Supplemental
Aquatic Resources Report

Mariner East Project – Houston to Delmont Mainline

June 2014

Prepared for:
Sunoco Logistics, L.P.
525 Fritztown Road
Sinking Spring, PA

Prepared by:
Tetra Tech, Inc.
285 Ellicott Street
Buffalo, NY 14203

Supplemental Aquatic Resources Report
Mariner East 1, Houston to Delmont Project
Washington County, Pennsylvania

Introduction

Tetra Tech, Inc. (Tetra Tech) was contracted by Sunoco Pipeline, L.P. (SPLP) to perform an aquatic resources survey throughout Washington County, Pennsylvania, for the proposed Mariner East 1 (ME1), Houston to Delmont Project. In the General Permit registration packages submitted for the ME1 Project in July 2013 an Aquatic Resources Report was also submitted to support the registration. Since that submission, new project areas have been identified and field surveys have been completed. This report presents the results of the field surveys conducted and is considered a supplement to the original Aquatic Resources Report. The new project areas resulted in the identification of two (2) new wetlands and eight (8) new streams.

Specifically, the purpose of this supplement is to present the results of the field investigation that was conducted to determine the presence and extent of additional areas within the survey areas that meet the criteria for federal wetlands designation according to the United States Army Corps of Engineers (USACE) guidelines, and are potentially jurisdictional and regulated under Section 404 of the Clean Water Act (CWA). Background review information, field methods, soils, and the presence of USFWS NWI features that fall within 100 feet of the survey areas are provided in the previously submitted ME1 report.

This supplemental report summarizes the characteristics of the delineated resources and provides figures of the survey area (Attachment A, Figures), photographic documentation of the identified aquatic resources (Attachment B, Photographic Record), and datasheets for each resource (Attachment C, Aquatic Resource Data Forms).

Survey Results – Additional Project Areas

Wetlands

Two (2) additional wetlands meeting USACE criteria were identified in the survey area. Their geometry and alignments are included in Attachment A, and photographs of each wetland can be viewed in Attachment B. A summary of wetland characteristics are summarized in Table 1 below.

Table 1. Additional Wetlands Delineated Within the Survey Area

Wetland ID	County[1]	Figure Page Number	Photo Number	Cowardin Classification[2]	Brief Wetland Description
W201	WA	5	1, 2	PEM	Seep within floodplain of stream S269.
W204	WA	6	3, 4	PEM	Topographic depression within hillslope.

[1] WA-Washington

[2] Field classification based on Cowardin *et al*. 1979. PEM = palustrine emergent wetland.

Waterbodies

Tetra Tech identified eight (8) additional streams within the survey area. Their alignments and locations are included in Attachment A and photographs of each stream are included in Attachment B. Table 2 below summarizes the features and characteristics of each stream.

Table 2. Additional Streams Identified Within the Survey Area

Stream ID	County[1]	Figure Page No.	Photo No.	USGS Name	Flow Regime	Bank Width (ft.)	Substrate[2]
S250	WA	1	5, 6	Unnamed Tributary to Little Chartiers Creek	Intermittent	6	--
S260	WA	2	7, 8	Unnamed Tributary to Little Chartiers Creek	Ephemeral	2	B, O
S269	WA	3	9, 10	Unnamed Tributary to Little Chartiers Creek	Intermittent	6	C/G, S, O
S270	WA	3	11, 12	Unnamed Tributary to Little Chartiers Creek	Intermittent	2	C/G, S
S271	WA	3	13, 14	Unnamed Tributary to Little Chartiers Creek	Intermittent	5	C/G, S, O
S279	WA	4	15, 16	Unnamed Tributary to Little Chartiers Creek	Ephemeral	3	C/G, S, O
S280	WA	4	17, 18	Unnamed Tributary to Little Chartiers Creek	Intermittent	3	C/G, S, S/C, O
S281	WA	4	19, 20	Unnamed Tributary to Little Chartiers Creek	Ephemeral	4	C/G, S, O

[1] WA-Washington

[2] B – Boulder, C/G – Cobble/Gravel, S – Sand, S/C – Silt/Clay, O – Organic

References

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31, Washington, D.C. 131 pp.

Environmental Laboratory. 1987. United States Army Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS. 100 pp.

Munsell Color. 2009. Munsell Soil Color Chart. MacBeth Division of Kollmorgen Instruments Corporation. Baltimore, MD. 27 pp.

