

Aquatic Resource Report Addendum
for the
Pennsylvania Pipeline Project
Allegheny County,
Pennsylvania



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March 2016

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE NO.</u>
ACRONYMS	iii
1.0 INTRODUCTION.....	1-1
2.0 METHODOLOGY.....	2-1
3.0 RESULTS	3-1
3.1 WETLAND IDENTIFICATION AND DELINEATION	
3.2 STREAM IDENTIFICATION AND EVALUATION	
4.0 CONCLUSIONS.....	4-1
REFERENCES.....	R-1

TABLE

1	WETLAND AND STREAM SUMMARY
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FIGURES

1-1 to 1-2	USGS PROJECT LOCATION MAPS
2-1 to 2-2	NRCS SOILS MAPS
3-1 to 3-2	NATIONAL WETLAND INVENTORY MAPS
4-IND-1 to 4-IND-2	INDEX MAPS
4-1 to 4-3	DETAIL MAPS

APPENDICES

A	WETLAND DETERMINATION DATA FORMS
B	WETLAND PHOTOGRAPHS
C	STREAM DATA SHEETS
D	STREAM PHOTOGRAPHS
E	HYDRIC SOILS LIST
F	RESUMES

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	Southwest Region, Pennsylvania Pipeline Project
PSS	Palustrine Scrub Shrub
ROW	Right-of-Way
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. (Tetra Tech), has prepared this Aquatic Resource Addendum Report for Allegheny County to support the Pennsylvania Pipeline Project (Project). Additional aquatic resource surveys were determined to be necessary to accommodate additional Project area changes. This report is an addendum to the original Aquatic Resources Report prepared for Allegheny County, Pennsylvania (PA) and dated June 2013. The two reports provide a comprehensive delineation of aquatic resources to be or likely to be impacted 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 Addendum Study Areas. This report provides additional baseline, existing environment 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 modifications to the proposed pipeline Project were performed during numerous field visits from November 2013 through March 2016. The study area was limited to the modification areas 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 1-2; USGS, 2009)
- Natural Resources Conservation Service (NRCS) National Cooperative Soil Survey (Figures 2-1 to 2-2; NRCS, 2014)
- USFWS National Wetland Inventory (NWI) Mapping (Figures 3-1 to 3-2; 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 4-3).

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 a list of hydric soils known to occur within Allegheny County. Resumes of project personnel are included in Appendix F.

3.0 RESULTS

The field investigations identified three areas within Allegheny County, located within the Southwest Region of the proposed Pennsylvania Pipeline Project study area, that met the wetland criteria outlined in the *1987 Manual*, as amended by the *Corps Regional Supplement*. Additionally, two streams were identified within the Project Addendum Study Area. A narrative summary of field data collected for these systems is presented below. The detail maps provided as Figures 4-1 to 4-3 illustrate the wetland and stream locations in relation to the Addendum 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 list for Allegheny County, PA is included in Appendix E. The NRCS soil survey maps are included as Figures 2-1 to 2-2. Confirmation of the soil mapping units was not performed during this site evaluation.

See Figures 3-1 to 3-2 for NWI wetlands that fall within the Addendum Study Area.

Based on field evidence and best professional judgment, it was determined that three wetlands are present within the study area. The areas demonstrated the presence of all three wetland parameters required by the *1987 Manual* and the *Corps Regional Supplement*. The vegetative community was dominated by hydrophytic plant species, 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 SZ3

Wetland SZ3 (W-SZ3) is a 242-square foot (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 Japanese stilt grass (*Microstegium vimineum*) and dark green bulrush (*Scirpus atrovirens*). The soil between 0 and 5 inches exhibits a low-chroma matrix (10YR 4/2) with a silt loam texture that contains redoximorphic features (5YR 4/6). The soil between 5 and 12 inches exhibits a 10YR 4/4 matrix with a silt loam texture.

Wetland SZ5

Wetland SZ5 (W-SZ5) is a 365- SF PEM wetland (Figure 4-2). Indicators of wetland hydrology include oxidized rhizospheres on living roots, geomorphic position, and a positive FAC-neutral

test. Dominant vegetation consists of dark green bulrush (*Scirpus atrovirens*), purple leaf willowherb (*Epilobium coloratum*), rough-stalk blue grass (*Poa pratensis*), and Japanese stilt grass (*Microstegium vimineum*). The soil between 0 and 8 inches exhibits a low-chroma matrix (2.5Y 4/2) with a sand loam texture that contains redoximorphic features (7.5YR 4/6).

Wetland SZ4 PEM

Wetland SZ4 PEM (W-ZS4 PEM) is a 3,198- SF PEM wetland (Figure 4-2). Indicators of wetland hydrology include surface water, high water table, saturation within the upper 12 inches of the soil profile, oxidized rhizospheres on living roots, drainage patterns, and geomorphic position. Dominant vegetation consists of box elder (*Acer negundo*), rambler rose (*Rosa multiflora*), and fowl manna grass (*Glyceria striata*). The soil between 0 and 2 inches exhibits a low-chroma matrix (10YR 3/1) with a mucky texture. The soil between 2 and 14 inches exhibits a low-chroma matrix (10YR 3/1) with a silt loam texture that contains redoximorphic features (7.5YR 4/6 and 2.5Y 6/1).

Wetland SZ4 PFO

Wetland SZ4 PFO (W-ZS4 PFO) is a 1,004- SF PFO wetland (Figure 4-2). Indicators of wetland hydrology include surface water, a thin muck surface, drainage patterns, and geomorphic position. Dominant vegetation consists of red maple (*Acer rubrum*), box elder (*Acer negundo*), Morrow's honeysuckle (*Lonicera morrowi*), crow garlic (*Allium vineale*), rough avens (*Geum laciniatum*), and wingstem (*Verbesina alternifolia*). The soil between 0 and 2 inches exhibits a low-chroma matrix (10YR 2/1) with a mucky texture. The soil between 2 and 9 inches exhibits a low-chroma matrix (10YR 5/2) with a silt loam texture. The soil between 9 and 16 inches exhibits a 10YR 3/3 matrix with a silt loam texture.

3.2 STREAM IDENTIFICATION AND EVALUATION

Based on field evidence and best professional judgment, it was determined that two streams were identified within the evaluated study area. Data sheets that detail the bank and channel characteristics, substrate composition, aquatic habitat, and hydrology were prepared for each of the streams (Appendix C).

Stream SZ1

Stream SZ1 (S-SZ1) is an intermittent unnamed tributary (UNT) to the Monongahela River (Figure 4-2). The stream bank is approximately 3 feet in width and 2 feet in height. The stream bed contains a gravel, sand, silt, and organic substrate. At the time of the field investigation the stream exhibited a water depth of 1 inch.

Stream SZ2

Stream SZ2 (S-SZ2) is an intermittent UNT to the Monongahela River (Figure 4-2). The stream bank is approximately 4 feet in width and 1 foot in height. The stream bed contains a cobble, gravel, sand, and silt substrate. At the time of the field investigation the stream exhibited a water depth of 3 inches.

4.0 CONCLUSIONS

During the field investigations in Allegheny County, PA, located within the Southwest Region of the proposed Pennsylvania Pipeline Project, three areas were identified within the Addendum 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, two streams were identified within the evaluated study area.

REFERENCES

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe, 1979. Classification of Wetlands and Deepwater Habitats of the United States. United States Government Printing Office. Washington, D.C. GPO 024-010-00524-6. 103 pp.

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Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. The National Wetland Plant List: 2014 Update of Wetland Ratings. Phytoneuron 2014-41: 1-42.

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United States Geological Survey, 2009, United States Geological Survey Topographical Mapping. available at: <http://nmviewogc.cr.usgs.gov/viewer.htm>.

TABLE

Table 1
Wetland and Stream Summary
Pennsylvania Pipeline Project
Page 1 of 1

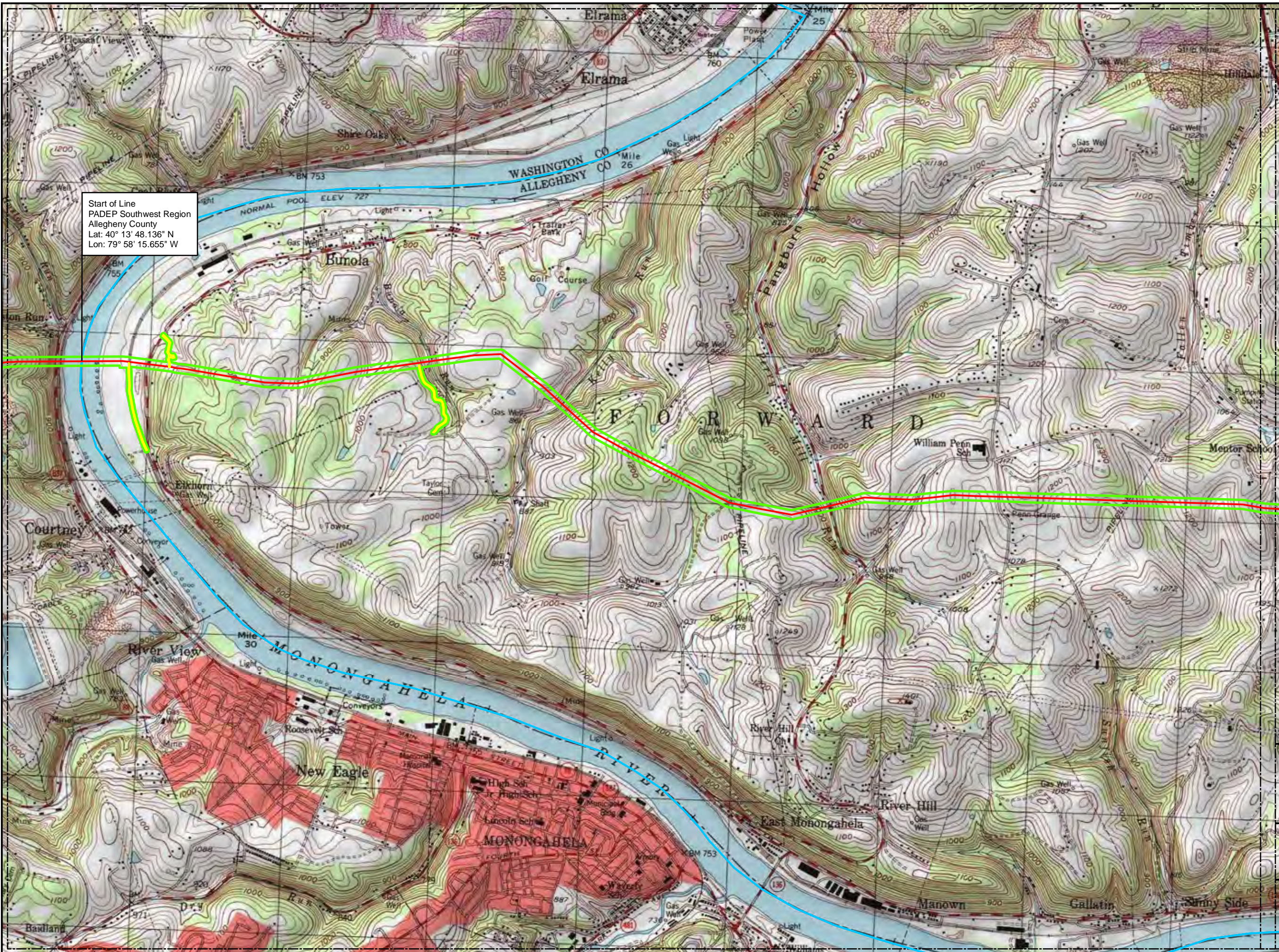
Water Resource	Dominant Plant Community/Flow Regime	Bank Full Width (ft.)	Water Depth	Channel Depth	Wetland Size (Square Feet)	Wetland Size (Acres)	Associated Water Resource
Wetland							
W-SZ3	PEM	-	-	-	242	0.01	S-SZ1
W-SZ5	PEM	-	-	-	365	0.01	N/A
W-SZ4	PEM	-	-	-	3198	0.07	S-SZ2
W-SZ4	PFO	-	-	-	1,004	0.02	S-SZ2
Streams							
S-SZ1	Intermittent	3.0	1.0"	2.0'	-	-	W-SZ3
S-SZ2	Intermittent	4.0	3.0"	1.0'	-	-	W-SZ4

* = See Data Sheet for Channel Depth - Right and Left Bank Measurements Differ.

