



TRANSCONTINENTAL GAS PIPE LINE, LLC
LEIDY SOUTH PROJECT

COMPENSATORY OFFSITE WETLAND MITIGATION PLAN

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC.

LEIDY SOUTH PROJECT

COMPENSATORY OFFSITE WETLAND MITIGATION PLAN

1.0 OBJECTIVES

The objective of the compensatory wetland mitigation project is to provide sufficient compensation to offset unavoidable wetland impacts resulting from the Leidy South Project (Project) proposed by Transcontinental Gas Pipe Line Company, LLC (Transco), a subsidiary of The Williams Companies, Inc. (Williams). Impacts resulting from the Project include: 1) permanent impacts to 0.22 acre of Palustrine Emergent (PEM) wetlands; 2) functional conversion impacts to 0.06 acre of Palustrine Shrub-Scrub (PSS) wetlands, and; 4) functional conversion impacts to 0.05 acre of PFO wetlands. The impacts associated with the Project are located in the Central West Branch Susquehanna Subbasin, Lower West Branch Susquehanna Subbasin and the Upper Central Susquehanna River Subbasin which corresponds to the Geographic Service Area of the Pennsylvania State Water Plan (Appendix A, Figure 1 – Geographic Service Area Map).

To mitigate for the wetland impacts, an offsite mitigation site has been designated to offset functional losses by providing 0.51 acre of wetland mitigation consisting of 0.27 acre of wetland creation and 0.24 acre of wetland enhancement within the Lower West Branch Susquehanna River Subbasin. The proposed offsite mitigation site is located within an existing property that is currently in use for other offsite permittee-responsible mitigation. The area proposed for mitigation activities associated with this Project is currently being used and has been historically altered for agriculture purposes.

This document has been prepared in accordance with 25 PA Code Chapter 105-20a - Wetland Replacement Criteria, and Federal Register, Department of the Army, Corps of Engineers 33 CFR Parts 325 and 332, Environmental Protection Agency 40 CFR Part 230 – Compensatory Mitigation for Losses of Aquatic Resources; Final Rule, April 10, 2008.

2.0 SITE SELECTION CRITERIA

A desktop analysis was completed within the geographic service areas of Project to determine potential locations to offset water resource impacts resultant of the project (Appendix A, Figure 1 – Geographic Service Area Map). Based on the review, several properties within the geographic service area were currently under an option agreement and have been assessed as areas where mitigation and/or water quality improvement projects would be beneficial within the watershed. Ultimately due to site suitability, the property serving other permittee-responsible mitigation, landowner cooperation, and the large contiguous nature of wetland features on the site, a farm within the Lower West Branch Susquehanna River Subbasin located in Liberty Township, Montour County was selected as an appropriate site to provide compensatory mitigation (Appendix A, Figure 2 – Project Location Map).

3.0 SITE PROTECTION INSTRUMENTS

This site is currently under contract and will be placed in a Declaration of Restrictive Covenants upon acceptance from regulatory agencies (Appendix B – Declaration of Restrictive Covenants Agreement Template). This agreement states that any construction restrictions as well as any other restrictions will be imposed upon the mitigation area. This Restrictive

Covenant shall run with the property in perpetuity and shall be binding on the owner; future owners; and their successors and assigns, lessees, easement holders, and any authorized agents, employees, or persons acting under their direction and control.

4.0 BASELINE INFORMATION

The site is located approximately 3.15 miles east – northeast of the town of Milton along Kelly’s Dam Road. Coordinates of the site are Latitude: 41.012344°N / Longitude: 76.752311°W. Current land use for the proposed mitigation site consists of wetlands and drained agriculture fields primarily used to harvest corn. Through a review of historic aerial imagery the property has been utilized for agriculture purposes for at least 70 years. The portion of property proposed for mitigation contains marginal crop farmland due to the high-water table and frequent flooding and ponding at the site.

4.1 EXISTING HYDROLOGY

The proposed mitigation site is located within the floodplain of the Chillisquaque Creek watershed which according to the Pa. Code 25, Chapter 93 water quality standards is classified as: Warm Water Fisheries (WWF). Through a review of historical aerial photography and during recent onsite investigations, drainage ditches were observed throughout the agricultural field (Appendix A, Figure 4 – Wetland Delineation Map). The noted drainage measures have effectively removed or reduced hydrology in only portions of the field. The remnant hydrology that drives the existing wetlands is provided primarily by upslope runoff and direct precipitation that support a shallow seasonal groundwater table.

4.2 EXISTING SOIL CONDITIONS

Holly silt loam, noted as soil mapping units Hz was mapped within the proposed mitigation site. Holly soils area considered hydric and are alluvial in nature. The following text briefly describes soils found within the project area as described by the USDA/NRCS Soil Survey for Montour County (1985).

4.2.1 HOLLY SILT LOAM, RARELY FLOODED (Hz)

This soil is nearly level, deep, and poorly drained and very poorly drained located on floodplains and is considered hydric. The permeability is moderately slow or moderate, and the available water capacity is high. Runoff is slow. The seasonal high-water table is between the surface and a depth of 6 inches in the winter and spring. The seasonal high-water table is the main limitation for crops, pasture and non-farm uses.

4.3 WATERS OF THE UNITED STATES

A field investigation was conducted to delineate wetland and water resource boundaries on the property and to determine if suitable conditions exist for mitigation activities to take place onsite. The proposed site was originally delineated on October 24, 2013 and boundaries were reconfirmed on August 5, 2019 (Appendix C – Wetland Delineation Report).

The wetland proposed to be enhanced and expanded (created) is an existing PEM wetland located in a slightly depressed area adjacent to and within agricultural fields east of Kelly’s Dam road. Portions of the wetland extended into agricultural fields

which was evident though stunted growth of crops. The remainder of the agricultural field displayed upland vegetation with less hydrologic wetland indicators. Evidence of standing water was located in the most depressed areas of the wetland area. Several drainage ditches were located within the wetland area to assist with draining fields for agricultural uses. Primary soil and hydrologic indicators consisted of oxidized rhizospheres, saturated soils, and a depleted matrix. Dominant vegetation included: *Setaria sp.* (Bristle grass, Facultative Wetland (FACW)), *Scirpus cyperinus* (Woolgrass, FACW), *Juncus effusus* (Soft rush, Obligate (OBL)), *Phalaris arundinacea* (Reed canary grass, FACW), and *Carex alopecoidea* (Foxtail Sedge, FACW).

5.0 CREDIT DETERMINATION METHODOLOGY

The Leidy South Project results in 0.22 acre of permanent PEM wetland impacts, 0.06 acre of functional conversion impacts to PSS wetlands, and functional conversion impacts to 0.05 acre of PFO wetlands. The following mitigation ratios were assessed for the Project:

- 2.5:1 for Exceptional Value (EV) PFO wetlands
- 2:1 for non-EV PFO wetlands
- 1.75:1 for EV PSS wetlands
- 1.5:1 for non-EV PSS wetlands
- 1.25:1 for EV PEM wetlands; and
- 1:1 for non-EV PEM wetlands

Table 5-1 outlines a breakdown of the impacts and proposed mitigation for the Project.

**Table 5-1
Offsite Compensatory Wetland Mitigation Summary**

| Facility | Crossing | Milepost | Feature ID | Wetland Type | Chapter 105.17 | Impact Type | Impacted Area (sq.ft.) | Impacted Area (acres) | Mitigation Ratio | Wetland Mitigation (sq.ft.) |
|--|----------|----------|--------------|--------------|----------------|-------------|------------------------|-----------------------|---|---------------------------------|
| Benton Loop | | | | | | | | | | |
| | BL-8 | 119.1 | W2-T4 | PFO | EV | Conversion | 464 | 0.011 | 2.5 to 1 | 1,161 |
| | BL-10 | 120.2 | W3-T1 | PSS | EV | Conversion | 99 | 0.002 | 1.75 to 1 | 173 |
| | | | | | | | | | PFO Functional Conversion Mitigation | 1,161 |
| | | | | | | | | | PSS Functional Conversion Mitigation | 173 |
| Hilltop Loop | | | | | | | | | | |
| | HL-2 | 184.4 | W1-T5-HL | PFO | EV | Conversion | 284 | 0.007 | 2.5 to 1 | 709 |
| | HL-3 | 184.9 | W1-T4-HL | PFO | EV | Conversion | 340 | 0.008 | 2.5 to 1 | 851 |
| | | | | | | | | | PFO Functional Conversion Mitigation | 1,560 |
| Hensel Replacement | | | | | | | | | | |
| | HR-4 | 190.5 | W8-T6-HR | PSS | EV | Conversion | 381 | 0.009 | 1.75 to 1 | 667 |
| | HR-5 | 190.7 | W1-T7-HR | PSS | EV | Conversion | 220 | 0.005 | 1.75 to 1 | 384 |
| | HR-5 | 190.7 | W1-T7-HR | PFO | EV | Conversion | 471 | 0.011 | 2.5 to 1 | 1,178 |
| | HR-8 | 193.0 | W4-T5-HR | PSS | EV | Conversion | 687 | 0.016 | 1.75 to 1 | 1,203 |
| | HR-9 | 193.1 | W4-T5-HR | PFO | EV | Conversion | 620 | 0.014 | 2.5 to 1 | 1,549 |
| | HR-9 | 193.1 | W4-T5-HR | PSS | EV | Conversion | 1,266 | 0.029 | 1.75 to 1 | 2,216 |
| | HR-AR-2 | - | W5-T7a-HR | PEM | Other | Fill | 816 | 0.019 | 1 to 1 | 816 |
| | | | | | | | | | PEM Wetland Creation Mitigation | 816 |
| | | | | | | | | | PFO Functional Conversion Mitigation | 2,727 |
| | | | | | | | | | PSS Functional Conversion Mitigation | 4,469 |
| Compressor Station 607 | | | | | | | | | | |
| | CS607A-1 | - | W2-T2-CS607A | PEM | EV | Fill | 8,429 | 0.194 | 1.25 to 1 | 10,536 |
| | CS607A-4 | - | W2-T3-CS607A | PEM | Other | Fill | 13 | 0.0003 | 1 to 1 | 13 |
| | CS607A-5 | - | W3-T3-CS607A | PEM | Other | Fill | 437 | 0.01 | 1 to 1 | 437 |
| | | | | | | | | | PEM Wetland Creation Mitigation Area | 10,986 |
| Overall Permanent PEM Impacts | | | | | | | 9,695 | 0.22 | Wetland Creation Mitigation | 11,802 (0.27 acres) |
| Overall Functional Conversion PSS Impacts | | | | | | | 2,652 | 0.06 | PSS Functional Conversion Mitigation | 4,642 sq.ft (0.11 acres) |
| Overall Functional Conversion PFO Impacts | | | | | | | 2,179 | 0.05 | PFO Functional Conversion Mitigation | 5,449 sq.ft (0.13 acres) |

The functions and values provided at the proposed mitigation site will provide sufficient compensation to offset water resource impacts. The functional conversion impacts will be offset by providing a functional gain in low quality PEM wetlands historically used for agricultural purposes by reverting to a higher quality wetland/riparian buffer ecosystem; while the permanent impacts will be offset at a ratio that will exceed no net loss and expand upon wetland habitat at the site. The mitigation areas will enhance and expand the existing wetland complex located at the site. The work plan will result in the expansion and functional enhancement of the existing condition of the PEM wetlands onsite, which are considered low quality due to land use. The permanent protection/conservation of the area, including implementation of a diverse tree and shrub planting plan, will result in an enhanced wetland ecosystem consisting of a mixed wetland /riparian buffer complex. The mitigation activities at the site will allow for the areas to once again provide essential functions and values within the sensitive resource areas. The primary functional improvements of the mitigation area include: 1) water quality benefits through the increased sediment and nutrient sequestration; 2) floral and vegetative diversity; and 3) enhanced wildlife habitat / utilization.

6.0 MITIGATION WORK PLAN

The design of the proposed enhancement and creation area consists of increasing and expanding functions of the existing wetland onsite. The wetland creation area will involve the creation of shallow vegetated open-water components to create and enhance habitat for amphibians, waterfowl, wading birds, and migratory songbird species. The wetlands proposed to be enhanced are in a degraded state due to current farming. Less diverse portions of the enhancement area will be cultivated or plowed to create appropriate conditions for wetland seeding. The design of the overall mitigation site will incorporate meandering flightways paralleled by an emergent and scrub/shrub fringe. Clumped distribution of tree and shrub plantings will be positioned on graded low hummocks or mounds where the collars will be above typical standing water elevations early in the growing season. Tree and shrub plantings are proposed along the perimeter of the site to act as screening/buffer for the enhanced and created wetlands.

6.1 WETLAND ENHANCEMENT

Wetlands within the enhancement areas are PEM wetlands. The existing vegetation within the proposed enhancement areas will be supplemented with native tree and shrub plantings to allow the wetlands to revert to a forested and/or scrub-shrub state; thereby increasing functions and values in these sensitive resource areas. The vegetative design proposed will incorporate diverse planting plans for each site that consist of a clumped distribution of monocultural blocks of trees and shrubs within the wetland enhancement areas to create a mixed wetland ecosystem. All plants will be planted in clumps of monocultures consisting of five (5) to ten (10) plants. Shrub and willow monocultures will be planted 4 feet on center (O.C.); while tree monocultures are to be planted 10 feet O.C. Table 6.1-1 outlines the wetland enhancement planting plan for 0.24 acre.

| TABLE 6.1-1 WETLAND ENHANCEMENT PLANTING PLAN (0.24 ACRES) | | | | |
|---|--------------------|---------------|----------------------|----------------|
| Scientific Name | Common Name | Status | Container | Spacing |
| <i>Cornus amomum</i> | silky dogwood | FACW Shrub | bare root / 1 gallon | 4' O.C. |

| | | | | |
|--|-------------------|----------------|----------------------|----------|
| <i>Cornus racemosa</i> | gray dogwood | FAC Shrub | bare root / 1 gallon | 4' O.C. |
| <i>Ilex verticillata</i> | winterberry | FACW Shrub | bare root / 1 gallon | 4' O.C. |
| <i>Alnus serrulata</i> | hazel alder | OBL Shrub | bare root / 1 gallon | 4' O.C. |
| <i>Salix discolor</i> | pussy willow | FACW Shrub | cutting / 1 gallon | 4' O.C. |
| <i>Salix nigra</i> | black willow | OBL Shrub/Tree | cutting / 1 gallon | 4' O.C. |
| <i>Quercus palustris</i> | pin oak | FACW Tree | 1 or 2 gallon | 10' O.C. |
| <i>Acer saccharinum</i> | silver maple | FACW Tree | 1 or 2 gallon | 10' O.C. |
| <i>Nyssa sylvatica</i> | black gum | FAC Tree | 1 of 2 gallon | 10' O.C. |
| <i>Platanus occidentalis</i> | american sycamore | FACW Tree | 1 or 2 gallon | 10' O.C. |
| Notes: | | | | |
| - Select a minimum of 3 tree species and 3 shrubs species to be planted in enhancement area. | | | | |
| - Plant at a density of 400 stems per acre (or 96 total stems) with trees (48) and shrubs (48) | | | | |

6.2 WETLAND CREATION

6.2.1 Hydrologic Design

The hydrology that drives the existing wetland is the result of a seasonal high water table which is between the surface and a depth of 6 inches in the winter and spring in the Holly (Hz) soil mapping unit, as described in the USDA-SCS Soil Survey for Montour County. Overbank flows from the adjacent tributary also provide additional hydrology during flooding events. Ancillary hydrologic inputs include upslope runoff and direct precipitation. The wetland complex experiences natural drawdown during the drier months of the growing season. The hydrologic design for the wetland creation areas will mimic that of the existing adjacent wetlands hydrology resulting in a shared hydrology model. Grading will be conducted to lower elevations in the proposed creation areas to provide closer interface with the seasonal groundwater. As a result, the design of the wetland creation site is dependent on groundwater, limited runoff and flooding, and direct precipitation as the hydrologic inputs for the mitigation wetlands. Primary water losses are expected to result from monthly evapotranspiration. The resulting inputs/losses hydrograph is expected to closely mirror the existing seasonal rise and fall of the adjacent farmed wetlands.

6.2.2 Grading Design

With respect to the design, the soils within the mitigation area are moderately slow to moderately permeable, have a slow runoff potential, have a seasonally high water table at or within 6 inches of the soil surface in the spring and winter, and have slopes that are nearly flat. Therefore, a wetland creation design based on capturing runoff and holding precipitation through the use of embankments is not appropriate in this setting/hydrogeomorphic landscape position. Instead, a wetland design approach that seeks to excavate to intercept seasonally high-water tables and eliminates potential failure from loss of earthen structures during major flood events is best suited for this site.

Shallow excavations in the wetland creation area and portions of the wetland enhancement area will be necessary to interface with seasonal groundwater and thereby support wetland development in creation areas and

open water pockets in the enhancement areas. The grading design includes a meandering flightway that mimics an old oxbow scour within the wetland creation areas. The flightway will be graded to a depth of approximately 3 feet below the existing and proposed surface elevation with a bottom width of approximately 10 feet. Side slopes will be graded at a 3:1 ratio located 2 feet from the bottom elevation and the final 1 foot will be graded at an 8:1 slope where fringe plantings are proposed along the side cast. Additional microtopography, including hummocks and shallow depressional areas will be included throughout both the wetland creation and enhancement areas to create diversity.

Contour elevations selected for the site are such that a significant soil surplus is not expected. Excess material generated by grading operations will be incorporated into the adjacent agricultural fields. No excess spoil will be placed within the floodplain. Elevations for newly graded contours have been based in part on depths of predicted seasonal groundwater as interpreted by depths of low chroma colors and redoximorphic features. The overall grading design within wetland creation areas and flightway zone will include the stripping of topsoil layer with a typical thickness of 10 – 12 inches, prior to initial grading. The areas will then be brought to within 10 inches (minimum) of final grade and the topsoil replaced to a minimum thickness of 10 inches. The existing topsoil will be acceptable as a substrate for wetland plantings due to the presence of ample sequestered organic matter.

6.2.3 Vegetative Design

The final grading of the site will result in microtopographic changes in elevations which will result in several hydrologic regimes and planting zones. The vegetative design of the site outlines a combination of a specific wetland seed mix, shrub, and tree species that were selected for each hydrologic regime. The site will be seeded and planted immediately following final grading/cultivation operations. If weather or timing following grading operations are not ideal for installation of trees and shrubs, woody plantings will be delayed until more favorable fall or spring seasons to ensure successful growth.

The wetland creation area will be seeded with a mixture of 40 pounds per acre of Annual Rye Grass and 15 pounds per acre of Ernst Seed Mix's – Waterfowl Buffet Mix for Wetland Enhancement (or equivalent). Hay or straw mulch will be applied at a rate of 3 tons per acre to the newly seeded sloping areas for protection against erosion during seed germination.

Plantings selected for the various regimes have been based on saturation/inundation tolerance for each species. All propagules and containerized plant materials will be planted in a clumped distribution of monoculture blocks of individual species. Monocultures will be planted from 2 to 4 feet O.C. for willow cuttings, and 4 to 8 feet O.C. for shrub species, and 8 to 12 feet O.C. for tree species. Spacing has been designed to provide uniform

ground cover and even diversity between strata in the wetland and surrounding upland.

6.2.3.1 SHALLOW VEGETATED OPEN WATER (FLIGHTWAY)

Shallow open water flightways will be located throughout the wetland creation and enhancement areas and will contain up to 3 feet of water. These areas have been designed to remain at least partially inundated throughout most or all of a typical growing season. Therefore, this area will be planted with Obligate (OBL) aquatic species such as, sago pondweed, water smartweed, pond lily, spatterdock, and pickerel weed (or equivalent).

6.2.3.2 SCRUB/SHRUB FRINGE

Fringe planting will take place within side casting from the excavated flightway and in clumped distributions within enhanced wetland approximately 0.3 to 0.5 feet above the high groundwater table and/or planned surface water inundation elevation. The area will range from being inundated or saturated throughout the spring of the year and be planted with mainly FACW shrub species consisting of silky dogwood, redosier dogwood, button bush, northern arrowwood, spicebush, and pussy willow (or equivalent).

6.2.3.3 TREE HUMMOCKS AND SCREENING

Tree planting will also take place within side casting from the excavated flightway, in intentionally fashioned hummocks, and in clumped distributions within other portions of the wetland approximately 0.3-foot above the control elevation of the wetland (seasonal highwater), and along the perimeter or buffer of the wetland mitigation site to act as a screening to block noise, light, human and other disturbances from the wetland. The species selected for the hummocks and screening includes deciduous species that are FACW and facilitative (FAC). Tree plantings will be placed in areas that will be saturated but slightly above the seasonal highwater elevation anticipated at the onset of the growing season. Plantings will consist of swamp white oak, pin oak, silver maple, red maple, black willow, American sycamore, and tulip-poplar (or equivalent).

6.3 METHOD OF PLANTING

All plants shall be installed according to acceptable standards of the trade under supervision of a landscape professional with suitable practical field experience in wetlands installation projects. All plant materials shall be nursery grown and shall be guaranteed to be true to name and healthy upon delivery.

Herbaceous species will be planted by digging down into the substrate at the point of installation. If the plant is in a plastic container, this shall be removed, taking care to keep the root mass intact. If the plant condition is bare root, plug, peat pot, or fiber pot, it can be installed directly into the planting hole. In all cases, the original grade in enhancement area and final grade in creation areas will be balanced with soil, compacted and watered in order to keep the original ground elevation when planting.

