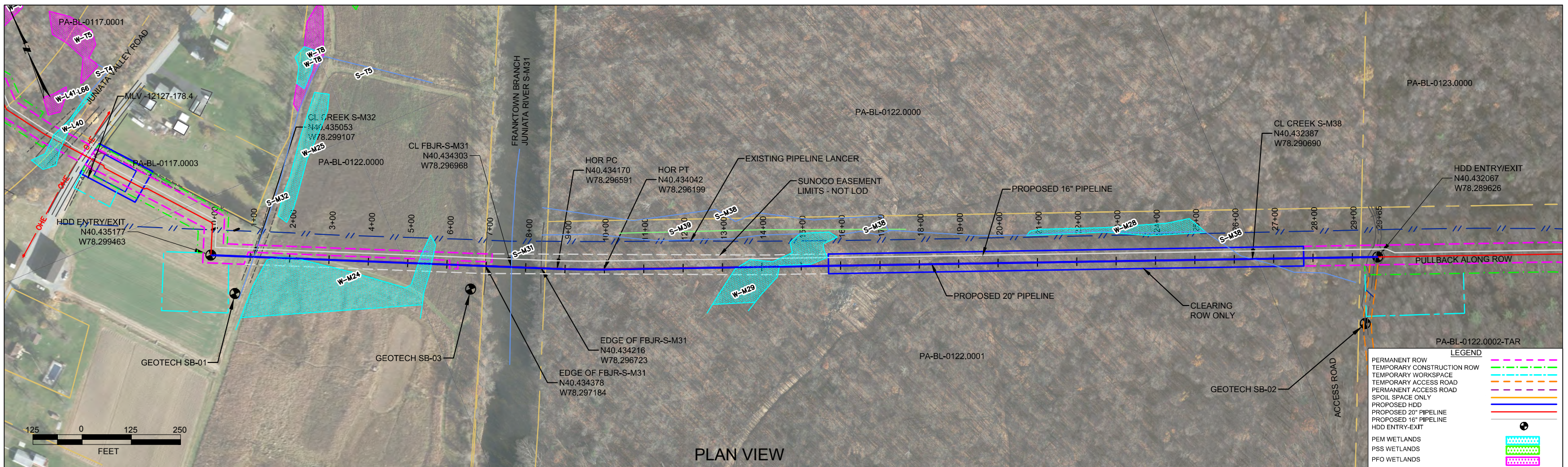


HDD PA-BL-0122.0000-WX (S-M32) (W-M24) (S-M31) (W-M29) (S-M38)

Given the design, the threat of inadvertent return has been reduced to the maximum extent practicable and in this case that threat is considered to be *low*. Implementing this design, along with adherence to the Pennsylvania Pipeline Project Inadvertent Return Contingency Plan will ensure inadvertent impacts, if they were to occur, are also minimized to the maximum extent.

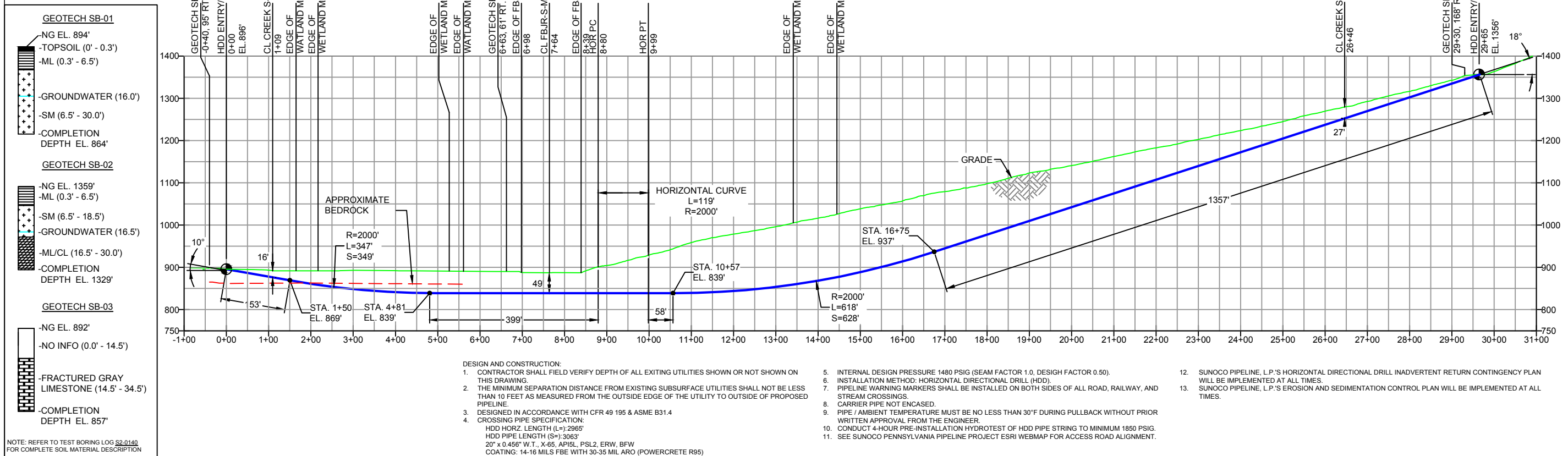
The drill will enter/exit 90 feet from the edge of the western most boundary of the stream S-M32. The drill will travel beneath stream S-M32 for 6 feet. Using the results of the geotechnical investigation, as well as several other data points, the entry/exit, angles, and depths have been configured to pass through the best substrates while maintaining pipe integrity (e.g., no large bends). The majority of the substrate that will be passed through is estimated to be fine silty sand. The drill will continue through the eastern most boundary of the stream S-M32 and will travel 30 feet to the western most edge of wetland W-M24. The drill will pass 420 feet under the wetland W-M24. The majority of the substrate that will be passed through is estimated to be fractured rock. The drill will continue beneath the eastern most boundary of the wetland W-M24 and will travel 160 feet to the western most edge of stream S-M31. The drill will continue beneath stream S-M31 for 130 feet. The majority of the substrate that will be passed through is estimated to be unfractured to moderately fractured gray limestone. The drill will continue beneath the eastern most boundary of the stream S-M31 and will travel 500 feet to the western most edge of wetland W-M29. The drill will continue beneath wetland W-M29 for 105 feet. The majority of the substrate that will be passed through is estimated to be dry weathered silt and clay with little fine to medium sand. The drill will continue beneath the eastern most boundary of wetland W-M29 and will travel 1020 feet to the western most edge of stream S-M38. The drill will continue beneath stream S-M38 for 8 feet. The majority of the substrate that will be passed through is estimated to be dry weathered silt and clay with little fine to medium sand. The drill will travel 230 feet from the eastern most edge of stream S-M38 where it will enter/exit.



PLAN VIEW

BLAIR COUNTY, PENNSYLVANIA - FRANKSTOWN TOWNSHIP
S2-0140

PROFILE VIEW



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): 2965'
HDD PIPE LENGTH (S): 3063'
20" x 0.456" W.T., X-65, API5L, PSL2, ERW, BFW
COATING: 14-16 MILS FBE WITH 30-35 MIL ARO (POWERCRETE R95)
- INTERNAL DESIGN PRESSURE 1480 PSIG (SEAM FACTOR 1.0, DESIGN FACTOR 0.50).
- 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.
- SEE SUNOCO PENNSYLVANIA PIPELINE PROJECT ESRI WEBMAP FOR ACCESS ROAD ALIGNMENT.
- SUNOCO PIPELINE, L.P.'S HORIZONTAL DIRECTIONAL DRILL INADVERTENT RETURN CONTINGENCY PLAN WILL BE IMPLEMENTED AT ALL TIMES.
- SUNOCO PIPELINE, L.P.'S EROSION AND SEDIMENTATION CONTROL PLAN WILL BE IMPLEMENTED AT ALL TIMES.

NOTE: REFER TO TEST BORING LOG S2-0140 FOR COMPLETE SOIL MATERIAL DESCRIPTION

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

ES-3.51	TO	ES-3.53	EROSION & SEDIMENT PLAN
SHEET 33	TO	SHEET 34	AERIAL SITE PLAN

REVISIONS

EP2	REVISED PER PADEP COMMENTS RECEIVED 09-06-16
EP1	REVISED PER PADEP COMMENTS
EP	
C	ADDED GEOTECH INFO
B	ISSUED FOR BID
A	ISSUED FOR REVIEW

REVISIONS

DLM	09/30/16	RMB	09/30/16	AAW	09/30/16
MRS	05/18/16	RMB	05/18/16	AAW	05/18/16
MRS	03/15/16	RMB	03/15/16	AAW	03/15/16
MRS	09/04/15	RMB	09/04/15	AAW	09/04/15
JAM	07/31/15	RMB	07/31/15	AAW	07/31/15
JAM	03/24/15	RMB	03/24/15	AAW	03/24/15
BY	DATE	CHK	DATE	APP	DATE

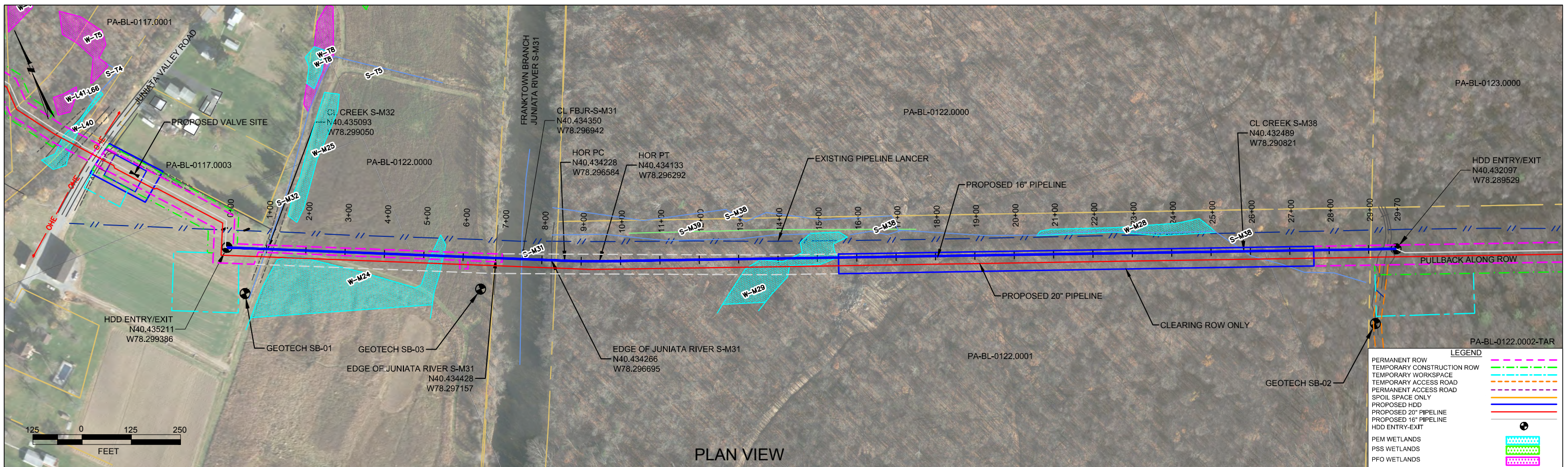
Sunoco Logistics Partners L.P.

TETRA TECH ROONEY
(303) 792-5911

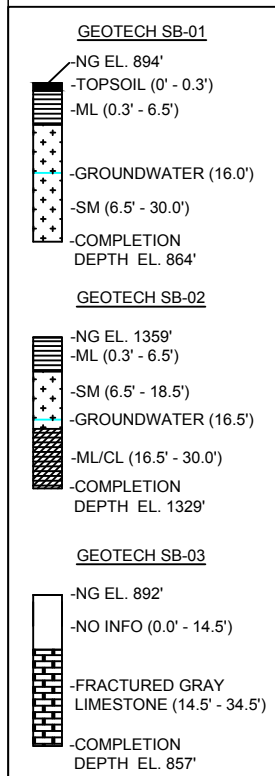
SUNOCO PIPELINE, L.P.

20-INCH HORIZONTAL DIRECTIONAL DRILL
JUNIATA RIVER
PENNSYLVANIA PIPELINE PROJECT

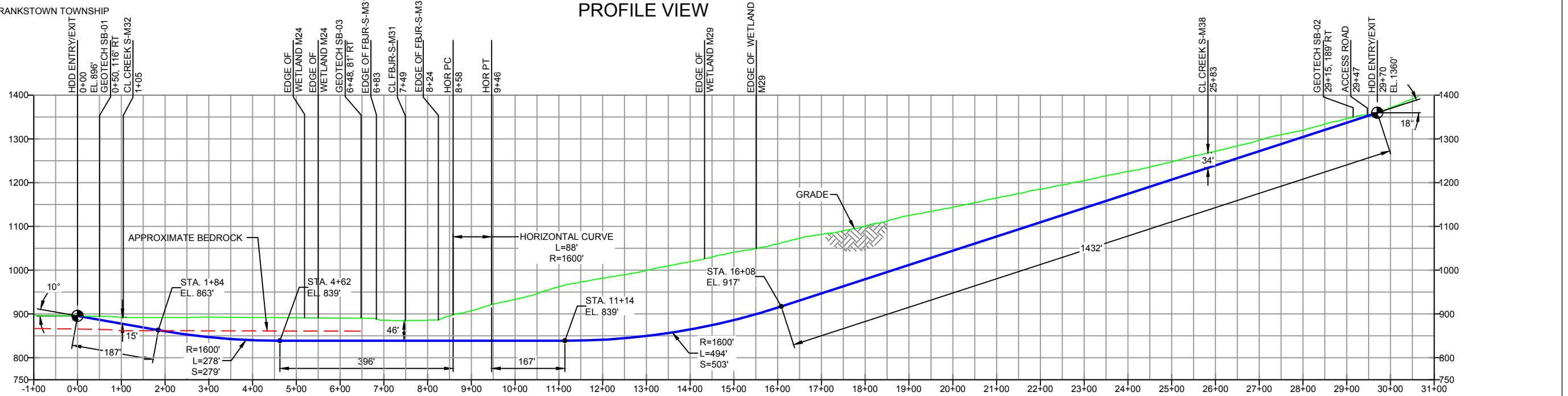
SCALE: 1"=250'
DWG. NO. PA-BL-0122.000-WX



BLAIR COUNTY, PENNSYLVANIA - FRANKSTOWN TOWNSHIP
S2-0140-16



NOTE: REFER TO TEST BORING LOG S2-0140 FOR COMPLETE SOIL MATERIAL DESCRIPTION



NOTES

- ALL COORDINATES SHOWN ARE IN LATITUDE AND LONGITUDE. ALL MSL ELEVATIONS ARE NAD83
- STATIONING IS BASED ON HORIZONTAL DISTANCES.
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- 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		EROSION & SEDIMENT PLAN	
ES-3.51	TO	ES-3.53	EROSION & SEDIMENT PLAN
SHEET 33	TO	SHEET 34	AERIAL SITE PLAN
		EP2	REVISED PER PADEP COMMENTS RECEIVED 09-06-16
		EP1	REVISED PER PADEP COMMENTS
		EP	
		B	ADDED GEOTECH INFO
		A	ISSUED FOR BID
DWG NO	DWG NO	DESCRIPTION	NO.

REVISIONS

BY	DATE	CHK	DATE	APP	DATE
DLM	10/07/16	RMB	10/07/16	AAW	10/07/16
MRS	05/09/16	RMB	05/09/16	AAW	05/09/16
MRS	11/23/15	RMB	11/23/15	AAW	11/23/15
MRS	09/04/15	RMB	09/04/15	AAW	09/04/15
MRS	08/31/15	RMB	08/31/15	AAW	08/31/15

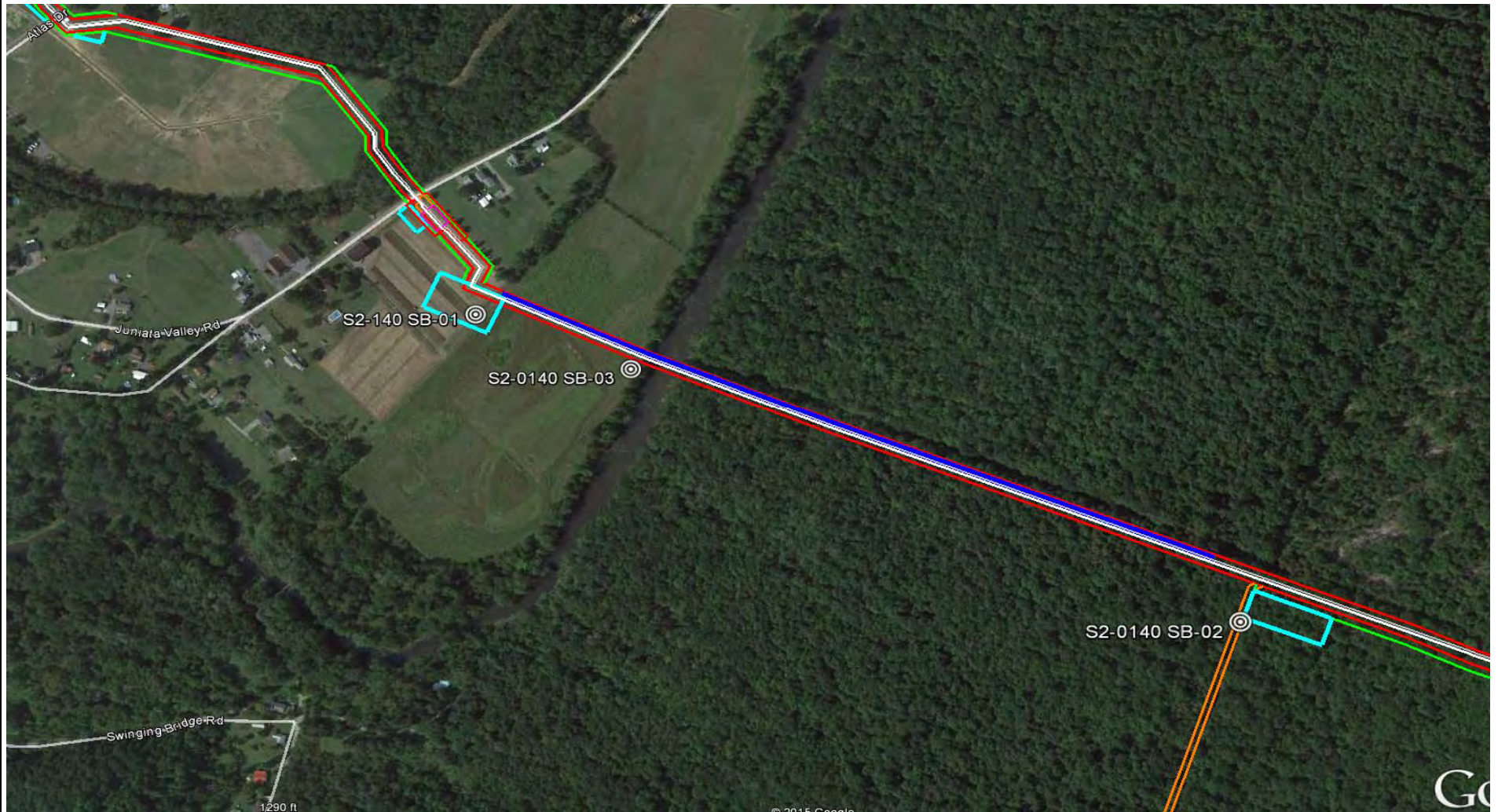
Sunoco Logistics Partners L.P.

TETRA TECH ROONEY
(303) 792-5911

SUNOCO PIPELINE, L.P.

16-INCH HORIZONTAL DIRECTIONAL DRILL
JUNIATA RIVER
PENNSYLVANIA PIPELINE PROJECT

SCALE: 1"=250' DWG. NO: PA-BL-0122.0000-WX-16



LEGEND:

⊙ Geotechnical Soil Boring (SB) Locations



TETRA TECH

GEOTECHNICAL BORING LOCATIONS

HDD S2-0140

BLAIR COUNTY, FRANKSTOWN TOWNSHIP, PA

SUNOCO PENNSYLVANIA PIPELINE PROJECT



TETRA TECH
 240 Continental Drive, Suite 200
 Newark, Delaware 19713
 302.738.7551
 fax: 302.454.5988

TEST BORING LOG

Project Name: SUNOCO PENNSYLVANIA PIPELINE PROJECT			Project No.: 103IP3406		
Project Location: JUNIATA VALLEY ROAD, HOLLISDAYSBURG, PA			Page 1 of 1		
HDD No.: S2-0140	Dates(s) Drilled: 10-11-14		Inspector: E. WATT		
Boring No.: SB-01	Drilling Method: SPT - ASTM D1586		Driller: S. HOFFER		
Drilling Contractor: HAD DRILLING	Groundwater Depth (ft): 16.0		Total Depth (ft): 28.3		
Boring Location Coordinates:			40°26'5.52"N		78°17'57.77"W

Sample No.	Sample Depth (ft)		Strata Depth (ft)		Recov. (in)	Strata (USCS)	Description of Materials	6" Increment Blows *				N	
	From	To	From	To									
			0.0	0.3			TOPSOIL (4").						
1	3.0	5.0	0.3		18	ML	LIGHT BROWN TO ORANGE BROWN SANDY SILT, TRACES OF	4	14	24	36	38	
				6.5			QUARTZ GRAVEL AND OXIDIZED WEATHERED SHALE. USCS: ML						
2	8.0	8.9	6.5		10	SM	DR WEATHERED TO A LIGHT GRAY FINE SAND WITH SOME SILT.	7	50/5"			>50	
3	13.0	13.9			10		HIGHLY WEATHERED GRAY TO DARK GRAY SHALE. WEATHERED TO	6	50/5"			>50	
							A FINE SAND CONSISTENCY.						
4	18.0	18.7			9		HIGHLY WEATHERED GRAY TO DARK GRAY SHALE. WEATHERED TO	8	50/3"			>50	
							A FINE SAND CONSISTENCY WITH UNWEATHERED GRAVEL.						
5	23.0	23.7			7		HIGHLY WEATHERED GRAY TO DARK GRAY SHALE. WEATHERED TO	12	50/3"			>50	
						A FINE SAND CONSISTENCY WITH UNWEATHERED GRAVEL.							
6	28.0	28.3			3	HIGHLY WEATHERED GRAY TO DARK GRAY SHALE. WEATHERED TO	50/3"				>50		
				30.0		A FINE SAND CONSISTENCY WITH UNWEATHERED GRAVEL.							

Notes/Comments: Pocket Pentrometer Testing DR: DECOMPOSED ROCK

Strata (USCS) Designations are approximated based on visual review, except where indicated in Description of Materials.

* Number of blows of 140 lb. Hammer dropped 30 in. required to drive 2 in. split-spoon sampler in 6 in. increments.
 N: Number of blows to drive spoon from 6" to 18" interval.



TETRA TECH

240 Continental Drive, Suite 200
Newark, Delaware 19713
302.738.7551
fax: 302.454.5988

TEST BORING LOG

Project Name: SUNOCO PENNSYLVANIA PIPELINE PROJECT
Project Location: LOCKE MOUNTAIN ROAD, GAME COMMISSION PROPERTY, HOLLIDAYSBURG, PA
HDD No.: S2-0140
Boring No.: SB-02
Drilling Contractor: HAD DRILLING

Main data table with columns: Sample No., Sample Depth (ft) From/To, Strata Depth (ft) From/To, Recov. (in), Strata (USCS), Description of Materials, 6" Increment Blows *, N

Notes/Comments:
Pocket Pentrometer Testing
DR: DECOMPOSED ROCK
S4: >4 TSF
S5: 3.0 TSF
Strata (USCS) Designations are approximated based on visual review, except where indicated in Description of Materials.
* Number of blows of 140 lb. Hammer dropped 30 in. required to drive 2 in. split-spoon sampler in 6 in. increments.
N: Number of blows to drive spoon from 6" to 18" interval.



TETRA TECH

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 Newark, Delaware 19713
 302.738.7551
 fax: 302.454.5988

TEST BORING LOG

Project Name: SUNOCO PENNSYLVANIA PIPELINE PROJECT			Project No.: 103IP3406		
Project Location: JUNIATA VALLEY ROAD, HOLLISDAYSBURG, PA			Page 1 of 1		
HDD No.: S2-0140		Dates(s) Drilled: 09-25-15		Inspector: E. WATT	
Boring No.: SB-03		Drilling Method: SPT - ASTM D1586		Driller: K. KERSH	
Drilling Contractor: CONNELLY		Groundwater Depth (ft):		Total Depth (ft): 34.5	
Boring Location Coordinates:			40° 26' 3.373" N		78° 17' 50.560" W

Sample No.	Sample Depth (ft)		Strata Depth (ft)		Recov. (in)	Strata (USCS)	Description of Materials	6" Increment Blows *				N
	From	To	From	To								
							AUGERED CONTINUOUSLY TO REFUSAL AT 14.5'.					
							<u>ROCK CORING</u>					
RUN 1	14.5	19.5	14.5	15.4	60	FRACTURED ROCK	VERY INTENSELY TO INTENSELY FRACTURED GRAY LIMESTONE.	TCR: 100%, SCR: 22%, RQD: 17%				
			15.4	19.0			VERY INTENSELY FRACTURED GRAY CALCEROUS SHALE.					
			19.0				MODERATELY FRACTURED GRAY LIMESTONE.					
RUN 2	19.5	24.5		21.0	60		VERY INTENSELY FRACTURED GRAY LIMESTONE.	TCR: 100%, SCR: 20%, RQD: 15%				
			21.0	23.4			VERY INTENSELY FRACTURED LIMESTONE.					
			23.4				MODERATELY TO INTENSELY FRACTURED GRAY LIMESTONE.					
RUN 3	24.5	29.5		25.7	54		INTENSELY TO VERY INTENSELY FRACTURED GRAY LIMESTONE.	TCR: 90%, SCR: 49%, RQD: 43%				
			25.7				SLIGHTLY TO MODERATELY FRACTURED GRAY LIMESTONE WITH					
				28.0			CALCITE DEPOSITS.					
			28.0	28.3			VERY INTENSELY FRACTURED GRAY CALCEROUS SHALE.					
			28.3	31.9		SLIGHTLY TO MODERATELY FRACTURED GRAY LIMESTONE.						
RUN 4	29.5	34.5	31.9	32.6	60	INTENSELY FRACTURED GRAY LIMESTONE.	TCR: 100%, SCR: 68%, RQD: 68%					
			32.6			UNFRACTURED TO MODERATELY FRACTURED GRAY LIMESTONE						
				34.5		WITH CALCITE DEPOSITS.						
							<u>CORE TESTING RESULTS (DEPTH 29.5-30'):</u>					
							COMPRESSIVE STRENGTH: 8,050 PSI					
							UNIT WEIGHT: 163.1 PCF					

Notes/Comments: Pocket Pentrometer Testing DR: DECOMPOSED ROCK

Strata (USCS) Designations are approximated based on visual review, except where indicated in Description of Materials.

* Number of blows of 140 lb. Hammer dropped 30 in. required to drive 2 in. split-spoon sampler in 6 in. increments.
 N: Number of blows to drive spoon from 6" to 18" interval.

**ROCK CORE DESCRIPTION SUMMARY
SUNOCO PENNSYLVANIA PIPELINE PROJECT
HDD S2-0140**

Location	Boring No.	Core Run	Core Depth (ft)		TCR (%)	SCR (%)	RQD (%)	Depth (ft)		Weathering	Classification	Bedding Thickness (ft)	Color	Discontinuity Data
			From	To				From	To					
S2-0140	SB-03	1	14.5	19.5	100	22	17	14.5	34.5	Moderate	Limestone	Massive	Gray	Fractures ranging from 6° to 56°, Avg. 31°; Occasional shaly cleavage to fractures
		2	19.5	24.5	100	20	15							
		3	24.5	29.5	90	49	43							
		4	29.5	34.5	100	68	68							

**GEOTECHNICAL LABORATORY TESTING SUMMARY
SUNOCO PENNSYLVANIA PIPELINE PROJECT
HDD S2-0140**

HDD No.	Test Boring No.	Sample No.	Depth of Sample (ft.)		Water Content, % (ASTM D2216)	Percent Silts/Clays, % (ASTM D1140)	Atterburg Limits (ASTM D4318)			USCS Classif. (ASTM D2487)
			From	To			Liquid Limit, %	Plastic Limit, %	Plasticity Index, %	
S2-0140	SB-01	1	3.0	5.0	10.3	63.1	31	24	7	ML
		2	8.0	8.9	4.3	29.5	-	-	-	-
		4	18.0	18.7	5.9	15.4	-	-	-	-
		6	28.0	28.3	5.1	27.4	-	-	-	-
	SB-02	1	3.0	5.0	12.3	56.4	-	-	-	-
		3	13.0	15.0	16.5	33.1	33	22	11	SM
		4	18.0	20.0	14.5	86.3	-	-	-	-
		5	23.0	25.0	15.2	81.8	35	24	11	ML/CL
		6	28.0	30.0	14.3	91.6	-	-	-	-

Rock Core Testing Results				
Boring No.	Core Run	Approximate Depth (ft)	Compressive Strength (psi)	Unit Weight (pcf)
SB-03	4	29.5 - 30.0	8,050	163.1

Notes:

- 1) Sample depths based on feet below grade at time of exploration.

**REGIONAL GEOLOGY SUMMARY
SUNOCO PENNSYLVANIA PIPELINE PROJECT
HDD S2-0140**

HDD No.	NAME	BORING NO.	REGIONAL GEOLOGY DESCRIPTION	GENERAL TOPOGRAPHIC SETTING	BEDROCK FORMATION	GENERAL ROCK TYPE	APPROX MAX FM THICKNESS (FT)	DEPTH TO ROCK (Ft bgs) based on nearby well drilling logs	NOTES / COMMENTS
S2-0140	Frankstown	SB-01	Hamilton Group - The Mahantango Formation and the underlying Marcellus Formation make up the Hamilton Group.	Ridge and Valley	Mahatango (aka Hamilton Group)	Shale-siltstone, laminated, fossiliferous			
		SB-02	Bloomsburg and Mifflintown Formations , undivided - The <u>Bloomsburg</u> Formation is predominantly red shale and siltstone. <u>Mifflintown</u> is Interbedded dark-gray shale and medium-gray fossiliferous limestone		Bloomsburg and Mifflintown Formations	predominantly red shale and siltstone.			
		SB-03	Onondaga and Old Port Formation (undivided) consists of two members - the upper Selinsgrove Limestone and the lower calcerous Needmore Shale.		Onondaga-Old Port	Limestone and calcareous shale with occasional chert	100-200	4-32	

Note : Source of well log data - <http://www.dcnr.state.pa.us/topogeo/groundwater/pagwis/records/index.htm>. All other sources as referenced in comments section.

FIELD DESCRIPTION AND LOGGING SYSTEM FOR SOIL EXPLORATION

GRANULAR SOILS

(Sand, Gravel & Combinations)

<u>Density</u>	<u>N (blows)*</u>
Very Loose	5 or less
Loose	6 to 10
Medium Dense	11 to 30
Dense	31 to 50
Very Dense	51 or more

Particle Size Identification

Boulders	8 in. diameter or more
Cobbles	3 to 8 in. diameter
Gravel	Coarse (C) 3 in. to ¾ in. sieve
	Fine (F) ¾ in. to No. 4 sieve
Sand	Coarse (C) No. 4 to No. 10 sieve (4.75mm-2.00mm)
	Medium (M) No. 10 to No. 40 sieve (2.00mm – 0.425mm)
	Fine (F) No. 40 to No. 200 sieve (0.425 – 0.074mm)
Silt/Clay	Less Than a No. 200 sieve (<0.074mm)

Relative Proportions

<u>Description Term</u>	<u>Percent</u>
Trace	1 - 10
Little	11 - 20
Some	21 - 35
And	36 - 50

COHESIVE SOILS

(Silt, Clay & Combinations)

<u>Consistency</u>	<u>N (blows)*</u>
Very Soft	3 or less
Soft	4 to 5
Medium Stiff	6 to 10
Stiff	11 to 15
Very Stiff	16 to 30
Hard	31 or more

Plasticity

<u>Degree of Plasticity</u>	<u>Plasticity Index</u>
None to Slight	0 - 4
Slight	5 - 7
Medium	8 - 22
High to Very High	> 22

ROCK

(Rock Cores)

<u>Rock Quality Designation (RQD), %</u>	<u>Rock Quality Description</u>
0-25	Very Poor
25-50	Poor
50-75	Fair
75-90	Good
90-100	Excellent

***N - Standard Penetration Resistance.** Driving a 2.0" O.D., 1-3/8" I.D. sampler a distance of 18 inches into undisturbed soil with a 140 pound hammer free falling a distance of 30.0 inches. The number of hammer blows to drive the sampler through each 6 inch interval is recorded; the number of blows required to drive the sampler through the final 12 inch interval is termed the Standard Penetration Resistance (SPR) N-value. For example, blow counts of 6/8/9 (through three 6-inch intervals) results in an SPR N-value of 17 (8+9).

Groundwater observations were made at the times indicated. Groundwater elevations fluctuate throughout a given year, depending on actual field porosity and variations in seasonal and annual precipitation.

UNIFIED SOIL CLASSIFICATION SYSTEM [Casagrande (1948)]

Major Divisions		Group Symbols	Typical Descriptions	Laboratory Classifications				
Coarse Grained Soils (More than half of material is larger than No. 200 sieve)	Gravels (More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravel (Little or no fines)	GW Well-graded gravels, gravel-sand mixtures, little or no fines	Determine Percentage of sand and gravel from grain size curve. Depending on Percentage of fines (fraction smaller than No. 200 sieve), coarse-grained soils are classified as follows: Less than 5 percent GW, GP, SW, SP More than 12 percent GM, GC, SM, SC 5 to 12 percent Borderline cases requiring dual symbols ⁽¹⁾	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4: $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3			
		GP Poorly graded gravels, gravel-sand mixtures, little or no fines	Not meeting C_u or C_c requirements for GW					
		Gravel with fines (Appreciable amount of fines)	GM Silty gravels, gravel-sand-silt mixtures		Atterberg limits below A Line or I_p less than 4	Limits plotting in hatched zone with I_p between 4 and 7 are borderline cases requiring use of dual symbols		
			GC Clayey gravels, gravel-sand-clay mixtures		Atterberg limits above A line with I_p greater than 7			
	Sands (More than half of coarse fraction is smaller than No. 4 Sieve)	Clean sands (Little or no fines)	SW Well graded sands, gravelly sands, little or no fines		$C_u = \frac{D_{60}}{D_{10}}$ greater than 6: $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3			
			SP Poorly graded sands, gravelly sands, little or no fines		Not meeting C_u or C_c requirements for SW			
		Sands with fines (Appreciable amount of fines)	SM Silty sands, sand-silt mixtures		Atterberg limits below A Line or I_p less than 4	Limits Plotting in hatched zone with I_p between 4 and 7 are borderline cases requiring use of dual symbols		
			SC Clayey sands, sand-clay mixtures		Atterberg limits above A line with I_p greater than 7			
						For soils plotting nearly on A line use dual symbols i.e., $I_p = 29.5$, $w_L = 60$ gives CH-MH. When w_L is near 50 use CL-CH or ML-MH. Take near as ± 2 percent.		
		Fine-grained soils (More than half of material is smaller than No. 200 sieve)	Silt and clays (Liquid limit less than 50)		ML Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity			
CL Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays								
OL Organic silts and organic silty clays of low plasticity								
Silt and Clays (Liquid limit greater than 50)	MH Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts							
	CH Inorganic clays of high plasticity, fat clays							
	OH Organic clays of medium to high plasticity, organic silts							
Highly organic soils	Pt Peat and other highly organic soils							

(1) Borderline classifications, used for soils possessing characteristics of two groups, are designated by combinations of group symbols. For example: GW-GC. well-graded gravel-sand mixture with clay binder.