

April 24, 2025

Chester Valley Engineers, Inc.  
112 Moores Rd. – Suite 200  
Malvern, PA 19355

**RE: Stormwater Infiltration Study & Report – Additional Testing**  
**2290 Gilbertsville Road Tract**  
**Upper Pottsgrove Twp., Montgomery Co., PA**  
**PTE #7250**

Dear Mr. Gryga,

Penn's Trail Environmental, LLC has performed a subsurface soil and permeability investigation on the referenced parcel as additional testing to our December 2024 report. The intent of this investigation was to evaluate the subsurface soil profile and determine the permeability characteristics of the areas indicated for proposed stormwater disposal via infiltration. Test excavations were developed with a backhoe and described in accordance with United States Department of Agriculture-Natural Resource Conservation Service (USDA-NRCS) methodology. In-situ permeability testing was conducted using the Double Ring Infiltrometer (DRI) method as described by ASTM-D3385-09 standards.

Current regulation requires that stormwater control be designed for this proposed new land development project. Permeability testing is required to determine if infiltrative capacity of the subsoil is present. Test locations were positioned throughout this site at the direction of the project engineer. Depth of testing was determined by final constructed grade of the stormwater facilities or adjusted for shallow bedrock or groundwater encountered in test excavations. A backhoe was required for excavation of the test probes and establishment of the double rings.

Soil profile descriptions were developed at each test point and include information such as texture, structure, soil depth, and indication (or lack thereof) of a seasonal high-water table or restricted drainage as would be indicated by redoximorphic features.

Redox features often occur when infiltrating water encounters a slowly permeable layer as it moves downward through the soil profile. These features typically do not indicate a true water table or zone that is saturated for prolonged periods by regional groundwater. Regional groundwater was not encountered on the site. Redox features, when they are observed, are an indicator of infiltration issues which are addressed by permeability testing and should not be considered a limiting design factor unless permeability rates reveal that to be the case.

Pre-development USDA-NRCS soil mapping at this site, or more specifically the test locations, was the Lehigh soil series. The Lehigh series consists of deep, moderately well and somewhat poorly drained soils formed in residuum from metamorphosed sandstone and shale. Saturated hydraulic conductivity is moderately low. Solum thickness ranges from 20 to 40 inches. Bedrock is at 40 to 60 inches. Diagnostic horizons and features recognized in this pedon are an ochric epipedon from the surface of the soil to a depth of about 7 inches (Ap horizon) and an argillic horizon from about 7 to 28 inches (Bt horizon).

The soils at the testing locations were found to be derived primarily from metamorphosed sandstone and shales as mapped. This investigation was not conducted for the purpose of disputing current mapping or as a re-mapping effort.

Soil profiles of the backhoe excavated test pits were developed to depths at or near final constructed grade of proposed stormwater control facilities. The most restrictive barriers from the point of infiltration to contacting the base flow groundwater table were determined. The most common of these barriers in our region include restrictive soil horizons, varying lithology, fracturing of the bedrock or insufficient

fracturing of the bedrock, and encountering groundwater among other factors. Redoximorphic features were noted in all test pits in the argillic (Bt) and Ct horizons. Subsequent detailed testing more accurately predicts the ability of the soil to efficiently infiltrate stormwater and has been attached.

Testing sought to identify zones that would potentially allow the infiltration of stormwater. The testing protocol used considers regional construction practices, the likelihood of “silting in” during and following construction and the subsurface characteristics of the soil and geology. The determination at this site was that bedrock presents the most restrictive condition to establish installation depth for infiltration of stormwater.

The recommended acceptable range for subsurface disposal of stormwater is 0.10 inches per hour to 10.0 inches per hour according to current BMP guidance. Surface basins where additional storage is economical can have much slower rates and still provide some infiltration. Our office recommends that the design engineer assume zero infiltration for any stormwater area which achieves less than 0.10 inches per hour.

There are various means to arrive at an infiltrative rate for the substratum following testing. Our method is to average the last four stabilized readings as established in the PA BMP Manual. Another is to use the “last” reading as is common for percolation testing for wastewater disposal. Averaging more accurately reflects what would likely occur during a rain (soil saturation) event.

Testing was conducted at discreet locations selected by the project engineer using double ring infiltrometers. Data sheets containing the information recorded for the soil profile descriptions and double ring infiltrometers have been included as attachments to this report. A table summarizing the field data can be found below:

<b>Stormwater Testing Summary</b>					
<b>Test Location</b>	<b>Depth of Test Pit</b> Inches	<b>Depth to Water</b> Inches	<b>Depth to Rock</b> Inches	<b>Depth of Testing</b> Inches	<b>Infiltration Rate</b> Inches per hour
5	26	---	26	0	0.00
6	25	---	25	0	0.31

\* - very slowly diggable

The soil encountered demonstrated varied infiltration rates. Subsurface conditions may change following construction and resultant redirection of surface water following development. Results suggest that the average infiltration rate at tested location 6 is within the recommended guidelines even after a safety factor of two is applied. At test location 5, the soils encountered demonstrated zero infiltration at the depth tested below the recommended guidelines of 0.10 inches per hour after a safety factor of two is applied.

At the test locations, stormwater control devices that allow the design engineer flexibility in reducing velocity containing and disposing of stormwater on this site should be limited to surface facilities due to the shallow bedrock and slow drainage of the soil at these locations. Alternatively, a stormwater best management practice (BMP) that sufficiently renovates the necessary volume of stormwater onsite can be selected by the project engineer based on the soil profiles and infiltration conditions encountered at the site. Surface features such as vegetated swales and berms can be employed to reduce overland flow and retain water in-situ thus extending contact time and providing for additional infiltration.

Our findings are a result of testing conducted in specific locations and conditions. Should evidence contrary to the findings in this report be discovered prior to, during, or after construction of the

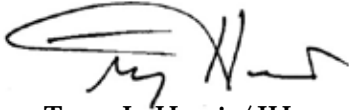
stormwater control devices, our office must be notified immediately so our recommendations can be reviewed and revised if necessary.

Penn's Trail Environmental, LLC expresses no guarantee that the soil conditions following excavation will be identical to those encountered during this investigation. We recommend that caution is exercised during construction to minimize compaction, or other disturbance in those areas intended for use as infiltration areas.

Please review the enclosed information and if any questions arise do not hesitate to contact our office.

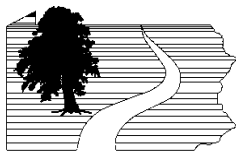
Sincerely,

**Penn's Trail Environmental, LLC**

A handwritten signature in black ink, appearing to read "Terry L. Harris". The signature is stylized with a large, sweeping initial "T" and "H".

Terry L. Harris/JH  
Soil Scientist

# Penn's Trail Environmental, LLC



21 East Lincoln Ave - Suite 160  
 Hatfield, PA 19440  
 ph. (215) 362-4610

Date: 4/24/25 Pit # 5 PTE # 7250  
 Project: 2290 Gilbertsville Road  
 Location: 2290 Gilbertsville Road  
Upper Pottsgrove Twp., Montgomery Co., PA  
 Soil Series Lehigh

Horizon	Depth (in.)	Color	Redox Features	Texture	Structure	Consistence	Boundary
Ap	0-6	10YR 4/2	---	silt loam	moderate medium gr	very friable	abrupt smooth
Bt	6-13	10YR 6/2 variegated	many prominent	gravelly sandy clay	moderate medium sbk	firm	clear wavy
Ct	13-26	10YR 6/2 variegated	many prominent	very flaggy sandy clay	massive	firm	clear wavy
R	26+						

Soil Scientist: James Haklar

## Notes

### EPIPEDON

Ochric

### SUBSURFACE HORIZON(S)

Argillic

### SOIL ORDER

Alfisol

### DRAINAGE CLASS

Somewhat Poorly Drained

### LANDFORM

Upland

### POSITION

Shoulder

### PARENT MATERIAL

Residium

### BEDROCK LITHOLOGY

Hornfels

### REDOX FEATURES

#### **Abundance**

*Few* ..... <2%

*Common* .. 2-20%

*Many* .....>20%

#### **Contrast**

##### **faint**

hue & chroma of matrix and redox are closely related.

##### **distinct**

matrix & redox features vary 1-2 units of hue and several units of chroma & value.

##### **prominent**

Matrix & redox features vary several units in hue, value & chroma.

### STRUCTURE

#### **Grade**

*Structureless* - No observable aggregation or arrangement of lines of weakness.

*Weak* - Poorly formed, indistinct peds barely observable in place.

*Moderate* - Well-formed, distinct peds moderately durable & evident in place.

*Strong* - Durable peds evident in undisturbed soil & become separated when disturbed.

### COARSE FRAGMENTS (% of profile)

#### **15-35%      35-65%      >65%**

gravelly	very gravelly	extremely gravelly
channery	very channery	extremely channery
cobbly	very cobbly	extremely cobbly
flaggy	very flaggy	extremely flaggy
stony	very stony	extremely stony

### BOUNDARY

#### **Distinctness**

*abrupt* ...<1" (thick)

*clear* ..1-2.5"

*gradual* ...2.5-5"

*diffuse*... ..>5"

#### **Topography**

*smooth* - boundary is nearly level

*wavy* - pockets with width greater than depth

*irregular* - pockets with depth greater than width

*broken* - boundary is discontinuous

and interrupted

#### **Type**

*pl* - platy

*pr* - prismatic

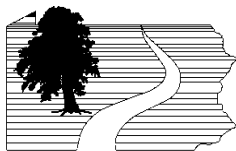
*cpr* - columnar

*gr* - granular

*abk* - angular blocky

*sbk* - subangular blocky

# Penn's Trail Environmental, LLC



21 East Lincoln Ave - Suite 160  
 Hatfield, PA 19440  
 ph. (215) 362-4610

Date: 4/24/25 Pit # 6 PTE # 7250  
 Project: 2290 Gilbertsville Road  
 Location: 2290 Gilbertsville Road  
Upper Pottsgrove Twp., Montgomery Co., PA  
 Soil Series Lehigh

Horizon	Depth (in.)	Color	Redox Features	Texture	Structure	Consistence	Boundary
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Bt	4-11	10YR 6/2 variegated	many prominent	gravelly sandy clay	moderate medium sbk	firm	clear wavy
Ct	11-25	10YR 6/2 variegated	many prominent	extremely flaggy sandy clay	massive	firm	clear wavy
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#### **Type**

*pl* - platy

*pr* - prismatic

*cpr* - columnar

*gr* - granular

*abk* - angular blocky

*sbk* - subangular blocky

## Double Ring Infiltrometer Data Reporting Sheet

Job Name:	<b>2290 Gilbertsville Road</b>	Job #:	<b>7250</b>
Location:	2290 Gilbertsville Road	Date:	4/24/2025
Township:	Upper Pottsgrove	Ring #:	5
County:	Montgomery	Technician:	Devon Tarantino
Witness:	-----	Tax Parcel:	60-00-01093-00-8
Water Temp:	60's °F	Weather:	sunny 60's °F
Test Depth:	Surface	pH:	6.9

Time (hr:min)	Interval (min)	Inner Ring Drop (in)	Inner Ring Volume change (ml)	Outer Ring Drop (in)	Outer Ring Volume Change (ml)	Rate (ml/min)	Infiltration rate (in/hr)
8:10 AM	<del> </del>		fill		fill	<del> </del>	<del> </del>
8:40 AM	30	0	0	0	0	0.00	0.00
9:10 AM	30	0	0	0	0	0.00	0.00
9:40 AM	30	0	0	0	0	0.00	0.00
10:10 AM	30	0	0	0	0	0.00	0.00
10:40 AM	30	0	0	0	0	0.00	0.00
11:10 AM	30	0	0	0	0	0.00	0.00
<i>Average</i>	<del> </del>		0.00		0.00	0.00	0.00

Notes: Water temperature was 56F, but 60F when rounded to the nearest 5F interval.



## Double Ring Infiltrometer Data Reporting Sheet

Job Name:	<b>2290 Gilbertsville Road</b>	Job #:	<b>7250</b>
Location:	2290 Gilbertsville Road	Date:	4/24/2025
Township:	Upper Pottsgrove	Ring #:	6
County:	Montgomery	Technician:	Devon Tarantino
Witness:	-----	Tax Parcel:	60-00-01093-00-8
Water Temp:	60's °F	Weather:	sunny 60's °F
Test Depth:	Surface	pH:	6.9

Time (hr:min)	Interval (min)	Inner Ring Drop (in)	Inner Ring Volume change (ml)	Outer Ring Drop (in)	Outer Ring Volume Change (ml)	Rate (ml/min)	Infiltration rate (in/hr)
8:11 AM	<del>X</del>		fill		fill	<del>X</del>	<del>X</del>
8:41 AM	30	< 1/8	20	1/8	140	0.67	0.09
9:11 AM	30	1/8	50	2/8	170	1.67	0.22
9:41 AM	30	1/8	80	2/8	180	2.67	0.35
10:11 AM	30	1/8	70	2/8	220	2.33	0.30
10:41 AM	30	1/8	80	2/8	190	2.67	0.35
11:11 AM	30	1/8	60	2/8	200	2.00	0.26
<i>Average</i>	<del>X</del>		72.50		197.50	2.42	0.31

Notes: Water temperature was 56F, but 60F when rounded to the nearest 5F interval.



