# STORMWATER MANAGEMENT REPORT

7<sup>th</sup> Avenue and Douglas Street Block 143 Lot 1 Elk Township Gloucester County, New Jersey



JOSEPH A. MANCINI N.J. Professional Engineer #24GE04579300

Assisted By: Joseph Rynkiewicz, E.I.T.

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> P .O. Box 1304 · Blackwood, New Jersey 08012 Telephone (856) 677-8742 · Fax (856) 879-2024

#### I. SUMMARY

#### SITE DESCRIPTION

The subject parcel is a  $\pm 2.97$  acre site located at the intersection of 7<sup>th</sup> Avenue and Douglas Street in Elk Township, known as Block 143 Lot 1. The existing subject site is a fully wooded area. The proposed development consists of clearing a portion of the wooded area to build 4 single family dwellings and associated infrastructure. Because the parcel does not front any paved roads, the project also proposes to develop a portion of the rights-of-way of both 7<sup>th</sup> Avenue and Douglas Street to allow for access to the proposed single-family dwellings. This new construction is considered a "Major development" as defined by the New Jersey Stormwater Management Rules (N.J.A.C. 7:8), and thus the Stormwater Management Rules apply to this project.

To accommodate the proposed single family dwellings and roads with respect to the Stormwater Management Rules for major developments, this project proposes a stormwater management system that consists of four rain gardens and two infiltration areas. Rain Gardens #1-4 are proposed to capture and treat the runoff from the four proposed single family dwellings and a portion of proposed roads.

Infiltration Areas #5-6 are proposed to meet the water quality requirement, by capturing and treating stormwater runoff from the northerly half of 7<sup>th</sup> avenue generated from the paving of the road.

Per the stormwater runoff quality standards for a major development (§ 86-4Q), the stormwater management system has been designed to capture and treat runoff from regulated, impervious motor vehicle surfaces in a way that provides 80% total suspended soilid (TSS) removal.

The stormwater management system has also been designed in accordance to the stormwater runoff quantity standards for a major development (§ 86-4R) to limit postdeveloped peak discharge rates in compliance with at the following rates: 2-year storm at 50% of the pre-development peak, 10-year storm at 75% of the pre-development peak, and 100-year storm at 80% of the pre-development peak.

Pre-development peak discharges at the point of interest, pre- and post-development curve numbers and time of concentration were calculated using the U.S.D.A. Natural Resource Conservation Service (NRCS) Technical Release No. 55 (TR-55). Existing and proposed hydrographs were calculated using the Delmarva Unit Hydrograph method as included in the *HydroCAD (version 10.00-14)* computer software. Post-development times of concentration to the basin assume a minimum of 10 minutes.

Stormwater storage volumes within the stormwater facility were calculated using storage calculations within in the *HydroCAD* computer software.

# DESIGN DATA

The pre-developed conditions of the site reflect four defined points where stormwater runoff is leaving the site. Pre-developed drainage area #1 is nearest to the intersection of 7<sup>th</sup> Avenue and Douglas Street, where all stormwater runoff flows to the intersection of Douglas Street with the vacated right-of-way of Eighth Avenue, as denoted as Analysis Point #1. Pre-Developed Drainage Area #2 does not directly flow out of the site but instead is partially detained and overflows into Pre-Developed Drainage Area #3 as a result of the site's topography. Runoff from Drainage Area #3 leaves the site at Analysis Point #3, at a low point along the northerly right-of-way line of Seventh Avenue. Runoff from Pre-Developed Drainage Area #4 generally flows in a southwesterly direction, to a low point along the easterly right-of-way line of Reed Street (vacated).

The 2-, 10-, and 100-year pre- and post-developed watershed peak discharges and inflow hydrographs were generated using the following data:

# **Pre-Development Conditions**

Drainage Area	<u>#1</u>
D.A.:	79,749 sf
CN:	37
T <sub>c</sub> :	53.6 min.
Drainage Area	<u>#2</u>
D.A.:	29,412 sf
CN:	32
T <sub>c</sub> :	28.7 min.
Drainage Area	<u>#3</u>
D.A.:	33,644 sf
CN:	55
T <sub>c</sub> :	25.9 min.
Drainage Area	. <u>#4</u>
D.A.:	26,915 sf
CN:	55
T <sub>c</sub> :	43.7 min.

# **Post-Development Conditions**

# Rain Garden #1

Itam Garaen n	<u> </u>
D.A.:	21,057 sf
CN:	72
T <sub>c</sub> :	10.0 min.

Rain Garden #2 D.A.: 41,267 sf CN: 61 T<sub>c</sub>: 10.0 min. Rain Garden #3 36,781 sf D.A.: CN: 48 T<sub>c</sub>: 10.0 min. Rain Garden #4 D.A.: 22,387 sf CN: 56 T<sub>c</sub>: 10.0 min. Infiltration Area #5 D.A.: 15,811 sf CN: 71 T<sub>c</sub>: 10.0 min. Infiltration Area #6 D.A.: 3.707 sf CN: 66 T<sub>c</sub>: 10.0 min. Post-Developed Drainage Area #1 (Undetained) D.A.: 19,178 sf CN: 40 T<sub>c</sub>: 42.7 min. Post-Developed Drainage Area #4 (Undetained) 9.822 sf D.A.:

 D.A.:
 9,822 sf

 CN:
 56

  $T_c$ :
 26.7 min.

#### BASIN CALCULATIONS

Rain Gardens #1 - #3 overflow towards the roadside swale and continue east along 7<sup>th</sup> Avenue, towards Douglas Street. Rain Garden #4 is designed to detain and infiltrate the entirety of the 100-year storm, but also has a 3 foot wide emergency overflow spillway at elevation 136.90 for storms greater than the 100-year storm. Overflow leaving this device would discharge into Douglas Street and flow to Analysis Point #1. Similarly, Infiltration Area #5 was designed to detain and infiltrate the entirety of the 100-year

storm and also has a 20 foot wide emergency overflow spillway at elevation 136.80, which discharges water towards Analysis Point #3. Infiltration Area #6 can retain and infiltrate the entirety of the stormwater runoff up to the 100-year storm on its own. All outlet devices in the overall system (overflow spillways on Rain Garden #4 and Infiltration Area #5) were placed at an elevation above the peak elevation for the NJDEP 2-hour, 1.25" Water Quality storm, allowing for the rain garden to contain and treat the entirety of the runoff generated from this event, and also at an elevation that allows for the analyzed site to meet the water quantity rate reduction requirements for the 2-, 10- and 100- year storms.

The overflow spillway for Rain Garden #4 and Infiltration Area #5 have been designed so that the 100-year peak outflow will pass through the spillway with a non-erosive velocity of less than 2.5 feet/second.

Flows through the outlets were calculated using *HydroCAD (version 10.00-25)* computer software.

# Stormwater Runoff Quantity

The stormwater management system consisting of four (4) rain gardens and two (2) infiltration areas was designed to comply with the NJDEP Stormwater Management Rules (N.J.A.C. 7:8-5.6) requirements for peak design outflow. More specifically, the section in the NJDEP Stormwater Management Rules (N.J.A.C. 7:8-5.6(b)3) on runoff quantity impacts which states that the design engineer shall "...Design stormwater measures so that the post-construction peak runoff rates for the 2-, 10-, and 100- year storm events are 50, 75, and 80 percent, respectively, of the preconstruction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed..."

The stormwater management system being proposed reduces the peak flow rate of stormwater runoff leaving at the four defined pre-developed analysis points by at least 50, 75 and 80 percent for the 2-, 10- and 100- year storms respectively, as shown in the tables below:

	Drainage Area #1						
Storm	Pre-Developed Peak Runoff Rate (cfs)	Maximum Rate Permitted (cfs)	Post-Developed Peak Runoff Rate (cfs)				
2-year	0.00	0.00	0.00				
10-year	0.03	0.02	0.02				
100-year	0.76	0.60	0.29				

	Drainage Area #2						
Storm	Pre-Developed Peak Runoff Rate (cfs)	Maximum Rate Permitted (cfs)	Post-Developed Peak Runoff Rate (cfs)				
2-year	0.00	0.00	0.00				
10-year	0.00	0.00	0.00				
100-year	0.16	0.12	0.00				

	Drainage Area #3						
Storm	Pre-Developed Peak Runoff Rate (cfs)	Maximum Rate Permitted (cfs)	Post-Developed Peak Runoff Rate (cfs)				
2-year	0.07	0.03	0.00				
10-year	0.46	0.35	0.00				
100-year	1.74	1.40	0.00				

	Drainage Area #4						
Storm	Pre-Developed Peak Runoff Rate (cfs)	Maximum Rate Permitted (cfs)	Post-Developed Peak Runoff Rate (cfs)				
2-year	0.05	0.02	0.02				
10-year	0.28	0.21	0.15				
100-year	1.06	0.85	0.53				

The post-developed peak discharge for each storm is reduced as required, therefore this requirement is met.

#### Stormwater Runoff Quality

The project was also designed in accordance with the NJDEP Stormwater Management Rules (N.J.A.C. 7:8) for water quality. The Stormwater Management Rules require that major development sites include stormwater management measures which reduce the average total suspended solids (TSS) load in the post-development runoff by 80 percent. More specifically, the section in the Stormwater Management Rules (N.J.A.C. 7:8-5.5(b)1) on runoff quality states that.... "Eighty percent TSS removal of the anticipated load.... Shall be achieved for the stormwater runoff from the net increase of motor vehicle surface." To satisfy the water quality standards in Section 5.5, green infrastructure BMP's identified in Table 5-1 at N.J.A.C. 7:8-502(f) shall be used. The 80% average TSS-removal, as well as nutrient load reduction, is accomplished on this

site using four (4) rain gardens and two (2) infiltration areas (80% TSS removal) to treat the entirety of the proposed impervious coverage that will serve vehicular traffic. The proposed system complies with the maximum contributory drainage area limitation of 2.5 acres contained in section 5.3(b)4 of the Rules.

The design meets the recommendations in the Stormwater Best Management Practices Manual (SWBMP) Section 9.8 including the requirements for the maximum design storm drain time, permeability rate factor of safety, minimum/maximum subsoil design permeability rate, and criteria for the sand layer.

The proposed stormwater management system provides greater than 80% TSS removal for the proposed impervious coverage serving vehicular by directing runoff into rain gardens and treating it (through retention and infiltration), therefore these requirements are met.

#### **Groundwater Recharge**

The rules also require that the pre-developed average annual groundwater recharge volume is maintained in the post-developed conditions.

The required annual recharge volume was calculated using the New Jersey Groundwater Recharge Spreadsheet (version 2.0) – see "Post-Development Annual Recharge Deficit" from the spreadsheet printouts in this report.

Recharge is accomplished on this site by the infiltration facilities. The annual recharge volume provided is calculated using the "BMP Calculations" worksheet in the Groundwater Recharge Spreadsheet. The effective depth is based upon the depth of the rain garden below the lowest orifice or outlet and upper and lower surfaces of the BMP are determined by the elevations of the basin. The annual recharge volume provided by each is calculated using the area of impervious surfaces that drain to that facility. A printout from the spreadsheets for each rain garden is included at the end of this section.

# Rain Garden #1:

Pre-Developed Annual Recharge Volume = <u>5,265 cu-ft</u>

**Post-Developed Recharge Volume Provided =** <u>5,737 cu-ft</u>

Rain Garden #2:

Pre-Developed Annual Recharge Volume = 4,390 cu-ft

Post-Developed Recharge Volume Provided = <u>9,250 cu-ft</u>

Rain Garden #3:

Pre-Developed Annual Recharge Volume = <u>2,789 cu-ft</u>

**Post-Developed Recharge Volume Provided =** <u>9,725 cu-ft</u>

# <u>Rain Garden #4:</u>

Pre-Developed Annual Recharge Volume = <u>5,351 cu-ft</u>

Post-Developed Recharge Volume Provided = 5,810 cu-ft

Infiltration Area #5:

Pre-Developed Annual Recharge Volume = 6,718 cu-ft

Post-Developed Recharge Volume Provided = <u>10,682 cu-ft</u>

Infiltration Area #6:

Pre-Developed Annual Recharge Volume = <u>1,577 cu-ft</u>

Post-Developed Recharge Volume Provided = <u>3,025 cu-ft</u>

# INFILTRATION REQUIREMENTS

The NJDEP Stormwater Management Rules, (as reflected in the SWBMP Section 9.8 on Small-Scale Infiltration Systems) require that the permeability rate of the soil must be sufficient to fully drain the infiltration basin's maximum design storm runoff volume within 72 hours.

The infiltration rates used are based on field soil tests performed on October 13, 2023. The Infiltration rates used for all design purposes were calculated by averaging the tested infiltration rate at each corresponding test pit and dividing by two as a factor of safety. Copies of the soil logs are included in this report.

For Rain Garden #1, The maximum design volume is the volume below the top of the basin and overflow to elevation 137.34 (4,976 ft<sup>3</sup>). Permeability tests shall be completed in accordance with Chapter 12 of the Manual to demonstrate that the soils are capable of meeting the minimum required permeability rate. The BMP Manual requires a minimum of 0.5 in/hour tested rate.

The drain time was calculated using the design permeability rate to demonstrate that the entire water quality volume will be infiltrated within the 72 hours as required. The drain

time was calculated by expressing the runoff volume as an equivalent depth across only the basin bottom area.

Volume below top of basin = 4,976 ft<sup>3</sup>

Bottom Surface Area =  $591 \text{ ft}^2$ 

Equivalent Depth of Water in Basin (ft) = 4,976 ft<sup>3</sup> / 591 ft<sup>2</sup> = 8.420 ft / (1.76 in / hr x 1/12) = 57.41 hours

# Rain Garden #1 fully drains the required volume within 57.41 hours, which is faster than the 72 hour maximum, therefore this requirement is met.

For Rain Garden #2, The maximum design volume is the volume below the top of the basin and overflow to elevation 138.45 (6,227 ft<sup>3</sup>) Permeability tests shall be completed in accordance with Chapter 12 of the Manual to demonstrate that the soils are capable of meeting the minimum required permeability rate. The BMP Manual requires a minimum of 0.5 in/hour tested rate. Copies of the soil logs are included in this report.

The drain time was calculated using the design permeability rate to demonstrate that the entire water quality volume will be infiltrated within the 72 hours as required. The drain time was calculated by expressing the runoff volume as an equivalent depth across only the basin bottom area.

Volume below top of basin = 6,227 ft<sup>3</sup>

Bottom Surface Area =  $550 \text{ ft}^2$ 

Equivalent Depth of Water in Basin (ft) = 6,227 ft<sup>3</sup> / 550 ft<sup>2</sup> = 11.32 ft / (4.47 in / hr x 1/12) = **30.39 hours** 

# Rain Garden #2 fully drains the required volume within 30.39 hours, which is faster than the 72 hour maximum, therefore this requirement is met.

For Rain Garden #3, The maximum design volume is the volume below the top of the basin and overflow to elevation 137.23 (2,662 ft<sup>3</sup>). Permeability tests shall be completed in accordance with Chapter 12 of the Manual to demonstrate that the soils are capable of meeting the minimum required permeability rate. The BMP Manual requires a minimum of 0.5 in/hour tested rate. Copies of the soil logs are included in this report.

The drain time was calculated using the design permeability rate to demonstrate that the entire water quality volume will be infiltrated within the 72 hours as required. The drain time was calculated by expressing the runoff volume as an equivalent depth across only the basin bottom area.

Volume below top of basin = 2,662 ft<sup>3</sup>

Bottom Surface Area =  $554 \text{ ft}^2$ 

Equivalent Depth of Water in Basin (ft) = 2,662 ft<sup>3</sup> / 554 ft<sup>2</sup> = 4.81 ft / (6.13 in / hr x 1/12) = 9.41 hours

# Rain Garden #3 fully drains the required volume within 9.41 hours, which is faster than the 72 hour maximum, therefore this requirement is met.

For Rain Garden #4, The maximum design volume is the volume of storage for the 100year storm at elevation 135.57 (1,755 ft<sup>3</sup>). Permeability tests shall be completed in accordance with Chapter 12 of the Manual to demonstrate that the soils are capable of meeting the minimum required permeability rate. The BMP Manual requires a minimum of 0.5 in/hour tested rate. Copies of the soil logs are included in this report. The drain time was calculated using the design permeability rate to demonstrate that the entire water quality volume will be infiltrated within the 72 hours as required. The drain time was calculated by expressing the runoff volume as an equivalent depth across only the basin bottom area.

Volume below lowest outlet =  $1,755 \text{ ft}^3$ 

Bottom Surface Area =  $1,253 \text{ ft}^2$ 

Equivalent Depth of Water in Basin (ft) =  $1,755 \text{ ft}^3 / 1,253 \text{ ft}^2 = 1.40 \text{ ft} / (4.53 \text{ in} / \text{hr x 1/12})$ = **3.71 hours** 

# Rain Garden #4 fully drains the required volume within 3.64 hours, which is faster than the 72 hour maximum, therefore this requirement is met.

For Infiltration Area #5, The maximum design volume is the volume of storage for the 100-year storm at elevation 137.58 (2,616 ft<sup>3</sup>). Permeability tests shall be completed in accordance with Chapter 12 of the Manual to demonstrate that the soils are capable of meeting the minimum required permeability rate. The BMP Manual requires a minimum of 0.5 in/hour tested rate. Copies of the soil logs are included in this report. The drain time was calculated using the design permeability rate to demonstrate that the entire water quality volume will be infiltrated within the 72 hours as required. The drain time was calculated by expressing the runoff volume as an equivalent depth across only the basin bottom area.

Volume below lowest outlet =  $2,616 \text{ ft}^3$ 

Bottom Surface Area =  $500 \text{ ft}^2$ 

Equivalent Depth of Water in Basin (ft) = 2,616 ft<sup>3</sup> / 500 ft<sup>2</sup> = 5.232 ft / (4.224 in / hr x 1/12) = **14.86 hours** 

Infiltration Area #5 fully drains the required volume within 14.86 hours, which is faster than the 72 hour maximum, therefore this requirement is met.

For Infiltration Area #6, The maximum design volume is the volume of storage for the 100-year storm at elevation 135.75 (432 ft<sup>3</sup>). Permeability tests shall be completed in accordance with Chapter 12 of the Manual to demonstrate that the soils are capable of meeting the minimum required permeability rate. The BMP Manual requires a minimum of 0.5 in/hour tested rate.

The drain time was calculated using the design permeability rate to demonstrate that the entire water quality volume will be infiltrated within the 72 hours as required. The drain time was calculated by expressing the runoff volume as an equivalent depth across only the basin bottom area.

