educational site. 12. Two or more wetland classes are visible from primary viewing locations. 13. Low-growing wetlands (marshes, scrub-shrub, bogs, and open water) are visible from primary viewing locations. 14. Half an acre of open water or 200 feet of stream is visible from the primary viewing locations. 15. Large area of wetland is dominated by flowering plants or plants that turn vibrant colors in different seasons. 16. General appearance of the wetland visible from primary viewing locations is unpolluted and/or undisturbed. 17. Overall view of the wetland is available from the surrounding upland. 18. Quality of the water associated with the wetland is high. 19. Opportunities for wildlife observations are available.

FUNCTION/VALUE	CONSIDERATIONS/QUALIFIERS
	20. Historical buildings are found within the wetland. 21. Presence of pond or pond site and remains of a dam occur within the wetland. 22. Wetland is within 50 yards of the nearest perennial watercourse. 23. Visible stone or earthen foundations, berms, dams, standing structures, or associated features occur within the wetland. 24. Wetland contains critical habitat for a state- or federally-listed threatened or endangered species. 25. Wetland is known to be a study site for scientific research. 26. Wetland is a natural landmark or recognized by the state natural heritage inventory authority as an exemplary natural community. 27. Wetland has local significance because it serves several functional values. 28. Wetland has local significance because it has biological, geological, or other features that are locally rare or unique. 29. Wetland is known to contain an important archaeological site. 30. Wetland is hydrologically connected to a state or federally designated scenic river. 31. Wetland is located in an area experiencing a high wetland loss rate. 32. Other
Visual Quality/Aesthetics	1. Multiple wetland classes are visible from primary viewing locations. 2. Emergent marsh and/or open water are visible from primary viewing locations. 3. A diversity of vegetative species is visible from primary viewing locations. 4. Wetland is dominated by flowering plants or plants that turn vibrant colors in different seasons. 5. Land use surrounding the wetland is undeveloped as seen from primary viewing locations. 6. Visible surrounding land use form contrasts with wetland. 7. Wetland views absent of trash, debris, and signs of disturbance. 8. Wetland is considered to be a valuable wildlife habitat. 9. Wetland is easily accessed. 10. Low noise level at primary viewing locations. 11. Unpleasant odors absent at primary viewing locations. 12. Relatively unobstructed sight line exists through wetland. 13. Other
Endangered Species Habitat	1. Wetland contains or is known to contain threatened or endangered species. 2. Wetland contains critical habitat for a state or federally listed threatened or endangered species.

3.0 RESULTS AND IMPACT ASSESSMENT

The Project crosses a total of 16 EV wetlands in Berks County. The Wetland Function-Value Evaluation Form is filled out for each of these wetlands and is located in Attachment A. For the non-exceptional value wetlands, the assessment is provided in Tabular format and is located in Attachment B. Please see the Alternative Analysis part of the application, specifically prepared in accordance with Title 25 of the Pennsylvania Code 105.18a(a), to demonstrate that the Project has avoided impacts to aquatic resources to the maximum extent practicable and has been designed to avoid significant adverse impact on wetlands, either through aerial extent or impacts on wetland function and values.

The Project crosses the 16 EV wetlands in Berks County for a total linear distance of approximately 0.19 mile (refer to Table 2); therefore, the total potential impact to EV wetlands (assuming a 50-foot wide construction ROW) would be approximately 1.14 acres. However, SPLP is paralleling their existing ROW through all these wetland areas and has reduced their potential construction impacts from 1.71 acres (based on a new 75' construction ROW width). In addition, SPLP will utilize boring construction methods at three (3) of these wetland crossings, thus reducing the total impacts through EV wetlands to approximately 0.86 acre, which would be temporary in nature and restored to preconstruction conditions/cover. As such, the Project will have no adverse impacts to wetland resources in Berks County as all wetlands areas will be restored (i.e., no fill or wetland loss).

All of the wetland impacts associated with the Project are temporary, and original grades and hydrology will be restored. Wetland and functions and values of all wetlands, including EV wetlands will not be significantly altered. Those wetlands crossed by an HDD have already implemented measures to reduce the potential for inadvertent return through design phase geotechnical study and careful drill alignment planning. No surface impact or function and value impact to these drilled wetlands is expected as a result of the Project. During drill operation an inadvertent return contingency plan will be implemented at all times to further reduce the potential for impacts to wetlands or the functions and values provided.

Extra precautions are taken at each wetland to protect functions and values. Before construction begins, all Project workspaces are surveyed and marked including wetland boundaries. During construction these areas are inspected often to ensure these limits are adhered too. This ensures that only permitted wetland disturbances occur. Limiting the disturbance level to the authorized and minimum amount practicable significantly reduces the potential for unplanned impacts to functions and values.

The Project will be constructed under a PADEP Chapter 102 Erosion and Sediment Control General Permit authorization. This authorization, provides for the construction sequence and requires the installation of BMPs to protect the wetland during and post-construction. The BMPs are derived directly from PADEP manuals and are designed to protect aquatic resource function and value. For example, the installation of trench breakers at wetland entry and exit points is designed to protect wetland hydrology and maintain preconstruction groundwater recharge/discharge, floodflow alteration, sediment/toxicant retention, nutrient removal, and production export when these functions are present. The erosion and control permit will also stipulate top-soil separation in non-saturated wetlands to ensure proper restoration of the native seedbank. In addition, permit authorizations will require monitoring and that monitoring

will establish criteria for contour, hydrology, and vegetation restoration. This monitoring and required agency reporting will further ensure functions and values are not lost.

Stream bed and banks are required to be restored to stabilized condition, and as a result, for wetlands directly abutting stream banks the sediment/shoreline stabilization function is expected to remain unchanged. Fish and shellfish habitat is often degraded as a result of undue sedimentation at Project areas or within downstream waters. The implementation of dry crossing methods at all flowing streams, reduces during construction sedimentation impacts and restoration of stream beds and banks after installation further protects adjacent wetlands and downstream waters. In addition, stream bed substrate is required to be separated and restored to protect important fish spawning habitat. Most streams will be traversed (trenched and backfilled) within 24 hours to reduce exposure to Project activities and unforeseen weather events.

Although many impacts are avoided and minimized, some functions and values would be temporarily affected by construction of the Project. All noted functions and values may be temporarily lost during construction as in the case of very small wetlands completely impacted by Project activities. However, these smaller wetlands often do not provide principal functions, unless an endangered species or unique/heritage value is noted. Large wetlands extending beyond the Project boundaries would still continue to provide the noted functions and values during construction as the impact area relative to the size of the wetland is minor. Several wetlands are noted as providing the wildlife habitat function. While temporary, short-term impacts may be unavoidable to non-mobile wildlife occupying these wetlands, the wetland will be restored and re-occupation is expected by the general wildlife community. More mobile species are expected to occupy adjacent habitats and all sensitive species occupied wetlands have been avoided through re-routes or Project design (e.g., HDD).

In summary, the exceptional value and other wetlands impacted provide functions and values at varying levels. SPLP has taken great steps to avoid and minimize wetland impacts across Berks County. Permanent ROW impacts are at 2.373 acres and temporary at 0.007 acre for the 21.0 miles. As shown in Attachments A and B, many of the wetlands impacted were found not suitable for provision of several of the 13 functions and values. Those where functions and values were found present, it is expected that they will be restored to preconstruction conditions and not significantly altered as a result of construction and operation of the Project.

4.0 REFERENCES

USACE. 1999. The Highway Methodology Workbook Supplemental. US Army Corps of Engineers New England Division. 39 pp. NAEPP-360-1-30a.

Attachment A

Attachment B