Shrubs and trees shall be planted by digging a hole twice the size of the width of the rootball down into the substrate at the point of installation. If the plant is in a plastic container, this shall be carefully removed to keep the rootball intact. After planting, the area should be backfilled and watered. Trees may be provided with support stakes if this is deemed necessary by the installer. Care should be taken when installing support stakes to ensure that the root ball is not disturbed by driving of the support stake into the soil.

6.4 WILDLIFE DAMAGE CONTROL

After planting of the site has been completed, a method for herbivory control will be established by installation of tree and shrub tubes. Alternatively, temporary electric fencing may be installed along the perimeter of the site, if necessary. Other methods of wildlife damage control include the application of rodenticide to each tree/shrub and meadow vole bait stations established at a minimum of 1 per acre.

6.5 BOUNDARY DEMARCATION

The boundary of the recorded conservation area will be demarcated in the field with either fiberglass sign/posts marked "Conservation Area", with metal t-posts, or with large boulders. Once trees and shrubs are established within the mitigation area, the woody vegetation shall also serve as the demarcation of the conservation area.

7.0 MAINTENANCE PLAN

The goal of the project is for the site to be self-sustaining post-construction with little to no maintenance needs beyond the five-year monitoring period. The proposed site design includes only minor grading and no mechanical structures. Maintenance for the first five years will take place in conjunction with the monitoring requirements for the site. The site shall be inspected at least twice a year for the first two years and no less than once per year during the following three years, or as directed by regulatory agencies. Maintenance activities may include removal of noxious/invasive species by cutting or spot herbicide treatment, inspection of the site after significant flooding events, tree tube alignment and removal, and other appropriate measures to ensure the performance standards are being met.

8.0 PERFORMANCE STANDARDS

Performance standards have been established that correspond with the goals and objective to offset water resource impacts. These standards will be used to determine the success of the Project. By monitoring the site for a period of no less than five years, and comparing results to the performance standards, a determination of the success of the site can be determined. The performance standards are as follows:

- Provide 0.24 acre of wetland enhancement consisting of mixed PSS & PFO habitat;
- Provide 0.27 acre of wetland creation consisting of mixed PEM, PSS & PFO habitat. The wetland creation site shall have saturation to the soil surface for a minimum of approximately 18 consecutive days during a typical growing season (during normal years);

- Planted trees and shrubs shall meet 85% survival throughout the 5-year monitoring period. Native woody plants naturally colonizing the enhancement area shall be included in plant density estimates;
- Vegetation within the enhanced wetland areas shall not be dominated by state or federally listed introduced, invasive, and/or noxious species identified on the current *Pennsylvania noxious weed control list* and the *Federal noxious weed list*; and
- Any deviation from these standards must be agreed upon by appropriate regulatory agencies.

If a successful mixed wetland community has not been achieved, additional plantings may be necessary to supplement the natural succession of the site. A vegetative analysis must continue on an annual basis until the performance standards or goals have been met. If mitigation is not successful, the monitoring report must include a discussion of remedial measures to correct the deficiencies.

9.0 MONITORING REQUIREMENTS

The monitoring will involve periodic inspections by qualified personnel for a period of five consecutive growing seasons. The inspections will take place at an interval of no less than twice per year for the first two years and no less than once per year during the following three years, or as outlined in permit conditions. Each monitoring report will include, at a minimum, the following information:

- a) Dates of inspection
- b) Photographic Documentation
- c) Vegetation data should summarize vegetative density, invasive species, dominant species, and species diversity
- d) Identification of any problems that need required remedial measures with description of remedial measures to be taken
- e) A species list of any wildlife observed at the mitigation site

10.0 LONG-TERM MANAGEMENT PLAN

The goal of the proposed wetland mitigation site is to be self-sustaining natural areas with no long-term management needs. No mechanical structures or berms were incorporated into the design of the site. The mitigation will result in wetland communities that will fit naturally into the landscape. The deed restriction placed on the property will ensure long-term protection of the area and will be referenced by future landowners. After meeting performance standards, long-term financing mechanisms for each site are not proposed due to the nature of the work, and the likeliness of invasive species colonizing and becoming dominant at the site after tree/shrub canopy has become fully established is unlikely.

11.0 ADAPTIVE MANAGEMENT PLAN

A qualified professional with documented experience in wetland mitigation will oversee the project. If plant species or spacing requirements need to be modified during the project, the consultant shall notify the district engineer of the modifications and reasons that were necessary to achieve the overall goal of the project. Minor changes to the plan that will not adversely affect the overall success of the site or enhance to success of the site may be implemented during the project.

To ensure the compensatory mitigation proposed meets the objectives and goals outlined in the offsite wetland mitigation plan, measures will be implemented to identify if success is being achieved, and to modify activities during and post-construction to ensure success of the site. Adaptive management is closely related to the mitigation work plan, monitoring/maintenance plan, and linked directly to the performance standards. Monitoring of the sites will identify the progression of the mitigation areas toward the performance standards set and will identify any areas not trending in the desired direction. For any areas not progressing towards the performance standards, appropriate remedial actions or measures, as outlined below will be implemented.

Although most of the mitigation activities proposed are low risk in nature, several potential challenges to achieving success have been identified regarding plant survival and noxious/invasive species control, as outlined below.

11.1 PLANT SURVIVAL

The planting plan was developed with the knowledge that trees and shrubs do not survive or do well in all locations within wetlands. Several potential challenges to the success of plantings have been identified. These challenges relate to competition from other vegetation, predation by deer and meadow voles, and mortality from excessively wet soils.

To prevent competition with other vegetation, herbicide application is proposed as a remedial measure and will be applied at the base of trees and shrub shelters. Herbicide application will be performed at an interval necessary to suppress growth in these areas as the trees and shrubs become established. The installation of tree and shrub shelters will also aid in vegetation success.

Predation due to deer browse and meadow vole girdling is a noted concern for newly planted woody vegetation. Tree and shrub shelters will protect woody vegetation from browsing until a time when they've become established or branches of trees are above browse height. Also, each planted tree/shrub will include the application and reapplications of Repellex tablets (animal repellent). In certain situations, where the meadow vole population is extensive, meadow vole bait stations including rodenticide may be utilized to control the local population.

If the survival rate is not meeting performance standards, replanting will take place. Replanting will be based upon best professional judgment when determining the conditions that may have resulted in the low survival rate. Replanting could take into account a species-specific replanting or only planting woody vegetation within certain locations within the mitigation area that are more adaptable.

11.2 INVASIVE SPECIES CONTROL

Invasive species will be documented during all monitoring events. As needed, herbicides and/or hand pulling will be utilized to control the occurrence of any invasive species. Invasive species will be controlled in order to prevent the site from becoming dominated by invasive and/or noxious species identified on the current *Pennsylvania noxious weed control list* and the *Federal noxious weed list*.

12.0 FINANCIAL ASSURANCES

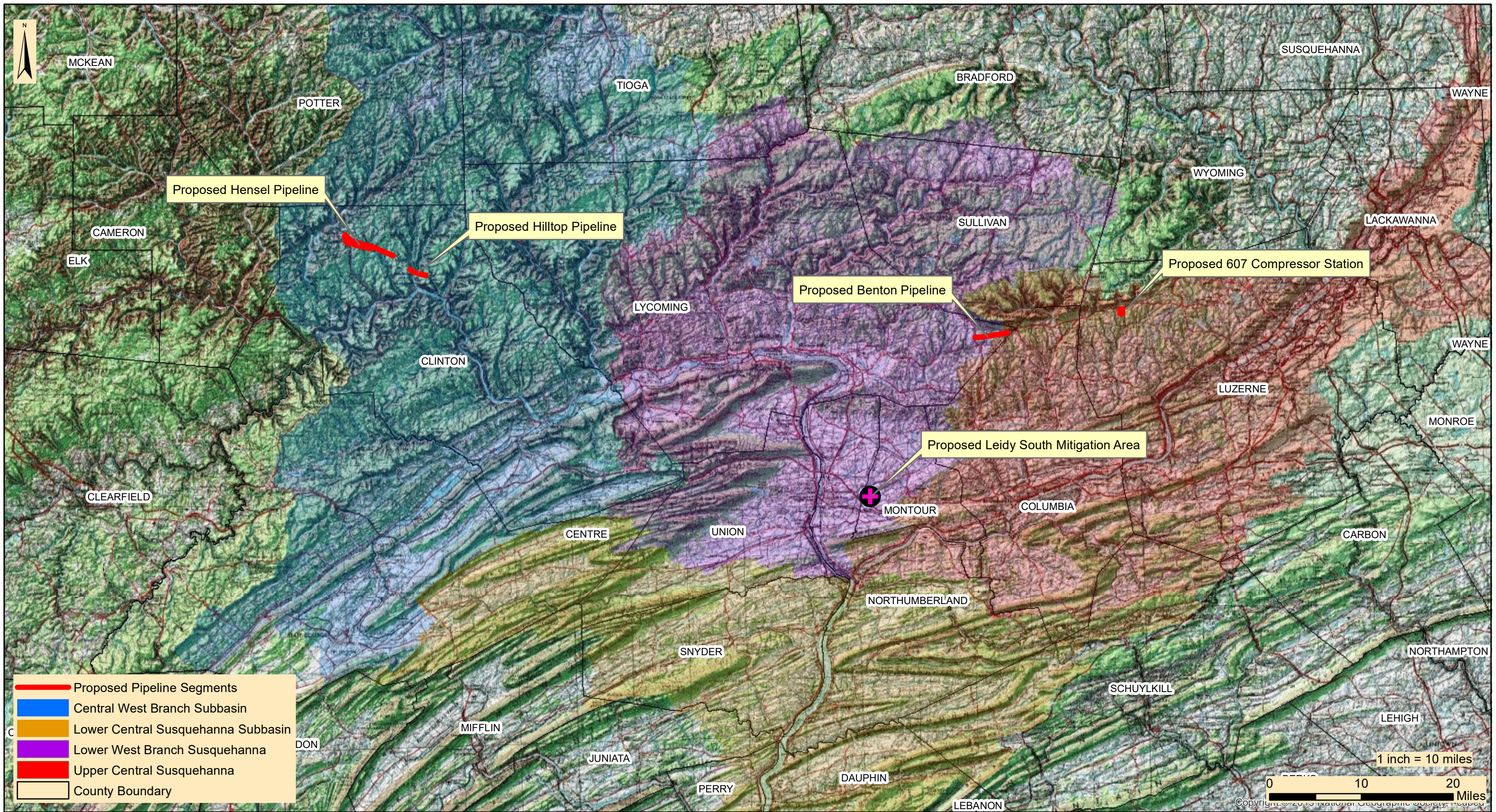
The permittee (Transco) has contracted WHM Consulting, Inc. (WHM) to provide mitigation services as it relates to the proposed Leidy South Project. WHM will be responsible for the execution of the deed restriction on the property, the permitted design, construction, and monitoring/maintenance of the project. Kevin Clark, PWS, is the lead designer and will carry out his role as a technical advisor for this project.

WHM has successfully employed over 30 wetland mitigation projects in the Baltimore, Pittsburgh, and Philadelphia USACE Districts over the past 15 years. Within the last 5 years, most of the mitigation provided has consisted of wetland enhancement primarily due to permanent functional conversion impacts (similar to this proposed mitigation project). Financial Assurances have not been required due to the relative nature of these projects (tree and shrub plantings within existing wetlands), selecting of appropriate sites for mitigation activities to occur, and the past performance of WHM in fulfilling mitigation requirements. The deed restriction on the property provides long-term assurance that after performance standards are met the mitigation area will be maintained in a natural state. Appendix G – Past Performance History, Resumes & Project Profiles has been included to outline our experience.

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APPENDIX A
FIGURES / DRAWINGS



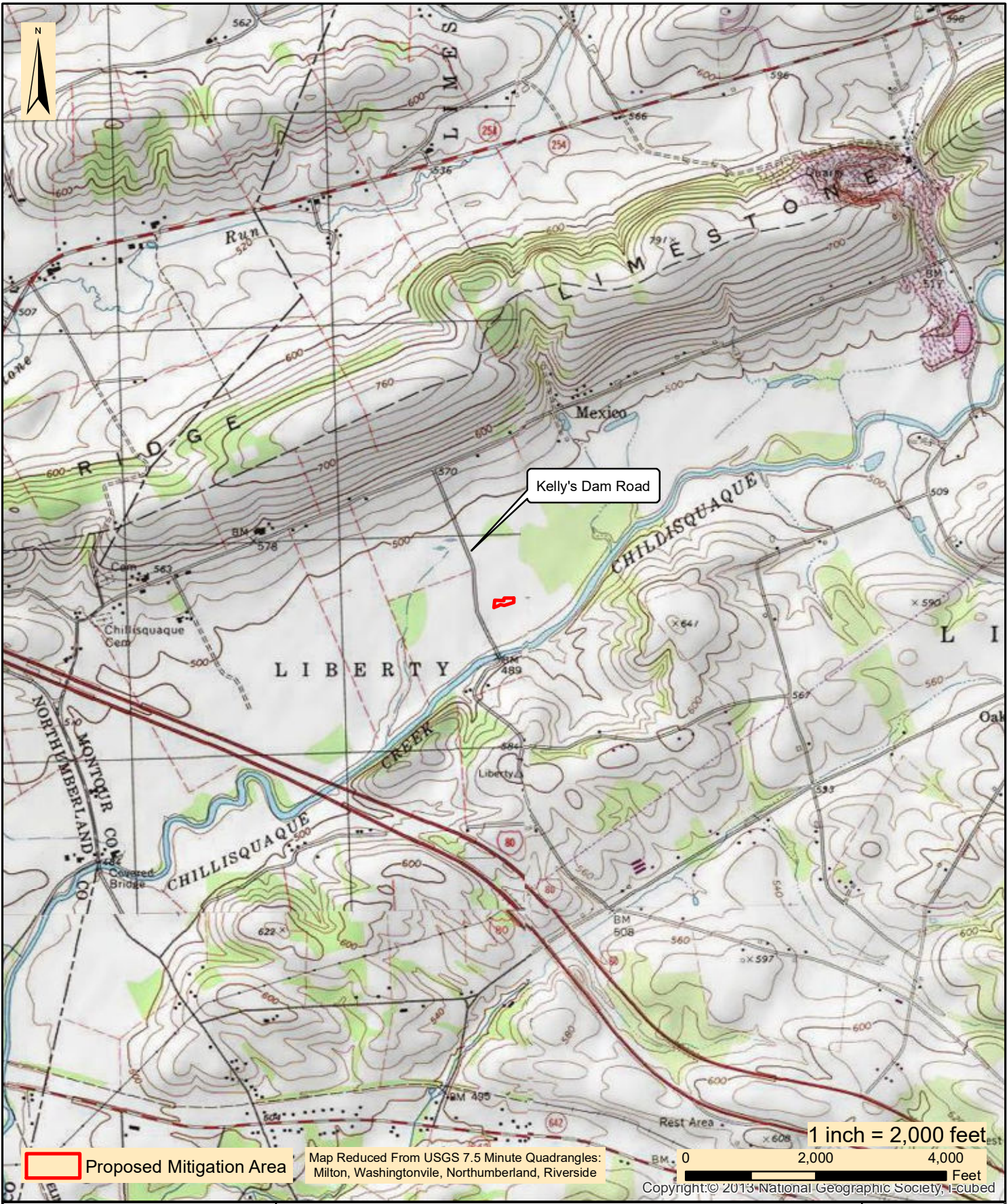
2525 Green Tech Drive, Suite B,
 State College, PA 16803
 Tele: 814.689.1650 Fax: 814.689.1557

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT
COMPENSATORY OFFSITE MITIGATION PLAN

MITIGATION GEOGRAPHIC SERVICE AREA MAP

PENNSYLVANIA

| | |
|---------------------|-----------------|
| Date: | 08/08/19 |
| WHM DRAWING NUMBER: | WILLIAMS186B001 |
| Drawn By: | PJF |
| Figure Number: | 1 |



Proposed Mitigation Area

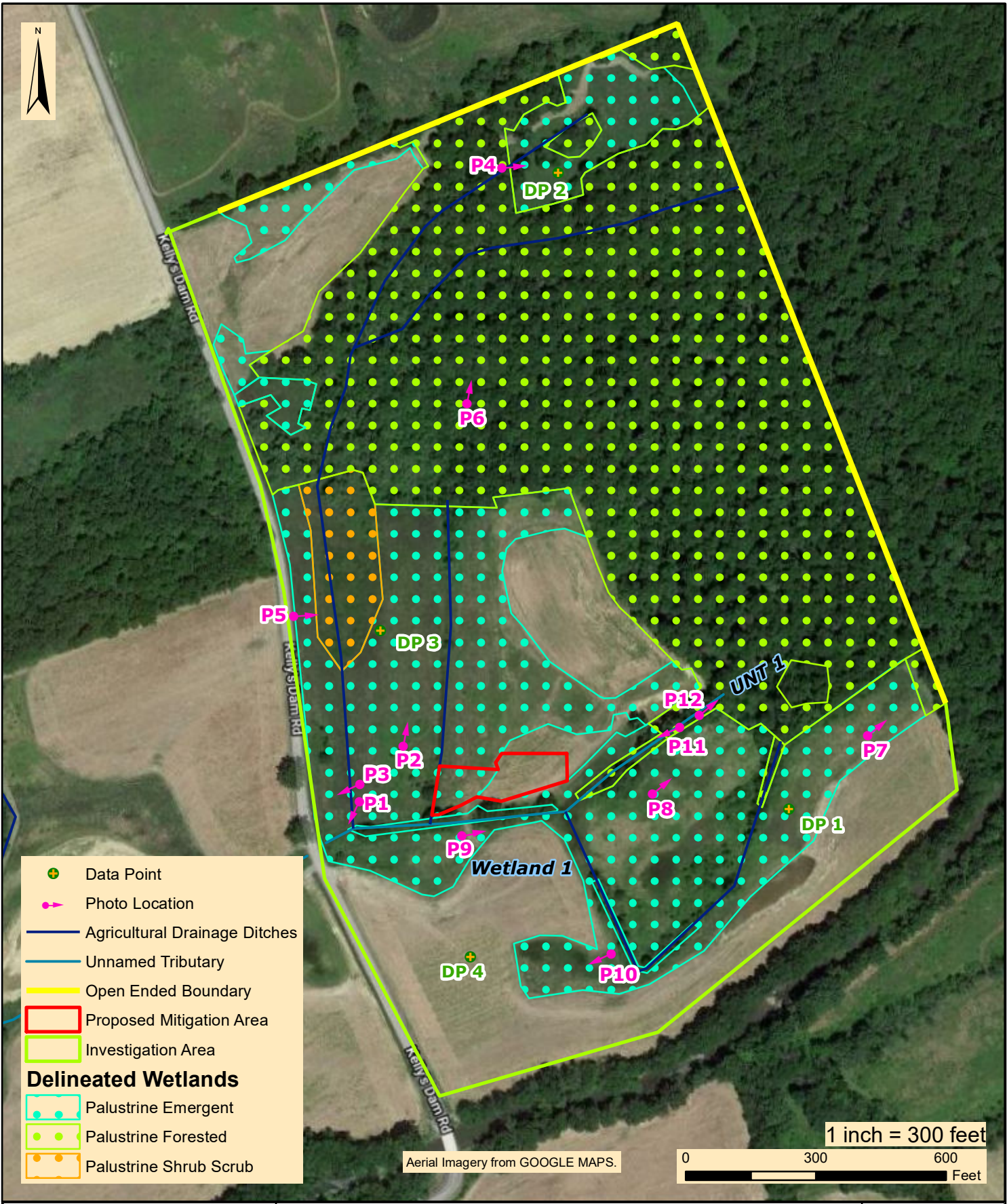
WHM
designs, permits, resolutions
consulting, inc.
2525 Green Tech Drive, Suite B,
State College, PA 16803
Tele: 814.689.1650 Fax: 814.689.1557

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT
COMPENSATORY OFFSITE MITIGATION PLAN

PROJECT LOCATION MAP

LIBERTY TOWNSHIP MONTOUR COUNTY PENNSYLVANIA

| | |
|---------------------|-----------------|
| Date: | 08/21/19 |
| WHM Drawing Number: | WILLIAMS186A002 |
| Drawn By: | PJB |
| Figure Number: | 2 |