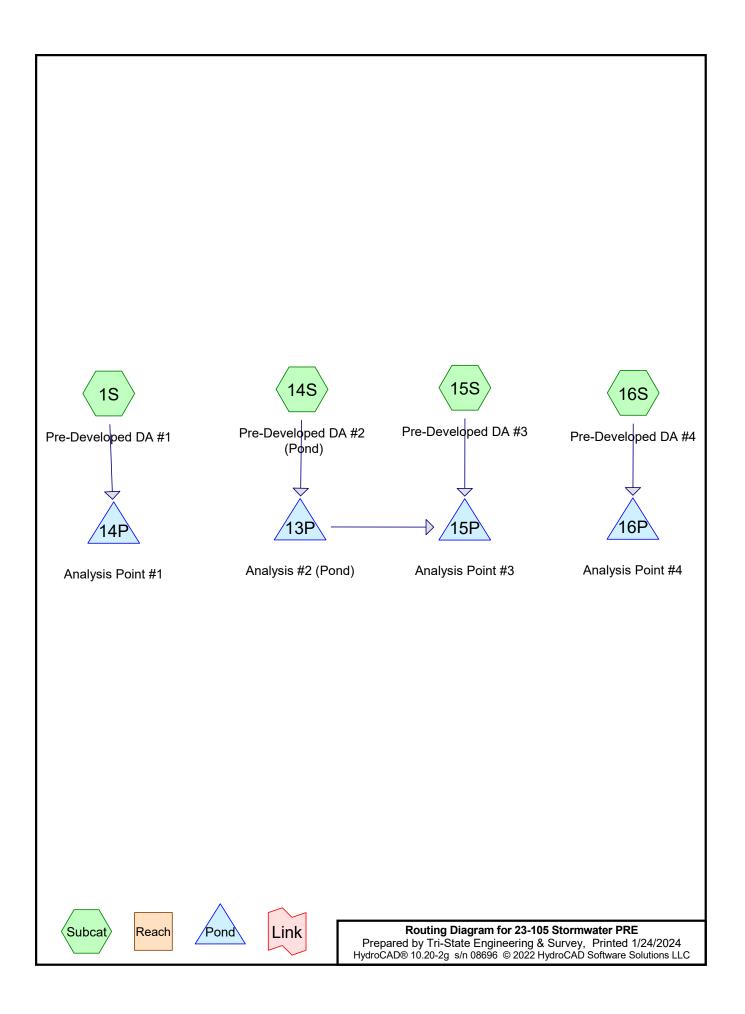
Volume below top of basin =  $432 \text{ ft}^3$ 

Bottom Surface Area =  $352 \text{ ft}^2$ 

Equivalent Depth of Water in Basin (ft) =  $432 \text{ ft}^3 / 352 \text{ ft}^2 = 1.23 \text{ ft} / (4.53 \text{ in} / \text{hr x 1/12})$ = **3.25 hours** 

Infiltration Area #6 fully drains the required volume within 3.25 hours, which is faster than the 72 hour maximum, therefore this requirement is met.

# **II. STORMWATER ROUTING CALCULATIONS**



# Area Listing (all nodes)

Area	CN	Description
(acres)		(subcatchment-numbers)
0.055	72	Dirt roads, HSG A (1S)
1.994	30	Woods, Good, HSG A (1S, 14S)
1.838	55	Woods, Good, HSG B (1S, 14S, 15S, 16S)

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# Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
2.049	HSG A	1S, 14S
1.838	HSG B	1S, 14S, 15S, 16S
0.000	HSG C	
0.000	HSG D	
0.000	Other	

			Ground C	overs (all r	loues)		
HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.055	0.000	0.000	0.000	0.000	0.055	Dirt roads	1S
1.994	1.838	0.000	0.000	0.000	3.832	Woods, Good	1S, 14S, 15S, 16S

# Ground Covers (all nodes)

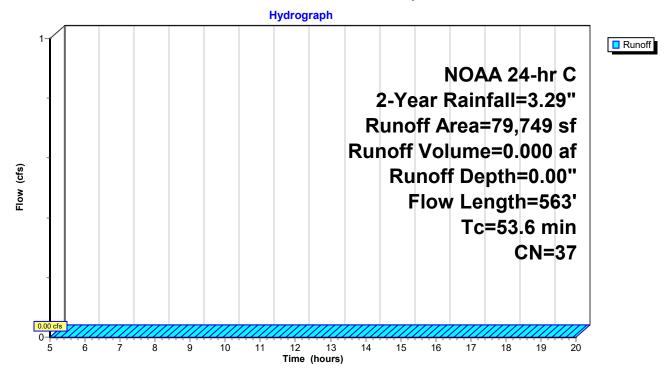
# Summary for Subcatchment 1S: Pre-Developed DA #1

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00" Routed to Pond 14P : Analysis Point #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs NOAA 24-hr C 2-Year Rainfall=3.29"

	A	rea (sf)	CN [	Description		
		60,061	30 \	Voods, Go	od, HSG A	
		2,415	72 [	Dirt roads, I	HSG A	
		17,273	55 \	Noods, Go	od, HSG B	
	79,749 37 Weighted Average					
		79,749		100.00% Pe	ervious Are	a
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	27.9	100	0.0100	0.06		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 3.29"
	25.7	463	0.0036	0.30		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
	53.6	563	Total			

#### Subcatchment 1S: Pre-Developed DA #1



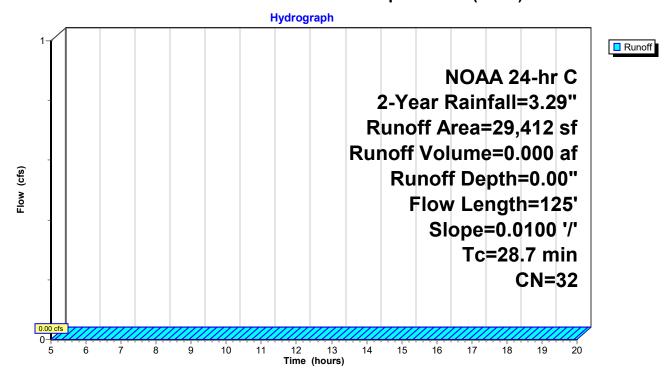
#### Summary for Subcatchment 14S: Pre-Developed DA #2 (Pond)

Runoff = 0.00 cfs @ 5.00 hrs, Volume= Routed to Pond 13P : Analysis #2 (Pond) 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs NOAA 24-hr C 2-Year Rainfall=3.29"

	A	rea (sf)	CN	Description		
		26,781	30	Woods, Go	od, HSG A	
		2,631	55	Woods, Go	od, HSG B	
		29,412	32	Weighted A	verage	
		29,412		100.00% Pe	ervious Are	a
	Тс	Length	Slope		Capacity	Description
(r	nin)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
2	27.9	100	0.0100	0.06		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 3.29"
	0.8	25	0.0100	0.50		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
2	28.7	125	Total			

Subcatchment 14S: Pre-Developed DA #2 (Pond)



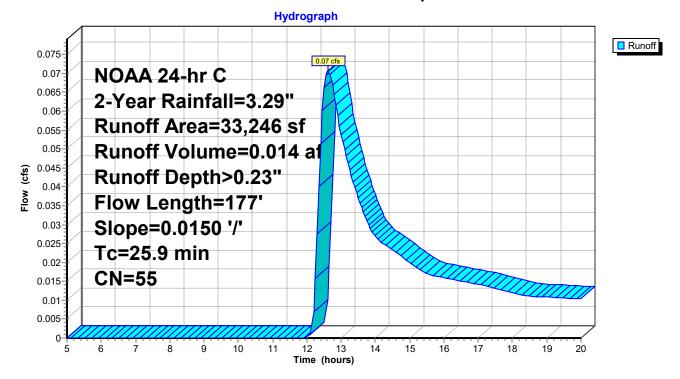
# Summary for Subcatchment 15S: Pre-Developed DA #3

Runoff = 0.07 cfs @ 12.62 hrs, Volume= 0.014 af, Depth> 0.23" Routed to Pond 15P : Analysis Point #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs NOAA 24-hr C 2-Year Rainfall=3.29"

_	A	rea (sf)	CN Description							
		33,246	55 N	55 Woods, Good, HSG B						
_		33,246	1	100.00% Pe	ervious Are	a				
Tc Length Slope Velocity Capacity (min) (feet) (ft/ft) (ft/sec) (cfs)					Capacity (cfs)	Description				
-	23.8	100	0.0150	0.07		Sheet Flow,				
	2.1	77	0.0150	0.61		Woods: Light underbrush n= 0.400 P2= 3.29" <b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps				
	25.9	177	Total							

# Subcatchment 15S: Pre-Developed DA #3



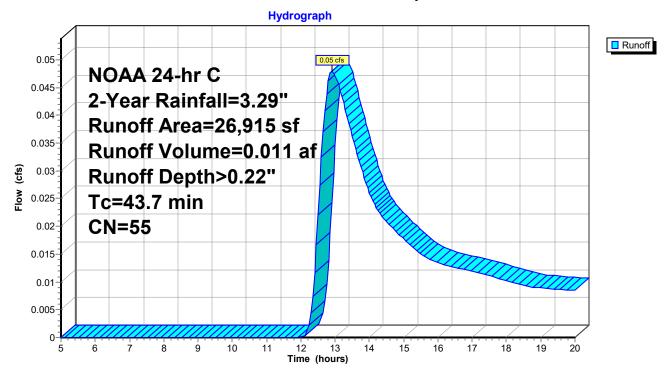
# Summary for Subcatchment 16S: Pre-Developed DA #4

Runoff = 0.05 cfs @ 12.91 hrs, Volume= 0.011 af, Depth> 0.22" Routed to Pond 16P : Analysis Point #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs NOAA 24-hr C 2-Year Rainfall=3.29"

A	rea (sf)	CN I	Description		
	26,915	55 \	Noods, Go	od, HSG B	
	26,915		100.00% Pe	ervious Are	28
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
43.7					Direct Entry,

#### Subcatchment 16S: Pre-Developed DA #4

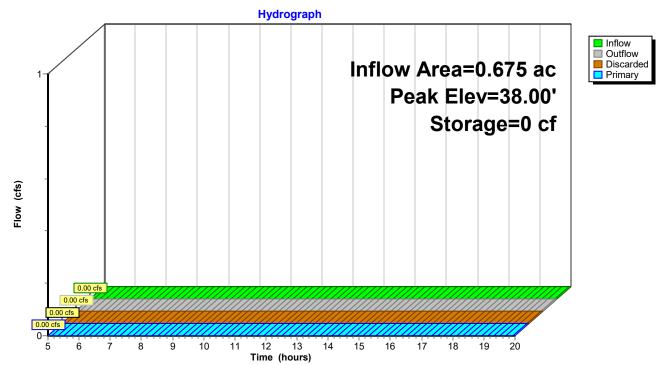


# Summary for Pond 13P: Analysis #2 (Pond)

Inflow Area Inflow Outflow Discarded Primary Routed	= 0.00 cfs = 0.00 cfs	<ul> <li>@ 5.00 hr</li> <li>@ 5.00 hr</li> <li>@ 5.00 hr</li> <li>@ 5.00 hr</li> </ul>	s, Volume s, Volume s, Volume s, Volume	e= 0. e= 0. e= 0.	.000 af	00" for 2-Year event Atten= 0%, Lag= 0.0 min		
	Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 38.00' @ 5.00 hrs Surf.Area= 2,857 sf Storage= 0 cf							
	Plug-Flow detention time= (not calculated: initial storage exceeds outflow) Center-of-Mass det. time= (not calculated: no inflow)							
Volume	Invert Av	ail.Storage	Storage D	escription				
#1	38.00'	3,614 cf	Custom S	tage Data (F	Prismati	<b>c)</b> Listed below (Recalc)		
<b>Flavetian</b>			_		_			
Elevation (feet)	Surf.Area (sq-ft)		Store -feet)	Cum.Store (cubic-feet				
(feet) 38.00	(sq-ft)	(cubic	Store <u>-feet)</u> 0	(cubic-feet				
(feet)	<u>(sq-ft)</u> 2,857	cubic	-feet)	(cubic-feet	<u>:)</u> D			
(feet) 38.00 38.50	<u>(sq-ft)</u> 2,857 11,600	(cubic	-feet) 0	cubic-feet) (	<u>:)</u> D			
(feet) 38.00 38.50 Device F	(sq-ft) 2,857 11,600 Routing	nvert Outle	<u>-feet)</u> 0 3,614 t Devices	cubic-feet) (	<u>;)</u> 0 4	IS		
(feet) 38.00 38.50 <u>Device F</u> #1 D	(sq-ft) 2,857 11,600 Routing I Discarded 3	<u>(cubic</u> nvert Outle 8.00' <b>3.00</b>	-feet) 0 3,614 t Devices cfs Exfiltra	(cubic-feet ( 3,614 ation at all e	<u>)</u> 0 4 • <b>levation</b>	s ular Weir 2 End Contraction(s)		

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=38.00' (Free Discharge) ←2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

# 23-105 Stormwater PRE

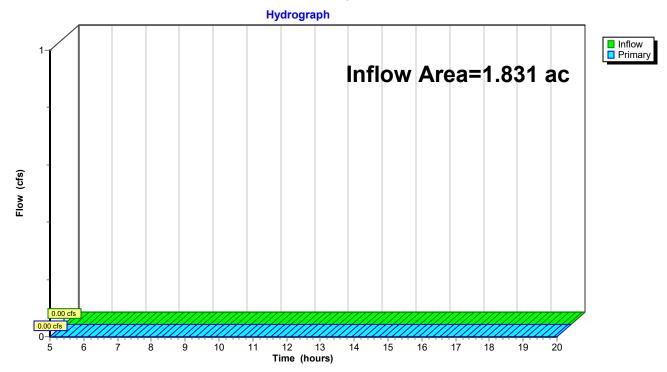


# Pond 13P: Analysis #2 (Pond)

# Summary for Pond 14P: Analysis Point #1

Inflow Area	a =	1.831 ac,	0.00% Impervious, Inf	flow Depth = 0.00"	for 2-Year event
Inflow	=	0.00 cfs @	5.00 hrs, Volume=	0.000 af	
Primary	=	0.00 cfs @	5.00 hrs, Volume=	0.000 af, Atte	en= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

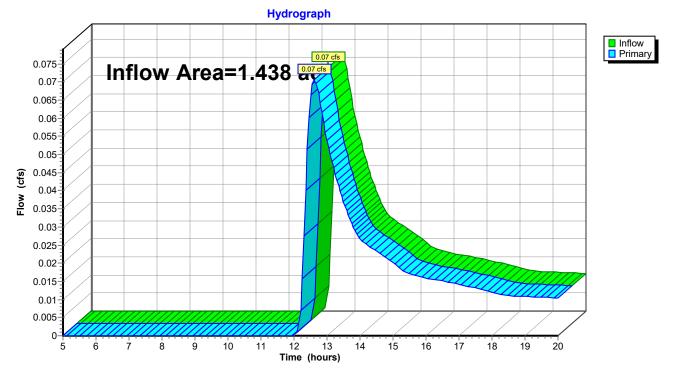


# Pond 14P: Analysis Point #1

# Summary for Pond 15P: Analysis Point #3

Inflow Area	a =	1.438 ac,	0.00% Impervious, In	nflow Depth > 0.12"	for 2-Year event
Inflow	=	0.07 cfs @	12.62 hrs, Volume=	0.014 af	
Primary	=	0.07 cfs @	12.62 hrs, Volume=	0.014 af, Atte	en= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

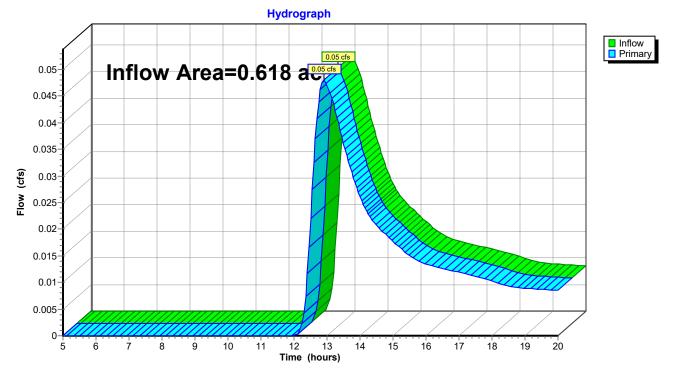


# Pond 15P: Analysis Point #3

# Summary for Pond 16P: Analysis Point #4

Inflow Area =	0.618 ac,	0.00% Impervious, Inflow	/ Depth > 0.22"	for 2-Year event
Inflow =	0.05 cfs @	12.91 hrs, Volume=	0.011 af	
Primary =	0.05 cfs @	12.91 hrs, Volume=	0.011 af, Atte	en= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



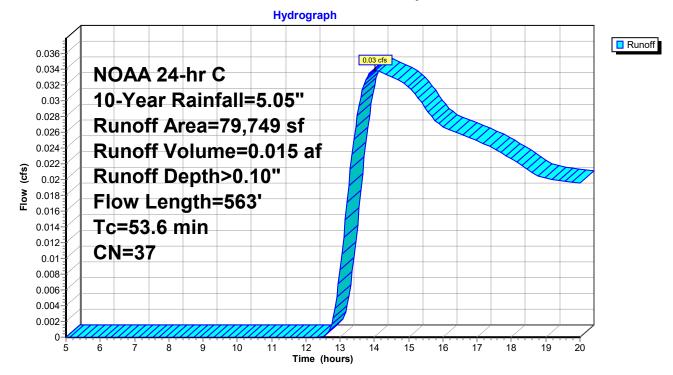
# Pond 16P: Analysis Point #4

0.03 cfs @ 14.01 hrs, Volume= 0.015 af, Depth> 0.10" Runoff = Routed to Pond 14P : Analysis Point #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs NOAA 24-hr C 10-Year Rainfall=5.05"

_	A	rea (sf)	CN I	Description		
		60,061	30 V	Noods, Go	od, HSG A	
		2,415	72 I	Dirt roads, l	HSG A	
		17,273	55 \	Noods, Go	od, HSG B	
		79,749	37 \	Neighted A	verage	
		79,749		100.00% Pe	ervious Are	a
	Tc	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	27.9	100	0.0100	0.06		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 3.29"
	25.7	463	0.0036	0.30		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
_	53.6	563	Total			·

