TRIP REPORT
JUANITA VALLEY ROAD 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 Juanita Valley Road site located in Frankstown Township, Blair County, Pennsylvania, as part of the Pennsylvania Pipeline Project (PPP) for Sunoco Pipeline, LP. Three shallow tests (IT-A, IT-B, and IT-C) 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 Keith Simpson and Jake Marlow of Tetra Tech, Inc., on October 3, 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. The tests were located in a brushy area along mildly sloped terrain on the east side of Juanita Valley Road.

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.

The 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 drop 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 70 degrees Fahrenheit, and no precipitation was observed during at 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 medium thick (up to approximately 12 inches) dusky red (2.5YR 3/2) surface soil layer composed of a loam with small roots underlain by a yellowish brown (10YR 5/6) silty clay loam with few fine roots and pores at IT-A, or a light greenish to bluish gray (Grey2 (8/1 to 7/1)) clay loam trending to a reddish yellow (7.5YR 6/8) clay with few to no roots or pores at IT-B and IT-C. Bedrock was not 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 types for the test locations are mapped as follows:

- Basher Soils - (Ba soil symbol) without percent slopes noted by the USDA; with low runoff and moderately well drained,
- Holly Silt Loam - (Ho soil symbol) without percent slopes noted by the USDA; with negligible runoff and poorly drained.

3.2 Infiltration Tests Results

Table 1 summarizes the infiltration rates (inches per hour) calculated from the test data. The 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-A and IT-B indicated low infiltration rates, requiring 30 minute test cycles; whereas, the pre-soak test result for IT-C indicated a high infiltration rate, requiring a 10 minute test cycle.

Table 1
Summary of Infiltration Test Results
Juanita Valley Road
Frankstown Township, Blair County, PA
Sunoco PPP

Test Location (IT-)	Location Data		Test Depth (inches)	Infiltration Test Result (inches/hour)
	LATITUDE	LONGITUDE		
IT-A	40.4358216°	- 078.3001432°	3	0.00
IT-B	40.4357174°	- 078.2998003°	2.5	0.00
IT-C	40.4358587°	- 078.2997760°	2.5	8.34

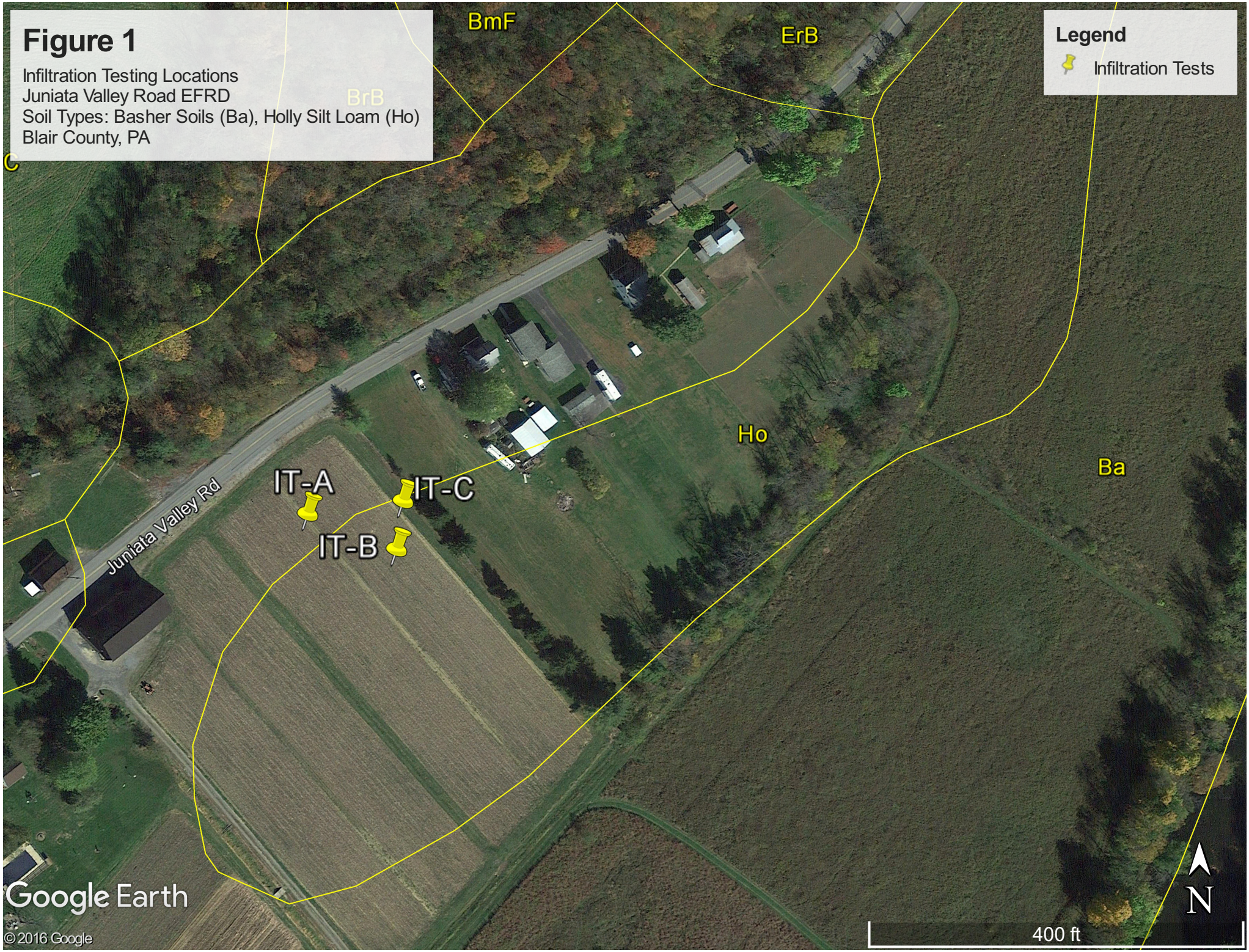
Figure 1
Infiltration Testing Locations
Juniata Valley Road EFRD
Soil Types: Basher Soils (Ba), Holly Silt Loam (Ho)
Blair County, PA
Legend
Infiltration Tests
BmF
ErB
BrB
Ho
Ba
IT-A
IT-B
IT-C
Juniata Valley Rd
Google Earth
© 2016 Google
N
400 ft

ATTACHMENTS

SOIL LOGS

A

TETRA TECH

Soil Log

1121C05958

Tested By: Scott Anderson **Project:** Seneca PPP **Project No.:** ~~1121C05777-07~~

Test Pit: Sunset Valley Road EFRD ITA **Date:** 10/3/2016 **Elevation:** _____ **Equipment Used** Mini Excavator

Geology: _____ **Soil Type:** _____ **Land Use:** _____ **Weather:** 70°F, Sunny

Additional Comments IT-A

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
O/A	0"	12"	Loam	Brown silt and clay to silt w/ clay	2.5Y 3/2	Solid	Increased fine roots, vegetation	>36"	>36"	- reworked - No mottling
B	12"	>36"	silty clay loam	Taylorsville silty clay w/ increasing w/ depth	10YR 5/6	Solid	few fine roots, pores	>36"	>36"	- Damp - No mottling
										- Rocks >2" below 32"

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	- No mottling observed - Landowner notes soils hydrophyllic - upper 2" moist, remainder damp - less than 0.5" rain last 24 hrs.
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

B

TETRA TECH **Soil Log**

1121C05958

Tested By: Scott Anderson **Project:** Sunoco PPP **Project No.:** ~~#215072~~ 17

IT B **Test Pit:** Juniata Valley Road GRD **Date:** 10/3/2016 **Elevation:** _____ **Equipment Used** Mini Excavator