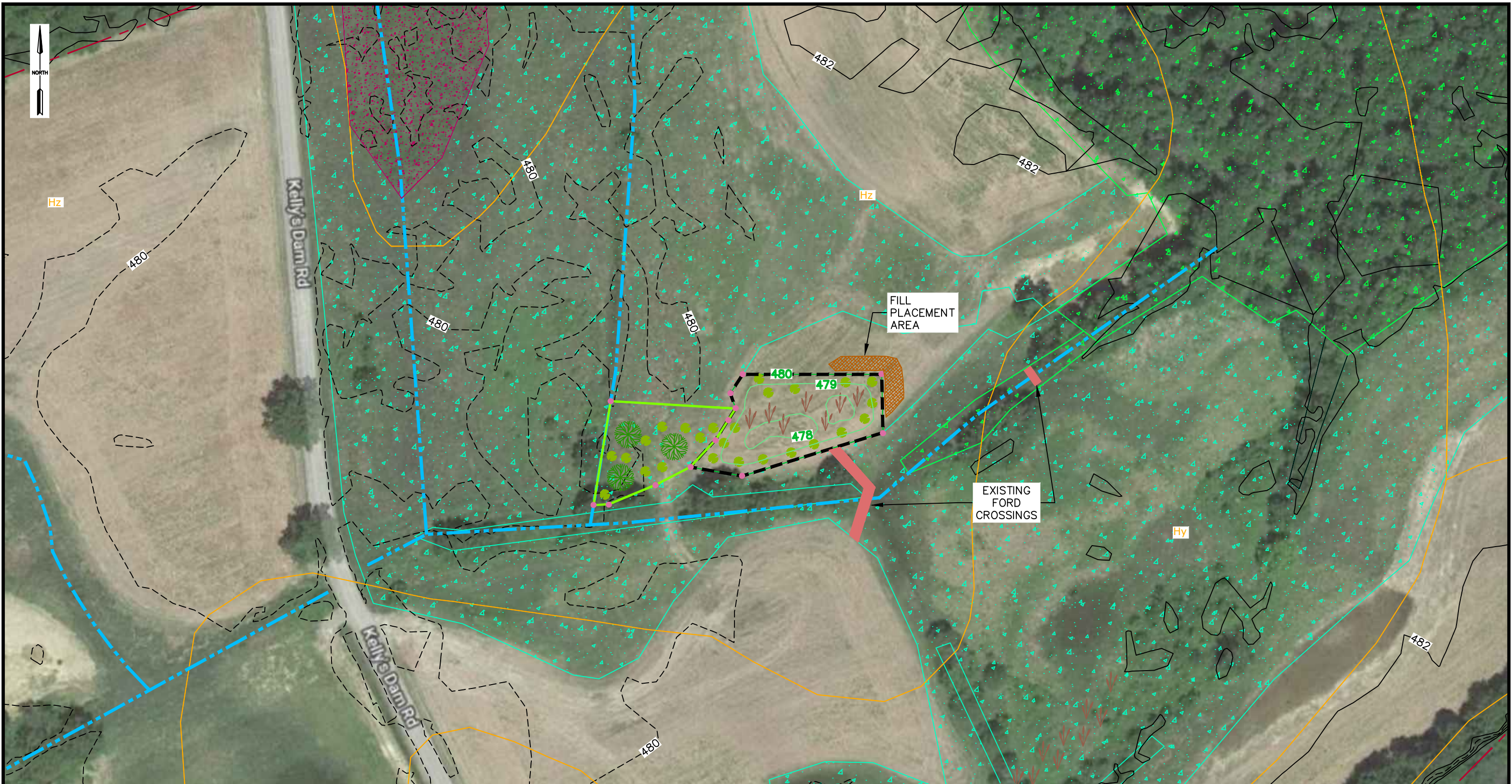
designs, permits, resolutions | **consulting, INC.**
 2525 Green Tech Drive, Suite B,
 State College, PA 16803
 Tele: 814.689.1650 Fax: 814.689.1557

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
 LEIDY SOUTH PROJECT
 COMPENSATORY OFFSITE MITIGATION PLAN

WETLAND DELINEATION MAP

LIBERTY TOWNSHIP MONTOUR COUNTY PENNSYLVANIA

| | |
|---------------------|-----------------|
| Date: | 08/21/19 |
| WHM Drawing Number: | WILLIAMS186A004 |
| Drawn By: | PJB |
| Figure Number: | 4 |



| LEGEND | |
|--------|--------------------------------------|
| | WETLAND CREATION AREA (0.27 ACRE) |
| | WETLAND ENHANCEMENT AREA (0.24 ACRE) |
| | DELINEATED PEM WETLAND |
| | DELINEATED PSS WETLAND |
| | DELINEATED PFO WETLAND |
| | EXISTING DRAINAGE CHANNEL |
| | SOIL BOUNDARIES |
| | CONSERVATION AREA POSTS |
| | FILL PLACEMENT AREA |
| | PROPERTY LINE |
| | EXISTING CONTOURS (C.I.=10') |
| | EXISTING CONTOURS (C.I.=2') |
| | FINAL GRADE CONTOURS (C.I.=5') |
| | FINAL GRADE CONTOURS (C.I.=1') |



designs, permits, resolutions **consulting, inc.**

2525 GREEN TECH DRIVE, SUITE B
STATE COLLEGE, PA 16803

TELEPHONE: (814)-689-1650 FAX: (814)-689-1557

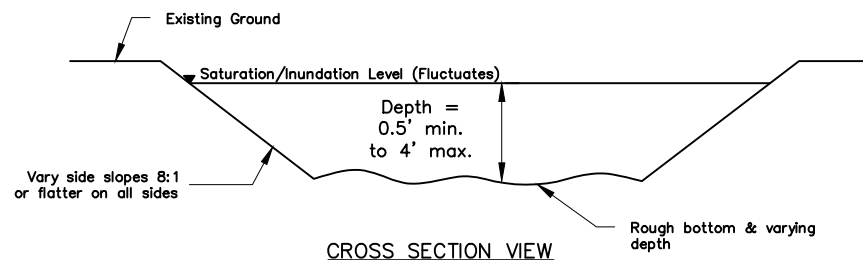
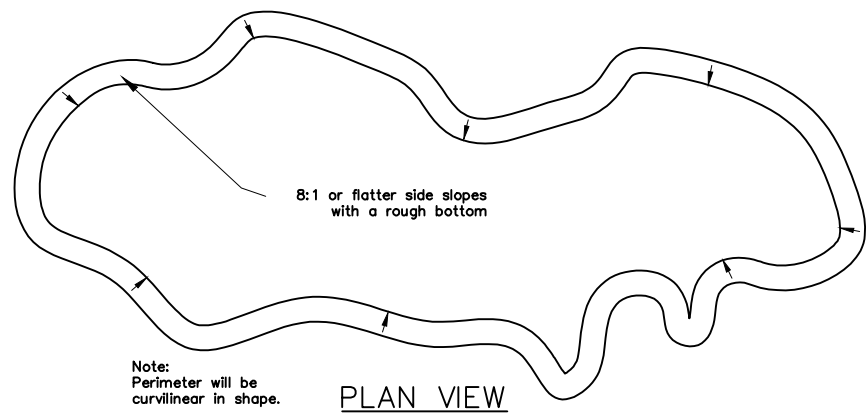


TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT
COMPENSATORY OFFSITE WETLAND MITIGATION PLAN

MITIGATION DESIGN PLAN

LIBERTY TOWNSHIP MONTOUR COUNTY PENNSYLVANIA

| | |
|-------------|------------------------|
| DATE: | 08/21/19 |
| DRAWN BY: | BWH |
| CHECKED: | KMC |
| DRAWING NO. | WILLIAMS186B001 |
| SHEET NO. | 5 |



See Sheet 3 for the location of the scrapes

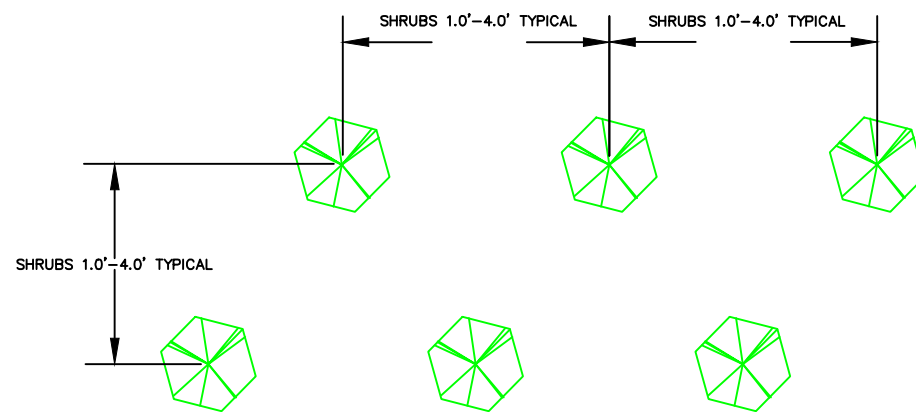
TYPICAL WETLAND CREATION/EXPANSION DETAIL
NOT TO SCALE

Notes:

1. Wetland Creation/Expansion areas will be constructed at locations and defined on plan drawings.
2. Wetland bottom shall be irregular in shape when completed.
3. Strip minimum 10" of topsoil and stockpile it for spreading, if needed, after the excavation is completed.
4. Before topsoil is spread, the depth and slopes must be checked by the Onsite Project Manager. Seeding shall be done as outlined on Sheet 4.
5. Spoil shall be disposed of at locations approved by the Onsite Project Manager.

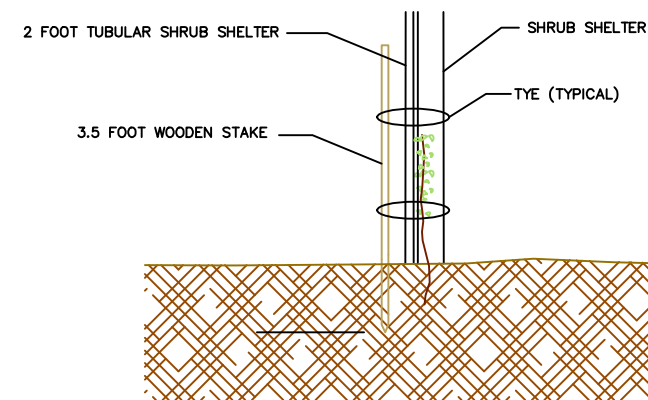
| Scientific Name | Common Name | Status | Container | Spacing |
|------------------------------|-------------------|-----------------|----------------------|----------|
| <i>Cornus amomum</i> | silky dogwood | FACW Shrub | bare root / 1 gallon | 4' O.C. |
| <i>Cornus racemosa</i> | gray dogwood | FAC Shrub | bare root / 1 gallon | 4' O.C. |
| <i>Ilex verticillata</i> | winterberry | FACW Shrub | bare root / 1 gallon | 4' O.C. |
| <i>Alnus serrulata</i> | hazel alder | OBL Shrub | bare root / 1 gallon | 4' O.C. |
| <i>Salix discolor</i> | pussy willow | FACW Shrub | cutting / 1 gallon | 4' O.C. |
| <i>Salix nigra</i> | black willow | OBL Shrub/Tree | cutting / 1 gallon | 4' O.C. |
| <i>Rhododendron maximum</i> | great laurel | FAC Shrub | cutting / 1 gallon | 4' O.C. |
| <i>Hamamelis virginiana</i> | witch hazel | FACU Shrub/Tree | cutting / 1 gallon | 4' O.C. |
| <i>Acer rubrum</i> | red maple | FAC Tree | 1 or 2 gallon | 10' O.C. |
| <i>Quercus palustris</i> | pin oak | FACW Tree | 1 or 2 gallon | 10' O.C. |
| <i>Acer saccharinum</i> | silver maple | FACW Tree | 1 or 2 gallon | 10' O.C. |
| <i>Nyssa sylvatica</i> | black gum | FAC Tree | 1 of 2 gallon | 10' O.C. |
| <i>Platanus occidentalis</i> | american sycamore | FACW Tree | 1 or 2 gallon | 10' O.C. |
| <i>Populus grandidentata</i> | big-tooth aspen | FACU Tree | 1 or 2 gallon | 10' O.C. |
| <i>Robinia pseudoacacia</i> | black locust | FACU Tree | 1 or 2 gallon | 10' O.C. |

*Select a minimum of 3 tree species and 3 shrubs species to be planted in enhancement area and one tree and one shrub species to be planted in the screening area.
**Plant at a density of 200 stems per acre (or 54 total stems) with trees (27) and shrubs (27)



1. TYPICAL SPACING IS APPROXIMATE. PLANTS SHOULD BE LOCATED RANDOMLY TO AVOID THE APPEARANCE OF ORGANIZED ROWS. SPECIES SHALL BE LOCATED IN CLUSTERS AS DIRECTED BY THE CONSTRUCTION MANAGER
2. TREES AND SHUBS ARE TO BE PLANTED ALONG FLIGHTWAY FRINGE, IN CLUSTERS AS DESIGNATED BY CONSTRUCTION MANAGER, AND ALONG THE PERIMETER OF THE SITE.

TYPICAL PLANT SPACING DETAIL
NOT TO SCALE



NOTE: SHELTERS ARE TO BE MADE FROM BIODEGRADABLE PLASTIC TUBING.

SHRUB SHELTER PLANTING DETAIL
NOT TO SCALE

| Scientific Name | Common Name | Status | Container | Spacing |
|------------------------------|-------------------|----------------|----------------------|----------|
| <i>Cornus amomum</i> | silky dogwood | FACW Shrub | bare root / 1 gallon | 4' O.C. |
| <i>Cornus racemosa</i> | gray dogwood | FAC Shrub | bare root / 1 gallon | 4' O.C. |
| <i>Ilex verticillata</i> | winterberry | FACW Shrub | bare root / 1 gallon | 4' O.C. |
| <i>Alnus serrulata</i> | hazel alder | OBL Shrub | bare root / 1 gallon | 4' O.C. |
| <i>Salix discolor</i> | pussy willow | FACW Shrub | cutting / 1 gallon | 4' O.C. |
| <i>Salix nigra</i> | black willow | OBL Shrub/Tree | cutting / 1 gallon | 4' O.C. |
| <i>Quercus palustris</i> | pin oak | FACW Tree | 1 or 2 gallon | 10' O.C. |
| <i>Acer saccharinum</i> | silver maple | FACW Tree | 1 or 2 gallon | 10' O.C. |
| <i>Nyssa sylvatica</i> | black gum | FAC Tree | 1 of 2 gallon | 10' O.C. |
| <i>Platanus occidentalis</i> | american sycamore | FACW Tree | 1 or 2 gallon | 10' O.C. |

*Select a minimum of 3 tree species and 3 shrubs species to be planted in enhancement area.
**Plant at a density of 400 stems per acre (or 96 total stems) with trees (48) and shrubs (48)

ERNST WATERFOWL BUFFET MIX for WETLAND ENHANCEMENT
ERNMX-175
(Application Rate- 15 pounds per acre)

| Percent | Scientific Name | Common Name |
|---------|---------------------------------------|------------------|
| 30.00% | <i>Carex vulpinoidea</i> | Fox Sedge |
| 25.00% | <i>Carex lurida</i> | Shallow Sedge |
| 14.00% | <i>Sparganium eurycarpum</i> | Giant Bur Reed |
| 10.00% | <i>Sparganium americanum</i> | Eastern Bur Reed |
| 10.00% | <i>Carex crinita</i> | Fringed Sedge |
| 3.00% | <i>Carex comosa</i> | Bearded Sedge |
| 3.00% | <i>Carex lupulina</i> | Hop Sedge |
| 3.00% | <i>Juncus effusus</i> | Soft Rush |
| 1.00% | <i>Schoenoplectus tabernaemontani</i> | Softstem bulrush |
| 1.00% | <i>Schoenoplectus acutus</i> | Hardstem bulrush |

ERNST QUICK EROSION CONTROL COVER MIX
(Application Rate- 50 pounds per acre)

| Percent | Scientific Name | Common Name |
|---------|---------------------------|--------------------|
| 50.00% | <i>Lolium multiflorum</i> | Annual ryegrass |
| 50.00% | <i>Lolium perenne</i> | Perennial ryegrass |

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT
COMPENSATORY OFFSITE WETLAND MITIGATION PLAN

DETAILS

LIBERTY TOWNSHIP MONTOUR COUNTY PENNSYLVANIA

| | |
|-------------|-----------------|
| DATE: | 08/21/19 |
| DRAWN BY: | BWH |
| CHECKED: | KMC |
| DRAWING NO. | WILLIAMS186B002 |
| SHEET NO. | 6 |

APPENDIX B
DECLARATION OF RESTRICTIVE COVENANTS AGREEMENT TEMPLATE
(PRIVILEGED)

APPENDIX C
WETLAND DELINEATION REPORT



CHILLISQUAQUE CREEK MITIGATION SITE
LIBERTY TOWNSHIP, MONTOUR COUNTY, PENNSYLVANIA

WETLAND DELINEATION REPORT

TABLE OF CONTENTS

Narrative

- 1.0 Introduction
- 2.0 Methodology
- 3.0 Desktop Findings
 - 3.1 USGS & Topographic Data
 - 3.2 Water Quality
 - 3.3 National Wetland Inventory
 - 3.4 USDA/NRCS Soil Descriptions
- 4.0 Water Resource Descriptions
 - 4.1 Wetland 1
- 5.0 Conclusions
- 6.0 References

Attachments

- A Data Forms
- B Photographic Documentation
- C Water Resource Summary Table
- D Resumes

CHILLISQUAQUE CREEK MITIGATION SITE
LIBERTY TOWNSHIP, MONTOUR COUNTY, PENNSYLVANIA

WETLAND DELINEATION REPORT

1.0 INTRODUCTION

WHM Consulting, Inc. (WHM) conducted a delineation of wetland and water resources associated with the Chillisquaque Creek Mitigation Site located in Liberty Township, Montour County, Pennsylvania (Figure 1 – Project Location Map). The purpose of this investigation was to determine whether regulated wetlands and waters exist within the subject project area in accordance with U.S. Army Corps of Engineers (USACE) guidelines which are regulated under Section 404 of the Clean Water Act (CWA) and Pa Code 25 Chapter 105. This report provides information on the methodology, data collected, delineation field findings, and conclusions pertaining to wetland and water resources identified in the study area. The initial delineation was performed by WHM on October 24th, 2013 and boundaries were confirmed on August 5th, 2019 by WHM.

2.0 METHODOLOGY

WHM conducted an investigation on the previously referenced project area in accordance with procedures and technical guidelines outlined in the 1987 *USACE Wetland Delineation Manual*, including specifically the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region*. The USACE protocol establishes a three parameter approach for identification and delineation of wetlands, which includes confirmation of the following:

- I. Hydrophytic Vegetation: This condition exists when greater than 50% of the plant species contain obligate (OBL), facultative-wet (FACW), or facultative (FAC) indicator status.

- II. Hydric Soils: Hydric soils are defined as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the soil (Federal Register, July 13, 1994).

- III. Wetland Hydrology: Wetland hydrology is recognized through evidence of inundation and/or saturation to the soil surface for at least 5% of the growing season during most years.

In undisturbed conditions, all three parameters must be confirmed to be present to characterize an area as a wetland. In highly disturbed or problematic wetland situations, Corps guidance details procedures to be used for evaluating these areas and determining which areas will most likely be considered wetlands upon review by a Corps representative. Upon completing our investigations, areas exhibiting all three of the USACE criteria presented above and which also have surface water connection to other waters of the United States are identified as resources that are likely to be regulated by the USACE as Jurisdictional Wetlands. Areas

exhibiting all three parameters but without surface water connection to other waters are also likely to be designated as wetlands or water resources that may or may not be regulated by the USACE.

In many cases, wetland areas not regulated by the USACE are still likely to be regulated by other state or local governing bodies.

In addition to wetlands, WHM also identifies adjacent waterways that are also likely to be regulated as waters of the United States, including ephemeral, intermittent and perennial waterways. The term "jurisdictional waters of the United States" as used by Section 404 of the CWA and defined under 33 Code of Federal Register (CFR) Section 328.1, includes adjacent wetlands and tributaries to traditionally navigable waters (TNW) and other waters with a hydrological connection to a TNW.

WHM provides a complete delineation flagging of wetland/waters resources and supporting data. As noted above, our determinations are based on our collective "best professional judgment" exercised with the guidance of the Corps' Manual and Supplements. However, the final determination of the Jurisdictional status of the resources that we identify lies entirely within the purview of the reviewing regulatory agencies. In other words, we identify a technically defensible boundary that must either be accepted or adjusted by the reviewing regulatory agencies in situations where encroachments may occur. As consultant environmental scientists, we do not have authority to assign regulatory jurisdiction.

For delineations performed in the Commonwealth of Pennsylvania, all wetlands and waters identified during the wetland delineation are deemed probable "Jurisdictional waters of the United States" until otherwise reviewed and accepted by the USACE and/or Pennsylvania Department of Environmental Protection (DEP). If upon review the wetland or water is determined to be isolated by the regulators (i.e. has no significant nexus to "jurisdictional waters of the United States"), the regulatory body for such waters then becomes the DEP.

3.0 DESKTOP FINDINGS

Prior to conducting field investigations, WHM completed a review of natural resource data associated with the project site. Specifically, WHM reviewed USGS 7.5 minute topographical mapping for Milton and Washingtonville, Pennsylvania, U.S. Fish and Wildlife National Wetland Inventory mapping, and the U.S Department of Agriculture – NRCS Soil Survey for Montour County, Pennsylvania. The results of this desktop analysis were used to help establish probable areas where wetlands and watercourses could be located before conducting the field investigation portion of the project.

3.1 USGS & TOPOGRAPHIC DATA

According to the 7.5 minute USGS quadrangles for Milton and Washingtonville, Pennsylvania, the center of the study area is located at approximately 41.013614°N, -76.751881°W.

3.2 WATER QUALITY

The project is located in the Chillisquaque Creek watershed, which has a Designated Use as a Warm Water Fishery with Migratory Fishes (WWF, MF), under PA Code 25, Chapter 93 Water Quality Standards.