# Subcatchment 1S: Pre-Developed DA #1



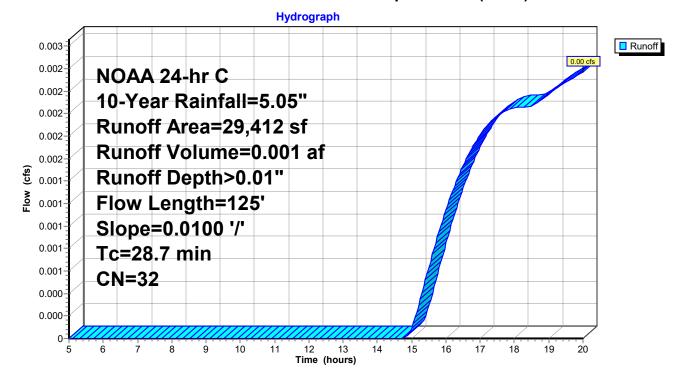
#### Summary for Subcatchment 14S: Pre-Developed DA #2 (Pond)

Runoff = 0.00 cfs @ 20.00 hrs, Volume= 0.001 af, Depth> 0.01" Routed to Pond 13P : Analysis #2 (Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs NOAA 24-hr C 10-Year Rainfall=5.05"

_	A	rea (sf)	CN	Description		
		26,781	30	Woods, Go	od, HSG A	
_		2,631	55	Woods, Go	od, HSG B	
		29,412	32	Weighted A	verage	
		29,412		100.00% Pe	ervious Are	a
	Тс	Length	Slope		Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	27.9	100	0.0100	0.06		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 3.29"
	0.8	25	0.0100	0.50		Shallow Concentrated Flow,
_						Woodland Kv= 5.0 fps
	28.7	125	Total			

#### Subcatchment 14S: Pre-Developed DA #2 (Pond)



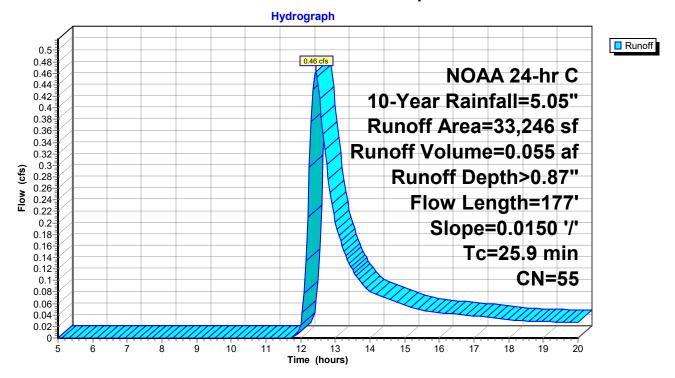
# Summary for Subcatchment 15S: Pre-Developed DA #3

Runoff = 0.46 cfs @ 12.43 hrs, Volume= 0.055 af, Depth> 0.87" Routed to Pond 15P : Analysis Point #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs NOAA 24-hr C 10-Year Rainfall=5.05"

A	vrea (sf)	CN E	Description		
	33,246	55 V	Voods, Go	od, HSG B	
	33,246	1	00.00% Pe	ervious Are	a
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	100	0.0150	0.07		Sheet Flow,
2.1	77	0.0150	0.61		Woods: Light underbrush n= 0.400 P2= 3.29" <b>Shallow Concentrated Flow,</b> Woodland Kv= 5.0 fps
25.9	177	Total			

# Subcatchment 15S: Pre-Developed DA #3



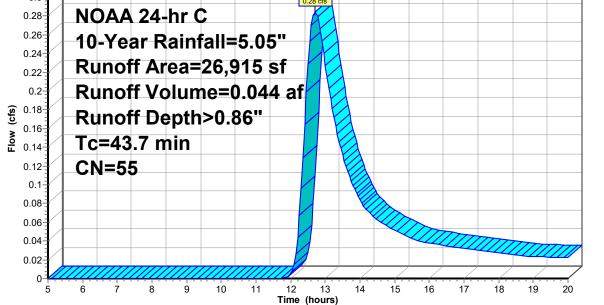
# Summary for Subcatchment 16S: Pre-Developed DA #4

Page 17

0.28 cfs @ 12.71 hrs, Volume= 0.044 af, Depth> 0.86" Runoff = Routed to Pond 16P : Analysis Point #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs NOAA 24-hr C 10-Year Rainfall=5.05"

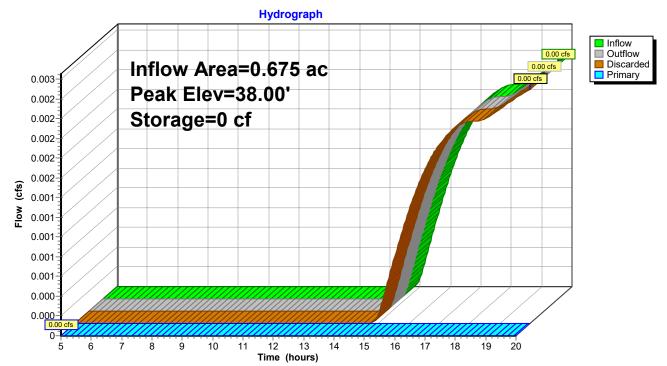
Ar	rea (sf)	CN E	Description					
	26,915	55 V	Voods, Go	od, HSG B				
:	26,915	1	00.00% Pe	ervious Are	а			
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
43.7					Direct Entry,			
			Subcat		6S: Pre-Deve	eloped D	)A #4	
				Hydro	graph			 
0.3					0.28 cfs			Runoff
0.28	Í L NQ	<b>AA 2</b> 4	l-hr C					 



# Summary for Pond 13P: Analysis #2 (Pond)

Inflow Outflow Discardeo Primary	= 0.00 cfs @ = 0.00 cfs @ d = 0.00 cfs @	20.00 hrs, Volur 20.00 hrs, Volur 20.00 hrs, Volur 5.00 hrs, Volur	ne= 0.001 at ne= 0.001 at ne= 0.001 at	f,  Atten= 0%,  Lag= 0.0 min f				
	Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 38.00' @ 20.00 hrs Surf.Area= 2,857 sf Storage= 0 cf							
	Plug-Flow detention time= 0.1 min calculated for 0.001 af (100% of inflow) Center-of-Mass det. time= 0.0 min(1,079.5 - 1,079.5)							
Volume	Invert Avail.S	torage Storage	Description					
#1	38.00' 3,	614 cf Custom	Stage Data (Prisma	atic) Listed below (Recalc)				
Elevation	o ( )	luce Otene	Cum.Store					
Elevatior (feet)		Inc.Store (cubic-feet)	(cubic-feet)					
	) (sq-ft)							
(feet)	) (sq-ft) ) 2,857	(cubic-feet)	(cubic-feet)					
(feet) 38.00 38.50	) (sq-ft) D 2,857	(cubic-feet) 0 3,614	(cubic-feet) 0 3,614					
(feet) 38.00 38.50 <u>Device</u> #1	) (sq-ft) D 2,857 D 11,600	(cubic-feet) 0 3,614 t Outlet Device	(cubic-feet) 0 3,614 s tration at all elevatio					
(feet) 38.00 38.50 <u>Device</u> #1	) (sq-ft) ) 2,857 ) 11,600 Routing Inver	(cubic-feet) 0 3,614 t Outlet Device	(cubic-feet) 0 3,614 s tration at all elevatio	ons gular Weir 2 End Contraction(s)				

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=38.00' (Free Discharge) ←2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

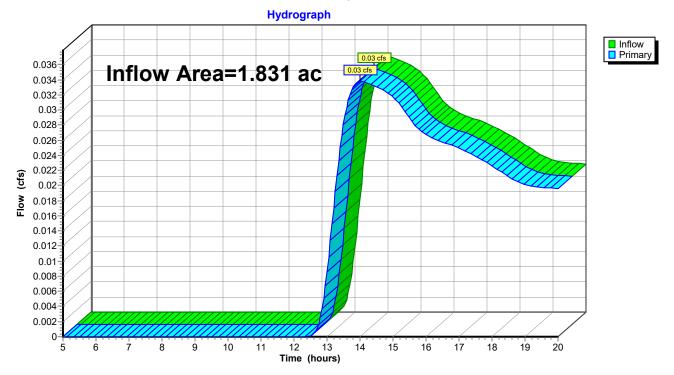


# Pond 13P: Analysis #2 (Pond)

# Summary for Pond 14P: Analysis Point #1

Inflow Area	a =	1.831 ac,	0.00% Impervious, In	nflow Depth > 0.10"	for 10-Year event
Inflow	=	0.03 cfs @	14.01 hrs, Volume=	0.015 af	
Primary	=	0.03 cfs @	14.01 hrs, Volume=	0.015 af, Atte	en= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

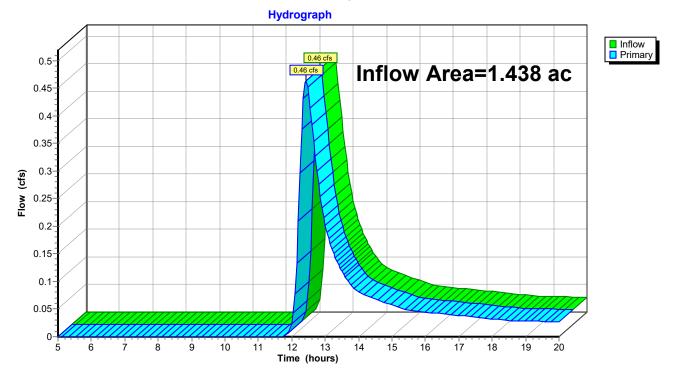


# Pond 14P: Analysis Point #1

# Summary for Pond 15P: Analysis Point #3

Inflow Area =	1.438 ac,	0.00% Impervious, Inflow	Depth > 0.46"	for 10-Year event
Inflow =	0.46 cfs @	12.43 hrs, Volume=	0.055 af	
Primary =	0.46 cfs @	12.43 hrs, Volume=	0.055 af, Atte	en= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

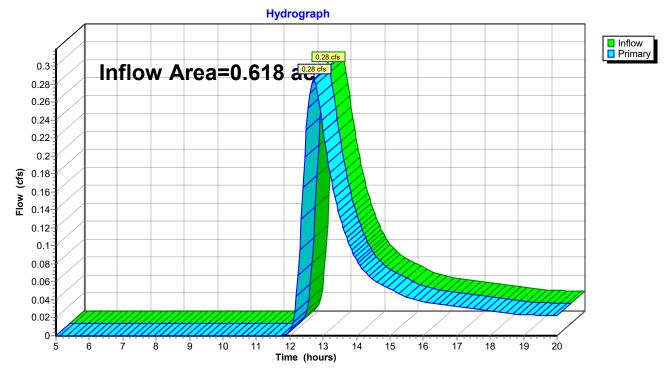


# Pond 15P: Analysis Point #3

# Summary for Pond 16P: Analysis Point #4

Inflow Area =	0.618 ac,	0.00% Impervious, I	nflow Depth > 0.86	for 10-Year event
Inflow =	0.28 cfs @	12.71 hrs, Volume=	0.044 af	
Primary =	0.28 cfs @	12.71 hrs, Volume=	• 0.044 af, A	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



# Pond 16P: Analysis Point #4

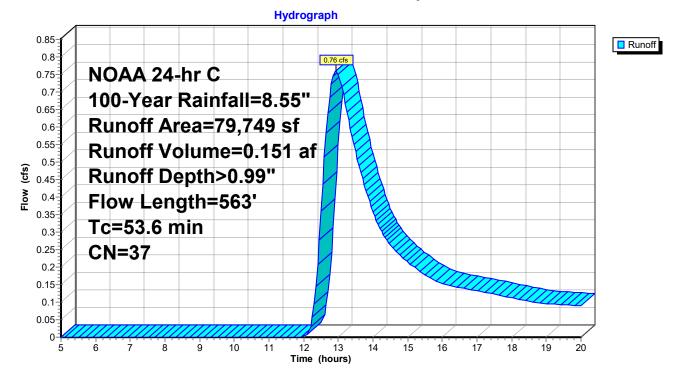
# Summary for Subcatchment 1S: Pre-Developed DA #1

0.76 cfs @ 12.94 hrs, Volume= 0.151 af, Depth> 0.99" Runoff = Routed to Pond 14P : Analysis Point #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs NOAA 24-hr C 100-Year Rainfall=8.55"

	A	rea (sf)	CN [	Description		
		60,061	30 \	) Woods, Good, HSG A		
		2,415	72 [	Dirt roads, I		
		17,273	55 \	55 Woods, Good, HSG B		
	79,749 37 Weighted Average		verage			
	79,749 100.00% Pervious Area				а	
	Тс	Length	Slope	Velocity	Capacity	Description
_	(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
	27.9	100	0.0100	0.06		Sheet Flow,
						Woods: Light underbrush n= 0.400 P2= 3.29"
	25.7	463	0.0036	0.30		Shallow Concentrated Flow,
						Woodland Kv= 5.0 fps
_	53.6	563	Total			

# Subcatchment 1S: Pre-Developed DA #1



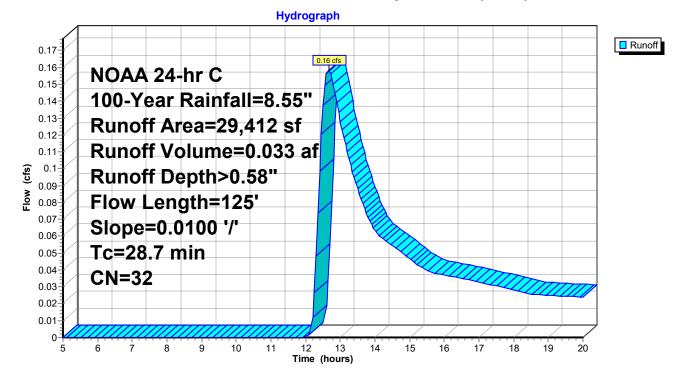
#### Summary for Subcatchment 14S: Pre-Developed DA #2 (Pond)

Runoff = 0.16 cfs @ 12.66 hrs, Volume= 0.033 af, Depth> 0.58" Routed to Pond 13P : Analysis #2 (Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs NOAA 24-hr C 100-Year Rainfall=8.55"

	Area (sf)	CN	Description		
	26,781	30	Woods, Good, HSG A		
	2,631	55	Woods, Good, HSG B		
	29,412	32 Weighted Average			
	29,412 100.00% Pervious Area				
To	5	Slope		Capacity	Description
(min)	) (feet)	(ft/ft)	(ft/sec)	(cfs)	
27.9	100	0.0100	0.06		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 3.29"
0.8	3 25	0.0100	0.50		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
28.7	125	Total			

#### Subcatchment 14S: Pre-Developed DA #2 (Pond)



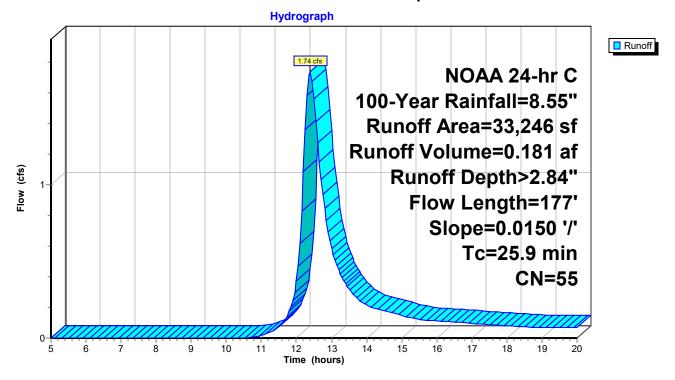
### Summary for Subcatchment 15S: Pre-Developed DA #3

1.74 cfs @ 12.39 hrs, Volume= 0.181 af, Depth> 2.84" Runoff = Routed to Pond 15P : Analysis Point #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs NOAA 24-hr C 100-Year Rainfall=8.55"

_	A	rea (sf)	CN E	escription					
		33,246	,246 55 Woods, Good, HSG B						
33,246 100.00% Pervious Area					ervious Are	a			
	Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description			
-	23.8	100	0.0150	0.07		Sheet Flow,			
_	2.1	77	0.0150	0.61		Woods: Light underbrush n= 0.400 P2= 3.29" Shallow Concentrated Flow, Woodland Kv= 5.0 fps			
	25.9	177	Total						

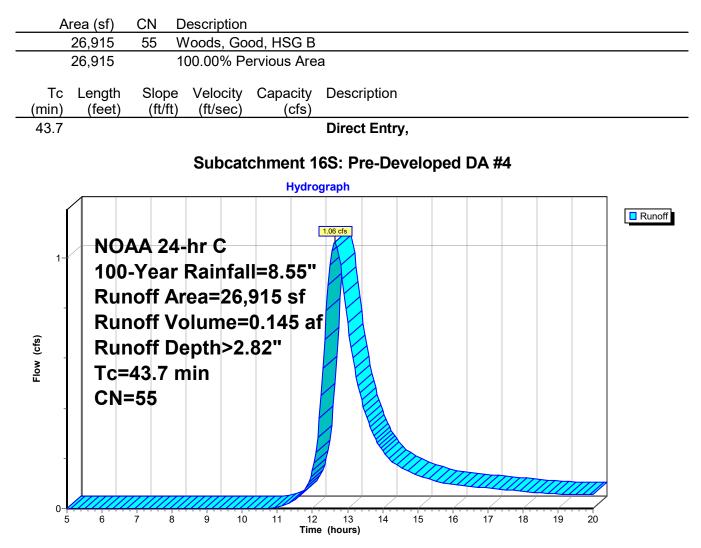
#### Subcatchment 15S: Pre-Developed DA #3



#### Summary for Subcatchment 16S: Pre-Developed DA #4

Runoff = 1.06 cfs @ 12.64 hrs, Volume= 0.145 af, Depth> 2.82" Routed to Pond 16P : Analysis Point #4

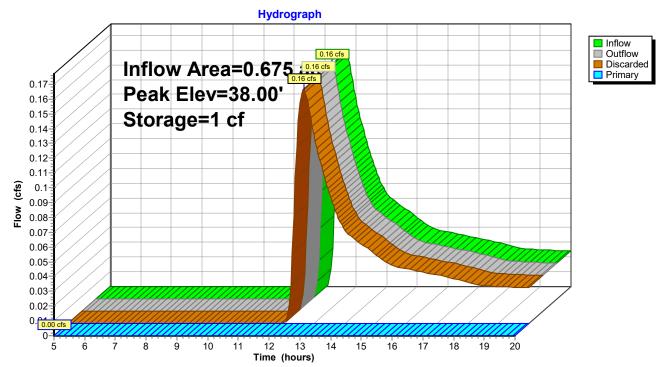
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs NOAA 24-hr C 100-Year Rainfall=8.55"



