

From: [Ranalli, Nicole](#)
To: [Shearer, Natalie](#)
Subject: 2015-1047 Falcon Ethane Pipeline Project
Date: Tuesday, August 08, 2017 1:42:06 PM

Ms. Shearer,

Thank you for providing the Service with a copy of the Mussel Habitat Assessment for the Falcon Ethane Pipeline Project of July 25, 2017. Based on the results of the assessment, we have concluded that the agency's comments of September 17, 2015, regarding Federally listed freshwater mussels remains valid. Please let me know if you have any questions.

--

Nicole Ranalli
U.S. Fish & Wildlife Service
Pennsylvania Field Office
110 Radnor Rd; Suite 101
State College, PA 16801
[814 234-4090 x7455](tel:8142344090)



July 25, 2017

Via Hard Copy

Pamela Shellenberger
US Fish & Wildlife Service
Pennsylvania Field Office
110 Radnor Rd; Suite 101
State College, PA 16801

**Re: Mussel Habitat Assessment Report
Falcon Ethane Pipeline Project
Shell Pipeline Company, LP
Beaver, Allegheny, and Washington Counties, Pennsylvania USFWS Project # 2015-1047**

Dear Ms. Shellenberger:

On behalf of Shell Pipeline Company LP (Shell), AECOM has completed a Mussel Habitat Assessment Report for Shell's Falcon Ethane Pipeline Project. The project was originally reviewed by your office for potential impacts to federal protected species on September 17, 2015 (#2015-1047). The Mussel Habitat Assessment report presented herein for your review and comment is provided to summarize the results of AECOM's mussel habitat assessment efforts.

The Mussel Habitat Assessment conducted by AECOM staff included a combination of desktop review completed early in 2016 and field view completed between May 23 and May 26, 2016. The study area for the assessment was based on the proposed project route, work areas, and presence of suitable habitat as they were known at the time of assessment. Raccoon Creek will be crossed in two locations. Per discussions with your office, both of these locations will be crossed via horizontal directional drill.

Shell and AECOM look forward to receiving your comments. Please contact Natalie Shearer at 412-503-4595 or natalie.shearer@aecom.com if additional information is desired.

Sincerely,
AECOM


Natalie L. Shearer, M.S., QEP
Natural Resources


Brandon M. Walker, PE, CPESC
Project Manager

Enclosures (1)
Mussel Habitat Assessment Report

AECOM
Foster Plaza 6
681 Anderson Drive, Suite 400
Pittsburgh, PA 15220

SHELL PIPELINE COMPANY, LP FALCON ETHANE PIPELINE PROJECT

CARROLL, HARRISON, AND JEFFERSON COUNTIES, OHIO

Freshwater Mussel (Unionid) Habitat Assessment

January 17, 2017



Prepared for:

Shell Pipeline Company, LP

910 Louisiana Street, Room 41082A
Houston, Texas 77002

Submitted by:

AECOM
Foster Plaza 6, Suite 400
Pittsburgh, Pennsylvania 15220



January 4, 2017

Mr. Nevin Welte
Pennsylvania Fish and Boat Commission
Division of Environmental Services
450 Robinson Lane
Bellefonte, PA 16823-7437

Sent Via Email

RE: Freshwater Mussel Habitat Assessment
Shell Pipeline Company, LP
Falcon Ethane Pipeline Project
Multiple Streams
Allegheny, Beaver, and Washington Counties, Pennsylvania

Dear Mr. Welte:

AECOM conducted a freshwater mussel (unionid) habitat assessment for the Shell Pipeline Company, LP's Falcon Ethane Pipeline project (Project). This habitat assessment was performed in accordance with 2015 Ohio Mussel Survey Protocol (Protocol) for the proposed pipeline corridor within the Commonwealth of Pennsylvania in May 2016.

Survey efforts were coordinated by an AECOM malacologist, Mr. Joseph Snaveley, experienced in survey methods employed in streams and rivers consistent with these locations. Mr. Snaveley is a Pennsylvania approved Ecologist/Malacologist surveyor. All habitat assessments were conducted between May 23 and May 26, 2016 as due diligence for the proposed stream crossing locations.

This summary briefly describes the habitat assessment method, data analysis, and results.

Habitat Assessment Method

Prior to field efforts, a desktop review of the proposed pipeline route as of April 28, 2016 was conducted to identify each perennial stream and its drainage area (DA) at the proposed pipeline crossing location. Habitat assessments were performed for a total of seven crossing locations in Pennsylvania in the following streams: Mill Creek, Service Creek, Raccoon Creek (2 sites), Potato Garden Run, Robinson Run, and Millers Run. Each crossing location evaluated as part of this habitat assessment is depicted on Figure 1 – Mussel Stream Overview. The pipeline crossing locations of these six streams are presented in Figure 2 – Mussel Stream Crossings.

Habitat assessments were conducted to determine the presence or absence of unionid mussels within the project area that may require additional in-stream work. Habitat assessments were performed in conjunction with an evaluation of several streams along the proposed pipeline route in Ohio. The Ohio Mussel Survey Protocol was employed at these locations for a reasonable and consistent approach across the project.

As stated in the Protocol the following tasks were completed at each stream crossing location:

- Conduct survey areas that include the pipeline crossing with an upstream (200 feet) and downstream (400 feet) buffer;
- Complete a timed visual search of the area of direct impact (ADI) and buffer areas for at least 60 minutes for small streams (DA – 10 to 100 mi²);
- Conduct a search in both in-stream and near stream habitats including stream banks (middens) and gravel bars for evidence of shells, fragments, or live unionids;
- Document the substrate habitat conditions;
- Complete the Ohio Mussel Habitat Assessment Form;
- Photo documentation.

The purpose of the habitat reconnaissance effort is to determine if live unionids are present. If evidence supports that live unionids may be present at a respective location, additional survey efforts may be required to determine species density and diversity. Evidence of non-native bivalves (Corbicula, Dressinia, etc.) are noted but not indicative of additional required survey efforts in the absence of unionids (live or shells).

The unionid survey area was first measured and the upstream and downstream limits demarcated. Two surveyors, including the qualified malacologist, started at the downstream limits and searched the entire reach using visual and tactile search methods. Bathyscopes (glass-bottom buckets) were employed throughout much of the survey areas. No diving or snorkeling was conducted as part of the habitat assessment efforts.

Results

AECOM used a standard operating procedure for unionid survey data collection in addition to a quality assurance/quality control program. Photographs were taken of the project area and a minimum of one representative of each unionid species, including shells for verification purposes.

Data that was recorded includes:

- Time for survey location;
- Substrate composition of each assessment reach (visual percentage based on Wentworth scale);
- Water depths – average and maximum depth for riffles, runs, and pools (meters);
- Unionid species observed (no species specific data processing at this time);
- Unionid shells (classified as fresh dead, weathered dead, or relic shell);
- GPS locations and/or lat/longs of each survey location;
- Other notable features.

Table 1 summarizes the conditions observed at each habitat assessment location. For the purposes of this report all of the respective crossing locations are described below. Surveys were conducted amidst flow conditions with ambient air temperatures ranging from daytime highs of 87 degrees Fahrenheit with overnight lows of 57 degrees Fahrenheit. Water temperatures ranged from 58 to 74 degrees depending on the location.

Table 1: List of Streams

Stream Name	Location	Latitude	Longitude	Group Number ¹	Drainage Area (sq. mi)	Survey Date	Water Temp (F ⁰)	Live Unionids ²	Unionid Shells
Mill Creek	Beaver County	40.59094	-80.47759	NA	5.3	5/23/2016	64	No	No ²
Service Creek	Beaver County	40.581359	-80.326301	NA	17.4	5/24/2016	69	No	No ²
Raccoon Creek 1**	Beaver County	40.655094	-80.345256	NA	184.0	5/26/2016	67	Yes	Yes ²
Raccoon Creek 2	Beaver County	40.550291	-80.316516	NA	133.0	5/26/2016	67	Yes	No
Potato Garden Run	Allegheny County	40.446971	-80.292168	NA	0.9	5/23/2016	74	No	No
Robinson Run	Washington County	40.36067	-80.273417	NA	3.6	5/23/2016	58	No	No
Millers Run	Washington County	40.326704	-80.261289	NA	2.7	5/23/2016	59	No	No

** Channel not accessible due to water depth and project survey limitation; live unionid presence assumed due to proximity to Ohio River

¹ Ohio Mussel Survey Protocol - Stream designations

² Corbicula (Asiatic Clams) observed

³ Sphaeridae spp. Observed

The Ohio Mussel Habitat Assessment Forms are included in Appendix A of this report. Representative photographs are included in Appendix B.

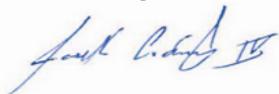
Summary

Results from the habitat reconnaissance indicate the presence of bivalves at Raccoon Creek due to the proximity to the Ohio River and live detections at the upstream crossing location. Both locations are currently proposed for Horizontal Directional Drill crossing and no impacts are anticipated as a result of these crossings. No evidence of unionids was observed at Mill Creek, Service Creek, Potato Garden Run, Robinson Run, or Millers Run. Should direct surface impacts to the stream channel be necessary at the Raccoon Creek proposed pipeline crossing locations additional survey and coordination may be required.

If there are any questions regarding this habitat assessment, please contact Brandon Walker at 412-503-4554 or brandon.walker@aecom.com.