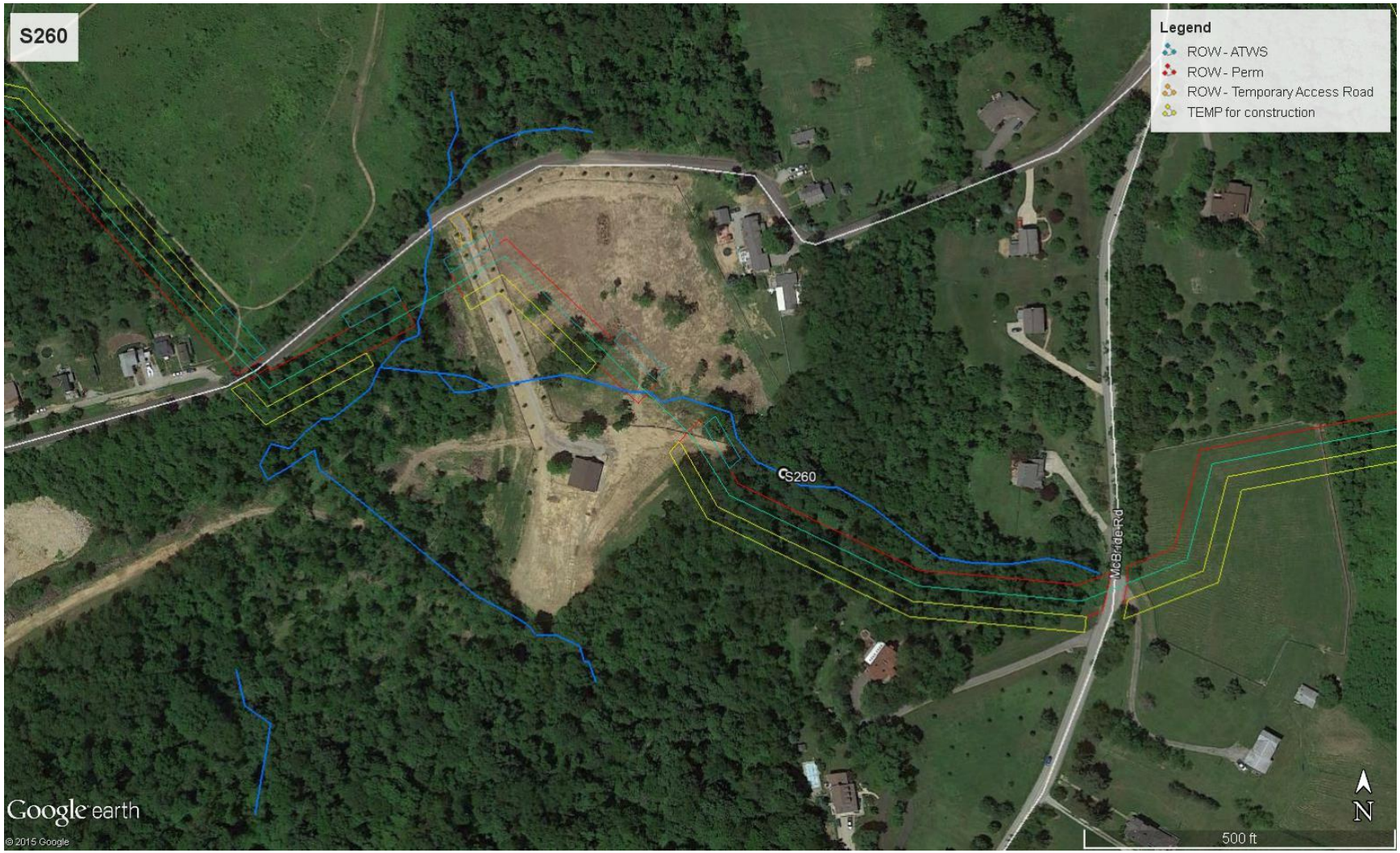
Robert W. Lichvar and John T. Kartesz. 2009. North American Digital Flora: National Wetland Plant List, version 2.4.0 (https://wetland_plants.usace.army.mil). U.S. Army Corps of Engineers, Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH, and BONAP, Chapel Hill, NC. (09/13/2012)