3.3 NATIONAL WETLAND INVENTORY

The U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) mapping within the project area is presented in Figure 2—USDA-NRCS Soils and NWI Map. According to the NWI mapping there are three (3) NWI wetlands located within the investigation area. The following is a list of the NWI classifications:

PFO1C – Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded

PEM5C – Palustrine, Emergent, *Phragmites australis*, Seasonally Flooded

3.4 USDA/NRCS SOIL DESCRIPTIONS

The soil associations on the site are identified through the Natural Resources Conservation Service (NRCS) web soil survey for Montour County, Pennsylvania. Four (4) soil mapping units were located within the investigation area: Basher soils (Bc), Evendale cherty silt loam (EvB), Holly silt loam, ponded (Hy) and Holly silt loam, rarely flooded (Hz). The mapping limits of these soils can be viewed in Figure 2—USDA-NRCS Soils and NWI Map. The following briefly describes the soil series mapped within the investigation area as described in the Soil Survey for Montour County, Pennsylvania:

Basher soils (Bc): This mapping unit consists of nearly level, deep, moderately well drained and somewhat poorly drained soils on flood plains. The soils are flooded on an average of less than once every 2 years. The average slope ranges from 0-3 percent. The permeability of these soils is moderate or moderately slow, and the available water capacity is moderate or high. Runoff is slow. Rooting is restricted by a seasonal high water table at a depth of about 12 to 36 inches. These soils have high productivity potential for trees. Removal of undesirable species will increase the water available to more desirable trees. Use of equipment is restricted in some years by flooding, but machine planting is generally practical on large areas. The capability subclass is llw; the woodland ordination group is 2o. The taxonomic class is Coarse-loamy, mixed, active, mesic Fluvaquentic Dystudepts. The following is a typical soil profile for the Basher soils:

Ap--0 to 9 inches; dark reddish brown (5YR 3/4) silt loam, light reddish brown (5YR 6/4) dry; weak fine granular structure; friable; many fine roots; very strongly acid; clear smooth boundary. (6 to 10 inches thick)

Bw1--9 to 14 inches; dark reddish brown (5YR 3/4) silt loam; weak medium subangular blocky structure parting to weak medium granular; friable; many fine roots; common fine pores; very strongly acid; clear wavy boundary.

Bw2--14 to 20 inches; dark reddish brown (5YR 3/4) silt loam; very weak medium subangular blocky structure; friable; common fine roots; common fine

pores; few fine distinct brown (7.5YR 5/2) iron depletions and many medium distinct brown (7.5YR 5/4) iron concentrations; very strongly acid; clear wavy boundary. (Combined thickness of the Bw is 10 to 24 inches.)

BC--20 to 27 inches; yellowish brown (10YR 5/4) silt loam; very weak medium subangular blocky structure; friable; few fine roots; common fine pores; many medium distinct grayish brown (10YR 5/2) iron depletions and common medium distinct strong brown (7.5YR 5/6) iron concentrations; very strongly acid; clear wavy boundary. (0 to 12 inches thick)

C1--27 to 32 inches; grayish brown (10YR 5/2) loam; massive; friable; few fine roots; few fine pores; many medium distinct yellowish brown (10YR 5/4) iron concentrations; moderately acid; clear irregular boundary.

C2--32 to 42 inches; gray (10YR 5/1) loam; massive; friable; few fine roots; few fine pores; common medium distinct yellowish brown (10YR 5/4) iron concentrations; slightly acid; clear wavy boundary.

C3--42 to 72 inches; very dark gray (10YR 3/1) fine sandy loam; massive; very friable; contains partially decomposed woody and herbaceous organic material; moderately acid.

Evendale cherty silt loam (EvB): This mapping unit consists of gently sloping, deep, and somewhat poorly drained soils found on toe slopes on cherty limestone ridges. The permeability of this Evendale soil is slow and the available water capacity is moderate or high. The erosion hazard is moderate. Runoff is slow. Bedrock is at a depth of more than 4 feet. Rooting is restricted by a seasonally high water table at a depth of about 6 to 18 inches. from slow to rapid and the runoff rating is slow to rapid. A seasonal high water table is usually located from 6 to 36 inches below the soil surface. This soil has high productivity potential for trees. The seasonal high water table restricts equipment use, but machine planting is generally practicable on large areas. The capability subclass is Illw; the woodland ordination group is 2w. The taxonomic class is Fine, mixed, semiactive, mesic Aquultic Hapludalfs. The following is a typical Evendale soil profile:

Ap--0 to 8 inches; very dark grayish brown (10YR 3/2) gravelly silt loam, light gray (10YR 7/2) dry; weak fine and medium granular structure; friable, nonsticky, slightly plastic; many roots; 15 percent chert fragments; moderately acid; abrupt smooth boundary. (6 to 12 inches thick)

Bt1--8 to 15 inches; yellowish brown (10YR 5/6) silty clay loam; many medium distinct light gray (10YR 7/2) and strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable, slightly sticky, plastic; many roots; few faint clay films on faces of peds; 10 percent chert fragments; moderately acid; clear wavy boundary. (4 to 15 inches thick)

Bt2--15 to 23 inches; yellowish brown (10YR 5/6) gravelly silty clay loam; light gray (10YR 7/1) coatings on peds; common fine distinct light gray (10YR 7/1) and strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; firm, slightly sticky, plastic; common roots; common faint clay films on faces of peds and in pores; 15 percent chert fragments; strongly acid; gradual wavy boundary. (6 to 20 inches thick)

Bt3--23 to 35 inches; yellowish brown (10YR 5/6) gravelly silty clay; light gray (10YR 7/1) coatings on peds; common fine distinct light gray (10YR 7/2) and strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; firm, slightly sticky, plastic; few roots; common faint clay films on faces of peds and in pores; 15 percent chert fragments; few black coatings on peds; very strongly acid; clear wavy boundary. (0 to 15 inches thick)

Bt4--35 to 41 inches; brown (7.5YR 4/4) gravelly silty clay loam; light gray (N 7/0) coating on faces of prisms; weak very coarse prismatic structure parting to weak coarse subangular blocky; firm, slightly sticky, plastic; few roots; common faint clay films on faces of peds and in pores; 25 percent chert fragments; very strongly acid; clear wavy boundary. (0 to 15 inches thick)

Bt5--41 to 51 inches; strong brown (7.5YR 5/6) very gravelly clay; gray (5Y 5/1) coatings on faces of prisms; fine prominent light gray (N 7/0) mottles; weak very coarse prismatic structure parting to weak coarse subangular blocky; firm, sticky, plastic; few faint clay films on faces of peds and in pores; 45 percent chert and shale fragments; very strongly acid; abrupt wavy boundary. (0 to 15 inches thick)

2BC--51 to 64 inches; dark reddish brown (5YR 3/3) very shaly clay loam; gray (5YR 5/1) coatings on faces of prisms; weak very coarse prismatic structure; firm, slightly sticky, plastic; few clay films in pores; 40 percent shale fragments; very strongly acid.(0 to 20 inches thick)

2R--64 inches; thin bedded black (5Y 2/1) and gray (5Y 5/1) shale bedrock.

Holly silt loam, ponded (Hy): This soil consists of poorly drained and very poorly drained soils located on floodplains. Water is ponded on the surface throughout the year. Slopes range from 0 to 3 percent. Rooting is restricted by a high water table located within 6 inches of the soil surface in the spring and winter. A seasonal high water table and frequent flooding makes this soil poorly suited for crops. The soil has a high productivity potential for trees. The following represents a typical Holly soil profile:

A-- 0 to 3 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; slightly acid; clear wavy boundary. (2 to 8 inches thick.)

Bg1-- 3 to 9 inches; dark gray (5Y 4/1) silt loam; weak medium subangular blocky structure; friable; common fine prominent brown (7.5YR 4/4) masses of iron accumulation in the matrix; slightly acid; clear smooth boundary.

Bg2-- 9 to 14 inches; dark gray (5Y 4/1) silt loam; weak coarse subangular blocky structure; friable; common medium prominent yellowish red (5YR 4/6) masses of iron accumulation in the matrix; slightly acid; clear smooth boundary.

Bg3-- 14 to 27 inches; gray (5Y 5/1) sandy loam; weak coarse subangular blocky structure; friable; common medium and fine prominent brown (7.5YR 4/4) and strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; slightly acid; clear wavy boundary. (Combined thickness of the Bg horizons are 10 through 32 inches.)

C1-- 27 to 35 inches; gray (N 5/0) loam; massive; friable; common medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; slightly acid; clear wavy boundary.

C2-- 35 to 43 inches; dark gray (N 4/0) sandy loam; massive; friable; slightly alkaline; clear wavy boundary.

2C3-- 43 to 60 inches; dark greenish gray (5BG 4/1) gravelly sand; single grain; loose; slightly alkaline.

Holly silt loam, rarely flooded (Hz): This soil consists of poorly drained and very poorly drained soils located on floodplains. Water is ponded on the surface throughout the year. Slopes range from 0 to 3 percent. Rooting is restricted by a high water table and flooding is frequent. The high water table interferes with the seeding and harvesting of some crops. The soil has a high productivity potential for trees. The main concern with tree growth is seedling mortality because of wetness. The following represents a typical Holly soil profile:

A-- 0 to 3 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; slightly acid; clear wavy boundary. (2 to 8 inches thick.)

Bg1-- 3 to 9 inches; dark gray (5Y 4/1) silt loam; weak medium subangular blocky structure; friable; common fine prominent brown (7.5YR 4/4) masses of iron accumulation in the matrix; slightly acid; clear smooth boundary.

Bg2-- 9 to 14 inches; dark gray (5Y 4/1) silt loam; weak coarse subangular blocky structure; friable; common medium prominent yellowish red (5YR 4/6) masses of iron accumulation in the matrix; slightly acid; clear smooth boundary.

Bg3-- 14 to 27 inches; gray (5Y 5/1) sandy loam; weak coarse subangular blocky structure; friable; common medium and fine prominent brown (7.5YR 4/4) and strong brown (7.5YR 5/6) masses of iron accumulation in the matrix; slightly

acid; clear wavy boundary. (Combined thickness of the Bg horizons are 10 through 32 inches.)

C1-- 27 to 35 inches; gray (N 5/0) loam; massive; friable; common medium prominent yellowish brown (10YR 5/6) masses of iron accumulation in the matrix; slightly acid; clear wavy boundary.

C2-- 35 to 43 inches; dark gray (N 4/0) sandy loam; massive; friable; slightly alkaline; clear wavy boundary.

2C3-- 43 to 60 inches; dark greenish gray (5BG 4/1) gravelly sand; single grain; loose; slightly alkaline.

4.0 WATER RESOURCE DESCRIPTIONS

After the completion of a desktop analysis, a formal wetland delineation was completed. Areas exhibiting the potential for regulated wetlands and watercourses were evaluated to determine whether they satisfied the USACE requirements. A total of one (1) wetland and one (1) UNT were identified during the delineation. Attachment A - Representative Data Forms includes data collected for the wetlands at the site. Attachment B - Photographic Documentation includes photographs of the investigation area as well as a brief description. The following provides a descriptive summary of the findings within the investigation area.

4.1 Wetland 1

Wetland 1 is primarily a palustrine emergent (PEM) wetland with intermingled areas of palustrine scrub-shrub (PSS) and palustrine forested (PFO) wetlands. The wetland is located in a large depressional area adjacent to and within agricultural fields east of Kelly's Dam road. Areas of the wetland extended into the agricultural fields where stunted vegetation (stunted corn) was present. The remainder of the agricultural field displayed upland vegetation. Evidence of standing water was located in the most depressed areas of the wetland area, just east of Kelly's dam road where Broad-leaf cattails are present. An area of PSS wetland was identified near the northern section of the wetland. Buttonbush (*Cephalanthus occidentalis*, OBL) was the primary shrub in this area. Several areas were dominated by stiltgrass (*Microstegium vimineum*) within Wetland 1. Several drainage tiles were located within the wetland area likely controlling hydrology. The drainage tiles are approximately 1 foot wide and are approximately 4698 linear feet.

Dominant vegetation included: *Setaria sp.* (Bristlegrass, FACW), *Typha latifolia* (Broadleaf cattail, OBL), *Phalaris arundinacea* (Reed canary grass, FACW), *Carex vulpinoidea* (Fox Sedge, FACW), *Scirpus cyperinus* (Woolgrass, FACW), *Microstegium vimineum* (Stiltgrass, FAC), *Euthamia graminifolia* (Flat top golden top, FAC), and *Juncus effusus* (Soft rush, OBL). Observed soils in the wetland had a dominant matrix of 10YR 4/2 from 0-3 inches with 10% 10YR 5/8 redox concentrations and from 3-14"+ had a matrix of 10YR 4/1 with 20% 10YR 5/8 concentrations. Wetland 1 is 49.01 acres or 2,137,259 sq. ft. in size within the investigation area. The PEM portion of the wetland is 19.67 acres or 856,619 sq. ft. in size. The PSS portion of the wetland is 1.4 acres or

60,769 sq. ft. in size. The PFO portion of the wetland is 28 acres or 1,219,870 sq. ft. in size.

4.2 UNT 1 to Chillisquaque Creek

UNT 1 is an intermittent stream that flows through the investigation area. The UNT has a narrow forested buffer on both sides consisting mainly of pin oak (*Quercus palustris*) and red maple (*Acer rubrum*) within the wetland areas and shagbark hickory (*Carya ovata*, FACU) within the upland areas. The substrate includes silt and clay with leave litter and woody debris scattered throughout. The UNT is approximately 3 feet wide and 1,015 linear feet long, comprising approximately 3,045 sq. ft. of the investigation area.

5.0 CONCLUSIONS

Based on the results of the field investigation 49.01 acres or 2,137,259 square feet of wetlands and 1,015 linear feet or 3,045 square feet of channel were identified within the investigation area. Any impacts to the identified resources would require authorization under PADEP and USACE guidelines.

6.0 REFERENCES

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6. United States Fish and Wildlife Service. National Wetland Inventory Map, 7.5 Minute Series Quadrangle Milton and Washingtonville, Pennsylvania.
7. United States Geological Survey (USGS). Topographic Quadrangle 7.5 minute Series Quadrangle, Milton and Washingtonville, PA.
8. United State Department of Agriculture Soil Conservation Service. 1985 Soil Survey of Montour County Pennsylvania.

ATTACHMENT A
DATA FORMS

VEGETATION - Use scientific names of plants

Sampling Point: DP-1-Wet-1

| Tree Stratum (Plot Size: 30') | | Absolute % Cover | Dominant Species | Indicator Staus |
|-------------------------------|-------|------------------|------------------|-----------------|
| 1 | _____ | _____ | _____ | _____ |
| 2 | _____ | _____ | _____ | _____ |
| 3 | _____ | _____ | _____ | _____ |
| 4 | _____ | _____ | _____ | _____ |
| 5 | _____ | _____ | _____ | _____ |
| 6 | _____ | _____ | _____ | _____ |
| 7 | _____ | _____ | _____ | _____ |
| | | _____ = | Total Cover | |

| Sapling/Shrub Stratum (Plot Size: 15') | | Absolute % Cover | Dominant Species | Indicator Staus |
|--|-------|------------------|------------------|-----------------|
| 1 | _____ | _____ | _____ | _____ |
| 2 | _____ | _____ | _____ | _____ |
| 3 | _____ | _____ | _____ | _____ |
| 4 | _____ | _____ | _____ | _____ |
| 5 | _____ | _____ | _____ | _____ |
| 6 | _____ | _____ | _____ | _____ |
| 7 | _____ | _____ | _____ | _____ |
| | | _____ = | Total Cover | |

| Herb Stratum (Plot Size: 5') | | Absolute % Cover | Dominant Species | Indicator Staus |
|------------------------------|---------------------------|------------------|------------------|-----------------|
| 1 | <i>Juncus effusus</i> | 10 | _____ | FACW |
| 2 | <i>Typha latifolia</i> | 5 | _____ | OBL |
| 3 | <i>Scirpus cyperinus</i> | 50 | Yes | FACW |
| 4 | <i>Scirpus atrovirens</i> | 10 | _____ | FACW |
| 5 | <i>Setara sp.</i> | 40 | Yes | FACW |
| 6 | <i>Carex alopecoidea</i> | 10 | _____ | FACW |
| 7 | _____ | _____ | _____ | _____ |
| | | 125 = | Total Cover | |

| Woody vine Stratum (Plot Size: 30') | | Absolute % Cover | Dominant Species | Indicator Staus |
|-------------------------------------|-------|------------------|------------------|-----------------|
| 1 | _____ | _____ | _____ | _____ |
| 2 | _____ | _____ | _____ | _____ |
| 3 | _____ | _____ | _____ | _____ |
| 4 | _____ | _____ | _____ | _____ |
| | | _____ = | Total Cover | |

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

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

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

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column totals _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

 x 1 - Rapid test for hydrophytic vegetation

 x 2 - Dominance test is >50%

 3 - Prevalence index is ≤3.0*

 4 - Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)

 5 - Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Vegetation Strata:

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

Sapling/shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic vegetation present? Yes x No

SOIL

Sampling Point: DP-1 Wet-1

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|----|----------------|----|-------|-------|---------|----------------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-3 | 10YR 4/2 | 90 | 10YR 5/8 | 10 | C | M | SL | oxidized roots |
| 3-14"+ | 10YR 4/1 | 80 | 10YR 5/8 | 20 | C | M | SL | oxidized roots |
| | | | | | | | | |
| | | | | | | | | |

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- Histisol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (**LRR R, MLRA 149B**)
- Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- Loamy Mucky Mineral (F1) (**LRR K, L**)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- Coast Prairie Redox (A16) (**LRR K, L, R**)
- 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- Dark Surface (S7) (**LRR K, L**)
- Polyvalue Below Surface (S8) (**LRR K, L**)
- Thin Dark Surface (S9) (**LRR K, L**)
- Iron-Manganese Masses (F12) (**LRR K, L, R**)
- Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

| | |
|----------------------------------|---|
| Restrictive Layer (if observed): | Hydric soil present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |
| Type: _____ | |
| Depth (inches): _____ | |

Remarks: Depleted Matrix and oxidized roots were observed.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Cunningham Property City/County: Montour County Sampling Date: 10/24/13
 Applicant/Owner: Cunningham State: PA Sampling Point DP-2-Wet-1
 Investigator(s): PF, DW, CB Section, Township, Range: Liberty Township
 Landform (hillslope, terrace, etc.): flat Local relief (concave, convex, none): none Slope (%): 0-3
 Subregion (LRR or MLRA): LRR Lat.: 41.016832 Long.: -76.752743 Datum: NAD 83
 Soil Map Unit Name: Evendale cherty silt loam NWI Classification: none
 Are climatic/hydrologic conditions of the site typical for this time of the year? Yes x No (If no, explain in remarks)
 Are vegetation No, soil No, or hydrology No significantly disturbed? Are "normal circumstances" present? Yes x No
 Are vegetation No, soil No, or hydrology No naturally problematic? (If needed, explain any answers in remarks)

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

| | |
|--|---|
| Hydrophytic vegetation present? <u> Y </u> Hydric soil present? <u> Y </u> Wetland hydrology present? <u> Y </u> | Is the sampled area within a wetland? Yes <u> x </u> No <u> </u> If yes, optional wetland site ID: <u> Wetland-2 </u> |
|--|---|

Remarks: Partly Cloudy, 55 degrees. Wetland-2 is an emergent and forested wetland located in a old pasture area.

HYDROLOGY

| | | |
|---|--|---|
| Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Other (Explain in Remarks) | Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input checked="" type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Microtopographic Relief (D4) |
|---|--|---|

| | |
|---|---|
| Field Observations: Surface water present? Yes <u> </u> No <u> x </u> Depth (inches): <u> </u> Water table present? Yes <u> </u> No <u> x </u> Depth (inches): <u> </u> Saturation present? Yes <u> x </u> No <u> </u> Depth (inches): <u> -8 </u> (includes capillary fringe) | Wetland hydrology present? Yes <u> x </u> No <u> </u> |
|---|---|

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hydrology received from seasonal high water table.

VEGETATION - Use scientific names of plants

Sampling Point: DP-2-Wet-1

| <u>Tree Stratum</u> (Plot Size: <u>30'</u>) | | | |
|---|-------------------|-------------------|-------------------|
| | Absolute % Cover | Dominant Species | Indicator Staus |
| 1 | <u>30</u> | <u>Yes</u> | <u>FACW</u> |
| 2 | <u> </u> | <u> </u> | <u> </u> |
| 3 | <u> </u> | <u> </u> | <u> </u> |
| 4 | <u> </u> | <u> </u> | <u> </u> |
| 5 | <u> </u> | <u> </u> | <u> </u> |
| 6 | <u> </u> | <u> </u> | <u> </u> |
| 7 | <u> </u> | <u> </u> | <u> </u> |
| | <u>30</u> = | Total Cover | |
| <u>Sapling/Shrub Stratum</u> (Plot Size: <u>15'</u>) | | | |
| | Absolute % Cover | Dominant Species | Indicator Staus |
| 1 | <u>10</u> | <u>Yes</u> | <u>FACW</u> |
| 2 | <u> </u> | <u> </u> | <u> </u> |
| 3 | <u> </u> | <u> </u> | <u> </u> |
| 4 | <u> </u> | <u> </u> | <u> </u> |
| 5 | <u> </u> | <u> </u> | <u> </u> |
| 6 | <u> </u> | <u> </u> | <u> </u> |
| 7 | <u> </u> | <u> </u> | <u> </u> |
| | <u>10</u> = | Total Cover | |
| <u>Herb Stratum</u> (Plot Size: <u>5'</u>) | | | |
| | Absolute % Cover | Dominant Species | Indicator Staus |
| 1 | <u>10</u> | <u> </u> | <u>FACW</u> |
| 2 | <u>20</u> | <u> </u> | <u>OBL</u> |
| 3 | <u>30</u> | <u>Yes</u> | <u>FACW</u> |
| 4 | <u>20</u> | <u> </u> | <u>FACW</u> |
| 5 | <u>40</u> | <u>Yes</u> | <u>FACW</u> |
| 6 | <u> </u> | <u> </u> | <u> </u> |
| 7 | <u> </u> | <u> </u> | <u> </u> |
| | <u>120</u> = | Total Cover | |
| <u>Woody vine Stratum</u> (Plot Size: <u>30'</u>) | | | |
| | Absolute % Cover | Dominant Species | Indicator Staus |
| 1 | <u> </u> | <u> </u> | <u> </u> |
| 2 | <u> </u> | <u> </u> | <u> </u> |
| 3 | <u> </u> | <u> </u> | <u> </u> |
| 4 | <u> </u> | <u> </u> | <u> </u> |
| | <u>0</u> = | Total Cover | |

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

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

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species x 1 =

FACW species x 2 =

FAC species x 3 =

FACU species x 4 =

UPL species x 5 =

Column totals (A) (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

 x 1 - Rapid test for hydrophytic vegetation

 x 2 - Dominance test is >50%

 3 - Prevalence index is ≤3.0*

 4 - Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)

 5 - Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Vegetation Strata:

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

Sapling/shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic vegetation present?