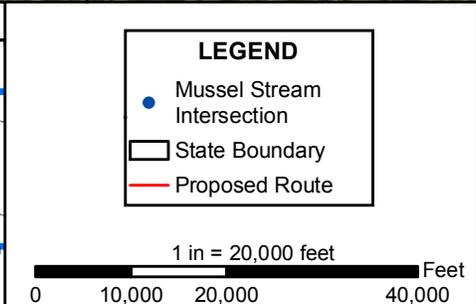
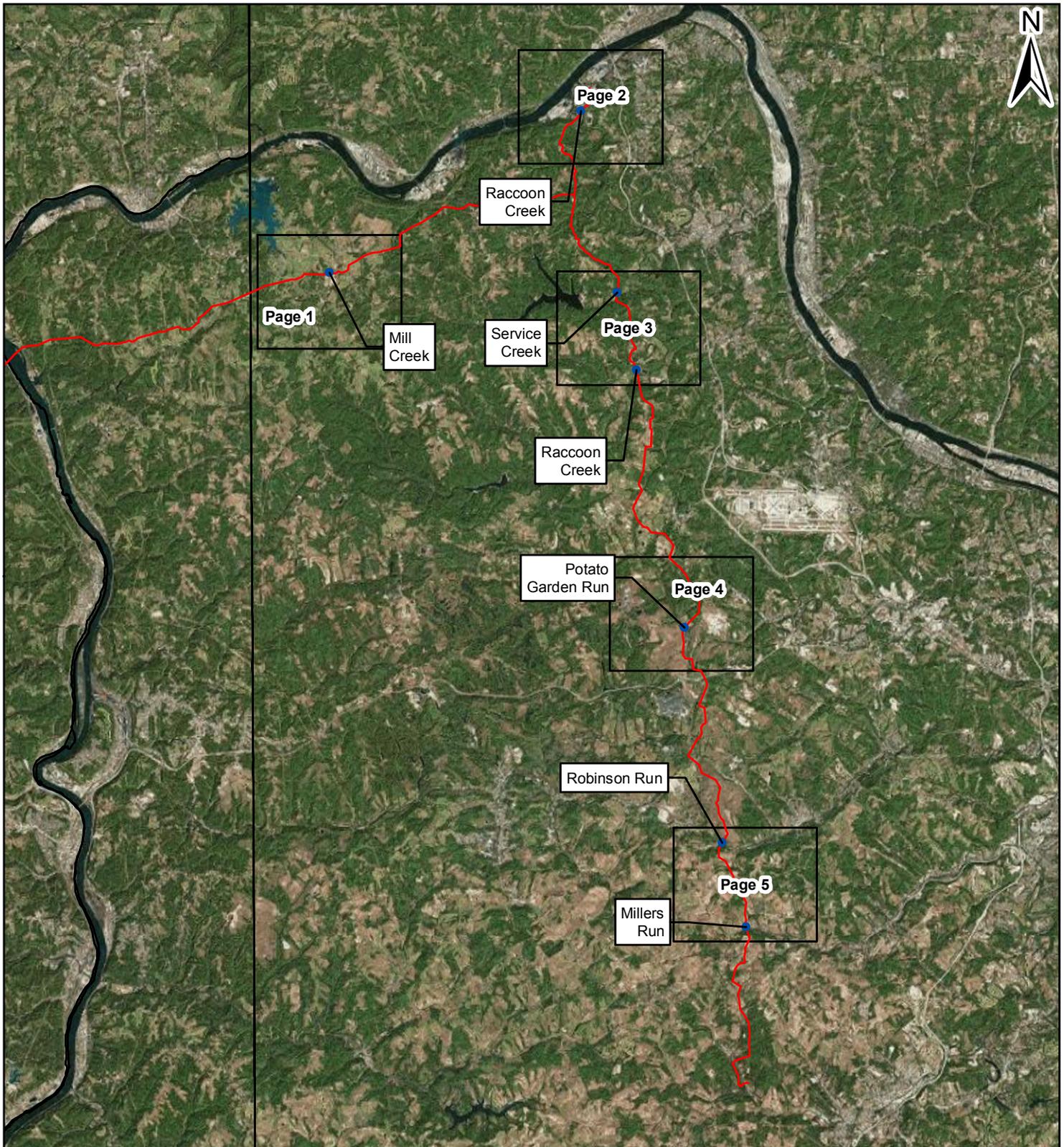
Sincerely,

Joseph Snavely
Senior Biologist



Brandon M. Walker, PE, CPESC
Project Manager/Pipeline Engineering





AECOM

FOSTER PLAZA 6
681 ANDERSEN DRIVE
4TH FLOOR
PITTSBURGH, PA 15220
412-503-4700

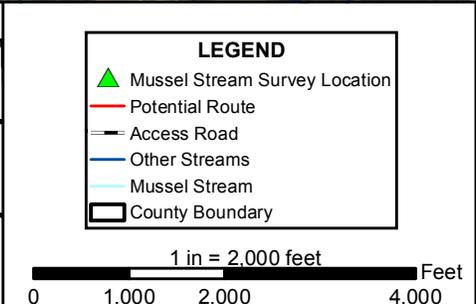
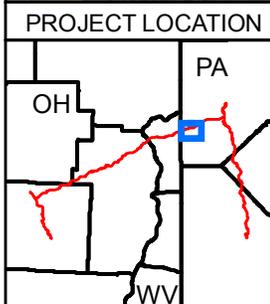
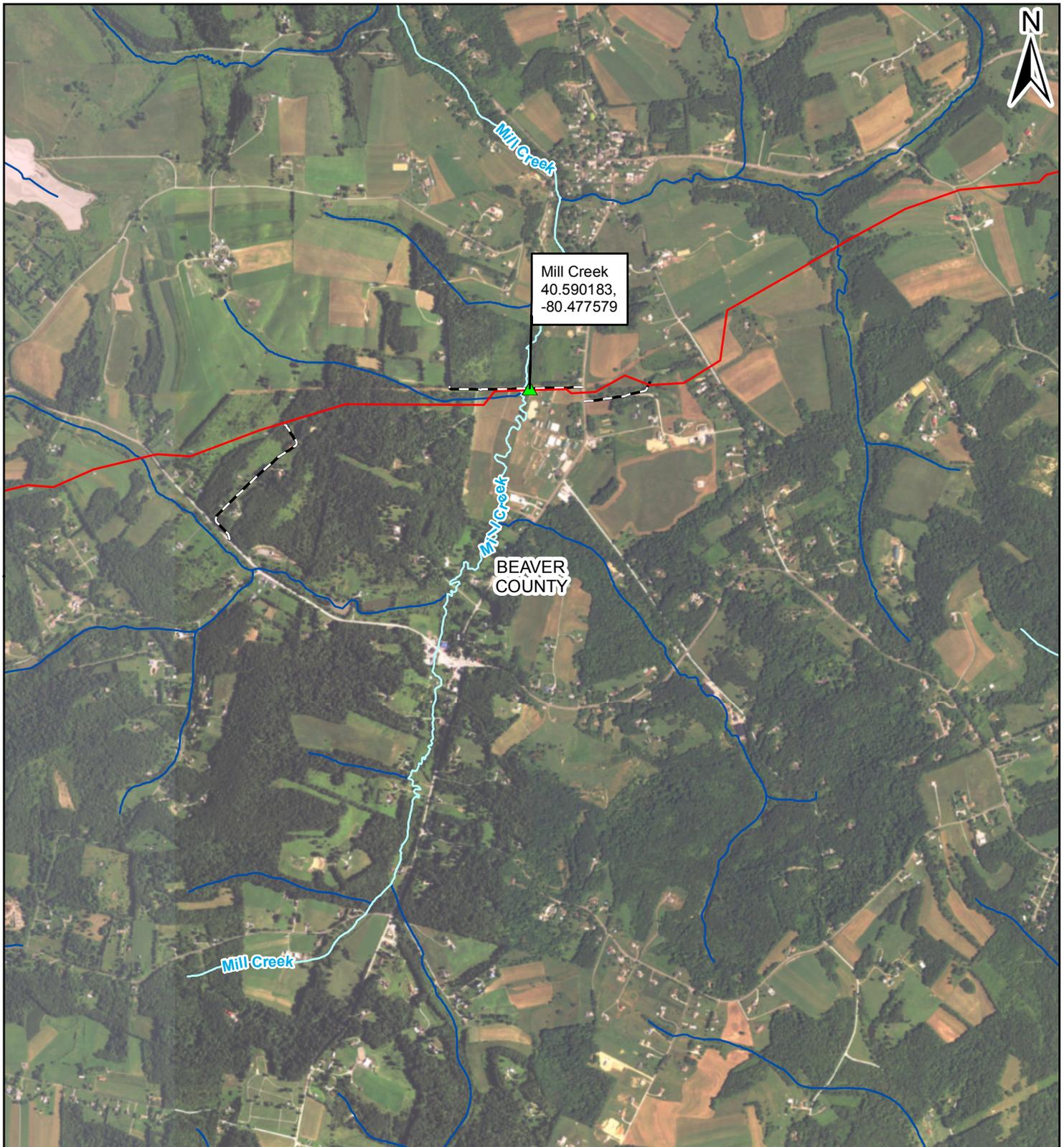
FIGURE 1