Geology: _____ **Soil Type:** _____ **Land Use:** _____ **Weather:** 70°F, Sunny

Additional 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
O/A	0	12"	Loam	Brown silt and clay to silt w/ clay	2.5Y 3/2	Solid	Numerous fine roots, vegetation	>36"	>36"	- Reworked/ disturbed
B	12"	>36"	clay Loam	Gray/brown silty clay to clay	GLEY 2 8/1 to 7/1 & 7.5YR 6/8	Solid	few to no roots, pores	>36"	>36"	Gray clay to silty clay w/ orange
										- No mottling - Moist to damp
										- many fine rocks (<1")

Horizon:	USDA Definition
O	Organic debris
A	Dark colored, mixed mineral organic matter
B	Maximum accumulation of silicate clay minerals
C	Weathered parent material
R	Layer of consolidated rock beneath the soil

Soil Textural Class
Use ternary diagram from US Department of Agriculture Soil Conservation Service

Boundary
Use depth and classification
Classification as Follows:
Abrupt
Clear
Gradual
Diffuse

Notes:
- No mottling observed
- Landowner notes soils are hydrophyllic (water attracting)
- Upper 3" moist, damp removed
- Less than 0.5" rain last 24 hours

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

C

TETRA TECH **Soil Log**

1121c05958

Tested By: Scott Anderson **Project:** Sinnco PPP **Project No.:** ~~#21C07771-7~~

ITC **Test Pit:** Juniata Valley Road EFRD **Date:** 10/3/2016 **Elevation:** _____ **Equipment Used** Mini Excavator

Geology: _____ **Soil Type:** _____ **Land Use:** _____ **Weather:** 70°F, Sunny

Additional 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
O/A	0"	9"	Loam	Brown silt and clay & silt w/ clay	2.5 Y 3/2	Solid	Numerous pores, fibrous Roots	>36"	>36"	- No mottling - re-worked
B	9"	>36"	clay Loam	Gray & orange silty clay with clay, rocks	GLEY 2 5/1 & 7/1 & 7.5YR 6/8	Solid	few to No pores, roots	>36"	>36"	- No mottling - damp - Some rocks, <2"

Horizon:	USDA Definition
O	Organic debris
A	Dark colored, mixed mineral organic matter
B	Maximum accumulation of silicate clay minerals
C	Weathered parent material
R	Layer of consolidated rock beneath the soil

Soil Textural Class
Use ternary diagram from US Department of Agriculture Soil Conservation Service

Boundary
Use depth and classification
Classification as Follows:
Abrupt
Clear
Gradual
Diffuse

Notes:
- No mottling observed
- Landowner notes soils hydroplaning (water affecting)
- upper 2" moist, rest damp
- less than 0.5" rain last 24 hr.

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

A

Tetra Tech, Inc.

JUNIATA VALLEY RD. EFND

PROJECT NAME: SUNOCO LOGISTICS
PROJECT NUMBER: 112IC05958 - 17
TEST AREA ID: IT - A
PERSONNEL: K. SIMPSON, J. MARLOW / S ANDERSON

TEST METHOD: (Double Ring Infiltrometer) Percolation
Single Ring Infiltrometer

INNER RING INSIDE DIAMETER/HEIGHT: 6" X 10"
OUTER RING INSIDE DIAMETER/HEIGHT: 10" X 10"

Location Coordinates or Description:
40.4358216
-078.3001432

PERCOLATION HOLE DIAMETER: NA (If performing an open hole perc test)

DATE(s): 10/3/16

Distance from the bottom of the inner ring/hole to measuring point (minimum water column of 6-8 inches): 7.5"

MEASURING POINT: Ring Rim Indicator Mark

DEPTH OF TEST: 3"

TIME	ELAPSED TIME SINCE START OF TEST (minutes)	WATER LEVEL DROP, INNER RING OR PERCOLATION HOLE (inches)	VOLUME OF WATER ADDED AT EACH CYCLE, INNER RING (liters)	REMARKS
PRESOAK DATA				
1227	0	----------	3.5	
1257	30	0	0	
1327	60	0	0	
TEST DATA		30 MIN TEST		
1327	0 (60)	----------	0	
1357	30 (90)	0	0	
1427	60 (120)	0	0	
1457	90 (150)	0	0	
1527	120 (180)	0	0	
Rainfall <0.5" IN LAST 24 HRS				

SEE ALSO PHOTOS & SOIL LOGS

B

INFILTRATION TEST DATA SHEET

Tetra Tech, Inc.

JUNIATA VALLEY RD EFRD

PROJECT NAME: SUNOCO LOGISTICS
PROJECT NUMBER: 112IC05958 - 17
TEST AREA ID: IT-B
PERSONNEL: K. SIMPSON, J. MARIOW/ S. ANDERSON

TEST METHOD: (Double Ring Infiltrometer) Percolation
Single Ring Infiltrometer

INNER RING INSIDE DIAMETER/HEIGHT: 6" X 10"
OUTER RING INSIDE DIAMETER/HEIGHT: 10" X 10"

Location Coordinates or Description:
40.4357174
-078.2998003

PERCOLATION HOLE DIAMETER: NA (If performing an open hole perc test)

DATE(s): 10/3/16

Distance from the bottom of the inner ring/hole to measuring point (minimum water column of 6-8 inches): 6.5"

MEASURING POINT: (Ring Rim) Indicator Mark

DEPTH OF TEST: 2.5" BGS

TIME	ELAPSED TIME SINCE START OF TEST (minutes)	WATER LEVEL DROP, INNER RING OR PERCOLATION HOLE (inches)	VOLUME OF WATER ADDED AT EACH CYCLE, INNER RING (liters)	REMARKS
PRESOAK DATA				
1220	0	----------	3.5	
1250 ~~1245~~	30	0	0	
1320	60	0	0	
TEST DATA		30 MIN TEST		
1320	0 (60)	----------	0	
1350	30 (90)	0	0	
1420	60 (120)	0	0	
1450	90 (150)	0	0	
1520	120 (180)	0	0	
	<0.5" RAIN IN LAST 24HRS			

SEE ALSO PHOTOS & SOIL LOGS

INFILTRATION TEST DATA SHEET

C

Tetra Tech, Inc.

JUNIATA VALLEY RD. EFND

PROJECT NAME: SUNOCO LOGISTICS
PROJECT NUMBER: 112IC05958 - 17
TEST AREA ID: IT - C
PERSONNEL: K. SIMPSON, J. MARLOW/ S. ANDERSON

TEST METHOD: (Double Ring Infiltrometer) Percolation
Single Ring Infiltrometer

Location Coordinates or Description:
40.4358587°
-078.2997760

INNER RING INSIDE DIAMETER/HEIGHT: 6" X 10"
OUTER RING INSIDE DIAMETER/HEIGHT: 10" X 10"

PERCOLATION HOLE DIAMETER: NA (If performing an open hole perc test)

DATE(s): 10/3/16

Distance from the bottom of the inner ring/hole to measuring point (minimum water column of 6-8 inches): 7"

MEASURING POINT: (Ring Rim) Indicator Mark

DEPTH OF TEST: 2.5" BGS

TIME	ELAPSED TIME SINCE START OF TEST (minutes)	WATER LEVEL DROP, INNER RING OR PERCOLATION HOLE (inches)	VOLUME OF WATER ADDED AT EACH CYCLE, INNER RING (liters)	REMARKS
PRESOAK DATA				
1224	0	----------	3.6	1243 DROP 3" ADD 1.6L
1254	30	KS ~~0~~ 1"	0.52	
1324	60	10/16	0.35	13:12 DROP 2 6/16" ADD 1.4L
TEST DATA		10 ~~30~~ KS MIN	TEST	
1324	0 (60)	----------	0	
1334	10 (70)	1 9/16	0.7	
1344	20 (80)	1 6/16	0.6	
1354	30 (90)	1 6/16	0.6	
1404	40 (100)	1 5/16	0.6	
	<0.5"	RAIN IN LAST 24 HRS		

SEE ALSO PHOTOS & SOIL LOGS