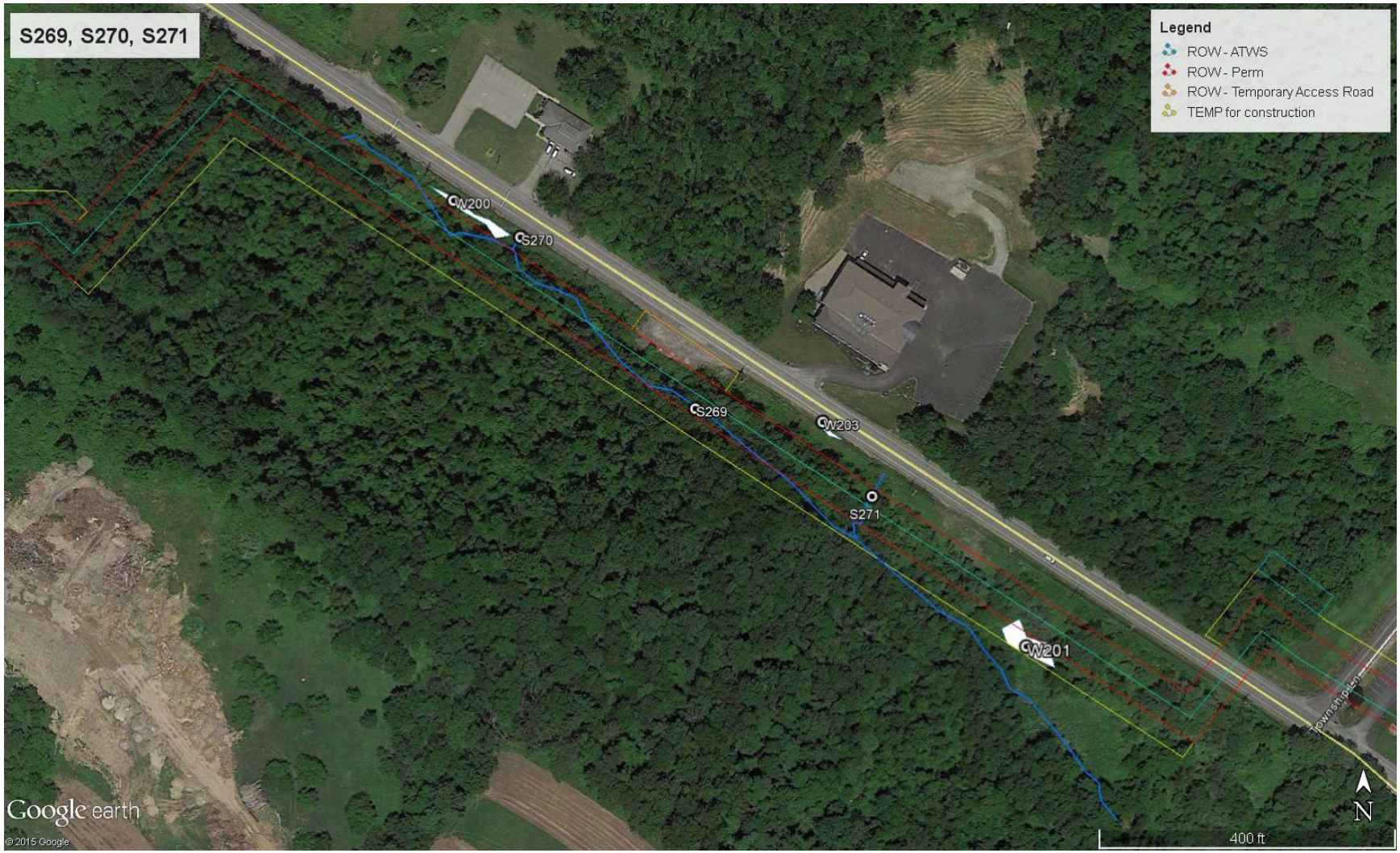
United States Army Corps of Engineers. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region. Vicksburg, MS. 182 pp.