# Summary for Pond 13P: Analysis #2 (Pond)

Inflow Are Inflow Outflow Discarded Primary Routed	$ \begin{array}{cccc} 0 & = \\ 0 & = \\ 0 & = \\ 0 & = \\ 0 & = \\ \end{array} $	).16 cfs @ 12 ).16 cfs @ 12 ).16 cfs @ 12	2.66 hrs, Volum 2.67 hrs, Volum 2.67 hrs, Volum 5.00 hrs, Volum	e= 0.033 af, Atten= 0%, Lag= 0.1 min e= 0.033 af					
	Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs Peak Elev= 38.00' @ 12.67 hrs Surf.Area= 2,862 sf Storage= 1 cf								
	Plug-Flow detention time= 0.1 min calculated for 0.033 af (100% of inflow) Center-of-Mass det. time= 0.1 min(893.4-893.4)								
Volume	Invert	Avail.Stor	rage Storage D	Description					
#1	38.00'	3,61	4 cf Custom S	Stage Data (Prismatic) Listed below (Recalc)					
Elevation (feet)		urf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)					
38.00	)	2,857	0	0					
38.50	)	11,600	3,614	3,614					
Device Routing Invert Outlet Devices									
	Discarded	38.00'	3.00 cfs Exfiltr	ation at all elevations					
#2 I	Primary	38.40'	46.0' long Sha	rp-Crested Rectangular Weir 2 End Contraction(	s)				
	<b>Discarded OutFlow</b> Max=3.00 cfs @ 12.67 hrs HW=38.00' (Free Discharge) <b>1=Exfiltration</b> (Exfiltration Controls 3.00 cfs)								

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=38.00' (Free Discharge) ←2=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

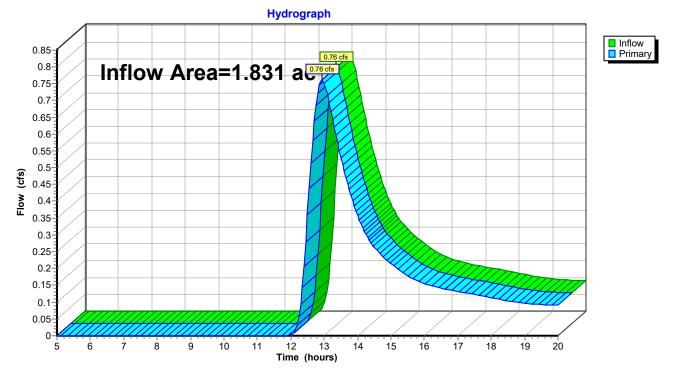


# Pond 13P: Analysis #2 (Pond)

### Summary for Pond 14P: Analysis Point #1

Inflow Area	a =	1.831 ac,	0.00% Impervious, In	flow Depth > 0.99"	for 100-Year event
Inflow	=	0.76 cfs @	12.94 hrs, Volume=	0.151 af	
Primary	=	0.76 cfs @	12.94 hrs, Volume=	0.151 af, Atte	en= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

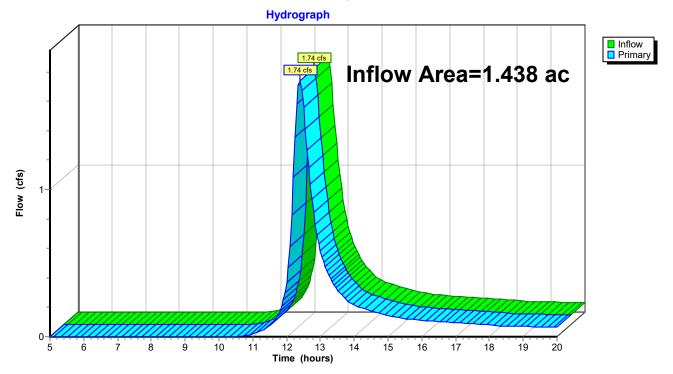


# Pond 14P: Analysis Point #1

# Summary for Pond 15P: Analysis Point #3

Inflow Area	a =	1.438 ac,	0.00% Impervious, I	nflow Depth > 1.51"	for 100-Year event
Inflow	=	1.74 cfs @	12.39 hrs, Volume=	0.181 af	
Primary	=	1.74 cfs @	12.39 hrs, Volume=	0.181 af, Att	en= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

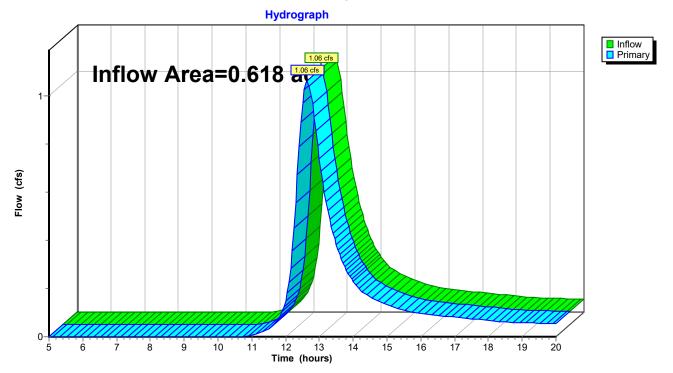


## Pond 15P: Analysis Point #3

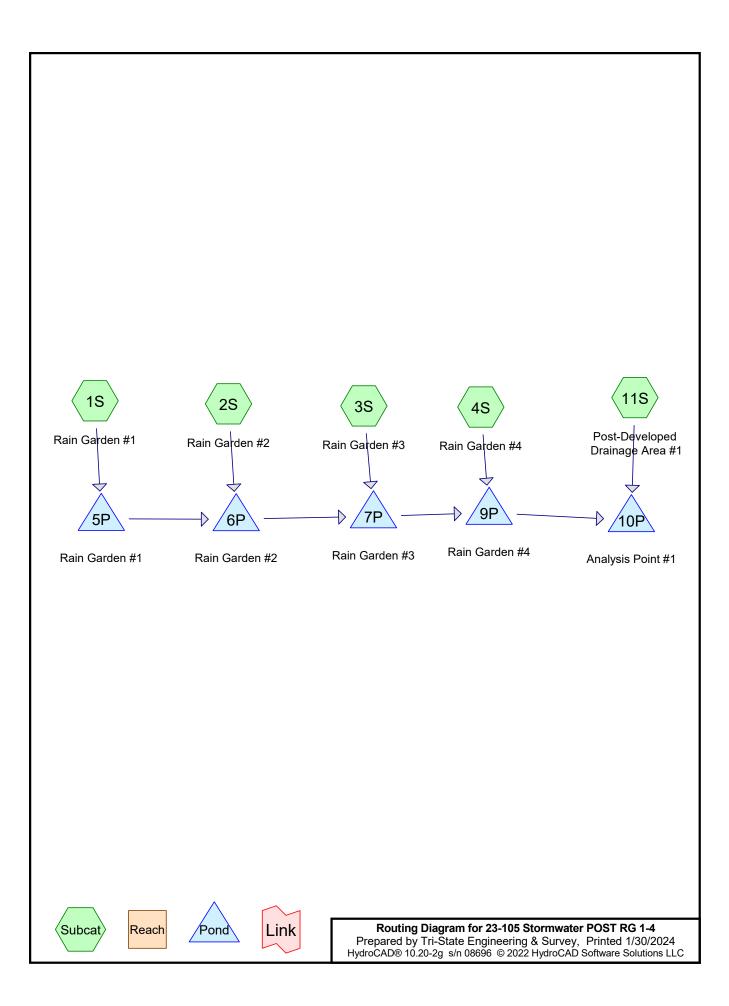
# Summary for Pond 16P: Analysis Point #4

Inflow Area	a =	0.618 ac,	0.00% Impervious,	Inflow Depth >	2.82"	for 100-Year event
Inflow	=	1.06 cfs @	12.64 hrs, Volume=	= 0.145	af	
Primary	=	1.06 cfs @	12.64 hrs, Volume=	= 0.145	af, Atte	en= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



## Pond 16P: Analysis Point #4



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# Area Listing (all nodes)

Area	CN	Description
 (acres)		(subcatchment-numbers)
0.508	98	(1S, 2S, 3S, 4S, 11S)
0.509	61	(2S, 11S)
1.485	39	(2S, 3S, 4S, 11S)
0.013	98	Driveway (1S)
0.321	61	Grass B (1S)
0.062	98	Roof (1S)
0.238	30	Woods, Good, HSG A (11S)
0.038	55	Woods, Good, HSG B (11S)
0.048	85	gravel B (1S)

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## Soil Listing (all nodes)

Soil Group	Subcatchment Numbers
HSG A	11S
HSG B	11S
HSG C	
HSG D	
Other	1S, 2S, 3S, 4S, 11S
	Group HSG A HSG B HSG C HSG D

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 HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	2.501	2.501		1S, 2S, 3S, 4S, 11S
0.000	0.000	0.000	0.000	0.013	0.013	Driveway	1S
0.000	0.000	0.000	0.000	0.321	0.321	Grass B	1S
0.000	0.000	0.000	0.000	0.062	0.062	Roof	1S
0.238	0.038	0.000	0.000	0.000	0.276	Woods, Good	11S
0.000	0.000	0.000	0.000	0.048	0.048	gravel B	1S

### Ground Covers (all nodes)

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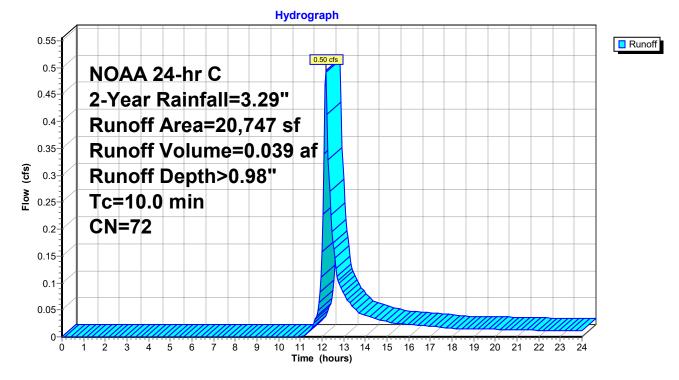
## Summary for Subcatchment 1S: Rain Garden #1

Runoff = 0.50 cfs @ 12.19 hrs, Volume= Routed to Pond 5P : Rain Garden #1 0.039 af, Depth> 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 2-Year Rainfall=3.29"

	A	rea (sf)	CN	Description		
*		2,700	98	Roof		
*		577	98	Driveway		
*		13,980	61	Grass B		
*		1,392	98			
*		2,098	85	gravel B		
		20,747	72	Weighted A	verage	
		16,078		77.50% Pe	rvious Area	3
		4,669		22.50% Im	pervious Are	rea
	Тс	Length	Slop	e Velocity	Capacity	Description
_	(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)	
	10.0					Direct Entry,

#### Subcatchment 1S: Rain Garden #1



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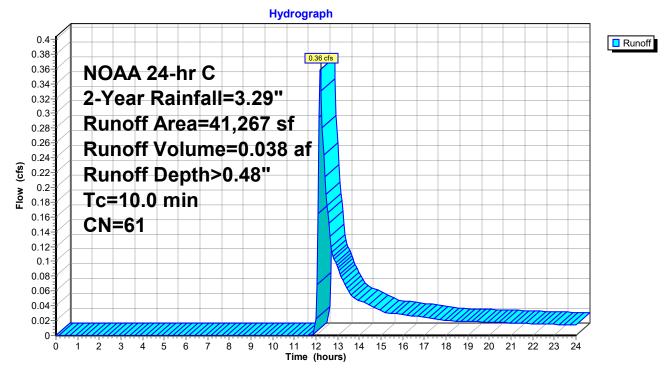
#### Summary for Subcatchment 2S: Rain Garden #2

Runoff = 0.36 cfs @ 12.21 hrs, Volume= Routed to Pond 6P : Rain Garden #2 0.038 af, Depth> 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 2-Year Rainfall=3.29"

_	A	rea (sf)	CN I	Description		
*		7,646	98			
*		21,463	61			
*		12,158	39			
		41,267 33,621 7,646	8	-	verage vious Area pervious Are	
_	Tc (min)	Length (feet)	Slope (ft/ft)		Capacity (cfs)	Description
	10.0					Direct Entry,

### Subcatchment 2S: Rain Garden #2



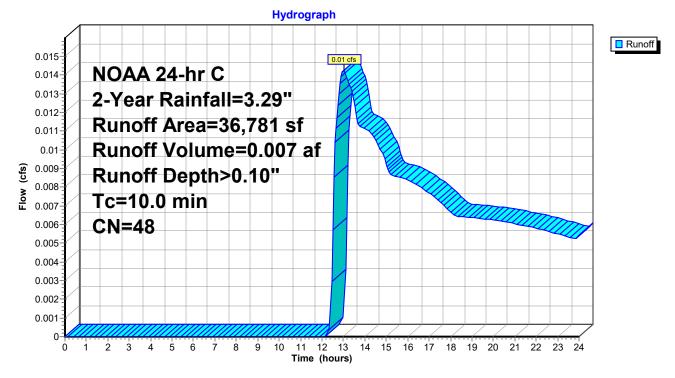
### Summary for Subcatchment 3S: Rain Garden #3

Runoff = 0.01 cfs @ 13.02 hrs, Volume= 0.007 af, Depth> 0.10" Routed to Pond 7P : Rain Garden #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 2-Year Rainfall=3.29"

	A	rea (sf)	CN	Description		
*		5,527	98			
*		31,254	39			
		36,781 31,254 5,527	48	Weighted A 84.97% Per 15.03% Imp	rvious Area	-
	Tc (min)	Length (feet)	Slop (ft/f		Capacity (cfs)	Description
	10.0					Direct Entry,

## Subcatchment 3S: Rain Garden #3



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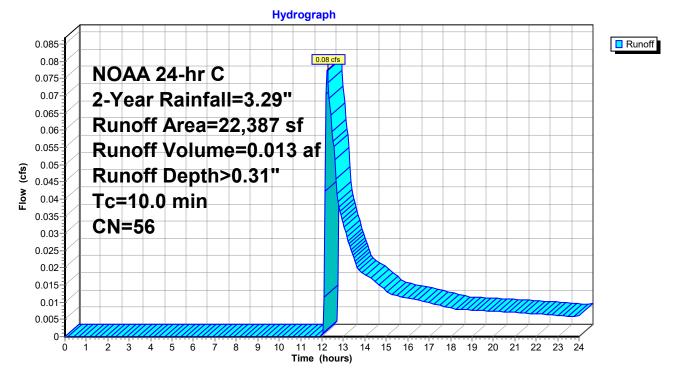
#### Summary for Subcatchment 4S: Rain Garden #4

Runoff = 0.08 cfs @ 12.26 hrs, Volume= Routed to Pond 9P : Rain Garden #4 0.013 af, Depth> 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 2-Year Rainfall=3.29"

_	A	rea (sf)	CN	Description		
*		6,345	98			
*		16,042	39			
	Тс	22,387 16,042 6,345		Weighted A 71.66% Per 28.34% Imp Velocity	vious Area pervious Are	
	(min)	Length (feet)	Slope (ft/ft		Capacity (cfs)	Description
	10.0	· · ·	•			Direct Entry,

## Subcatchment 4S: Rain Garden #4



#### Summary for Subcatchment 11S: Post-Developed Drainage Area #1

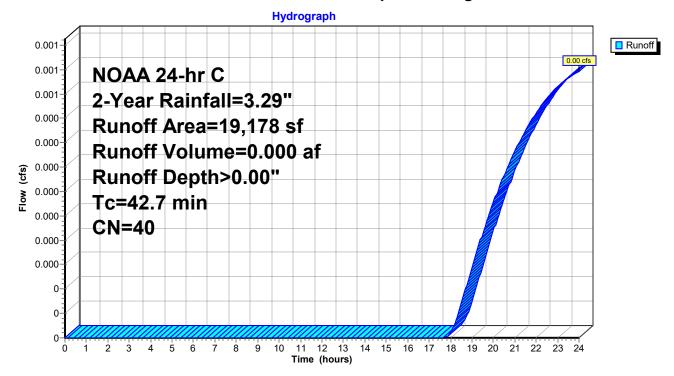
Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Routed to Pond 10P : Analysis Point #1

0.000 af, Depth> 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 2-Year Rainfall=3.29"

_	A	rea (sf)	CN	Description				
*		1,201	98					
*		5,225	39					
*		709	61					
		10,382	30	Woods, Go	od, HSG A	N N N N N N N N N N N N N N N N N N N		
		1,661	55	Woods, Go	od, HSG B			
		19,178	40	Weighted A	verage			
		17,977		93.74% Per	rvious Area	3		
		1,201		6.26% Impe	ervious Area	a		
	Тс	Length	Slop		Capacity	Description		
	(min)	(feet)	(ft/ft	i) (ft/sec)	(cfs)			
	42.7					Direct Entry,		

#### Subcatchment 11S: Post-Developed Drainage Area #1



NOAA 24-hr C 2-Year Rainfall=3.29" Printed 1/30/2024 ions LLC Page 10

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### Summary for Pond 5P: Rain Garden #1

Inflow Area =	0.476 ac, 22.50% Impervious, Inflow De	epth > 0.98" for 2-Year event
Inflow =	0.50 cfs @ 12.19 hrs, Volume=	0.039 af
Outflow =	0.04 cfs @ 13.70 hrs, Volume=	0.038 af, Atten= 91%, Lag= 90.8 min
Discarded =	0.04 cfs @ 13.70 hrs, Volume=	0.038 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 135.39' @ 13.70 hrs Surf.Area= 1,087 sf Storage= 738 cf

Plug-Flow detention time= 193.7 min calculated for 0.038 af (96% of inflow) Center-of-Mass det. time= 173.0 min (1,045.5 - 872.4)

Volume	Invert	Avail.Sto	rage Storage	e Description		
#1	134.50'	6,78	84 cf Custor	m Stage Data (Prismatic) Listed below (Recalc)		
Elevatio (fee		urf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)		
134.5	50	591	0	0		
135.0	00	862	363	363		
136.0	00	1,446	1,154	1,517		
136.5	50	1,774	805	2,322		
137.7	70	5,662	4,462	6,784		
Device	Routing	Invert	Outlet Devic	ces		
#1	Discarded	134.50'	1.760 in/hr E	Exfiltration over Surface area		
Discard	Discarded OutFlow, Max-0.04 ofs @ 13.70 brs. HW-135.30' (Free Discharge)					

**Discarded OutFlow** Max=0.04 cfs @ 13.70 hrs HW=135.39' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.04 cfs)

#### 23-105 Stormwater POST RG 1-4 Prepared by Tri-State Engineering & Survey

Hydrograph Inflow 0.55 Discarded 0.50 cfs Inflow Area=0.476 ac 0.5 Peak Elev=135.39' 0.45 Storage=738 cf 0.4 0.35 (cts) 0.3 0.2 0.15 0.1 0.04 cfs 0.05 0-1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 Ó Time (hours)

# Pond 5P: Rain Garden #1

 NOAA 24-hr C
 2-Year Rainfall=3.29"