Yes x No

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

SOIL

Sampling Point: DP-2 Wet-1

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|----|----------------|----|-------|-------|---------|----------------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-4 | 10YR 4/2 | 90 | 10YR 5/8 | 10 | C | M | SL | oxidized roots |
| 4-16"+ | 10YR 4/1 | 80 | 10YR 5/8 | 20 | C | M | SL | oxidized roots |
| | | | | | | | | |
| | | | | | | | | |

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- Histisol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (**LRR R, MLRA 149B**)
- Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- Loamy Mucky Mineral (F1) (**LRR K, L**)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- Coast Prairie Redox (A16) (**LRR K, L, R**)
- 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- Dark Surface (S7) (**LRR K, L**)
- Polyvalue Below Surface (S8) (**LRR K, L**)
- Thin Dark Surface (S9) (**LRR K, L**)
- Iron-Manganese Masses (F12) (**LRR K, L, R**)
- Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

| | |
|--|---|
| Restrictive Layer (if observed): Type: _____ Depth (inches): _____ | Hydric soil present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |
|--|---|

Remarks: Depleted Matrix and oxidized roots were observed.

VEGETATION - Use scientific names of plants

Sampling Point: DP-3-Wet-1

| Tree Stratum (Plot Size: <u>30'</u>) | | Absolute % Cover | Dominant Species | Indicator Staus |
|---------------------------------------|-------|------------------|------------------|-----------------|
| 1 | _____ | _____ | _____ | _____ |
| 2 | _____ | _____ | _____ | _____ |
| 3 | _____ | _____ | _____ | _____ |
| 4 | _____ | _____ | _____ | _____ |
| 5 | _____ | _____ | _____ | _____ |
| 6 | _____ | _____ | _____ | _____ |
| 7 | _____ | _____ | _____ | _____ |
| | | _____ = | Total Cover | |

| Sapling/Shrub Stratum (Plot Size: <u>15'</u>) | | Absolute % Cover | Dominant Species | Indicator Staus |
|--|-------|------------------|------------------|-----------------|
| 1 | _____ | _____ | _____ | _____ |
| 2 | _____ | _____ | _____ | _____ |
| 3 | _____ | _____ | _____ | _____ |
| 4 | _____ | _____ | _____ | _____ |
| 5 | _____ | _____ | _____ | _____ |
| 6 | _____ | _____ | _____ | _____ |
| 7 | _____ | _____ | _____ | _____ |
| | | <u>10</u> = | Total Cover | |

| Herb Stratum (Plot Size: <u>5'</u>) | | Absolute % Cover | Dominant Species | Indicator Staus |
|--------------------------------------|-------------------------------------|------------------|------------------|-----------------|
| 1 | <u><i>Typha latifolia</i></u> | <u>50</u> | <u>Yes</u> | <u>OBL</u> |
| 2 | <u><i>Onoclea sensibilis</i></u> | <u>20</u> | | <u>OBL</u> |
| 3 | <u><i>Scirpus cyperinus</i></u> | <u>35</u> | <u>Yes</u> | <u>FACW</u> |
| 4 | <u><i>Symplocarpus foetidus</i></u> | <u>5</u> | | <u>FACW</u> |
| 5 | <u><i>Setara sp.</i></u> | <u>10</u> | | <u>FACW</u> |
| 6 | _____ | _____ | _____ | _____ |
| 7 | _____ | _____ | _____ | _____ |
| | | <u>120</u> = | Total Cover | |

| Woody vine Stratum (Plot Size: <u>30'</u>) | | Absolute % Cover | Dominant Species | Indicator Staus |
|---|-------|------------------|------------------|-----------------|
| 1 | _____ | _____ | _____ | _____ |
| 2 | _____ | _____ | _____ | _____ |
| 3 | _____ | _____ | _____ | _____ |
| 4 | _____ | _____ | _____ | _____ |
| | | <u>0</u> = | Total Cover | |

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

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

Percent of Dominant Species that are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column totals _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

 x 1 - Rapid test for hydrophytic vegetation

 x 2 - Dominance test is >50%

 3 - Prevalence index is ≤3.0*

 4 - Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)

 5 - Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Vegetation Strata:

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

Sapling/shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic vegetation present? Yes x No

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

SOIL

Sampling Point: DP-3 Wet-1

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|----|----------------|----|-------|-------|---------|----------------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-2 | 10YR 4/1 | 90 | 10YR 5/8 | 10 | C | M | SL | oxidized roots |
| 2-16"+ | 10YR 4/1 | 80 | 10YR 5/8 | 20 | C | M | SL | oxidized roots |
| | | | | | | | | |
| | | | | | | | | |

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

**Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- Histisol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR R, MLRA 149B)
- Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- Thin Dark Surface (S9) (LRR R, MLRA 149B)
- Loamy Mucky Mineral (F1) (LRR K, L)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- Coast Prairie Redox (A16) (LRR K, L, R)
- 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- Dark Surface (S7) (LRR K, L)
- Polyvalue Below Surface (S8) (LRR K, L)
- Thin Dark Surface (S9) (LRR K, L)
- Iron-Manganese Masses (F12) (LRR K, L, R)
- Piedmont Floodplain Soils (F19) (MLRA 149B)
- Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric soil present? Yes No

Remarks: Depleted Matrix and oxidized roots were observed.

VEGETATION - Use scientific names of plants

Sampling Point: DP-4 UP

| Tree Stratum (Plot Size: 30') | | | |
|-------------------------------|------------------|------------------|-----------------|
| | Absolute % Cover | Dominant Species | Indicator Staus |
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| | | = Total Cover | |

| Sapling/Shrub Stratum (Plot Size: 15') | | | |
|--|------------------|------------------|-----------------|
| | Absolute % Cover | Dominant Species | Indicator Staus |
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| | 10 | = Total Cover | |

| Herb Stratum (Plot Size: 5') | | | |
|------------------------------|------------------|------------------|-----------------|
| | Absolute % Cover | Dominant Species | Indicator Staus |
| 1 | 100 | Zea Mays | Yes |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| | 100 | = Total Cover | |

| Woody vine Stratum (Plot Size: 30') | | | |
|-------------------------------------|------------------|------------------|-----------------|
| | Absolute % Cover | Dominant Species | Indicator Staus |
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| | 0 | = Total Cover | |

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

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

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species x 1 =

FACW species x 2 =

FAC species x 3 =

FACU species 100 x 4 = 400

UPL species x 5 =

Column totals 100 (A) 400 (B)

Prevalence Index = B/A = 4.00

- Hydrophytic Vegetation Indicators:**
- 1 - Rapid test for hydrophytic vegetation
 - 2 - Dominance test is >50%
 - 3 - Prevalence index is ≤3.0*
 - 4 - Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)
 - 5 - Problematic hydrophytic vegetation* (explain)
- *Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Vegetation Strata:

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

Sapling/shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic vegetation present?

Yes No x

Remarks: Corn plants were 8ft tall and looked very healthy with no impacts from water/wetland conditions. Wetlands were delineated into the corn only in the areas where the corn was stunted and the foxtail bristlegress encroached into the corn.

SOIL

Sampling Point: DP-4-UP

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

| Depth (Inches) | Matrix | | Redox Features | | | | Texture | Remarks |
|----------------|---------------|----|----------------|---|-------|-------|---------|---------|
| | Color (moist) | % | Color (moist) | % | Type* | Loc** | | |
| 0-14"+ | 10YR 4/2 | 95 | 7.5YR 5/8 | 5 | C | M | SL | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- Histisol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) (**LRR R, MLRA 149B**)
- Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- Loamy Mucky Mineral (F1) (**LRR K, L**)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)

Indicators for Problematic Hydric Soils:

- 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- Coast Prairie Redox (A16) (**LRR K, L, R**)
- 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- Dark Surface (S7) (**LRR K, L**)
- Polyvalue Below Surface (S8) (**LRR K, L**)
- Thin Dark Surface (S9) (**LRR K, L**)
- Iron-Manganese Masses (F12) (**LRR K, L, R**)
- Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

| | |
|--|---|
| Restrictive Layer (if observed): Type: _____ Depth (inches): _____ | Hydric soil present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |
|--|---|

Remarks: Soil was dry. Soil series is Holly which is listed as a hydric soil for Montour county.

ATTACHMENT B
PHOTOGRAPHIC DOCUMENTATION



ID: Photo 1

Date: 10/24/13

Taken by: DW

Comments:
This photo depicts a western view of Wetland 1 looking towards Kelly's Dam road.



ID: Photo 2

Date: 10/24/13

Taken by: DW

Comments:
This photo depicts a northeastern view of Wetland 1.



ID: Photo 3

Date: 3/31/13

Taken by: DW

Comments:
This photo depicts a western view of Wetland 1 looking towards Kelly's Dam road.



ID: Photo 4

Date: 10/24/13

Taken by: DW

Comments:
This photo depicts an eastern view of Wetland 1.



ID: Photo 5

Date: 10/24/13

Taken by: DW

Comments:
This photo depicts an eastern view of Wetland 1 from Kelly's Dam road.



ID: Photo 6

Date: 10/24/13

Taken by: DW

Comments:
This photo depicts a northern view of the forested portion of Wetland 1.



ID: Photo 7

Date: 10/24/13

Taken by: DW

Comments:

This photo depicts a northern view of Wetland 1 near the most eastern edge of the investigation area.



ID: Photo 8

Date: 10/24/13

Taken by: DW

Comments:

This photo depicts a northeastern view of Wetland 1.



ID: Photo 9

Date: 10/24/13

Taken by: DW

Comments:
This photo depicts a northeastern view of Wetland 1 along a corn field.



ID: Photo 10

Date: 10/24/13

Taken by: DW

Comments:
This photo depicts a northeastern view of Wetland 1 along a corn field.



ID: Photo 11
Date: 3/31/13
Taken by: DW
Comments:
This photo depicts a southwestern view of UNT 1.



ID: Photo 12
Date: 3/31/13
Taken by: DW
Comments:
This photo depicts a northeastern view of UNT 1.

ATTACHMENT C
WATER RESOURCE SUMMARY TABLE

CHILLISQUAQUE CREEK MITIGATION SITE

WATER RESOURCE SUMMARY TABLE

| Waters Name | Cowardin Code | HGM Code | Estimated Amount of Aquatic Resource in Review Area (sq. ft.) | Estimated Amount of Aquatic Resource in Review Area Linear (ft.) | Estimated Channel Width (ft) | Waters Types | Latitude (dd nad83) | Longitude (dd nad83) | Local Waterway | Stream Type (P-Perennial, I-Intermittent, or E-Ephernal) |
|------------------------|---------------|----------|---|--|------------------------------|--------------|---------------------|----------------------|----------------|--|
| Wetland 1 | PEM | DEPRESS | 856,619 | N/A | N/A | RPWWD | 41.012963 | -76.751322 | Chillisquaque | N/A |
| Wetland 1 | PSS | DEPRESS | 60,769 | N/A | N/A | RPWWD | 41.014372 | -76.752212 | Chillisquaque | N/A |
| Wetland 1 | PFO | DEPRESS | 1,219,870 | N/A | N/A | RPWWD | 41.012959 | -76.750071 | Chillisquaque | N/A |
| UNT 1 | R4 | RIVERINE | 3,045 | 1,015 | 3 | RPW | 41.012810 | -76.750378 | Chillisquaque | I |
| Drain* | N/A | RIVERINE | 4,096 | 4,096 | 1 | N/A | 41.012952 | -76.751522 | Chillisquaque | N/A |
| Total Wetland | | | 2,137,258 | N/A | | | | | | |
| Total Stream | | | 3,045 | 1,015 | | | | | | |
| Total Drain | | | 4,096 | 4,096 | | | | | | |
| TOTAL RESOURCES | | | 2,144,399 | 5,111.0 | | | | | | |

*Drains are considered drainage patterns within the wetlands.

ATTACHMENT D
RESUMES

COMPANY TITLE:

**Environmental Technician II
Health and Safety Officer (HSO)**

EDUCATION

- *Environmental Soil Science, Bachelors of Science, The Pennsylvania State University, University Park, Pennsylvania, 2009.*

PROFESSIONAL CERTIFICATIONS

- *Wetland Professional In Training (WPIT) Certification March 2012*
- *Occupational Safety and Health Professional Certification May 2012*

PROFESSIONAL TRAINING

- *PA DEP ESCGP-2 Training July 10, 2013 State College, PA*
- *OSHA 40 Hour HAZWOPER Training; AllProbe Environmental; June 2013*
- *E&S Manual Training – Scranton, PA - PA Association of Conservation Districts - May 15-16, 2013, at the Hilton Scranton & Conference Center*
- *Hydric Soil Indicators Field Seminar April 25, 2013 Pennsylvania Association of Professional Soil Scientists - Stoll Natural Resources Center, Wysox, PA*
- *Williams Contractor Safety; May 2012*
- *First Aid/ CPR; Emergency Care & Safety Institute; May 2012*
- *Primary Headwater Habitat Assessment Training – West Woods Metro Park, Geauga County, Ohio May 23, 2012*
- *132 Hour Occupational Safety and Health Professional Training – OSHA Academy, May 2012*
- *"Planning Hydrology for Constructed Wetlands", Wetland Training Institute, State College, PA November 2011*
- *"Grasses, Sedges, and Rushes" Pennsylvania Institute for Conservation Education, Shavers Creek Environmental Center, Huntingdon, PA August 2011*
- *Hydrology of Wetlands Rutgers University – New Jersey Agricultural Experiment Station Tuckerton, New Jersey May, 2011*
- *"Functional Assessment as the Basis for Mitigation of Wetland Impacts - Overview and Discussion", State College, PA – M.N. Gilbert Environmental April, 2011*
- *ACOE Wetland Delineation/Regional Supplement Training Richard Chinn Environmental Training State College.*

Paul Fisher, WPIT

Mr. Fisher is a graduate from The Pennsylvania State University in 2009, where he was awarded Bachelors degree in Environmental Soil Science with a minor in Watershed and Water Resources. Since graduation he has gained experience in many environmental areas including wetland delineations, stream projects, threatened and endangered species surveys and GIS mapping. Mr. Fisher was awarded certification as a Wetland Professional In Training (WPIT) in March of 2012 and is actively working towards the full-time professional experience requirement to gain his Professional Wetland Scientist (PWS) Certification.

PROFESSIONAL EXPERIENCE**GENERAL ENVIRONMENTAL PROJECTS**

- Used GIS software for mapping and analysis
- Used a Trimble GPS for mapping boundaries for mapping purposes
- Composed various Environmental Reports for landfills, gas companies, wind farms, construction companies, private landowners, and regulatory agencies
- Performed land analysis's using GIS Software for determining suitable areas for development.
- Completed various Environmental Permits for clients.

WETLAND AND STREAM RESTORATION PROJECTS

- Performed wetland monitoring and maintenance on various wetlands
- Performed Stream Surveys
- Practiced wetland delineations using US Army Corps of Engineers Wetlands Delineation Manual 1987 and applicable regional supplements
- Used the Pa Code Chapter 93 Water Quality Standards and Chapter 105 Dam safety and Waterway Management
- Used surveying equipment to characterize stream profiles for mapping and design purposes
- Delineated wetlands and water resources at several projects throughout Pennsylvania, Ohio and West Virginia.
- Checked seismic testing locations for wetlands.

BIOLOGICAL EXPERIENCE

- Assisted on several Timber Rattlesnake Phase I and II surveys
- Assisted on several Bog Turtle Phase II surveys
- Assisted on Allegheny Wood Rat surveys
- Helped with tracking Timber Rattlesnakes in Eastern Pennsylvania
- Identification and documentation of different herptile species at numerous wetland sites
- Composed various Threatened and Endangered species reports
- Performed Macro-invertebrate sampling on several streams.

COMPANY TITLE:*Environmental Technician***EDUCATION**

- *BA, Environmental Studies, The Pennsylvania State University, 2010: Minor in Biology*

PROFESSIONAL TRAINING

- *PA DEP ESCGP-2 Training July 10, 2013 State College, PA*
- *OSHA 8 Hour HAZWOPER Refresher Training; AllProbe Environmental; June 2013*
- *OSHA 40 Hour HAZWOPER Training; AllProbe Environmental; June 2012*
- *PA SFI@ Training; Prof. Timber Harvesting Ess., Wildlife - Young Forest Initiative, Game of Logging - Level 1; May 2012*
- *First Aid/ CPR; Emergency Care & Safety Institute; May 2012*
- *Marcellus Workshop February 2012 "An Update On PHMSA Pipeline Regulations & Act 127" "Taking Cartopac Into The Field {Who, How, And Why}" "Streamlining Field Data Collection For Pipeline And Environmental Workflows"*
- *General Permit – 4 (PASPGP-4) Workshop; Army Corps of Engineers, Baltimore District, Regulatory Branch; October 2011*

RELAVENT COURSES

- *Field Biology- utilized field research methods and analyzed data.*
- *Biological Statistics- statistics in context to biology and ecology.*
- *Ecology of Mid Atlantic- assessed the ecology of the Mid Atlantic.*
- *Conservation Biology- dealt with conservation methods and theories.*
- *GIS- Practiced using Geographical Information Systems with layered mapping.*

SKILLS

- *Computer skills: Microsoft Word, Excel, PowerPoint.*
- *Mapping skills: Arch GIS.*
- *Communication skills: Public*

Mr. Wood graduated from The Pennsylvania State University with a degree in Environmental Studies and a minor in Biology. Since graduation, he has been associated with numerous projects at many different levels and has gained a vast knowledge of all aspects of environmental permitting. He gained skills through his previous experiences and WHM Consulting, Inc. in various environmental projects dealing with water quality and land use.

PROFESSIONAL EXPERIENCE

- Performed Erosion and Sediment control inspections on gas well sites.
- Assisted with a variety of environmental permitting projects.
- Field assistant on multiple Timber Rattlesnake Phase I and II surveys and Allegheny Wood Rat surveys.
- Forest inventory and assessment
- Performed a summer internship for the Green Environmental Management Systems at the Veterans Affairs Hospital in Altoona PA, which included researching conservation methods for a storm waste water wetlands/pond complex.
- Executed and reported on a six week stream study of Spring Run on Altoona campus.
- Performed macroinvertebrate sampling.
- Collected water samples and onsite water quality data.
- Produced mitigation plans for wetland and stream impacts.
- Penn DOT, bridge crew performing minor repairs on bridges. Also, highway maintenance with duties of flagging and laboring.
- Obtained certificate for training on the “Overview of Wetland Delineation Protocols and the Interim NC/NE Regional Supplement to the USACE Delineation Manual”.
- Performed water resource delineations and reporting, and performed wetland and stream mitigation monitoring and reporting.
- Perform task utilizing Trimble surveying equipment.
- Collected elevation data for stream profiles and cross sections.
- Utilize GIS software for mapping and data analysis.
- Assisted with rare, threatened and endangered plant surveys and reporting.

APPENDIX D
PHOTOGRAPHIC DOCUMENTATION



ID: Photo 1

Date: 8/05/19

Taken by: CG

Comments:
This photo shows a view of the proposed wetland creation area.



ID: Photo 2

Date: 8/05/19

Taken by: CG

Comments:
This photo shows a view of the proposed wetland enhancement area.

