

TRIP REPORT

ARCONA ROAD VALVE SITE – INFILTRATION TESTING

1.0 PURPOSE

This Trip Report presents the field data and results of double-ring soil infiltration tests conducted to support the design of a stormwater management system at the Arcona Road Valve site located in Lower Allen Township, Cumberland County, Pennsylvania, as part of the Pennsylvania Pipeline Project (PPP) for Sunoco Pipeline, LP. Two deep and two shallow tests (IT-A and IT-B) were performed at the site. The test locations are listed by coordinates (latitude and longitude) in Table 1 and shown on the attached figure.

2.0 FIELD ACTIVITIES

The infiltration tests were conducted by Mark Mengel and Kevin Schwab of Tetra Tech, Inc., on October 04, 2016. The test locations were positioned in the field using a handheld, WAAS-enabled GPS unit. Table 1 provides the coordinates of the test locations. Both tests were located in a tall grassy area, between an existing valve site and an impoundment pond.

The infiltration tests were performed in accordance with the procedure specified in the 2006 Pennsylvania Stormwater Best Management Practices (BMP) Manual. The test locations were prepared with hand tools and a mini-excavator, and care was taken to minimize disturbance of the soil surface to be tested. Double-ring infiltrometers were used for testing and consisted of 10-inch diameter and 6-inch diameter sections of steel casing, each 10 inches in height. After digging to the target depth, the test surface was leveled, and loose soil and debris were removed. The rings were driven a minimum of 2 inches into the soil. The infiltration test depths are presented in Table 1.

Test locations were pre-soaked for 1 hour. The tests were then conducted with measurements at 10-minute or 30-minute intervals, based on the observed water level drops during the last half of the pre-soak period. Pre-soak and test information was recorded on infiltration test data sheets; copies of the test data sheets are attached to this report.

During the testing, the weather was sunny, approximately 65-70 degrees Fahrenheit, and no precipitation was observed during the time of testing. Additionally, less than 0.5 inches of precipitation was observed 24 hours prior to testing.

Test pits were excavated near each testing location to characterize the soil, determine the depth to bedrock, if encountered, and inspect for evidence of the seasonal high water table. The test pits were identified with the corresponding infiltration test name. The test pits were machine-excavated to 2 feet below the target infiltration test depth or refusal, whichever was encountered first. Descriptions of the soil were recorded on field logs, which were based on the form example in the BMP manual. Copies of the field soil logs are attached to this report.

3.0 RESULTS

3.1 Soil Description

Soils encountered generally consisted of a relatively deep (up to 12.2 inches) dark brown (7.5YR 3/2) topsoil/surface layer composed of a silt loam with small roots throughout. This surface layer was underlain by more developed illuvial layers which trended from a silt clay to a clay with depth. Soil in the illuvial layers found near the IT-B test location contained slightly more clay which resulted in a slightly less permeable layer than that found in IT-A. Roughly 2-5% of the soil consisted of small quartzite channers and colors of the subsurface consisted mainly of a strong brown (7.5YR 5/6-7.5YR 4/6). The total depth of the soil profile was terminated at roughly 5 ft bgs with no bedrock encountered.

Seasonal high water was not observed at the testing location, nor was any mottling observed.

According to United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey data, the soil type for the test location is mapped as follows:

- Edom Silt Loam - (EdB soil symbol) with 3-8 percent slopes; with medium runoff and well drained.

3.2 Infiltration Tests Results

Table 1 summarizes the infiltration rates (inches per hour) calculated from the test data. Infiltration rates presented in Table 1 were calculated from the average water level drop of the last four stabilized readings measured in the inner ring.

The pre-soak test results for IT-B (deep) indicated a low infiltration rate, requiring a 30 minute test cycle; whereas, the pre-soak test results for IT-A (surface and deep) and IT-B (surface) indicated high infiltration rates, requiring 10 minute test cycles.


Table 1
Summary of Infiltration Test Results
Arcona Road Valve
Lower Allen Township, Cumberland County, PA
Sunoco PPP

Test Location (IT-)	Location Data		Test Depth (inches)	Infiltration Test Result (inches/hour)
	LATITUDE	LONGITUDE		
IT-A (shallow)	40.192904°	- 076.9469980°	2	7.90
IT-A (deep)			36	5.25
IT-B (shallow)	40.1929837°	- 076.9471253°	2	12.40
IT-B (deep)			36	0.20

Figure 1

Infiltration Testing Locations
Arcona Road Valve
Soil Type: Edom Silty Clay Loam (EdB)
Cumberland County, PA

Legend

 Infiltration Tests



ATTACHMENTS

SOIL LOGS



TETRA TECH

Soil LogTested By: KAS Kevin SchwabProject: Arcona Rd Sunoco ^{PPP} Project No.: 112 ICo 6958Test Pit: IT-A Eastern Date: 10/4/16

Elevation: _____

Equipment
Used: _____

Geology: _____ Soil Type: _____

Land Use: flat field nearWeather: partly cloudyoverhead powerlineAdditional Comments

Horizon	Upper Boundary	Lower Boundary	Soil Textural Class	Type, Size, Coarse Fragments, etc.	Soil Color	Color Patterns	Pores, Roots, Rock Structure	Depth to Bedrock	Depth to Water	Comments
A	0"	12"	silt loam	fine granular	7.5YR 3/2	even	small roots			
B	12"	22"	silt clay	fine-med weak sub angular sub rounded	7.5YR 5/6	↓	2-5% small quartzite channers			
B2	22"	43 1/4"	silt clay	fine-med med sub angular blocky	7.5YR 5/4		↓			
B3	43 1/4"	59"	clay	med med-strong angular blocky	7.5YR 4/6		↓			

Horizon:	USDA Definition	Soil Textural Class	Boundary	Notes:
O	Organic debris	Use ternary diagram from US Department of Agriculture Soil Conservation Service	Use depth and classification	less clay than IT-B (deep) until B3 horizon, then clay content increases
A	Dark colored, mixed mineral organic matter		Classification as Follows:	
B	Maximum accumulation of silicate clay minerals		Abrupt	
C	Weathered parent material		Clear	
R	Layer of consolidated rock beneath the soil		Gradual	
			Diffuse	

Table based on: Sample soil log located on page 12 of the Pennsylvania Stormwater Best Management Practices Manual
 USDA Definitions located from: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054308

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TETRA TECH

Soil LogTested By: VAS Kevin SchnabProject: Arcona Rd. Sunoco PPP Project No.: 112 IC 05958Test Pit: IT-BDate: 10/4/16

Elevation: _____ Equipment Used: _____

Geology: _____

Soil Type: _____

Land Use: flat field near overhead
powerline + sunoco valveWeather: partly cloudyAdditional Comments

Horizon	Upper Boundary	Lower Boundary	Soil Textural Class	Type, Size, Coarse Fragments, etc.	Soil Color	Color Patterns	Pores, Roots, Rock Structure	Depth to Bedrock	Depth to Water	Comments
A	0"	10 1/2"	silt loam	fine granular	2.5YR 3/2	even	small roots			
B	10 1/2"	26"	silt clay	fine-med granular weak sub angular blocky	7.5YR 5/6	↓	2-5% small quartzite channers			
B2	26"	60 1/4"	clay	med strong angular to prismatic	7.5YR 4/6	↓	SAA			

Horizon:	USDA Definition	Soil Textural Class	Boundary	Notes:
O	Organic debris	Use ternary diagram from US Department of Agriculture Soil Conservation Service	Use depth and classification	
A	Dark colored, mixed mineral organic matter		Classification as Follows: Abrupt	
B	Maximum accumulation of silicate clay minerals		Clear	
C	Weathered parent material		Gradual	
R	Layer of consolidated rock beneath the soil		Diffuse	

Table based on: Sample soil log located on page 12 of the Pennsylvania Stormwater Best Management Practices Manual
 USDA Definitions located from: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/edu/?cid=nrcs142p2_054308

INFILTRATION TEST DATA SHEETS



INFILTRATION TEST DATA SHEET

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