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### Summary for Pond 6P: Rain Garden #2

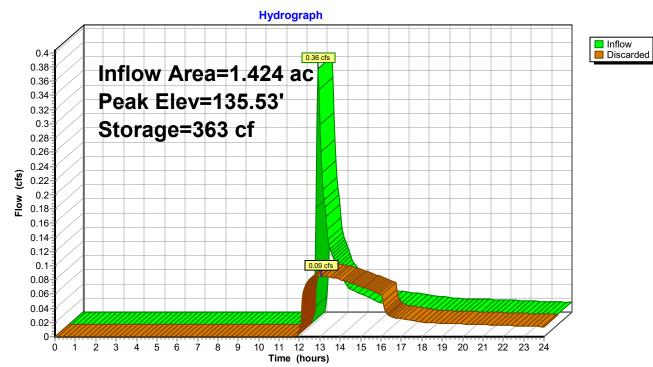
Inflow Area =	1.424 ac, 19.86% Impervious, Inflow De	pth > 0.32" for 2-Year event
Inflow =	0.36 cfs @ 12.21 hrs, Volume=	0.038 af
Outflow =	0.09 cfs @ 13.07 hrs, Volume=	0.038 af, Atten= 76%, Lag= 51.5 min
Discarded =	0.09 cfs @ 13.07 hrs, Volume=	0.038 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 135.53' @ 13.07 hrs Surf.Area= 827 sf Storage= 363 cf

Plug-Flow detention time= 35.7 min calculated for 0.038 af (99% of inflow) Center-of-Mass det. time= 33.5 min (951.1 - 917.6)

Volume	Invert A	vail.Storage	Storage	Description	
#1	135.00'	8,564 cf	Custom	Stage Data (Pri	smatic) Listed below (Recalc)
#2	139.00'	1,504 cf			smatic) Listed below (Recalc)
		10,068 cf	Total Av	ailable Storage	
Elevation	Surf.Are		Store.	Cum.Store	
(feet)	(sq-	ft) (cubi	c-feet)	(cubic-feet)	
135.00	5	50	0	0	
136.00	1,0	75	813	813	
137.00	1,6	70	1,373	2,185	
138.00	3,23	30	2,450	4,635	
139.00	4,62	27	3,929	8,564	
Elevation	Surf.Are	ea Inc	Store.	Cum.Store	
(feet)	(sq-	ft) (cubi	c-feet)	(cubic-feet)	
139.00	58	80	0	0	
140.00	2,42	28	1,504	1,504	
Device R	Routing	Invert Out	et Device	S	
#1 D	Discarded	135.00' <b>4.47</b>	0 in/hr E>	filtration over S	Surface area

**Discarded OutFlow** Max=0.09 cfs @ 13.07 hrs HW=135.53' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.09 cfs)



## Pond 6P: Rain Garden #2

 NOAA 24-hr C
 2-Year Rainfall=3.29"

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### Summary for Pond 7P: Rain Garden #3

Inflow Area =	2.268 ac, 18.06% Impervious, Inflow D	epth > 0.04" for 2-Year event
Inflow =	0.01 cfs @ 13.02 hrs, Volume=	0.007 af
Outflow =	0.01 cfs @ 13.09 hrs, Volume=	0.007 af, Atten= 1%, Lag= 4.0 min
Discarded =	0.01 cfs $\overline{@}$ 13.09 hrs, Volume=	0.007 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 135.01' @ 13.09 hrs Surf.Area= 557 sf Storage= 3 cf

Plug-Flow detention time= 4.1 min calculated for 0.007 af (99% of inflow) Center-of-Mass det. time= 2.5 min (1,042.4 - 1,039.9)

Volume	Invert	: Avail.Sto	rage Storage	e Description		
#1	135.00	7,79	94 cf Custor	n Stage Data (Pri	smatic) Listed below (Recalc)	
Elevatio (fee		urf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)		
135.0	00	554	0	0		
136.0	00	1,097	826	826		
137.0	00	1,700	1,399	2,224		
138.0	00	3,243	2,472	4,696		
138.6	60	7,084	3,098	7,794		
Device	Routing	Invert	Outlet Devic	es		
#1	Discarded	135.00'	6.130 in/hr E	Exfiltration over S	urface area	
Discourd	<b>Discourded OutFlow:</b> May-0.00 of $= 12.00$ hm $100/-125.011$ (Free Discharme)					

**Discarded OutFlow** Max=0.08 cfs @ 13.09 hrs HW=135.01' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Hydrograph Inflow Discarded 0.01 cfs 0.015 Inflow Area=2.268 a 0.014 Peak Elev=135.01' 0.013 0.012 Storage=3 cf 0.011 0.01 Flow (cfs) 0.009 0.008 0.007 0.006 0.005 0.004 0.003 0.002 0.001 0-0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 Time (hours)

## Pond 7P: Rain Garden #3

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# Summary for Pond 9P: Rain Garden #4

Inflow Area =       2.782 ac, 19.96% Impervious, Inflow Depth > 0.06" for 2-Year event         Inflow =       0.08 cfs @       12.26 hrs, Volume=       0.013 af         Outflow =       0.07 cfs @       12.33 hrs, Volume=       0.013 af, Atten= 8%, Lag= 4.4 min         Discarded =       0.07 cfs @       12.33 hrs, Volume=       0.013 af         Primary =       0.00 cfs @       0.00 hrs, Volume=       0.000 af         Routed to Pond 10P : Analysis Point #1       10       10						min
			Span= 0.00-24.0 Surf.Area= 2,809			
Center-o	of-Mass det.	time= 2.2 mir	n calculated for 0. n(951.3 - 949.1)	)	of inflow)	
Volume	Invert	Avail.Sto	rage Storage D	escription		
#1	135.00'	7,37	70 cf Custom S	tage Data (Pri	<b>smatic)</b> Listed below (Recal	c)
Elevatio (fee		urf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)		
135.0	)0	2,805	0	0		
136.0		3,669	3,237	3,237		
137.0	00	4,597	4,133	7,370		
Device Routing Invert Outlet Devices						
Device				Created Dee		action(s)
<u>Device</u> #1	Primary	136.90'	3.0° long Sharp	-Crested Rect	angular weir 2 End Contra	
	Primary Discarded	136.90' 135.00'	4.530 in/hr Exfi		angular Weir 2 End Contra Surface area	00000

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=135.00' (Free Discharge) ☐ 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

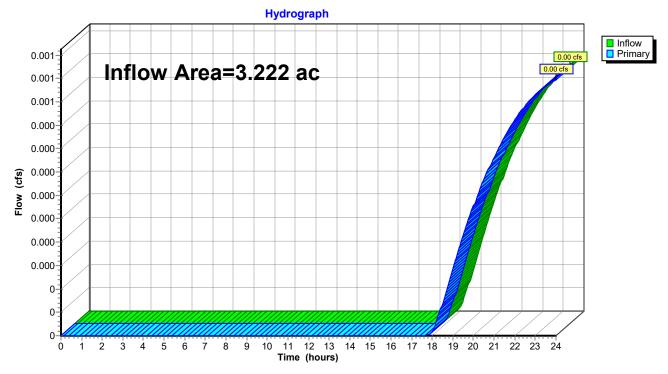
Hydrograph Inflow Outflow 0.08 cfs Inflow Area=2.782 ac Discarded Primary 0.085 Peak Elev=135.00 0.08 0.075 Storage=14 cf 0.07 0.065 0.06 0.055 0.05 (cfs) 0.045 Flov 0.04 0.035 0.03 0.025 0.02 0.015 0.01 0.0 0-1 2 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 Ś 4 5 6 7 8 Ó Time (hours)

## Pond 9P: Rain Garden #4

### Summary for Pond 10P: Analysis Point #1

Inflow Area	ı =	3.222 ac, 18.09% Impervious, Inflow Depth > 0.00" for 2-Year event	
Inflow	=	0.00 cfs @ 24.00 hrs, Volume= 0.000 af	
Primary	=	0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 m	in

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



## Pond 10P: Analysis Point #1

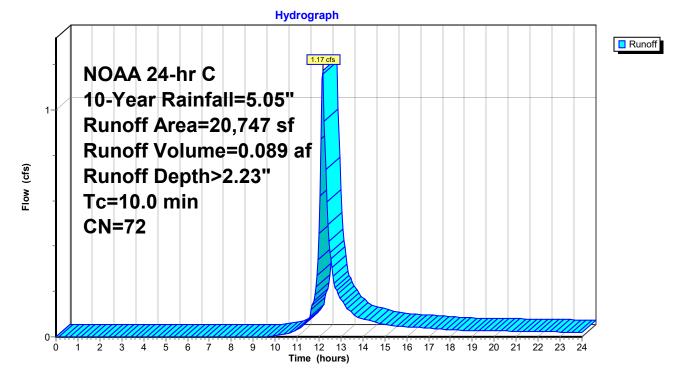
#### Summary for Subcatchment 1S: Rain Garden #1

Runoff = 1.17 cfs @ 12.18 hrs, Volume= Routed to Pond 5P : Rain Garden #1 0.089 af, Depth> 2.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description				
*	2,700	98	Roof				
*	577	98	Driveway	Driveway			
*	13,980	61	Grass B				
*	1,392	98					
*	2,098	85	gravel B				
	20,747	72	Weighted A	verage			
	16,078		77.50% Per	vious Area	l		
	4,669		22.50% Imp	22.50% Impervious Area			
	Tc Length	Slop	be Velocity	Capacity	Description		
1	0			(cfs)	Description		
	min) (feet)	(ft/	ft) (ft/sec)	(CIS)			
1	10.0				Direct Entry,		

#### Subcatchment 1S: Rain Garden #1



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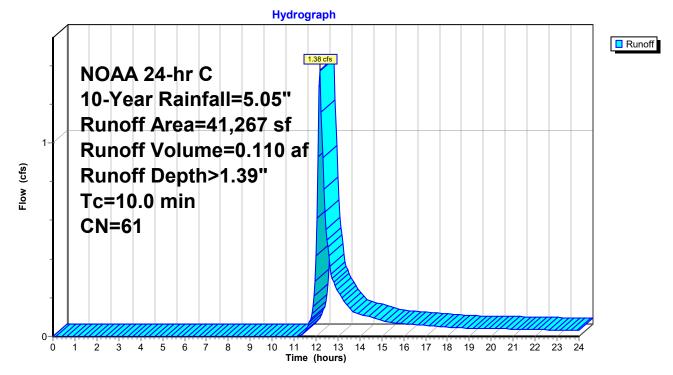
#### Summary for Subcatchment 2S: Rain Garden #2

Runoff = 1.38 cfs @ 12.19 hrs, Volume= 0.110 af, Depth> 1.39" Routed to Pond 6P : Rain Garden #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 10-Year Rainfall=5.05"

_	Area (sf)	CN	Description		
*	7,646	98			
*	21,463	61			
*	12,158	39			
	41,267 33,621 7,646		Weighted A 81.47% Pei 18.53% Imp	rvious Area	-
	Tc Lengt (min) (feet		,	Capacity (cfs)	Description
	10.0				Direct Entry,

## Subcatchment 2S: Rain Garden #2



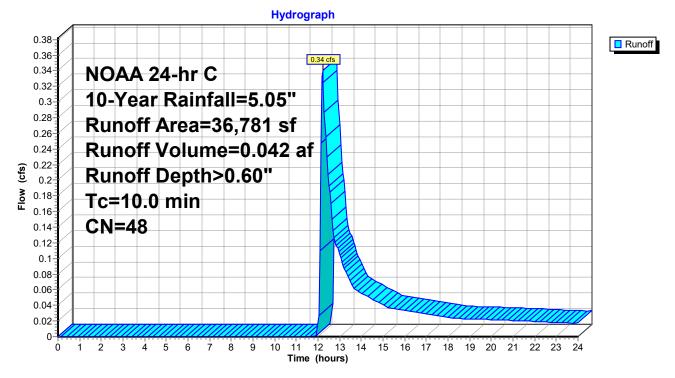
#### Summary for Subcatchment 3S: Rain Garden #3

0.34 cfs @ 12.22 hrs, Volume= 0.042 af, Depth> 0.60" Runoff = Routed to Pond 7P : Rain Garden #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 10-Year Rainfall=5.05"

	A	rea (sf)	CN	Description		
*		5,527	98			
*		31,254	39			
		36,781 31,254 5,527	48	Weighted A 84.97% Per 15.03% Imp	rvious Area	
	Tc (min)	Length (feet)	Slop (ft/ft		Capacity (cfs)	
	10.0					Direct Entry,

#### Subcatchment 3S: Rain Garden #3



### Summary for Subcatchment 4S: Rain Garden #4

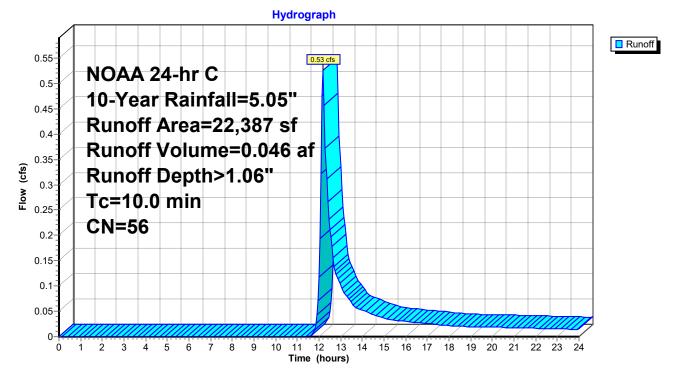
Runoff = 0.53 cfs @ 12.20 hrs, Volume= 0.04 Routed to Pond 9P : Rain Garden #4

0.046 af, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 10-Year Rainfall=5.05"

_	A	rea (sf)	CN	Description		
*		6,345	98			
*		16,042	39			
		22,387 16,042 6,345	56	Weighted A 71.66% Per 28.34% Imp	rvious Area	
	Tc (min)	Length (feet)	Slope (ft/ft		Capacity (cfs)	Description
	10.0					Direct Entry,

#### Subcatchment 4S: Rain Garden #4



#### Summary for Subcatchment 11S: Post-Developed Drainage Area #1

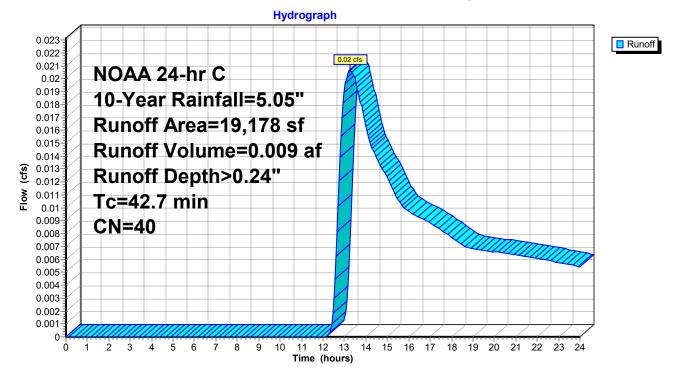
Runoff = 0.02 cfs @ 13.26 hrs, Volume= 0.009 a Routed to Pond 10P : Analysis Point #1

0.009 af, Depth> 0.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 10-Year Rainfall=5.05"

_	A	rea (sf)	CN	Description		
*		1,201	98			
*		5,225	39			
*		709	61			
		10,382	30	Woods, Go	od, HSG A	
		1,661	55	Woods, Go	od, HSG B	
		19,178	40	Weighted A	Verage	
		17,977 93.74% Pervious Area				a
		1,201		6.26% Impe	ervious Area	a
	Tc	Length	Slop		Capacity	Description
_	(min)	(feet)	(ft/ft	t) (ft/sec)	(cfs)	
	42.7					Direct Entry,

#### Subcatchment 11S: Post-Developed Drainage Area #1



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### Summary for Pond 5P: Rain Garden #1

Inflow Area =	0.476 ac, 22.50% Impervious, Inflow De	epth > 2.23" for 10-Year event
Inflow =	1.17 cfs @ 12.18 hrs, Volume=	0.089 af
Outflow =	0.07 cfs @ 14.45 hrs, Volume=	0.064 af, Atten= 94%, Lag= 136.4 min
Discarded =	0.07 cfs @ 14.45 hrs, Volume=	0.064 af

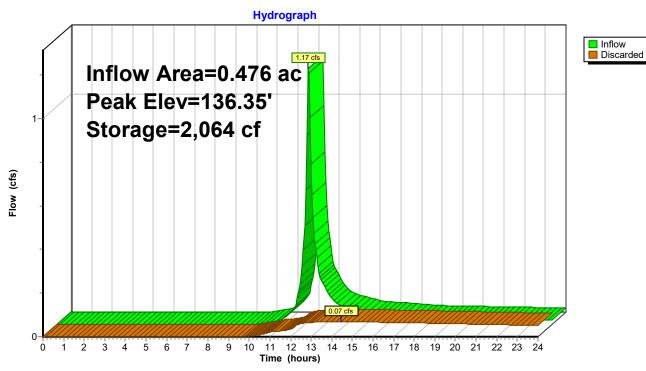
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 136.35' @ 14.45 hrs Surf.Area= 1,676 sf Storage= 2,064 cf

Plug-Flow detention time= 299.8 min calculated for 0.064 af (72% of inflow) Center-of-Mass det. time= 200.9 min (1,048.4 - 847.5)

Volume	Invert	Avail.Sto	rage Storage	e Description			
#1	134.50'	6,78	84 cf Custor	n Stage Data (Pris	smatic) Listed below (Recalc)		
Elevatio (fee		urf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)			
134.5	50	591	0	0			
135.0	00	862	363	363			
136.0	00	1,446	1,154	1,517			
136.5	50	1,774	805	2,322			
137.7	70	5,662	4,462	6,784			
Device #1	Routing Discarded	5 -		Outlet Devices 1.760 in/hr Exfiltration over Surface area			
Discard	Discarded OutFlow Max=0.07 cfs @ 14.45 hrs. HW=136.35' (Free Discharge)						

**Discarded OutFlow** Max=0.07 cfs @ 14.45 hrs HW=136.35' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.07 cfs)

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# Pond 5P: Rain Garden #1

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### Summary for Pond 6P: Rain Garden #2

Inflow Area =	1.424 ac, 19.86% Impervious, Inflow Depth > 0.9	93" for 10-Year event
Inflow =	1.38 cfs @ 12.19 hrs, Volume= 0.110 af	
Outflow =	0.16 cfs @ 13.43 hrs, Volume= 0.110 af,	Atten= 88%, Lag= 74.2 min
Discarded =	0.16 cfs @ 13.43 hrs, Volume= 0.110 af	

