

HDD Wire Guided Waterway Crossing ATON Plan

Susquehanna River (S-A22)

Mariner East Phase 2 Pipeline Project

Prepared for:

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Sunoco Pipeline, L.P. HDD Wire Guided Waterway Crossing ATON Plan
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November 14, 2016

1.0 INTRODUCTION

Sunoco Pipeline, L.P. (SPLP) proposes to construct and operate the Pennsylvania Pipeline Project (Project or PPP) that would expand existing pipeline systems to provide natural gas liquid (NGL) transportation of up to 700,000 barrels per day. The Project involves the installation of two parallel pipelines within an approximately 306.8-mile, 50-foot-wide right-of-way (ROW) from Houston, Washington County, Pennsylvania to SPLP's Marcus Hook facility in Delaware County, Pennsylvania with the purpose of interconnecting with existing SPLP Mariner East pipelines. A 20-inch diameter pipeline will be installed within the ROW from Houston to Marcus Hook (306.8 miles) and a second, 16-inch diameter pipeline, will also be installed in the same ROW. The second line is proposed to be installed from SPLP's Delmont Station, Westmoreland County, Pennsylvania to the Marcus Hook facility, paralleling the initial line for approximately 255.8 miles. The majority of the new ROW will be co-located adjacent to existing utility corridors, including approximately 230 miles of pipeline that will be co-located in the existing SPLP Mariner East pipeline system.

As part of the work, several water crossings are required. Horizontal directional drilling (HDD) is proposed to install the pipeline segments underneath the waterways being crossed. To direct the drilling a 4 – 6 gauge (direct current) or 10 -14 gauge (alternating current) coated wire is placed at ground surface (beneath the water surface). The wire conducts an electrical current producing a magnetic field that the drill steering tube can reference to direct the position of the drill bit as it drills a boring under the ground surface.

The primary purpose of this ATON plan is to insure the safety of recreational boaters who may attempt to travel through or near an area impacted by this construction project. The waterway crossing has been determined to have a potential impact on recreational boating by the Pennsylvania Fish and Boat Commission (PFBC). As required for potentially impacted waterways, this Aid to Navigation (ATON) Plan has been prepared to address the specific equipment to be used in the waterway during the drilling, restrictions placed on boating during the conduct of the work, and navigational aids to be used to communicate hazards and restrictions to boating during the conduct of the work.

2.0 PROJECT SPECIFIC FEATURES

The following sections outline specific features of the waterway crossing for the Susquehanna River (S-A22).

2.1 WATERWAY CROSSING LOCATION

The waterway of concern for this crossing is the Susquehanna River (stream identification S-A22) a perennial drainage located in Dauphin County near the township of Highspire. The latitude and longitude of the crossing, respectively, are 40.200361, -76.790812. The river width being crossed is approximately 4,000 feet. Figure 1 presents a site location map of the waterway crossing and surrounding area. Figures 2 and 3 present a close up of a quadrangle map and an aerial photograph of the crossing for the two pipelines.

2.2 SCOPE OF WORK

Signs and buoys, as required for the crossing, will be setup as described in Section 2.4 of this plan. A permit application for floating structures referred to as PFBC-277 "Application to Install Floating Structure(s) or Private Aids to Navigation" will be submitted at least 60 days prior to the installation of such item. The waterway was not identified by the PFBC

as a shared jurisdictional waterway with the U.S. Coast Guard (USCG) and will not require the acquisition of a USCG PATON permit or waiver.

Prior to drilling underneath the waterway the wire guidance system is setup from the HDD staging areas on either side of the waterway. The procedure for installing the wire guidance system will include the following:

- Wire spools will be delivered to the site at the HDD entry side. Several smaller coils may be used and spliced together in the field to create the loop.
- The wire will be hand laid on top of the ground and stream bed and spliced together along the HDD path using a small crew of workers. Splices that will end up in the waterway will be made on land prior to installing the cable or in the work boat as the cable is being placed in the waterway. A small boat will be used to lay the cable across the waterway. At this time, no special anchoring is anticipated to be required. If the cable needs to be anchored small weights (5 pounds) will be placed on the cable to immobilize it.
- The centerline wire is surveyed by a surveyor in a small boat using typical hand held field survey equipment to verify its position. Small floating buoys may be attached to the wire to aid in the surveying of its location.
- After the HDD is complete, the wires will be removed from the waterway by utilizing the work boat.

Two separate HDDs will be constructed at this location. To accommodate each drill, a centerline wire will be run directly over the intended boring location. A return loop will be laid in the water and offset from the centerline wire by approximately 40 feet. Two wires will be in the water at any one time for the active drill location. The centerline wire will be repositioned for the second drill following completion of the first drill. Figures 2 and 3 present the wire locations.

Passage of recreational boaters will be accommodated during the drilling operation. During initial placement, repositioning of the centerline and loop wires, and removal of the wires, passage in the river may be temporarily and briefly impacted. However, a safe channel for recreational traffic will be provided to direct traffic away from the active work zone.

2.3 ESTIMATED DATES OF CONSTRUCTION

The work is anticipated to begin during January 2017. The approximate dates of the work at this location will be sent to the PFBC when it is more clearly known.

2.4 DESCRIPTION OF ATON PLAN

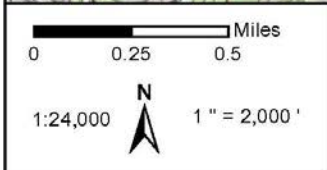
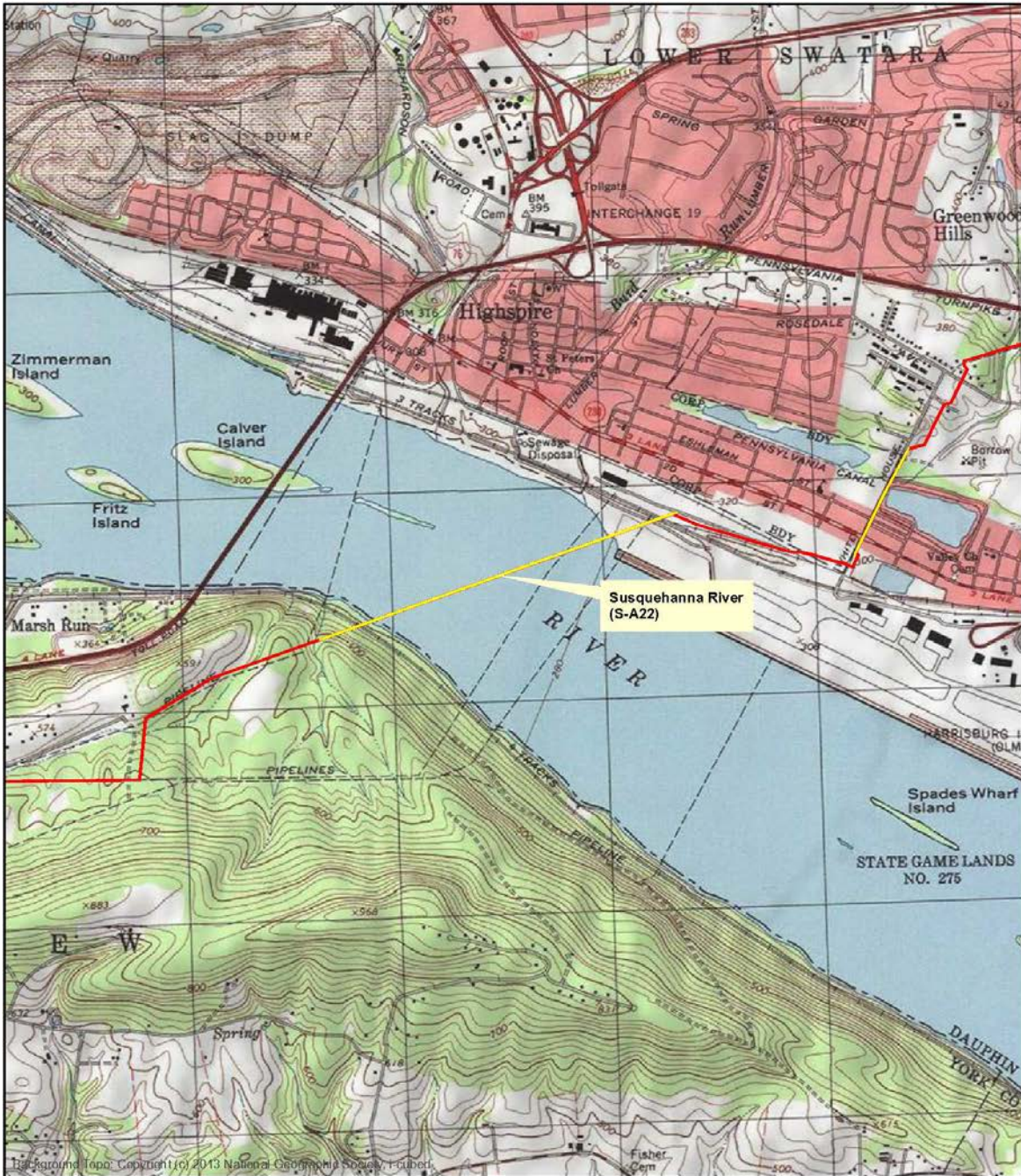
The Susquehanna River appears to be utilized by both by motorized and non-powered craft and is 4,000 feet in width along the centerline of the pipeline crossing. Based on this, land based signs in combination with buoys are proposed for the crossing. The signs will include the following:

- Four construction warning signs, two of each located on each river bank at least 200 feet above and below the work zone, respectively;

- Four construction warning buoys, two of each located at least 400 feet above and below the work zone, respectively, and approximately 1200 feet into the waterway from each river bank; and
- Two safe channel marker buoys located 200 feet above and below the work zone, respectively, to be positioned above the work zone in the safe channel location. Once the cables are set and drilling has commenced the safe channel marker buoys will be removed from the waterway until the cables require repositioning or removal.


Figures 2 and 3 present the location of the signage, buoys and work boat for the project. The work boat(s) will primarily be trasversing the river over the cable locations with the exception of the placement of the buoys. The buoys will be standard nine foot inland regulatory buoys. The buoys will be white in color with and include standard symbols identifying the nature of the message in orange, with the message in black lettering. No channel or lighted buoys are proposed. The Appendix presents the proposed signage and buoy details.

FIGURES



Legend

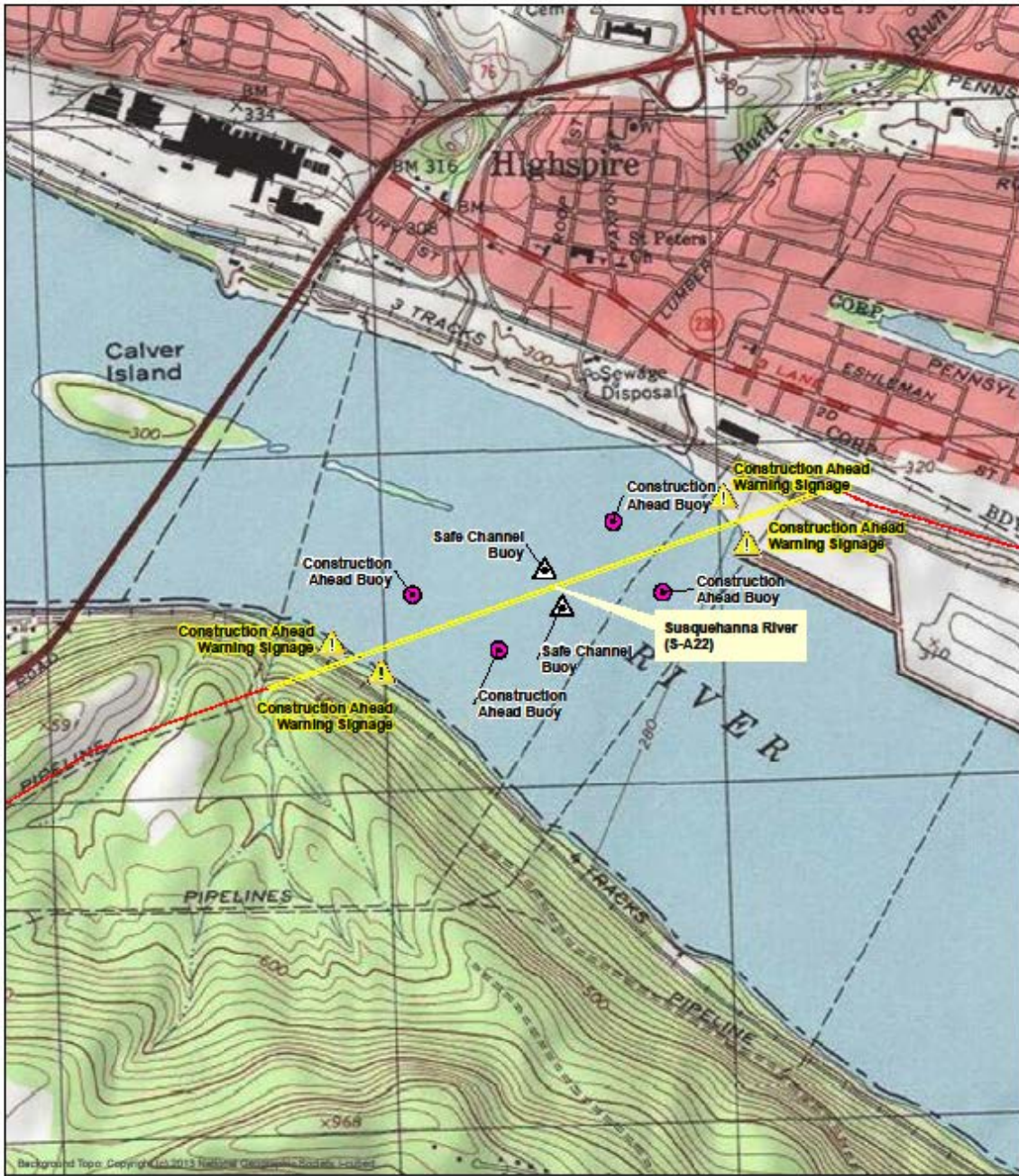
- Proposed HDD Segment
- Proposed Pipe Centerline





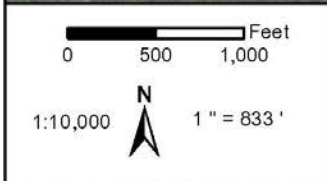
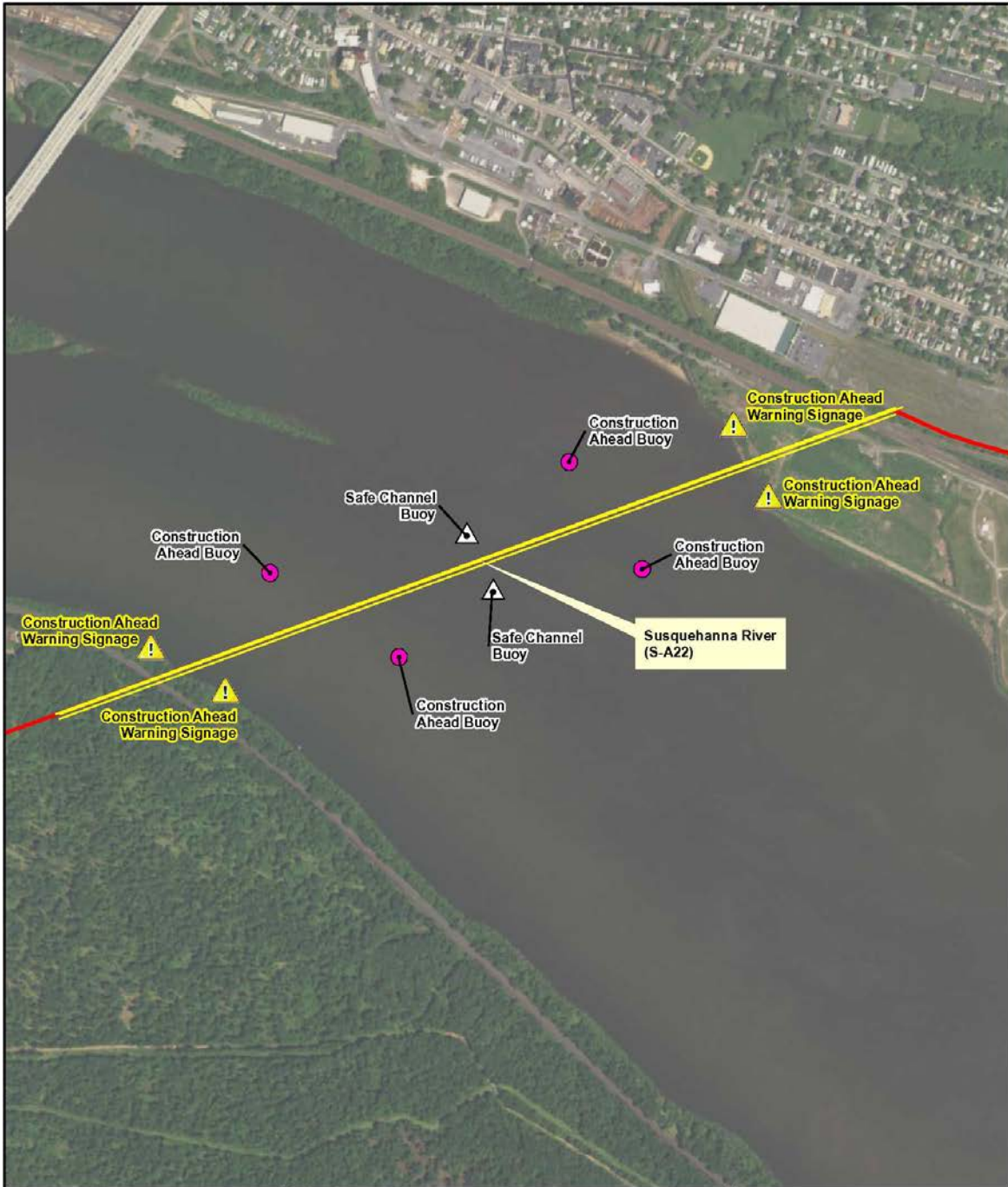
TETRA TECH, INC.

FIGURE 1
SUSQUEHANNA RIVER (S-A22)

ATON Plan
 Sunoco Mariner East Phase 2




<p>0 750 1,500 Feet</p> <p>1:15,000</p>  <p>1" = 1,250'</p>	<p>Legend</p> <ul style="list-style-type: none"> — Proposed Wire Locations — Proposed Pipe Centerline  <p>TETRA TECH, INC.</p>	<p>FIGURE 2</p> <p>SUSQUEHANNA RIVER (S-A22)</p> <p>ATON Plan</p> <p>Sunoco Mariner East Phase 2</p>
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Legend

- Proposed Wire Locations
- Proposed Pipe Centerline



TETRA TECH, INC.

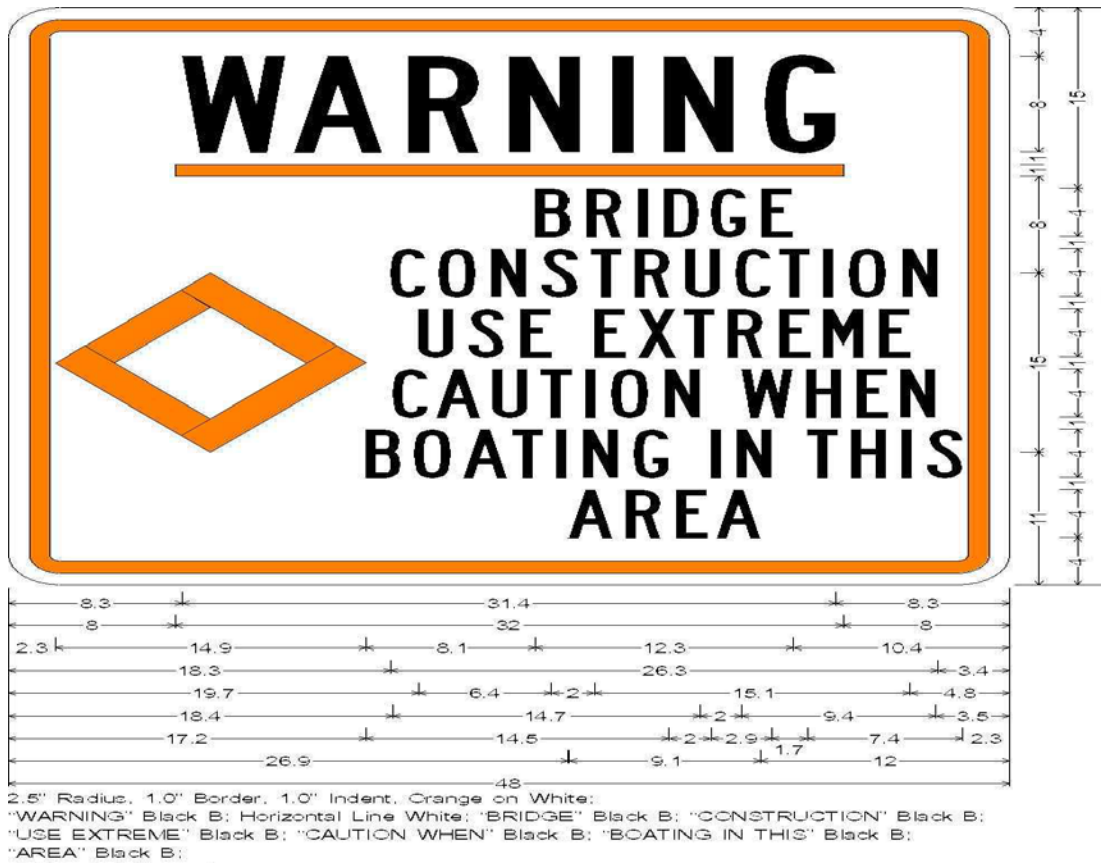
FIGURE 3
SUSQUEHANNA RIVER
(S-A22)

ATON Plan
 Sunoco Mariner East Phase 2

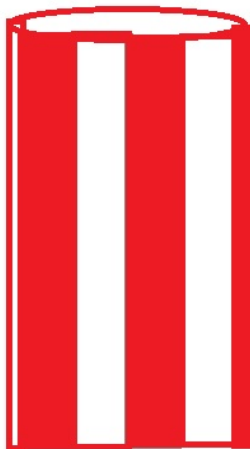
APPENDIX

Proposed ATON Signage

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Drawing is excerpted from PFBC ATON Guidance Document and will be modified to say "Warning – Construction Area Ahead Use Extreme Caution" or similar.

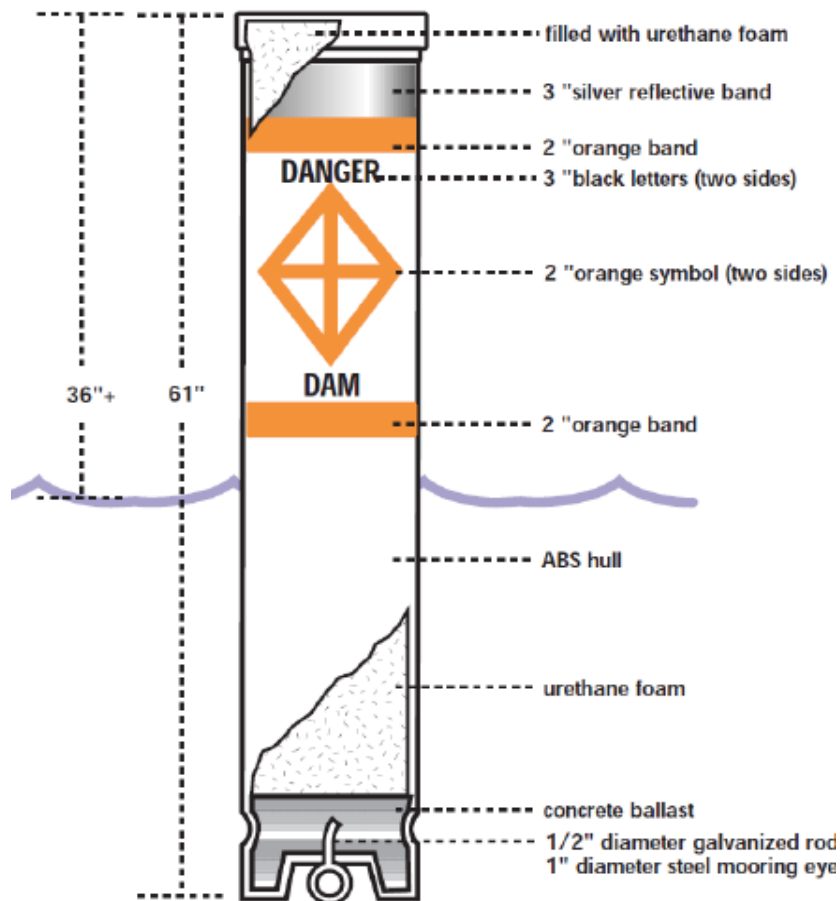


Safe Waters (Safe Channel) buoy depiction.

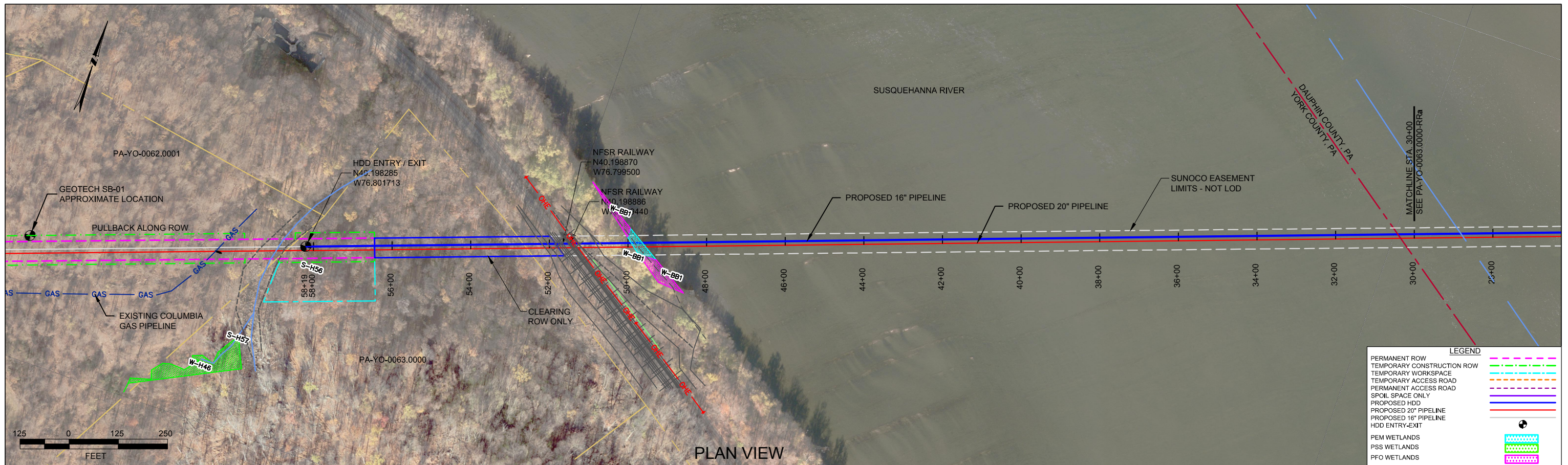


CHANNEL LEFT

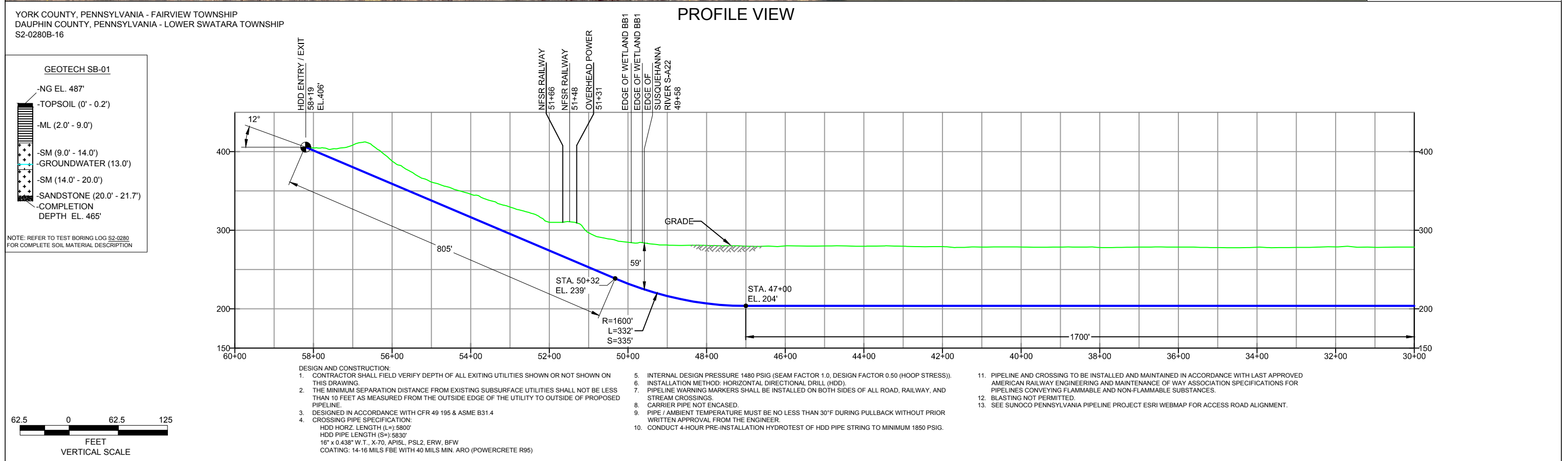
Channel informational marking for buoy located above work area during cable installation, repositioning, and removal. Directional arrow will reflect current channel preference. Drawing is excerpted from PFBC ATON Guidance Document.



Buoy typical excerpted from PFBC ATON Guidance Document. Buoy markings will be "Warning – Construction Area Ahead Use Extreme Caution" or similar.



PLAN VIEW

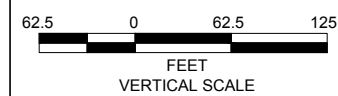


PROFILE VIEW

GEOTECH SB-01

- NG EL. 487'
- TOPSOIL (0' - 0.2')
- ML (2.0' - 9.0')
- SM (9.0' - 14.0')
- GROUNDWATER (13.0')
- SM (14.0' - 20.0')
- SANDSTONE (20.0' - 21.7')
- COMPLETION DEPTH EL. 465'

NOTE: REFER TO TEST BORING LOG S2-0280 FOR COMPLETE SOIL MATERIAL DESCRIPTION



- DESIGN AND CONSTRUCTION:**
- CONTRACTOR SHALL FIELD VERIFY DEPTH OF ALL EXISTING UTILITIES SHOWN OR NOT SHOWN ON THIS DRAWING.
 - THE MINIMUM SEPARATION DISTANCE FROM EXISTING SUBSURFACE UTILITIES SHALL NOT BE LESS THAN 10 FEET AS MEASURED FROM THE OUTSIDE EDGE OF THE UTILITY TO OUTSIDE OF PROPOSED PIPELINE.
 - DESIGNED IN ACCORDANCE WITH CFR 49 195 & ASME B31.4
 - CROSSING PIPE SPECIFICATION:
HDD HORZ. LENGTH (L)=5800'
HDD PIPE LENGTH (S)=5830'
16" x 0.438" W.T., X-70, API5L, PSL2, ERW, BFW
COATING: 14-16 MILS FBE WITH 40 MILS MIN. ARO (POWERCRETE R95)
 - INTERNAL DESIGN PRESSURE 1480 PSIG (SEAM FACTOR 1.0, DESIGN FACTOR 0.50 (HOOP STRESS)).
 - INSTALLATION METHOD: HORIZONTAL DIRECTIONAL DRILL (HDD).
 - PIPELINE WARNING MARKERS SHALL BE INSTALLED ON BOTH SIDES OF ALL ROAD, RAILWAY, AND STREAM CROSSINGS.
 - CARRIER PIPE NOT ENCASED.
 - PIPE / AMBIENT TEMPERATURE MUST BE NO LESS THAN 30°F DURING PULLBACK WITHOUT PRIOR WRITTEN APPROVAL FROM THE ENGINEER.
 - CONDUCT 4-HOUR PRE-INSTALLATION HYDROTEST OF HDD PIPE STRING TO MINIMUM 1850 PSIG.
 - PIPELINE AND CROSSING TO BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH LAST APPROVED AMERICAN RAILWAY ENGINEERING AND MAINTENANCE OF WAY ASSOCIATION SPECIFICATIONS FOR PIPELINES CONVEYING FLAMMABLE AND NON-FLAMMABLE SUBSTANCES.
 - BLASTING NOT PERMITTED.
 - SEE SUNOCO PENNSYLVANIA PIPELINE PROJECT ESRI WEBMAP FOR ACCESS ROAD ALIGNMENT.

NOTES

- ALL COORDINATES SHOWN ARE IN LATITUDE AND LONGITUDE. ALL MSL ELEVATIONS ARE NAD83
- STATIONING IS BASED ON HORIZONTAL DISTANCES
- ROONEY ENGINEERING, INC. AND SUNOCO PIPELINE, LP ARE NOT RESPONSIBLE FOR LOCATION OF FOREIGN UTILITIES SHOWN IN PLOT PLAN OR PROFILE. THE INFORMATION SHOWN HEREON IS FURNISHED WITHOUT LIABILITY ON THE PART OF ROONEY ENGINEERING, INC. AND SUNOCO PIPELINE, LP. FOR ANY DAMAGES RESULTING FROM ERRORS OR OMISSIONS THEREIN.
- CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UTILITIES. CONTACT ONE CALL AT 811 PRIOR TO DIGGING.
- SUNOCO EMERGENCY HOTLINE NUMBER IS #1-800-786-7440.

REF. DRAWING		REVISIONS	
ES-4.20	TO ES-4.04	NO.	DESCRIPTION
SHEET 13	SHEET 2	EP2	EROSION & SEDIMENT PLAN
		EP1	AERIAL SITE PLAN
		EP	REVISED PER PADEP COMMENTS RECEIVED 09-06-16
		A	REVISED PER PADEP COMMENTS
			ISSUED FOR REVIEW
DWG NO	DWG NO	NO.	DESCRIPTION

Sunoco Logistics Partners L.P.

TETRA TECH ROONEY
(303) 792-5911

SUNOCO PIPELINE, L.P.

16-INCH HORIZONTAL DIRECTIONAL DRILL
SUSQUEHANNA RIVER
PENNSYLVANIA PIPELINE PROJECT

SCALE: 1"=250' DWG. NO: PA-YO-0063.0000-RRb-16