' = Feet

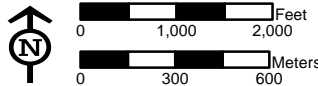
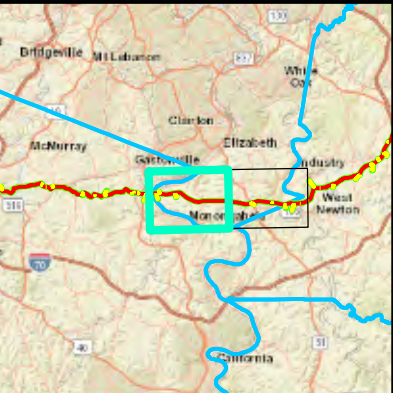
" = Inches

FIGURES



- Legend**
- Access Road
 - Alignment Centerline
 - Study Area
 - County Boundary

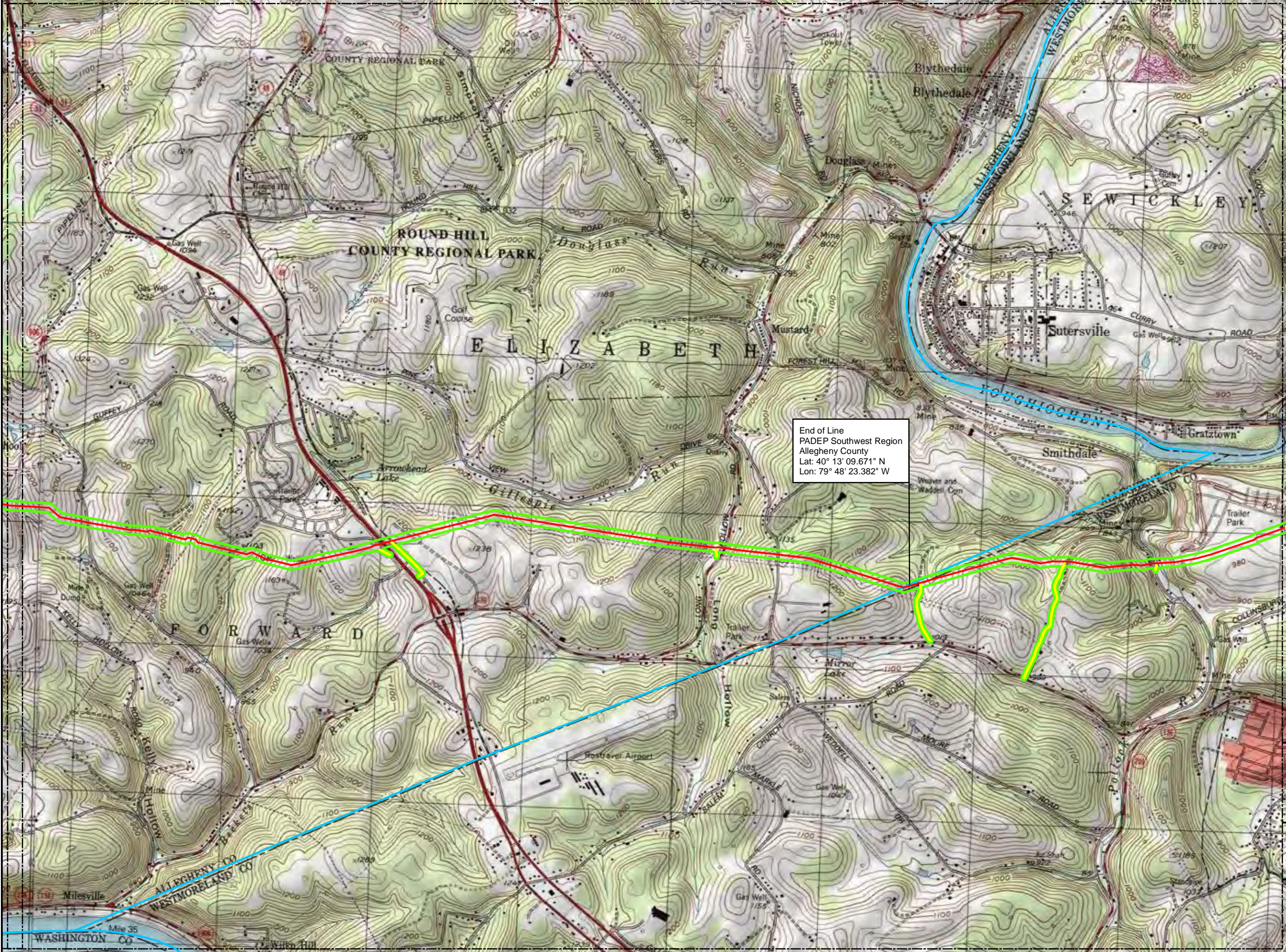
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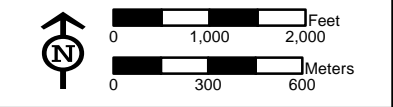
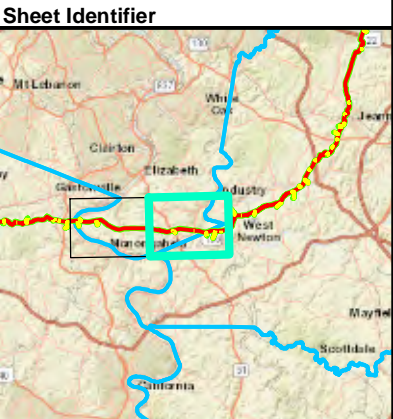
USGS PROJECT LOCATION MAP
FIGURE 1-1
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
SUNOCO LOGISTICS, L.P.
ALLEGHENY COUNTY, PA



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 Monongahela



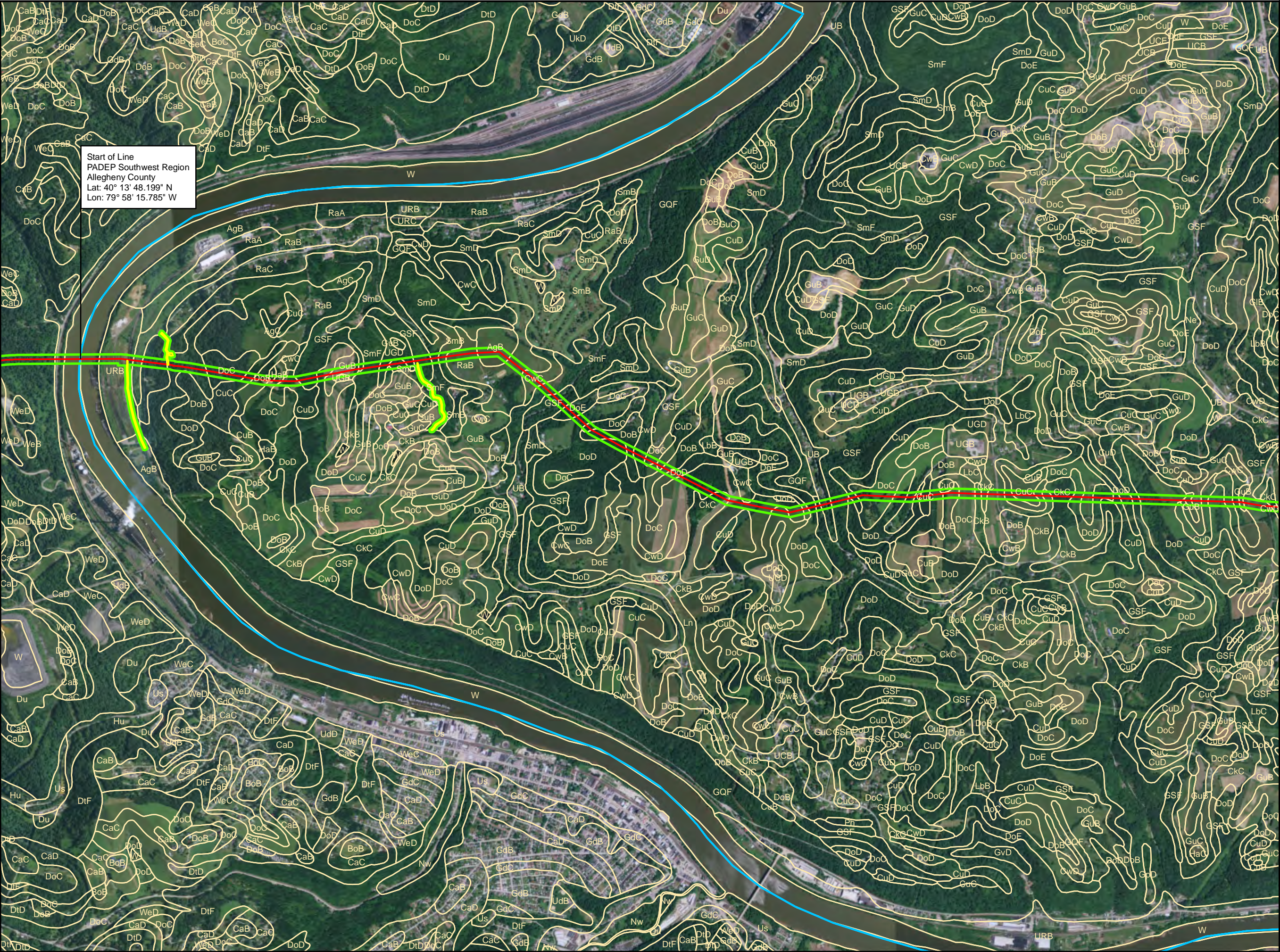
- Legend**
- Access Road
 - Alignment Centerline
 - Study Area
 - County Boundary



USGS PROJECT LOCATION MAP
FIGURE 1-2
PENNSYLVANIA PIPELINE PROJECT
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ALLEGHENY COUNTY, PA

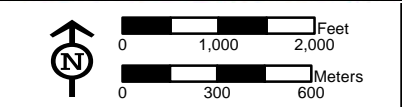
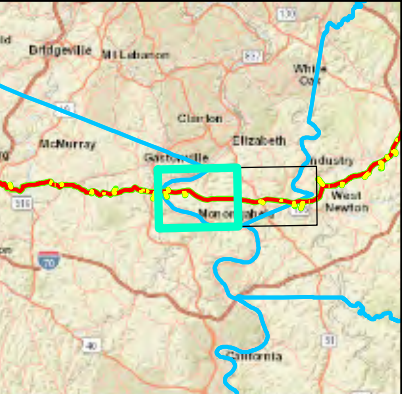


Notes:
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2) Quadrangles being displayed are Donora, McKeesport, Monongahela



- Legend**
- Access Road
 - Alignment Centerline
 - Study Area
 - County Boundary
 - NRCS Soils and Codes

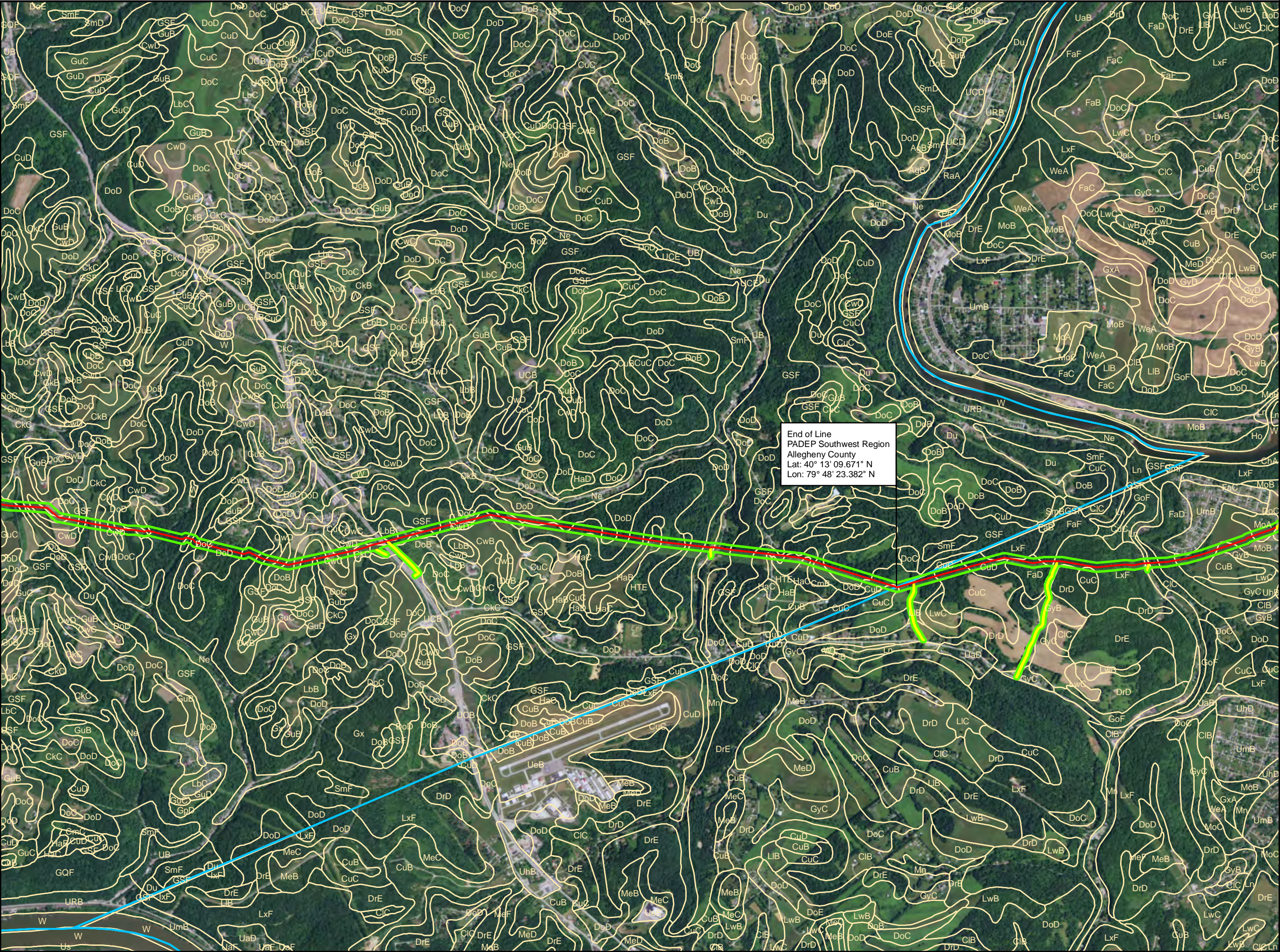
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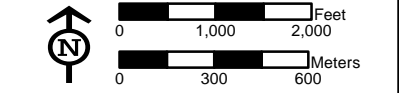
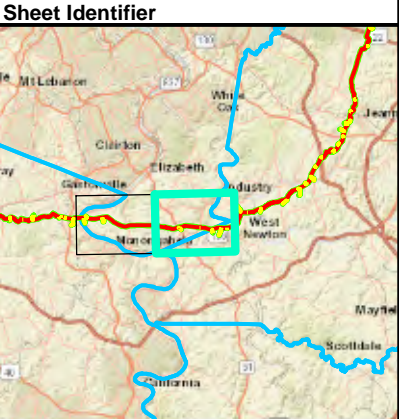
NRCS SOILS MAP
FIGURE 2-1
PENNSYLVANIA PIPELINE PROJECT
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ALLEGHENY COUNTY, PA