ATTACHMENT A

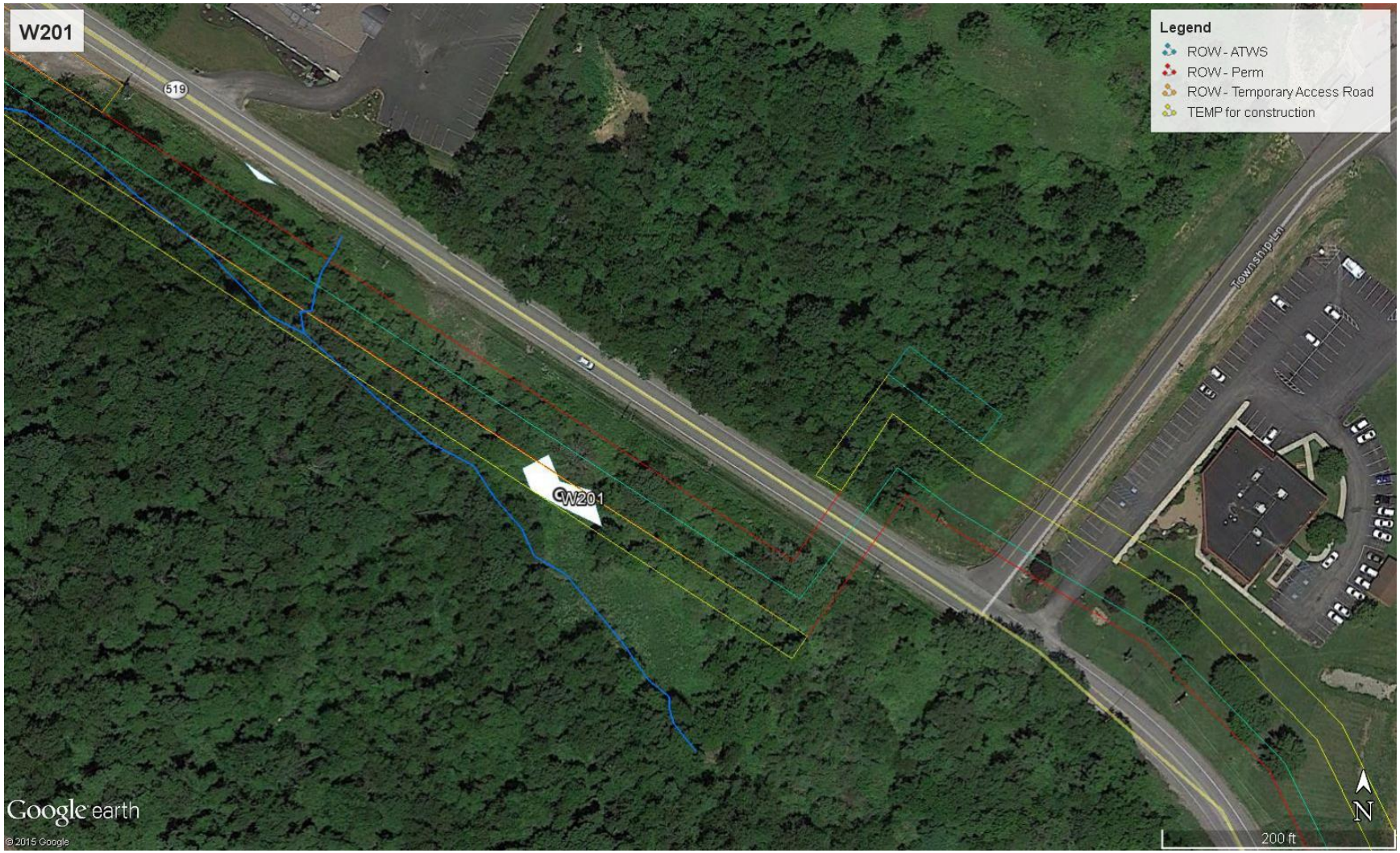
FIGURES

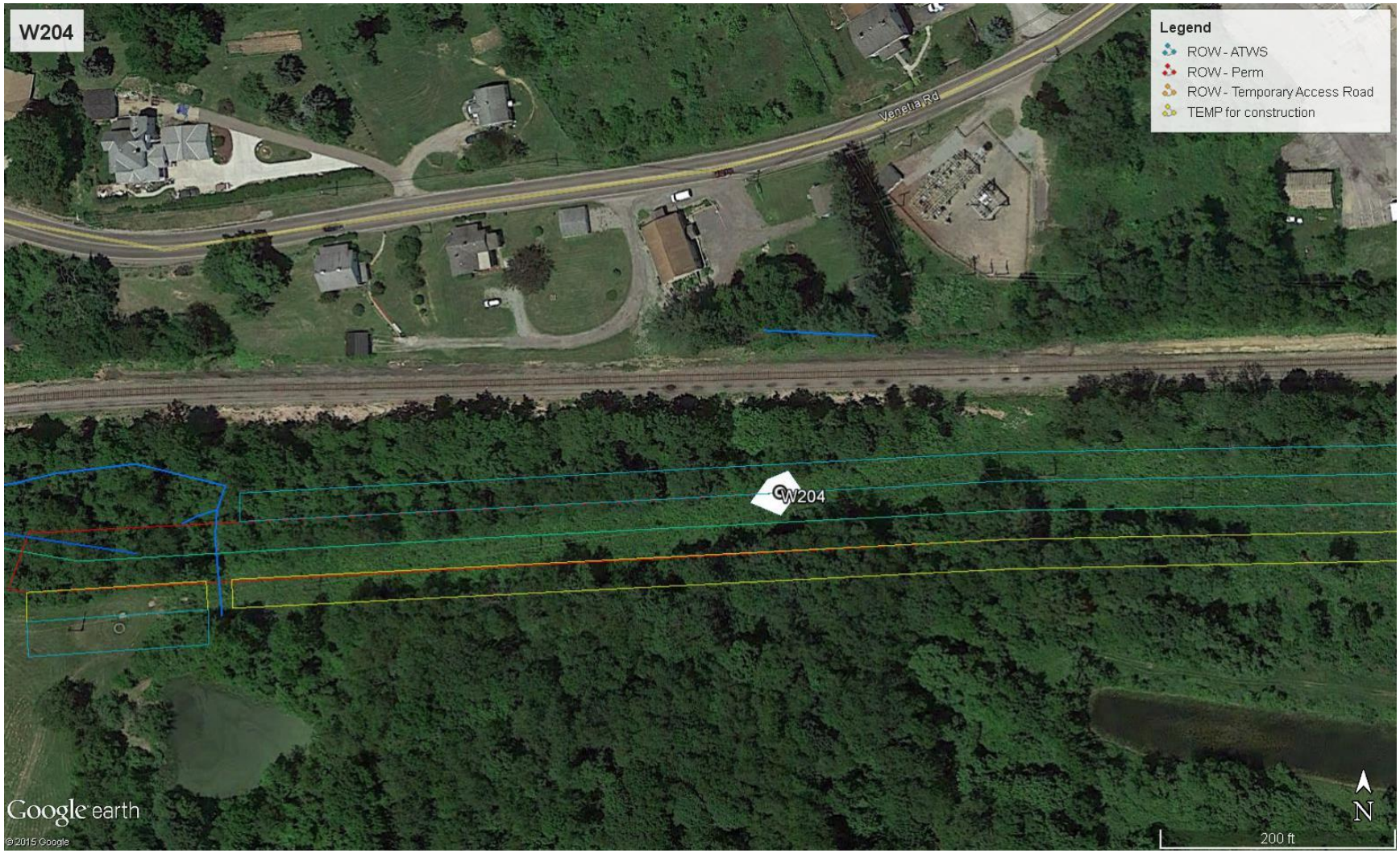

S250
Legend
ROW - ATWS
ROW - Perm
ROW - Temporary Access Road
TEMP for construction
S15
S250
Google earth
© 2015 Google
300 ft
N


S260
Legend
ROW - ATWS
ROW - Perm
ROW - Temporary Access Road
TEMP for construction
S260
McBride Rd
Google earth
© 2015 Google
N
500 ft


S269, S270, S271
Legend
ROW - ATWS
ROW - Perm
ROW - Temporary Access Road
TEMP for construction
W200
S270
S269
W203
S271
W201
Township Line
Google earth
© 2015 Google
400 ft
N