**MUSSEL STREAM OVERVIEW
PENNSYLVANIA**

**SHELL PIPELINE COMPANY, LP
FALCON ETHANE PIPELINE
PROJECT**

REFERENCE: AERIAL LAYER - SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N PROJECTION: TRANSVERSE MERCATOR

DRAWN BY: EES DATE: 1/3/2017
APPROVED: JCS PROJECT #: 60487539



AECOM

FOSTER PLAZA 6
681 ANDERSEN DRIVE
4TH FLOOR
PITTSBURGH, PA 15220
412-503-4700

FIGURE 2

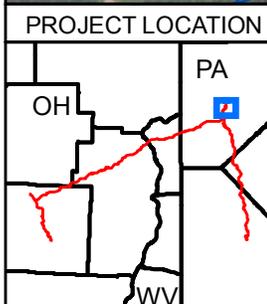
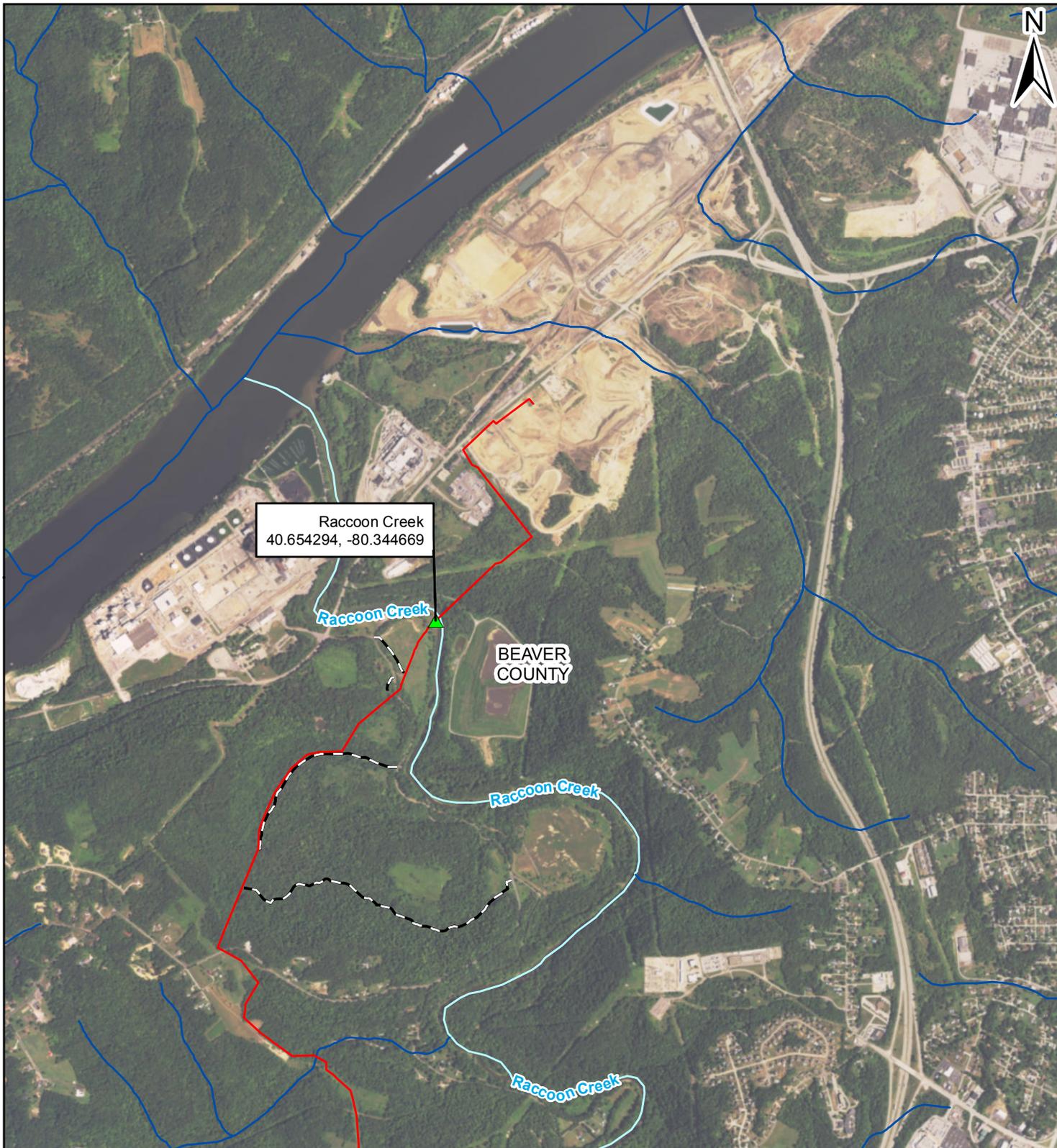
**MUSSEL STREAM CROSSINGS
PENNSYLVANIA**

Page 1 of 5

**SHELL PIPELINE COMPANY, LP
FALCON ETHANE PIPELINE
PROJECT**

REFERENCE: AERIAL LAYER - SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N PROJECTION: TRANSVERSE MERCATOR

DRAWN BY: EES DATE: 1/3/2017
APPROVED: JCS PROJECT #: 60487539



LEGEND

- ▲ Mussel Stream Survey Location
- Potential Route
- Access Road
- Other Streams
- Mussel Stream
- County Boundary

1 in = 2,000 feet

0 1,000 2,000 4,000 Feet

AECOM

FOSTER PLAZA 6
681 ANDERSEN DRIVE
4TH FLOOR
PITTSBURGH, PA 15220
412-503-4700

FIGURE 2

**MUSSEL STREAM CROSSINGS
PENNSYLVANIA**

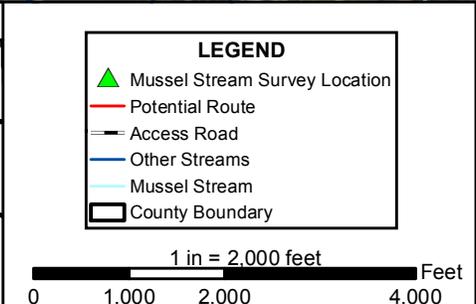
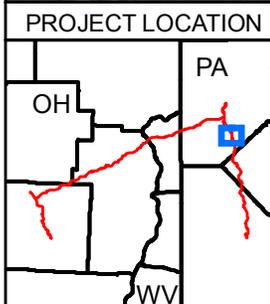
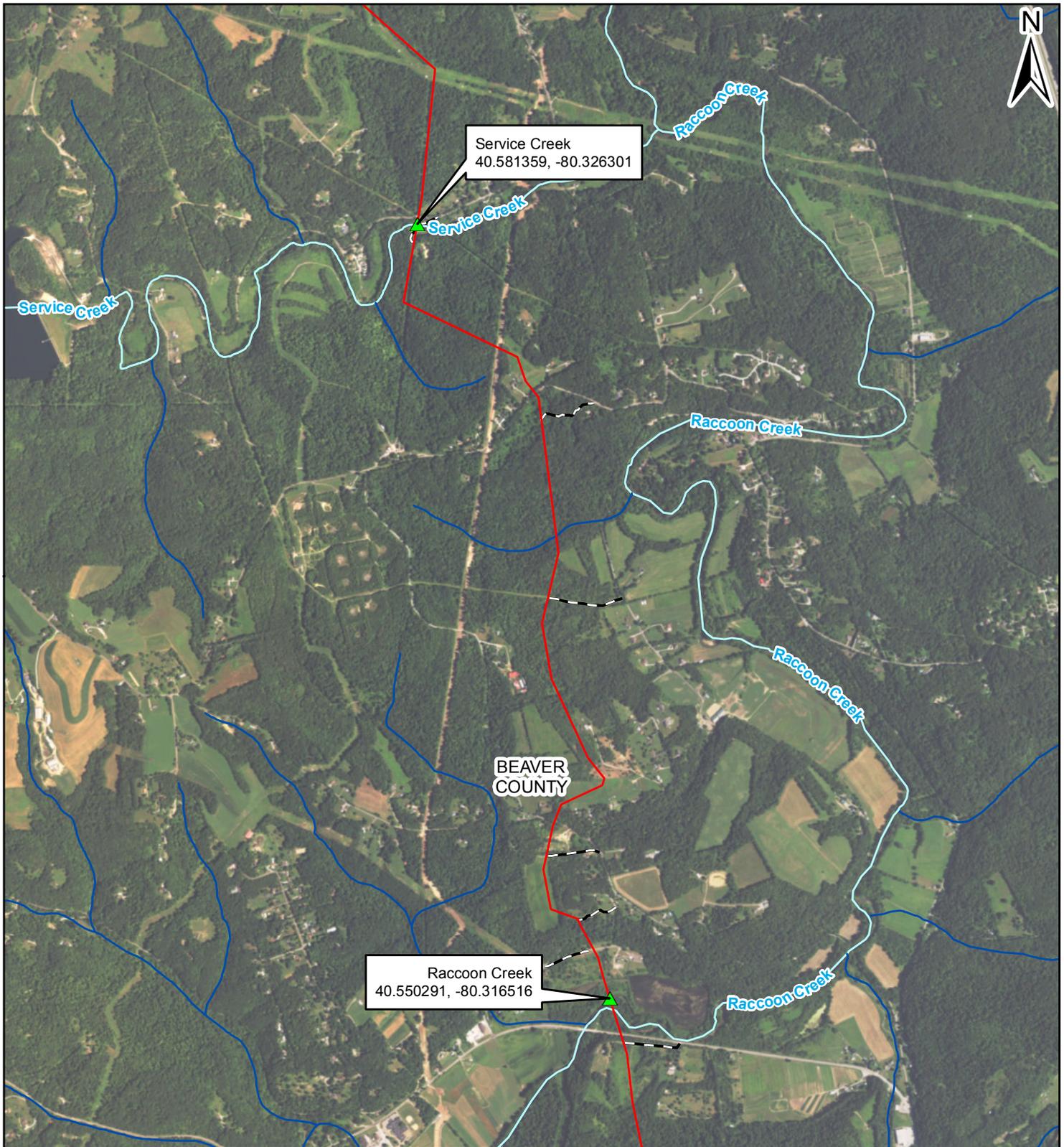
Page 2 of 5

**SHELL PIPELINE COMPANY, LP
FALCON ETHANE PIPELINE
PROJECT**

REFERENCE: AERIAL LAYER - SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N PROJECTION: TRANSVERSE MERCATOR

DRAWN BY: EES DATE: 1/3/2017
APPROVED: JCS PROJECT #: 60487539

Y:\GIS\Projects\Shell\Northeast Pipeline\MXDs\Mussel Maps\Mussel_Stream_MapBook_PA.mxd