APPENDIX E
PENNSYLVANIA NATURAL DIVERSITY INDEX ENVIRONMENTAL
REVIEW RECEIPT AND CORRESPONDENCE

1. PROJECT INFORMATION

Project Name: **Cunningham Farm Mitigation Site**

Date of Review: **7/30/2019 09:54:33 AM**

Project Category: **Habitat Conservation and Restoration, Wetland Restoration, Wetland Creation, or Wetland Enhancement**

Project Area: **12.09 acres**

County(s): **Montour**

Township/Municipality(s): **LIBERTY**

ZIP Code: **17821**

Quadrangle Name(s): **MILTON; WASHINGTONVILLE**

Watersheds HUC 8: **Lower West Branch Susquehanna**

Watersheds HUC 12: **Chillisquaque Creek-West Branch Susquehanna River**

Decimal Degrees: **41.013670, -76.751094**

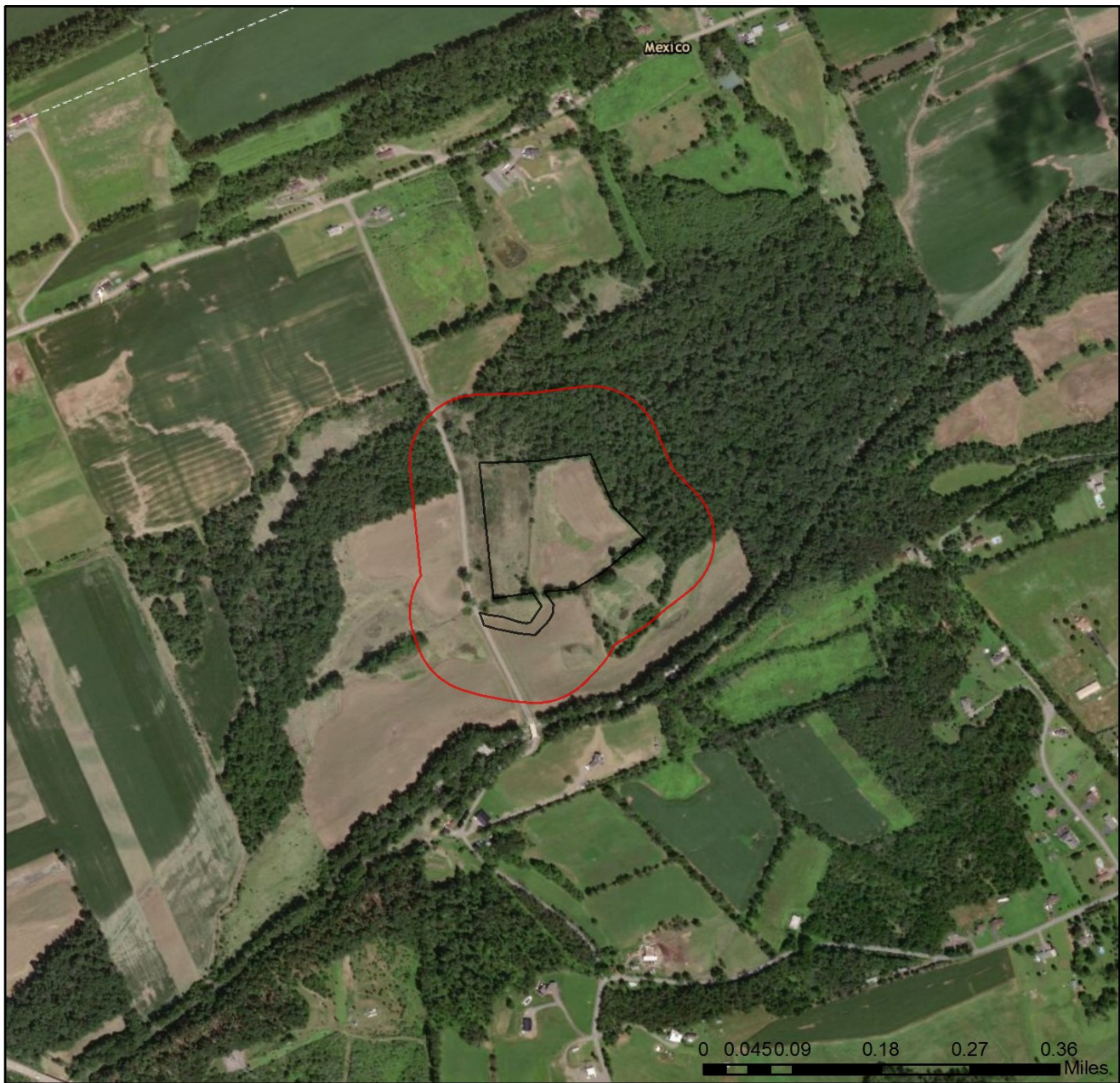
Degrees Minutes Seconds: **41° 0' 49.2137" N, 76° 45' 3.9370" W**

2. SEARCH RESULTS

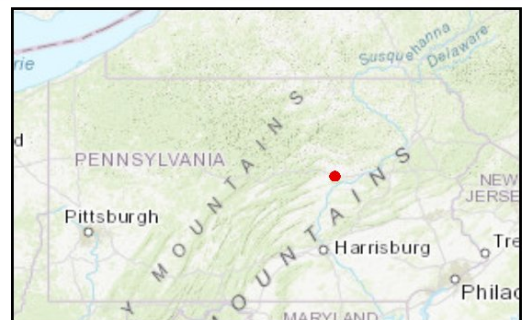
| Agency | Results | Response |
|---|-------------------------|--|
| PA Game Commission | Potential Impact | FURTHER REVIEW IS REQUIRED, See Agency Response |
| PA Department of Conservation and Natural Resources | Potential Impact | FURTHER REVIEW IS REQUIRED, See Agency Response |
| PA Fish and Boat Commission | No Known Impact | No Further Review Required |
| U.S. Fish and Wildlife Service | No Known Impact | No Further Review Required |

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

Cunningham Farm Mitigation Site

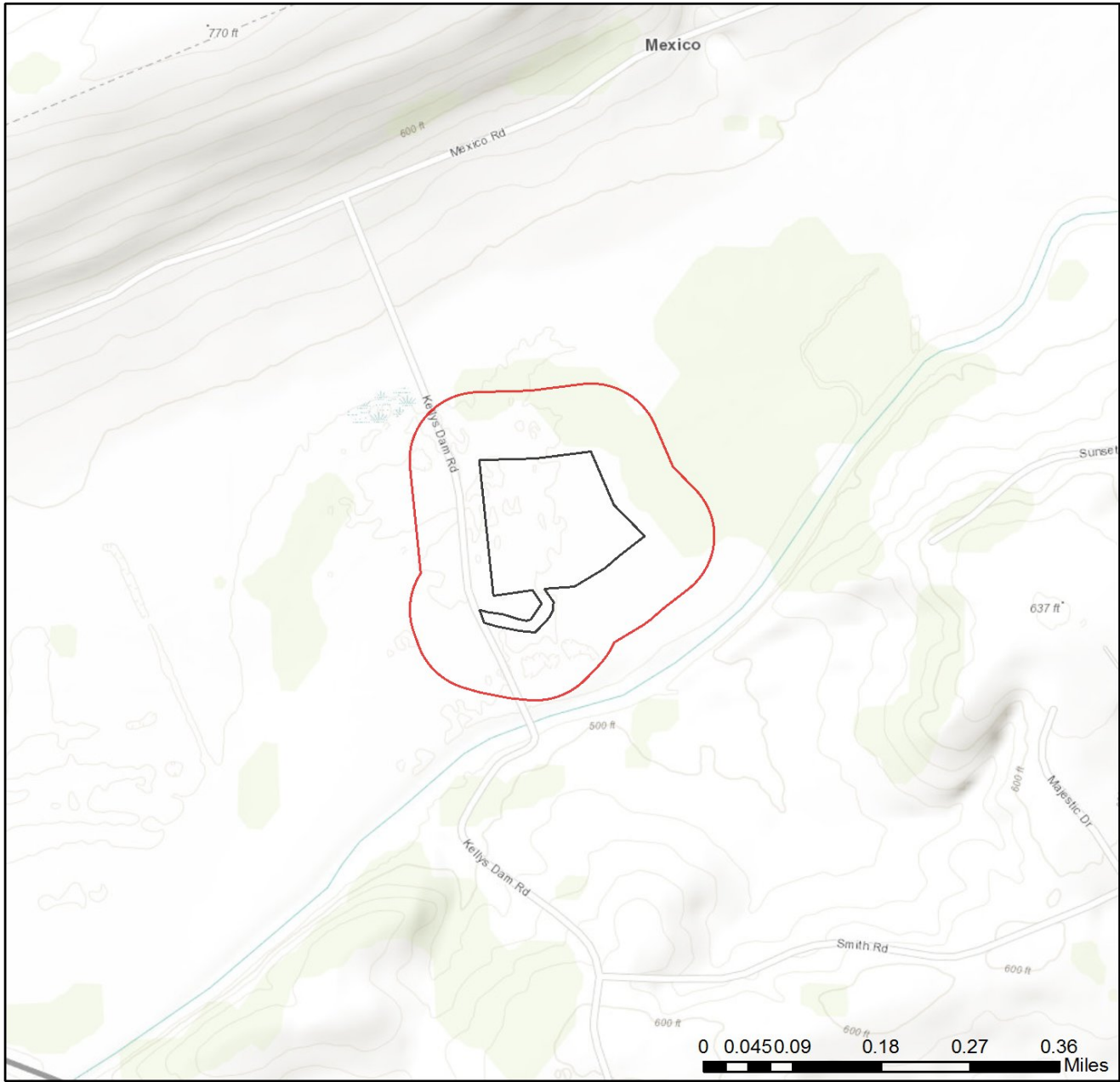


- Project Boundary
- Buffered Project Boundary

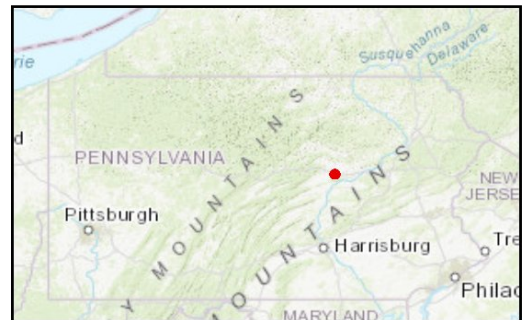


Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

Cunningham Farm Mitigation Site



- Project Boundary
- Buffered Project Boundary



Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS,

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jurisdictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission

RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

PGC Species: (Note: The Pennsylvania Conservation Explorer tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below.)

| Scientific Name | Common Name | Current Status |
|-----------------------|-------------|--------------------------|
| Cistothorus palustris | Marsh Wren | Special Concern Species* |

PA Department of Conservation and Natural Resources

RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

DCNR Species: (Note: The Pennsylvania Conservation Explorer tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below. After desktop review, if a botanical survey is required by DCNR, we recommend the DCNR Botanical Survey Protocols, available here: <https://conservationexplorer.dcnr.pa.gov/content/survey-protocols>)

| Scientific Name | Common Name | Current Status | Proposed Status | Survey Window |
|-----------------|---------------|----------------|-----------------|-----------------------------|
| Carex typhina | Cattail Sedge | Endangered | Threatened | Fruits mid June - September |

PA Fish and Boat Commission

RESPONSE:

No impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service

RESPONSE:

No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq. is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

* Special Concern Species or Resource - Plant or animal species classified as rare, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern populations (plants or animals) and unique geologic features.

** Sensitive Species - Species identified by the jurisdictional agency as collectible, having economic value, or being susceptible to decline as a result of visitation.

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, upload* or email* the following information to the agency(s). Instructions for uploading project materials can be found [here](#). This option provides the applicant with the convenience of sending project materials to a single location accessible to all three state agencies. Alternatively, applicants may email or mail their project materials (see AGENCY CONTACT INFORMATION).

***Note:** U.S.Fish and Wildlife Service requires applicants to mail project materials to the USFWS PA field office (see AGENCY CONTACT INFORMATION). USFWS will not accept project materials submitted electronically (by upload or email).

Check-list of Minimum Materials to be submitted:

___ Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.

___ A map with the project boundary and/or a basic site plan (particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)

In addition to the materials listed above, USFWS REQUIRES the following

___ **SIGNED** copy of a Final Project Environmental Review Receipt

The inclusion of the following information may expedite the review process.

___ Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)

___ Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at <https://conservationexplorer.dcnr.pa.gov/content/resources>.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources

Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552
Harrisburg, PA 17105-8552
Email: RA-HeritageReview@pa.gov

U.S. Fish and Wildlife Service

Pennsylvania Field Office
Endangered Species Section
110 Radnor Rd; Suite 101
State College, PA 16801
NO Faxes Please

PA Fish and Boat Commission

Division of Environmental Services
595 E. Rolling Ridge Dr., Bellefonte, PA 16823
Email: RA-FBPACENOTIFY@pa.gov

PA Game Commission

Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA 17110-9797
Email: RA-PGC_PNDI@pa.gov
NO Faxes Please

7. PROJECT CONTACT INFORMATION

Name: Paul Fisher
Company/Business Name: WHM Consulting, Inc.
Address: 2525 Green Tech Drive Suite B
City, State, Zip: State College, PA 16803
Phone: (814) 689-1650 Fax: (814) 689-1650
Email: paulf@whmgroup.com

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.



applicant/project proponent signature

08/06/19

date

BUREAU OF FORESTRY

Date: August 6, 2019

PNDI Number: 689723
Version: Final_1; 7/30/2019

Paul Fisher
WHM Consulting Inc.
2525 Green Tech drive Suite B
State College, PA 16803

Email: paulf@whmgroup.com (hard copy will not follow)

Re: Cunningham Farm Mitigation Site
Township: Liberty **County: Montour**

Dear Mr. Fisher,

Thank you for the submission of the Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Receipt Number **689723 (Final_1)** for review. PA Department of Conservation and Natural Resources screened this project for potential impacts to species and resources under DCNR's responsibility, which includes plants, terrestrial invertebrates, natural communities, and geologic features only.

No Impact Anticipated (Conservation Measure)

PNDI records indicate species or resources under DCNR's jurisdiction are located in the vicinity of the project. However, based on the information you submitted concerning the nature of the project, the immediate location, and our detailed resource information, DCNR has determined that no impact is likely. No further coordination with our agency is needed for this project.

***Carex typhina* (Cattail Sedge) is known to occur in close proximity to the project site within wooded bottomland along Chillisquaque Creek. This species is currently ranked PA Endangered and proposed PA Threatened. Please avoid all impacts to wooded wetlands on the project site.**

Recommended Actions to avoid the spread of invasive species:

- Clean boot treads, construction equipment, and vehicles thoroughly (especially the undercarriage and wheels) before they are brought on site. This will remove invasive plant seeds and invasive earthworms/cocoons that may have been picked up at other sites.
- Do not transport unsterilized leaves, mulch, compost, or soil to the site from another location.
- Do not use seed mixes that include invasive species. Please also use weed-free straw or hay mixes. More information about invasive species in Pennsylvania can be found at the following link:
<http://www.dcnr.pa.gov/Conservation/WildPlants/InvasivePlants/Pages/default.aspx>
- Use habitat appropriate seed mixes. For example, when reseeding along a waterway, utilize a riparian seed mix. The Bureau of Forestry Planting & Seeding Guidelines can be found here for recommendations:
http://www.docs.dcnr.pa.gov/cs/groups/public/documents/document/dcnr_20031083.pdf
- Report occurrences of invasive species to iMapInvasives at <https://www.imapinvasives.org/>. Focus on large infestations and species that are not yet well established in the region or in Pennsylvania (<https://www.paimapinvasives.org/be-on-the-lookout>).

This response represents the most up-to-date review of the PNDI data files and is valid for two (2) years only. If project plans change or more information on listed or proposed species becomes available, our determination may be reconsidered. Should the proposed work continue beyond the period covered by this letter and a permit has not been acquired, please resubmit the project to this agency as an "Update" (including an updated PNDI receipt, project narrative, description of project changes and accurate map). As a reminder, this finding applies to potential impacts under DCNR's jurisdiction only. Visit the PNHP website for directions on contacting the Commonwealth's other resource agencies for environmental review.

Should you have any questions or concerns, please contact Rich Shockey, Ecological Information Specialist, by phone (717-772-0263) or via email (c-rshockey@pa.gov).

Sincerely

A handwritten signature in black ink that reads "Greg Podnieszinski". The signature is written in a cursive style and is centered within a light gray rectangular box.

Greg Podnieszinski, Section Chief
Natural Heritage Section

ATTACHMENT D – PENNSYLVANIA GAME COMISSION CORRESPONDENCE

Coordination with the Pennsylvania Game Commission (PGC) is ongoing. Attachment E will be updated once a response letter is received.

APPENDIX F
CULTURAL RESOURCE NOTICE



Pennsylvania State Historic Preservation Office

PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION

6 January 2017

David J. Rue
Rue Environmental
1257 East College Avenue
State College, PA 16801

Re: ER 2014-0191-093-D
Phase I Archaeological Survey, Cunningham Wetland Mitigation Site, Liberty Township,
Montour County, Pennsylvania

Dear Mr. Rue:

Thank you for submitting information concerning the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

This report meets our standards and specifications as outlined in *Guidelines for Archaeological Investigations in Pennsylvania* (PA SHPO 2016) and the Secretary of the Interior's Guidelines for Archaeological Documentation. We agree with the recommendations of this report and in our opinion no further archaeological work is necessary for this project.

Please send one bound copy and three digital copies (PDF preferred) on separate CDs of the final report for our files. For all copies, photographs must adhere to the National Register Photo Policy.

If you need further information in this matter concerning archaeological resources please consult Steven McDougal at (717) 772-0923.

Sincerely,



Douglas C. McLearn, Chief
Division of Archaeology & Protection

DCM/srm



Negative Survey Form

(This form may be used if the Phase I guidelines have been followed and no cultural resources have been identified.)

1. Project Identification:

ER Number: 2014-0191-093

Project Name &/or Agency Tracking #: Cunningham Wetland Mitigation Site.

Agency: ACOE Applicant: WHM Consulting

Preparers Name and affiliation: David Rue, Rue Environmental LLC

Date Prepared: 11/29/2016

Project Area County/Municipality (list all)

| County | Municipality |
|---------|--------------|
| Montour | Liberty |

2. Project Setting: (check all that apply)

- urban/suburban; rural
 upland; floodplain/terrace (active; stable terrace)

7.5" USGS Quadrangle(s) Name (list all):

| Name | Date |
|--------|------|
| Milton | |

Physiographic Zone(s)(list All. Use DCNR Map 13 compiled by W.D. Sevon, Fourth Edition, 2000.):

| Physiographic Zone |
|--------------------------|
| Susquehanna Lowland (30) |

Project Area Drainage(s), (list all) (Sub-basin and Watershed can be obtained from CRGIS):

| Sub-basin | Watershed | Major Stream | Minor Stream |
|---------------------------|-----------|------------------|--------------|
| L. W. Br Susquehanna (10) | D | West Branch Susq | Other |

3. Basic Field Conditions:

(Text fields will expand as needed. Please be complete)

Area of APE / Project Area in hectares: 2.26 Hectares tested: 2.26

General Description of APE / Project Area: Herbaceous covered terrain on alluvium with relatively shallow soils

Type of Proposed Project / Impact: Creation of wetlands through relatively shallow excavations averaging 75 cm

Date of field investigation(s): Nov 15-17, 2016

Description of Field Conditions including percentage of surface visibility:

Grass and weed cover in cultivated fields, very low surface visibility

4. Previously Recorded Archaeological Sites within APE / Project Area and not relocated by this project:

| PASS Site Number | Reason not re-located |
|------------------|-----------------------|
| n/a | |

5. Survey Methodology: (check all that apply to the entire project; attach any supporting documents)

- PASS file Research Contacted Local Historical Association/Commission/Park/Etc.
 Informant Data Historic Records/Maps/Photos SCS Soil Maps
 Surface Survey Geomorphological Borings STPs
 Test Units Geomorphological Trenches Remote Sensing
 Other: _____

Professional Geomorphologist was Present or Not Present During Field Investigations

Name: _ Affiliation:

Formal Geomorphological Report Prepared: Yes No

6. Results: (Describe both the design and the results of every methodology checked in 5. Include the size and condition of the area tested by each.)

The APE included five sub-areas with a total area of 2.26 ha. The CRGIS indicated that no previously recorded sites were located in the APE. The 1875 atlas was reviewed (not reproduced here), it showed no expected historic resources in the APE. The predictive model shows the area to be categorized as primarily low probability for prehistoric sites. Soils are of the Holly series, formed in stream alluvium. Existing wetlands are located all around the area. The soils are relatively poorly drained, proving a low probability of significant prehistoric site use other than ephemeral resource procurement. A moderate probability shovel testing interval of 25 m was utilized across the area and no historic or prehistoric artifacts were recovered. Testing consisted of excavation of 36 shovel test pits.

In the northern most of the larger areas tested by STPS 101-109, the profile included an Ap horizon of brown (10YR4/2) silty clay loam ranging in thickness from 25-30 cm. The B horizon was a yellowish brown (10YR5/6) – mottled with 10YR5/2) clay loam, 25-35 cm thick. The underlying BC horizon was a 10YR7/2 sandy gravel tested to depths to 65 cm.

In the two larger sub-areas to the south of the above area, STPS 201-215 and 301-307 were completed. The profile here included an Ap horizon whose depth and characteristics were similar to that described above. The B horizon was a 10YR 5/4 (mottled with 5/2) clay loam 45-55 cm thick. This was underlain by a BC horizon of 10YR5/2 clay often with gravel tested to depths of 80 cm.

The two small areas to the south were tested with STPS 401 and 501-504. Here, project impacts will be limited to depths of 45 cm. Evidence of poorer drainage was encountered in the shovel testing of these areas. Beneath an Ap horizon congruent with the rest of the area, a B1 horizon from circa 30-45 cm of 10YR5/2 silty clay was encountered. A B2 horizon of similar soil color mottled with 10YR5/4 was encountered to excavated depths up to 60 cm.

7. Statewide Pre-Contact Probability Model Analysis: (Use the model from CRGIS to determine portions of the project area that were located within each sensitivity tier and list all testing methods used within each tier. If more than one method was used, estimate the percentage of the tier tested by each method. In the Sites Located section, include Isolated Finds for which a number is assigned.)

| Sensitivity Tier | Area within this Tier | Percent of Total Project Area | Method(s) Used to test this tier (Use list from 5 above. Include % if multiple.) | Number of Sites Located |
|------------------|-----------------------|-------------------------------|---|-------------------------|
| High | 0 sq. m. | 0 % | | 0 |
| Moderate | 0 sq. m. | 0 % | | 0 |
| Low | 22,500 sq. m. | 100 % | STPS 25 m | 0 |

8. Required Attachments:

- 7.5' USGS Quadrangle Map delineating APE / Project Area
- Project map showing testing strategy(ies)
- Testing strategy justification / predictive model
- Supporting photographs with descriptions of view and view direction
- Engineering / Project Plans if prepared
- Geomorphological Report if prepared
- Representative excavation profiles and descriptions

List all other attachments to this Negative Survey Form:

| Attachment Type |
|-----------------|
| |

Survey Strategy Justification

The probability model indicated the project area had a low potential for prehistoric resources and there was no evidence wo suggest that historic resources were present. The entire APE was tested with a moderate shovel test interval of 25 m.

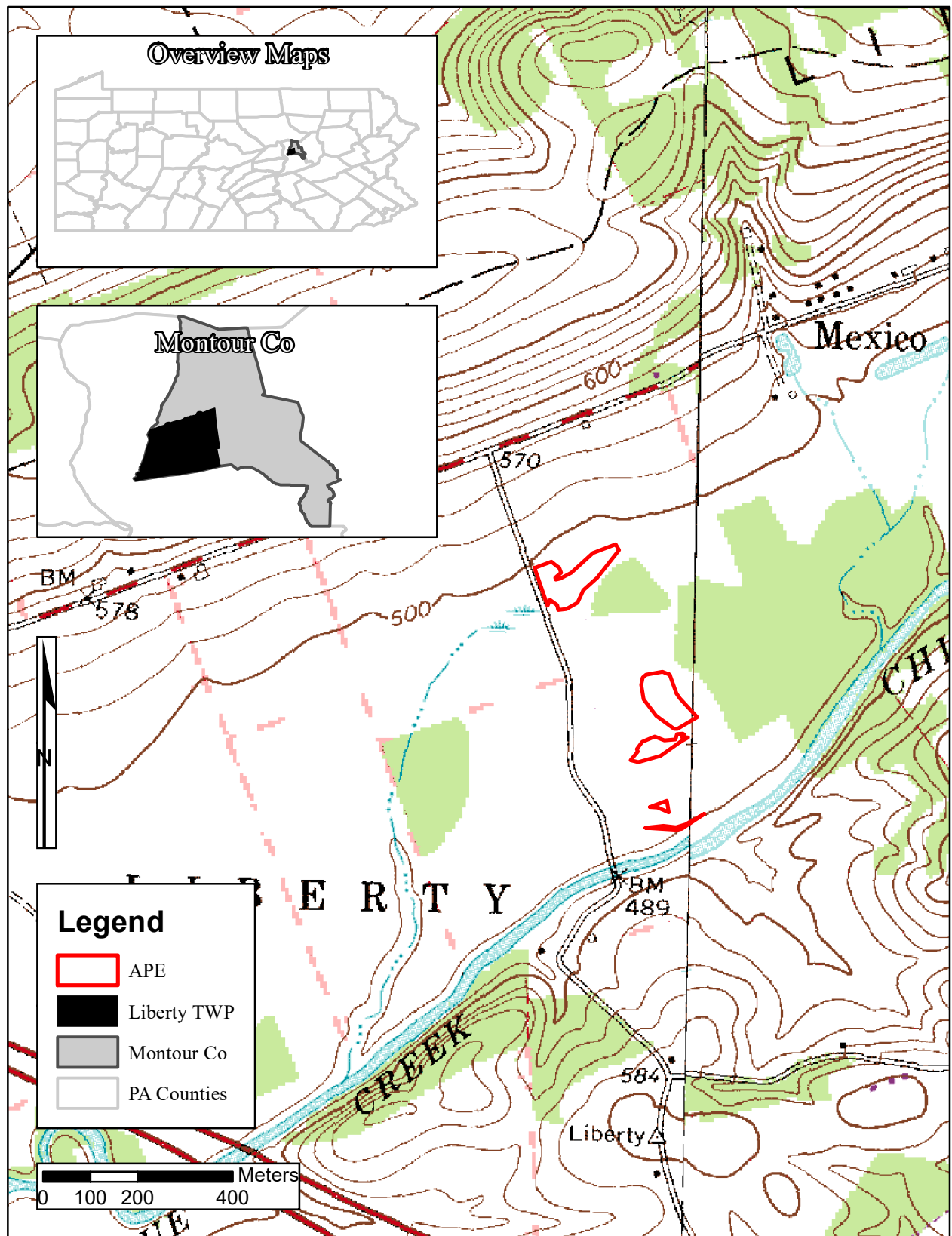


Figure 1. Liberty APE on topo map.

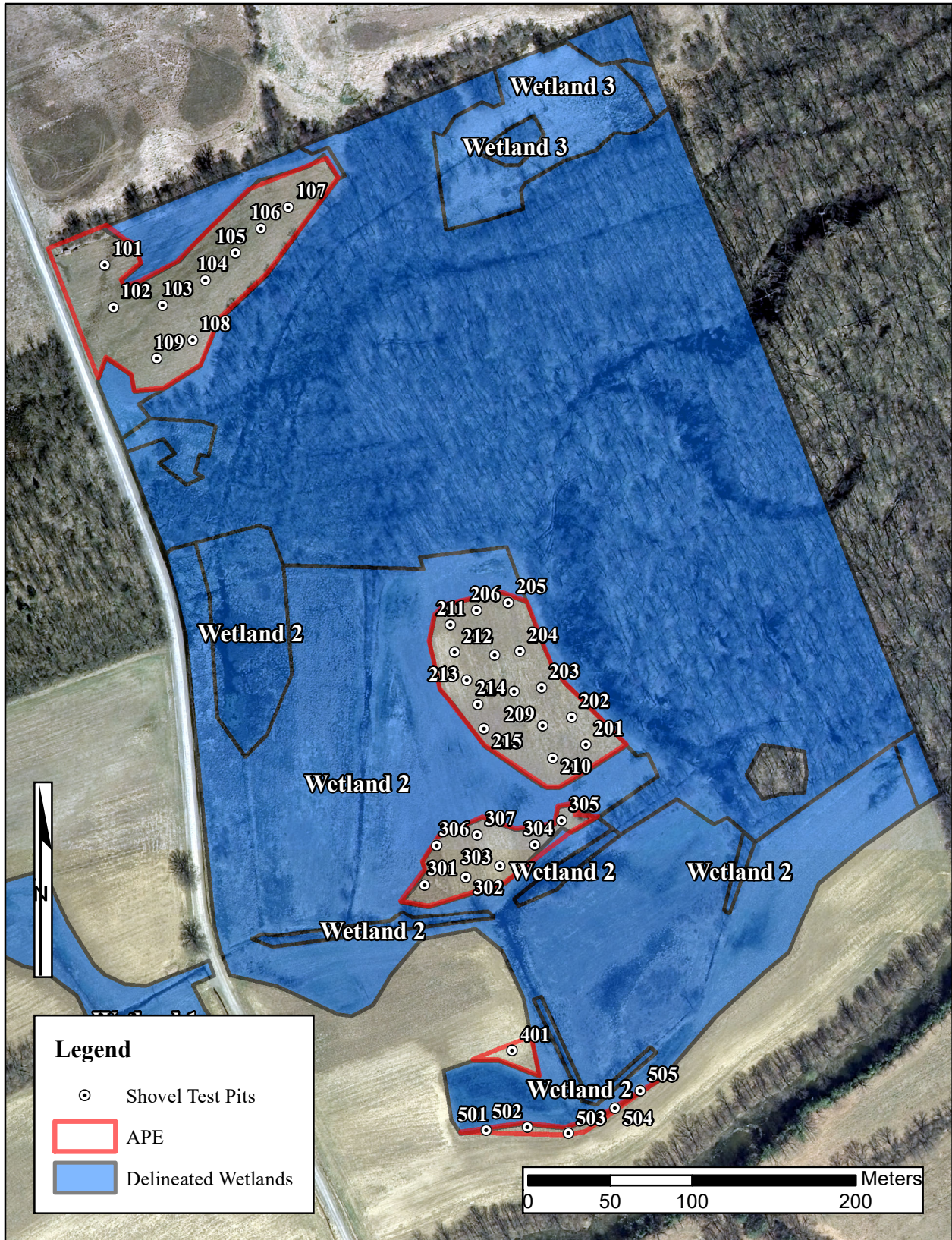


Figure 2. Shovel test locations.

Note: Wetland ID's of this Figure do not match ID's outlined in Wetland Delineation Report and mapping.



Photo 1. Area 1 East Side Looking Northeast.

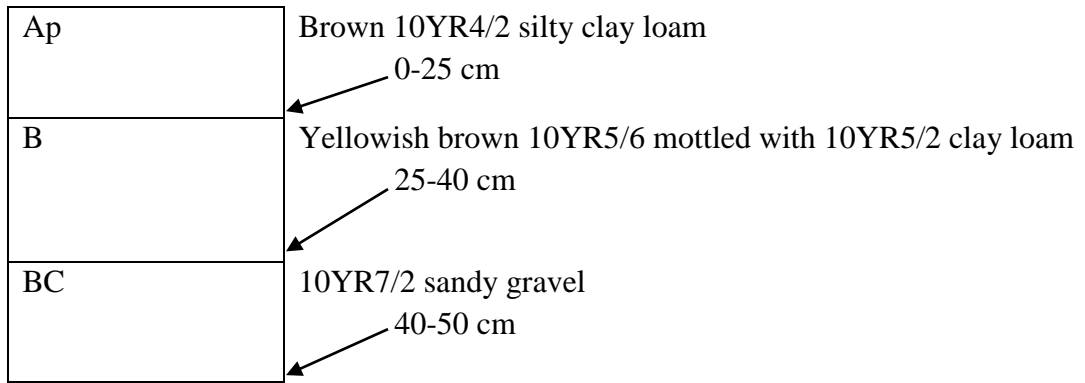


Photo 2. Area 2 Southeast Corner Looking Southwest Towards Area 4.

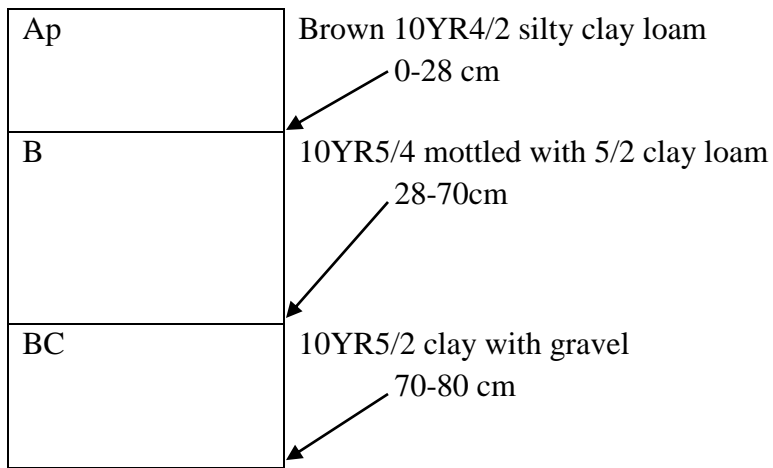


Photo 3. Area 5 West End Looking East.

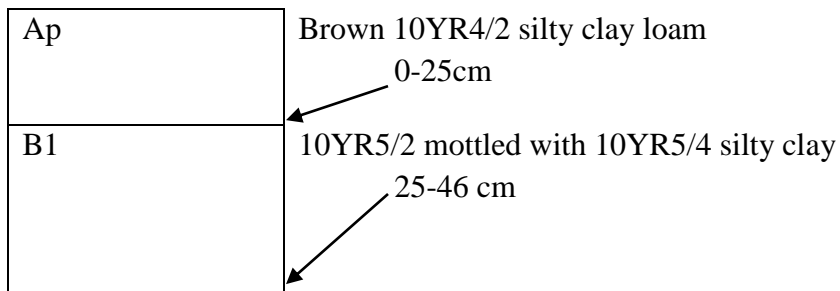
STP 103



STP 211



STP 505



Representative Shovel Test Profiles.

APPENDIX G
PAST PERFORMANCE HISTORY, RESUMES & PROJECT PROFILES

WHM PERFORMANCE HISTORY

| PROJECT NAME | USACE PERMIT # | DEP PERMIT # | USACE DISTRICT | DEED RESTRICTION DATE | MITIGATION ACREAGE | MITIGATION TYPE | PERFORMANCE STANDARD MET / IN COMPLIANCE | FINANCIAL ASSURANCES REQUIRED |
|--|---|---|----------------------|-----------------------|--------------------|---|--|-------------------------------|
| BALD EAGLE WETLAND | CENAB-OP-RPA-02-02087-12 CENAB-OP-RPA-04-01670-12 | E14-427 E14-465 | BALTIMORE USACE - PA | 16-Nov-10 | 52.78 | WETLAND CREATION WETLAND ENHANCEMENT WETLAND PRESERVATION | MET | YES |
| TUNKHANNOCK VIADUCT - WYOMING PIPELINE | CENAB-OP-2010-02810-P13 | E6629-003 | BALTIMORE USACE - PA | 15-Dec-11 | 1.02 | | MET | NO |
| | | | | | 4.55 | WETLAND ENHANCEMENT | | |
| USG ANCILLARY IMPROVEMENTS PROJECT | CENAB-OP-RPA-2007-1215-P05 | E47-087 | BALTIMORE USACE - PA | 9-Mar-12 | 2.67 | WETLAND CREATION | MET | NO |
| | | | | | 1.69 | WETLAND RESTORATION | | |
| BONNELL TO ROGERS PIPELINE | CENAB-OP-RPA-2011-00411-05 | E4129-056 | BALTIMORE USACE - PA | 22-Dec-11 | 0.22 | WETLAND ENHANCEMENT | IN COMPLIANCE | NO |
| | | | | | 0.48 | RIPARIAN BUFFER | | |
| FRYMIRE GATHERING PIPELINE | CENAB-OP-RPA-2011-00410-P05 | E4129-078 | BALTIMORE USACE - PA | 22-Dec-11 | 5.07 | WETLAND ENHANCEMENT | IN COMPLIANCE | NO |
| SALT RUN PIPELINE | CENAB-OP-RPA-2011-00410-05 | E4129-075 | BALTIMORE USACE - PA | 22-Dec-11 | 0.76 | WETLAND ENHANCEMENT | IN COMPLIANCE | NO |
| | | | | | 0.46 | RIPARIAN BUFFER | | |
| SALT RUN TO WALLIS RUN_SCHRINERTO WEST LATERAL_NEVIN SMITH TO ANNA SMITH GATHERING | CENAB-OP-RPA-2011-00410 CENAB-OP-RPA-2011-00411 | E4129-039 E4129-057 | BALTIMORE USACE - PA | 22-Dec-11 | 1.17 | WETLAND ENHANCEMENT | IN COMPLIANCE | NO |
| | | | | | 2.20 | RIPARIAN BUFFER | | |
| WARRENSVILLE WEST LATERAL | CENAB-OP-RPA-20 11-00410-05 | E4129-020 | BALTIMORE USACE - PA | 22-Dec-11 | 1.11 | WETLAND ENHANCEMENT | IN COMPLIANCE | NO |
| | | | | | 2.64 | RIPARIAN BUFFER | | |
| BRADFORD WEST COMPRESSOR STATION #2 | CENAB-OP-RPA-2011-1923 | GP05-08-29-13-026 GP07-08-29-13-006 GP08-08-29-13-024 | BALTIMORE USACE - PA | 31-Jul-13 | 0.01 | WETLAND CREATION | IN COMPLIANCE | NO |
| | | | | | 0.10 | WETLAND ENHANCEMENT | | |
| GARRISON PIPELINE & POLOVITCH EW | CENAB-OP2010-0281 0-P 13 | GP05-66-29-11-11 GP07-66-29-11-03 GP08-66-29-11-10 | BALTIMORE USACE - PA | 4-Dec-12 | 0.09 | WETLAND CREATION | IN COMPLIANCE | NO |
| | | | | | 0.82 | WETLAND ENHANCEMENT | | |
| | | | | | 0.15 | RIPARIAN BUFFER | | |
| POLOVITCH EAST TO JERAULD & TAYLOR PIPELINE | CENAB-OP-RPA-2010-02810-P13 | E5829-034 | BALTIMORE USACE - PA | 15-Dec-11 | 0.48 | WETLAND ENHANCEMENT | IN COMPLIANCE | NO |
| BARTO TAP SYSTEM PIPELINE | NAB-2011-00177-P05 | GP08-41-09-503 E4129-013 | BALTIMORE USACE - PA | 4-Dec-12 | 2,154 LINEAR FT | STREAM RESTORATION | IN COMPLIANCE | NO |
| | | | | | 6.03 | RIPARIAN BUFFER | | |
| CANTON PIPELINE | CENAB-OP-RPA-2012-01107 | E4129-037 E5929-030 E0829-039 | BALTIMORE USACE - PA | 10-Sep-12 | 0.05 | WETLAND CREATION | MET | NO |
| | | | | | 1.20 | RIPARIAN BUFFER | | |
| TGP SOUTH SALES PIPELINE | CENAB-OP-RPA-2012-00368-P09 | E0829-055 | BALTIMORE USACE - PA | 16-Sep-13 | 3.10 | RIPARIAN BUFFER | IN COMPLIANCE | NO |
| | | | | | 2.50 | WETLAND ENHANCEMENT | | |
| U GATHERING | CENAB-OP-RPA-2012-00368-P09 | E0829-061 | BALTIMORE USACE - PA | 16-Sep-13 | 1.35 | RIPARIAN BUFFER | IN COMPLIANCE | NO |
| | | | | | 0.10 | WETLAND ENHANCEMENT | | |
| UNIT 4 GATHERING LINE | CENAB-OP-RPA-2012-00368-P09 | E0829-058 | BALTIMORE USACE - PA | 16-Sep-13 | 0.50 | RIPARIAN BUFFER | IN COMPLIANCE | NO |
| | | | | | 1.65 | WETLAND ENHANCEMENT | | |
| UNIT 9 GATHERING LINE | CENAB-OP-RPA-2012-00368 | E0829-066 | BALTIMORE USACE - PA | 16-Sep-13 | 0.75 | WETLAND ENHANCEMENT | IN COMPLIANCE | NO |
| WHITE COMPRESSOR STATION | CANAB-OP-RPA-2012-00368-P09 | GP-07-0824 GP-12-028 | BALTIMORE USACE - PA | 16-Sep-13 | 0.25 | RIPARIAN BUFFER | IN COMPLIANCE | NO |
| | | | | | 0.15 | WETLAND CREATION | | |

WHM PERFORMANCE HISTORY

| PROJECT NAME | USACE PERMIT # | DEP PERMIT # | USACE DISTRICT | DEED RESTRICTION DATE | MITIGATION ACREAGE | MITIGATION TYPE | PERFORMANCE STANDARD MET / IN COMPLIANCE | FINANCIAL ASSURANCES REQUIRED |
|--|-----------------------------|-------------------------------------|-------------------------|------------------------------|---------------------------|------------------------|---|--------------------------------------|
| WASTEWATER TREATMENT PLANT | CENAB-OP-RPA-2012-01099-05 | E41-629 | BALTIMORE USACE - PA | 9-Mar-12 | 0.15 | WETLAND ENHANCEMENT | IN COMPLIANCE | NO |
| NW1 GATHERING LINE | CENAB-OP-RPA-2011-01795 | E5829-049 | BALTIMORE USACE - PA | 24-Oct-13 | 0.60 | WETLAND ENHANCEMENT | IN COMPLIANCE | NO |
| VARGO COMPRESSOR STATION | CENAB-OP-RPA-2011-00410 | E4129-080 | BALTIMORE USACE - PA | 22-Dec-11 | 0.90 | WETLAND CREATION | IN COMPLIANCE | NO |
| WARRENSVILLE NORTH EXTENSION | CENAB-OP-RPA-20 11-00410-05 | E4129-019 | BALTIMORE USACE - PA | 22-Dec-11 | 0.72 | WETLAND ENHANCEMENT | IN COMPLIANCE | NO |
| | | | | | 0.80 | RIPARIAN BUFFER | | |
| CHESAPEAKE ABLE LATERAL PIPELINE | CENAB-OP-RPA-2012-00561-05 | E4129-052 E5729-038 | BALTIMORE USACE - PA | 31-Dec-12 | 0.98 | WETLAND ENHANCEMENT | IN COMPLIANCE | NO |
| | | | | | 3.03 | RIPARIAN BUFFER | | |
| S7 CROSSING | CENAB-OP-RPA-2012-01107 | E4129-037 E5929-030 E0829-039 | BALTIMORE USACE - PA | 10-Sep-12 | 0.20 | WETLAND ENHANCEMENT | IN COMPLIANCE | NO |
| | | | | | 0.05 | WETLAND CREATION | | |
| | | | | | 1.30 | RIPARIAN BUFFER | | |
| AUBURN LINE EXTENSION PROJECT | CENAB-OP-RPA-2011-03756 | E4029-003 E6629-015 | BALTIMORE USACE - PA | 31-Jul-13 | 3.39 | WETLAND ENHANCEMENT | IN COMPLIANCE | NO |
| TEAM 2014 | CENAB-OP-RPA-2013-1374-P12 | - | BALTIMORE USACE - PA | 14-May-14 | 4.68 | WETLAND ENHANCEMENT | IN COMPLIANCE | NO |
| CANTON PIPELINE MAJOR MODIFICATION | CENAB-OP-RPA-2012-01107-P05 | E4129-037 E5929-030 E0829-039 | BALTIMORE USACE - PA | 17-Jul-14 | 9.00 | WETLAND CREATION | IN COMPLIANCE | NO |
| HEMLOCK LATERAL | CENAB-OP-RPA-2013-00806-05 | - | BALTIMORE USACE - PA | 17-Jul-14 | 0.18 | WETLAND CREATION | IN COMPLIANCE | NO |
| | | | | | 0.66 | WETLAND ENHANCEMENT | | |
| | | | | | 0.35 | RIPARIAN BUFFER | | |
| UNION DALE LATERAL PROJECT | CENAB-OP-RPA-2013-01861-P25 | - | BALTIMORE USACE - PA | 24-Oct-13 | 0.21 | WETLAND ENHANCEMENT | IN COMPLIANCE | NO |
| EMERALD LONGWALL MINE PANEL D2 PROJECT | 2014-0283 | GP113014205 GP083014208 | PITTSBURGH USACE - PA | 29-Aug-14 | 0.31 | WETLAND CREATION | IN COMPLIANCE | NO |
| AUBURN LOOP LINE | CENAB-OP-RPA-2010-03756-P25 | - | BALTIMORE USACE - PA | 24-Oct-13 | 0.33 | WETLAND ENHANCEMENT | IN COMPLIANCE | NO |
| BIRCHARD PIPELINE | CENAB-OP-RPA-2009-01676-P25 | E5829-091 | BALTIMORE USACE - PA | 24-Oct-13 | 0.36 | WETLAND ENHANCEMENT | IN COMPLIANCE | NO |
| LEIDY SOUTHEAST EXPANSION | CENAB-OP-RPA-2013-01107-05 | E4129-037 E5929-030 | PHILADELPHIA USACE - PA | 20-May-15 | 15.20 | WETLAND ENHANCEMENT | IN COMPLIANCE | NO |

BALD EAGLE WETLAND MITIGATION SITE CENTRE COUNTY, PENNSYLVANIA

Few issues have polarized the business community and environmentalists more than the balance between development and protecting wetlands. WHM has developed a highly innovative approach that creates new wetlands while allowing projects to move ahead. An example is the Bald Eagle Wetland Mitigation Site, the first of its kind in Pennsylvania.



Although avoidance of wetland damage is a goal in highway construction, some impact is unavoidable. The Pennsylvania Department of Transportation hired WHM to provide mitigation for such situations. We utilize a non-traditional methodology, assembling a team to handle everything at no risk to the client. We find a site, purchase the property, acquire the permits, deal with regulatory agencies and construct replacement wetlands – all at a per-acre fixed cost.

Through careful field and desktop evaluations, followed by numerous discussions with property owners, WHM located several potential properties in the Bald Eagle Valley in Centre County, Pa. These properties were selected based on their ability to create wetlands as determined by an examination of hydrology and soils, as well as other environmental and non-environmental factors. Larger contiguous properties create a more diverse habitat than smaller unwanted parcels. Properties that retained a high possibility of success were ranked for acquisition.

After clearances were issued and sites were selected, WHM began to create a design for the Bald Eagle project based on the overall shape of the landscape and the development of a hydrologic water budget. The concept was presented to the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, Pennsylvania Department of Environmental Protection, Pennsylvania Fish and Boat Commission, and other state and local agencies. The final design was based on input from each of these agencies, and then used to obtain regulatory approvals necessary for the construction of wetlands.

As the project progressed, a series of construction drawings was developed, resulting in a final, detailed design illustrating phased construction activities, erosion control practices and a complete planting and re-vegetation schedule. As part of the regulatory permits and approvals, WHM developed a monitoring plan to ensure long-term site maintenance and success. Funding for the project includes provisions for ongoing and long-term management of the wetlands by a non-profit organization.

In 2010, a search ensued for a suitable not-for-profit organization for the perpetual care and use of the property. WHM began discussions with the Wildlife for Everyone Endowment Foundation (WFEEF) and determined their goals to support to enhance wildlife habitat, scientific research and education; land preservation; and the development of youth programs would be a great fit as a steward of the property and the habitat into the future. In 2011, WHM donated more than 135 acres of land along Bald Eagle Creek, and a \$50,000 maintenance fund for the property to WFEEF. Upon acquisition of the recreational property, WFEEF dedicated the land to an honorary board member and former Pennsylvania Governor Tom Ridge.

The Governor Tom Ridge Wetland Preserve has provided PennDOT with 50 acres of wetland mitigation credits. In addition, wetland preservation, restoration and upland habitat are part of this project. Based on past wetland construction costs for highway projects, the client stands to save considerable money. Rather than utilizing traditional methods of contracting with multiple entities and managing multiple contracts without guarantee of success, WHM provides a single “family” to ensure success.

WETLAND REMEDIATION PROJECT MONTOUR COUNTY, PENNSYLVANIA

WHM Solutions, Inc. (WHM) was retained by an undisclosed client to provide sufficient compensation to offset impacts incurred by a site improvement project. Due to insufficient compensation of replacement acreage at an existing mitigation site, the client contracted WHM to develop additional compensation within an appropriate geographic service area or watershed. WHM was responsible for the execution of the deed restriction on the property, the permitted design, construction, and monitoring of the project.

WHM completed a desktop analysis within an appropriate geographic service area to determine potential locations to offset water resource impacts resultant of the project. The site selection process focused on the location of the existing water resource impacts which span throughout the watershed, and a conducive location to offset the impacts. Potential sites or leads were initially reviewed through a GIS desktop analysis outlining: aerial photography, LiDAR topographic contour data, floodplain boundaries, and hydric soils. Based on the desktop review, landowners with suitable properties were contacted to determine interest of conducting a mitigation project on their property. Several landowners with favorable properties were contacted throughout the site selection process. Ultimately due to site suitability, landowner cooperation, and an onsite field meeting with the USACE, a farm located in Montour County was selected as an appropriate site to conduct wetland remediation measures.

The design of the wetland restoration and wetland creation consisted of increasing and expanding functions of the existing bottomland wetland located to the south of the mitigation area. The purpose of the remediation project was to provide additional compensation and the creation of a functional wetland system. The design incorporated expansion of the bottomland forest wetland with shallow vegetated open-water components to create and enhance habitat for amphibians, waterfowl, wading birds, and migratory songbird species. The design provided random clumped distribution of tree plantings positioned on graded low hummocks or mounds where the tree collars will be above typical standing water elevations early in the growing season. Trees were also planted along the perimeter of the site to act as screening/buffer for the wetlands. The open-water flightway was paralleled by emergent and scrub/shrub fringe to enhance diversity and mimic natural oxbow features in the watershed.

The result of the project has provided a native wetland community and riparian buffer that fit naturally into the landscape. The site is self-sustaining with no financial assurances or long-term management needs due to the relative nature of the project, selection of an appropriate site for mitigation activities, and the past performance of WHM in fulfilling mitigation requirements. The deed restriction on the property provides long-term assurance that after performance standards are met, the mitigation area will be maintained in a natural state.



BEFORE



DURING



AFTER

MOORE FARM WETLAND MITIGATION SITE LYCOMING COUNTY, PENNSYLVANIA

WHM Solutions, Inc. (WHM) offers comprehensive solutions to difficult environmental problems, streamlining the business endeavors of our clients while preserving our country's environmental assets. From permitting to design to erosion and settlement controls, we handle every aspect of the mitigation process and present it in one fixed-rate, turnkey package.

An undisclosed midstream company contracted WHM to develop compensation for several proposed natural gas pipeline projects in north central Pennsylvania that would result in wetland damage. WHM was responsible for the execution of the deed restriction on the property, for acquiring all necessary permits and dealing with regulatory agencies, and for the design, construction, and monitoring of the project.

WHM completed a desktop analysis within the appropriate geographic service area to determine potential locations. These sites were initially reviewed through a GIS desktop analysis outlining: aerial photography, LiDAR topographic contour data, floodplain boundaries, hydric soils, and tax parcel data. Landowners with suitable property to conduct mitigation activities were contacted and several landowners with favorable properties were approached throughout the site selection process. Ultimately, due to site suitability, landowner cooperation, and the non-attaining status of the waters, a farm located in Platt Township, Lycoming County was chosen to accomplish compensatory mitigation for the proposed project impacts.

The design of the mitigation site consists of wetland enhancement and the installation of a forested riparian buffer. The mitigation area is a contiguous land feature that will be expanded by future projects leading to an overall benefit to functions and values. The work plan will enhance functions of the existing wetland which is in a degraded state due to the current land use as a cattle pasture, resulting in considerable nutrient inputs. The purpose of the project is to offset function and value losses resulting from impacts associated with the proposed pipeline project. The design will incorporate wetland and stream fencing to remove cattle from the areas proposed for mitigation. It will include a meandering flightway to create and enhance habitat for waterfowl, wading birds, and migratory songbird species. The flightway will be paralleled by an emergent and scrub/shrub fringe. The vegetative design of the site will incorporate a diverse planting plan consisting of herbaceous seeding followed by a clumped distribution of tree and shrub plantings. Once the mitigation areas are established, increased nutrient and sediment sequestering will be provided within the areas resulting in an improvement of water quality and habitat enhancement.

The result of the project has provided 11.82 acres of native wetland community and 6.58 acres of forested riparian buffer that fit naturally into the landscape. The site is self-sustaining with no financial assurances or long-term management needs due to the relative nature of the project, selection of an appropriate site for mitigation activities, and the past performance of WHM in fulfilling mitigation requirements. The deed restriction on the property provides long-term assurance that after performance standards are met, the mitigation area will be maintained in a natural state.

WHM's design-built and innovative approach to wetland mitigation proves that development in the natural gas industry doesn't have to come at the risk of our aquatic resources or at the hassle of our clients working towards the future of the energy industry.



BEFORE



DURING



AFTER

SPADINE FARM MITIGATION SITE WYOMING COUNTY, PENNSYLVANIA

WHM Solutions, Inc. (WHM) has a design-built and highly innovative approach to wetland mitigation that allows our clients to move projects forward without compromising the condition of our natural resources. WHM is unique in that everything from permitting, to design, to monitoring, and more is handled through one company. An undisclosed midstream company retained WHM to provide compensatory mitigation projects for several pipeline projects that caused functional conversion and permanent wetland impacts in the Upper Susquehanna – Tunkhannock Subbasin.

WHM completed a desktop analysis to determine geographically appropriate location sites. These sites were initially reviewed through a GIS desktop analysis outlining: aerial photography, LiDAR topographic contour data, floodplain boundaries, hydric soils, and tax parcel data. Landowners with suitable property to conduct mitigation activities were contacted and several landowners with favorable properties were approached throughout the site selection process. Ultimately, due to site suitability, landowner cooperation, and previous mitigation activities already occurring on portions of this property, a farm located in Nicholson Township, Wyoming County was selected as an appropriate site to conduct mitigation measures.

The design for the 6.78 acre wetland enhancement and 1.14 acre wetland creation consists of increasing and expanding functions of the adjacent existing wetland which is in a degraded state due to current and past agricultural use. The design will incorporate minor grading in the wetland creation area and a diverse planting plan to expand function and value of the adjacent existing mitigation areas.

The vegetative design of the site is intended to jump start or supplement naturally occurring succession (volunteer species) ensuing from the change in land use type as a result of installation of cattle exclusion fencing. The planting plan will consist of a clumped distribution of monocultural blocks of trees and shrubs within portions of the wetland system. A 0.15 acre forested riparian buffer will be installed along the spring fed channel which flows into an Unnamed Tributary to Tunkhannock Creek. The area will be planted with a forested riparian buffer to create a stable ecosystem adjacent to the water's edge, provide soil/water contact area to facilitate nutrient buffering processes, provide shade to moderate and stabilize water temperature encouraging the production of beneficial algal forms and to contribute necessary detritus and large woody debris to the stream ecosystem.

The result of the project provides 7.72 acres of native wetland community and .15 acres of forested riparian buffer that fit naturally into the landscape. The site is self-sustaining with no financial assurances or long-term management needs due to the relative nature of the project, selection of an appropriate site for mitigation activities, and the past performance of WHM in fulfilling mitigation requirements. The deed restriction on the property provides long-term assurance that after performance standards are met, the mitigation area will be maintained in a natural state.



BEFORE



DURING



AFTER

TAYLOR PROPERTY WETLAND MITIGATION SITE TIOGA COUNTY, PENNSYLVANIA

Natural gas development is one of the fastest growing industries in our country and the new infrastructure necessary to keep production moving forward sometimes begets an unavoidable impact on our aquatic resources. WHM Solutions, Inc. (WHM) offers an all-encompassing remediation solution, handling every aspect of the mitigation process from design to landowner relations to permitting.

An undisclosed midstream company contracted WHM to develop compensation for a new natural gas pipeline project that resulted in significant temporary and conversion impacts to wetlands and channels crossed by the pipeline. WHM was responsible for the execution of the deed restriction on the property, for acquiring all necessary permits and dealing with regulatory agencies, and for the design, construction, and monitoring of the project.

WHM completed a desktop analysis within watersheds proposed to be impacted by the project. These sites were initially reviewed through a GIS desktop analysis outlining: aerial photography, LiDAR topographic contour data, floodplain boundaries, hydric soils, and tax parcel data. Landowners with suitable property to conduct mitigation activities were contacted and several landowners with favorable properties were approached throughout the site selection process. Ultimately, due to site suitability, landowner cooperation, and the degraded state of the waters onsite, a farm located in Liberty Township, Tioga County within the Little Elk Run watershed was chosen to accomplish compensatory mitigation for the proposed impacts.

The design of the mitigation site consists of a wetland creation area and the installation of a forested riparian buffer. The mitigation area is a contiguous land feature that will lead to an overall benefit to functions and values in Little Elk Run and the Antes-Lycoming Creeks watershed. The work plan will establish a forested riparian buffer and additional wetland acreage adjacent to Little Elk Run to increase functions and values of the existing condition of the water resources which is in a degraded state due to the current land use as a cattle pasture, resulting in considerable nutrient inputs. The design will incorporate the removal of cattle from the areas proposed for mitigation. The vegetative design of the site will incorporate a diverse planting plan consisting of herbaceous seeding in the wetland creation area and a clumped distribution of tree and shrub plantings. Once the mitigation areas are established, increased nutrient and sediment sequestering will be provided within the areas resulting in an improvement of water quality and habitat enhancement.

The result of the project created 2,364 square feet, or 0.05 acres, of wetland by taking the area out of an active cattle pasture and reverting to functional forested wetland habitat. It has also provided 1.2 acres of forested riparian buffer along Little Elk Run. The site is self-sustaining with no financial assurances or long-term management needs due to the relative nature of the project, selection of an appropriate site for mitigation activities, and the past performance of WHM in fulfilling mitigation requirements. The deed restriction on the property provides long-term assurance that after performance standards are met, the mitigation area will be maintained in a natural state.



BEFORE



DURING



AFTER

COMPANY TITLE:

Chief Operating Officer

Education

- *BS, Environmental Resource Management, The Pennsylvania State University, 1998*

Professional Training

- *First Aid/ CPR; Emergency Care & Safety Institute; May 2012*
- *“Applied Fluvial Geomorphology”, Canaan Valley Institute, WV, 2000.*
- *“River Morphology and Applications” Wildland Hydrology, Pagosa Springs, CO, 2000.*
- *“Macroinvertebrate Monitoring for North Carolina Stream Restoration” Raleigh NC, 2001.*
- *“River Assessment and Monitoring”, Wildland Hydrology, Pagosa Springs, CO, 2001*
- *“River Restoration and Natural Channel Design”, Wildland Hydrology, Pagosa Springs CO, 2002*
- *“AutoCAD use for Stream Restoration and Monitoring”, The North Carolina State University, University Park, PA, 2005*
- *“Overview of Wetland Delineation Protocols and the Interim Regional Supplement to the USACE Delineation Manual”, State College, April 2011*
- *“Planning Hydrology for Constructed Wetlands”, Wetland Training Institute, State College, PA November 2011*

Conferences and Seminars

- *The SGA Technical Conference on Environmental Permitting & Construction Hyatt Regency – Austin TX February 17-19, 2014*
- *Mid-Atlantic Stream Restoration Conference, Baltimore, MD 21530 , 2013*
- *Federal Energy Commission “Environmental Review and Compliance for Natural Gas Facilities Seminar” San Antonio, TX, 2013*
- *SGA FERC Environmental Permitting & Construction Compliance Workshop, Houston, TX, 2013*
- *SGA FERC Environmental Permitting & Construction Compliance Workshop, New Orleans, LA, 2012*
- *SGA FERC Environmental Permitting & Construction Compliance Workshop, San Antonio, TX, 2011*
- *Mid-Atlantic Stream Restoration Conference, Flinstone, MD 21530 , 2011*

D. Josh Lincoln

Mr. Lincoln has over 12 years of experience providing professional environmental and natural resource consulting services to private, industrial and institutional landowners; nonprofit organizations, and all levels of government. He has implemented eclectic blends of regulatory strategies and restoration practices to support land development, energy, transportation, mining, solid waste, and community infrastructure. Technical proficiencies include resource assessment, impact analysis, permitting and compliance, ground and surface water quality, ecosystem restoration design, environmental monitoring, watershed assessments, stream monitoring, stream design, wetland delineation, and construction management. Mr. Lincoln’s diverse background in this field allows him to provide turnkey services for environmental resource projects.

As Chief Operating Officer at WHM Consulting, Inc., Mr. Lincoln coordinates and manages scientists, engineers, and environmental experts to oversee environmental projects from planning through construction.

PROFESSIONAL EXPERIENCE**WETLANDS PROJECTS**

- Managed wetland investigation teams for large site development projects throughout the Mid-Atlantic.
- Permitting of development projects involving regulated water resources, e.g., landfill expansions, interstate road alignments, wind farms, and residential developments.
- Selection and design of wetland replacement sites.
- Manager of wetland replacement construction projects
- Operator of heavy equipment for the construction of wetland replacement projects.
- Manager of landfill wetland mitigation projects

STREAM RESTORATION

- Monitored stream bank erosion rates and calculated sediment loading curves for several watersheds in Pennsylvania, West Virginia, Maryland, New York and North Carolina.
- Developed regression relations for bankfull stream characteristics based on drainage area used for natural channel design.
- Selected and surveyed reference reach streams to develop natural channel design criteria based on bankfull stage channel dimensions.
- Designer of several miles of stream restoration projects using natural channel design methods in Pennsylvania, North Carolina, New York, Maryland, and West Virginia.
- Manager of several miles of stream restoration projects.
- Operator of heavy equipment to construct cross rock vanes and j-hooks vanes structures for stream restoration project.

WATERSHED MANAGEMENT

- Manager of several watershed assessments conducted throughout Pennsylvania. The projects included developing GIS data bases that inventoried assessment results.
- Developed watershed management plans for nonprofit watershed groups.
- Manager of wind farm permitting projects.
- Prepared grants for nonprofit watershed groups.

COMPANY TITLE:

Project Manager

EDUCATION

- *B.A., Environmental Studies, The Pennsylvania State University, 2006*

CERTIFICATIONS

- *Professional Wetland Scientist
PWS Seal #: 2285*

PROFESSIONAL TRAINING

- *Federal Energy Commission
"Environmental Review and Compliance for Natural Gas Facilities Seminar"
Orlando, Florida Feb. 26-28, 2013*
- *Planning Hydrology, Vegetation, and Soils for Constructed Wetlands – The Wetland Training Institute; State College, PA – Sept. 10-12, 2012*
- *Erosion & Sediment (E&S) Manual Training (Northampton Co.) by the PACD in conjunction PADEP August 20, 2012*
- *Williams Contractor Safety; May 2012*
- *First Aid/ CPR; Emergency Care & Safety Institute; May 2012*
- *Primary Headwater Habitat Assessment Training – West Woods Metro Park, Geauga County, Ohio May 23, 2012*
- *"Functional Assessment as the Basis for Mitigation of Wetland Impacts - Overview and Discussion", State College, PA – M.N. Gilbert Environmental April, 2011*
- *PaDEP—Technical Review of the revised Chapter 102 Regulations, Penn Tech Campus, Williamsport, PA – December, 2010*
- *"Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual": PAPSS, DCNR Bureau of Forestry, Laporte, PA - April, 2010*
- *Department of Environmental Protection "Regulatory Requirements Seminar for Marcellus Shale"; Harrisburg, PA - March, 2010*
- *Wetland Delineator Training, Institute for Wetland and Environmental Education and Research, Inc., Tiner and Veneman, Albany, New York – July, 2008.*
- *Plant ID: Wetlands and Their Borders, Institute for Wetland and Environmental Education and Research, Inc., Weldy, Albany, New York - July 2008.*
- *DEP Stormwater Best Management Practices Manual Training Session, State College, Pennsylvania - May 2007.*

Kevin Clark, PWS

Kevin Clark has over 7 years experience with wetland delineation and evaluation, permitting, mitigation design, and the preparation of environmental compliance documents in accordance with national (NEPA), state, and local criteria and guidelines. Mr. Clark is a Professional Wetland Scientist (PWS) certified by the Society of Wetland Scientists (SWS) that manages the design and construction of habitat and wetland restoration, enhancement and replacement projects for WHM. Additionally, Mr. Clark, specializes in the assessment and remediation of polluted mine drainage, primarily by passive treatment techniques. Mr. Clark regularly works with various watershed organizations, townships and municipalities, non-profit organizations, engineering firms, energy companies, and state and federal agencies. Mr. Clark also has been successful in acquiring state and federal grants for non-profit organizations to secure funding for water quality improvement projects.

PROFESSIONAL EXPERIENCE**ENVIRONMENTAL PERMITTING**

- Completed local, state, and federal environmental permitting for various types of development and water quality improvement projects, which included detail studies/reports and thorough coordination with regulatory agencies;
- Completed and assisted with NPDES permit applications, Erosion and Sedimentation Control Plans, and Post-Construction Stormwater Management Plans;
- Produced detailed ArcGIS and AutoCAD maps of various projects.

WATER RESOURCE PROJECTS

- Completed and assisted with wetland and stream mitigation plans, including designs, in accordance with USACE's *Compensatory Losses of Aquatic Resources* guidance document;
- Construction oversight and monitoring of wetland construction project;
- Completed small to large scale delineations throughout the northeast in accordance with 1987 USACE Wetland Delineation Manual and applicable regional supplements.
- Completed numerous watershed assessments to determine point and non-point source pollution with a main focus on Abandoned Mine Lands (AML) and Abandoned Mine Drainage (AMD) impacted streams;
- Assisted with treatment system design and restoration plans for watersheds impacted by AMD;
- Conducted water quality analysis's including: macroinvertebrate sampling and identification and habitat assessment.
- Obtained numerous Growing Greener and Chesapeake Bay Small Watershed Grant awards for several non-profit organizations for AMD related issues.
- Utilized GPS units for high accurate field data collection and produce detailed mapping.
- Assisted with threatened and endangered species surveys through the Pennsylvania Natural Diversity Index (PNDI) program for various plant and animal species.