Notes:
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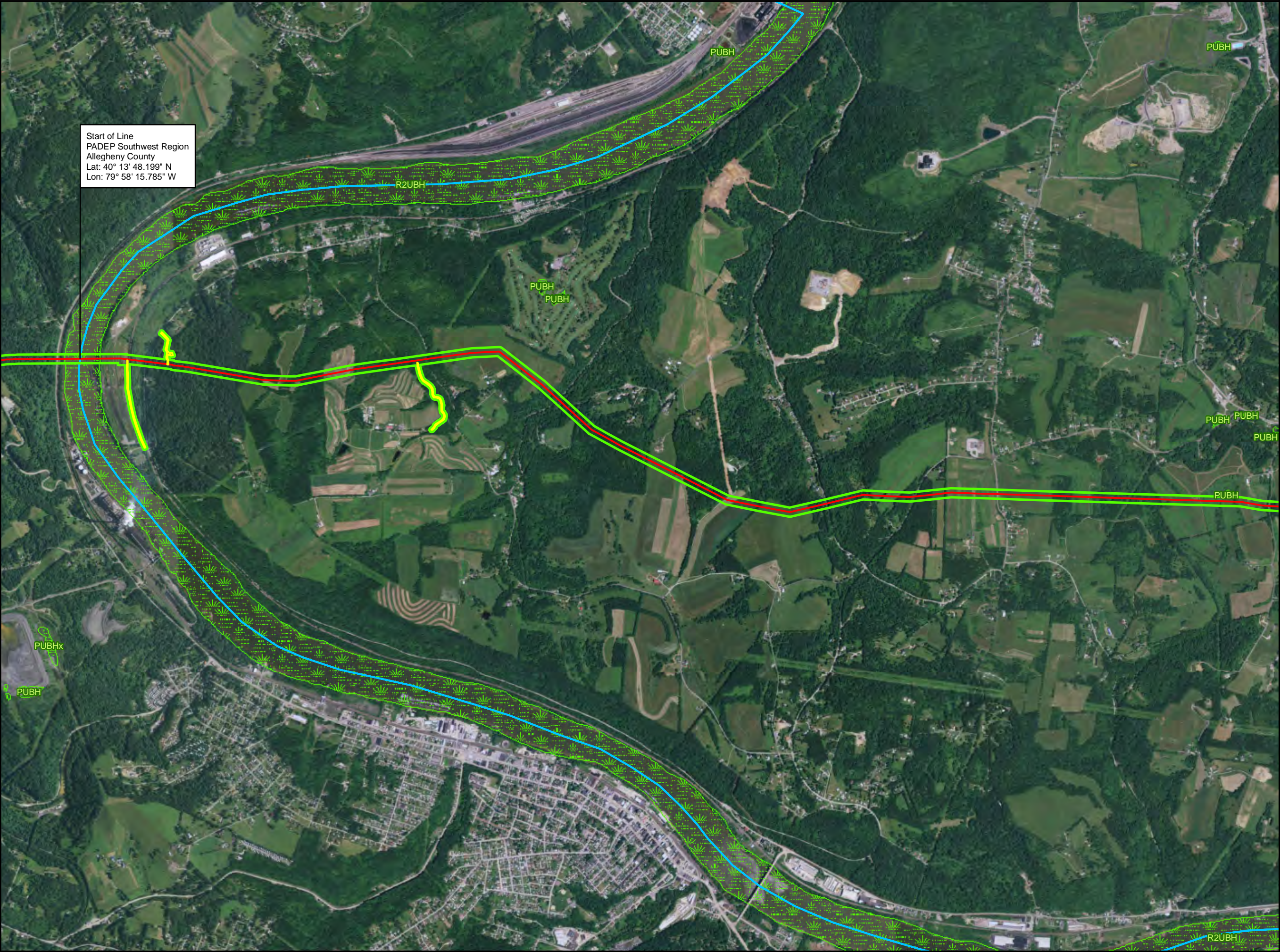
- Legend**
- Access Road
 - Alignment Centerline
 - Study Area
 - County Boundary
 - NRCS Soils and Codes



**NRCS SOILS MAP
FIGURE 2-2
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ALLEGHENY COUNTY, PA**

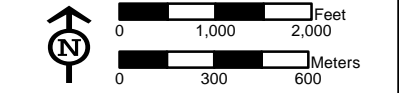


Notes:
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Start of Line
PADEP Southwest Region
Allegheny County
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Lon: 79° 58' 15.785" W

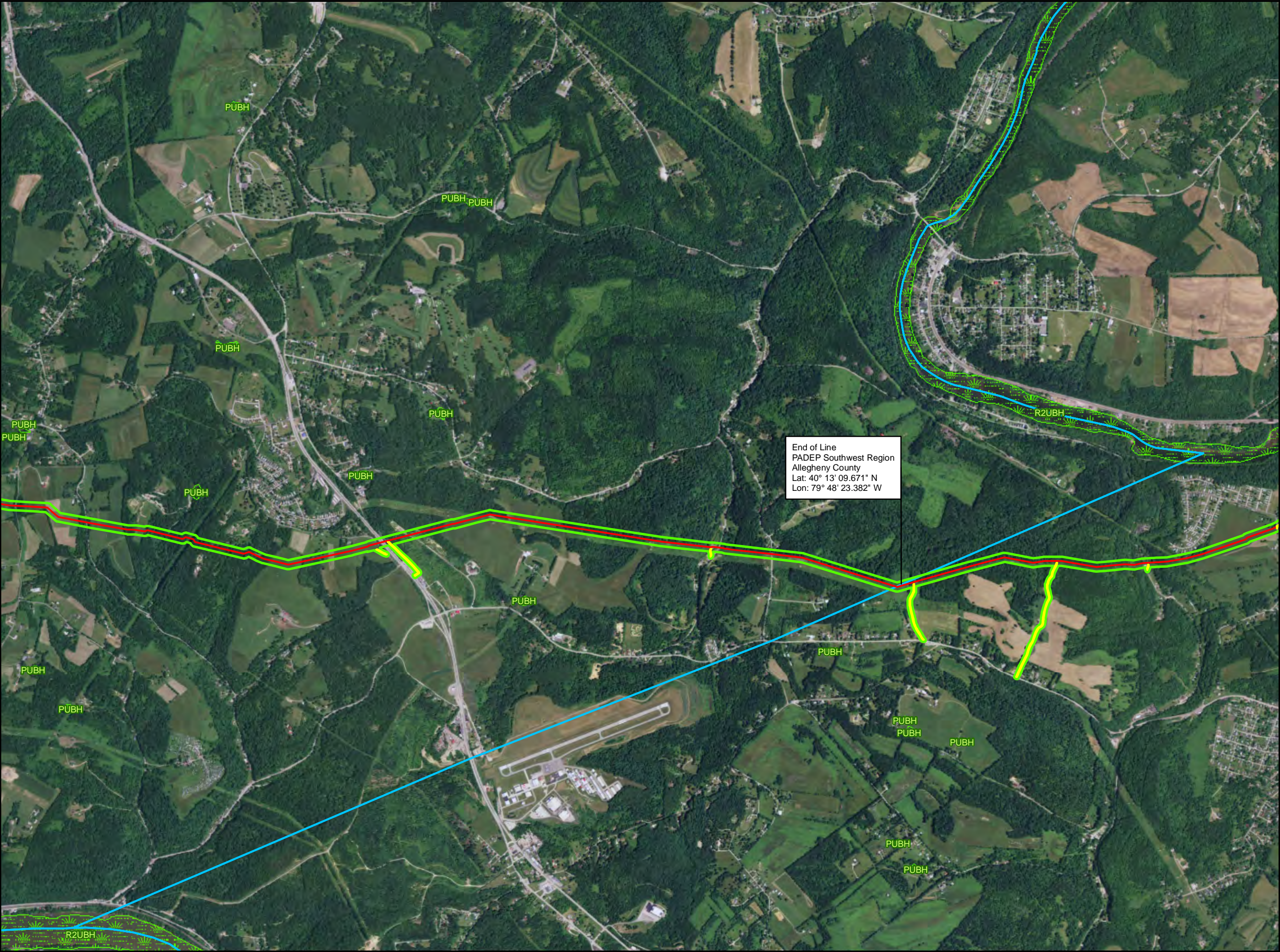
- Legend**
- Access Road
 - Alignment Centerline
 - Study Area
 - County Boundary
 - NWI Wetlands and Codes



**NWI WETLANDS MAP
FIGURE 3-1
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
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ALLEGHENY COUNTY, PA**



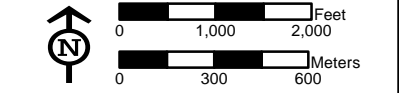
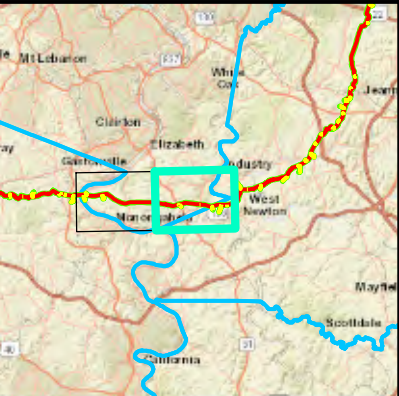
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- Legend**
- Access Road
 - Alignment Centerline
 - Study Area
 - County Boundary
 - NWI Wetlands and Codes

End of Line
PADEP Southwest Region
Allegheny County
Lat: 40° 13' 09.671" N
Lon: 79° 48' 23.382" W

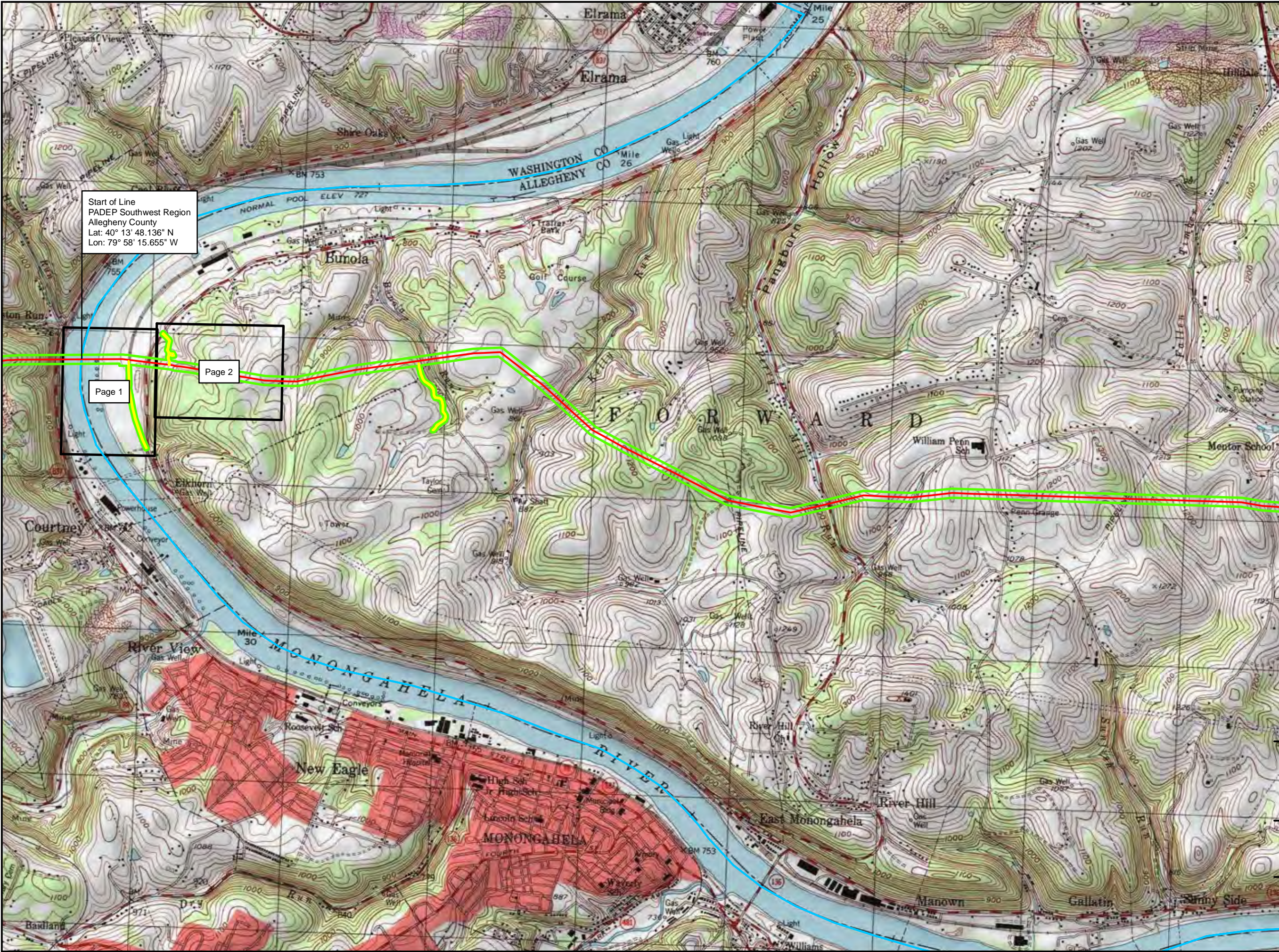
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NWI WETLANDS MAP
FIGURE 3-2
PENNSYLVANIA PIPELINE PROJECT
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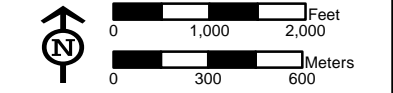
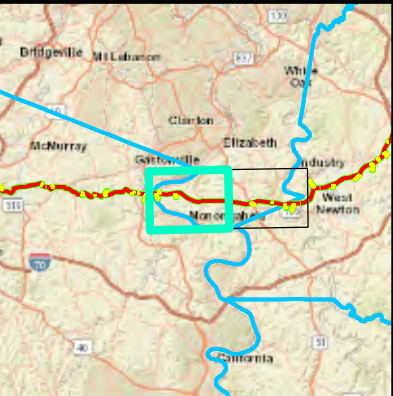


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- Legend**
- Access Road
 - Alignment Centerline
 - Study Area
 - County Boundary
 - Map Book Index

Sheet Identifier

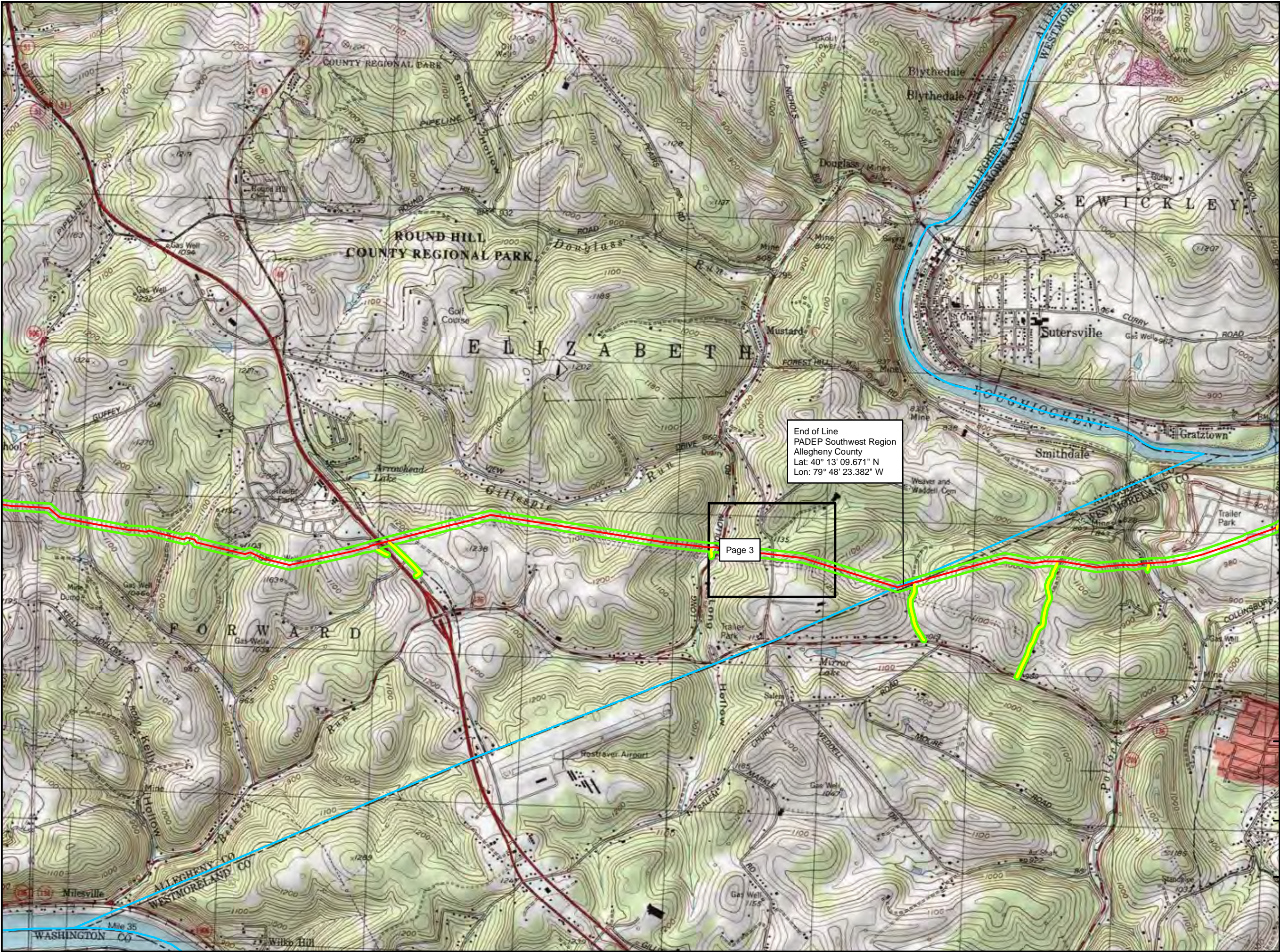


**INDEX MAP
FIGURE 4-INDEX-1
PENNSYLVANIA PIPELINE PROJECT
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ALLEGHENY COUNTY, PA**



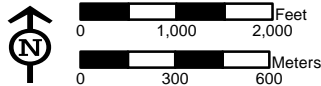
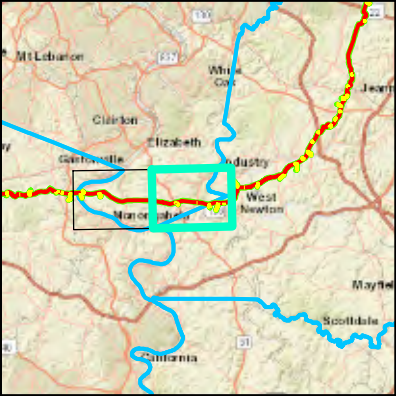
Notes:
1) Topographic map provided by ESRI's ArcGIS Online USA Topo Maps map service (© 2013 National Geographic Society, i-cubed).
2) Quadrangles being displayed are Monongahela

PGH-PAGE\SUNOCO\MARINER EAST 2\MD\PPP-WETLANDS SWP\PENNPipeline_ALLEGHENY\CO_INDEX\MXD 032116.SP



- Legend**
- Access Road
 - Alignment Centerline
 - Study Area
 - County Boundary
 - Map Book Index

Sheet Identifier



INDEX MAP
FIGURE 4-INDEX-2
PENNSYLVANIA PIPELINE PROJECT
FEBRUARY 25, 2016 ALIGNMENT
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ALLEGHENY COUNTY, PA



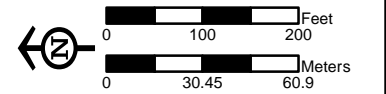
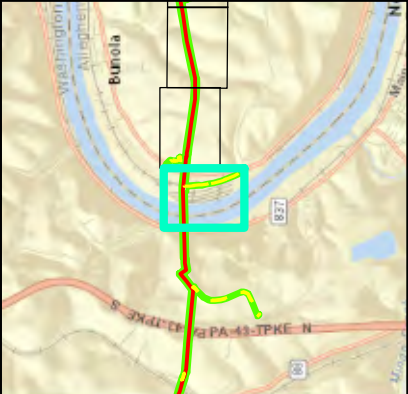
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Legend

- Culvert
- Sample Location
- Photo Location
- Stream
- Wetland
 - ▨ PEM
 - ▨ PFO
 - ▨ PSS
 - ▨ PuB
- New Wetland
 - PEM
 - PFO
 - PSS
 - PuB
- Access Road
- Alignment Centerline
- - Access Road (7/1/15)
- - Alignment Centerline (7/1/15)
- ▭ Survey Area (7/9/13)

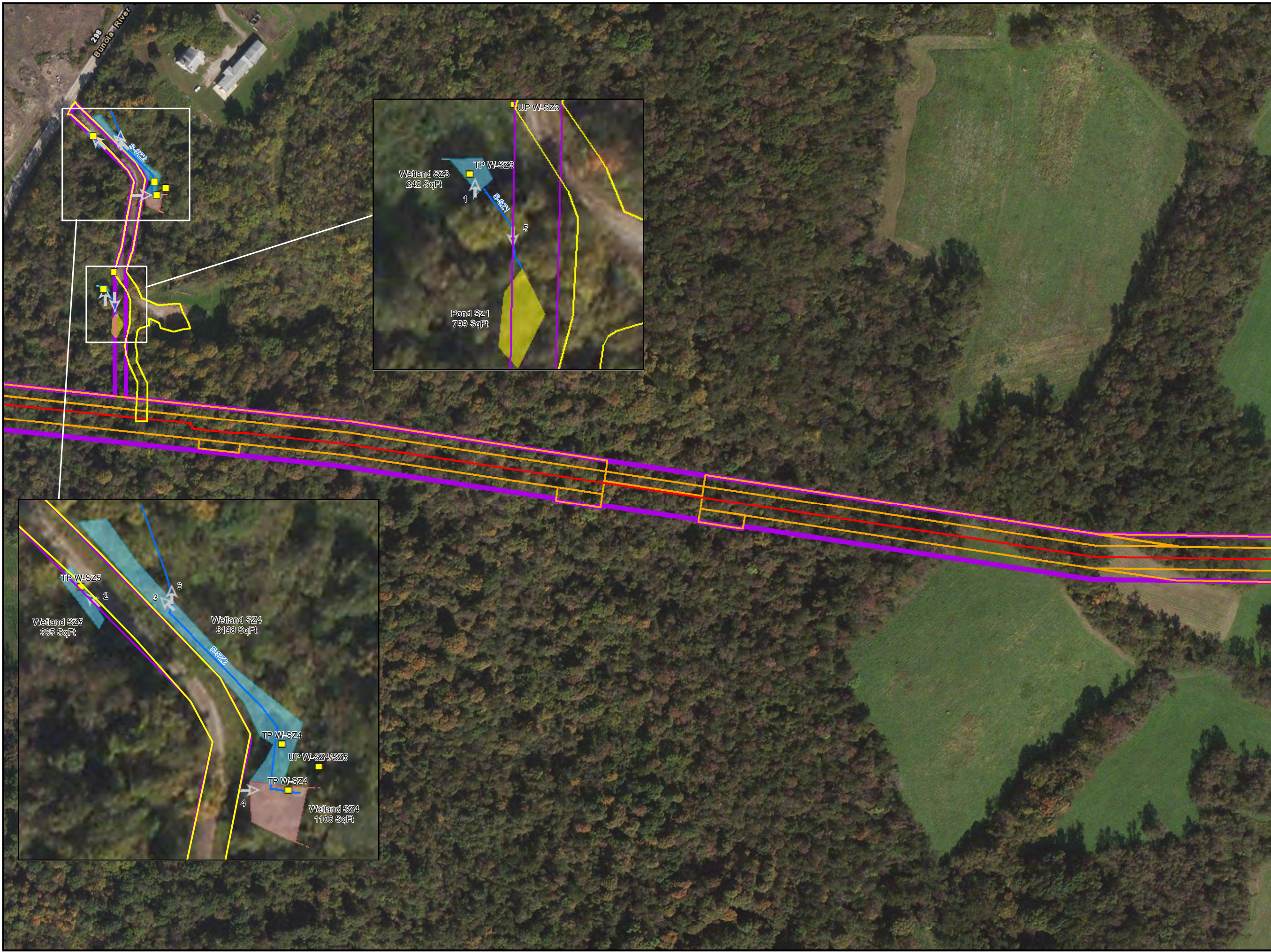
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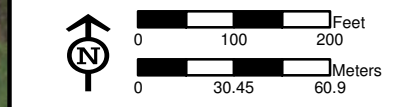
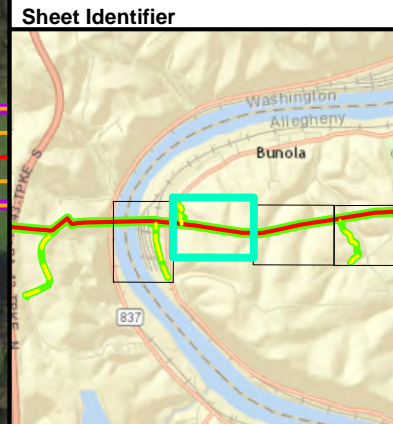
ADDENDUM WETLANDS DETAIL MAP
FIGURE 4-1
PENNSYLVANIA PIPELINE PROJECT
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Notes:
1) Topographic map provided by ESRI's ArcGIS Online
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2) Quadrangles being displayed are