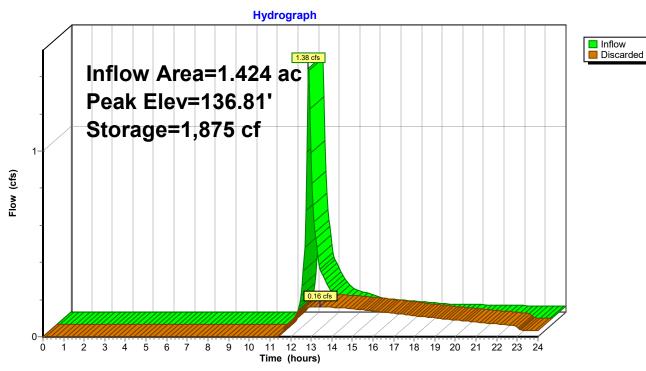
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 136.81' @ 13.43 hrs Surf.Area= 1,556 sf Storage= 1,875 cf

Plug-Flow detention time= 131.4 min calculated for 0.110 af (99% of inflow) Center-of-Mass det. time= 129.4 min (1,006.6 - 877.2)

Volume	Invert	Avail.Sto	rage Stora	age Description		
#1	135.00'	,		tom Stage Data (Prismatic) Listed below (Recalc)		
#2	139.00'	1,50	)4 cf <b>Cust</b>	tom Stage Data (Prismatic) Listed below (Recalc)		
		10,06	68 cf Tota	al Available Storage		
Elevatior	n Su	rf.Area	Inc.Store	e Cum.Store		
(feet	)	(sq-ft)	(cubic-feet)	t) (cubic-feet)		
135.00	C	550	C	0 0		
136.00	C	1,075	813	3 813		
137.00	C	1,670	1,373	3 2,185		
138.00	C	3,230	2,450	0 4,635		
139.00	C	4,627	3,929	9 8,564		
Elevatior	n Su	rf.Area	Inc.Store	e Cum.Store		
(feet	)	(sq-ft)	(cubic-feet)	t) (cubic-feet)		
139.00	C	580	C	0 0		
140.00	C	2,428		4 1,504		
Device	Routing	Invert	Outlet Dev	vices		
#1	Discarded	135.00'	4.470 in/hr Exfiltration over Surface area			

**Discarded OutFlow** Max=0.16 cfs @ 13.43 hrs HW=136.81' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.16 cfs)

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Pond 6P: Rain Garden #2

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### Summary for Pond 7P: Rain Garden #3

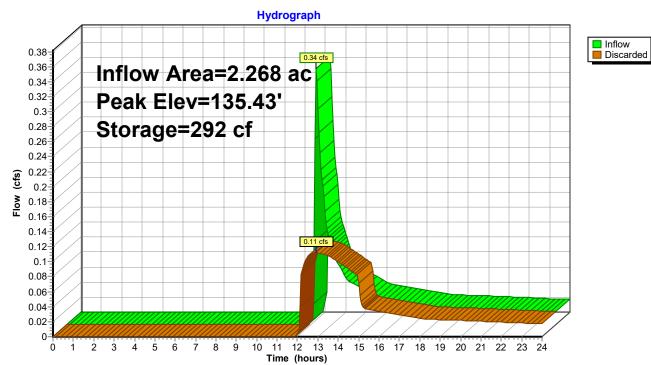
Inflow Area =	2.268 ac, 18.06% Impervious, Inflow D	epth > 0.22" for 10-Year event
Inflow =	0.34 cfs @ 12.22 hrs, Volume=	0.042 af
Outflow =	0.11 cfs @ 12.91 hrs, Volume=	0.042 af, Atten= 67%, Lag= 41.4 min
Discarded =	0.11 cfs @ 12.91 hrs, Volume=	0.042 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 135.43' @ 12.91 hrs Surf.Area= 790 sf Storage= 292 cf

Plug-Flow detention time= 19.0 min calculated for 0.042 af (100% of inflow) Center-of-Mass det. time= 17.8 min ( 948.9 - 931.2 )

Volume	Invert	Avail.Sto	rage Storag	ge Description		
#1	135.00'	7,79	94 cf Custo	m Stage Data (Pr	ismatic) Listed below (Recalc)	
Elevatio	n Sı	urf.Area	Inc.Store	Cum.Store		
(feet	t)	(sq-ft)	(cubic-feet)	(cubic-feet)		
135.0	0	554	0	0		
136.0	0	1,097	826	826		
137.0	0	1,700	1,399	2,224		
138.0	0	3,243	2,472	4,696		
138.6	0	7,084	3,098	7,794		
Device	Routing	Invert	Outlet Devi	ces		
#1	Discarded	135.00'	6.130 in/hr	Exfiltration over	Surface area	
Discorded OutElow May-0.11 of @ 12.01 hrs. LIW-125.421 (Eres Discharge)						

**Discarded OutFlow** Max=0.11 cfs @ 12.91 hrs HW=135.43' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.11 cfs)



# Pond 7P: Rain Garden #3

 NOAA 24-hr C
 10-Year Rainfall=5.05"

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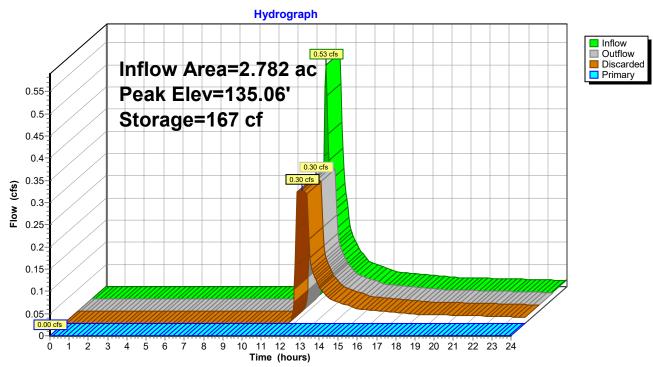
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# Summary for Pond 9P: Rain Garden #4

Inflow Outflow Discarde Primary	Inflow Area =       2.782 ac, 19.96% Impervious, Inflow Depth > 0.20" for 10-Year event         Inflow =       0.53 cfs @       12.20 hrs, Volume=       0.046 af         Outflow =       0.30 cfs @       12.36 hrs, Volume=       0.045 af, Atten= 43%, Lag= 10.1         Discarded =       0.30 cfs @       12.36 hrs, Volume=       0.045 af         Primary =       0.00 cfs @       0.00 hrs, Volume=       0.000 af         Routed to Pond 10P : Analysis Point #1       1       0.000 af					
•	Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 135.06' @ 12.36 hrs Surf.Area= 2,856 sf Storage= 167 cf					
•			calculated for ( ( 897.5 - 893.9	0.045 af (100% of inflow) 9)		
Volume	Invert	Avail.Sto	rage Storage	Description		
#1	135.00'	7,37	70 cf Custom	Stage Data (Prismatic) Listed below (Recalc)		
Elevatio	on Su	ırf.Area	Inc.Store	Cum.Store		
(fee	et)	(sq-ft)	(cubic-feet)	(cubic-feet)		
135.0	00	2,805	0	0		
136.00 3		3,669	3,237	3,237		
137.0	00	4,597	4,133	7,370		
Device	Routing	Invert	Outlet Devices	S		
#1	Primary	136.90'		rp-Crested Rectangular Weir 2 End Contraction(s)	)	
#2	Discarded	135.00'	4.530 in/hr Ex	filtration over Surface area		

**Discarded OutFlow** Max=0.30 cfs @ 12.36 hrs HW=135.06' (Free Discharge) **2=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=135.00' (Free Discharge) ☐ 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs) Prepared by Tri-State Engineering & Survey HydroCAD® 10.20-2g s/n 08696 © 2022 HydroCAD Software Solutions LLC

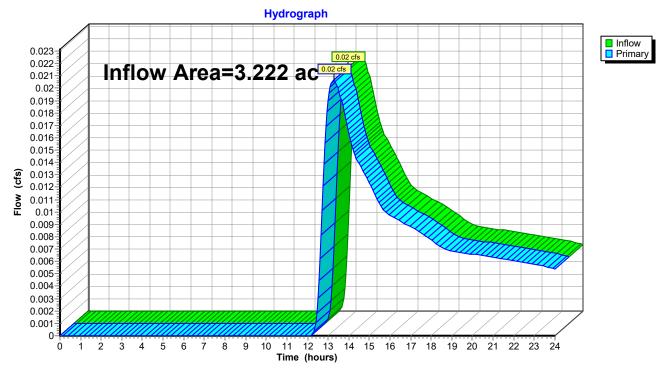


# Pond 9P: Rain Garden #4

## Summary for Pond 10P: Analysis Point #1

Inflow Area	a =	3.222 ac, 18.09% Impervious, Inflow Depth > 0.03" for 10-Year event	
Inflow	=	0.02 cfs @ 13.26 hrs, Volume= 0.009 af	
Primary	=	0.02 cfs @ 13.26 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



# Pond 10P: Analysis Point #1

### Summary for Subcatchment 1S: Rain Garden #1

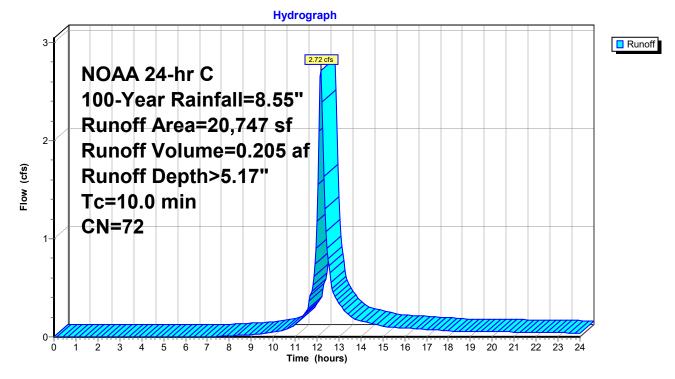
2.72 cfs @ 12.17 hrs, Volume= Runoff = Routed to Pond 5P : Rain Garden #1

0.205 af, Depth> 5.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 100-Year Rainfall=8.55"

	Area (	sf) CN	Description		
*	2,7	00 98	Roof		
*	5	77 98	Driveway		
*	13,9	80 61	Grass B		
*	1,3	92 98			
*	2,0	98 85	gravel B		
	20,7	47 72	Weighted A	Verage	
	16,0	78	77.50% Pe	rvious Area	a
	4,6	69	22.50% Im	pervious Are	rea
	<b>T</b> . I			0	
,	Tc Len		ope Velocity	Capacity	
(r	nin) (fe	eet) (f	t/ft) (ft/sec)	(cfs)	
1	10.0				Direct Entry,

#### Subcatchment 1S: Rain Garden #1



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 NOAA 24-hr C
 100-Year Rainfall=8.55"

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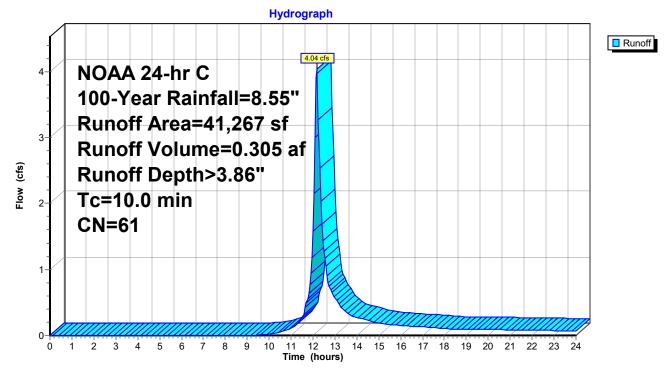
#### Summary for Subcatchment 2S: Rain Garden #2

Runoff = 4.04 cfs @ 12.18 hrs, Volume= Routed to Pond 6P : Rain Garden #2 0.305 af, Depth> 3.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 100-Year Rainfall=8.55"

	Ar	rea (sf)	CN	Description		
*		7,646	98			
*		21,463	61			
*		12,158	39			
		41,267 33,621 7,646		-	verage vious Area pervious Are	
	Tc (min)	Length (feet)	Slope (ft/ft)		Capacity (cfs)	Description
	10.0					Direct Entry,

# Subcatchment 2S: Rain Garden #2



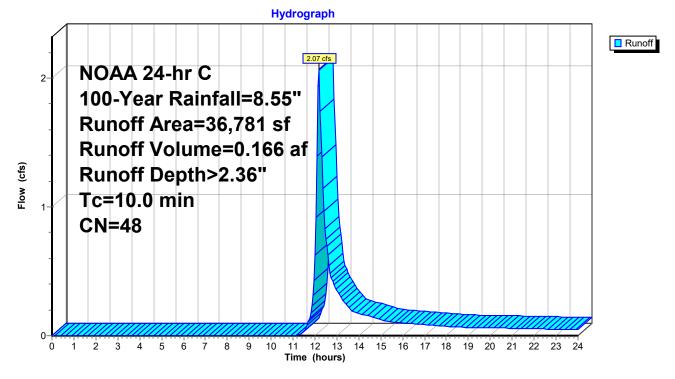
#### Summary for Subcatchment 3S: Rain Garden #3

Runoff = 2.07 cfs @ 12.19 hrs, Volume= Routed to Pond 7P : Rain Garden #3 0.166 af, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 100-Year Rainfall=8.55"

	A	rea (sf)	CN	Description		
*		5,527	98			
*		31,254	39			
		36,781 31,254 5,527	48	Weighted A 84.97% Per 15.03% Imp	rvious Area	
	Tc (min)	Length (feet)	Slop (ft/ft		Capacity (cfs)	Description
	10.0					Direct Entry,

#### Subcatchment 3S: Rain Garden #3



#### Summary for Subcatchment 4S: Rain Garden #4

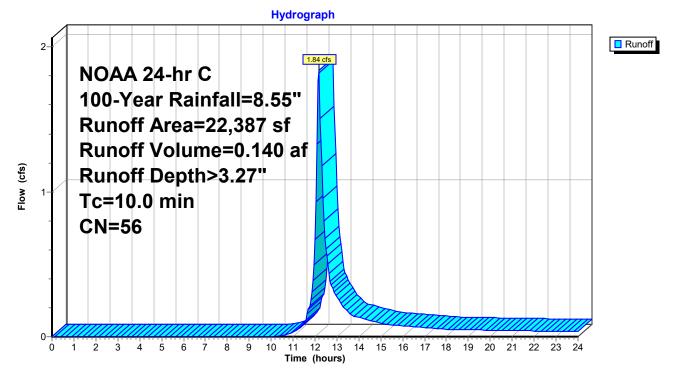
Runoff = 1.84 cfs @ 12.18 hrs, Volume= 0 Routed to Pond 9P : Rain Garden #4

0.140 af, Depth> 3.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 100-Year Rainfall=8.55"

	Area	(sf) (	CN D	<b>Description</b>		
*	6,3	345	98			
*	16,0	)42	39			
	22,3	387	56 V	Veighted A	verage	
	16,0	)42	7	1.66% Per	vious Area	l
	6,3	845	2	8.34% Imp	pervious Are	ea
	Tc Le	ngth	Slope	Velocity	Capacity	Description
(r	nin) (1	eet)	(ft/ft)	(ft/sec)	(cfs)	
1	10.0					Direct Entry,
						-

#### Subcatchment 4S: Rain Garden #4



#### Summary for Subcatchment 11S: Post-Developed Drainage Area #1

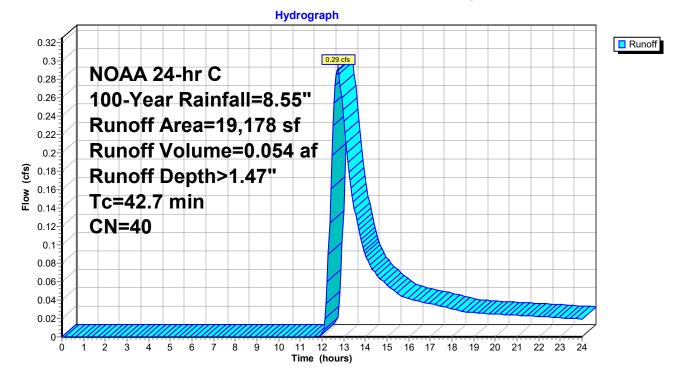
Runoff = 0.29 cfs @ 12.72 hrs, Volume= Routed to Pond 10P : Analysis Point #1

0.054 af, Depth> 1.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 100-Year Rainfall=8.55"

_	A	rea (sf)	CN	Description		
*		1,201	98			
*		5,225	39			
*		709	61			
		10,382	30	Woods, Go	od, HSG A	N
_		1,661	55	Woods, Go	od, HSG B	3
		19,178	40	Weighted A	verage	
		17,977		93.74% Pe	rvious Area	3
		1,201		6.26% Impe	ervious Area	a
	Тс	Length	Slop		Capacity	Description
_	(min)	(feet)	(ft/f	t) (ft/sec)	(cfs)	
	42.7					Direct Entry,

#### Subcatchment 11S: Post-Developed Drainage Area #1



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## Summary for Pond 5P: Rain Garden #1

Inflow Area =	0.476 ac, 22.50% Impervious, Inflow D	epth > 5.17" for 100-Year event
Inflow =	2.72 cfs @ 12.17 hrs, Volume=	0.205 af
Outflow =	0.18 cfs @ 13.67 hrs, Volume=	0.149 af, Atten= 93%, Lag= 90.0 min
Discarded =	0.18 cfs @ 13.67 hrs, Volume=	0.149 af

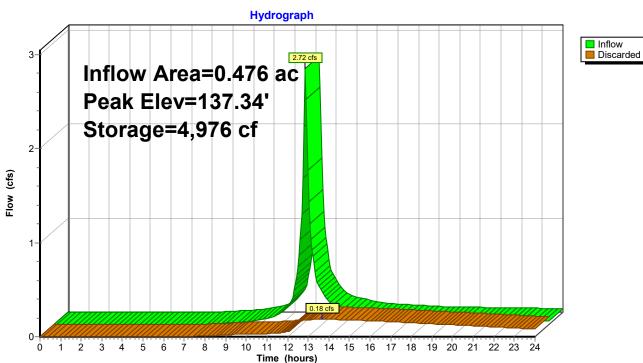
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 137.34' @ 13.67 hrs Surf.Area= 4,511 sf Storage= 4,976 cf

Plug-Flow detention time= 285.8 min calculated for 0.149 af (72% of inflow) Center-of-Mass det. time= 192.1 min (1,015.3 - 823.2)

Volume	Invert	Avail.Sto	rage Storage	e Description		
#1	134.50'	6,78	B4 cf Custor	m Stage Data (Prismatic) Listed below (Recalc)		
Elevatio (fee		urf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)		
134.5	0	591	0	0		
135.0	0	862	363	363		
136.0	0	1,446	1,154	1,517		
136.5	0	1,774	805	2,322		
137.7	0	5,662	4,462	6,784		
Device #1	Routing Discarded	Invert 134.50'	Outlet Devic	ces Exfiltration over Surface area		
	<b>Discarded OutFlow</b> Max=0.18 cfs @ 13.67 hrs. HW=137.34' (Free Discharge)					

**Discarded OutFlow** Max=0.18 cfs @ 13.67 hrs HW=137.34' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.18 cfs)

#### 23-105 Stormwater POST RG 1-4 Prepared by Tri-State Engineering & Survey



Pond 5P: Rain Garden #1

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## Summary for Pond 6P: Rain Garden #2

Inflow Area =	1.424 ac, 19.86% Impervious, Inflow D	epth > 2.57" for 100-Year event
Inflow =	4.04 cfs @ 12.18 hrs, Volume=	0.305 af
Outflow =	0.40 cfs @ 13.38 hrs, Volume=	0.275 af, Atten= 90%, Lag= 71.9 min
Discarded =	0.40 cfs @ 13.38 hrs, Volume=	0.275 af

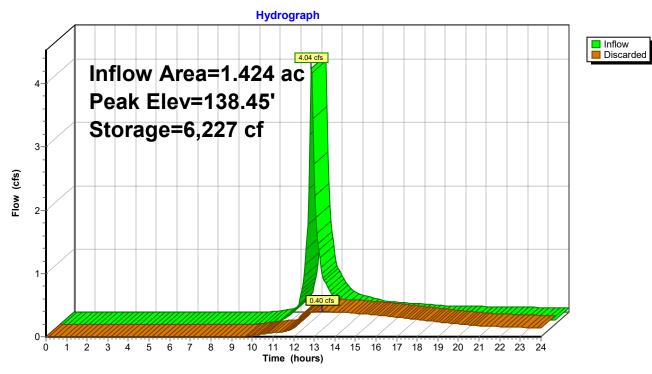
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 138.45' @ 13.38 hrs Surf.Area= 3,858 sf Storage= 6,227 cf

Plug-Flow detention time= 204.2 min calculated for 0.274 af (90% of inflow) Center-of-Mass det. time= 155.7 min (1,001.7 - 846.0)

Volume	Invert Ava	ail.Storage Sto	prage Description
#1	135.00'	8,564 cf <b>Cu</b>	istom Stage Data (Prismatic) Listed below (Recalc)
#2	139.00'		stom Stage Data (Prismatic) Listed below (Recalc)
		10,068 cf To	tal Available Storage
Elevation	Surf.Area		-
(feet)	(sq-ft)	(cubic-fee	et) (cubic-feet)
135.00	550		0 0
136.00	1,075	8	13 813
137.00	1,670		73 2,185
138.00	3,230	· · · ·	
139.00	4,627	· · · ·	
	.,•=-	0,01	
Elevation	Surf.Area	Inc.Sto	ore Cum.Store
(feet)	(sq-ft)	(cubic-fee	et) (cubic-feet)
139.00	580		0 0
140.00	2,428		04 1,504
	, -	) -	,
Device Ro	outing I	nvert Outlet D	Devices
#1 Di	iscarded 13	5.00' <b>4.470 in</b>	/hr Exfiltration over Surface area

**Discarded OutFlow** Max=0.40 cfs @ 13.38 hrs HW=138.45' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.40 cfs)

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# Pond 6P: Rain Garden #2

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## Summary for Pond 7P: Rain Garden #3

Inflow Area =	2.268 ac, 18.06% Impervious, Inflow De	epth > 0.88" for 100-Year event
Inflow =	2.07 cfs @ 12.19 hrs, Volume=	0.166 af
Outflow =	0.29 cfs @ 13.19 hrs, Volume=	0.166 af, Atten= 86%, Lag= 60.2 min
Discarded =	0.29 cfs @ 13.19 hrs, Volume=	0.166 af

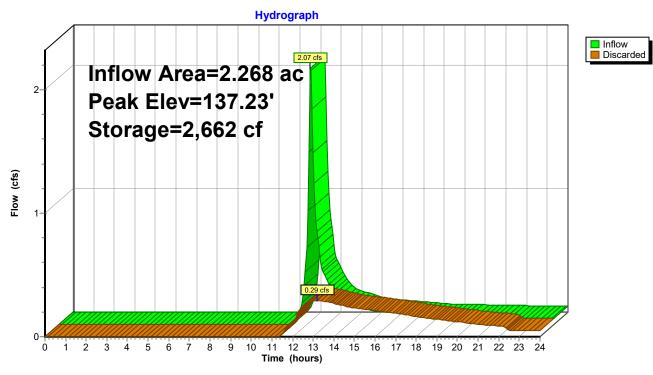
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 137.23' @ 13.19 hrs Surf.Area= 2,059 sf Storage= 2,662 cf

Plug-Flow detention time= 108.6 min calculated for 0.165 af (100% of inflow) Center-of-Mass det. time= 107.4 min (984.7 - 877.3)

Volume	Invert	Avail.Sto	rage Storage	e Description	
#1	135.00'	7,79	94 cf Custor	n Stage Data (Pris	matic) Listed below (Recalc)
Elevatio (fee		urf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	
135.0	00	554	0	0	
136.0	00	1,097	826	826	
137.0	00	1,700	1,399	2,224	
138.0	00	3,243	2,472	4,696	
138.6	30	7,084	3,098	7,794	
Device	Routing	Invert	Outlet Devic	es	
#1	Discarded	135.00'	6.130 in/hr E	Exfiltration over Su	urface area
Discord	ad OutFlow		a @ 12 10 hra		

**Discarded OutFlow** Max=0.29 cfs @ 13.19 hrs HW=137.23' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.29 cfs)

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# Pond 7P: Rain Garden #3

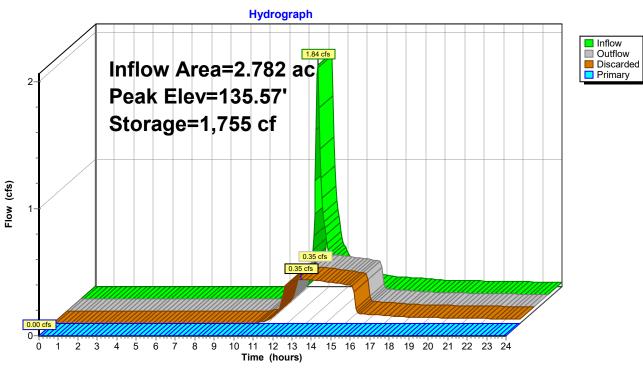
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# Summary for Pond 9P: Rain Garden #4

Inflow Are Inflow Outflow Discarde Primary Route	= ( d = ( = (	1.84 cfs @ 1 0.35 cfs @ 1 0.35 cfs @ 1	96% Impervious 2.18 hrs, Volum 2.77 hrs, Volum 2.77 hrs, Volum 0.00 hrs, Volum Point #1	e= 0.1 e= 0.1 e= 0.1	40 af	100-Year event 31%, Lag= 35.3 min
			Span= 0.00-24.0 Surf.Area= 3,30			
	Plug-Flow detention time= 38.0 min calculated for 0.140 af (100% of inflow) Center-of-Mass det. time= 37.3 min ( 894.3 - 857.0 )					
Volume	Invert	t Avail.Sto	rage Storage D	Description		
#1	135.00	7,37	70 cf Custom S	Stage Data (Pr	r <b>ismatic)</b> Listed	below (Recalc)
Elevation (feet		urf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)		
135.0	0	2,805	0	0		
136.0	0	3,669	3,237	3,237		
137.0	0	4,597	4,133	7,370		
Device	Routing	Invert	Outlet Devices			
#1	Primary	136.90'	3.0' long Sharı 4.530 in/hr Exf			2 End Contraction(s)
#2	Discarded	135.00'	4.550 III/III EXI		Surface area	

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=135.00' (Free Discharge) ☐ 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

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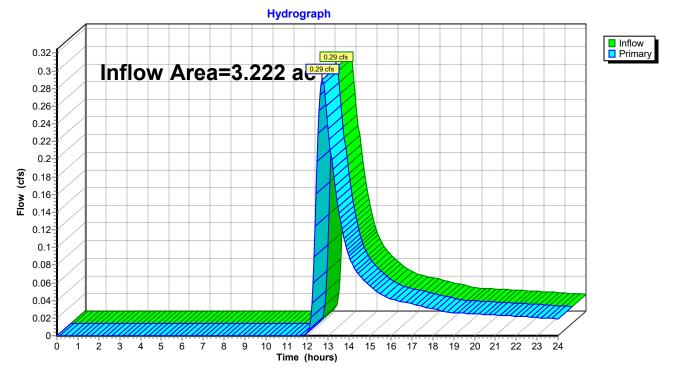


# Pond 9P: Rain Garden #4

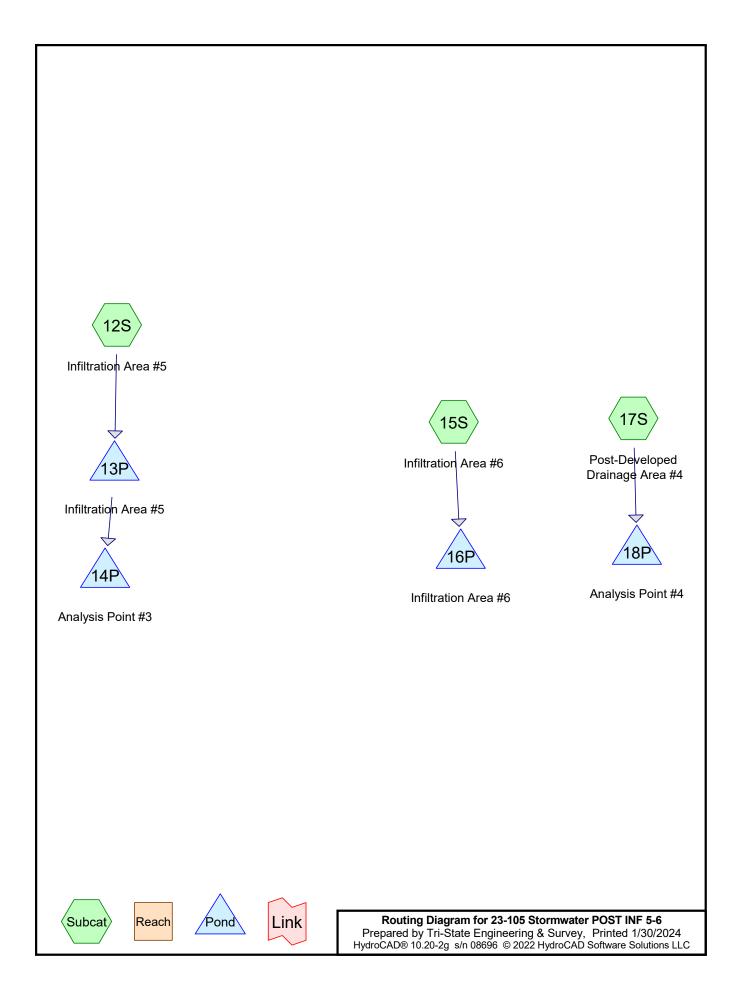
## Summary for Pond 10P: Analysis Point #1

Inflow Area =	3.222 ac,	18.09% Impervious,	Inflow Depth > (	0.20" for 100-Year event
Inflow =	0.29 cfs @	12.72 hrs, Volume	= 0.054 a	f
Primary =	0.29 cfs @	12.72 hrs, Volume	= 0.054 a	f, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



# Pond 10P: Analysis Point #1



# 23-105 Stormwater POST INF 5-6

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# Area Listing (all nodes)

Area	CN	Description
(acres)		(subcatchment-numbers)
0.152	98	(12S, 15S)
0.107	61	(12S)
0.131	39	>75% Grass cover, Good, HSG A (12S, 15S)
0.046	61	>75% Grass cover, Good, HSG B (17S)
0.058	85	Gravel roads, HSG B (12S)
0.180	55	Woods, Good, HSG B (17S)

# 23-105 Stormwater POST INF 5-6

# Soil Listing (all nodes)

Area	Soil	Subcatchment
(acres)	Group	Numbers
0.131	HSG A	12S, 15S
0.283	HSG B	12S, 17S
0.000	HSG C	
0.000	HSG D	
0.259	Other	12S, 15S

# 23-105 Stormwater POST INF 5-6

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HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchme Numbers
0.000	0.000	0.000	0.000	0.259	0.259		12S,
							15S
0.131	0.046	0.000	0.000	0.000	0.177	>75% Grass cover, Good	12S,
							15S,
							17S
0.000	0.058	0.000	0.000	0.000	0.058	Gravel roads	12S
0.000	0.180	0.000	0.000	0.000	0.180	Woods, Good	17S

## Ground Covers (all nodes)

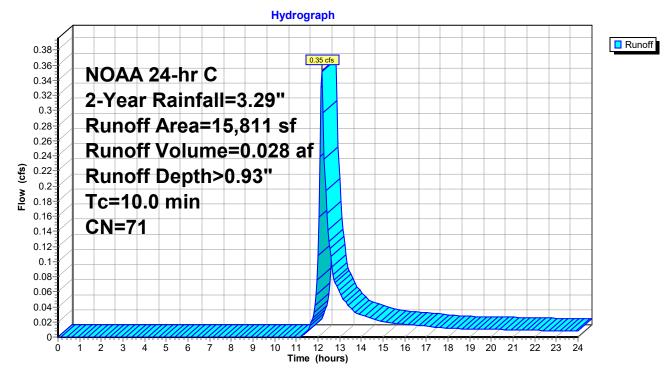
# Summary for Subcatchment 12S: Infiltration Area #5

Runoff = 0.35 cfs @ 12.19 hrs, Volume= 0.028 af, Depth> 0.93" Routed to Pond 13P : Infiltration Area #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 2-Year Rainfall=3.29"

	A	rea (sf)	CN	Description				
*		4,951	98					
		3,698	39	>75% Gras	s cover, Go	ood, HSG A		
*		4,655	61					
		2,507	85	Gravel road	ls, HSG B			
		15,811	71	Weighted A	verage			
		10,860		68.69% Pervious Area				
		4,951		31.31% lm	rea			
	То	Longth	Slop	- Volocity	Conosity	Description		
1	Tc	Length	Slope		Capacity			
	nin)	(feet)	(ft/ft	) (ft/sec)	(cfs)			
1	0.0					Direct Entry,		

## Subcatchment 12S: Infiltration Area #5



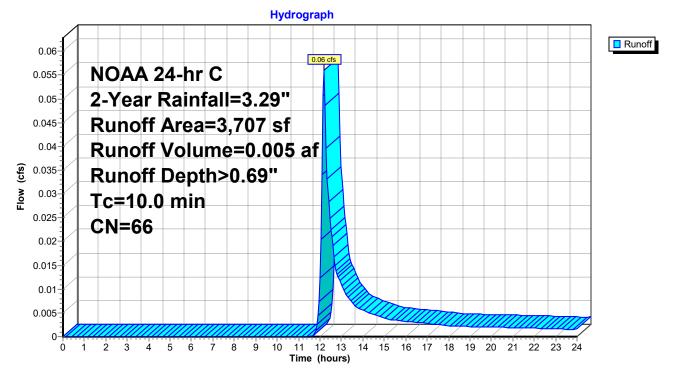
# Summary for Subcatchment 15S: Infiltration Area #6

Runoff = 0.06 cfs @ 12.20 hrs, Volume= 0.005 af, Depth> 0.69" Routed to Pond 16P : Infiltration Area #6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 2-Year Rainfall=3.29"

	Ar	ea (sf)	CN	Description		
*		1,683	98			
		2,024	39	>75% Gras	s cover, Go	ood, HSG A
		3,707	66	Weighted A	verage	
		2,024		54.60% Pe	vious Area	а
		1,683		45.40% Imp	pervious Ar	rea
(r	Tc min)	Length (feet)	Slop (ft/fl	,	Capacity (cfs)	Description
1	10.0					Direct Entry,

#### Subcatchment 15S: Infiltration Area #6



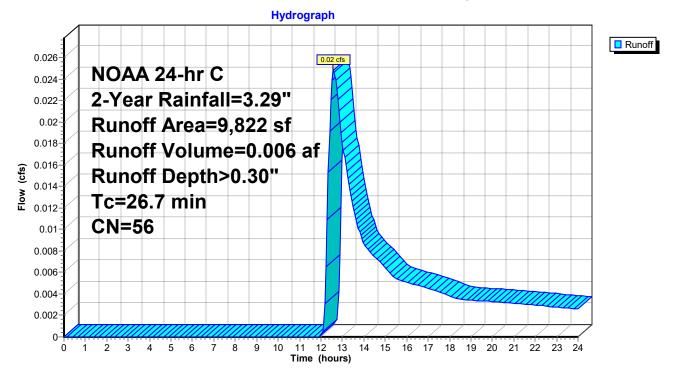
## Summary for Subcatchment 17S: Post-Developed Drainage Area #4

Runoff = 0.02 cfs @ 12.58 hrs, Volume= 0.006 af, Depth> 0.30" Routed to Pond 18P : Analysis Point #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 2-Year Rainfall=3.29"

A	rea (sf)	CN	Description		
	7,839	55	Woods, Go	od, HSG B	
	1,983	61	>75% Gras	s cover, Go	pod, HSG B
	9,822	56	Weighted A	verage	
	9,822		100.00% P	ervious Are	a
_					
Tc	Length	Slope	e Velocity	Capacity	Description
(min)	(feet)	(ft/ft	) (ft/sec)	(cfs)	
26.7					Direct Entry,
					•

#### Subcatchment 17S: Post-Developed Drainage Area #4



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# Summary for Pond 13P: Infiltration Area #5

Inflow Area = 0	.363 ac, 31.31% Impervious, Inflow [	Depth > 0.93" for 2-Year event				
Inflow $=$ 0.	.35 cfs @ 12.19 hrs, Volume=	0.028 af				
Outflow = 0.	.10 cfs @ 12.64 hrs, Volume=	0.028 af, Atten= 73%, Lag= 27.1 min				
Discarded = 0.	.10 cfs @_12.64 hrs, Volume=	0.028 af				
Primary = 0.	.00 cfs @ 0.00 hrs, Volume=	0.000 af				
Routed to Pond 14P : Analysis Point #3						
Routing by Stor-Ind method, Time Span= 0.00-24.00 brs. dt= 0.05 brs						

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 136.39' @ 12.64 hrs Surf.Area= 979 sf Storage= 287 cf

Plug-Flow detention time= 23.4 min calculated for 0.028 af (100% of inflow) Center-of-Mass det. time= 22.7 min ( 898.5 - 875.8 )