AECOM

FOSTER PLAZA 6
681 ANDERSEN DRIVE
4TH FLOOR
PITTSBURGH, PA 15220
412-503-4700

FIGURE 2

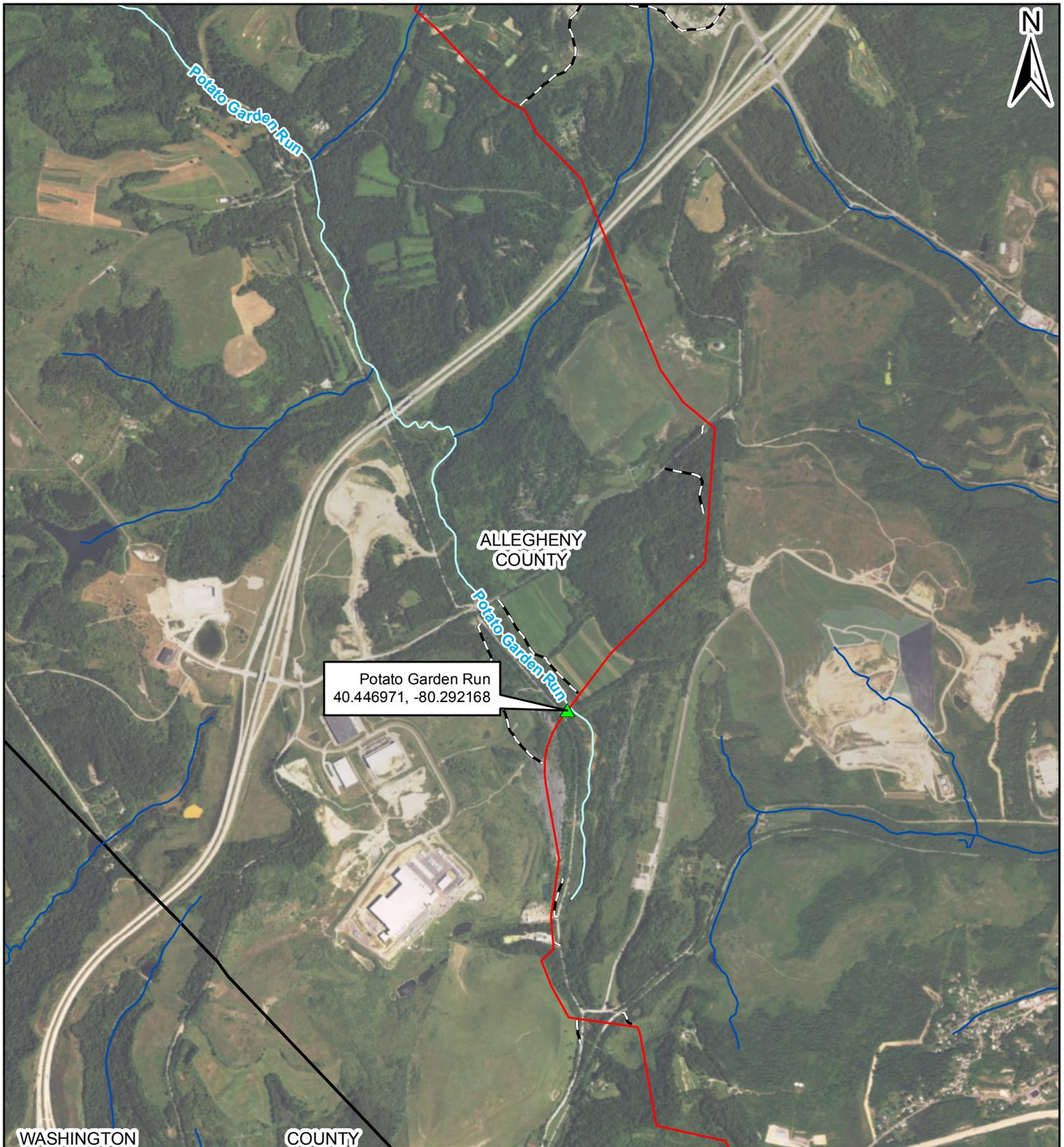
**MUSSEL STREAM CROSSINGS
PENNSYLVANIA**

Page 3 of 5

**SHELL PIPELINE COMPANY, LP
FALCON ETHANE PIPELINE
PROJECT**

REFERENCE: AERIAL LAYER - SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N PROJECTION: TRANSVERSE MERCATOR

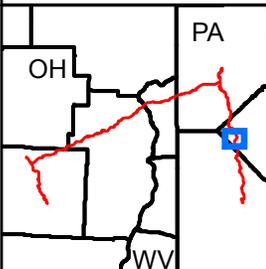
DRAWN BY: EES DATE: 1/3/2017
APPROVED: JCS PROJECT #: 60487539



WASHINGTON COUNTY

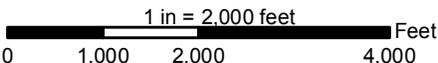
COUNTY

PROJECT LOCATION



LEGEND

- ▲ Mussel Stream Survey Location
- Potential Route
- Access Road
- Other Streams
- Mussel Stream
- County Boundary



AECOM

FOSTER PLAZA 6
681 ANDERSEN DRIVE
4TH FLOOR
PITTSBURGH, PA 15220
412-503-4700

FIGURE 2

MUSSEL STREAM CROSSINGS PENNSYLVANIA

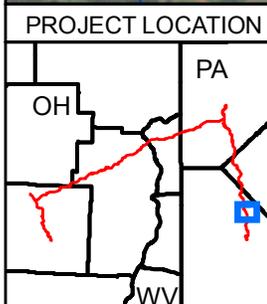
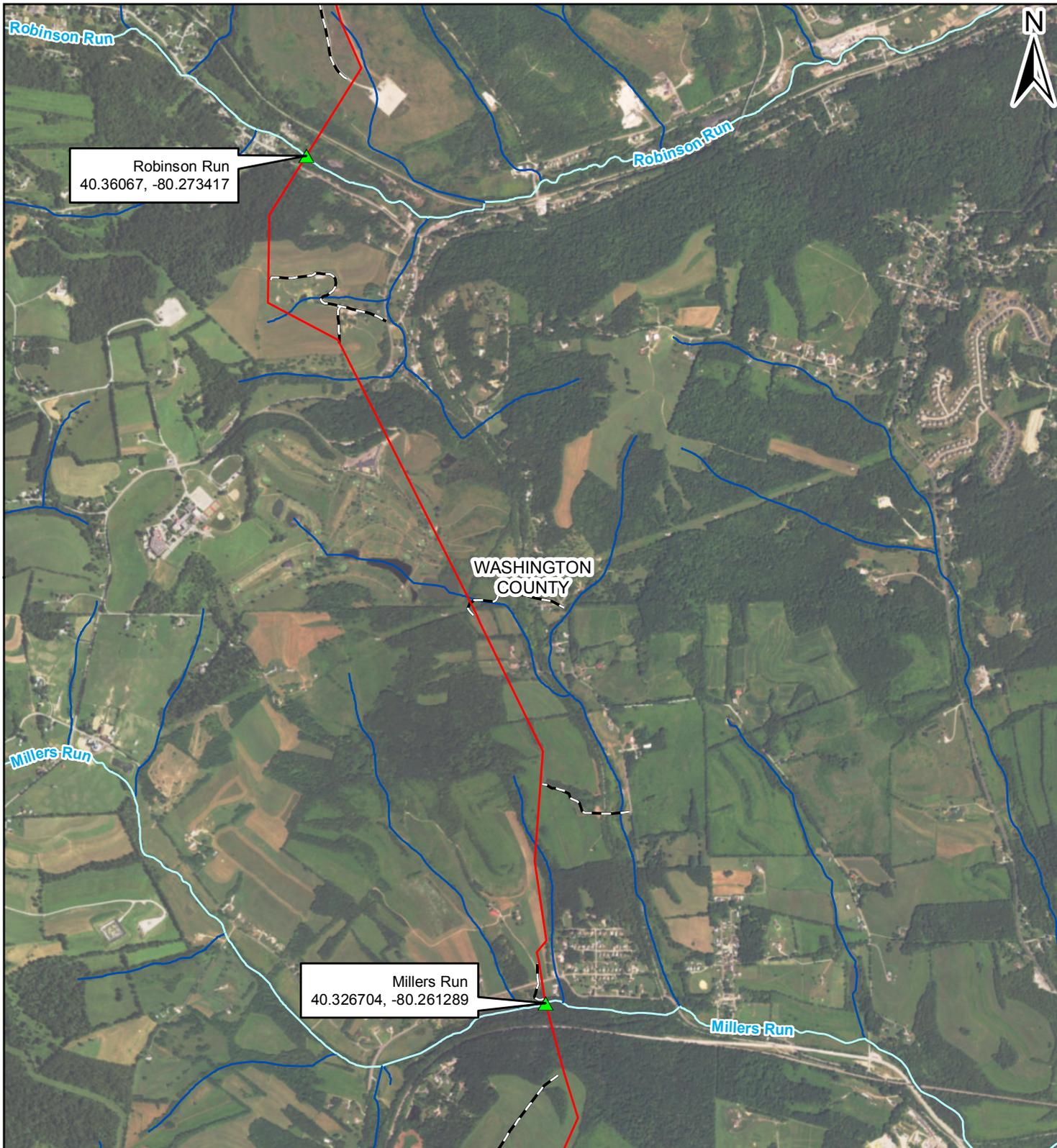
Page 4 of 5

**SHELL PIPELINE COMPANY, LP
FALCON ETHANE PIPELINE
PROJECT**

REFERENCE: AERIAL LAYER - SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS,

COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N
PROJECTION: TRANSVERSE MERCATOR

DRAWN BY: EES DATE: 1/3/2017
APPROVED: JCS PROJECT #: 60487539



LEGEND

- ▲ Mussel Stream Survey Location
- Potential Route
- Access Road
- Other Streams
- Mussel Stream
- County Boundary

1 in = 2,000 feet

0 1,000 2,000 4,000 Feet

AECOM

FOSTER PLAZA 6
 681 ANDERSEN DRIVE
 4TH FLOOR
 PITTSBURGH, PA 15220
 412-503-4700

FIGURE 2

**MUSSEL STREAM CROSSINGS
 PENNSYLVANIA**

Page 5 of 5

**SHELL PIPELINE COMPANY, LP
 FALCON ETHANE PIPELINE
 PROJECT**

REFERENCE: AERIAL LAYER - SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N PROJECTION: TRANSVERSE MERCATOR

DRAWN BY: EES DATE: 1/3/2017
 APPROVED: JCS PROJECT #: 60487539

Y:\GIS\Projects\Shell\Northeast Pipeline\MXDs\Mussel Maps\Mussel_Stream_MapBook_PA.mxd