S279, S280, S281
Legend
ROW - ATWS
ROW - Perm
ROW - Temporary Access Road
TEMP for construction
S129
S279
W202
S280
S281
Linden Rd
Google earth
© 2015 Google
400 ft
N


W201
Legend
ROW - ATWS
ROW - Perm
ROW - Temporary Access Road
TEMP for construction
519
Township Ln
W201
Google earth
© 2015 Google
200 ft
N


W204
Legend
ROW - ATWS
ROW - Perm
ROW - Temporary Access Road
TEMP for construction
Venetia Rd
W204
Google earth
© 2015 Google
200 ft
N

ATTACHMENT B

PHOTOGRAPHIC RECORD

PHOTOGRAPHIC LOG

Company: Sunoco Logistics, L.P.
Project: Pennsylvania Pipeline Project

Photographer: N. Grosse
Date: 5/19/2014
Photo No.: 1
Direction: S

Comments: Wetland W201 vegetation.

Photographer: N. Grosse
Date: 5/19/2014
Photo No.: 2
Direction: N

Comments: Upland vegetation adjacent to wetland W201.

PHOTOGRAPHIC LOG

Company: Sunoco Logistics, L.P.
Project: Pennsylvania Pipeline Project

Photographer: N. Grosse
Date: 5/21/2014
Photo No.: 3
Direction: S

Comments: Wetland W204 vegetation.

Photographer: N. Grosse
Date: 5/21/2014
Photo No.: 4
Direction: SW

Comments: Upland vegetation adjacent to wetland W204.

PHOTOGRAPHIC LOG

Company: Sunoco Logistics, L.P.
Project: Pennsylvania Pipeline Project

Photographer:
Date:
Photo No.: 5
Direction:
Comments: Stream S250 upstream

PHOTO NOT AVAILABLE

Photographer:
Date:
Photo No.: 6
Direction:
Comments: Stream S250 downstream

PHOTO NOT AVAILABLE

PHOTOGRAPHIC LOG

Company: Sunoco Logistics, L.P.
Project: Pennsylvania Pipeline Project

Photographer: N. Grosse
Date: 5/19/2014
Photo No.: 7
Direction: E

Comments: Stream S260 upstream

Photographer: N. Grosse
Date: 5/19/2014
Photo No.: 8
Direction: W

Comments: Stream S260 downstream

PHOTOGRAPHIC LOG

Company: Sunoco Logistics, L.P.
Project: Pennsylvania Pipeline Project

Photographer: N. Grosse
Date: 5/19/2014
Photo No.: 9
Direction: W

Comments: Stream S269 upstream.

Photographer: N. Grosse
Date: 5/19/2014
Photo No.: 10
Direction: E

Comments: Stream S269 downstream.

PHOTOGRAPHIC LOG

Company: Sunoco Logistics, L.P.
Project: Pennsylvania Pipeline Project

Photographer: N. Grosse
Date: 5/19/2014
Photo No.: 11
Direction: N

Comments: Stream S270 upstream.

Photographer: N. Grosse
Date: 5/19/2014
Photo No.: 12
Direction: S

Comments: Stream S270 downstream.

PHOTOGRAPHIC LOG

Company: Sunoco Logistics, L.P.
Project: Pennsylvania Pipeline Project

Photographer: N. Grosse
Date: 5/19/2014
Photo No.: 13
Direction: N

Comments: Stream S271 upstream.

Photographer: N. Grosse
Date: 5/19/2014
Photo No.: 14
Direction: S

Comments: Stream S271 downstream.

PHOTOGRAPHIC LOG

Company: Sunoco Logistics, L.P.
Project: Pennsylvania Pipeline Project

Photographer: N. Grosse
Date: 5/20/2014
Photo No.: 15
Direction: NE

Comments: Stream S279 upstream.

Photographer: N. Grosse
Date: 5/20/2014
Photo No.: 16
Direction: SW

Comments: Stream S279 downstream.

PHOTOGRAPHIC LOG

Company: Sunoco Logistics, L.P.
Project: Pennsylvania Pipeline Project

Photographer: N. Grosse
Date: 5/20/2014
Photo No.: 17
Direction: E

Comments: Stream S280 upstream.

Photographer: N. Grosse
Date: 5/20/2014
Photo No.: 18
Direction: W

Comments: Stream S280 downstream.

PHOTOGRAPHIC LOG

Company: Sunoco Logistics, L.P.
Project: Pennsylvania Pipeline Project

Photographer: N. Grosse
Date: 5/20/2014
Photo No.: 19
Direction: E

Comments: Stream S281 upstream.

Photographer: N. Grosse
Date: 5/20/2014
Photo No.: 20
Direction: W

Comments: Stream S281 downstream.