- Legend**
- Culvert
 - Sample Location
 - ➔ Photo Location
 - Stream
 - Wetland
 - ▨ PEM
 - ▨ PFO
 - ▨ PSS
 - ▨ PuB
 - New Wetland
 - PEM
 - PFO
 - PSS
 - PuB
 - Access Road
 - Alignment Centerline
 - Limit of Disturbance
 - Access Road (7/1/15)
 - Alignment Centerline (7/1/15)
 - Survey Area (7/9/13)



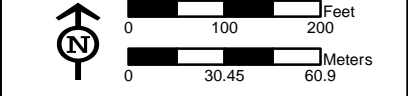
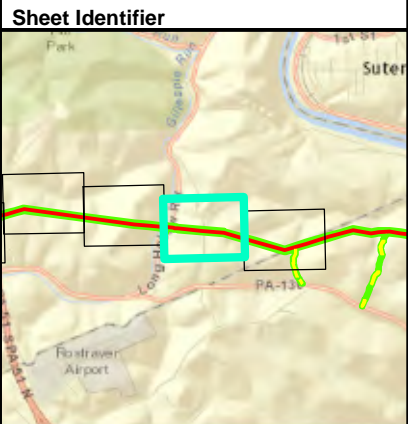
ADDENDUM WETLANDS DETAIL MAP
FIGURE 4-2
PENNSYLVANIA PIPELINE PROJECT
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SUNOCO LOGISTICS, L.P.
ALLEGHENY COUNTY, PA



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



- Legend**
- Culvert
 - Sample Location
 - Photo Location
 - Stream
 - Wetland**
 - ▨ PEM
 - ▨ PFO
 - ▨ PSS
 - ▨ PuB
 - New Wetland**
 - PEM
 - PFO
 - PSS
 - PuB
 - Access Road
 - Alignment Centerline
 - - Access Road (7/1/15)
 - - Alignment Centerline (7/1/15)
 - ▭ Survey Area (7/9/13)



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



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

APPENDIX A
WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Allegheny Sampling Date: 03/02/2016
 Applicant/Owner: Sunoco Logistics, L.P. State: PA Sampling Point: W-SZ3
 Investigator(s): J. McGuirk, S. Zabowski Lieb Section, Township, Range: NA
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): Concave Slope (%): 0-5
 Subregion (LRR or MLRA): LRRN Lat: 40.230628 Long: -79.964392 Datum: NAD83
 Soil Map Unit Name: Rainsboro silt loam, 8 to 15 percent slopes 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 <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

Remarks:

Cowardin Code: PEM

HGM: Slope

WT: RPWWD

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? Yes ☐ No ☒ Depth (inches):
 (includes capillary fringe)

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-SZ3

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
<u>0</u> = Total Cover 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				Prevalence Index worksheet: <u> </u> Total % Cover of: <u> </u> Multiply by: OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u> </u> x 5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
<u>0</u> = Total Cover 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				Hydrophytic Vegetation Indicators: <u> </u> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <u> </u> 3 - Prevalence Index is ≤3.0 ¹ <u> </u> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Microstegium vimineum</u>	<u>40</u>	<input checked="" type="checkbox"/>	<u>FAC</u>	
2. <u>Scirpus atrovirens</u>	<u>30</u>	<input checked="" type="checkbox"/>	<u>OBL</u>	
3. <u>Dichanthelium clandestinum</u>	<u>5</u>	_____	<u>FAC</u>	
4. <u>Juncus tenuis</u>	<u>5</u>	_____	<u>FAC</u>	
5. <u>Eupatorium perfoliatum</u>	<u>5</u>	_____	<u>FACW</u>	
6. <u>Euthamia graminifolia</u>	<u>5</u>	_____	<u>FAC</u>	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>90</u> = Total Cover 50% of total cover: <u>45</u> 20% of total cover: <u>18</u>				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.
Woody Vine Stratum (Plot size: <u>15'</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
<u>0</u> = Total Cover 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <u> </u>
Remarks: (Include photo numbers here or on a separate sheet.)				

SOIL

Sampling Point: W-SZ3

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Allegheny Sampling Date: 03/02/2016
 Applicant/Owner: Sunoco Logistics, L.P. State: PA Sampling Point: W-SZ5
 Investigator(s): JM, SZ Section, Township, Range: NA
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): Concave Slope (%): 0-5
 Subregion (LRR or MLRA): LRRN Lat: 40.231565 Long: -79.964478 Datum: NAD83
 Soil Map Unit Name: Rainsboro silt loam, 8 to 15 percent slopes 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 <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

Remarks:

Cowardin Code: PEM

HGM: Depressional

WT: Isolate

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

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

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-SZ5

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>75</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
<u>0</u> = Total Cover 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				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 = _____
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
<u>0</u> = Total Cover 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Scirpus atrovirens</u>	<u>30</u>	<input checked="" type="checkbox"/>	<u>OBL</u>	
2. <u>Epilobium coloratum</u>	<u>20</u>	<input checked="" type="checkbox"/>	<u>FACW</u>	
3. <u>Poa pratensis</u>	<u>20</u>	<input checked="" type="checkbox"/>	<u>FACU</u>	
4. <u>Microstegium vimineum</u>	<u>20</u>	<input checked="" type="checkbox"/>	<u>FAC</u>	
5. <u>Cyperus esculentus</u>	<u>5</u>		<u>FACW</u>	
6. _____	_____	_____	_____	
<u>95</u> = Total Cover 50% of total cover: <u>47.5</u> 20% of total cover: <u>19</u>				
Woody Vine Stratum (Plot size: <u>15'</u>)				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.
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
<u>0</u> = Total Cover 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
Remarks: (Include photo numbers here or on a separate sheet.)				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____

SOIL

Sampling Point: W-SZ5[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Allegheny Sampling Date: 03/02/2016
Applicant/Owner: Sunoco Logistics, L.P. State: PA Sampling Point: W-SZ4-PEM
Investigator(s): JM, SZ Section, Township, Range: NA
Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): Concave Slope (%): 0-5
Subregion (LRR or MLRA): LRRN Lat: 40.231560 Long: -79.964295 Datum: NAD83
Soil Map Unit Name: Rainsboro silt loam, 8 to 15 percent slopes 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 <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

Remarks:

Cowardin Code: PEMHGM: RiverineWT: RPWWD**HYDROLOGY**

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
<u>Primary Indicators (minimum of one is required; check all that apply)</u>		<input type="checkbox"/> Surface Soil Cracks (B6)
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Saturation (A3)	<input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Iron Deposits (B5)		<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> Aquatic Fauna (B13)		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:Surface Water Present? Yes ☒ No ☐ Depth (inches): 0.5Water Table Present? Yes ☒ No ☐ Depth (inches): 4Saturation Present? Yes ☒ No ☐ Depth (inches): 0
(includes capillary fringe)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-SZ4-PEM

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>3</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67%</u> (A/B)
4. _____	_____	_____	_____	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 = _____
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
_____ = Total Cover 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. <u>Acer negundo</u>	<u>5</u>	<input checked="" type="checkbox"/>	<u>FAC</u>	
2. <u>Rosa multiflora</u>	<u>5</u>	<input checked="" type="checkbox"/>	<u>FACU</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
_____ = Total Cover 50% of total cover: <u>5</u> 20% of total cover: <u>2</u>				
Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Glyceria striata</u>	<u>50</u>	<input checked="" type="checkbox"/>	<u>OBL</u>	
2. <u>Impatiens sp</u>	<u>10</u>	_____	<u>FACW</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
_____ = Total Cover 50% of total cover: <u>30</u> 20% of total cover: <u>12</u>				
Woody Vine Stratum (Plot size: <u>15'</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
Remarks: (Include photo numbers here or on a separate sheet.) Impatiens sp. - both species of Impatiens found in PA have a hydric indicator status of FACW				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____

SOIL

Sampling Point: W-SZ4-PEM

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Allegheny Sampling Date: 03/02/2016
Applicant/Owner: Sunoco Logistics, L.P. State: PA Sampling Point: W-SZ4-PFO
Investigator(s): JM, SZ Section, Township, Range: NA
Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): Concave Slope (%): 0-5
Subregion (LRR or MLRA): LRRN Lat: 40.231286 Long: -79.963989 Datum: NAD83
Soil Map Unit Name: Strip mines, 8 to 25 percent slopes 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 <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

Remarks:

Cowardin Code: PFO

HGM: Riverine

WT: RPWWD

HYDROLOGY

Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
<u>Primary Indicators (minimum of one is required; check all that apply)</u>	<input type="checkbox"/> Surface Soil Cracks (B6)
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> High Water Table (A2)	<input checked="" type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Iron Deposits (B5)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Microtopographic Relief (D4)
<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> True Aquatic Plants (B14)	
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	
<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	
<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	
<input checked="" type="checkbox"/> Thin Muck Surface (C7)	
<input type="checkbox"/> Other (Explain in Remarks)	

Field Observations:

Surface Water Present? Yes ☒ No ☐ Depth (inches): 1

Water Table Present? Yes ☐ No ☒ Depth (inches):

Saturation Present? Yes ☐ No ☒ Depth (inches):
(includes capillary fringe)

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-SZ4-PFO

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>Acer rubrum</u>	<u>25</u>	<input checked="" type="checkbox"/>	<u>FAC</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>6</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67%</u> (A/B)
2. <u>Acer negundo</u>	<u>15</u>	<input checked="" type="checkbox"/>	<u>FAC</u>	
3. <u>Celtis occidentalis</u>	<u>5</u>		<u>FACU</u>	
4. _____				
5. _____				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 = _____
6. _____				
7. _____				
8. _____				
50% of total cover: <u>22.5</u> 20% of total cover: <u>9</u> Sapling/Shrub Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
1. <u>Lonicera morrowi</u>	<u>15</u>	<input checked="" type="checkbox"/>	<u>FACU</u>	
2. _____				
3. _____				
50% of total cover: <u>7.5</u> 20% of total cover: <u>3</u> Herb Stratum (Plot size: <u>5'</u>)				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.
1. <u>Allium vineale</u>	<u>10</u>	<input checked="" type="checkbox"/>	<u>FACU</u>	
2. <u>Geum laciniatum</u>	<u>10</u>	<input checked="" type="checkbox"/>	<u>FAC</u>	
3. <u>Verbesina alternifolia</u>	<u>5</u>	<input checked="" type="checkbox"/>	<u>FAC</u>	
50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u> Woody Vine Stratum (Plot size: <u>15'</u>)				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
1. _____				
2. _____				
3. _____				
50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
Remarks: (Include photo numbers here or on a separate sheet.)				

SOIL

Sampling Point: W-SZ4-PFO

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: PPP City/County: Allegheny Sampling Date: 03/02/2016
Applicant/Owner: Sunoco Logistics, L.P. State: PA Sampling Point: W-SZ3,4,5-UPL
Investigator(s): JM, SZ Section, Township, Range: NA
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): Convex Slope (%): 5-10
Subregion (LRR or MLRA): LRRN Lat: 40.230736 Long: -79.964309 Datum: NAD83
Soil Map Unit Name: Rainsboro silt loam, 8 to 15 percent slopes 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 <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	

Remarks:

Upland

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)		
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Aquatic Fauna (B13)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

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

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-SZ3,4,5-UPL

Tree Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. <u>Juglans nigra</u>	<u>10</u>	<input checked="" type="checkbox"/>	<u>FACU</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)
2. <u>Prunus serotina</u>	<u>10</u>	<input checked="" type="checkbox"/>	<u>FACU</u>	Total Number of Dominant Species Across All Strata: <u>6</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33</u> (A/B)
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
<u>20</u> = Total Cover 50% of total cover: <u>10</u> 20% of total cover: <u>4</u>				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. <u>Rubus occidentalis</u>	<u>30</u>	<input checked="" type="checkbox"/>	<u>UPL</u>	Prevalence Index worksheet: <u> </u> Total % Cover of: <u> </u> Multiply by: OBL species <u> </u> x 1 = <u> </u> FACW species <u> </u> x 2 = <u> </u> FAC species <u> </u> x 3 = <u> </u> FACU species <u> </u> x 4 = <u> </u> UPL species <u> </u> x 5 = <u> </u> Column Totals: <u> </u> (A) <u> </u> (B) Prevalence Index = B/A = <u> </u>
2. <u>Rubus allegheniensis</u>	<u>10</u>	<input checked="" type="checkbox"/>	<u>FACU</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
<u>40</u> = Total Cover 50% of total cover: <u>20</u> 20% of total cover: <u>8</u>				
Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Microstegium vimineum</u>	<u>25</u>	<input checked="" type="checkbox"/>	<u>FAC</u>	Hydrophytic Vegetation Indicators: <u> </u> 1 - Rapid Test for Hydrophytic Vegetation <u> </u> 2 - Dominance Test is >50% <u> </u> 3 - Prevalence Index is ≤3.0 ¹ <u> </u> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Verbesina alternifolia</u>	<u>15</u>	<input checked="" type="checkbox"/>	<u>FAC</u>	
3. <u>Dichanthelium clandestinum</u>	<u>10</u>	_____	<u>FAC</u>	
4. <u>Symphyotrichum pilosum</u>	<u>5</u>	_____	<u>FAC</u>	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>55</u> = Total Cover 50% of total cover: <u>27.5</u> 20% of total cover: <u>11</u>				
Woody Vine Stratum (Plot size: <u>15'</u>)				
1. _____	_____	_____	_____	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.
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
<u>0</u> = Total Cover 50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
Hydrophytic Vegetation Present? Yes <u> </u> No <input checked="" type="checkbox"/>				
Remarks: (Include photo numbers here or on a separate sheet.) 				

SOIL

Sampling Point: W-SZ3,4,5-UPL

[illegible]

APPENDIX B
WETLAND PHOTOGRAPHS



Photograph Number: 1 **Feature Name:** W-SZ3 **Date:** 03/02/2016
Direction: N **Plant Community:** PEM **Remarks:** N/A



Photograph Number: 2 **Feature Name:** W-SZ5 **Date:** 03/02/2016
Direction: NW **Plant Community:** PEM **Remarks:** N/A



Photograph Number: 3 **Feature Name:** W-SZ4 PEM **Date:** 03/02/2016
Direction: NW **Plant Community:** PEM **Remarks:** N/A



Photograph Number: 4 **Feature Name:** W-SZ4 PFO **Date:** 03/02/2016
Direction: E **Plant Community:** PFO **Remarks:** N/A

APPENDIX C
STREAM DATA SHEETS

STREAM ID S-SZ1		STREAM NAME UNT to Monongahela River	
LAT 40.230556 LONG -79.964310		DATE 03/02/2016	
CLIENT Sunoco Logistics, L.P.		PROJECT NAME PPP	
INVESTIGATORS JM, SZ			
WATER TYPE TNW <input type="checkbox"/> RPW <input checked="" type="checkbox"/> NRPW <input type="checkbox"/>		FLOW REGIME Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral <input type="checkbox"/>	

CHANNEL FEATURES	Estimate Measurements Top of Bank Width: <u>3.0</u> ft Top of Bank Height: LB <u>2.0</u> ft RB <u>2.0</u> ft Water Depth: <u>1.00</u> in Water Width: <u>0.5</u> ft Ordinary High Water Mark (Width): <u>8.0</u> in Ordinary High Water Mark (Height): <u>2.0</u> in Flow Direction: <u>Northwest</u>	Stream Erosion <input checked="" type="checkbox"/> None <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy Artificial, Modified or Channelized <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Dam Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Sinuosity <input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High Gradient <input type="checkbox"/> Flat <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Severe (0.5/100 ft) (2 ft/100 ft) (10 ft/100 ft)
	Water Present <input type="checkbox"/> No water, stream bed dry <input type="checkbox"/> Stream bed moist <input type="checkbox"/> Standing water <input checked="" type="checkbox"/> Flowing water Velocity <input type="checkbox"/> Fast <input type="checkbox"/> Moderate <input checked="" type="checkbox"/> Slow	Proportion of Reach Represented by Stream Morphology Types Riffle 100 % Run % Pool % Turbidity <input type="checkbox"/> Clear <input type="checkbox"/> Slightly turbid <input checked="" type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other _____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%) 100			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	40
Boulder	> 256 mm (10")				
Cobble	64-256 mm (2.5"-10")		Muck-Mud	black, very fine organic (FPOM)	
Gravel	2-64 mm (0.1"-2.5")	5			
Sand	0.06-2mm (gritty)	65	Marl	grey, shell fragments	
Silt	0.004-0.06 mm	30			
Clay	< 0.004 mm (slick)				

WATERSHED FEATURES	Predominant Surrounding Landuse <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Residential <input type="checkbox"/> Other: _____ Canopy Cover <input type="checkbox"/> Open <input type="checkbox"/> Partly shaded <input checked="" type="checkbox"/> Shaded	Indicate the dominant type <input checked="" type="checkbox"/> Trees <input type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous Floodplain Width <input type="checkbox"/> Wide > 30ft <input checked="" type="checkbox"/> Moderate 15-30ft <input type="checkbox"/> Narrow <16ft Wetland Present <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Wetland ID W-SZ3
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AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present <input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free floating <input type="checkbox"/> Floating algae <input type="checkbox"/> Attached algae
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MACROINVERTEBRATES OR OTHER WILDLIFE OBSERVED/OTHER OBSERVATIONS AND NOTES	
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STREAM ID S-SZ2		STREAM NAME UNT to Monongahela River	
LAT 40.231540	LONG -79.964256	DATE 03/02/2016	
CLIENT Sunoco Logistics, L.P.		PROJECT NAME PPP	
INVESTIGATORS JM, SZ			
WATER TYPE TNW <input type="checkbox"/> RPW <input checked="" type="checkbox"/> NRPW <input type="checkbox"/>		FLOW REGIME Perennial <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Ephemeral <input type="checkbox"/>	

CHANNEL FEATURES	Estimate Measurements Top of Bank Width: <u>4.0</u> ft Top of Bank Height: LB <u>1.0</u> ft RB <u>1.0</u> ft Water Depth: <u>3.00</u> in Water Width: <u>1.5</u> ft Ordinary High Water Mark (Width): <u>2.0</u> in Ordinary High Water Mark (Height): <u>6.0</u> in Flow Direction: <u>Northwest</u>	Stream Erosion <input checked="" type="checkbox"/> None <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy Artificial, Modified or Channelized <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Dam Present <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Sinuosity <input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High Gradient <input checked="" type="checkbox"/> Flat <input type="checkbox"/> Moderate <input type="checkbox"/> Severe (0.5/100 ft) (2 ft/100 ft) (10 ft/100 ft)
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FLOW CHARACTERISTICS	Water Present <input type="checkbox"/> No water, stream bed dry <input type="checkbox"/> Stream bed moist <input type="checkbox"/> Standing water <input checked="" type="checkbox"/> Flowing water Velocity <input type="checkbox"/> Fast <input checked="" type="checkbox"/> Moderate <input type="checkbox"/> Slow	Proportion of Reach Represented by Stream Morphology Types Riffle 80 % Run % Pool 20 % Turbidity <input type="checkbox"/> Clear <input checked="" type="checkbox"/> Slightly turbid <input type="checkbox"/> Turbid <input type="checkbox"/> Opaque <input type="checkbox"/> Stained <input type="checkbox"/> Other _____
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INORGANIC SUBSTRATE COMPONENTS (should add up to 100%) 100			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	
Boulder	> 256 mm (10")				
Cobble	64-256 mm (2.5"-10")	10	Muck-Mud	black, very fine organic (FPOM)	
Gravel	2-64 mm (0.1"-2.5")	30			
Sand	0.06-2mm (gritty)	50	Marl	grey, shell fragments	
Silt	0.004-0.06 mm	10			
Clay	< 0.004 mm (slick)				

WATERSHED FEATURES	Predominant Surrounding Landuse <input checked="" type="checkbox"/> Forest <input type="checkbox"/> Commercial <input type="checkbox"/> Field/Pasture <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Residential <input checked="" type="checkbox"/> Other: _____ Canopy Cover <input type="checkbox"/> Open <input checked="" type="checkbox"/> Partly shaded <input type="checkbox"/> Shaded	Indicate the dominant type <input checked="" type="checkbox"/> Trees <input checked="" type="checkbox"/> Shrubs <input type="checkbox"/> Grasses <input type="checkbox"/> Herbaceous Floodplain Width <input type="checkbox"/> Wide > 30ft <input type="checkbox"/> Moderate 15-30ft <input checked="" type="checkbox"/> Narrow <16ft Wetland Present <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Wetland ID W-SZ4
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AQUATIC VEGETATION	Indicate the dominant type and record the dominant species present <input type="checkbox"/> Rooted emergent <input type="checkbox"/> Rooted submergent <input type="checkbox"/> Rooted floating <input type="checkbox"/> Free floating <input type="checkbox"/> Floating algae <input type="checkbox"/> Attached algae
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MACROINVERTEBRATES OR OTHER WILDLIFE OBSERVED/OTHER OBSERVATIONS AND NOTES	
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APPENDIX D
STREAM PHOTOGRAPHS



Photograph Number: 5 **Feature Name:** S-SZ1 **Date:** 03/02/2016
Direction: S, Downstream **Flow Regime:** Intermittent **Remarks:** N/A



Photograph Number: 6 **Feature Name:** S-SZ2 **Date:** 03/02/2016
Direction: N, Downstream **Flow Regime:** Intermittent **Remarks:** N/A

APPENDIX E
HYDRIC SOILS LIST

Hydric Soils List

Allegheny County, Pennsylvania

Map Unit Symbol	Map Unit Name	Component Name and Phase	Landforms
At	Atkins silt loam	Atkins	flood plains
BrB	Brinkerton silt loam, 2 to 8 percent slopes	Brinkerton	draws
BrC	Brinkerton silt loam, 8 to 15 percent slopes	Brinkerton	
BrC	Brinkerton silt loam, 8 to 15 percent slopes	Atkins	flood plains
CaB	Cavode silt loam, 2 to 8 percent slopes	Brinkerton	draws
CaC	Cavode silt loam, 8 to 15 percent slopes	Brinkerton	draws
CeB	Caneadea silt loam, 3 to 8 percent slopes	Canadice	lakebeds (relict)
CeB	Caneadea silt loam, 3 to 8 percent slopes	Mill	ground moraines
CoD	Cookport loam, 15 to 25 percent slopes	Andover	mountain slopes
Du	Dumps, coal wastes	Wet spots	depressions
Dw	Dumps, industrial wastes	Wet spots	draws
ErB	Ernest silt loam, 2 to 8 percent slopes	Brinkerton	hills

ErC	Ernest silt loam, 8 to 15 percent slopes	Brinkerton	hills
EvB	Ernest-Vandergrift silt loams, 3 to 8 percent slopes	Brinkerton	hillslopes
EvC	Ernest-Vandergrift silt loams, 8 to 15 percent slopes	Brinkerton	hillslopes
EvD	Ernest-Vandergrift silt loams, 15 to 25 percent slopes	Brinkerton	hillslopes
GvB	Guernsey-Vandergrift silt loams, 3 to 8 percent slopes	Brinkerton	hills
GvC	Guernsey-Vandergrift silt loams, 8 to 15 percent slopes	Brinkerton	hills
GvD	Guernsey-Vandergrift silt loams, 15 to 25 percent slopes	Brinkerton	hills
Gx	Gullied land	Brinkerton	draws
Hu	Huntington silt loam	Atkins	flood plains
Ln	Lindside silt loam	Melvin	flood plains
Ne	Newark silt loam	Brinkerton	depressions
Ne	Newark silt loam	Atkins	flood plains
Ph	Philo silt loam	Atkins	flood plains
TaB	Tilsit silt loam, 3 to 8 percent slopes	Brinkerton	hills
UGB	Urban land-Guernsey complex, gently sloping	Thorndale	draws
URB	Urban land-Rainsboro complex, gently sloping	Ginat	terraces
UWB	Urban land-Wharton complex, gently sloping	Armagh	hills

VcB	Vandergrift-Cavode silt loams, 3 to 8 percent slopes	Brinkerton	hillslopes
VcC	Vandergrift-Cavode silt loams, 8 to 15 percent slopes	Brinkerton	
VcD	Vandergrift-Cavode silt loams, 15 to 25 percent slopes	Brinkerton	
WhB	Wharton silt loam, 3 to 8 percent slopes	Cavode	hills
WhB	Wharton silt loam, 3 to 8 percent slopes	Brinkerton	depressions

APPENDIX F
RESUMES

Preston R Smith
DEPARTMENT MANAGER/BIOLOGIST/ECOLOGIST
PITTSBURGH, PA

EDUCATION: B.S. Biology (Environmental Science); University of Pittsburgh; Dec. 2000
M.S. Biological Sciences; Wright State University; March 2010

EXPERIENCE SUMMARY:

Mr. Preston Smith is a Biologist with 13+ total years of professional experience. Mr. Smith currently manages the Wetlands and Ecological Services Department for the Appalachian Basin Oil and Gas Services Group. His current responsibilities include project management, staff management, workload delegation including scheduling personnel for field work and report writing, QA/QC of work products and deliverables, and proposal/budget preparation. Mr. Smith has been involved in wetland delineations, habitat studies, plant surveys, permitting, and related report generation for commercial Oil and Gas clients in Pennsylvania, Ohio, and West Virginia for natural gas pipelines, water lines, well pads, impoundments, and water withdrawal locations. Since starting at Tetra Tech, Mr. Smith has also been involved in NEPA Categorical Exclusion, Environmental Assessment, and Environmental Impact Statement projects in several capacities serving as Project Manager, Deputy Project Manager, Water Resources Specialist, and Ecologist for various clients including the US Coast Guard, Department of Energy, Federal Energy Regulatory Commission, Nuclear Regulatory Commission, and Tennessee Department of Transportation.

TRAINING: OSHA 1910.120 40-Hour HAZWOPER Training; June 22, 2007
OSHA 1910.120(e)(4) 8-Hour HAZWOPER Supervisory; October 17, 2008
OSHA 1910.120 8-Hour HAZWOPER Refresher; November 1, 2013
ACOE-based 40-hour Wetland Delineation Certification; June 26, 2009

RELEVANT PROJECT EXPERIENCE:

Manager, Wetlands and Ecological Services Department; Various Midstream and Exploration and Production Oil and Gas Clients, Ohio, Pennsylvania, and West Virginia, 2011-present. As the Wetlands and Ecological Services Department Manager, Mr. Smith has managed Wetland Delineation and Stream Identification field activities and report generation for 250+ miles of pipeline, 40+ well pads, 20+ water withdrawal locations;

Natural Resources Lead; Confidential Client; Ohio, West Virginia, and Pennsylvania, 2013-present. As the Natural Resources Lead, Mr. Smith is responsible for scheduling and managing Wetland and Stream surveys and Rare, Threatened, and Endangered Species Surveys for an approximately 350-mile Non-FERC, Natural Gas Liquid Pipeline. He is also responsible for Agency coordination.

Task Manager/Biologist; Confidential Client, Washington, Allegheny, and Westmoreland County, PA, 2013. As a Task Manager/Biologist, Mr. Smith scheduled field crews and participated in Rare, Threatened and Endangered Plant surveys for large natural gas pipeline project. A final report was also prepared under Mr. Smith's direction and approval was received from the PA DCNR.

Task Manager/Biologist; Confidential Client, Beaver and Butler County, PA, 2013-present. As a Task Manager/Biologist, Mr. Smith scheduled field crews and participated in Rare, Threatened and Endangered Plant surveys for a large natural gas pipeline project. A final report was also prepared under Mr. Smith's direction and approval was received from the PA DCNR.

Natural Resource Permit Manager; Confidential Client; West Virginia; 2013-present. As the Natural Resource Permitting Manager, Mr. Smith prepared Preconstruction Notifications for U.S. Army Corps of Engineers Nationwide Permit 12 for several natural gas and water pipeline projects. He also prepared a Stream Activity Application Reports for submittal to the WV Department of Natural Resources (WV DNR) Office of Lands and Streams as part of these projects. Mr. Smith coordinated with US Fish and Wildlife Service and WV DNR Natural Heritage Program to evaluate the potential for threatened and endangered species within the project areas.

Natural Resource Permit Manager; Multiple Clients; Ohio; 2012-present. As the Natural Resource Permitting Manager, Mr. Smith prepared Preconstruction Notifications for U.S. Army Corps of Engineers Nationwide Permit 12 for several natural gas pipeline projects. Mr. Smith coordinated with US Fish and Wildlife Service and the Ohio Department of Natural Resources Division of Wildlife to evaluate the potential for threatened and endangered species within the project areas.

Project Manager; Stream Restoration Plan; Confidential Client; Eastern Ohio; 2013. As a Project Manager, Mr. Smith managed and contributed to Stream Restoration and Mitigation Plan for an Ohio EPA Director's Authorization to open cut a Class III Cold-water habitat stream. The Stream Restoration and Mitigation Plan was approved by Ohio EPA and led to the successful approval of the Director's Authorization.

Task Manager; Confidential Client; Fayette County, PA, September 2012. As a Task Manager/Biologist, Mr. Smith scheduled field crews for a Rare, Threatened and Endangered Plant survey for a natural gas pipeline project. A final report was also prepared under Mr. Smith's direction and approval was received from the PA DCNR.

Task Manager; Confidential Client; Armstrong County, PA, July 2012. As a Task Manager/Biologist, Mr. Smith scheduled field crews for a Rare, Threatened and Endangered Plant survey for a natural gas pipeline project. A final report was also prepared under Mr. Smith's direction and approval was received from the PA DCNR.

Project Biologist; Confidential Client; Fayette County, PA; 2010. As a Project Biologist, Mr. Smith completed a field survey for presence/absence and potential habitat survey for the Allegheny woodrat, *Neotoma magister*, and submitted the report to the PA Game Commission for expedited review for Marcellus Shale-related activities. The survey was approved by the PA Game Commission.

Biologist/Wetland Delineator; Confidential Clients; Western PA/Northern West Virginia/Eastern Ohio; 2009-present. As a Biologist/Wetland Delineator, Mr. Smith has conducted and assisted with wetland investigations based on the 1987 US Army Corps of Engineers Wetland Delineation Manual and Regional Supplements. The investigations involved

identifying wetland vegetation, soils, and hydrology along linear pipelines, water withdrawal sites, and well pad sites and preparing Wetland Reports for Marcellus/Utica Shale-related activities.

Biologist; Confidential Client; Eastern OH; 2012. As a Biologist, Mr. Smith assisted with a habitat survey for Indiana Bat roost tree suitability. The investigations involved identifying suitable habitat for the Indiana bat (*Myotis sodalis*) and preparing a report for submittal with a Nationwide Permit 12 to the Army Corps of Engineers.

Natural Resource Permit Manager; Confidential Client; West Virginia; 2011. As the Project Permitting Manager, Mr. Smith coordinated with USFWS and WV Department of Natural Resources (WV DNR) to secure the permitting for Nationwide Permit 12 for a natural gas pipeline project. Mr. Smith also prepared a Stream Activity Application Report for submittal to the WV DNR as part of this project.

Project Manager; Environmental Assessment for the New Station Lake Charles; U.S. Coast Guard; Lake Charles, LA. 2010-2011. As a project manager, Mr. Smith managed all aspects of the EA and Finding of No Significant Impact for construction and operation of a new USCG facility in Lake Charles, LA from kickoff to completion. His duties included client management, budget monitoring, workload delegation, agency coordination, contributing to various sections of the document, site visit to characterize habitat, and publishing and submittal of all documents.

Deputy Project Manager; Environmental Impact Statement for a Coal Gasification Plant; U.S. Department of Energy; Beaumont, TX. 2009-2010. As a Deputy Project Manager, Mr. Smith assisted the Project Manager with client relations, attended the Public Scoping Meeting, coordinated and attended meetings with federal and local agencies, drafted and attended project meetings, and authored several ecological sections of a pre-Draft Environmental Impact Statement for the DoE for the TX Energy Industrial Gasification Plant. Mr. Smith also coordinated and participated in Biological surveys including fish and benthic sampling on the Neches River and a site habitat characterization in for the project, which is currently on hold.

NEPA Project Manager; Categorical Exclusion for the Memphis Medical Center Streetscape; City of Memphis; Memphis, TN. 2011-present. As a NEPA project manager, Mr. Smith is managing all aspects of the CE for street improvements along a 2.81-mile segment of Elvis Presley Boulevard. His duties include client management, budget monitoring, workload delegation, agency coordination, contributing to the document, and publishing and submittal of all documents.

NEPA Analyst/Environmental Scientist; FERC-regulated Environmental Assessment for an Interstate Natural Gas Pipeline; West Virginia and Pennsylvania; 2010-present. As a NEPA analyst, Mr. Smith drafted the Aquatic Resource section of a FERC-regulated EA for a commercial Oil and Gas client for Marcellus Shale-related activities.

NEPA Analyst/Ecologist; NEPA Environmental Report in support of a DOE Federal Loan Guarantee Program for Clean Coal Technology for a Coal Gasification Plant; Beaumont, TX; Eastman Chemical; 2008-2009. As a NEPA Specialist, Mr. Smith authored several ecological sections of an Environmental Report in support of an Environmental Impact Statement for the DoE for the TX Energy Industrial Gasification Plant.

Biologist/Field Operations Leader; TX Energy Environmental Report; Eastman Chemical; Beaumont, TX; 2008. As the Field Operations Leader, Mr. Smith coordinated and participated in Biological surveys including fish and benthic sampling on the Neches River and a site habitat characterization in Beaumont, TX.

Deputy Project Manager/NEPA Analyst/Ecologist; Environmental Assessment for a Dredge Boat Basin at the U.S. Coast Guard Station, Marblehead, OH; 2007. As a Deputy Project Manager/NEPA Analyst/Ecologist, Mr. Smith contributed to the planning and development of an environmental assessment and Finding of No Significant Impact/Record of Decision for a proposed blasting/dredging operation for the U.S. Coast Guard. He authored the geology, topography, soils, seismic zone considerations and coastal zone considerations; water resources and drainage; hazardous materials and hazardous waste; aquatic environment; threatened and endangered species; and the wild and scenic rivers sections of the environmental assessment in addition to assisting with overall document research and development.

Aquatic Ecologist; South Texas Project Combined Construction and Operating License Application Environmental Report; Bechtel; Texas; 2007. As an Aquatic Ecologist, Mr. Smith prepared the aquatic ecology sections for site alternatives to building and operating two Advanced Boiling Water Reactors (ABWR) units on the South Texas Project (STP) site. He evaluated the aquatic environmental impacts associated with developing new nuclear capacity at each of three alternative sites. Part of the evaluation included the impacts of water usage and disposal for electricity generation. Additionally, the impacts to threatened and endangered species were considered.

Aquatic Ecologist; Beaver Valley Nuclear Power Station License Renewal Environmental Review Program; FirstEnergy Nuclear Operating Company; Pennsylvania; 2007. As an Aquatic Ecologist, Mr. Smith prepared part of the aquatic impacts section of an environmental report for the Davis-Besse Nuclear Power Station license renewal. The focus of the section was assessing the impacts of impingement/entrainment on fish species and comparing the data to permissible rates.

Benthic Ecologist; U.S. Navy, NSF Dahlgren, VA; 2008-present. As a benthic ecologist, Mr. Smith prepared response to comments, attended meetings, and prepared a work plan for field studies, and a benthic report in support of benthic monitoring program at NSF Dahlgren.

Ecologist; Endangered Species Review; Munitions Response Program; MCB Quantico; 2007-2008. As an Ecologist, Mr. Smith prepared the endangered species section of the Munitions Response Program at the Marine Corps Base Quantico. He gathered information on species occurring at the base and determined the Federal and State status of those species and identified locations where those species are likely to occur.

Project Manager; Wetland Delineation for the New Station Lake Charles; U.S. Coast Guard; Lake Charles, LA. 2011-2012. As a project manager, Mr. Smith is currently managing all aspects of the Wetland Delineation for a proposed site of a new USCG facility in Lake Charles, LA. His duties

included client management, budget monitoring, workload delegation, and review of the jurisdictional determination.

CHRONOLOGICAL WORK HISTORY:

Wetlands and Ecological Services Department Manager, Tetra Tech NUS, Inc.; Pittsburgh, PA; November 2011-present.

Biologist/Ecological Risk Assessor; Tetra Tech NUS, Inc.; Pittsburgh, PA; January 2007-November 2011.

Research Assistant/Lab Manager; Wright State University; Dayton, OH; September 2003-December 2006.

Managed an aquatic toxicology laboratory. Responsibilities included maintaining laboratory cultures and supplies, managing grant related research projects (see descriptions above), supervising undergraduate students, writing technical reports, conducting literature reviews, and maintaining laboratory and field equipment.

Research Assistant; Indiana University of Pennsylvania; Indiana, PA; September 2002-August 2003.

Provided support in maintaining laboratory insect cultures and supplies. Conducted small mammal surveys; endangered reptile surveys (Eastern Massasauga Rattlesnake); collected and identified amphibians and reptiles in Western Pennsylvania for the Pennsylvania Herpetological Atlas; identified benthic macroinvertebrates for Abandoned Mine Drainage projects.

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.

EXPERIENCE SUMMARY

Ms. Stephanie Zabowski Lieb is a wetland/environmental scientist with 5+ years of experience in wetland delineation and stream evaluation, and rare, threatened & endangered botanical surveying and assessment, throughout Pennsylvania, Ohio, and West Virginia. This includes preparation of wetland delineation and stream evaluation reports, botanical reports, US Army Corps Joint and Nation Wide Permits, and PA Department of Environmental Protection General Permits. Stephanie has additional experience performing geographic information systems (GIS) data processing and figure creation using ArcGIS10.1. She also has experience performing bat hibernaculum and summer roost tree habitat surveys in West Virginia.

RELEVANT EXPERIENCE

Wetland/Environmental Scientist III; Sunoco Logistics; OPP Natural Gas Pipeline Projects, Ohio and West Virginia; August 2015 to present. Responsibilities included aiding in wetland delineations and stream assessments for the proposed 70 miles of the Ohio Pipeline and West Virginia Pipeline Projects.

Wetland/Environmental Scientist III; MarkWest Liberty Midstream & Resources, LLC; Fox to Houston Natural Gas Pipeline Project, Washington County, PA; August 2015 to present. Responsible for conducting wetland delineations and stream assessments for the approximate 1 mile of proposed pipeline.

Environmental Scientist; Pittsburgh Botanic Garden; Kentucky Hollow Site, Allegheny County, PA; 2015. Responsible conducting wetland delineations and stream assessments for the approximate 40 acre area for proposed construction of trails and passive acid mine drainage treatment system. Prepared wetland delineation and stream assessment reports and associated GIS data processing and figure creation.

Environmental Scientist; EQT Gathering; NIMC S001 Pipeline Project, Allegheny & Washington Counties, PA; 2015. Responsible for conducting botanical survey for wild hyacinth (*Cammasia scilloides*) and snow trillium (*Trillium nivale*), PA state-listed species. Responsible for preparing a botanical survey report.

Environmental Scientist; Grace Baptist Church Additions; Grace Baptist Church, Allegheny County, PA; 2015. Responsible for compiling components of the NPDES permit package and GIS figure creation for church additions.

Environmental Scientist; NiSource Midstream Services, LLC; East Washington Gathering Pipeline Project, Washington County, PA; 2015. Assisted in the transplantation of Short's sedge

EDUCATION

B.S. Environmental Resource Management,
The Pennsylvania State University, May 2009

Minors: Wildlife and Fisheries Science, May 2009; Watershed and Water Resources, May 2009

REGISTRATIONS

Wild Plant Management Permit, PA, 2015
Permit # 15-650

AREA OF EXPERTISE

Wetland Delineation and Stream Identification;
RTE Botanical Surveys

TRAINING/CERTIFICATIONS

USFWS and WV DNR Sponsored Training for the Identification of the Federally Listed Running Buffalo Clover, Virginia Spirea, and Small Whorled Pogonia, May 2015.

2015 PA Plant Forum and Winter Woody ID workshop. Sponsored by the PA DCNR and Western Pennsylvania Conservancy, April 2015.

USACE 1987 Manual and Regional Supplement Wetland Delineation Training, Swamp School, 2013.

Ohio Rapid Assessment Method for Wetlands Training, Ohio EPA, 2013.

Grasses, Sedges and Rushes Identification Workshop. Taught by Sarah Chamberlain, 2013.

Sedge Identification Workshop. Taught by Dr. Timothy Block and Dr. Ann Rhoads, 2013.

OFFICE

Pittsburgh, PA

YEARS OF EXPERIENCE

5+

YEARS WITHIN FIRM

0

CONTACT

Stephanie.ZabowskiLieb@TetraTech.com

(*Carex shortiana*), a PA state-listed species, as part of mitigation request by PA DCNR. Responsible for associated GIS data processing and figure creation.

Environmental Scientist; West Newton Borough; 100 Pemberton Place Retaining Wall, Westmoreland County, PA; 2015. Responsible for compiling joint permit registration package and associated GIS figure creation for a 130 foot long retaining wall.

Environmental Scientist; Plum Borough School District; Regency Park Elementary School, Allegheny County, PA; 2015. Responsible for conducting wetland delineations and stream assessments for the approximate 5 acre school property. Prepared wetland delineation and stream assessment reports and associated GIS data processing and figure creation.

Environmental Scientist; Freeport Area School Athletic Field; Freeport Area School District, Butler County, PA; 2015. Responsibilities for compiling components of the NPDES permit package and associated GIS figure creation.

Environmental Scientist; EQT Corporation; Above Ground Storage Tank Inspection/Registration, various Counties, WV; 2014. Responsible for GIS data processing, shapefile creation, organization, progress tracking, and mapping of 1600+ above ground storage tanks.

Environmental Scientist; Sunoco Logistics; Pennsylvania Pipeline Project, Cambria County, PA; 2014. Responsible for conducting botanical survey for federally listed Northeastern Bulrush (*Scirpus ancistrochaetus*) along the 23 mile pipeline route in Cambria County, PA and associated data processing.

Environmental Scientist; Bethel Park Municipal Authority; Bethel Park Wastewater Treatment Plant Expansion, Allegheny County, PA; 2014. Responsible for compiling joint permit registration package and associated GIS figure creation for wastewater treatment plant expansion.

Environmental Scientist; EQT Gathering; Yablonski Well Line Project, Washington & Greene Counties, PA; 2014. Responsible for conducting botanical survey for fringed bluets (*Houstonia canadensis*) and tall larkspur (*Delphinium exaltatum*), PA state-listed species, and preparing associated botanical report for 3 mile pipeline project.

Environmental Scientist; Y-Grade Pipeline Project; Hilcorp Energy Company, Columbiana County, OH; 2014. Responsible for conducting wetland delineations and stream assessments of access roads for proposed pipeline project. Prepared wetland delineation and stream assessment report. Assisted in erosion and sediment control monitoring during pipeline construction.

Environmental Scientist; various projects; Antero Resources, various counties, WV; 2014. Responsible for conducting wetland delineations and stream assessments for various proposed pipeline projects. Prepared wetland delineation and stream assessment reports.

Biologist II; NRG Homer City Services, LLC; Homer City Ash Landfill Expansion, Indiana County, PA; 2013. Responsible for conducting wetland delineations and stream assessments for the approximate 130 acre proposed ash landfill expansion. Prepared wetland delineation and stream assessment reports and associated GIS data processing and figure creation.

Biologist II; MarkWest Liberty Midstream & Resources, LLC; Burg to Wack Pipeline, Butler County, PA; 2013. Responsible for conducting wetland delineations and stream assessments for the approximate 2.5 mile proposed pipeline. Prepared wetland delineation and stream assessment reports, associated GIS data processing and figure creation, and PA DEP general permit package.

Biologist II; MarkWest Liberty Midstream & Resources, LLC; Bame to Bluestone Pipeline, Butler County, PA; 2013. Responsible for conducting wetland delineations and stream assessments for the approximate 3 mile proposed pipeline. Prepared wetland delineation and stream assessment reports, associated GIS data processing and figure creation, and PA DEP general permit package.

Biologist II; MarkWest Liberty Midstream & Resources, LLC; Stebbins to McElhinney Pipeline, Butler County, PA; 2013. Responsible for conducting wetland delineations and stream assessments for the approximate 3 mile proposed pipeline. Prepared wetland delineation and stream assessment reports, associated GIS data processing and figure creation, and PA DEP general permit package.

Biologist II; EQT Gathering, LLC; NIJU S026 Pipeline, Washington County, PA; 2013. Responsible for conducting wetland delineations and stream assessments for the approximate 2.5 mile proposed pipeline. Prepared wetland delineation and stream assessment reports, associated GIS data processing and figure creation, and PA DEP general permit package. Assisted with archeology field work and GIS figure creation.

Biologist II; MarkWest Liberty Midstream & Resources, LLC; Lynn to Stebbins Pipeline, Butler County, PA; 2013. Responsible for conducting a wetland delineation and stream investigation, as well as a botanical survey for a PA state-listed species. Prepared a wetland delineation and stream identification report, botanical survey report, associated GIS data processing and figure creation, and PA DEP general permit package.

Biologist II; EQT Gathering, LLC; MOME S007 Pipeline, Harrison County, WV; 2012. Responsible for preparing nationwide permit package. Also assisted in Indiana Bat habitat assessment and report preparation.

Environmental Scientist; Williams; Huczko to Clark Pipeline Project, Westmoreland County, PA; 2012. Assisted in surveys for PA state-listed species including purple fringeless orchid (*Platanthera peramoena*), bushy bluestem (*Andropogon glomeratus*), shining ladies' tresses (*Spiranthes lucida*), and mountain bugbane (*Actea podocarpa*). Prepared reports for PA state regulatory agencies and associated GIS figure creation.

Environmental Scientist; Williams; Jury to 6-inch Pipeline Project, Westmoreland County, PA; 2011. Assisted in botanical surveys for PA state-listed species including purple rocket (*Iodanthus pinnatifidus*), scouring rush (*Equisetum x ferrissii*), and Torrey's sedge (*Juncus torreyi*) for a 4 mile natural gas pipeline project. Prepared reports for PA state regulatory agencies and associated GIS figure creation.

Environmental Scientist; XTO; North Discharge/Indiana Extension Pipeline Project, Westmoreland & Indiana Counties, PA; 2011. Assisted in a wetland delineation/stream survey and a survey for PA state-listed species including purple fringeless orchid (*Platanthera peramoena*), bushy bluestem (*Andropogon glomeratus*), shining ladies' tresses (*Spiranthes lucida*), leafcup (*Smallanthus uvedalius*), and eastern coneflower (*Rudbeckia fulgida*) for a 12 mile natural gas pipeline project. Prepared reports for PA state regulatory agencies and associated GIS figure creation.

Environmental Scientist; Williams; Gamelands to Jordan Pipeline Project, Greene County, PA; 2011. Assisted in surveys for state-listed species including shining ladies' tresses (*Spiranthes ovalis*), wild senna (*Senna marilandica*), leaf-cup (*Smallanthus uvedalius*), sourwood (*Oxydendron arboreum*), crested dwarf iris (*Iris cristata*), St. Andrew's cross (*Hypericum stragulum*), harbinger-of-spring (*Erigenia bulbosa*), lobed spleenwort (*Asplenium pinnatifidum*), puttyroot (*Aplectrum hyemale*), single-headed pussytoes (*Antennaria solitaria*), and blue monkshood (*Aconitum uncinatum*). Prepared reports for PA state regulatory agencies.

Environmental Scientist; Range Resources; Multiple Temporary and Permanent Water Pipelines; Washington County, Pennsylvania. 2010 to 2011. Responsible for wetland delineations and stream evaluations on dozens of temporary and permanent water pipelines linking frac water impoundments in the Washington County area. Also prepared wetland delineation and stream assessment reports.

CHRONOLOGICAL HISTORY

Wetland/Environmental Scientist III; Tetra Tech, Inc.; Pittsburgh, PA, August 2015 – Present.

Environmental Scientist – Part-time; Pennsylvania Soil and Rock, Inc. Monroeville, PA, March 2015 – August 2015

Environmental Scientist; Dawood Engineering Inc., Canonsburg, PA, February 2014 – January 2015

Biologist II; AECOM Technical Services, Inc.; Pittsburgh, PA, August 2012 – February 2014

Environmental Scientist; Pennsylvania Soil and Rock, Inc.; Monroeville, PA, April 2010 – August 2012

Black Fly Suppression Program Intern; Pennsylvania Department of Environmental Protection; Pittsburgh, PA, May 2008 – August 2008

SCIENTIFIC/TECHNICAL PUBLICATIONS

- N/A

MEMBERSHIPS

- Botanical Society of Western Pennsylvania

AWARDS

- N/A