**Appendix A – Ohio Mussel Habitat
Assessment Forms**

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Shell NEP
 County: Beaver Township: Greene Township
 Latitude (DD.DDDD): 40.59094 Longitude (DD.DDDD): -80.47759
 Stream Name: Mill Creek Group # (From Appendix A): NA - PA

Methods

Name of Surveyor(s): N. Jones, J. Swartz
 Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
 Date of Survey: 5/23/16 Distance Surveyed (ft.): 600 ft
 Total Survey Time (min. x people): 30 x 2 Scientific Collector's Permit Number(s): 18-125

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

None - Resurvey under better visibility and habitat and sphaeriidae observed

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 5.3 Water Temp. (°F): 64°F Air Temp. (°F): 75°F

Substrate Types (include %):

<input type="checkbox"/> Boulder	<input checked="" type="checkbox"/> Gravel <u>30</u>	<input type="checkbox"/> Bedrock	<input type="checkbox"/> Detritus	<input checked="" type="checkbox"/> Silt <u>20</u>
<input checked="" type="checkbox"/> Cobble <u>20</u>	<input checked="" type="checkbox"/> Sand <u>30</u>	<input type="checkbox"/> Hardpan	<input type="checkbox"/> Muck	<input type="checkbox"/> Artificial

Water Level: High Up Normal Low Dry/Interstitial

Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom

Average Depth (cm): Riffle 8 Run 15 Pool 29

Max Depth (cm): Riffle 14 Run 26 Pool 30

Mill Creek
5/23/14

Results

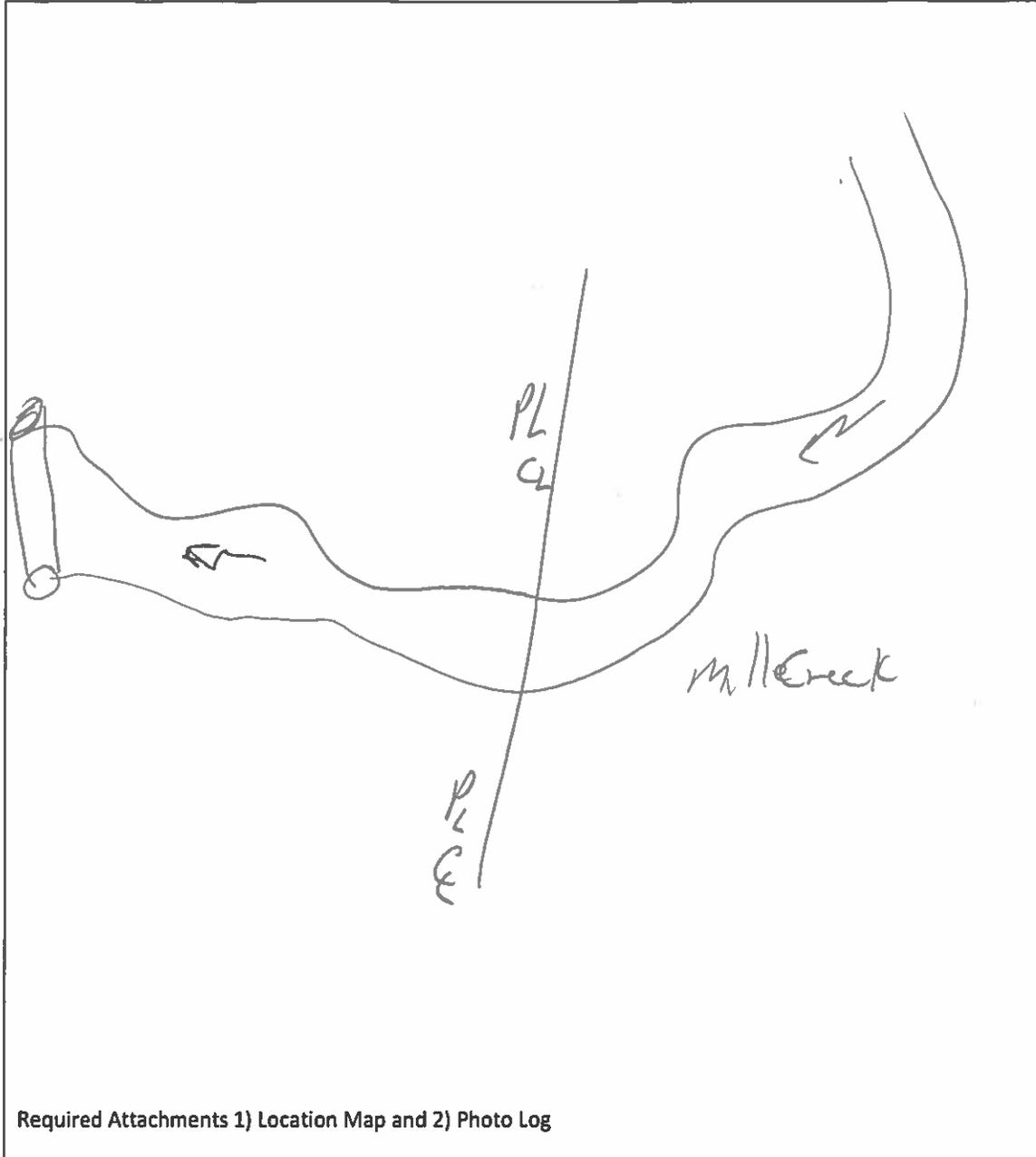
Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

None Mussel Shell Only - Subfossil Mussel Shell Only - Weathered Dead Mussel Shell Only - Fresh Dead Living Mussels

Sphaeridia
Abundant

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.

No live mussels or shells observed



Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Shell NBP
County: Beaver Co. Township: Independence
Latitude (DD.DDDD): 40.581359 Longitude (DD.DDDD): -80.326301
Stream Name: Service Creek Group # (From Appendix A): NA-PA

Methods

Name of Surveyor(s): J. Smarady, N. Jones
Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
Date of Survey: 5-24-2016 Distance Surveyed (ft.): 600 LF
Total Survey Time (min. x people): 35 x 2 Scientific Collector's Permit Number(s): 18-125

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

None - used wading & bathyscopes

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 17.4 Water Temp. (°F): 69°F Air Temp. (°F): 76°F

Substrate Types (include %):

Boulder 5 Gravel 35 Bedrock Detritus Silt 10
 Cobble 20 Sand 30 Hardpan Muck Artificial

Water Level: High Up Normal Low Dry/Interstitial

Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom 1.5m

Average Depth (cm): Riffle 21 Run 36 Pool 34

Max Depth (cm): Riffle 29 Run 54 Pool 56

Service Creek
5-24-2016

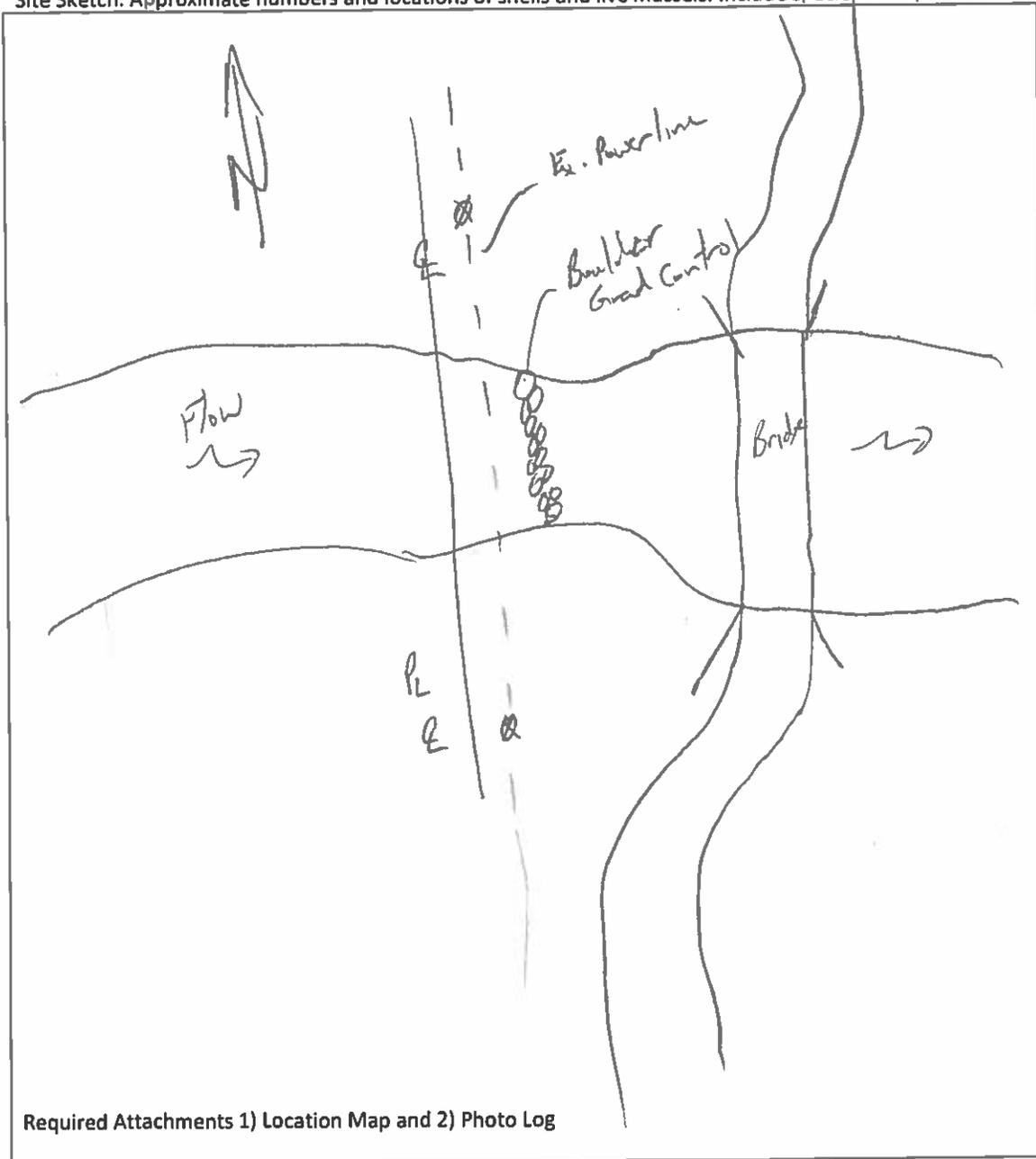
Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

- None Mussel Shell Only - Subfossil Mussel Shell Only - Weathered Dead Mussel Shell Only - Fresh Dead Living Mussels

C. Flummer

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Shell NEP
County: Beaver Township: Potter 315730
Latitude (DD.DDDD): 40.655094 Longitude (DD.DDDD): -80.345236
Stream Name: Beacon Cr. - DS Group # (From Appendix A): NA-PA

Methods

Name of Surveyor(s): J. Snavely, N. Jones
Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
Date of Survey: 5-26-2016 Distance Surveyed (ft.): 600 LF
Total Survey Time (min. x people): 27 min x 2 Scientific Collector's Permit Number(s): 18-125

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

Channel not accessible due to water depths and project survey limitations. Live unionids assumed present based on proximity to Ohio River

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 184 mi² Water Temp. (°F): 67°F Air Temp. (°F): 72°F

Substrate Types (include %):

Boulder Gravel Bedrock Detritus Silt
 Cobble Sand Hardpan Muck Artificial

Water Level: High Up Normal Low Dry/Interstitial

Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom

Average Depth (cm): Riffle None Run 2.25 m Pool 2.25 m

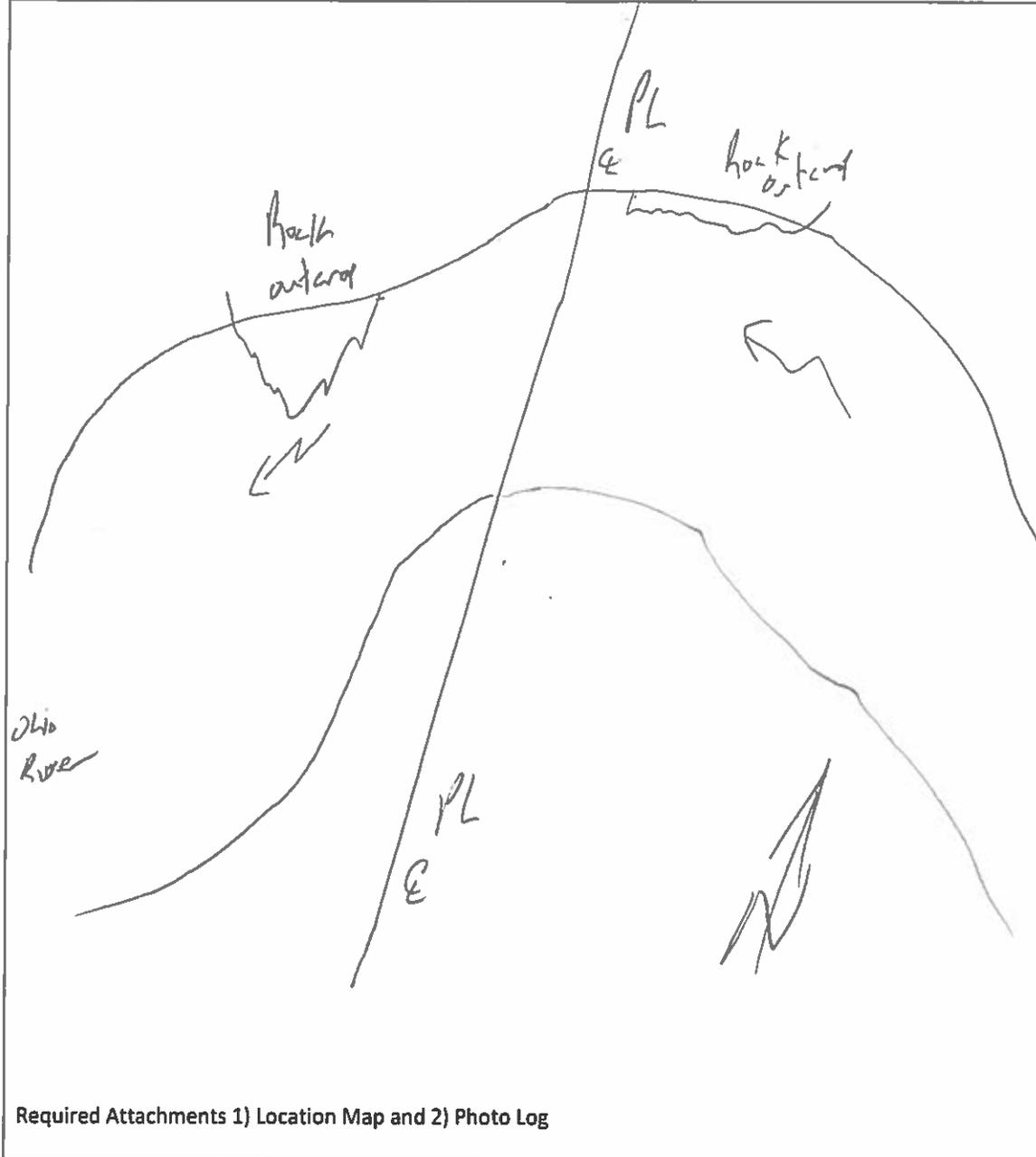
Max Depth (cm): Riffle / Run / Pool /

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

- None Mussel Shell Only - Subfossil Mussel Shell Only - Weathered Dead Mussel Shell Only - Fresh Dead Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Required Attachments 1) Location Map and 2) Photo Log

Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Shell NEP
 County: Beaver Township: Indendencia
 Latitude (DD.DDDD): 40.550211 Longitude (DD.DDDD): -80.316516
 Stream Name: Raccoon Creek - US Group # (From Appendix A): NA-VA

Methods

Name of Surveyor(s): J. Snavely N. Jones
 Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
 Date of Survey: 5-26-2016 Distance Surveyed (ft.): 600 LF
 Total Survey Time (min. x people): 56 x 2 Scientific Collector's Permit Number(s): 18-125

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

None - Wading and Bedlyscope, water depth and clarity limited survey area

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 133mi² Water Temp. (°F): 67°F Air Temp. (°F): 77°F

Substrate Types (include %):

<input checked="" type="checkbox"/> Boulder <u>5</u>	<input checked="" type="checkbox"/> Gravel <u>30</u>	<input type="checkbox"/> Bedrock <u> </u>	<input type="checkbox"/> Detritus <u> </u>	<input checked="" type="checkbox"/> Silt <u>10</u>
<input checked="" type="checkbox"/> Cobble <u>5</u>	<input checked="" type="checkbox"/> Sand <u>45</u>	<input checked="" type="checkbox"/> Hardpan <u>5</u>	<input type="checkbox"/> Muck <u> </u>	<input type="checkbox"/> Artificial <u> </u>

Water Level: High Up Normal Low Dry/Interstitial

Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom

Average Depth (cm): Riffle 25 Run 36 Pool 76

Max Depth (cm): Riffle 32 Run 49 Pool 118

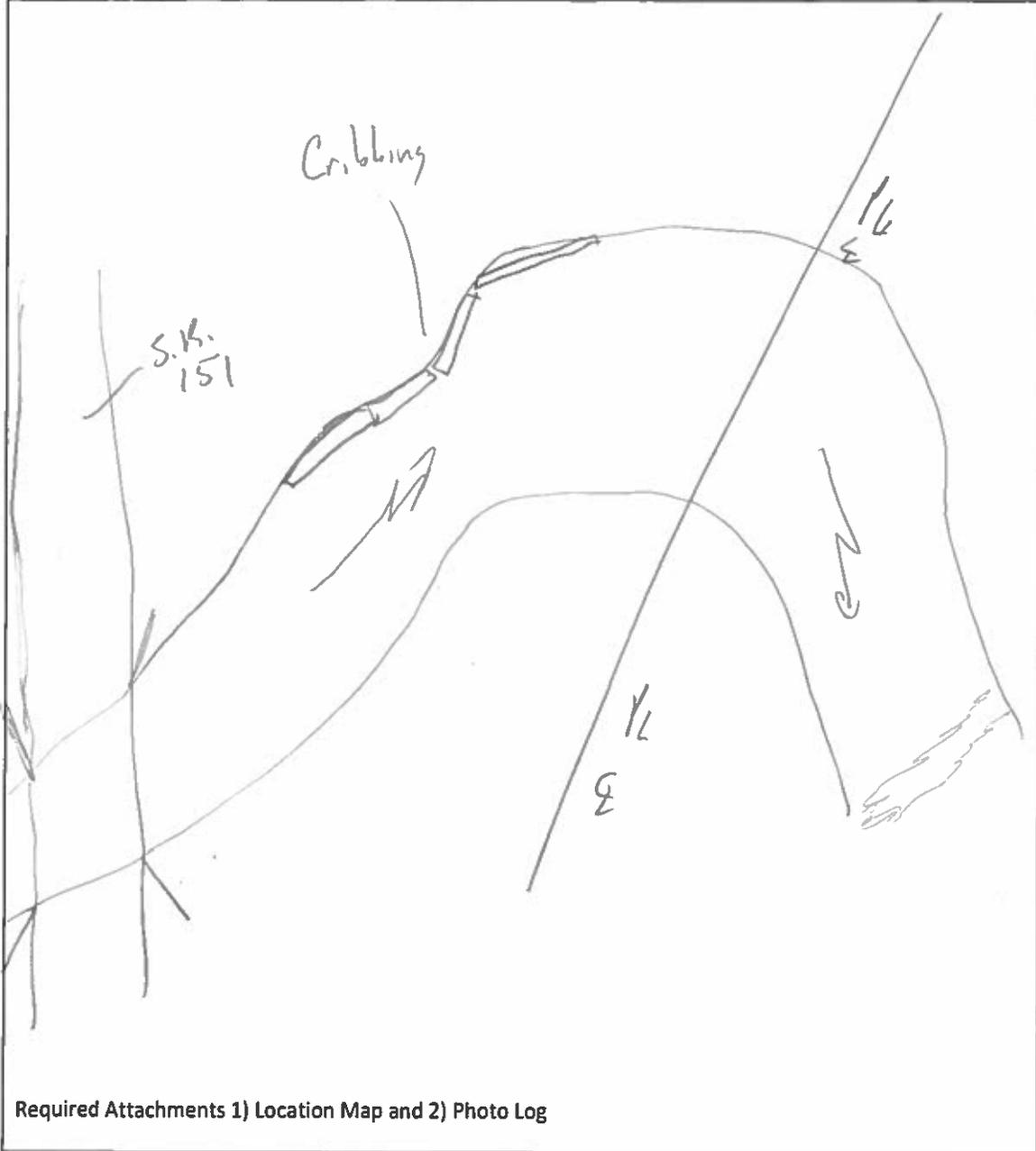
Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