ATTACHMENT C

AQUATIC RESOURCE DATA FORMS

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: MARZNER EAST City/County: WASHINGTON Sampling Date: 5/19/2014

Applicant/Owner: SUNOCO LOGISTICS State: PA Sampling Point: W201-wetl

Investigator(s): PAT GREEN Section, Township, Range: NORTH STRABANE

Landform (hillslope, terrace, etc.): HILLSLOPE Local relief (concave, convex, none): NONE Slope (%): 2

Subregion (LRR or MLRA): LRR N Lat: 40.236176 Long: -80.171513 Datum: WGS 84

Soil Map Unit Name: FA- FLUVAQUENTS, LOAMY NWI classification: PEM

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks: SEEP AREA IN FLOODPLAIN

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Wetland Hydrology Present? Yes X No _____

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

Remarks: Seep area in non-study area

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W201-wet1

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		
Herb Stratum (Plot size: 5m)			
1. Ranunculus sceleratus	80	Y	OBL
2. Juncus effusus	10	N	FACW
3. Mentha spicata	4	N	FACW
4. Equisetum arvense	1	N	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	95 = Total Cover		
50% of total cover: 47.5	20% of total cover: 19		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
50% of total cover: _____	20% of total cover: _____		

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	80
FACW species	14	x 2 =	28
FAC species	1	x 3 =	3
FACU species	–	x 4 =	–
UPL species	–	x 5 =	–
Column Totals:	95 (A)		111 (B)

Prevalence Index = B/A = 1.168

Hydrophytic Vegetation Indicators:

+ 1 - Rapid Test for Hydrophytic Vegetation

+ 2 - Dominance Test is >50%

+ 3 - Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes X No _____

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

SOIL

Sampling Point: W201-wet

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/1	100	N/A				SiL	mucky

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if observed):

Type: N/A

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Spring area in floodplain

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: MANNER EAST City/County: WASHINGTON Sampling Date: 5/19/21

Applicant/Owner: SUNOCO LOGISTICS State: PA Sampling Point: W201-up

Investigator(s): PAT GREEN Section, Township, Range: NORTH STRABANE

Landform (hillslope, terrace, etc.): VALLEY FLOODPLAIN Local relief (concave, convex, none): NONE Slope (%): —

Subregion (LRR or MLRA): LRR N Lat: 40.236055 Long: -80.171489 Datum: WGS 84

Soil Map Unit Name: FA - FLUVAQUENTS, LOAMY NWI classification: N/A

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

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

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

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

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

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Wetland Hydrology Present? Yes _____ No X

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

Remarks:

NO INDICATORS OF HYDROLOGY OBSERVED

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: W201-upl

Tree Stratum (Plot size: 30ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus americana	70	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Herb Stratum (Plot size:)			
1. Viburnum alternifolia	30	Y	FAC
2. Tazfolium [illegible]	20	Y	FACU
3. Aliaria petiolata	20	Y	FACU
4. Carex [illegible]	15	N	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	85 = Total Cover		
50% of total cover: 42.5	20% of total cover: 17		

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	30	x 3 =	90
FACU species	60	x 4 =	240
UPL species	0	x 5 =	0
Column Totals:	105 (A)		360 (B)

Prevalence Index = B/A = 3.43

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes ____ No X

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

SOIL

Sampling Point: W201-U1

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8"	10 YR 3/4	100					SiL	

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

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

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Mariner East City/County: Washington Sampling Date: 5/21/2014

Applicant/Owner: Sunoco Logistics State: PA Sampling Point: W204-wet1

Investigator(s): Pat Green Section, Township, Range: Nottingham

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): —

Subregion (LRR or MLRA): LRR N Lat: 40.235592 Long: -80.087841 Datum: WGS 84

Soil Map Unit Name: CaC- Culleoka silt loam NWI classification: PEM

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

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	No ___	Is the Sampled Area within a Wetland? Yes X No ___
Hydric Soil Present?	Yes X	No ___	
Wetland Hydrology Present?	Yes X	No ___	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): <1"
Water Table Present?	Yes X	No ___	Depth (inches): 3"
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): Surface

Wetland Hydrology Present? Yes X 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: L204-wet1

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	_____ = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	_____ = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: _____)			
1. Impatiens capensis	80	Y	FACW
2. Juncus effusus	10	N	FACW
3. Viburnum alternifolia	5	N	FAC
4. Carex stricta	5	N	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		

50% of total cover: 50 20% of total cover: 20

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	90	x 2 =	180
FAC species	5	x 3 =	15
FACU species	—	x 4 =	—
UPL species	—	x 5 =	—
Column Totals:	100 (A)		200 (B)

Prevalence Index = B/A = 2

Hydrophytic Vegetation Indicators:

- + 1 - Rapid Test for Hydrophytic Vegetation
- + 2 - Dominance Test is >50%
- + 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes X No _____

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

SOIL

Sampling Point: W204-wet1

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100					S;C	

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: MARZNER EAST City/County: WASHINGTON Sampling Date: 5/21/2014

Applicant/Owner: SUNOCO LOGISTICS State: PA Sampling Point: WD04-UP1

Investigator(s): PAT GAFFEY Section, Township, Range: NOTTINGHAM

Landform (hillslope, terrace, etc.): HILLSLOPE Local relief (concave, convex, none): CONVEX Slope (%): 10

Subregion (LRR or MLRA): LRR N Lat: 40.235622 Long: -80.087769 Datum: WGS84

Soil Map Unit Name: CaC – CULLEOKA SILT LOAM NWI classification: N/A

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

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

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

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

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

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

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

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

Wetland Hydrology Present? Yes _____ No X

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

Remarks:

No hydrology indicators observed

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: L204-upl

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. Prunus serotina	10	Y	FACU
2. Acer saccharum	10	N	FACU
3.			
4.			
5.			
6.			
7.			
	20 = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size:)			
1. Rubus allegheniensis	35	Y	FACU
2. Lonicera japonica	10	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
	45 = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size:)			
1. Solidago canadensis	15	N	FACU
2. Aesa multiflora	10	N	FACU
3. Hesperis matronalis	10	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	35 = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

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

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	—	x 1 =	—
FACW species	—	x 2 =	—
FAC species	—	x 3 =	—
FACU species	100	x 4 =	400
UPL species	—	x 5 =	—
Column Totals:	160 (A)		400 (B)

Prevalence Index = B/A = 4

Hydrophytic Vegetation Indicators:

- — 1 - Rapid Test for Hydrophytic Vegetation
- — 2 - Dominance Test is >50%
- — 3 - Prevalence Index is ≤3.0[1]
- — 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- — Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Four Vegetation Strata:

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

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

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

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

Hydrophytic Vegetation Present? Yes _____ No X

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

SOIL

Sampling Point: W204-up

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	100	N/A				SC	
4-12	10YR 4/4	85	10YR 7/6	10	C	M	SC	disturbed floor soils
			10YR 4/6	5	C	M	SC	

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ____

Remarks:

Tetra Tech Stream Data Sheet

Surveyors: Pat Green, Barry Eckenrod Date: 5/20/13 Resource ID Number: S250

Project: Mariner Integrity State: PA County: Washington

Photo Number (s): _____ Canopy Cover: _____%

Flow Direction: SW **Bank Width:** 6 feet **Water Width:** _____ feet

High Water Depth: _____ feet **Water Depth:** _____ feet **Turbidity:** _____

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

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

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

Substrate:
- [ ] Bedrock ___%
- [ ] Boulder ___%
- [ ] Cobble/Gravel ___%
- [ ] Sand ___%
- [ ] Silt/Clay ___%
- [ ] Organic ___%

Bank Substrate:
Height: Left ____ Right____

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

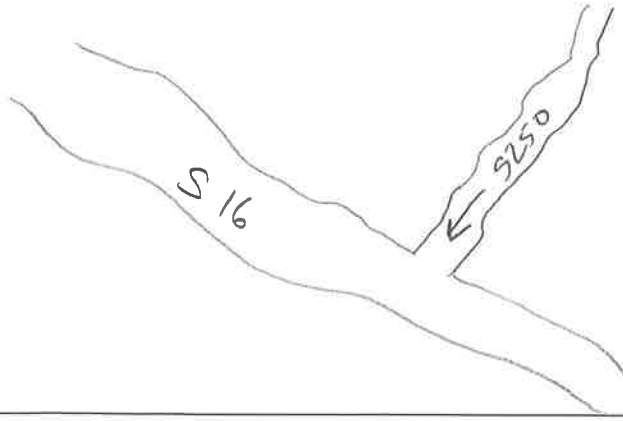
Floodplain Width:

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

Dominant Vegetation:
- [ ] Forested
  - Species: _____
- [ ] Shrub
  - Species: _____
- [ ] Herbaceous
  - Species: _____

Wildlife Observed/Notes:

Sketch:



Tetra Tech Stream Data Sheet

Surveyors: P. Green, N. Grosse, R. Cornish Date: 5/19/14 Resource ID Number: S260
Project: Marine East State: PA County: Washington
Photo Number (s): 2972, 2973 Canopy Cover: 100 %

Flow Direction: W **Bank Width:** 2 feet **Water Width:** 1 feet
High Water Depth: _____ feet **Water Depth:** 2" feet **Turbidity:** _____

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

Sinuosity:
[ ] Low
[ ] Medium
[ ] High

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

Substrate:
[ ] Bedrock ___%
[X] Boulder 20 %
[ ] Cobble/Gravel ___%
[ ] Sand ___%
[ ] Silt/Clay ___%
[X] Organic 80 %

Bank Substrate:
Height: Left ____ Right____

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

Floodplain Width:

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

Dominant Vegetation:
[X] Forested
Species: Slippery Elm, Black Cherry
[ ] Shrub
Species: _____
[ ] Herbaceous
Species: _____

Wildlife Observed/Notes:

Sketch:

Tetra Tech Stream Data Sheet

Surveyors: P. Green, N. Grosse, R. Cornish Date: 5/19/2014 Resource ID Number: S269

Project: Mariner East State: PA County: Washington

Photo Number (s): 2990, 2991 Canopy Cover: 80 %

Flow Direction: E **Bank Width:** 6 feet **Water Width:** 4 feet

High Water Depth: _____ feet **Water Depth:** 3" feet **Turbidity:** _____

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

Sinuosity:
- [ ] Low
- [ ] Medium
- [ ] High

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

Substrate:
- [ ] Bedrock ___%
- [ ] Boulder ___%
- [X] Cobble/Gravel 75 %
- [X] Sand 20 %
- [ ] Silt/Clay ___%
- [X] Organic 5 %

Bank Substrate:
Height: Left ____ Right ____

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

Floodplain Width:

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

Dominant Vegetation:
- [X] Forested
  - Species: Box elder, Multiflora, Salix spp
- [ ] Shrub
  - Species: _____
- [ ] Herbaceous
  - Species: _____

Wildlife Observed/Notes:

Sketch:

Tetra Tech Stream Data Sheet

Surveyors: P. Green, N. Grosse, R. Cornish Date: 5/19/14 Resource ID Number: S270
Project: Marcher East State: PA County: _____
Photo Number (s): 2994, 2995 Canopy Cover: 20 %

Flow Direction: S **Bank Width:** 2 feet **Water Width:** 1 feet
High Water Depth: _____ feet **Water Depth:** 1" ~~feet~~ **Turbidity:** _____

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

Sinuosity:
[ ] Low
[ ] Medium
[ ] High

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

Substrate:
[ ] Bedrock ___%
[ ] Boulder ___%
[X] Cobble/Gravel 85 %
[X] Sand 15 %
[ ] Silt/Clay ___%
[ ] Organic ___%

Bank Substrate:
Height: Left ____ Right____

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

Floodplain Width:

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

Dominant Vegetation:
[ ] Forested
Species: _____
[X] Shrub
Species: Tartarian Honeysuckle
[X] Herbaceous
Species: Garlic Mustard

Wildlife Observed/Notes:

Sketch:

Tetra Tech Stream Data Sheet

Surveyors: P. Green + N. Grosse Date: 5/19/14 Resource ID Number: S271
Project: Mariner East State: PA County: _____
Photo Number (s): 2996, 2997 Canopy Cover: 85 %

Flow Direction: S **Bank Width:** 5 feet **Water Width:** 2 feet
High Water Depth: _____ feet **Water Depth:** 3" ~~feet~~ **Turbidity:** _____

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

Sinuosity:
[ ] Low
[ ] Medium
[ ] High

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

Substrate:
[ ] Bedrock ___%
[ ] Boulder ___%
[X] Cobble/Gravel 80 %
[X] Sand 15 %
[ ] Silt/Clay ___%
[X] Organic 5 %

Bank Substrate:
Height: Left ____ Right____

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

Floodplain Width:

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

Dominant Vegetation:
[X] Forested Species: Box Alder, American Elm
[X] Shrub Species: Multiflora rose, Wild Grape
[ ] Herbaceous Species: _____

Wildlife Observed/Notes:

Sketch:

Tetra Tech Stream Data Sheet

Surveyors: P. Green + N. Grosse Date: 5/20/14 Resource ID Number: S279
Project: Mariner East State: PA County: _____
Photo Number (s): 3016, 3017 Canopy Cover: 60%

Flow Direction: SW **Bank Width:** 3 feet **Water Width:** 1 feet
High Water Depth: _____ feet **Water Depth:** 3" ~~feet~~ **Turbidity:** _____

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

Sinuosity:
[ ] Low
[ ] Medium
[ ] High

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

Substrate:
[ ] Bedrock ___%
[ ] Boulder ___%
[X] Cobble/Gravel 40%
[X] Sand 40%
[ ] Silt/Clay ___%
[X] Organic 20%

Bank Substrate:
Height: Left ____ Right____

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

Floodplain Width:

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

Dominant Vegetation:
[X] Forested
Species: Prunus serotina,
[X] Shrub
Species: Multiflora rose, Rubus spp., Tartarian honeysuckle
[ ] Herbaceous
Species: _____

Wildlife Observed/Notes:

Sketch:

Tetra Tech Stream Data Sheet

Surveyors: P. Green + N. Grosse Date: 5/20/14 Resource ID Number: 5280
Project: Manor East State: PA County: _____
Photo Number (s): 3018, 3019 Canopy Cover: 100%

Flow Direction: W **Bank Width:** 3 feet **Water Width:** 1 feet
High Water Depth: _____ feet **Water Depth:** 3" ~~feet~~ **Turbidity:** _____

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

Sinuosity:
[ ] Low
[ ] Medium
[ ] High

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

Substrate:
[ ] Bedrock ___%
[ ] Boulder ___%
[X] Cobble/Gravel 40%
[X] Sand 25%
[X] Silt/Clay 25%
[X] Organic 10%

Bank Substrate:
Height: Left ____ Right____

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

Floodplain Width:

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

Dominant Vegetation:
[X] Forested
Species: Sugar Maple, Black cherry, American Elm
[X] Shrub
Species: Multiflora rose
[ ] Herbaceous
Species: _____

Wildlife Observed/Notes:

Sketch:

Tetra Tech Stream Data Sheet

Surveyors: P. Green + N. Grosse Date: 5/20/14 Resource ID Number: S281
Project: Mariner East State: PA County: _____
Photo Number (s): 3020, 3021 Canopy Cover: 100 %

Flow Direction: W **Bank Width:** 4 feet **Water Width:** 1 feet
High Water Depth: _____ feet **Water Depth:** 1" ~~feet~~ **Turbidity:** _____

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

Sinuosity:
[ ] Low
[ ] Medium
[ ] High

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

Substrate:
[ ] Bedrock ___%
[ ] Boulder ___%
[X] Cobble/Gravel 20 %
[X] Sand 5 %
[ ] Silt/Clay ___%
[X] Organic 75 %

Bank Substrate:
Height: Left ____ Right____

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

Floodplain Width:

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

Dominant Vegetation:
[X] Forested
Species: American Elm, Black Cherry, White Ash
[ ] Shrub
Species: _____
[ ] Herbaceous
Species: _____

Wildlife Observed/Notes:

Sketch: