Supplemental Aquatic Resource Report for the Pennsylvania Pipeline Project Stations Washington, Westmoreland, Cambria, Huntingdon, Perry, Dauphin, Berks, Delaware Counties, Pennsylvania

Prepared By:

Tetra Tech, Inc.

For

Sunoco Pipeline, LP

525 Fritztown Road

Sinking Spring, PA

May 2016

TABLE OF CONTENTS

ACRONYMS

1987 Manual	Corps of Engineers Wetland Delineation Manual
Corps Regional Supplement	Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region
FAC	Facultative
FACU	Facultative Upland
FACW	Facultative Wetland
GIS	Geographic Information Systems
GPS	Global Positioning System
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OBL	Obligate
PA	Pennsylvania
PEM	Palustrine Emergent
PFO	Palustrine Forested
Project	Pennsylvania Pipeline Project
PSS	Palustrine Scrub Shrub
SF	Square Feet
SPLP	Sunoco Pipeline, LP
UNT	Unnamed Tributary
UPL	Upland
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1.0 INTRODUCTION

On behalf of Sunoco Pipeline, LP (SPLP), Tetra Tech, Inc. has prepared this Supplemental Aquatic Resource Report for stations located in Washington, Westmoreland, Cambria, Huntingdon, Perry, Dauphin, Berks, and Delaware Counties, Pennsylvania (PA) of the Pennsylvania Pipeline Project (Project). This report is a supplement to the original Aquatic Resource Reports and Aquatic Resource Addendum Reports prepared for the Project dated August 2015 and March 2016, respectively. These reports provide a comprehensive delineation of aquatic resources within the area of the proposed Project. Wetland areas were delineated onsite using methodology outlined within the United States Army Corps of Engineers (USACE) *Wetland Delineation Manual* (Environmental Laboratory, 1987; *1987 Manual*), as amended by the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region*, April 2012 (Environmental Laboratory, 2012; *Corps Regional Supplement*).

The content of this report presents the methodology, results, and conclusions of wetland delineation and stream identification activities completed for the proposed Project Study Areas. This report provides additional information in regards to aquatic resources so that proper avoidance and minimization measures can be implemented. This report does not reference a detailed project description or present impacts, or discuss Clean Water Act jurisdiction.

2.0 METHODOLOGY

USACE requires the use of the procedures enumerated in the *1987 Manual* (Environmental Laboratory, 1987) and the *Corps Regional Supplement* (Environmental Laboratory, 2012) for making jurisdictional determinations. According to the *1987 Manual*, an area is defined as a wetland if, under normal circumstances, it meets all three of the following criteria:

1. Predominance of hydrophytic vegetation (plants which are adapted for life in saturated soil conditions);
2. Hydric soils (soils which were formed under water, or in saturated conditions); and
3. Wetland hydrology (or the presence of inundated or saturated soils at some time during the growing season).

Wetlands identified in the field were classified in accordance with the U.S. Fish and Wildlife Service's (USFWS) *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al., 1979). Wetland classifications are as follows: palustrine emergent (PEM), palustrine scrub-shrub (PSS), and palustrine forested (PFO). Dominant vegetation was identified and classified according to The National Wetland Plant List: 2014 Update of Wetland Ratings (Lichvar, 2014). Plant classifications are as follows:

Obligate (OBL) - essentially always found in wetlands; estimated probability >99%

Facultative Wetland (FACW) - usually found in wetlands; estimated probability 67%-99%

Facultative (FAC) - equally likely to occur in wetlands and non-wetlands;
estimated probability 34%-66%

Facultative Upland (FACU) - sometimes occurs in wetlands; estimated probability 1%-33%

Upland (UPL) - rarely occurs in wetlands; estimated probability <1%

The field investigations for the proposed Project Study Area were performed during numerous field visits from May 2013 through March 2016. The Study Area is illustrated on the Project mapping. Preliminary site reconnaissance of the study area was conducted through a review of available Geographic Information Systems (GIS) resources. Existing information reviewed included the following:

- United States Geological Survey (USGS) topographic mapping (Figures 1-1 to 1-8; USGS, 2009)
- Natural Resources Conservation Service (NRCS) National Cooperative Soil Survey (Figures 2-1 to 2-8; NRCS, 2014)
- USFWS National Wetland Inventory (NWI) Mapping (Figures 3-1 to 3-8; USFWS, 2009)

The delineation consisted of the establishment of the wetland/upland margin with flagging hung at intervals that accurately depicted the outline of the boundary. The individual flags were then located using a Global Positioning System (GPS) receiver and later added to the Project area mapping. Wetland flagging was limited to the bounds of the investigated study area and wetlands are shown as closed or partially closed systems on the detail map (Figures 4-1 to 4-8).

Data concerning soils, hydrology, and vegetation were collected and recorded on USACE Wetland Determination Data Forms at wetlands and upland point locations associated with wetlands, which are provided in Appendix A. Photographs depicting wetland topography and vegetation are included in Appendix B. Stream data sheets detailing stream characteristics are provided in Appendix C. Appendix D contains photographs of streams located within the study area. Appendix E provides lists of hydric soils known to occur within Greene, Washington, Westmoreland, Cambria, Huntingdon, Perry, Dauphin, Berks, and Delaware Counties. Resumes of project personnel are included in Appendix F.

3.0 RESULTS

The field investigations identified 11 areas within the proposed Project Study Area within Washington, Westmoreland, Cambria, Perry, Dauphin, Berks, and Delaware Counties that met the wetland criteria outlined in the *1987 Manual*, as amended by the *Corps Regional Supplement*. Additionally, one stream was identified within the Project Study Area. A narrative summary of field data collected for the system is presented below. The detail maps provided as Figures 4-1 to 4-8 illustrate the wetland locations in relation to the Study Area.

3.1 WETLAND IDENTIFICATION AND DELINEATION

Hydric soils and soils with hydric components are often associated with wetlands. The NRCS Soil Survey hydric soils lists for Greene, Washington, Westmoreland, Cambria, Perry, Dauphin, Berks, and Delaware Counties, PA are included in Appendix E. The NRCS soil survey maps are included as Figures 2-1 to 2-8. Confirmation of the soil mapping units was not performed during this site evaluation.

See Figures 3-1 to 3-8 for NWI's that fall within the Project Study Area.

Based on field evidence and best professional judgment, it was determined that 11 wetlands are present within the proposed Project Study Area. These areas demonstrated the presence of all three wetland parameters required by the *1987 Manual and the Regional Supplement*. The vegetative community was dominated by hydrophytic plant species or had a prevalence index ≤ 3, the soils exhibited hydric characteristics, and the areas contained wetland hydrology indicators.

USACE wetland determination data forms that detail the existing vegetation, soil characteristics, and hydrology were prepared for each wetland and its associated upland point (Appendix A).

Wetland Q67

Wetland Q67 (W-Q67) is a 1,449-square foot (SF) PEM wetland (Figure 4-1). Indicators of wetland hydrology include surface soil cracks, saturation visible on aerial imagery, geomorphic position, and a positive FAC-neutral test. Dominant vegetation consists of pinkweed (*Persicaria pensylvanica*) and spotted lady's-thumb (*Persicaria maculosa*). The soil between 0 and 3 inches exhibits a low-chroma matrix (10YR 5/2) with a silt loam texture that contains redoximorphic features (7.5YR 5/6). The soil between 3 and 12 inches exhibits a 10YR 5/3 matrix with a silt loam texture that contains redoximorphic features (7.5YR 5/6 and 10YR 5/1).

Wetland DS4

Wetland DS4 (W-DS4) is a 4,474-SF PEM wetland (Figure 4-2). Indicators of wetland hydrology include oxidized rhizospheres on living roots and a positive FAC-neutral test. Dominant vegetation consists of green ash (*Fraxinus pennsylvanica*), fox sedge (*Carex vulpinoidea*), lamp rush (*Juncus effusus*), and dark-green bulrush (*Scirpus atrovirens*). The soil between 0 and 6 inches exhibits a low-chroma matrix (10YR 3/2) with a sandy clay texture that contains redoximorphic features (7.5YR 4/6). The soil between 6 and 18 inches exhibits a mixed matrix (10YR 4/1 and 10YR 7/6) with a clay texture that contains redoximorphic features (2.5YR 4/6 and 2.5YR 5/6).

Wetland BB161

Wetland BB161 (W-BB161) is a 1,553-SF PEM wetland (Figure 4-6). Indicators of wetland hydrology include a high water table, saturation within the upper 12 inches of the soil profile, drainage patterns, and a positive FAC-neutral test. Dominant vegetation consists of rambler rose (*Rosa multiflora*), Japanese stilt grass (*Microstegium vimineum*), common boneset (*Eupatorium perfoliatum*), spotted touch-me-not (*Impatiens capensis*), dark green bulrush (*Scirpus atrovirens*), an unidentified sedge (*Carex* sp.), and flat-top goldenrod (*Euthamia graminifolia*). The soil between 0 and 16 inches exhibits a low-chroma matrix (7.5YR 4/2) with a silty clay loam texture that contains redoximorphic features (10YR 4/6 and 7.5YR 4/6).

Wetland BB162

Wetland BB162 (W-BB162) is a 207-SF PEM wetland (Figure 4-6). Indicators of wetland hydrology include a high water table, saturation within the upper 12 inches of the soil profile, sediment deposits, and a positive FAC-neutral test. Dominant vegetation consists of spotted touch-me-not (*Impatiens capensis*), dark green bulrush (*Scirpus atrovirens*), Canadian clearweed (*Pilea pumila*), and halberd-leaf tearthumb (*Persicaria arifolium*). The soil between 0 and 8 inches exhibits a 7.5YR 4/4 matrix with a sandy texture. The soil between 8 and 16 inches exhibits a low-chroma matrix (7.5YR 4/2) with a silty clay loam texture that contains redoximorphic features (10YR 4/3).

Wetland BB163

Wetland BB163 (W-BB163) is a 128-SF PEM wetland (Figure 4-6). Indicators of wetland hydrology include a high water table, saturation within the upper 12 inches of the soil profile, sediment deposits, and a positive FAC-neutral test. Dominant vegetation consists of spotted touch-me-not (*Impatiens capensis*) and Japanese stilt grass (*Microstegium vimineum*). The soil between 0 and 16 inches exhibits a low-chroma matrix (7.5YR 4/2) with a sand loam texture that contains redoximorphic features (10YR 4/3).

Wetland BB164

Wetland BB164 (W-BB164) is a 40-SF PEM wetland (Figure 4-6). Indicators of wetland hydrology include a high water table, saturation within the upper 12 inches of the soil profile, sediment deposits, drainage patterns, and a positive FAC-neutral test. Dominant vegetation consists of spotted touch-me-not (*Impatiens capensis*) and Japanese stilt grass (*Microstegium vimineum*). The soil between 0 and 12 inches exhibits 7.5YR 4/3 matrix with a sand loam texture. The soil between 12 and 16 inches exhibits a low-chroma matrix (7.5YR 4/2) with a loam texture that contains redoximorphic features (7.5YR 4/3).

Wetland BB165

Wetland BB165 (W-BB165) is a 708-SF PEM wetland (Figure 4-6). Indicators of wetland hydrology include a high water table, saturation within the upper 12 inches of the soil profile, sediment deposits, drainage patterns, and a positive FAC-neutral test. Dominant vegetation consists of southern arrow-wood (*Viburnum dentatum*), Asiatic tearthumb (*Persicaria perfoliata*), spotted touch-me-not (*Impatiens capensis*), skunk cabbage (*Symplocarpus foetidus*), and an unidentified sedge (*Carex* sp.). The soil between 0 and 6 inches exhibits a low-chroma matrix (7.5YR 4/2) with a silt loam texture that contains redoximorphic features (7.5YR 3/4). The soil between 6 and 16 inches exhibits a 7.5YR 3/4 matrix with a silt loam texture.

Wetland BB166

Wetland BB166 (W-BB166) is a 79-SF PEM wetland (Figure 4-6). Indicators of wetland hydrology include surface water, a high water table, saturation within the upper 12 inches of the soil profile, iron deposits, and a positive FAC-neutral test. Dominant vegetation consists of spotted touch-me-not (*Impatiens capensis*), Canadian clearweed (*Pilea pumila*), lamp rush (*Juncus effusus*), and Japanese honeysuckle (*Lonicera japonica*). The soil between 0 and 6 inches exhibits a low-chroma matrix (7.5YR 4/2) with a silt loam texture that contains redoximorphic features (7.5YR 3/4). The soil between 6 and 16 inches exhibits a 7.5YR 4/3 matrix with a silt loam texture.

Wetland I3

Wetland I3 (W-I3) is a 2,401-SF PEM wetland (Figure 4-8). Indicators of wetland hydrology include surface water, a high water table, saturation within the upper 12 inches of the soil profile, and a positive FAC-neutral test. Dominant vegetation consists of black willow (*Salix nigra*), broad-leaf cattail (*Typha latifolia*), common reed (*Phragmites australis*), and lamp rush (*Juncus effusus*). The soil between 0 and 6 inches exhibits a low-chroma matrix (2.5Y 5/1) with a gravelly silt loam texture that contains redoximorphic features (7.5YR 4/6). The soil between 6 and 12 inches exhibits a low-chroma matrix (10YR 5/1) with a gravelly clay loam texture that contains redoximorphic features (7.5YR 4/6).

Wetland I4

Wetland I4 (W-I4) is a 7,250-SF PEM wetland (Figure 4-8). Indicators of wetland hydrology include surface water, a high water table, saturation within the upper 12 inches of the soil profile, and a positive FAC-neutral test. Dominant vegetation consists of common reed (*Phragmites australis*) and lamp rush (*Juncus effusus*). The soil between 0 and 8 inches exhibits a low-chroma matrix (2.5Y 4/2) with a clay loam texture that contains redoximorphic features (7.5YR 4/6).

Wetland 4

Wetland 4 (W-4) is a 344-SF PEM wetland (Figure 4-8). The boundary of W-4 was delineated based on hydrology, hydrophytic vegetation, and hydric soils. However, at the time of the field investigation, no data was collected. W-4 is within a drainage basin and has hydrology that is driven by precipitation. The vegetation is similar to W-JM1 which has been previously submitted. The soils are significantly disturbed with hydric characteristics.

3.2 STREAM IDENTIFICATION AND EVALUATION

Based on field evidence and best professional judgment, one stream was identified within the evaluated study area. A data sheet that details the bank and channel characteristics, substrate composition, aquatic habitat, and hydrology was prepared for the stream (Appendix C).

Stream BB122

Stream BB122 (S-BB122) is a perennial unnamed tributary (UNT) to Swatara Creek (Figure 4-6). The stream bank is approximately 7 feet in width. The bank height is approximately 27 inches. The stream bed contains a cobble, gravel, sand, silt, and clay substrate. At the time of the field investigation the stream exhibited an average water depth of 3 inches.

4.0 CONCLUSIONS

During the field investigations for the PPP stations in Washington, Westmoreland, Cambria, Huntingdon, Perry, Dauphin, Berks, and Delaware Counties, PA, 11 areas were identified within the proposed Project Study Area which exhibited all three criteria necessary to be classified as a jurisdictional wetland in accordance with the *1987 Manual* and the *Corps Regional Supplement*:

1. Predominance of hydrophytic vegetation (plants which are adapted for life in saturated soil conditions);
2. Hydric soils (soils which were formed under water, or in saturated conditions); and
3. Wetland hydrology (or the presence of inundated or saturated soils at some time during the growing season).

Additionally, one stream was identified within the evaluated study area.

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FIGURES

Legend

- Houston Injection Site
- Access Road
- Alignment Centerline
- Study Area

Sheet Identifier

N

Feet
0 1,000 2,000

Meters
0 300 600

USGS PROJECT LOCATION MAP
FIGURE 1-1
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
WASHINGTON COUNTY, PA

TETRA TECH

Notes:
1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).
2) Quadrangles being displayed are Midway, Canonsburg & Washington West/East

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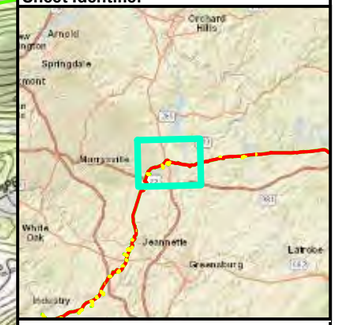
Delmont Pump Station

Legend

- Delmont Station
- Access Road
- Alignment Centerline
- Study Area

Sheet Identifier



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USGS PROJECT LOCATION MAP
FIGURE 1-2
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
WESTMORELAND COUNTY, PA

TETRA TECH

Notes:
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2) Quadrangles being displayed are Slickville

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Ebendburg Pump Station

CAMBRIA

EBENSBURG STATE SCHOOL

Holy Name Cem.

State Police

Sewage Disposal

Trailer Park

Reclaimed Strip Mine

Water Tank

Howells Run

Roaring Run

PIPELINE

TELEPHONE

PIPELINES

BM 2036

BM 2057

BM 1638

BM 1685

North Branch

Legend

- Ebensburg Station
- Access Road
- Alignment Centerline
- Study Area

Sheet Identifier

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Meters
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USGS PROJECT LOCATION MAP
FIGURE 1-3
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CAMBRIA COUNTY, PA

TETRA TECH

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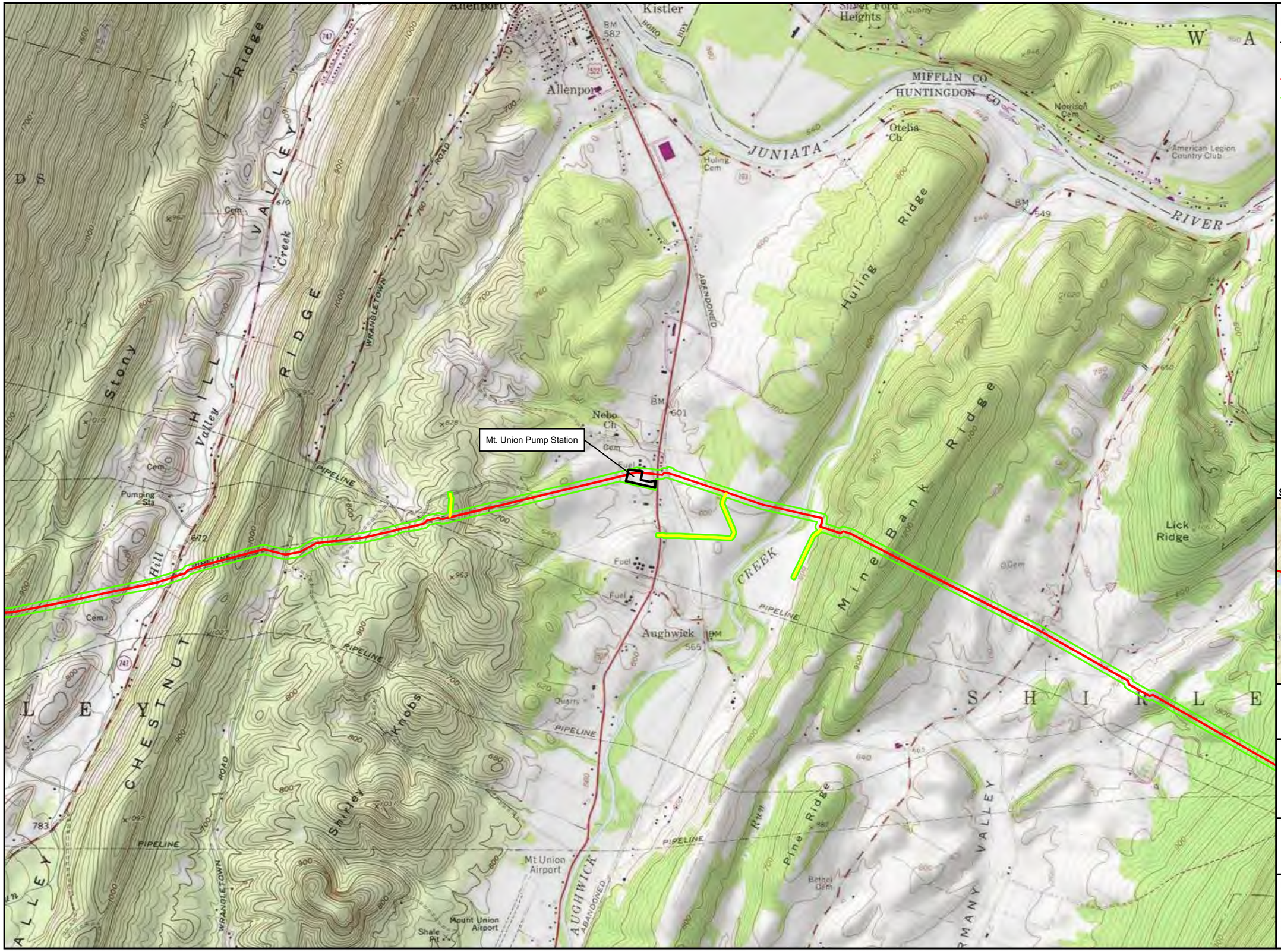
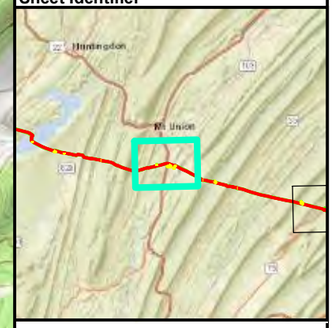


Legend

- Mt. Union Station
- Access Road
- Alignment Centerline
- Study Area

Sheet Identifier



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USGS PROJECT LOCATION MAP
FIGURE 1-4
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
HUNTINGDON COUNTY, PA

TETRA TECH

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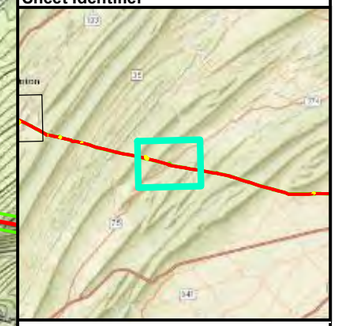
Doylesburg Pump Station

Legend

- Doylesburg Station
- Access Road
- Alignment Centerline
- Study Area

Sheet Identifier



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USGS PROJECT LOCATION MAP
FIGURE 1-5
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
PERRY COUNTY, PA

TETRA TECH

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Middletown Pump Station

Legend

- Middletown Station
- Access Road
- Alignment Centerline
- Study Area

Sheet Identifier

Feet
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Meters
0 300 600

USGS PROJECT LOCATION MAP
FIGURE 1-6
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DAUPHIN COUNTY, PA

TETRA TECH

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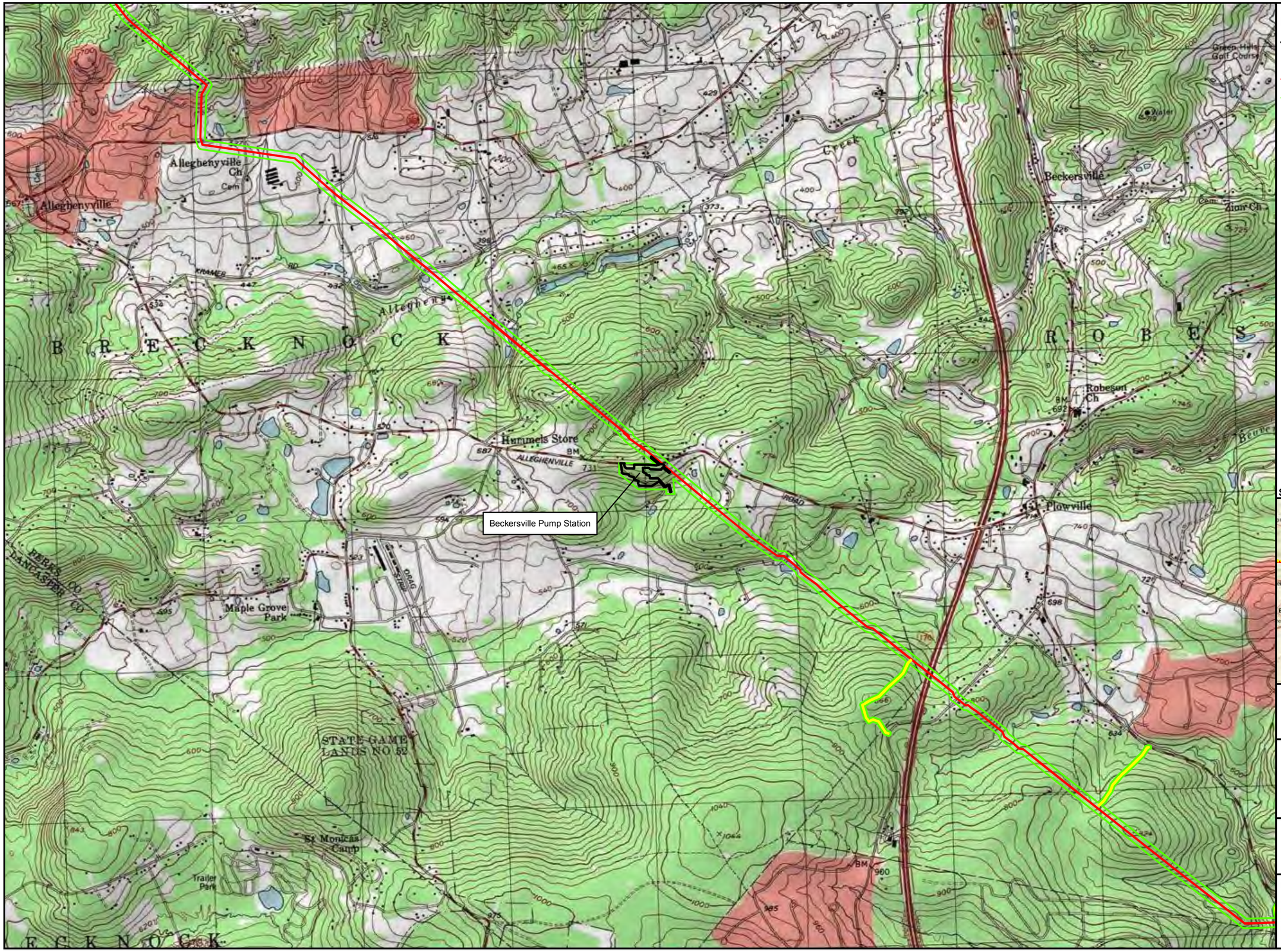

Legend

- Beckersville Station
- Access Road
- Alignment Centerline
- Study Area

Sheet Identifier

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USGS PROJECT LOCATION MAP
FIGURE 1-7
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
BERKS COUNTY, PA

TETRA TECH

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Legend

- Twin Oaks Station
- Access Road
- Alignment Centerline
- Study Area

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Feet: 0 | 1,000 | 2,000

Meters: 0 | 300 | 600

USGS PROJECT LOCATION MAP
FIGURE 1-8
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY, PA

TETRA TECH

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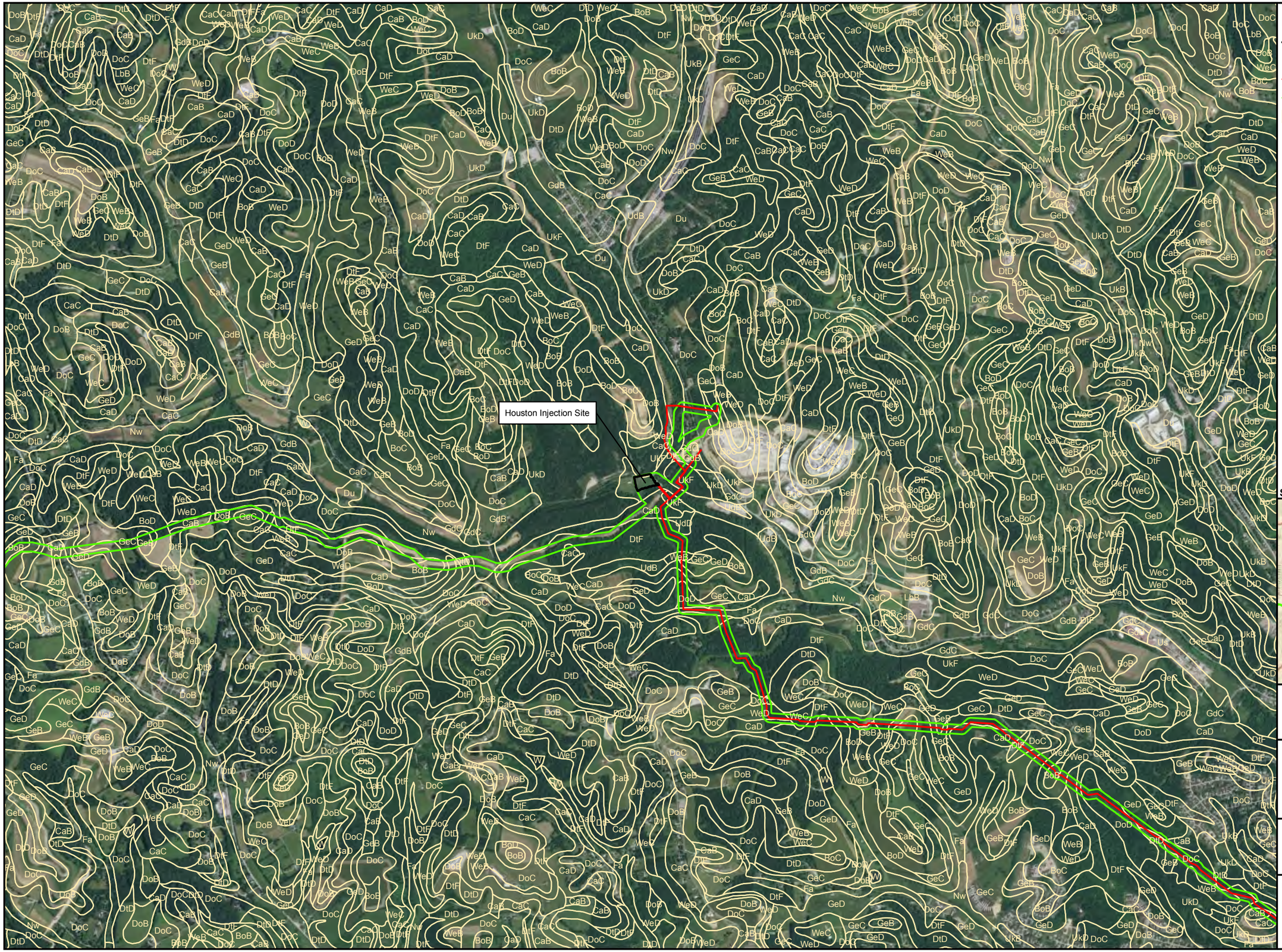

Legend

- Houston Injection Site
- Access Road
- Alignment Centerline
- Study Area
- NRCS Soils and Codes

Sheet Identifier

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NRCS SOILS MAP
FIGURE 2-1
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
WASHINGTON COUNTY, PA

TETRA TECH

Notes:
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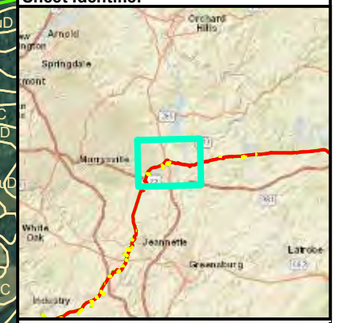
Delmont Pump Station

Legend

- Delmont Station
- Access Road
- Alignment Centerline
- Study Area
- NRCS Soils and Codes

Sheet Identifier



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NRCS SOILS MAP
FIGURE 2-2
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
WESTMORELAND COUNTY, PA

TETRA TECH

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Ebendburg Pump Station

Legend

- Ebensburg Station
- Access Road
- Alignment Centerline
- Study Area
- NRCS Soils and Codes

Sheet Identifier

N

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0 300 600 Meters

NRCS SOILS MAP
FIGURE 2-3
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CAMBRIA COUNTY, PA

TETRA TECH

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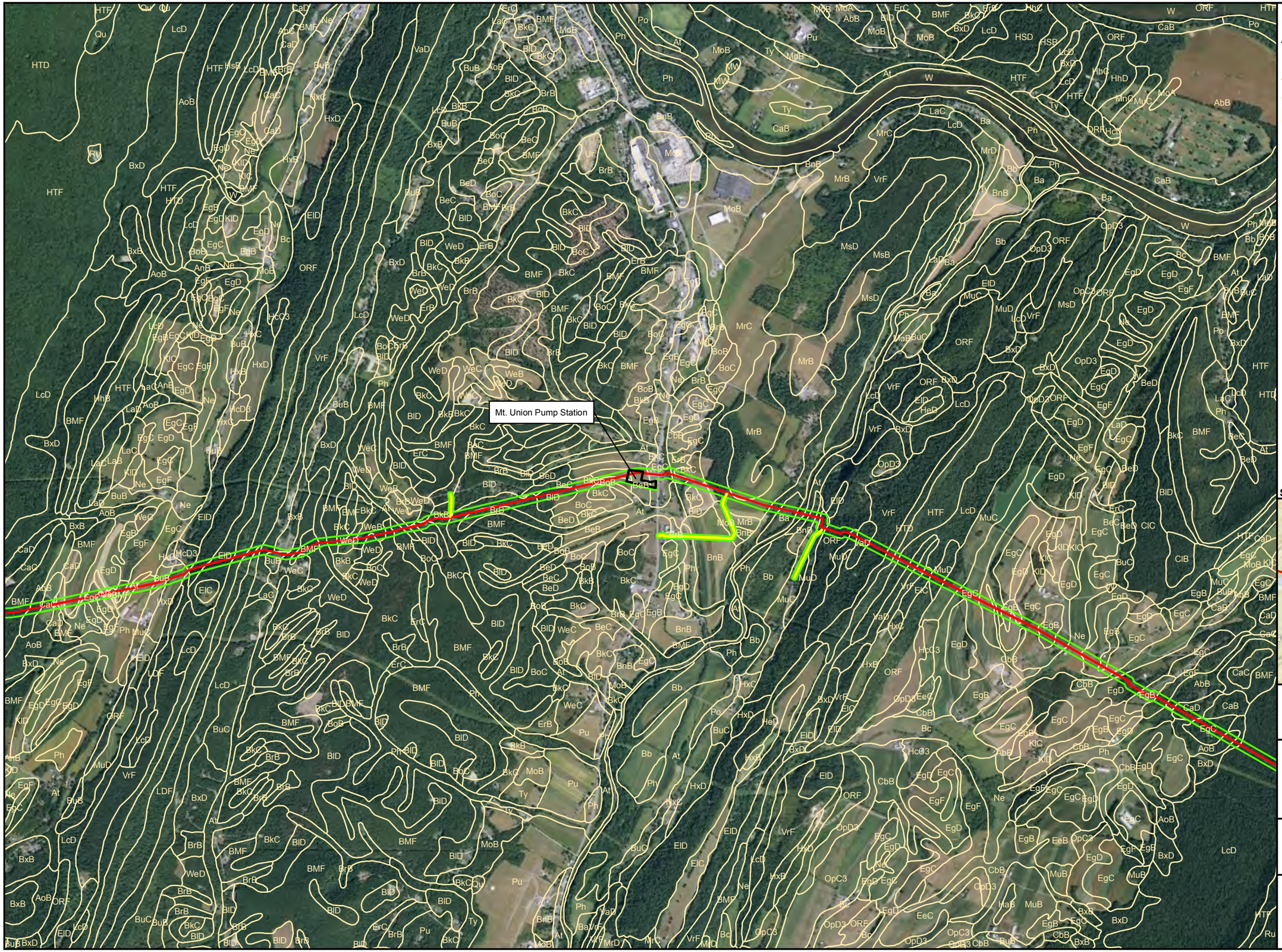

Legend

- Mt. Union Station
- Access Road
- Alignment Centerline
- Study Area
- NRCS Soils and Codes

Sheet Identifier

N

Feet
0 1,000 2,000

Meters
0 300 600

NRCS SOILS MAP
FIGURE 2-4
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
HUNTINGDON COUNTY, PA

TETRA TECH

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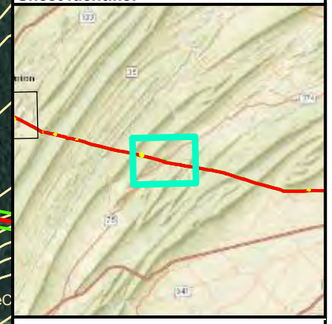
Legend

- Doylesburg Station
- Access Road
- Alignment Centerline
- Study Area
- NRCS Soils and Codes

Sheet Identifier



Feet
0 1,000 2,000

Meters
0 300 600

NRCS SOILS MAP
FIGURE 2-5
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
PERRY COUNTY, PA

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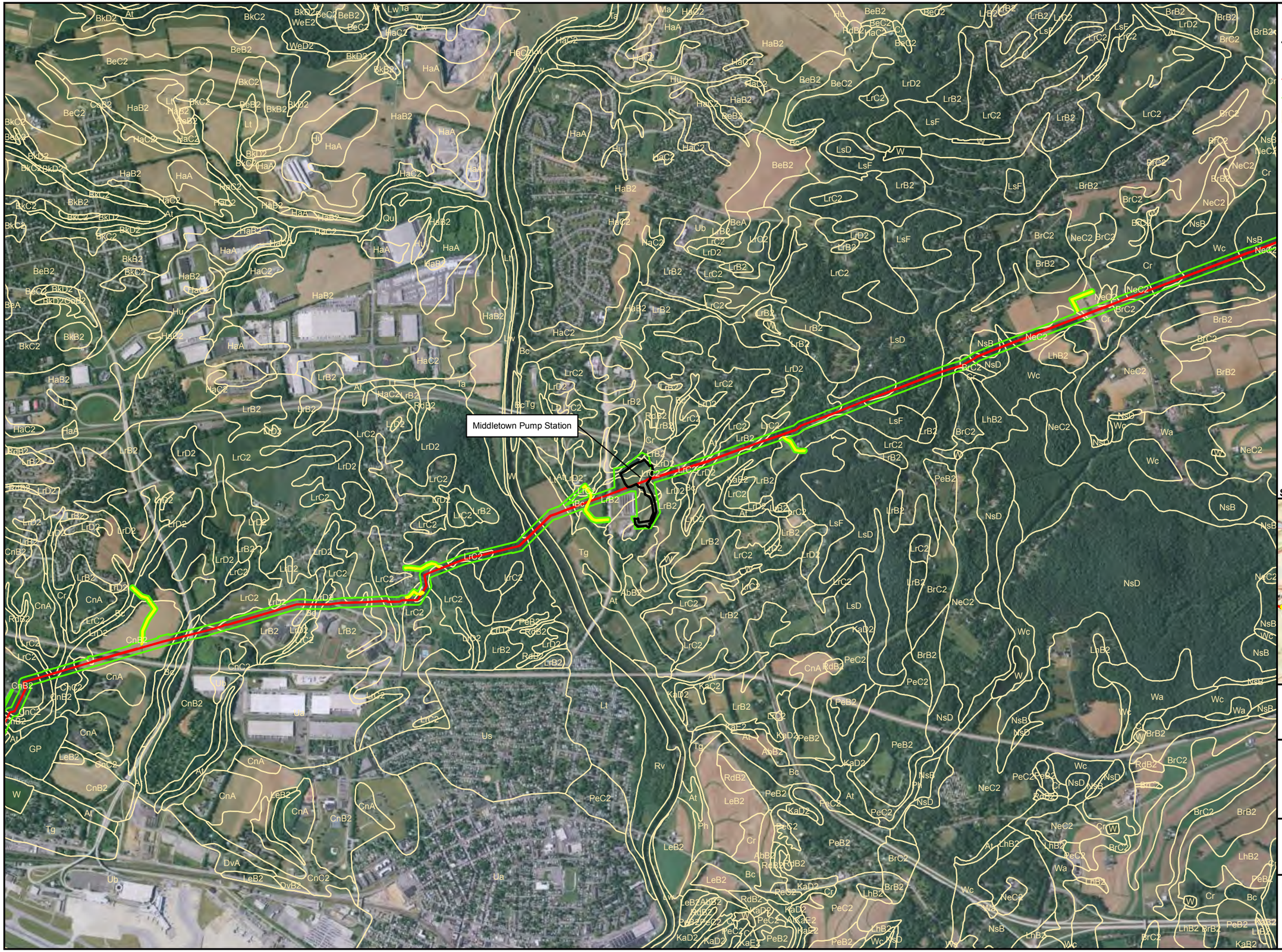

Legend

- Middletown Station
- Access Road
- Alignment Centerline
- Study Area
- NRCS Soils and Codes

Sheet Identifier

N

Feet
0 1,000 2,000

Meters
0 300 600

NRCS SOILS MAP
FIGURE 2-6
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DAUPHIN COUNTY, PA

TETRA TECH

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Legend

- Beckersville Station
- Access Road
- Alignment Centerline
- Study Area
- NRCS Soils and Codes

Sheet Identifier

N

0 1,000 2,000 Feet

0 300 600 Meters

NRCS SOILS MAP
FIGURE 2-7
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
BERKS COUNTY, PA

TETRA TECH

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Twin Oaks Pump Station

Legend

- Twin Oaks Station
- Access Road
- Alignment Centerline
- Study Area
- NRCS Soils and Codes

Sheet Identifier

N

0 1,000 2,000 Feet

0 300 600 Meters

NRCS SOILS MAP
FIGURE 2-8
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY, PA

TETRA TECH

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Legend

- Houston Injection Site
- Access Road
- Alignment Centerline
- Study Area
- NWI Wetlands and Codes

Sheet Identifier

N

Feet
0 1,000 2,000

Meters
0 300 600

NWI WETLANDS MAP
FIGURE 3-1
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
WASHINGTON COUNTY, PA

TETRA TECH

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PGH: P:\GIS\SUNOCO\MARINER EAST 2\MXD\PENN\PIPELINE_PUMPSTATION_SUPPLEMENTAL_NWI.MXD 05/24/16 JN

Legend

- Delmont Station
- Access Road
- Alignment Centerline
- Study Area
- NWI Wetlands and Codes

Sheet Identifier

N

0 1,000 2,000 Feet

0 300 600 Meters

NWI WETLANDS MAP
FIGURE 3-2
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
WESTMORELAND COUNTY, PA

TETRA TECH

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Legend

- Ebensburg Station
- Access Road
- Alignment Centerline
- Study Area
- NWI Wetlands and Codes

Sheet Identifier

N

0 1,000 2,000 Feet

0 300 600 Meters

NWI WETLANDS MAP
FIGURE 3-3
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CAMBRIA COUNTY, PA

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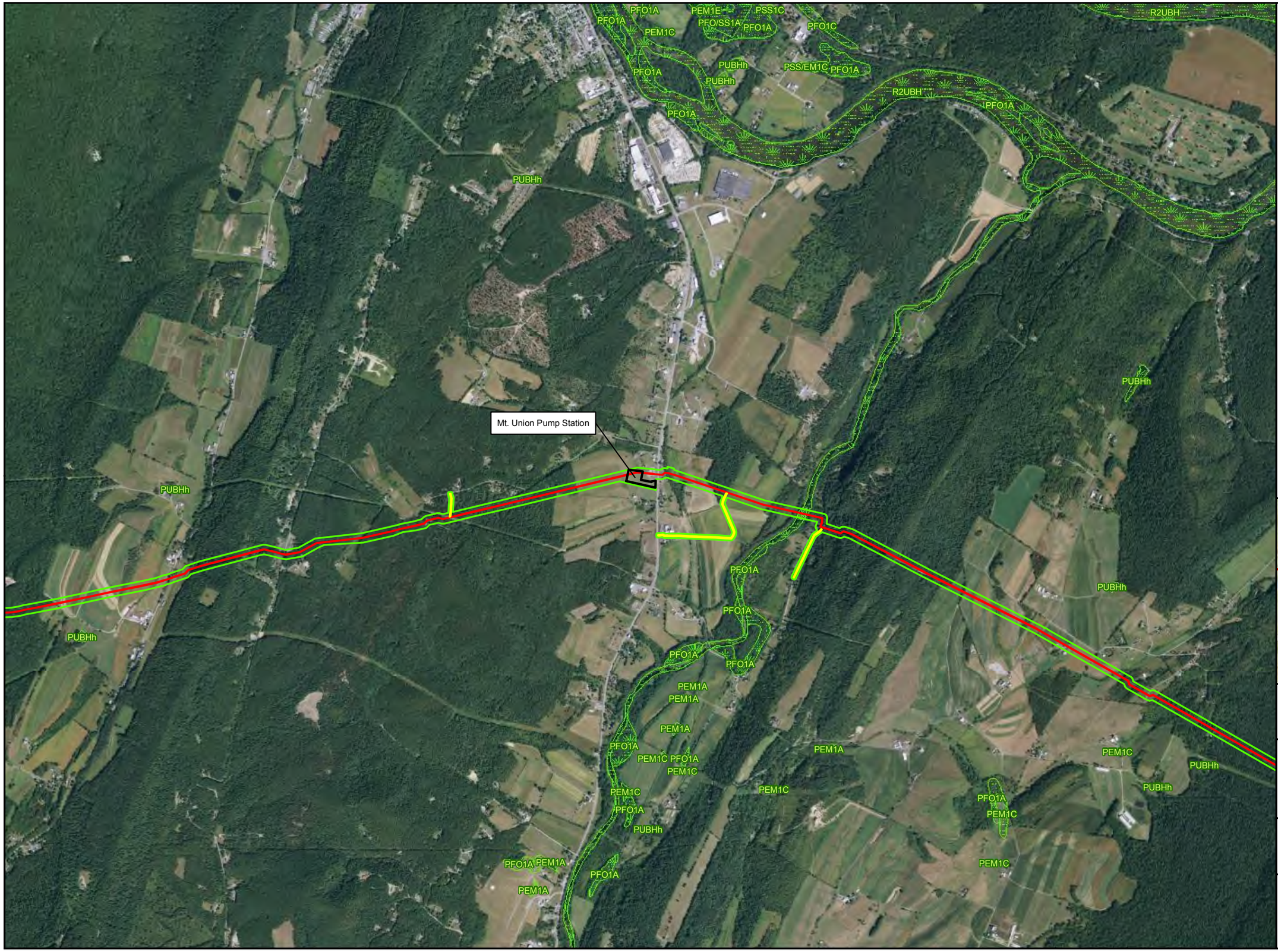

Legend

- Mt. Union Station
- Access Road
- Alignment Centerline
- Study Area
- NWI Wetlands and Codes

Sheet Identifier

N

0 1,000 2,000 Feet

0 300 600 Meters

NWI WETLANDS MAP
FIGURE 3-4
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
HUNTINGDON COUNTY, PA

TETRA TECH

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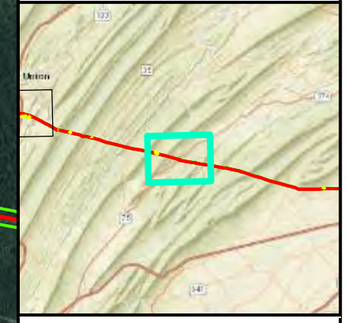
Legend

- Doylesburg Station
- Access Road
- Alignment Centerline
- Study Area
- NWI Wetlands and Codes

Sheet Identifier



N

0 1,000 2,000 Feet

0 300 600 Meters

NWI WETLANDS MAP
FIGURE 3-5
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
PERRY COUNTY, PA

TETRA TECH

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Legend

- Middletown Station
- Access Road
- Alignment Centerline
- Study Area
- NWI Wetlands and Codes

Sheet Identifier

N

Feet
0 1,000 2,000

Meters
0 300 600

NWI WETLANDS MAP
FIGURE 3-6
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DAUPHIN COUNTY, PA

TETRA TECH

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Legend

- Beckersville Station
- Access Road
- Alignment Centerline
- Study Area
- NWI Wetlands and Codes

Sheet Identifier

N

Feet
0 1,000 2,000

Meters
0 300 600

NWI WETLANDS MAP
FIGURE 3-7
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
BERKS COUNTY, PA

TETRA TECH

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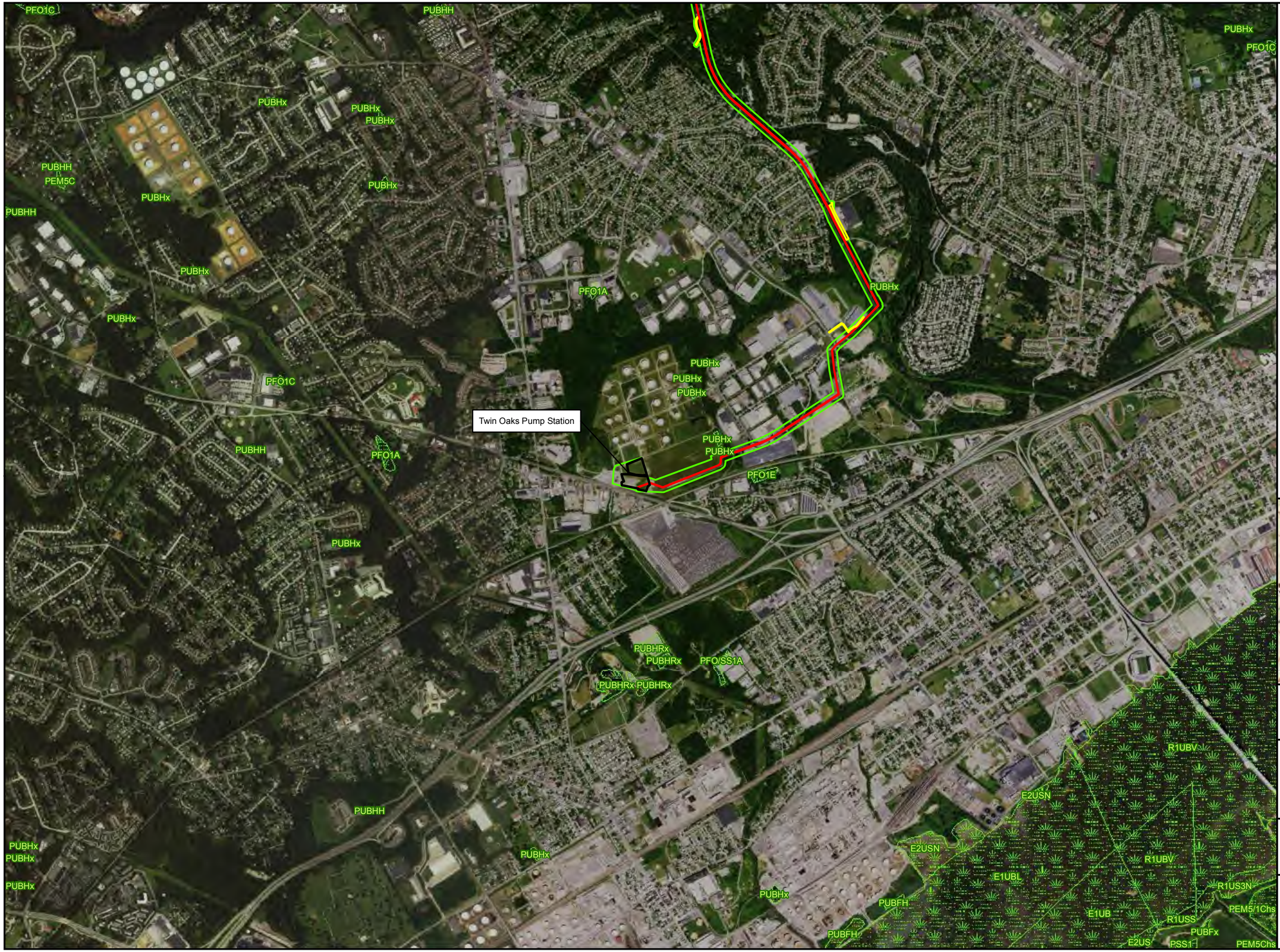
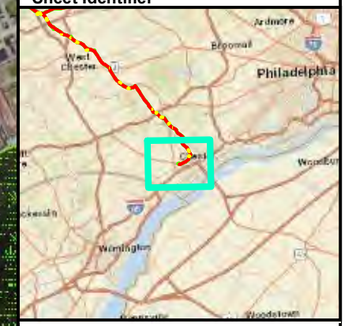


Legend

- Twin Oaks Station
- Access Road
- Alignment Centerline
- Study Area
- NWI Wetlands and Codes

Sheet Identifier



N

0 1,000 2,000 Feet

0 300 600 Meters

NWI WETLANDS MAP
FIGURE 3-8
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY, PA

TETRA TECH

Notes:
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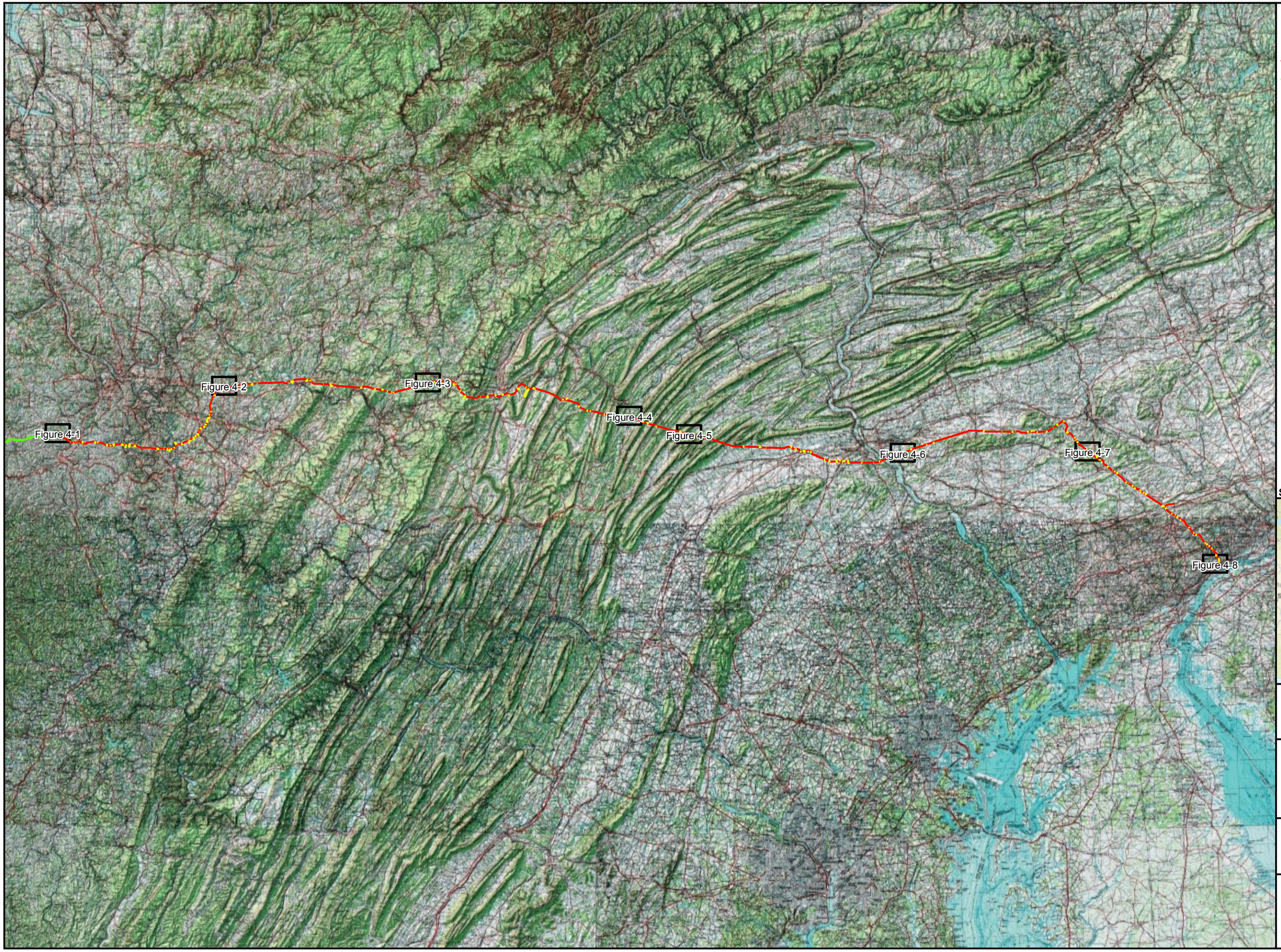


Legend

- Access Road
- Alignment Centerline
- Study Area

Sheet Identifier

N

Miles
0 10 20

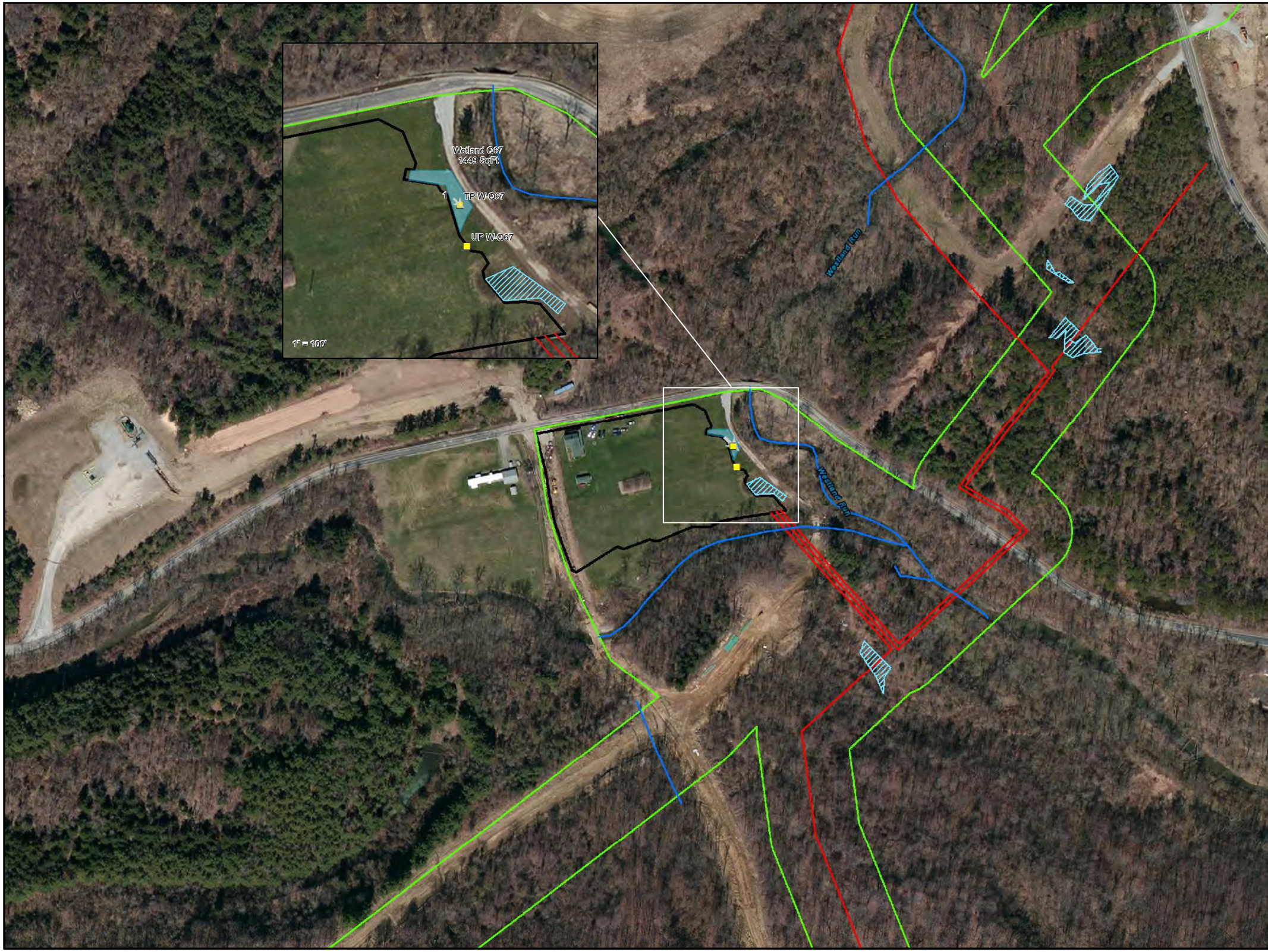
Kilometers
0 16.09345 32.1869

USGS PROJECT LOCATION MAP
FIGURE 4-INDEX
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
COUNTY,

TETRA TECH

Notes:
1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).
2) Quadrangles being displayed are

PGH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PENNPIPELINE_PUMPSTATION_SUPPLEMENTAL_INDEX.MXD 05/25/16 JN



Legend

- Sample Location
- Photo Location
- Previously Submitted Stream
- PEM

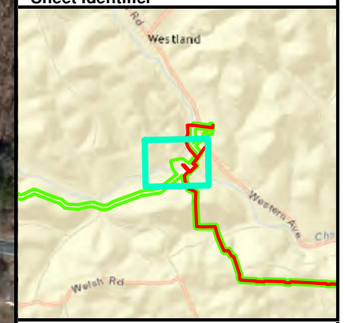
Previously Submitted Wetland

- PEM

Wetland

- PEM
- Alignment Centerline
- Study Area
- Houston Injection Site

Sheet Identifier



N

Feet
0 100 200

Meters
0 30.48 60.96

WETLAND DETAIL MAP
FIGURE 4-1
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
WASHINGTON COUNTY, PA

TETRA TECH

Notes:
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POH P:\GIS\SUNOCO\MARINER EAST 2\MXD\PENNPIPELINE_PUMPSTATION_SUPPLEMENTAL_DETAIL.MXD 05/24/16 JN

Legend

- Culvert
- Sample Location
- Photo Location
- Drainage Feature
- Previously Submitted Stream
- PEM
- PFO

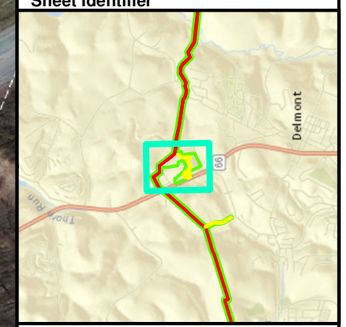
Previously Submitted Wetland

- PEM
- PFO

Wetland

- PEM
- Alignment Centerline
- Study Area
- Delmont Station

Sheet Identifier



Feet
0 100 200
Meters
0 30.48 60.96

WETLAND DETAIL MAP
FIGURE 4-2
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
WESTMORELAND COUNTY, PA

TETRA TECH

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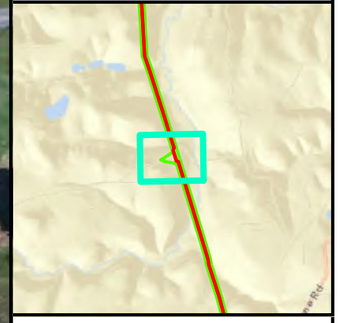
Legend

- Photo Location
- Drainage Feature
- Previously Submitted Stream

Previously Submitted Wetland

- PEM
- PFO
- Alignment Centerline
- Study Area
- Ebensburg Station

Sheet Identifier



Feet
0 100 200
Meters
0 30.48 60.96

WETLAND DETAIL MAP
FIGURE 4-3
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
CAMBRIA COUNTY, PA

TETRA TECH

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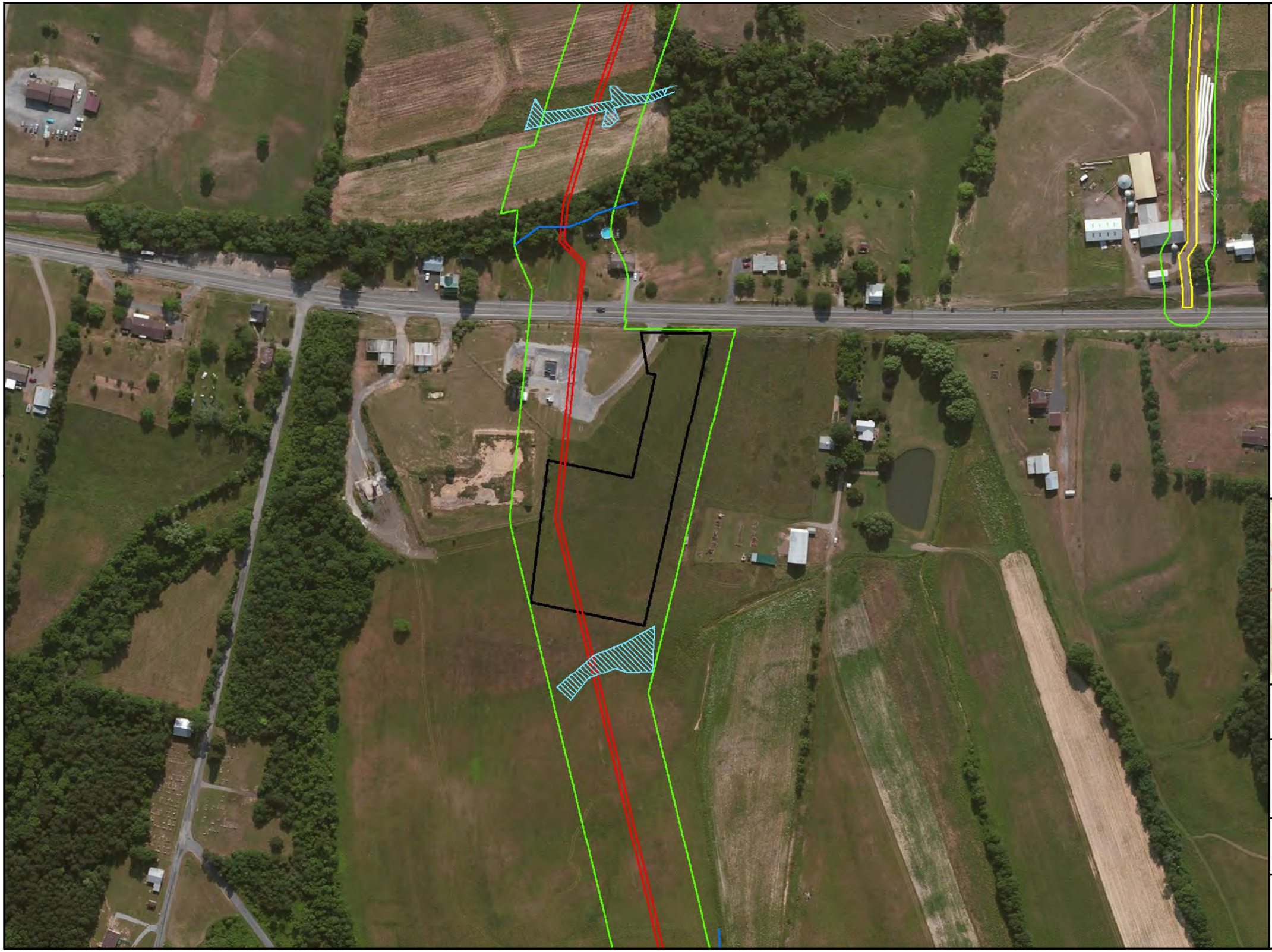


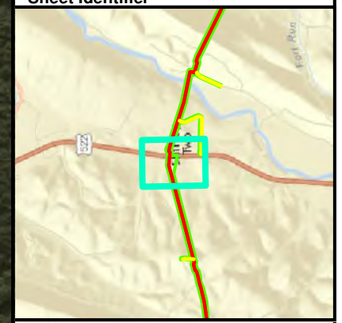
Legend

- Photo Location
- Previously Submitted Stream
- PEM

Previously Submitted Wetland

- PEM
- Access Road
- Alignment Centerline
- Study Area
- Mt. Union Station

Sheet Identifier



Feet
0 100 200
Meters
0 30.48 60.96

WETLAND DETAIL MAP
FIGURE 4-4
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
HUNTINGDON COUNTY, PA

TETRA TECH

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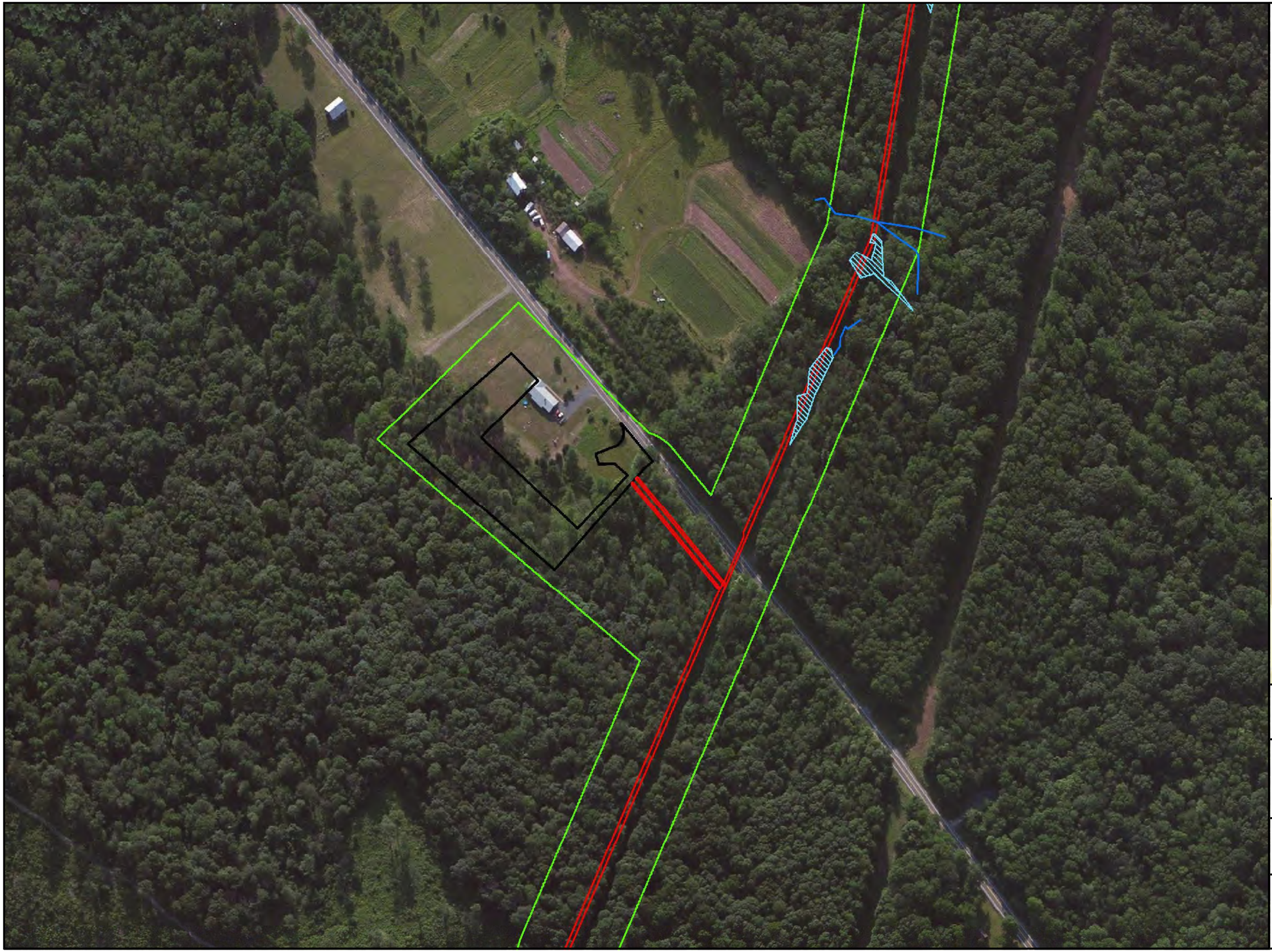


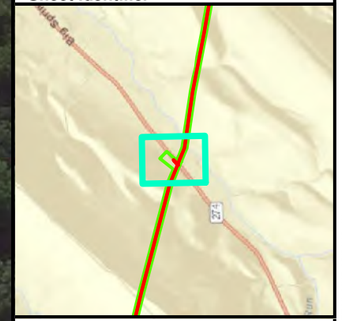
Legend

- Photo Location
- Previously Submitted Stream

Previously Submitted Wetland

- PEM
- Alignment Centerline
- Study Area
- Doylesburg Station

Sheet Identifier



Feet
0 100 200

Meters
0 30.48 60.96

WETLAND DETAIL MAP
FIGURE 4-5
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
PERRY COUNTY, PA

TETRA TECH

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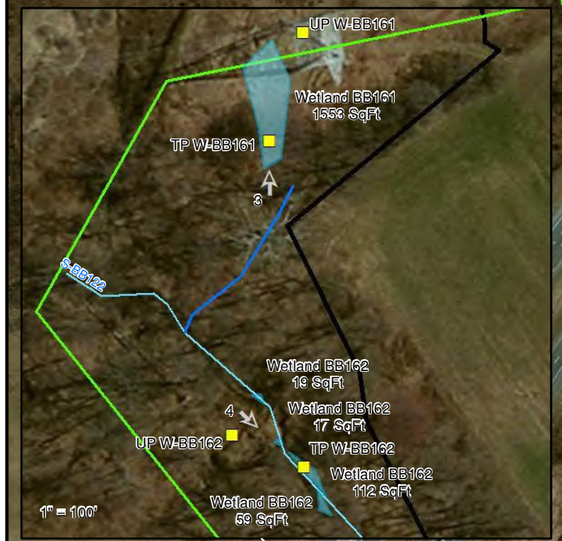

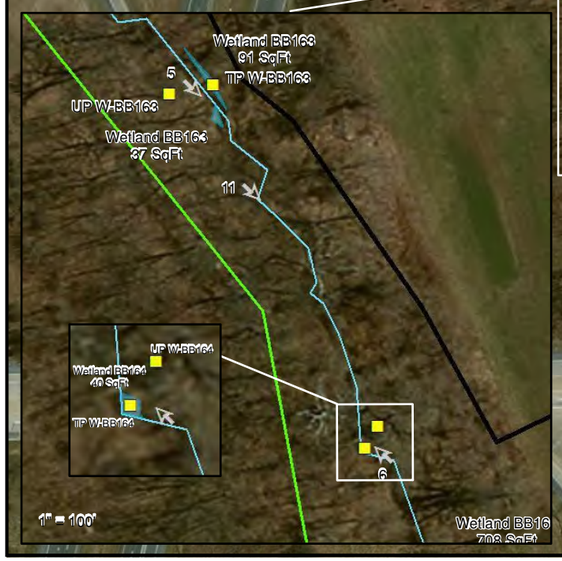

Legend

- Culvert
- Sample Location
- Photo Location
- Previously Submitted Stream
- Stream

Previously Submitted Wetland

- PEM
- PFO
- PSS

Wetland

- PEM
- Access Road
- Alignment Centerline
- Study Area
- Middletown Station

Sheet Identifier

Feet
0 100 200
Meters
0 30.48 60.96

WETLAND DETAIL MAP
FIGURE 4-6
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DAUPHIN COUNTY, PA

TETRA TECH

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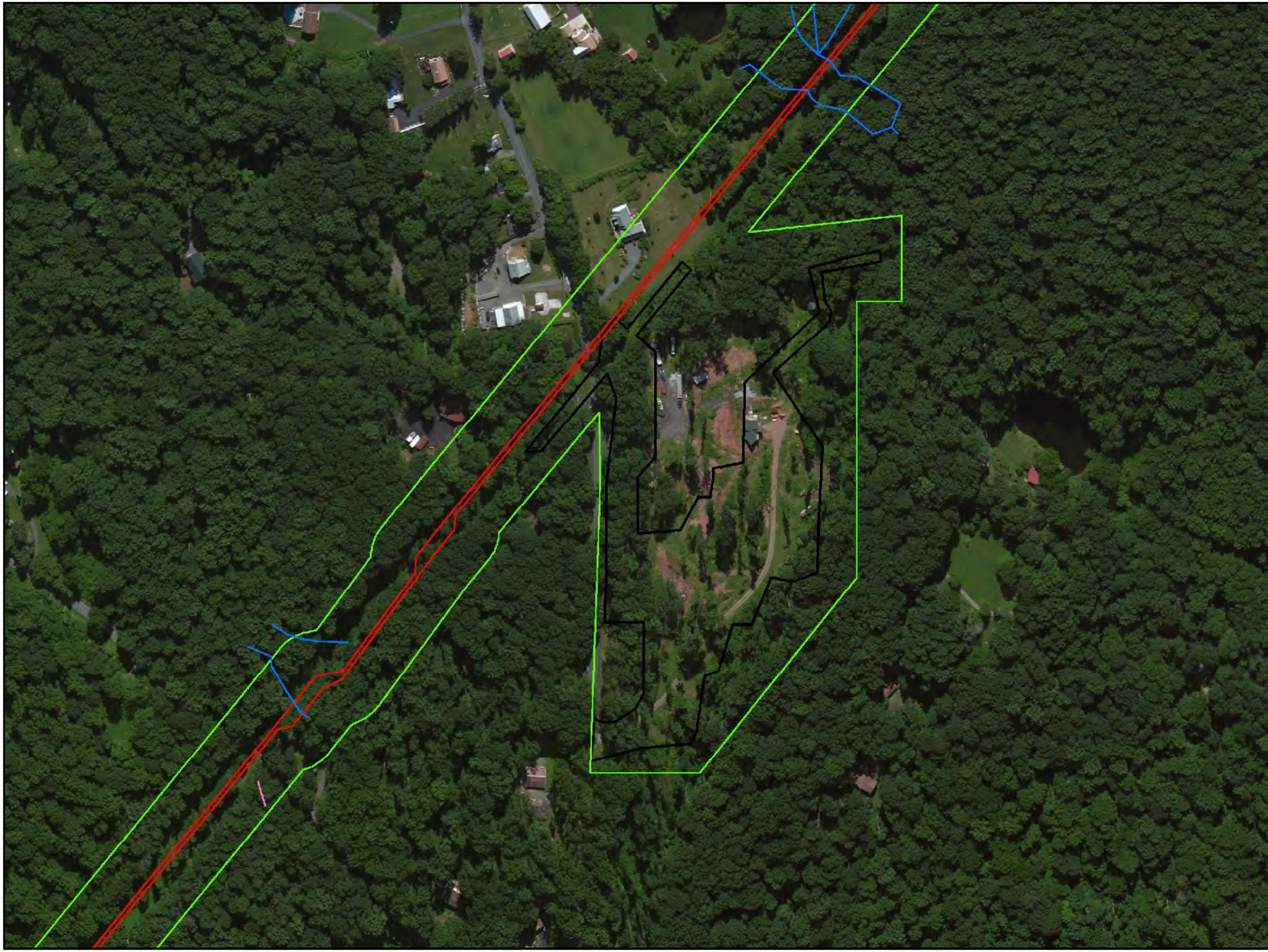

Legend

- Photo Location
- Drainage Feature
- Previously Submitted Stream
- Alignment Centerline
- Study Area
- Beckersville Station

Sheet Identifier

Feet
0 100 200
Meters
0 30.48 60.96

WETLAND DETAIL MAP
FIGURE 4-7
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
BERKS COUNTY, PA

TETRA TECH

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Legend

- Culvert
- Sample Location
- Photo Location
- Previously Submitted Stream

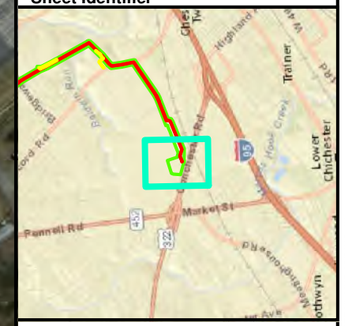
Previously Submitted Wetland

- PEM

Wetland

- PEM
- Alignment Centerline
- Study Area
- Twin Oaks Station

Sheet Identifier



N

0 100 200 Feet

0 30.48 60.96 Meters

WETLAND DETAIL MAP
FIGURE 4-8
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
DELAWARE COUNTY, PA

TETRA TECH

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APPENDIX A
WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Washington Sampling Date: 06/25/2015

Applicant/Owner: Sunoco State: PA Sampling Point: W-Q67

Investigator(s): J.McGuirk, D. Quinn Section, Township, Range: Chartiers

Landform (hillslope, terrace, etc.): valley bottom Local relief (concave, convex, none): concave Slope (%): 0-1%

Subregion (LRR or MLRA): LRRN Lat: 40 15'43.21" Long: -80 16'02.50" Datum: NAD 83

Soil Map Unit Name: Newark silt loam NWI classification: None

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

Are Vegetation _____, Soil ✔, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

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

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

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

Remarks:
Cowardin Code: PEM
HGM: Depressional
WT: RPWWN

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:
evidence of ponding

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-Q67

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 5')			
1. Persicaria pensylvanica	30	✔	FACW
2. Persicaria maculosa	15	✔	FACW
3. Eleocharis palustris	10		OBL
4. Juncus effusus	10		FACW
5. Carex sp.	5		ND
6.			
7.			
8.			
9.			
10.			
11.			
	70 = Total Cover		
50% of total cover: 35	20% of total cover: 14		
Woody Vine Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

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% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

✔ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ✔ No ___

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

ND- not determined

SOIL Sampling Point: W-Q67

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3"	10YR 5/2	90	7.5YR 5/6	10	C	M	SiL	problematic
3-12"	10YR 5/3	55	7.5YR 5/6	25	C	M	SiL	heavily disturbed
			10YR 5/1	20			SiL	depletions

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Washington Sampling Date: 06/25/2015

Applicant/Owner: Sunoco State: PA Sampling Point: W-Q67 UPL

Investigator(s): J.McGuirk, D. Quinn Section, Township, Range: Chartiers

Landform (hillslope, terrace, etc.): valley bottom Local relief (concave, convex, none): concave Slope (%): 0-1%

Subregion (LRR or MLRA): LRRN Lat: 40 15'44.56" Long: -80 16'02.91" Datum: NAD 83

Soil Map Unit Name: Newark silt loam NWI classification: None

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

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

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

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

Remarks:

Upland

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Wetland Hydrology Present? Yes _____ No ✔

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

Remarks:

Mowed lawn

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-Q67 UPL

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 5')			
1. Poa sp.	45	✔	ND
2. Trifolium pratense	10		FACU
3. Achillea millefolium	10		FACU
4. Taraxacum officinale	10		FACU
5. Plantago lanceolata	10		UPL
6.			
7.			
8.			
9.			
10.			
11.			
	85 = Total Cover		
50% of total cover: 42.5	20% of total cover: 17		
Woody Vine Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 0* (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ___ No ✔

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

ND- not determined

*Vegetation not ID'd down to species level not included in dominance test.

SOIL Sampling Point: W-Q67 UPL

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6"	10YR 4/2	100					SiL	
6-12"	10YR 4/3	100					SiL	

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Westmoreland Co Sampling Date: 06/15/2015

Applicant/Owner: Sunoco State: PA Sampling Point: W-DS4

Investigator(s): Greg Stevens, Adam Mengel Section, Township, Range: Salem

Landform (hillslope, terrace, etc.): Stream valley Local relief (concave, convex, none): Concave Slope (%): 3-5%

Subregion (LRR or MLRA): LRRN Lat: 40.426961 Long: -79.575644 Datum: NAD83

Soil Map Unit Name: Guernsey silt loam, 8 to 15 percent slopes (GyC) NWI classification: None

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

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

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

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

Remarks:
Cowardin Code: PEM
HGM: Depression
WT: Isolate

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-DS4

Tree Stratum (Plot size: 10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum (Plot size: 10')			
1. Fraxinus pennsylvanica	5	✔	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	5 = Total Cover		
50% of total cover: 2.5	20% of total cover: 1		
Herb Stratum (Plot size: 5')			
1. Carex vulpinodea	50	✔	OBL
2. Juncus effusus	25	✔	FACW
3. Scirpus atrovirens	25	✔	OBL
4. Agrimonia parviflora	10		FACW
5. Rumex crispus	5		FAC
6.			
7.			
8.			
9.			
10.			
11.			
	115 = Total Cover		
50% of total cover: 57.5	20% of total cover: 23		
Woody Vine Stratum (Plot size: 10')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

✔ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ✔ No ___

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

SOIL Sampling Point: W-DS4

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6"	10YR 3/2	85	7.5YR 4/6	15	C	M/PL	SC	
6-18"	10YR 4/1	60	2.5YR 4/6	7	C	M/PL	C	
	10YR 7/6	23	2.5YR 5/6	10	C	M/PL	C	Gravely

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Westmoreland Co Sampling Date: 06/15/2015

Applicant/Owner: Sunoco State: PA Sampling Point: W-DS4 UPL

Investigator(s): Greg Stevens, Adam Mengel Section, Township, Range: Salem

Landform (hillslope, terrace, etc.): Sideslope Local relief (concave, convex, none): Linear Slope (%): 5%

Subregion (LRR or MLRA): LRRN Lat: 40.42711 Long: -79.575747 Datum: NAD83

Soil Map Unit Name: Guernsey silt loam, 8 to 15 percent slopes (GyC) NWI classification: None

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

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

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

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

Remarks:
Upland

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Wetland Hydrology Present? Yes _____ No ✔

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-DS4 UPL

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 5')			
1. Panicum capillare	35	✔	FAC
2. Rosa multiflora	20	✔	FACU
3. Solidago canadensis	15		FACU
4. Plantago lancelata	15		UPL
5. Asclepias syriaca	5		FACU
6.			
7.			
8.			
9.			
10.			
11.			
	90 = Total Cover		
50% of total cover: 45	20% of total cover: 18		
Woody Vine Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ___ No ✔

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

SOIL

Sampling Point: W-DS4 UPL

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16"	10YR 6/6	37	5YR 4/6	3	C	M/PL	SIC	
	10YR 7/1	30	7.5YR 5/6	30	C	M	C	

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Dauphin County Sampling Date: 7/23/2015
Applicant/Owner: Sunoco State: PA Sampling Point: W-BB161-WP1 (PEM)
Investigator(s): Logan Zugay, Dylan Woodworth Section, Township, Range: Londonderry Township
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3-5%
Subregion (LRR or MLRA): LRR 148 Lat: 40° 14' 22.98" Long: 76° 42' 57.90" Datum: WGS-84
Soil Map Unit Name: LrB2: Lewisberry gravelly sandy laom NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks:

Cowardin: PEM
HGM: Depressional
WT: RPWWN

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____
Water Table Present? Yes ✔ No _____ Depth (inches): 0"
Saturation Present? (includes capillary fringe) Yes ✔ No _____ Depth (inches): 0"

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-BB161-WP1 (PEM)

Tree Stratum (Plot size: 0)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum (Plot size: 0)			
1. Rosa multiflora	5%	✔	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	5 = Total Cover		
50% of total cover: 2.5	20% of total cover: 1		
Herb Stratum (Plot size: 5')			
1. Microstegium vimineum	40%	✔	FAC
2. Eupatorium perfoliatum	7.5%	✔	FACW
3. Impatiens capensis	7.5%	✔	FACW
4. Scirpus atrovirens	7.5%	✔	OBL
5. Carex sp.*	7.5%	✔	ND
6. Euthamia graminifolia	7.5%	✔	FAC
7. Vernonia noveboracensis	2.5%		FACW
8. Verbena hastata	5%		FACW
9. Polygonum perfoliatum	2.5%		FAC
10. Agrostis gigantea	2.5%		FACW
11. Onoclea sensibilis	2.5%		FACW
	92.5 = Total Cover		
50% of total cover: 46.25	20% of total cover: 18.5		
Woody Vine Stratum (Plot size: 0)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 83% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ✔ No ___

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

ND- Not determined

*Vegetation not ID'd down to species level not included in dominance test.

SOIL Sampling Point: W-BB161-WP1 (PEM)

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	7.5YR 4/2	90%	10YR 4/6	5%	C	M	SICL	
			7.5YR4/6	5%	C	M		

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Dauphin County Sampling Date: 7/23/2015

Applicant/Owner: Sunoco State: PA Sampling Point: W-BB161-UP1

Investigator(s): Logan Zugay, Dylan Woodworth Section, Township, Range: Londonderry Township

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3-5%

Subregion (LRR or MLRA): LRR 148 Lat: 40° 13' 22.35" Long: 76° 42' 56.65" Datum: WGS-84

Soil Map Unit Name: LrB2: Lewisberry gravelly sandy laom NWI classification: None

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

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

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

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

Remarks:

Uplands

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Wetland Hydrology Present? **Yes** _____ **No** ✔

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-BB161-UP1

Tree Stratum (Plot size: 0)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum (Plot size: 0)			
1. Rubus sp.	25%	✔	ND
2. Lonicera tatarica	15%	✔	FACU
3. Rosa multiflora	15%	✔	FACU
4.			
5.			
6.			
7.			
8.			
9.			
	55 = Total Cover		
50% of total cover: 27.5	20% of total cover: 11		
Herb Stratum (Plot size: 5')			
1. Alliaria petiolata	15%	✔	FACU
2. Erigeron annuus	15%	✔	FACU
3. Phleum pratense	10%	✔	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	40 = Total Cover		
50% of total cover: 20	20% of total cover: 8		
Woody Vine Stratum (Plot size: 0)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ___ No ✔

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

ND- Not determined

*Vegetation not ID'd down to species level not included in dominance test.

SOIL

Sampling Point: W-BB161-UP1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR4/4	100%					SIL	Rock at 5 inches

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 5

Hydric Soil Present? **Yes** _____ **No** ✔

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Dauphin County Sampling Date: 7/23/2015

Applicant/Owner: Sunoco State: PA Sampling Point: W-BB162-WP1 (PEM)

Investigator(s): Logan Zugay, Dylan Woodworth Section, Township, Range: Londonderry Township

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 3-5%

Subregion (LRR or MLRA): LRR 148 Lat: 40° 14' 22.46" Long: 76° 43' 00.05" Datum: WGS-84

Soil Map Unit Name: Bc: Basher silt loam NWI classification: None

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

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

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

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

Remarks:

Cowardin: PEM
HGM: Riverine/Depressional
WT: RPWWD

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes ✔	No _____	Depth (inches): 0"
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0"

Wetland Hydrology Present? **Yes** ✔ **No** _____

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-BB162-WP1 (PEM)

Tree Stratum (Plot size: 0)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum (Plot size: 0)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 5')			
1. Impatiens capensis	35%	✔	FACW
2. Scirpus atrovirens	20%	✔	OBL
3. Pilea pumila	15%	✔	FACW
4. Persicaria arifolium	15%	✔	OBL
5. Carex sp.	10%		ND
6. Juncus effusus	10%		FACW
7. Rosa multiflora	10%		FACU
8.			
9.			
10.			
11.			
	115 = Total Cover		
50% of total cover: 57.5	20% of total cover: 23		
Woody Vine Stratum (Plot size: 0)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

✔ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ✔ No ___

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

ND- Not determined

SOIL Sampling Point: W-BB162-WP1 (PEM)

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR4/4	100%					S	
8-16	7.5YR4/2	90%	10YR3/4	10%	C	M	SICL	

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Dauphin County Sampling Date: 7/23/2015

Applicant/Owner: Sunoco State: PA Sampling Point: W-BB162-UP1

Investigator(s): Logan Zugay, Dylan Woodworth Section, Township, Range: Londonderry Township

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3-5%

Subregion (LRR or MLRA): LRR 148 Lat: 40° 13' 23.33" Long: 76° 43' 00.36" Datum: WGS-84

Soil Map Unit Name: LrC2: Lewisberry gravelly sandy laom NWI classification: None

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

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

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

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

Remarks:

Upland

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Wetland Hydrology Present? **Yes** _____ **No** ✔

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-BB162-UP1

Tree Stratum (Plot size: 0)	Absolute % Cover	Dominant Species?	Indicator Status
1. Carya sp.	10%	✔	ND
2.			
3.			
4.			
5.			
6.			
7.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		
Sapling/Shrub Stratum (Plot size: 0)			
1. Rosa multiflora	55%	✔	FACU
2. Lonicera tatarica	15%	✔	FACU
3. Rubus sp.	5%		ND
4.			
5.			
6.			
7.			
8.			
9.			
	75 = Total Cover		
50% of total cover: 37.5	20% of total cover: 15		
Herb Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Woody Vine Stratum (Plot size: 0)			
1. Toxicodendron radicans	10%	✔	FAC
2.			
3.			
4.			
5.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 3* (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ___ No ✔

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

ND- Not determined

*Vegetation not ID'd down to species level not included in dominance test.

SOIL

Sampling Point: W-BB162-UP1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR4/3	100%					SIL	Rock at 6 inches

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 6

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Dauphin County Sampling Date: 7/23/2015

Applicant/Owner: Sunoco State: PA Sampling Point: W-BB163-WP1 (PEM)

Investigator(s): Logan Zugay, Dylan Woodworth Section, Township, Range: Londonderry Township

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 3-5%

Subregion (LRR or MLRA): LRR 148 Lat: 40° 13' 21.53" Long: 76° 43' 02.51" Datum: WGS-84

Soil Map Unit Name: Bc: Basher silt loam NWI classification: None

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

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

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

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

Remarks:

Cowardin: PEM
HGM: Riverine/Depressional
WT: RPWWD

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes ✔ No _____ Depth (inches): 10"

Saturation Present? (includes capillary fringe) Yes ✔ No _____ Depth (inches): 0"

Wetland Hydrology Present? **Yes** ✔ **No** _____

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-BB163-WP1 (PEM)

Tree Stratum (Plot size: 0)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum (Plot size: 0)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 5')			
1. Impatiens capensis	35%	✔	FACW
2. Microstegium vimineum	35%	✔	FAC
3. Polygonum arifolium	10%		OBL
4. Scirpus atrovirens	10%		OBL
5. Pilea pumila	5%		FACW
6.			
7.			
8.			
9.			
10.			
11.			
	95 = Total Cover		
50% of total cover: 47.5	20% of total cover: 19		
Woody Vine Stratum (Plot size: 0)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

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% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ✔ No ___

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

SOIL

Sampling Point: W-BB163-WP1 (PEM)

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	7.5YR4/2	90%	10YR4/3	10%	C	M	SL	Water at 10 inches

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Dauphin County Sampling Date: 7/23/2015

Applicant/Owner: Sunoco State: PA Sampling Point: W-BB163-UP1

Investigator(s): Logan Zugay, Dylan Woodworth Section, Township, Range: Londonderry Township

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3-5%

Subregion (LRR or MLRA): LRR 148 Lat: 40° 13' 22.10" Long: 76° 43' 02.56" Datum: WGS-84

Soil Map Unit Name: LrC2: Lewisberry gravelly sandy loam NWI classification: None

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

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

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

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

Remarks:

Upland

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Wetland Hydrology Present? **Yes** _____ **No** ✔

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-BB163-UP1

Tree Stratum (Plot size: 0)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum (Plot size: 0)			
1. Rosa multiflora	55%	✔	FACU
2. Lonicera tatarica	15%	✔	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	70 = Total Cover		
50% of total cover: 35	20% of total cover: 14		
Herb Stratum (Plot size: 5')			
1. Solidago sp.	10%	✔	ND
2. Dennstaedtia punctilobula	10%	✔	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	20 = Total Cover		
50% of total cover: 10	20% of total cover: 4		
Woody Vine Stratum (Plot size: 0)			
1. Parthenocissus quinquefolia	10%	✔	FACU
2.			
3.			
4.			
5.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ___ No ✔

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

ND- Not determined

*Vegetation not ID'd down to species level not included in dominance test.

SOIL

Sampling Point: W-BB163-UP1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR4/3	100%					SIL	Rock at 6 inches

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 6

Hydric Soil Present? **Yes** _____ **No** ✔

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Dauphin County Sampling Date: 7/23/2015
Applicant/Owner: Sunoco State: PA Sampling Point: W-BB164-WP1 (PEM)
Investigator(s): Logan Zugay, Dylan Woodworth Section, Township, Range: Londonderry Township
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 3-5%
Subregion (LRR or MLRA): LRR 148 Lat: 40° 13' 21.03" Long: 76° 43' 03.43" Datum: WGS-84
Soil Map Unit Name: Bc: Basher silt loam NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks:

Cowardin: PEM
HGM: Riverine/Depressional
WT: RPWWD

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____
Water Table Present? Yes ✔ No _____ Depth (inches): 12"
Saturation Present? (includes capillary fringe) Yes ✔ No _____ Depth (inches): 0"

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-BB164-WP1 (PEM)

Tree Stratum (Plot size: 0)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum (Plot size: 0)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 5')			
1. Impatiens capensis	50%	✔	FACW
2. Microstegium vimineum	50%	✔	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
50% of total cover: 50	20% of total cover: 20		
Woody Vine Stratum (Plot size: 0)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

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% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ✔ No ___

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

SOIL

Sampling Point: W-BB164-WP1 (PEM)

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR4/3	100%					SL	w/ Gravel
12-16	7.5YR4/2	90%	7.5YR4/3	10%	C	M	L	Water at 12 inches

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Dauphin County Sampling Date: 7/23/2015

Applicant/Owner: Sunoco State: PA Sampling Point: W-BB164-UP1

Investigator(s): Logan Zugay, Dylan Woodworth Section, Township, Range: Londonderry Township

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3-5%

Subregion (LRR or MLRA): LRR 148 Lat: 40° 13' 21.05" Long: 76° 43' 03.06" Datum: WGS-84

Soil Map Unit Name: LrC2: Lewisberry gravelly sandy laom NWI classification: None

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

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

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

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

Remarks:

Upland

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Wetland Hydrology Present? **Yes** _____ **No** ✔

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-BB164-UP1

Tree Stratum (Plot size: 0)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	10%	✔	FAC
2. Juglans nigra	10%	✔	FACU
3.			
4.			
5.			
6.			
7.			
	20 = Total Cover		
50% of total cover: 10	20% of total cover: 4		
Sapling/Shrub Stratum (Plot size: 0)			
1. Rosa multiflora	35%	✔	FACU
2. Lonicera tatarica	25%	✔	FACU
3. Rubus sp.*	15%	✔	ND
4.			
5.			
6.			
7.			
8.			
9.			
	75 = Total Cover		
50% of total cover: 37.5	20% of total cover: 15		
Herb Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Woody Vine Stratum (Plot size: 0)			
1. Parthenocissus quinquefolia	5%	✔	FACU
2.			
3.			
4.			
5.			
	5 = Total Cover		
50% of total cover: 2.5	20% of total cover: 1		

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 20% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ___ No ✔

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

ND- Not determined

*Not identified to species, not included in dominance test

SOIL

Sampling Point: W-BB164-UP1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR4/3	100%					SIL	Rock at 6 inches

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 6

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Dauphin County Sampling Date: 7/23/2015
Applicant/Owner: Sunoco State: PA Sampling Point: W-BB165-WP1 (PEM)
Investigator(s): Logan Zugay, Dylan Woodworth Section, Township, Range: Londonderry Township
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 3-5%
Subregion (LRR or MLRA): LRR 148 Lat: 40° 13' 20.37" Long: 76° 43' 06.10" Datum: WGS-84
Soil Map Unit Name: Bc: Basher silt loam NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks:

Cowardin: PEM
HGM: Riverine/Depressional
WT: RPWWD

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present?	Yes _____	No ✔	Depth (inches): _____
Water Table Present?	Yes ✔	No _____	Depth (inches): 0"
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0"

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-BB165-WP1 (PEM)

Tree Stratum (Plot size: 0)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum (Plot size: 0)			
1. Viburnum dentatum	2.5%	✔	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	2.5 = Total Cover		
50% of total cover: 1.25	20% of total cover: 0.5		
Herb Stratum (Plot size: 5')			
1. Persicaria perfoliata	25%	✔	FAC
2. Impatiens capensis	20%	✔	FACW
3. Symplocarpus foetidus	15%	✔	OBL
4. Carex sp.	15%	✔	ND
5. Verbena hastata	10%		FACW
6. Rumex crispus	5%		FAC
7. Pilea pumila	5%		FACW
8.			
9.			
10.			
11.			
	95 = Total Cover		
50% of total cover: 47.5	20% of total cover: 19		
Woody Vine Stratum (Plot size: 0)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ✔ No ___

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

ND- Not determined

*Vegetation not ID'd down to species level not included in dominance test.

SOIL Sampling Point: W-BB165-WP1 (PEM)

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR4/2	85%	7.5YR3/4	15%	C	M	SIL	
6-16	7.5YR4/3	100%					SIL	

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Dauphin County Sampling Date: 7/23/2015

Applicant/Owner: Sunoco State: PA Sampling Point: W-BB165-UP1

Investigator(s): Logan Zugay, Dylan Woodworth Section, Township, Range: Londonderry Township

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3-5%

Subregion (LRR or MLRA): LRR 148 Lat: 40° 13' 20.87" Long: 76° 43' 06.77" Datum: WGS-84

Soil Map Unit Name: LrC2: Lewisberry gravelly sandy laom NWI classification: None

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

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

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

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

Remarks:

Upland

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Wetland Hydrology Present? **Yes** _____ **No** ✔

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-BB165-UP1

Tree Stratum (Plot size: 0)	Absolute % Cover	Dominant Species?	Indicator Status
1. Robinia pseudoacacia	10%	✔	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		
Sapling/Shrub Stratum (Plot size: 0)			
1. Lonicera tatarica	25%	✔	FACU
2. Rubus sp.	15%	✔	ND
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	40 = Total Cover		
50% of total cover: 20	20% of total cover: 8		
Herb Stratum (Plot size: 5')			
1. Cirsium sp.	10%	✔	ND
2. Phytolacca americana	10%	✔	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	20 = Total Cover		
50% of total cover: 10	20% of total cover: 4		
Woody Vine Stratum (Plot size: 0)			
1. Parthenocissus quinquefolia	15%	✔	FACU
2. Lonicera japonica	15%	✔	FAC
3.			
4.			
5.			
	30 = Total Cover		
50% of total cover: 15	20% of total cover: 6		

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 20% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ___ No ✔

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

ND- Not determined

*Vegetation not ID'd down to species level not included in dominance test.

SOIL Sampling Point: W-BB165-UP1

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR4/3	100%					SIL	
8-6	7.5YR4/4	100%					SIL	Rock at 8 inches

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 8

Hydric Soil Present? **Yes** _____ **No** ✔

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Dauphin County Sampling Date: 7/23/2015
Applicant/Owner: Sunoco State: PA Sampling Point: W-BB166-WP1 (PEM)
Investigator(s): Logan Zugay, Dylan Woodworth Section, Township, Range: Londonderry Township
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 3-5%
Subregion (LRR or MLRA): LRR 148 Lat: 40° 13' 19.59" Long: 76° 43' 07.56" Datum: WGS-84
Soil Map Unit Name: Bc: Basher silt loam NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

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

Remarks:

Cowardin: PEM
HGM: Depressional
WT: RPWWN

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes ✔ No _____ Depth (inches): <1"
Water Table Present? Yes ✔ No _____ Depth (inches): 0"
Saturation Present? (includes capillary fringe) Yes ✔ No _____ Depth (inches): 0"

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-BB166-WP1 (PEM)

Tree Stratum (Plot size: 0)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum (Plot size: 0)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 5')			
1. Impatiens capensis	35%	✔	FACW
2. Pilea pumila	35%	✔	FACW
3. Juncus effusus	20%	✔	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90 = Total Cover		
50% of total cover: 45	20% of total cover: 18		
Woody Vine Stratum (Plot size: 0)			
1. Lonicera japonica	10%	✔	FAC
2.			
3.			
4.			
5.			
	10 = Total Cover		
50% of total cover: 5	20% of total cover: 2		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ✔ No ___

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

SOIL Sampling Point: W-BB166-WP1 (PEM)

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR4/2	85%	7.5YR3/4	15%	C	M	SIL	
6-16	7.5YR4/3	100%					SIL	

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Dauphin County Sampling Date: 7/23/2015

Applicant/Owner: Sunoco State: PA Sampling Point: W-BB166-UP1

Investigator(s): Logan Zugay, Dylan Woodworth Section, Township, Range: Londonderry Township

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3-5%

Subregion (LRR or MLRA): LRR 148 Lat: 40° 13' 19.81" Long: 76° 43' 07.72" Datum: WGS-84

Soil Map Unit Name: LrC2: Lewisberry gravelly sandy laom NWI classification: None

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

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

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

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

Remarks:

Upland

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Wetland Hydrology Present? **Yes** _____ **No** ✔

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-BB166-UP1

Tree Stratum (Plot size: 0)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus sp.	15%	✔	ND
2. Juglans nigra	10%	✔	FACU
3.			
4.			
5.			
6.			
7.			
	25 = Total Cover		
50% of total cover: 12.5	20% of total cover: 5		
Sapling/Shrub Stratum (Plot size: 0)			
1. Rosa multiflora	25%	✔	FACU
2. Rubus sp.	25%	✔	ND
3. Lonicera tatarica	10%		FACU
4.			
5.			
6.			
7.			
8.			
9.			
	60 = Total Cover		
50% of total cover: 30	20% of total cover: 12		
Herb Stratum (Plot size: 5')			
1. Solidago sp.	15%	✔	ND
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	15 = Total Cover		
50% of total cover: 7.5	20% of total cover: 3		
Woody Vine Stratum (Plot size: 0)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ___ No ✔

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

ND- Not determined

*Vegetation not ID'd down to species level not included in dominance test.

SOIL Sampling Point: W-BB166-UP1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR4/3	100%					SIL	
8-6	7.5YR4/4	100%					SIL	Rock at 8 inches

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 8

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Delaware Sampling Date: 03/25/2014

Applicant/Owner: Sunoco State: PA Sampling Point: W-I3

Investigator(s): J. McGuirk, D. Quinn Section, Township, Range: Upper Chichester

Landform (hillslope, terrace, etc.): Valley bottom Local relief (concave, convex, none): Concave Slope (%): 1-3

Subregion (LRR or MLRA): LRRS Lat: 39.844917 Long: -75.419534 Datum: NAD 83

Soil Map Unit Name: Made land, silt and clay materials, Wehadkee silt loam NWI classification: None

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

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

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

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

Remarks:
Cowardin Code: PEM
HGM: Depressional
WT: Isolate

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present?	Yes ✔	No _____	Depth (inches): 2"
Water Table Present?	Yes ✔	No _____	Depth (inches): 0"
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0"

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-I3

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum (Plot size: 15')			
1. Salix nigra	20	✔	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	20 = Total Cover		
50% of total cover: 10	20% of total cover: 4		
Herb Stratum (Plot size: 5')			
1. Typha latifolia	30	✔	OBL
2. Phragmites australis	20	✔	FACW
3. Juncus effusus	15	✔	FACW
4. Cyperus esculentus	5		FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	70 = Total Cover		
50% of total cover: 35	20% of total cover: 14		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

✔ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ✔ No ___

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

SOIL Sampling Point: W-I3

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6"	2.5Y 5/1	80	7.5YR 4/6	20	C	M	GRSIL	
6-12"	10YR 5/1	70	7.5YR 4/6	30	C	M	GRCL	

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ No ____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Delaware Sampling Date: 03/25/2014

Applicant/Owner: Sunoco State: PA Sampling Point: W-I4

Investigator(s): J. McGuirk, D. Quinn Section, Township, Range: Upper Chichester

Landform (hillslope, terrace, etc.): Valley bottom Local relief (concave, convex, none): Concave Slope (%): 1-3

Subregion (LRR or MLRA): LRRS Lat: 39.845552 Long: -75.419078 Datum: NAD 83

Soil Map Unit Name: Made land, silt and clay materials NWI classification: None

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

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

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

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

Remarks:
Cowardin Code: PEM
HGM: Depressional
WT: Isolate

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present?	Yes ✔	No _____	Depth (inches): 2"
Water Table Present?	Yes ✔	No _____	Depth (inches): 0"
Saturation Present? (includes capillary fringe)	Yes ✔	No _____	Depth (inches): 0"

Wetland Hydrology Present? Yes ✔ No _____

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-I4

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 5')			
1. Phragmites australis	40	✔	FACW
2. Juncus effusus	25	✔	FACW
3. Typha latifolia	15		OBL
4. Cyperus esculentus	10		FACW
5. Juncus tenuis	10		FAC
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
50% of total cover: 50	20% of total cover: 20		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

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% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

✔ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ✔ No ___

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

SOIL Sampling Point: W-I4

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8"	2.5Y 4/2	70	7.5YR 4/6	30	C	M	CL	
8+"								Refusal - coarse fragments

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: coarse fragments

Depth (inches): 8+"

Hydric Soil Present? Yes ✔ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Delaware Sampling Date: 03/24/2014

Applicant/Owner: Sunoco State: PA Sampling Point: W-I3, W-I4 UPL

Investigator(s): J. McGuirk, D. Quinn Section, Township, Range: Upper Chichester

Landform (hillslope, terrace, etc.): Valley bottom Local relief (concave, convex, none): Linear Slope (%): 1-3

Subregion (LRR or MLRA): LRRS Lat: 39.844986 Long: -75.419263 Datum: NAD 83

Soil Map Unit Name: Made land, silt and clay materials NWI classification: None

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

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

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

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

Remarks:
Upland, industrial yard

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Wetland Hydrology Present? Yes _____ No ✔

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

Remarks:

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W-I3, W-I4 UPL

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Herb Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total cover: 0	20% of total cover: 0		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
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:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ___ No ✔

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

No veg - Industrial yard

SOIL

Sampling Point: W-I3, W-I4 UPL

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2"	10YR 4/4	100					GRSIL	
2+"								Refusal

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: Refusal coarse fragments

Depth (inches): 2+"

Hydric Soil Present? Yes _____ No ✔

Remarks:

APPENDIX B
WETLAND PHOTOGRAPHS

Photograph Number:	1	**Feature Name:**	W-Q67	**Date:**	06/25/2015
Direction:	SE	**Plant Community:**	PEM	**Remarks:**	N/A

Photograph Number:	2	**Feature Name:**	W-DS4	**Date:**	06/15/2015
Direction:	S	**Plant Community:**	PEM	**Remarks:**	N/A

Photograph Number:	3	**Feature Name:**	W-BB161	**Date:**	07/23/2015
Direction:	E	**Plant Community:**	PEM	**Remarks:**	N/A

Photograph Number:	4	**Feature Name:**	W-BB162	**Date:**	07/23/2015
Direction:	SW	**Plant Community:**	PEM	**Remarks:**	N/A

Photograph Number:	5	**Feature Name:**	W-BB163	**Date:**	07/23/2015
Direction:	SW	**Plant Community:**	PEM	**Remarks:**	N/A

Photograph Number:	6	**Feature Name:**	W-BB164	**Date:**	07/23/2015
Direction:	NE	**Plant Community:**	PEM	**Remarks:**	N/A

Photograph Number:	7	**Feature Name:**	W-BB165	**Date:**	07/23/2015
Direction:	E	**Plant Community:**	PEM	**Remarks:**	N/A

Photograph Number:	8	**Feature Name:**	W-BB166	**Date:**	07/23/2015
Direction:	NE	**Plant Community:**	PEM	**Remarks:**	N/A

Photograph Number:	9	**Feature Name:**	W-I3	**Date:**	03/25/2014
Direction:	S	**Plant Community:**	PEM	**Remarks:**	N/A

Photograph Number:	10	**Feature Name:**	W-I4	**Date:**	03/25/2014
Direction:	N	**Plant Community:**	PEM	**Remarks:**	N/A

Photograph Number:	Not available	**Feature Name:**	W-4	**Date:**	2013
Direction:	N/A	**Plant Community:**	PEM	**Remarks:**	N/A

APPENDIX C
STREAM DATA SHEET

Tetra Tech Stream Data Sheet

Surveyors: Logan Zugay & Shelly and Loy Date: 7-22-15 Resource ID Number: S-BB122
Project: PPP State: PA County: Dauphin
Photo Number (s): _____ Canopy Cover: 90 %

Flow Direction: NE to SW **Bank Width:** 5-9 feet **Water Width:** 3-5 feet
High Water Depth: 36" **Water Depth:** 1-5 inches **Turbidity:** N/A

Flow Regime: [X] Perennial [ ] Intermittent [ ] Ephemeral [ ] Flowing Ditch [ ] Dry/Stagnant Ditch

Sinuosity:
[ ] Low
[X] Medium
[ ] High

Features:
[X] Riffles [X] Sand/Mud Bar [X] Run/Glide
[X] Pools [X] Gravel Bar [ ] Braided
[ ] Rapids [ ] Aquatic Vegetation [ ] Other _____

Substrate:
[ ] Bedrock ___%
[ ] Boulder ___%
[X] Cobble/Gravel 30%
[X] Sand 30%
[X] Silt/Clay 40%
[ ] Organic ___%

Bank Substrate:
Height: Left 6-48" Right 6-48"

	Left	Right
[ ] Bedrock	[ ]	
[ ] Boulder	[ ]	
[ ] Gravel	[ ]	
[X] Sand	[X]	
[X] Silt/Clay	[X]	
[X] Organic	[X]	

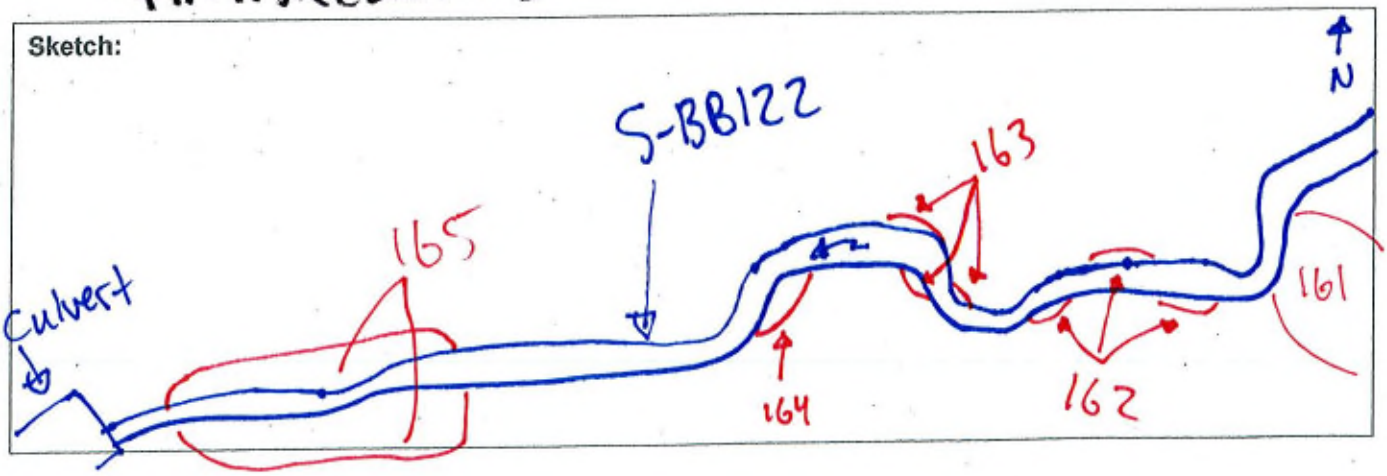
Floodplain Width:

	Left	Right
[ ]	<10 feet	[ ]
[X]	<25 feet	[X]
[ ]	<50 feet	[ ]
[ ]	<100 feet	[ ]
[ ]	>100 feet	[ ]

Dominant Vegetation:
[X] Forested Species: Red maple, Ash sp., Black Walnut, Am. Beech, Box elder
[X] Shrub Species: Multiflora rose, Tartarian honeysuckle, Raspberry sp.
[X] Herbaceous Species: Garlic Mustard, Goldenrod sp., JW, Clearweed, S. Rush, Dark green bulrush

Wildlife Observed/Notes:
- green frog
- finfish (Darters)

Sketch:



APPENDIX D
STREAM PHOTOGRAPH

Photograph Number:	11	**Feature Name:**	S-BB122	**Date:**	07/22/2015
Direction:	SW, Downstream	**Flow Regime:**	Perennial	**Remarks:**	N/A

APPENDIX E
HYDRIC SOILS LISTS

Hydric Soils List
Greene and Washington Counties, Pennsylvania

Map Unit Symbol	Map Unit Name	Component Name and Phase	Landforms
Du	Dumps, mine	Wet spots	depressions
Fa	Fluvaquents, loamy	Melvin	flood plains
GdA	Glenford silt loam, 0 to 3 percent slopes	Purdy	terraces
GdB	Glenford silt loam, 3 to 8 percent slopes	Purdy	terraces
GdC	Glenford silt loam, 8 to 15 percent slopes	Purdy	terraces
Hu	Huntington silt loam	Atkins	flood plains
LbA	Library silty clay loam, 0 to 3 percent slopes	Purdy	terraces
Nw	Newark silt loam	Atkins, Brinkerton	flood plains, depressions
Py	Purdy silt loam	Purdy	terraces
Sk	Skidmore gravelly loam	Melvin	flood plains
UdB	Udorthents, smoothed, gently sloping	Wet spots	depressions
UdD	Udorthents, smoothed, moderately steep	Wet spots	depressions
Modified from Hydric Soils of the United States (NRCS 2014)			

Hydric Soils List
Westmoreland County, Pennsylvania

Map Unit Symbol	Map Unit Name	Component Name and Phase	Component Percent	Landforms
AlB	Albrights silt loam, 0 to 8 percent slopes, very stony	Brinkerton	5	draws
AlD	Albrights silt loam, 8 to 25 percent slopes, very stony	Brinkerton	5	hills
At	Atkins silt loam, 0 to 3 percent slopes, frequently flooded	Atkins	85	flood plains
BeB	Bethesda very channery silt loam, 0 to 8 percent slopes	Wet spots	1	depressions
BeD	Bethesda very channery silt loam, 8 to 25 percent slopes	Wet spots	1	depressions
BkA	Brinkerton silt loam, 0 to 3 percent slopes	Brinkerton	85	draws
BkB	Brinkerton silt loam, 3 to 8 percent slopes	Brinkerton	80	hills
BuB	Buchanan loam, 0 to 8 percent slopes, extremely stony	Andover	5	mountain slopes
CaB	Cavode silt loam, 3 to 8 percent slopes	Brinkerton	5	hills
CaC	Cavode silt loam, 8 to 15 percent slopes	Brinkerton	5	hills
CeB	Cavode silt loam, 0 to 8 percent slopes, very stony	Brinkerton	5	draws
CeD	Cavode silt loam, 8 to 25 percent slopes, very stony	Brinkerton	5	draws

CoB	Cookport loam, 0 to 8 percent slopes, very stony	Nolo	5	depressions
CrB	Craigsville-Buchanan complex, 0 to 8 percent slopes, extremely stony	Andover	2	mountain slopes
ErB	Ernest silt loam, 3 to 8 percent slopes	Brinkerton	5	hills
ErC	Ernest silt loam, 8 to 15 percent slopes	Brinkerton	5	draws
FaB	Fairpoint very channery silt loam, 0 to 8 percent slopes	Wet spots	1	depressions
FaC	Fairpoint very channery silt loam, 8 to 15 percent slopes	Wet spots	1	depressions
FaD	Fairpoint very channery silt loam, 15 to 25 percent slopes	Wet spots	1	depressions
GxA	Ginat silt loam, 0 to 2 percent slopes	Ginat	70	terraces
Ho	Holly silt loam, 0 to 2 percent slopes	Holly	75	flood plains
Ln	Lindside silt loam, 0 to 2 percent slopes	Melvin	5	flood plains
Lo	Lobdell silt loam, 0 to 2 percent slopes	Holly	5	flood plains
Mn	Melvin and Newark silt loams, 0 to 2 percent slopes	Melvin	45	flood plains
MoA	Monongahela silt loam, 0 to 3 percent slopes	Purdy	5	terraces
MoB	Monongahela silt loam, 3 to 8 percent slopes	Purdy	5	terraces
MoC	Monongahela silt loam, 8 to 15 percent slopes	Purdy	5	terraces
NoB	Nolo loam, 0 to 8 percent slopes, very stony	Nolo	80	depressions
Pa	Palms muck, 0 to 3 percent slopes	Palms	90	depressions

Pa	Palms muck, 0 to 3 percent slopes	Nolo	5	depressions
Ph	Philo loam, 0 to 2 percent slopes	Atkins	5	flood plains
Pu	Purdy silt loam, 0 to 2 percent slopes	Purdy	75	terraces
ThA	Thorndale silt loam, 0 to 3 percent slopes	Thorndale	90	depressions
ThB	Thorndale silt loam, 3 to 8 percent slopes	Thorndale	90	drainageways
TyA	Tyler silt loam, 0 to 2 percent slopes	Purdy	5	terraces
WeA	Weinbach silt loam, 0 to 2 percent slopes	Ginat	5	terraces
WrB	Wharton silt loam, 3 to 8 percent slopes	Cavode	8	hills
WrB	Wharton silt loam, 3 to 8 percent slopes	Brinkerton	5	depressions
WsB	Wharton silt loam, 0 to 8 percent slopes, very stony	Brinkerton	5	draws
WsD	Wharton silt loam, 8 to 25 percent slopes, very stony	Brinkerton	5	draws
Modified from Hydric Soils of the United States (NRCS 2014)				

Hydric Soils List
Cambria County, Pennsylvania

Map Unit Symbol	Map Unit Name	Component Name and Phase	Component Percent	Landforms
AbB	Albrights silt loam, 3 to 8 percent slopes	Brinkerton	5	hillslopes
AbC	Albrights silt loam, 8 to 15 percent slopes	Brinkerton	5	hillslopes
AmB	Armagh silt loam, 0 to 8 percent slopes	Armagh	85	depressions
AmB	Armagh silt loam, 0 to 8 percent slopes	Armagh, very stony	5	depressions
At	Atkins silt loam, 0 to 3 percent slopes, frequently flooded	Atkins	85	flood plains
BmB	Blairton silt loam, 3 to 8 percent slopes	Brinkerton	5	hills
BmC	Blairton silt loam, 8 to 15 percent slopes	Brinkerton	5	hills
BnB	Blairton very stony silt loam, 3 to 8 percent slopes	Brinkerton	85	depressions
BpC	Blairton-Berks channery silt loams, 8 to 15 percent slopes	Brinkerton	5	depressions
BtB	Brinkerton soils, 3 to 8 percent slopes	Brinkerton, wooded	66	hillslopes
BtB	Brinkerton soils, 3 to 8 percent slopes	Brinkerton, nonwooded	19	hillslopes
BvB	Brinkerton very stony silt loam, 0 to 8 percent slopes	Brinkerton	90	hills

CaA	Cavode silt loam, 0 to 3 percent slopes	Brinkerton	5	hills
CaB	Cavode silt loam, 3 to 8 percent slopes	Brinkerton	5	hills
CaC	Cavode silt loam, 8 to 15 percent slopes	Brinkerton	5	draws
CbB	Cavode very stony silt loam, 0 to 8 percent slopes	Brinkerton	5	draws
CeA	Cookport and Ernest soils, 0 to 3 percent slopes	Brinkerton	10	depressions
CeB	Cookport and Ernest soils, 3 to 8 percent slopes	Brinkerton	10	depressions
CeC	Cookport and Ernest soils, 8 to 15 percent slopes	Brinkerton	5	depressions
CeD	Cookport and Ernest soils, 15 to 25 percent slopes	Brinkerton	5	depressions
CvB	Cookport and Ernest very stony soils, 0 to 8 percent slopes	Brinkerton	10	depressions
CvD	Cookport and Ernest very stony soils, 8 to 25 percent slopes	Brinkerton	5	depressions
Dp	Dumps, industrial wastes	Wet spots	1	depressions
Du	Dumps, mine	Wet spots	1	depressions
LtB	Leetonia very stony loamy sand, 3 to 8 percent slopes	Nolo	2	depressions
NoB	Nolo very stony sandy loam, 0 to 8 percent slopes	Nolo	90	depressions
Ph	Philo silt loam, 0 to 3 percent slopes, occasionally flooded	Atkins	10	flood plains
Po	Pope silt loam	Atkins	6	flood plains
UDC	Udorthents, strip mine, sloping	Wet spots	1	depressions

URB	Urban land-Udorthents complex, gently sloping	Wet spots	1	depressions
URC	Urban land-Udorthents complex, sloping	Wet spots	1	depressions
WaB	Wharton silt loam, 3 to 8 percent slopes	Brinkerton	2	sloughs
WaC	Wharton silt loam, 8 to 15 percent slopes	Brinkerton	2	hills
Modified from Hydric Soils of the United States (NRCS 2014)				

Hydric Soils List
Perry County, Pennsylvania

Map Unit Symbol	Map Unit Name	Component Name and Phase	Component Percent	Landforms
AbB	Albrights silt loam, 3 to 8 percent slopes	Shelmadine	5	drainageways
AbC	Albrights silt loam, 8 to 15 percent slopes	Brinkerton	5	hills
AnB	Andover gravelly loam, 0 to 8 percent slopes	Andover	90	mountain slopes
AoB	Andover very stony loam, 0 to 8 percent slopes	Andover, very stony	90	mountain slopes
Aw	Atkins silt loam	Atkins	85	flood plains
Aw	Atkins silt loam	Muck	2	depressions
Bb	Barbour soils	Atkins	5	flood plains
Bc	Basher soils	Holly	5	flood plains
BpB	Blairton silt loam, 3 to 8 percent slopes	Brinkerton	5	hills
BrA	Brinkerton silt loam, 0 to 3 percent slopes	Brinkerton	80	depressions
BrA	Brinkerton silt loam, 0 to 3 percent slopes	Atkins	6	flood plains
BrB	Brinkerton silt loam, 3 to 8 percent slopes	Brinkerton	75	depressions

BrB	Brinkerton silt loam, 3 to 8 percent slopes	Atkins	3	flood plains
BuB	Buchanan gravelly loam, 3 to 8 percent slopes	Andover	10	depressions
BuC	Buchanan gravelly loam, 8 to 15 percent slopes	Shelmadine	5	drainageways
BxB	Buchanan very stony loam, 0 to 8 percent slopes	Andover, very stony	10	mountain slopes
BxC	Buchanan very stony loam, 8 to 25 percent slopes	Andover	5	mountain slopes
EtB	Ernest silt loam, 3 to 8 percent slopes	Brinkerton	5	depressions
EtB	Ernest silt loam, 3 to 8 percent slopes	Atkins	2	flood plains
EtC	Ernest silt loam, 8 to 15 percent slopes	Brinkerton	5	depressions
EvA	Evendale cherty silt loam, 0 to 3 percent slopes	Brinkerton, poorly drained areas	15	hills
EvB	Evendale cherty silt loam, 3 to 8 percent slopes	Shelmadine	10	drainageways
HuA	Huntington silt loam, 0 to 5 percent slopes	Atkins	5	flood plains
KnB	Klinesville very shaly silt loam, 3 to 8 percent slopes	Croton	1	depressions
KnC	Klinesville very shaly silt loam, 8 to 15 percent slopes	Croton	1	depressions
KnD	Klinesville very shaly silt loam, 15 to 25 percent slopes	Croton	1	depressions
KrA	Kreamer cherty silt loam, 0 to 3 percent slopes	Thorndale	10	draws
KrB	Kreamer cherty silt loam, 3 to 8 percent slopes	Shelmadine	5	drainageways
KrC	Kreamer cherty silt loam, 8 to 15 percent slopes	Shelmadine	3	drainageways

Ls	Lindside silt loam	Melvin	5	flood plains
Me	Melvin silt loam	Melvin	85	flood plains
Mf	Middlebury soils	Holly	5	flood plains
MnA	Monongahela silt loam, 0 to 3 percent slopes	Holly	5	flood plains
MnB	Monongahela silt loam, 3 to 8 percent slopes	Holly	3	flood plains
MnC	Monongahela silt loam, 8 to 15 percent slopes	Purdy	2	depressions
MuA	Murrill channery loam, 0 to 3 percent slopes	Andover	3	depressions
MuB	Murrill channery loam, 3 to 8 percent slopes	Andover	3	depressions
MuC	Murrill channery loam, 8 to 15 percent slopes	Andover	2	depressions
Pe	Penlaw silt loam	Melvin	5	flood plains
Pt	Pits and quarries	Ponded areas	1	depressions
Pu	Purdy silt loam	Purdy	85	terraces
RaA	Raritan silt loam, 0 to 5 percent slopes	Lamington	5	terraces
Tg	Tioga soils	Atkins	5	flood plains
Ty	Tyler silt loam	Purdy	5	depressions
Modified from Hydric Soils of the United States (NRCS 2014)				

Hydric Soils List
Dauphin County, Pennsylvania

Map Unit Symbol	Map Unit Name	Component Name and Phase	Component Percent	Landforms
AbA	Albrights silt loam, 0 to 3 percent slopes	Andover	5	depressions
AbB2	Albrights silt loam, 3 to 10 percent slopes, moderately eroded	Andover	5	depressions
AbgB	Albrights silt loam, 3 to 8 percent slopes	Shelmadine	5	drainageways
AnB	Andover gravelly loam, 3 to 8 percent slopes	Andover	75	depressions
AnB	Andover gravelly loam, 3 to 8 percent slopes	Atkins	3	flood plains
AnB	Andover gravelly loam, 3 to 8 percent slopes	Swampy areas	3	depressions
AoB	Andover very stony loam, 0 to 8 percent slopes	Andover, very stony	90	mountain slopes
AogB	Andover gravelly loam, 0 to 8 percent slopes, extremely stony	Andover, extremely stony	85	depressions
AogB	Andover gravelly loam, 0 to 8 percent slopes, extremely stony	Andover, nonstony	4	depressions
At	Atkins silt loam	Atkins	85	flood plains
At	Atkins silt loam	Muck	2	depressions
Bb	Barbour silt loam	Atkins	7	flood plains

Bc	Basher silt loam	Atkins	7	flood plains
BrgA	Brinkerton silt loam, 0 to 3 percent slopes	Brinkerton	80	depressions
BrgA	Brinkerton silt loam, 0 to 3 percent slopes	Atkins	6	flood plains
BtA	Brinkerton and Armagh silt loams, 0 to 3 percent slopes	Brinkerton	45	depressions
BtA	Brinkerton and Armagh silt loams, 0 to 3 percent slopes	Armagh	45	depressions
BtB2	Brinkerton and Armagh silt loams, 3 to 8 percent slopes, moderately eroded	Brinkerton	45	depressions
BtB2	Brinkerton and Armagh silt loams, 3 to 8 percent slopes, moderately eroded	Armagh	45	depressions
BuB	Buchanan gravelly loam, 3 to 8 percent slopes	Andover	10	depressions
BvB	Buchanan very stony loam, 0 to 8 percent slopes	Andover, very stony	10	mountain slopes
BxgB	Buchanan gravelly loam, 0 to 8 percent slopes, extremely stony	Andover, extremely stony	5	depressions
BxgD	Buchanan gravelly loam, 8 to 25 percent slopes, extremely stony	Andover, extremely stony	10	depressions
CkC2	Calvin-Klinesville shaly silt loams, 8 to 15 percent slopes, moderately eroded	Brinkerton	5	depressions
CkD2	Calvin-Klinesville shaly silt loams, 15 to 25 percent slopes, moderately eroded	Brinkerton	5	depressions
CkgD	Calvin-Klinesville channery silt loams, 15 to 25 percent slopes	Brinkerton	5	depressions
CoB2	Comly silt loam, 2 to 8 percent slopes, moderately eroded	Brinkerton	5	depressions
Cr	Croton silt loam	Croton	90	depressions
DP	Dump	Andover	1	depressions

DuB2	Duffield silt loam, 3 to 8 percent slopes, moderately eroded	Thorndale	2	depressions
HugB	Hustontown silt loam, 3 to 8 percent slopes	Brinkerton	2	depressions
HvgB	Hustontown silt loam, 0 to 8 percent slopes, very stony	Brinkerton soils	2	depressions
KaB2	Klinesville shaly silt loam, 3 to 8 percent slopes, moderately eroded	Brinkerton	2	hills
KaC2	Klinesville shaly silt loam, 8 to 15 percent slopes, moderately eroded	Brinkerton	2	hills
LdgF	Laidig gravelly loam, 25 to 60 percent slopes, extremely stony	Andover, extremely stony	5	depressions
LhB2	Lehigh silt loam, 3 to 8 percent slopes, moderately eroded	Croton	8	depressions
Lt	Lindside silt loam	Melvin	5	flood plains
Lw	Lindside silt loam, coal overwash	Atkins	5	flood plains
Ma	Made land, sanitary fill	Croton	2	depressions
MfgF	Meckesville gravelly loam, 25 to 35 percent slopes, extremely stony	Andover	1	depressions
Mu	Muck	Muck	85	swamps
Mu	Muck	Andover	8	depressions
PeB2	Penn shaly silt loam, 3 to 8 percent slopes, moderately eroded	Croton	3	depressions
PeC2	Penn shaly silt loam, 8 to 15 percent slopes, moderately eroded	Croton	3	depressions
Ph	Philo silt loam	Atkins	10	flood plains
RdB2	Readington silt loam, 3 to 8 percent slopes, moderately eroded	Croton	6	depressions

St	Strip mine spoil	Brinkerton	3	depressions
UdgB	Udorthents, shale and sandstone, 0 to 8 percent slopes	Croton	1	depressions
UdgD	Udorthents, shale and sandstone, 8 to 25 percent slopes	Croton	5	depressions
Wa	Watchung silt loam	Watchung, silt loam	86	depressions
Wa	Watchung silt loam	Towhee	9	depressions
Wc	Watchung very stony silt loam	Watchung, extremely stony	90	depressions
WeC2	Weikert shaly silt loam, 5 to 15 percent slopes, moderately eroded	Markes	5	depressions
Modified from Hydric Soils of the United States (NRCS 2014)				

Hydric Soils List
Berks County, Pennsylvania

Map Unit Symbol	Map Unit Name	Component Name and Phase	Component Percent	Landforms
AbA	Abbottstown silt loam, 0 to 3 percent slopes	Croton	5	depressions
AbB	Abbottstown silt loam, 3 to 8 percent slopes	Croton	5	depressions
AnA	Andover-Buchanan gravelly loams, 0 to 3 percent slopes	Andover	55	hillslopes
AnB	Andover-Buchanan gravelly loams, 3 to 8 percent slopes	Andover	55	hillslopes
AoB	Andover-Buchanan gravelly loams, 0 to 8 percent slopes, extremely stony	Andover, extremely stony	55	hillslopes
BfB	Bedington-Berks complex, 3 to 8 percent slopes	Brinkerton	3	depressions
BfC	Bedington-Berks complex, 8 to 15 percent slopes	Brinkerton	3	depressions
BkA	Berks-Weikert complex, 0 to 3 percent slopes	Brinkerton	3	depressions
BkB	Berks-Weikert complex, 3 to 8 percent slopes	Brinkerton	3	depressions
BkC	Berks-Weikert complex, 8 to 15 percent slopes	Brinkerton	3	depressions
BkD	Berks-Weikert complex, 15 to 25 percent slopes	Brinkerton	3	depressions
BkF	Berks-Weikert complex, 25 to 60 percent slopes	Brinkerton	2	depressions

BmA	Birdsboro silt loam, 0 to 3 percent slopes	Lamington	3	terraces
BmB	Birdsboro silt loam, 3 to 8 percent slopes	Lamington	3	terraces
Bo	Bowmansville-Knauers silt loams	Knauers	40	flood plains
BtA	Brinkerton-Comly silt loams, 0 to 3 percent slopes	Brinkerton	75	hills
BtB	Brinkerton-Comly silt loams, 3 to 8 percent slopes	Brinkerton	75	hills
BuB	Buchanan gravelly loam, 3 to 8 percent slopes	Andover	10	depressions
BvB	Buchanan gravelly loam, 0 to 8 percent slopes, extremely stony	Andover, extremely stony	5	depressions
BvD	Buchanan gravelly loam, 8 to 25 percent slopes, extremely stony	Andover, extremely stony	10	depressions
CaB	Calvin-Klinesville channery silt loams, 3 to 8 percent slopes	Brinkerton	5	depressions
CaC	Calvin-Klinesville channery silt loams, 8 to 15 percent slopes	Brinkerton	5	depressions
CaD	Calvin-Klinesville channery silt loams, 15 to 25 percent slopes	Brinkerton	5	depressions
CmA	Clarksburg silt loam, 0 to 3 percent slopes	Thorndale	5	depressions
CmB	Clarksburg silt loam, 3 to 8 percent slopes	Thorndale	5	depressions
CpA	Comly silt loam, 0 to 3 percent slopes	Brinkerton	5	depressions
CpB	Comly silt loam, 3 to 8 percent slopes	Brinkerton	5	depressions
CwA	Croton silt loam, 0 to 3 percent slopes	Croton	90	depressions
CwB	Croton silt loam, 3 to 8 percent slopes	Croton	90	depressions

DbA	Duffield silt loam, 0 to 3 percent slopes	Thorndale	2	depressions
DbB	Duffield silt loam, 3 to 8 percent slopes	Thorndale	2	depressions
DfC	Duffield-Ryder silt loams, 8 to 15 percent slopes	Thorndale	3	depressions
DfD	Duffield-Ryder silt loams, 15 to 25 percent slopes	Thorndale	3	depressions
EdB	Edgemont channery sandy loam, 0 to 8 percent slopes, extremely stony	Andover, extremely stony	2	drainageways
EdD	Edgemont channery sandy loam, 8 to 25 percent slopes, extremely stony	Andover, extremely stony	3	drainageways
EdF	Edgemont channery sandy loam, 25 to 60 percent slopes, extremely stony	Andover, extremely stony	3	drainageways
EhB	Edgemont channery loam, 3 to 8 percent slopes	Andover	3	drainageways
EhC	Edgemont channery loam, 8 to 15 percent slopes	Andover	3	drainageways
EhD	Edgemont channery loam, 15 to 25 percent slopes	Andover	3	drainageways
Gc	Gibraltar silt loam	Holly	5	flood plains
GeB	Gladstone gravelly loam, 3 to 8 percent slopes	Cokesbury	3	depressions
GeC	Gladstone gravelly loam, 8 to 15 percent slopes	Cokesbury	5	depressions
GeD	Gladstone gravelly loam, 15 to 25 percent slopes	Cokesbury	5	depressions
GfB	Gladstone gravelly loam, 0 to 8 percent slopes, very bouldery	Cokesbury	5	depressions
GfD	Gladstone gravelly loam, 8 to 25 percent slopes, very bouldery	Cokesbury	5	depressions
GfF	Gladstone gravelly loam, 25 to 55 percent slopes, very bouldery	Cokesbury	5	depressions

GnA	Glenville silt loam, 0 to 3 percent slopes	Baile	5	depressions
GnB	Glenville silt loam, 3 to 8 percent slopes	Baile	5	depressions
HaB	Hagerstown-Duffield silt loams, 3 to 8 percent slopes	Thorndale	2	depressions
Ho	Holly silt loam	Holly	94	flood plains
Ho	Holly silt loam	Brinkerton	2	depressions
JnB	Joanna loam, 3 to 8 percent slopes	Croton	5	depressions
JnC	Joanna loam, 8 to 15 percent slopes	Croton	5	depressions
JnD	Joanna loam, 15 to 25 percent slopes	Croton	5	depressions
JnE	Joanna loam, 25 to 35 percent slopes	Croton	5	depressions
JpB	Joanna loam, 0 to 8 percent slopes, extremely stony	Croton	4	depressions
JpD	Joanna loam, 8 to 25 percent slopes, extremely stony	Croton	2	depressions
JpF	Joanna loam, 25 to 60 percent slopes, extremely stony	Croton	2	depressions
KlF	Klinesville-Calvin channery silt loams, 25 to 60 percent slopes	Brinkerton	5	depressions
LbB	Laidig very gravelly loam, 0 to 8 percent slopes, extremely stony	Andover	4	hillslopes
LbD	Laidig very gravelly loam, 8 to 25 percent slopes, extremely stony	Andover, extremely stony	4	hillslopes
LbF	Laidig very gravelly loam, 25 to 55 percent slopes, extremely stony	Andover, extremely stony	5	hillslopes
LdF	Laidig-Rubble land complex, 25 to 55 percent slopes	Andover	5	hillslopes

LfA	Lamington silt loam, 0 to 3 percent slopes	Lamington	85	terraces
LmA	Lehigh silt loam, 0 to 3 percent slopes	Croton	8	depressions
LmB	Lehigh silt loam, 3 to 8 percent slopes	Croton	8	depressions
Lv	Linden loam	Holly	3	flood plains
Me	Middlebury silt loam	Holly	5	flood plains
MgB	Monongahela silt loam, 3 to 8 percent slopes	Lamington	5	terraces
MlB	Mount Lucas silt loam, 3 to 8 percent slopes	Towhee	6	depressions
MmB	Mount Lucas silt loam, 0 to 8 percent slopes, extremely stony	Towhee, extremely stony	9	depressions
MuB	Murrill gravelly loam, 3 to 8 percent slopes	Thorndale	2	depressions
MuC	Murrill gravelly loam, 8 to 15 percent slopes	Thorndale	2	depressions
NaB	Neshaminy silt loam, 3 to 8 percent slopes	Towhee	3	depressions
NaC	Neshaminy silt loam, 8 to 15 percent slopes	Towhee	5	depressions
NaD	Neshaminy silt loam, 15 to 25 percent slopes	Towhee	5	depressions
NhB	Neshaminy gravelly silt loam, 0 to 8 percent slopes, extremely bouldery	Towhee, extremely stony	5	depressions
NhD	Neshaminy gravelly silt loam, 8 to 25 percent slopes, extremely bouldery	Towhee, extremely stony	3	depressions
NhF	Neshaminy gravelly silt loam, 25 to 60 percent slopes, extremely bouldery	Towhee, extremely stony	3	depressions
PeB	Penn channery silt loam, 3 to 8 percent slopes	Croton	3	depressions

PeC	Penn channery silt loam, 8 to 15 percent slopes	Croton	3	depressions
PeD	Penn channery silt loam, 15 to 25 percent slopes	Croton	3	depressions
PkC	Penn-Klinesville channery silt loams, 8 to 15 percent slopes	Croton	2	depressions
PkD	Penn-Klinesville channery silt loams, 15 to 25 percent slopes	Croton	5	depressions
RaB	Raritan silt loam, 3 to 8 percent slopes	Knauers	2	flood plains
ReA	Readington silt loam, 0 to 3 percent slopes	Croton	3	depressions
ReB	Readington silt loam, 3 to 8 percent slopes	Croton	6	depressions
RhA	Reaville silt loam, 0 to 3 percent slopes	Croton	6	depressions
RhB	Reaville silt loam, 3 to 8 percent slopes	Croton	2	depressions
Ro	Rowland silt loam	Knauers	8	flood plains
ThA	Thorndale-Penlaw silt loams, 0 to 3 percent slopes	Thorndale	55	depressions
ToA	Towhee silt loam, 0 to 3 percent slopes	Towhee	96	depressions
ToB	Towhee silt loam, 3 to 8 percent slopes	Towhee	88	depressions
ToB	Towhee silt loam, 3 to 8 percent slopes	Watchung, silt loam	2	depressions
TwB	Towhee silt loam, 0 to 8 percent slopes, very stony	Towhee, very stony	90	depressions
Udp	Udorthents, sanitary landfill	Croton	2	depressions
UkB	Urban land-Berks complex, 0 to 8 percent slopes	Brinkerton	5	depressions

UkD	Urban land-Berks complex, 8 to 25 percent slopes	Brinkerton	5	depressions
UmB	Urban land-Duffield complex, 0 to 8 percent slopes	Thorndale	2	depressions
UmD	Urban land-Duffield complex, 8 to 25 percent slopes	Thorndale	2	depressions
UnB	Urban land-Gladstone complex, 0 to 8 percent slopes	Cokesbury	5	depressions
UnD	Urban land-Gladstone complex, 8 to 25 percent slopes	Cokesbury	5	depressions
UpB	Urban land-Joanna complex, 0 to 8 percent slopes	Croton	4	depressions
UpD	Urban land-Joanna complex, 8 to 25 percent slopes	Croton	4	depressions
UsB	Urban land-Laidig complex, 0 to 8 percent slopes	Andover	5	hillslopes
UsD	Urban land-Laidig complex, 8 to 25 percent slopes	Andover	5	hillslopes
UxB	Urban land-Penn complex, 0 to 8 percent slopes	Croton	4	depressions
UxD	Urban land-Penn complex, 8 to 25 percent slopes	Croton	4	depressions
WeB	Weikert-Berks complex, 3 to 8 percent slopes	Brinkerton	5	depressions
WeD	Weikert-Berks complex, 15 to 25 percent slopes	Brinkerton	5	depressions
Modified from Hydric Soils of the United States (NRCS 2014)				

Hydric Soils List
Delaware County, Pennsylvania

Map Unit Symbol	Map Unit Name	Component Name and Phase	Component Percent	Landforms
AgB2	Aldino silt loam, 3 to 8 percent slopes, moderately eroded	Calvert	7	valleys
BeA	Beltsville silt loam, 0 to 3 percent slopes	Othello	5	terraces
BeB2	Beltsville silt loam, 3 to 8 percent slopes, moderately eroded	Othello	5	terraces
ByA	Butlertown silt loam, 0 to 3 percent slopes	Othello	5	terraces
ByB2	Butlertown silt loam, 3 to 8 percent slopes, moderately eroded	Othello	5	terraces
CaA	Calvert silt loam, 0 to 3 percent slopes	Calvert	85	depressions
CaB	Calvert silt loam, 3 to 8 percent slopes	Calvert	85	valleys
CaB2	Calvert silt loam, 3 to 8 percent slopes, moderately eroded	Calvert	100	valleys
CaaA	Califon loam, 0 to 3 percent slopes	Holly	4	flood plains
CaaA	Califon loam, 0 to 3 percent slopes	Baile	3	depressions
CaaA	Califon loam, 0 to 3 percent slopes	Fluvaquents	3	flood plains
Ch	Chewacla silt loam	Wehadkee	5	flood plains
Cm	Codorus silt loam	Hatboro	8	flood plains

Cm	Codorus silt loam	Baile	3	depressions
Cn	Congaree silt loam	Holly	8	flood plains
GdB	Gladstone gravelly loam, 3 to 8 percent slopes	Cokesbury	3	depressions
GdC	Gladstone gravelly loam, 8 to 15 percent slopes	Cokesbury	5	depressions
GnA	Glenville silt loam 0 to 3 percent slopes	Baile	5	depressions
GnB	Glenville silt loam, 3 to 8 percent slopes	Baile	5	depressions
GnB2	Glenville silt loam, 3 to 8 percent slopes, moderately eroded	Worsham	7	depressions
Ha	Hatboro silt loam	Hatboro	95	flood plains
Ma	Made land, gravelly materials	Croton	1	depressions
Me	Made land, schist and gneiss materials	Hatboro	1	flood plains
Mf	Made land, sanitary land fill	Croton	2	depressions
MgB2	Manor loam, 3 to 8 percent slopes, moderately eroded	Hatboro	2	flood plains
MgC	Manor loam, 8 to 15 percent slopes	Hatboro	2	flood plains
Mn	Melvin silt loam	Melvin	85	flood plains
MoB2	Montalto channery silt loam, 3 to 8 percent slopes, moderately eroded	Watchung	5	depressions
NaD	Neshaminy gravelly silt loam, 15 to 25 percent slopes	Towhee	5	depressions
NsB	Neshaminy very stony silt loam, 0 to 8 percent slopes	Towhee, extremely stony	5	depressions

NsD	Neshaminy very stony silt loam, 8 to 25 percent slopes	Towhee, extremely stony	3	depressions
NsF	Neshaminy very stony silt loam, 25 to 45 percent slopes	Towhee, extremely stony	3	depressions
OtA	Othello silt loam	Othello	90	terraces
OtA	Othello silt loam	Nanticoke	2	tidal flats
UrlB	Urban land-Gladstone complex, 0 to 8 percent slopes	Cokesbury	5	depressions
UrlD	Urban land-Gladstone complex, 8 to 25 percent slopes	Cokesbury	5	depressions
UugB	Urban land-Udorthents, schist and gneiss complex, 0 to 8 percent slopes	Baile	1	depressions
UugD	Urban land-Udorthents, schist and gneiss complex, 8 to 25 percent slopes	Baile	1	depressions
WaA	Watchung silt loam, 0 to 3 percent slopes	Watchung, silt loam	86	depressions
WaA	Watchung silt loam, 0 to 3 percent slopes	Towhee	9	depressions
WcB	Watchung very stony silt loam, 0 to 8 percent slopes	Watchung	85	depressions
WoA	Worsham silt loam, 0 to 3 percent slopes	Worsham	85	drainageways
WoB	Worsham silt loam, 3 to 8 percent slopes	Worsham	85	drainageways
WoB2	Worsham silt loam, 3 to 8 percent slopes, moderately eroded	Worsham	85	drainageways
WsB	Worsham very stony silt loam, 0 to 8 percent slopes	Worsham	85	drainageways
Modified from Hydric Soils of the United States (NRCS 2014)				

APPENDIX F
RESUMES

TETRA TECH

Jason McGuirk
Wetland/Environmental Scientist IV

EXPERIENCE SUMMARY

Mr. Jason McGuirk has six years of professional experience in wetland delineation, permitting, fisheries and wildlife, and stream assessments and classification in Pennsylvania, New York, Ohio, and Alaska. Mr. McGuirk has conducted hundreds of wetland delineations, stream evaluations as well as conducted and produced habitat assessments, and post monitoring impact statements and assessments on over 800 miles of proposed natural gas pipeline, and fifty plus proposed well pad sites. He has extensive knowledge in watercourse classification and assessment including the Rosgen method. In particular attention of his has been focused on fisheries habitat and macro-invertebrate work, with over fifty miles of stream classifications in Alaska. Mr. McGuirk's educational background is in Fisheries and Aquaculture with a minor focus in Marine Biology and Wildlife management.

RELEVANT EXPERIENCE

Environmental Scientist III; Sunoco Logistics; Wetland Delineations for Miscellaneous Natural Gas Pipeline Projects, Engendered Species Surveys; Reptilia (*Glyptemys muhlenbergii*), Plantae (*Ellisia nyctelea*); Pennsylvania. Segments 1, 2, and 3 wetlands field lead, and crew leader. Responsibilities include organizing and conducting all field work operations for multiple wetlands crews, wetland delineations and stream assessments for the proposed 450 mile Pennsylvania Pipeline Project. Additional work included proposing potential re-route on an environmental basis.

Environmental Scientist III; MarkWest Liberty Midstream & Resources, LLC; Wetland Delineations for Miscellaneous Natural Gas Pipeline Projects; Pennsylvania. Responsible for performing and assisting with wetland delineations for various proposed natural gas pipeline projects in southwestern Pennsylvania. Specific tasks included field survey, report preparation, and wetland functional assessments.

Environmental Scientist III; MarkWest Ohio Gathering Company, LLC; Wetland Delineations for Miscellaneous Natural Gas Pipeline Projects; Ohio. Responsible for performing and assisting with wetland delineations for various proposed natural gas pipeline projects in eastern Ohio. Specific tasks included field survey, report preparation, and completion of Ohio EPA specific wetland and stream assessments.

EDUCATION

B.T. Fisheries and Aquaculture, SUNY Cobleskill, 2011T

REGISTRATIONS

Wild Plant Management Permit, PA, 2014, Permit # 14-651

AREA OF EXPERTISE

Wetland Delineation and Stream Identification, Fisheries, and Botanical Surveys

TRAINING/CERTIFICATIONS

Winter Vegetation ID, Rutgers University, 2012

Amtrak Contractor Certification, 2014

Certified Wetland Assessment Delineator, NY, 2009

OFFICE

Pittsburgh, PA

YEARS OF EXPERIENCE

6+

YEARS WITH TETRA TECH

2+

Environmental Scientist III; Gulfport Energy Corporation; Wetland Delineations for Miscellaneous Natural Gas Well Pad Projects; Ohio. Responsible for performing and assisting with wetland delineations for various proposed natural well pads southeastern Ohio. Specific tasks included field survey, report preparation, PCN preparation, and completion of Ohio EPA specific wetland and stream assessments.

Environmental Scientist III; MarkWest Liberty Midstream & Resources, LLC; Wetland Delineation and Engendered Species Survey (*Ranunculus flabellaris and Alopecurus aequalis*) for Vanport to Butler Gas Pipeline; Butler County, Pennsylvania. Responsible for performing and assisting with wetland delineation and endangered species survey along pipeline right-of-way. Specific tasks included field survey and report preparation.

Environmental Scientist III; Antero Resources Appalachian Corp.; Wetland Delineations for Miscellaneous Natural Gas Pipeline Projects; Ritchie and Doddridge Counties, West Virginia. Responsible for performing and assisting with wetland delineations for various proposed natural gas well pads and access roads in northern West Virginia. Specific tasks included field survey and report preparation.

Wetland & Watercourse Biologist; Chesapeake Energy; Schoharie County, PA; November 2011 to October 2012. Responsible for conducting wetland delineations for proposed pipe line routes and reroutes. Performed PA Rapid Assessments, stream evaluation, and preparation of wetland report for 30 miles of pipeline in Northeastern Pennsylvania.

Wetland & Watercourse Biologist; Southwest Energy L.P; Schoharie County, PA; November 2011 to October 2012. Responsible for conducting wetland delineations on proposed Well pad and compressor sites. Performed PA Rapid Assessments, stream evaluation, and preparation of wetland report for 15 proposed well pad locations in Northeastern Pennsylvania.

Wetland & Watercourse Biologist; Southwest Energy L.P; Susquehanna County, PA; November 2011 to October 2012. Responsible for conducting wetland delineations on proposed Well pad and compressor sites. Performed PA Rapid Assessments, stream evaluation, and preparation of wetland report for 20 proposed well pad locations in Northeastern Pennsylvania.

Wetland & Watercourse Biologist; Chesapeake Energy; Carroll, Jefferson County, OH; November 2011 to October 2012. Responsible for conducting wetland delineations for proposed pipe line routes and reroutes. Performed ORAM and QHEI Assessments, and preparation of wetland report for 30 miles of pipeline in Eastern Ohio.

Wetland & Watercourse Biologist; Shell Oil; Butler County, PA; November 2011 to October 2012. Responsible for conducting wetland delineations for proposed pipe line routes and reroutes. Performed PA Rapid Assessments, stream evaluation, and preparation of wetland report for 40 miles of pipeline in Western Pennsylvania.

Wetland & Watercourse Biologist; Chesapeake Energy; Schoharie County, PA; November 2011 to October 2012. Responsible for conducting Indiana Bat habitat surveys on multiple proposed natural gas pipelines in Northeastern Pennsylvania.

Wetland & Watercourse Biologist; Chesapeake Energy; Schoharie County, PA; November 2011 to October 2012. Responsible for conducting post construction habitat monitoring and assessment of constructed natural gas pipelines in Northeastern Pennsylvania.

CHRONOLOGICAL HISTORY

Wetland Environmental Scientist IV; Tetra Tech, Inc.; Pittsburgh, PA, June 2014 - Present

Wetland Environmental Scientist III; Tetra Tech, Inc.; Pittsburgh, PA, February 2013 - June 2014

Wetland & Watercourse Biologist; Hanover Engineering & Associates; Towanda, PA, November 2011 - October 2012

Assistant Hatchery Manager; SUNY Cobleskill; Cobleskill, NY, September – May of 2009- 2011

Biological Fisheries Technician, US Forest Service; Thorne Bay, AK, May 2010 - August 2010

Fisheries Technician, Cook Inlet Aquaculture Association, Kenai, AK, May 2009 – August 2009

SCIENTIFIC/TECHNICAL PUBLICATIONS

- McGuirk, J, M, "Walleye (*Sander vitreus)* spawning movements and habitat utilization in Otsego Lake, NY, 2011

MEMBERSHIPS

- N/A

AWARDS

- David E. Moorehouse Award for Outstanding Junior in Fisheries and Aquaculture B.T.

TETRA TECH

Deanna N.Quinn
Wetland/Environmental Scientist II

EXPERIENCE SUMMARY

Ms. Quinn has two years' experience as an environmental scientist/ wildlife biologist with a background in wildlife and fisheries resource management. Her education background includes studies in chemistry, biology, statistics, botany, terrestrial ecology, natural resource management, conservation ecology, environmental policy and regulatory compliance, wetland ecosystems, wetland assessment and delineation, geographic information systems and other environmental related fields. Deanna has performed numerous wildlife and vegetation surveys, stream assessments habitat assessments and related report generation. As an Environmental Scientist, Deanna has had the opportunity of working fulltime on wetland delineations under Environmental Wetland Specialists, primarily for Marcellus shale projects. She also has experience performing bat hibernaculum habitat surveys in Western Pennsylvania as well as Phase 1 Bog Turtle surveys in Pennsylvania.

RELEVANT EXPERIENCE

Environmental Scientist II, Sunoco Logistics, Ohio-Pennsylvania Pipeline Project, Spanning from Delaware County, PA through Harrison County, Ohio, November 2013 to present. Ms. Quinn conducted site investigations, wetland delineations, stream assessments, performed Ohio Rapid Assessment Method, PHWH HHEI & QHEI, Phase 1 Bog Turtle surveys, macroinvertebrate surveys, and wetland report preparation for proposed 300 mile natural gas pipeline reaching from the Delaware River in PA to Scio, OH.

Environmental Scientist I; Gulfport Energy; Various Natural Gas Well Pad Sites; Belmont County, Ohio; August 2013 to present. Ms. Quinn conducted site investigations, wetland delineations, stream assessments, performed Ohio Rapid Assessment Method, PHWH HHEI & QHEI, and wetland report preparation for proposed well pad locations in Belmont County, Ohio.

EDUCATION

BT Wildlife Management, 2011, SUNY Cobleskill

AAS Animal Sciences & Ecology, 2009, SUNY Delhi

REGISTRATIONS

NA

TRAINING/CERTIFICATIONS

Certified Wetland Assessment Delineator, 2010, NY

OFFICE

Pittsburgh, PA

YEARS OF EXPERIENCE

3

YEARS WITH TETRA TECH

1 year 10months

Environmental Scientist I; MarkWest Liberty Midstream & Resources, LLC; Wetland Delineations for Miscellaneous Natural Gas Pipeline Projects; Pennsylvania; May 2013 to present. Responsible for performing and assisting with wetland delineations for various proposed natural gas pipeline projects in southwestern Pennsylvania. Specific tasks included field survey, report preparation, and wetland functional assessments.

CHRONOLOGICAL HISTORY

Environmental Analysis/Management: Environmental Scientist I-II, 2013-present, Pittsburgh, PA
Research: Husbandry Services Technician I, 2013, Pittsburgh, PA
Research Wildlife Biologist, 2010-2012, Cobleskill, NY
Research Avian Research Technician, 2011, Abaco, Bahamas
Research Predator Research Technician, 2010, Batavia, NY

SCIENTIFIC/TECHNICAL PUBLICATIONS

- N/A

MEMBERSHIPS

- The Wildlife Society, N/A

AWARDS

- N/A

TETRA TECH

Adam Mengel

Environmental Scientist/Wildlife Biologist I

EXPERIENCE SUMMARY

Mr. Adam Mengel has two years of experience as an environmental scientist/ wildlife biologist with a background in ecology and conservation. His education background includes studies in chemistry, biology, mathematics, statistics, botany, terrestrial ecology, population ecology, herpetology, evolutionary biology, wetland ecosystems, wetland assessment and delineation, geographic information systems and other environmental related fields. Adam has performed numerous wildlife and vegetation surveys, stream assessments, and habitat assessments. As an Environmental Scientist, Adam has had the opportunity of working fulltime on wetland delineations under Environmental Wetland Specialists, primarily for Marcellus shale projects. He also has experience in performing both acoustic and mist net surveys for the Northern long-eared bat species in Pennsylvania and the Midwest. Additionally, he has experience in performing radio telemetry and emergence counts.

RELEVANT EXPERIENCE

Crew Lead; Line 66 and Sandpiper Pipeline Project; Enbridge; WI, MN, ND; May – August 2014. Mr. Mengel led acoustic and radio telemetry surveys for the Northern long-eared bat in the Midwest. He has also performed roost counts and mist net surveys.

Research Technician; Goleden-winged Warbler Habitat Conservation Plan; Delaware State Forest; May – July 2013. Mr. Mengel monitored Golden-winged Warbler nesting success and assisted in locating a state record of 51 nests for the threatened species.

EDUCATION

B.S. Biology: Environmental Science, 2012, Saint Francis University

REGISTRATIONS

Wild Plant Management Permit, PA, 2015, Permit # 15-674

TRAINING/CERTIFICATIONS

40 Hour Army Corps of Engineers Wetland Delineation Training Program – Richard Chinn Environmental Training, Inc.

First aid, CPR, AED

OFFICE

Pittsburgh, PA

YEARS OF EXPERIENCE

2

YEARS WITH TETRA TECH

1

CHRONOLOGICAL HISTORY

Environmental Scientist/Wildlife Biologist I, Tetra Tech, Inc., December, 2014 – Present, Pittsburgh, PA

Research Technician, WEST, Inc., May – August, 2014, Bloomington, IN

Research Technician, Indiana University of Pennsylvania, May – July, 2014, Indiana, PA

SCIENTIFIC/TECHNICAL PUBLICATIONS

Loya, L.J., C. Clair, P.H. Harchack, and A.J. Mengel. 2014. "Odonate Diversity at an Acid Mine Drainage Remediation Site in Cambria, County, Pennsylvania." Argia. 26(3):14-17

LOGAN T. ZUGAY, Wildlife Biologist/Environmental Scientist

EDUCATION:
B.S., Wildlife Biology, 2011, The Pennsylvania State University

PROFESSIONAL REGISTRATIONS AND CERTIFICATIONS:
Recognized Qualified Bog Turtle Surveyor – U.S. Fish and Wildlife Service (PA)/PA Fish and Boat Commission

YEARS OF EXPERIENCE:
4 Years

Mr. Zugay's project experience has focused primarily in the area of jurisdictional wetland identification and delineation, but also includes the study and evaluation of aquatic ecosystems, water quality monitoring, and threatened/endangered/rare species investigations.

PROFESSIONAL EXPERIENCE

Wetland Identification/Delineation - Mr. Zugay has completed many wetland identification / delineation, and permitting projects for transportation, mining, and energy projects in Pennsylvania and West Virginia. He has experience in wetland function evaluation using the USACE Wetland Evaluation Technique II, Hydrogeomorphic Classification, and New England USACE Descriptive Method.

Bog Turtle Species Specialist - Mr. Zugay is on the USFWS and PFBC qualified bog turtle surveyors list in Pennsylvania. He has been a part of numerous potential habitat evaluations and field surveys for the bog turtle (*Clemmys/Glyptemys muhlenbergii*), a Federally listed threatened species and State listed endangered species. Investigations conducted include potential habitat investigations (Phase 1 Surveys), field surveys for the species (Phase 2 Surveys), trapping surveys (Phase 3 Surveys), and radio telemetry research for the species throughout Pennsylvania. This includes characterization of the existing vegetative community, hydrologic regime, evaluation of the soils composition, metapopulation analysis, and hydrologic connectivity assessments. He has located numerous bog turtles at various sites, along with countless other herptofauna.

Biological Evaluations - Mr. Zugay has also been involved with the biological evaluations for benthic macroinvertebrates, ambient water quality evaluations, and physical aquatic habitat evaluations. He has also participated in surveys for Eastern box turtles (*Terrapene carolina*) in Maryland. Additionally, Mr. Zugay has experience in the design, restoration, and enhancement of streams using the methodologies and techniques of Applied River Morphology (fluvial geomorphology).

PROJECT EXPERIENCE

Wetland Delineator, Qualified Bog Turtle Surveyor, Project Coordinator, and Field Crew leader, Mariner East 2 Pipeline - Sunoco, Pennsylvania –Mr. Zugay performed wetland and watercourse delineations in Westmoreland, Indiana, Cambria, Blair, Huntington, Perry, Cumberland, York, Lancaster, Lebanon, Berks, and Chester Counties. He also conducted over one-hundred Phase 1 bog turtle habitat assessments and assisted on dozens of Phase 2 bog turtle surveys. In addition to his field work responsibilities, Mr. Zugay also was responsible for the day-to-day operations of field crews, development of mapping, composition of wetland and stream data forms as well as Phase 1 bog turtle habitat assessment forms, daily coordination with land agents and project managers, and attendance at multiple project management meetings. The project is on-going.

Assistant, Bog Turtle Surveying and Radio Telemetry, Chester County, Pennsylvania – Mr. Zugay was part of a team that searched for bog turtles in wetlands in Chester County in order to perform a radio telemetry study. He located and positively identified multiple bog turtles, and assisted with data collection, scute notching, attachment of radio transmitters, and the weekly monitoring and GPS surveying of several turtles.

Wetland Delineator and Assistant Project Coordinator, NM45 ECDA Dig Project, Mercer County, Pennsylvania – Mr. Zugay delineated wetlands and

watercourses over an approximately 2-mile corridor along an existing natural gas line. In addition to his field work responsibilities, Mr. Zugay also was responsible for performing the GPS survey of aquatic resources, managing the development of the E&S plan and permit package composition, and attending a pre-application meeting on behalf of the client with the Pennsylvania Department of Environmental Protection.

Field Crew Leader and Assistant Project Coordinator, Tygart Valley Pipeline Wetland and Watercourse Delineations, West Virginia – Mr. Zugay delineated over fifty wetlands and over thirty watercourses in portions of the thirty-two mile long corridor. Soils, vegetation, and hydrology were analyzed and recorded. Mr. Zugay was also responsible for the daily organization of the delineation team.

Wetland Delineator and Assistant Project Coordinator, FM100 Pipeline Replacement Project, Cameron County, Pennsylvania - Mr. Zugay delineated wetlands and watercourses over an approximately 1.5-mile corridor along an existing natural gas line proposed for replacement. In addition to his field work responsibilities, Mr. Zugay also was responsible for managing the GPS survey of aquatic resources, development of the E&S plan, permit package composition, and other management activities associated with the project.

Assistant, US 219 Bat Hibernacula Surveys, Somerset County, Pennsylvania – Mr. Zugay was a member of a field team responsible for locating potential bat hibernacula portals and trapping those locations. Bat handling, species identification, and data processing with a Qualified Indiana Bat Surveyor (QIBS) were the key components to the job.

Assistant, Water Quality Monitoring, Tennessee - Mr. Zugay helped to collect data and grab samples from surface water systems in Tennessee as part of strip mine pollution monitoring. The data included pH, dissolved oxygen, specific conductance, and flow. Benthic macroinvertebrates were also collected and analyzed in order to determine the health of the insect communities living in the streams.

Assistant, West Virginia Route 10 Wetland and Watercourse Delineations, West Virginia – Mr. Zugay delineated over ten watercourses and over twenty wetlands along the two-mile study area. Soils, vegetation, and hydrology were analyzed and recorded. Additionally, high gradient streams were evaluated with the USACE data sheets for embeddedness, canopy cover, substrate size, detritus material cover, and more.

Field Crew Member for Potential Indiana Bat Hibernacula and Mist Net Survey, Mingo County, West Virginia - Mr. Zugay was part of a team that identified potential Indiana bat hibernacula and picked out mist net survey locations. He also participated in a mist net survey.

Assistant, Eastern Box Turtle Surveyor, InterCounty Connector Highway Project, Maryland - Mr. Zugay participated in field surveys for Eastern box turtles within the project area, collecting data on the turtles, notching scutes, and relocating the turtles outside of the project impact area.

Assistant Stream Surveyor, Carbon County, Pennsylvania - Mr. Zugay assisted in the surveying of water depths, bank heights, riffle/run lengths, and also evaluated substrate sizes. The data is used as a model for stream rehabilitations.

Field Crew Leader, Water Quality/Flow Monitoring and Well Testing, Centre and Sullivan Counties, Pennsylvania - Mr. Zugay was responsible for the monthly monitoring of watercourses for flow, pH, total suspended solids, and total dissolved solids. He was also responsible for the monitoring of well depths, pH, and field temperature.

Assistant, Bat Emergence Surveys, Lackawanna County, Pennsylvania - Mr. Zugay assisted on a bat emergence count survey to monitor activity of bats in a mitigation site. Activities included the use of infrared camera equipment, Anabat audio recording devices, and various forms of data collection.

Field Crew Leader, Well Water and Surface Water Sampling and Monitoring, Indiana County, Pennsylvania – Mr. Zugay was responsible for the collection of well water and surface water samples for baseline data for the site of a future rock quarry. The well samples were acquired by using the Low Stress (low flow) Purging method.

LOGAN T. ZUGAY, Wildlife Biologist/Environmental Scientist

DYLAN J. WOODWORTH, Environmental Scientist/Biologist

EDUCATION:
B.S., Geography with Concentration in Watershed Management, 2013, Mansfield University

PROFESSIONAL REGISTRATIONS AND CERTIFICATIONS:
CPR Training

YEARS OF EXPERIENCE:
2 Year

Mr. Woodworth's project experience focuses primarily on jurisdictional wetland identification and delineation and also includes study and evaluation of aquatic ecosystems and threatened/endangered/rare species investigations.

PROFESSIONAL EXPERIENCE

Wetland Identification/Delineation - Participated in many wetland identification / delineation investigations for transportation, developments, and mining projects in Pennsylvania. Experienced in wetland function evaluation using the USACE Wetland Evaluation Technique II, Hydrogeomorphic Classification, and New England USACE Descriptive Method.

Bog Turtle Experience - Participated in numerous potential habitat evaluations and field surveys for the bog turtle (*Clemmys/Glyptemys muhlenbergii)*, a federally listed threatened species and State listed endangered species. Investigations included potential habitat investigations (Phase 1 Surveys) and field surveys for the species (Phase 2 Surveys), focusing on characterization of the existing vegetative community, hydrologic regime, evaluation of the soils composition, and hydrologic connectivity assessments.

Biological Evaluations - Participated in biological evaluations for benthic macroinvertebrates, ambient water quality evaluations, and physical aquatic habitat evaluations. Also assisted in the research of threatened and endangered bat species and their habitats. Also has been part of a team that searched for the Northern Goshawk (*Accipiter gentilis*).

PROJECT EXPERIENCE

PennDOT Wetland and Watercourse Investigations, Pennsylvania – Assisted with numerouse wetland and watercourse investigations throughout Pennsylvania for roadway improvement and bridge/culvert replacement projects. Activities associated with these projects included wetland and watercourse delineation, GPS survey, threatened and endangered species evaluations, and report preparation.

Rosebud Mining, Indiana County and Clearfield County, Pennsylvania - Assisted in identifying / delineating wetlands and watercourses on several Rosebud Mining properties and in report preparation for these sites.

Bog Turtle Surveying, York County, Pennsylvania - Team participant on Phase 2 Bog Turtle Surveys for various transportation projects in York County.

Water Quality Monitoring, Tennessee - Assisted in collection of data and grab samples from surface water systems in Tennessee as part of strip mine pollution monitoring. The data included pH, dissolved oxygen, specific conductance, and flow. Benthic macroinvertebrates were also collected and analyzed in order to determine the health of the insect communities living in the streams.

Field Crew Member for Mist Net Surveying, Harrison County, West Virginia - Participated on team identifying mist net survey locations and assisted with the actual mist net surveys. Bat handling, species identification, and data processing with a Qualified Indiana Bat Surveyor (QIBS) were key components to the project. Species caught included the Eastern Small-Footed Myotis (*Myotis Leibii*) and the Big Brown Bat (*Eptesicus Fuscus*).

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Bat Emergence Surveys, Lackawanna County, Pennsylvania – Assisted on a bat emergence count survey to monitor activity of bats in a mitigation site. Activities included the use of infrared camera equipment, Anabat audio recording devices, and various forms of data collection.

Northern Goshawk Survey, Randolph County, West Virginia – Assisted in a survey for the Northern Goshawk (*Accipiter gentilis*) associated with the Corridor H project. Activities included following transects to predetermined call-points from which call-back and visual surveys were conducted.

South Valley Parkway, Mitigation Site Selection, Luzerne County, Pennsylvania - Assisted with the selection of wetland mitigation sites and the installation of groundwater monitoring wells.

Pennsylvania Pipeline Project Wetland and Watercourse Investigations, Pennsylvania – Assistant with wetland and watercourse investigations throughout Pennsylvania for the instillation of the ME2 pipeline for Sunoco. Activities associated with this project include wetland and watercourse delineation, GPS survey, threatened and endangered species evaluations, and data form completion.

Northeastern Bulrush Survey, Pennsylvania – Assisted in conducting plant surveys for the Northeastern Bulrush (*Scirpus ancistrochaetus*). An unknown population was found during the field efforts.

Northern Cricket Frog Survey, Pennsylvania – Team participant on Phase 2 and 3 surveys for a confidential client. Activities included trapping/trap checking, opportunistic survey, and audio survey.

Harp Trap Surveying, Lackawanna County, Pennsylvania – Assisted with emergence harp trap surveying to determine presence or probable absence of the species within potential habitat sites.

DYLAN J. WOODWORTH, Environmental Scientist/Biologist