- None Mussel Shell Only - Subfossil Mussel Shell Only - Weathered Dead Mussel Shell Only - Fresh Dead Living Mussels

*Corbicula
P. Alcockus
L. Fragilis*

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Shell NEP
County: Allegheny Co. Township: Findlay
Latitude (DD.DDDD): 40.446971 Longitude (DD.DDDD): -80.292168
Stream Name: Potato Garden Run Group # (From Appendix A): NA-PA

Methods

Name of Surveyor(s): J. Snavely, N. Jones
Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
Date of Survey: 5/23/2016 Distance Surveyed (ft.): 600 LP
Total Survey Time (min. x people): 10 min Scientific Collector's Permit Number(s): 18-125

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

AMD Impacted Area - No Habitat Observed

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 0.9 Water Temp. (°F): 74°F Air Temp. (°F): 73°F

Substrate Types (include %):

Boulder Gravel Bedrock Detritus 10 Silt 90
 Cobble Sand Hardpan Muck Artificial

Water Level: High Up Normal Low Dry/Interstitial

Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom

Average Depth (cm): Riffle _____ Run _____ Pool _____

Max Depth (cm): Riffle _____ Run _____ Pool _____

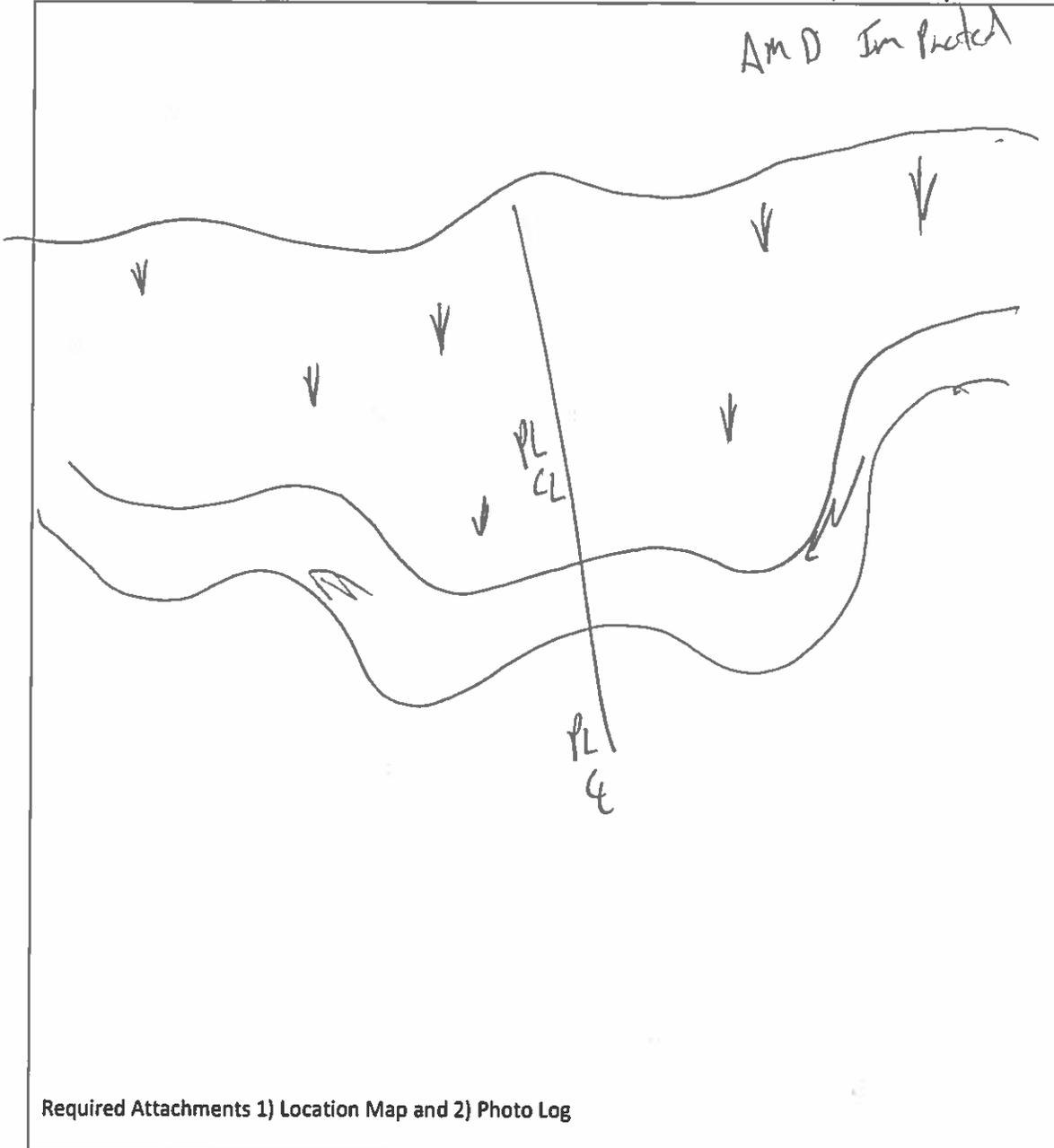
Potato Garden
ham

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

- None Mussel Shell Only - Subfossil Mussel Shell Only - Weathered Dead Mussel Shell Only - Fresh Dead Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Shell NEP
 County: Washington Co. PA Township: Robinson
 Latitude (DD.DDDD): 40.36067 Longitude (DD.DDDD): -80.273417
 Stream Name: Robinson Run Group # (From Appendix A): NA-PA

Methods

Name of Surveyor(s): J. Snavely, N. Jones
 Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
 Date of Survey: 5-23-2016 Distance Surveyed (ft.): 600 LF
 Total Survey Time (min. x people): 32 x 2 Scientific Collector's Permit Number(s): 18-125

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

None - Applied Habitat Assessments to PA sites

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 3.6 Water Temp. (°F): 58°F Air Temp. (°F): 75°F

Substrate Types (include %):

<input checked="" type="checkbox"/> Boulder <u>5</u>	<input checked="" type="checkbox"/> Gravel <u>45</u>	<input type="checkbox"/> Bedrock _____	<input type="checkbox"/> Detritus _____	<input checked="" type="checkbox"/> Silt <u>10</u>
<input checked="" type="checkbox"/> Cobble <u>15</u>	<input checked="" type="checkbox"/> Sand <u>10</u>	<input checked="" type="checkbox"/> Hardpan <u>15</u>	<input type="checkbox"/> Muck _____	<input type="checkbox"/> Artificial _____

Water Level: High Up Normal Low Dry/Interstitial

Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom

Average Depth (cm): Riffle 28 Run 32 Pool 76

Max Depth (cm): Riffle 32 Run 40 Pool 88

Rain events received past 48hrs; SAV (E/Idea) observed

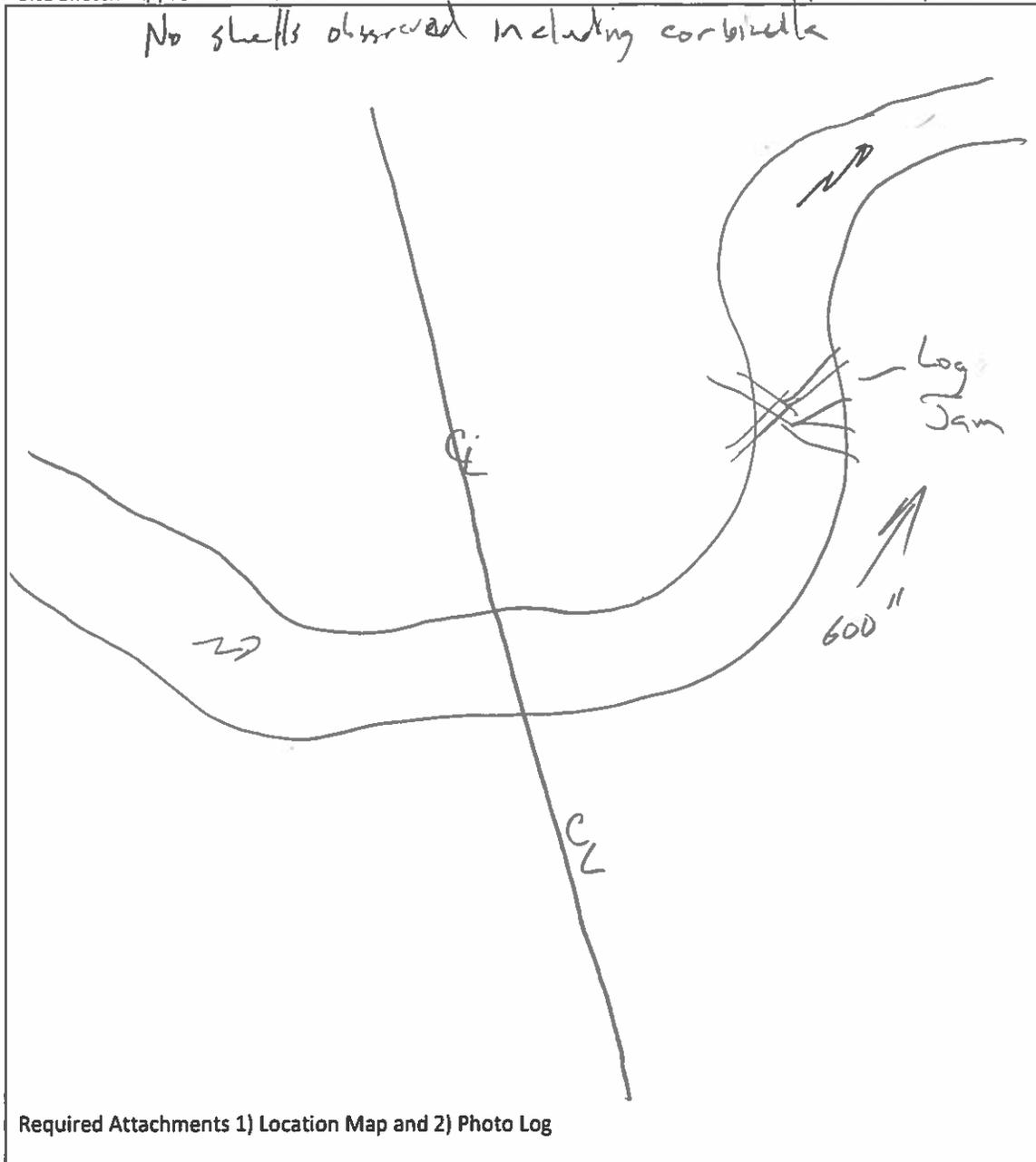
Robinson Fork
5-23-2014

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

- None Mussel Shell Only - Subfossil Mussel Shell Only - Weathered Dead Mussel Shell Only - Fresh Dead Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Ohio Mussel Habitat Assessment Form

Project Information

Project Name: Shell NEP
County: Washington Township: Mount Pleasant
Latitude (DD.DDDD): 40.326704 Longitude (DD.DDDD): -80.261289 *Double check*
Stream Name: Millers Run Group # (From Appendix A): NA-PA

Methods

Name of Surveyor(s): J. Snavely, N. Jones
Qualification of Surveyor(s): USFWS Approved ODNR Approved Aquatic Biologist (minimum)
Date of Survey: 5/23/2016 Distance Surveyed (ft.): 600 LF
Total Survey Time (min. x people): 30 x 2 Scientific Collector's Permit Number(s): _____

Note any deviations from the Ohio Mussel Habitat Assessment Methods :

None - PA stream using same methods

Habitat Description of Survey Area

Drainage Area at Survey Location (mi²): 2.7 Water Temp. (°F): 59°F Air Temp. (°F): 69°F

Substrate Types (include %):

Boulder _____ Gravel 25 Bedrock _____ Detritus _____ Silt 10
 Cobble 25 Sand 30 Hardpan 5 Muck _____ Artificial _____

Water Level: High Up Normal Low Dry/Interstitial

Visibility: 0-15 cm 15-30 cm 30-50 cm >50 cm Visible to Bottom

Average Depth (cm): Riffle 20 Run 51 Pool 75

Max Depth (cm): Riffle 28 Run 62 Pool 80

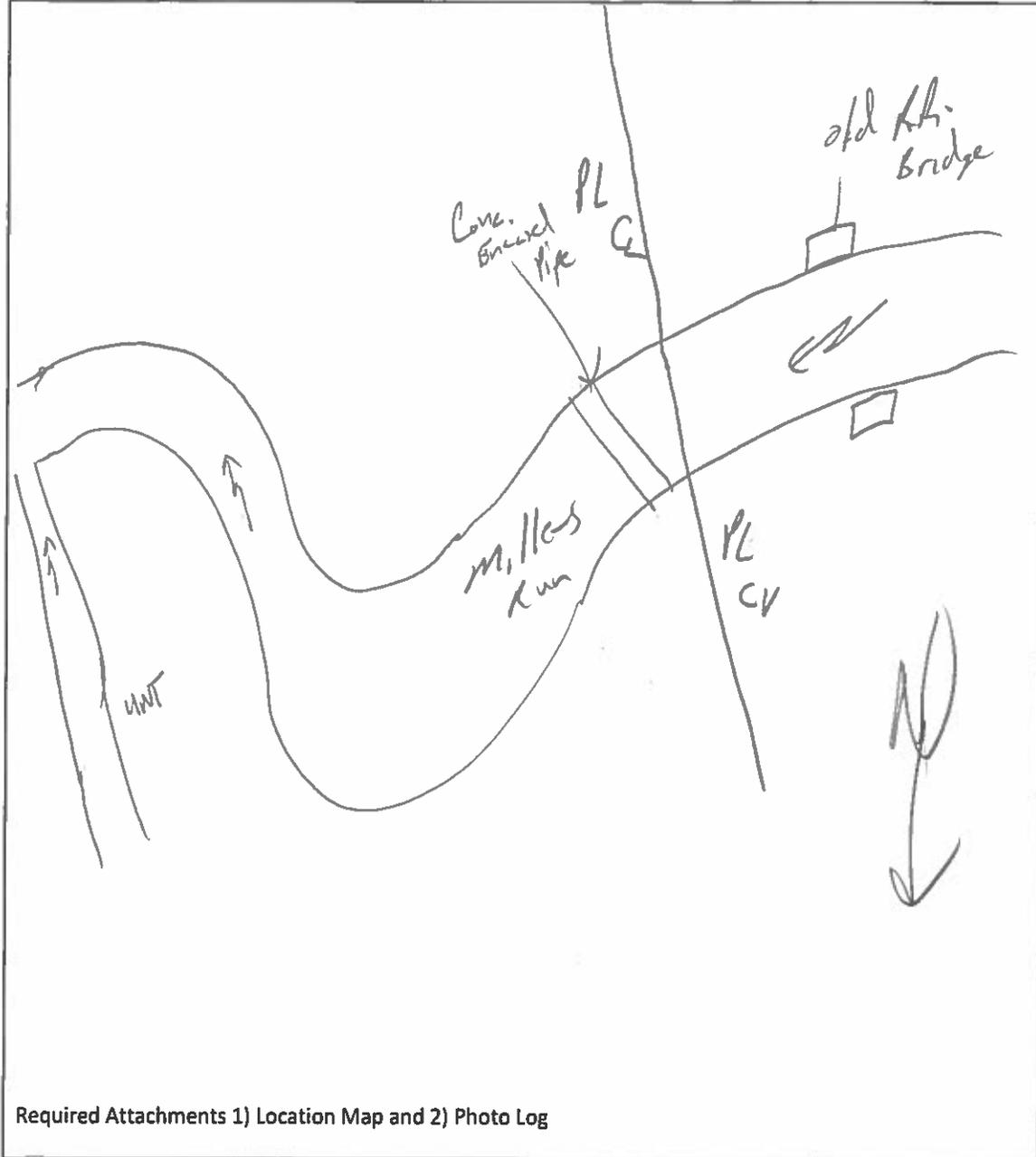
Millers Run
5/23/2016

Results

Evidence of Mussels: Presence of fresh dead mussel shells and living mussels will trigger a full mussel survey

- None Mussel Shell Only - Subfossil Mussel Shell Only Weathered Dead Mussel Shell Only Fresh Dead Living Mussels

Site Sketch. Approximate numbers and locations of shells and live mussels. Include species list if possible.



Appendix B - Photographs

Client Name: Shell Pipeline Company, LP Falcon Ethane Pipeline Project		Site Location: Mill Creek and Service Creek, Beaver County, PA	Project No. 60487539
Photo No. 1	Date: 5/24/16		
Direction Photo Taken: East			
Description: Mill Creek facing upstream at the proposed approximate pipeline crossing location			

Photo No. 2	Date: 5/24/16		
Direction Photo Taken: South			
Description: Service Creek facing upstream			

Client Name: Shell Pipeline Company, LP Falcon Ethane Pipeline Project		Site Location: Raccoon Creek, Beaver County, PA	Project No. 60487539
Photo No. 3	Date: 5/26/16		
Direction Photo Taken: South			
Description: Raccoon Creek facing upstream at the proposed approximate downstream pipeline crossing location			

Photo No. 4	Date: 5/26/16		
Direction Photo Taken: North			
Description: Raccoon Creek facing upstream at the proposed approximate pipeline crossing location			

Client Name: Shell Pipeline Company, LP Falcon Ethane Pipeline Project	Site Location: Raccoon Creek and Potato Garden Run, Beaver and Allegheny Counties, PA	Project No. 60487539
-------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------	--------------------------------

Photo No. 5	Date: 5/26/16
Direction Photo Taken: Species picture	

Description:

Live *Leptodea fragilis* and *Potamilus alatus* observed in the vicinity the proposed approximate upstream pipeline crossing location on Raccoon Creek.



Photo No. 6	Date: 5/23/16
Direction Photo Taken: East	

Description:

Potato Garden Run facing upstream and acid mine drainage effects



Client Name: Shell Pipeline Company, LP Falcon Ethane Pipeline Project		Site Location: Robinson Run and Millers Run, Washington County, PA	Project No. 60487539
Photo No. 7	Date: 5/23/16		
Direction Photo Taken: North			
Description: Robinson Run facing upstream			

Photo No. 8	Date: 5/23/16		
Direction Photo Taken: East			
Description: Millers Run facing downstream			