Volume	Invert	Avail.Sto	rage Storage D	escription		
#1	136.00'	4,3	10 cf Custom S	tage Data (Pri	smatic) Listed below (Recalc)	
Elevatio (fee		ırf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)		
136.0	00	500	0	0		
137.0	00	1,734	1,117	1,117		
138.0	00	4,651	3,193	4,310		
Device	Routing	Invert	Outlet Devices			
#1	Primary	137.80'	20.0' long Shar	p-Crested Rec	ctangular Weir 2 End Contraction(s)	
#2	Discarded	136.00'	4.224 in/hr Exfi	Itration over S	Surface area	
<b>Discarded OutFlow</b> Max=0.10 cfs @ 12.64 hrs HW=136.39' (Free Discharge)						

**2=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=136.00' (Free Discharge) ☐ 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

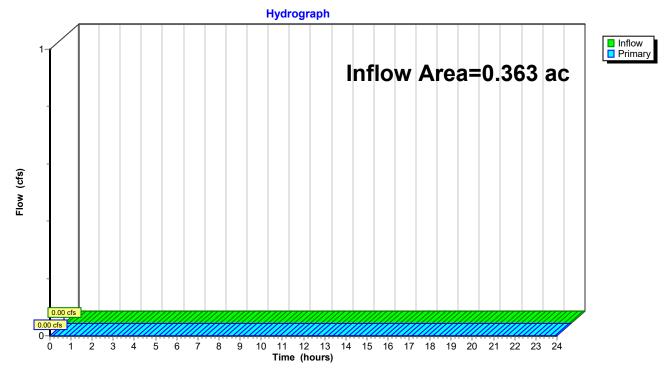
Hydrograph Inflow 0.35 cfs Outflow Discarded Inflow Area=0.363 ac Primary 0.38 Peak Elev=136.39' 0.36 0.34 Storage=287 cf 0.32 0.3 0.28 0.26 0.24 (s) 0.24 0.2 0.2 0.18 0.16 0.16-0.10 cfs 0.14-0.12-0.1 0.08 0.06 0.04 0. 0.0 0 1 2 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 Ś 4 5 6 Ż 8 Ó Time (hours)

# Pond 13P: Infiltration Area #5

## Summary for Pond 14P: Analysis Point #3

Inflow Area =	0.363 ac, 3	1.31% Impervious, Inflov	v  Depth = 0.00"	for 2-Year event
Inflow =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	
Primary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af, Atte	en= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



# Pond 14P: Analysis Point #3

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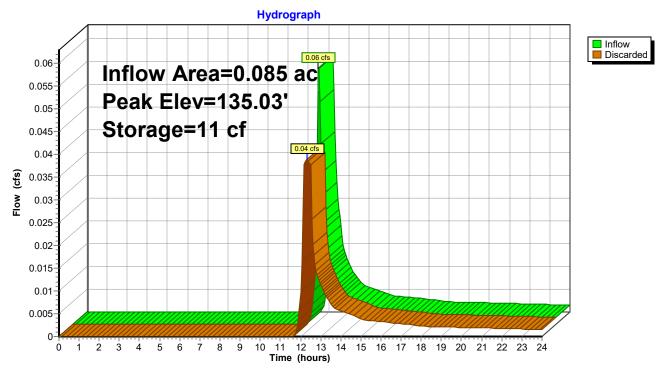
# Summary for Pond 16P: Infiltration Area #6

Inflow Area = Inflow = Outflow = Discarded =	0.06 cfs @ ´ 0.04 cfs @ ´	5.40% Impervious 12.20 hrs, Volum 12.31 hrs, Volum 12.31 hrs, Volum	e= 0.005 at e= 0.005 at	f, Atten= 31%, Lag= 6.9 min			
• •	Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 135.03' @ 12.31 hrs Surf.Area= 369 sf Storage= 11 cf						
U U	ntion time= 2.0 mi s det. time= 1.7 mi		.005 af (100% of in )	flow)			
Volume	nvert Avail.Ste	orage Storage D	Description				
#1 13	35.00' 6	645 cf Custom S	Stage Data (Prisma	atic) Listed below (Recalc)			
Elevation	Surf.Area	Inc.Store	Cum.Store				
(feet)	(sq-ft)	(cubic-feet)	(cubic-feet)				
135.00	352	0	0				
155.00	552						
136.00	938	645	645				

#1 Discarded 135.00' **4.530 in/hr Exfiltration over Surface area** 

**Discarded OutFlow** Max=0.04 cfs @ 12.31 hrs HW=135.03' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.04 cfs)

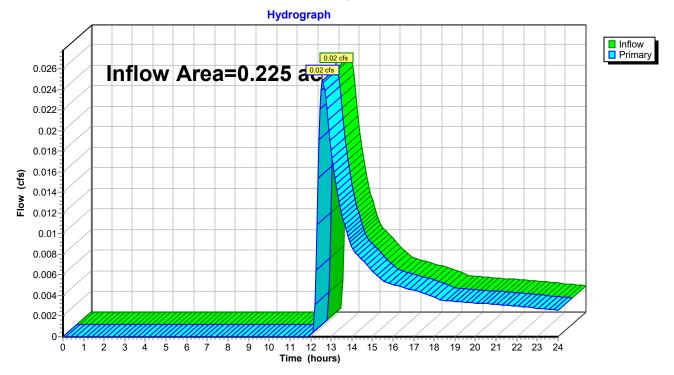
# Pond 16P: Infiltration Area #6



## Summary for Pond 18P: Analysis Point #4

Inflow Area	=	0.225 ac,	0.00% Impervious,	Inflow Depth >	0.30"	for 2-Year event
Inflow :	=	0.02 cfs @	12.58 hrs, Volum	e= 0.006	af	
Primary :	=	0.02 cfs @	12.58 hrs, Volum	e= 0.006	af, Atte	en= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



# Pond 18P: Analysis Point #4

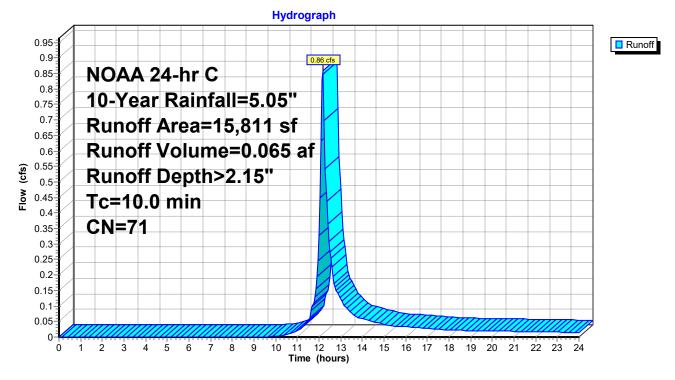
#### Summary for Subcatchment 12S: Infiltration Area #5

Runoff = 0.86 cfs @ 12.18 hrs, Volume= 0.065 af, Depth> 2.15" Routed to Pond 13P : Infiltration Area #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 10-Year Rainfall=5.05"

	A	rea (sf)	CN	Description					
*		4,951	98						
		3,698	39	>75% Gras	s cover, Go	ood, HSG A			
*		4,655	61						
		2,507	85	Gravel road	ls, HSG B				
		15,811	71	Weighted Average					
		10,860		68.69% Pe	vious Area	3			
		4,951		31.31% Impervious Area					
	-		~		<b>A</b>				
	Tc	Length	Slop	,	Capacity	Description			
(	min)	(feet)	(ft/ft	) (ft/sec)	(cfs)				
	10.0					Direct Entry,			

## Subcatchment 12S: Infiltration Area #5



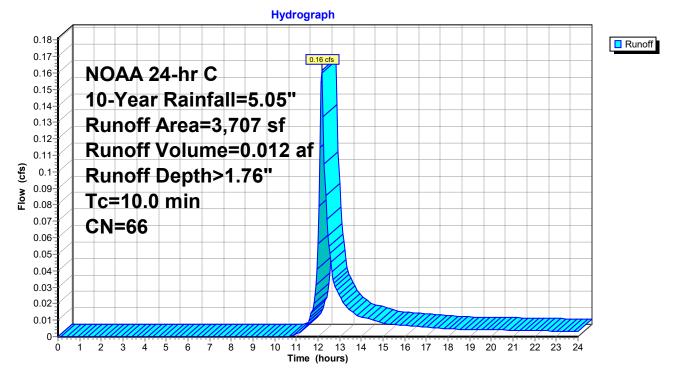
## Summary for Subcatchment 15S: Infiltration Area #6

Runoff = 0.16 cfs @ 12.18 hrs, Volume= 0.012 af, Depth> 1.76" Routed to Pond 16P : Infiltration Area #6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 10-Year Rainfall=5.05"

	Area (sf)	CN	Description					
*	1,683	98						
	2,024	39	>75% Gras	s cover, Go	lood, HSG A			
	3,707	66	Weighted Average					
	2,024		54.60% Pervious Area					
	1,683		45.40% Imp	pervious Ar	rea			
T (mir	c Length n) (feet)	Slope (ft/ft	,	Capacity (cfs)	1			
10.	0				Direct Entry,			

# Subcatchment 15S: Infiltration Area #6



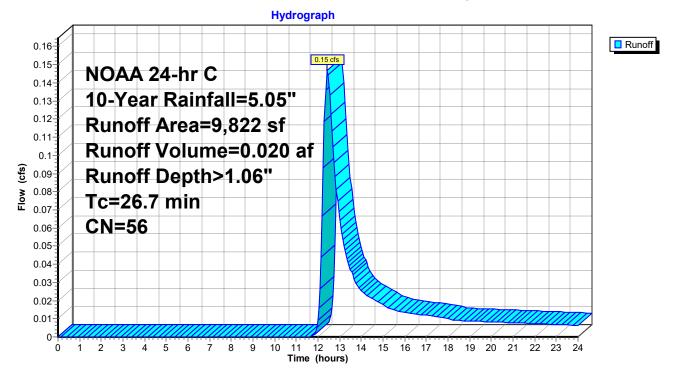
#### Summary for Subcatchment 17S: Post-Developed Drainage Area #4

Runoff = 0.15 cfs @ 12.44 hrs, Volume= 0.020 af, Depth> 1.06" Routed to Pond 18P : Analysis Point #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 10-Year Rainfall=5.05"

A	rea (sf)	CN	Description				
	7,839	55	Woods, Go	od, HSG B			
	1,983	61	>75% Gras	s cover, Go	bod, HSG B		
	9,822	56	Weighted Average				
	9,822		100.00% Pervious Area				
_							
Tc	Length	Slope	e Velocity	Capacity	Description		
(min)	(feet)	(ft/ft	) (ft/sec)	(cfs)			
26.7					Direct Entry,		
					• *		

# Subcatchment 17S: Post-Developed Drainage Area #4



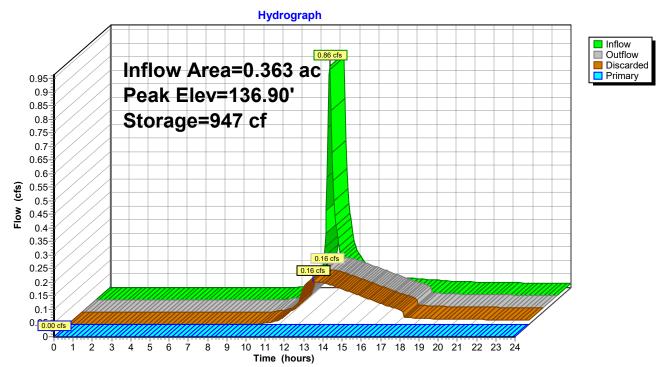
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# Summary for Pond 13P: Infiltration Area #5

Inflow Ar Inflow Outflow Discarde Primary Route	= 0 = 0 = 0 = 0	).86 cfs @ 12 ).16 cfs @ 12 ).16 cfs @ 12	2.18 hrs, Volum 2.77 hrs, Volum 2.77 hrs, Volum 0.00 hrs, Volum	e= 0.065 af e= 0.065 af	, Atten= 82%,	
				00 hrs, dt= 0.05 hrs 8 sf Storage= 947		
			in calculated for in ( 905.4 - 850.0	0.065 af (100% of ir ))	nflow)	
Volume	Invert	Avail.Stor	rage Storage D	Description		
#1	136.00'	4,31	10 cf Custom S	Stage Data (Prisma	tic) Listed below	w (Recalc)
Elevatio	n Si	urf.Area	Inc.Store	Cum.Store		
(feet		(sq-ft)	(cubic-feet)	(cubic-feet)		
136.0	0	500	0	0		
137.0	0	1,734	1,117	1,117		
138.0	0	4,651	3,193	4,310		
Device	Routing	Invert	Outlet Devices			
#1	Primary	137.80'	20.0' long Sha	rp-Crested Rectang	gular Weir 2 E	nd Contraction(s)
#2			4.224 in/hr Exf			

**Discarded OutFlow** Max=0.16 cfs @ 12.77 hrs HW=136.90' (Free Discharge) **2=Exfiltration** (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=136.00' (Free Discharge) ☐ 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

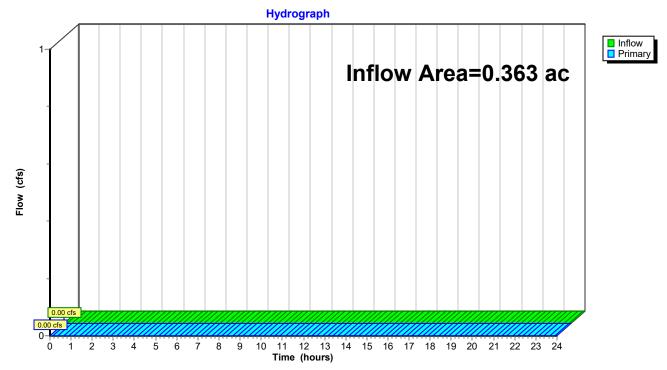


# Pond 13P: Infiltration Area #5

## Summary for Pond 14P: Analysis Point #3

Inflow Area =	0.363 ac, 3	1.31% Impervious, Inflo	w Depth = 0.00"	for 10-Year event
Inflow =	0.00 cfs @	0.00 hrs, Volume=	0.000 af	
Primary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af, Atte	en= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



# Pond 14P: Analysis Point #3

136.00

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## Summary for Pond 16P: Infiltration Area #6

Inflow Area = Inflow =				Depth > 1.76 0.012 af	6" for 10-Year event		
Outflow =	0.05 cfs @	,		0.012 af, <i>i</i>	Atten= 68%, Lag= 20.7 m	in	
Discarded =	0.05 cfs @	12.53 hrs,	Volume=	0.012 af			
	Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 135.25' @ 12.53 hrs Surf.Area= 497 sf Storage= 105 cf						
Ŷ	Plug-Flow detention time= 13.2 min calculated for 0.012 af (100% of inflow) Center-of-Mass det. time= 12.9 min ( 875.9 - 863.0 )						
Volume	Invert Avail.S	storage Sto	orage Descriptio	on			
#1 13	35.00'	645 cf Cu	istom Stage Da	ta (Prismatio	<b>;)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Inc.Sto (cubic-fe					
135.00	352		0	0			

Device	Routing	Invert	Outlet Devices
#1	Discarded	135.00'	4.530 in/hr Exfiltration over Surface area

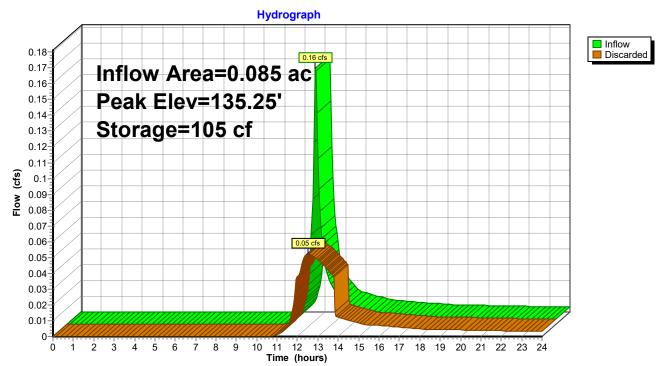
645

938

**Discarded OutFlow** Max=0.05 cfs @ 12.53 hrs HW=135.25' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.05 cfs)

# Pond 16P: Infiltration Area #6

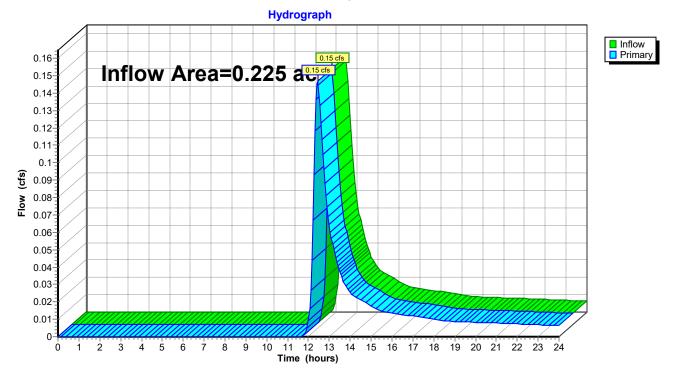
645



#### Summary for Pond 18P: Analysis Point #4

Inflow Area	a =	0.225 ac,	0.00% Impervious, Inf	low Depth > 1.06"	for 10-Year event
Inflow	=	0.15 cfs @	12.44 hrs, Volume=	0.020 af	
Primary	=	0.15 cfs @	12.44 hrs, Volume=	0.020 af, Atte	en= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



## Pond 18P: Analysis Point #4

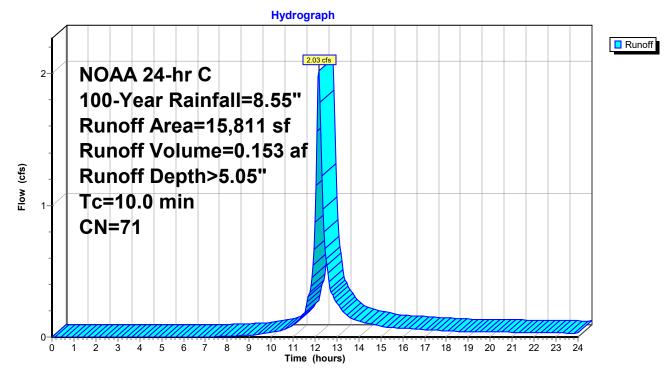
#### Summary for Subcatchment 12S: Infiltration Area #5

Runoff = 2.03 cfs @ 12.17 hrs, Volume= 0.153 af, Depth> 5.05" Routed to Pond 13P : Infiltration Area #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 100-Year Rainfall=8.55"

	A	rea (sf)	CN	Description			
*		4,951	98				
		3,698	39	>75% Gras	s cover, Go	ood, HSG A	
*		4,655	61				
		2,507	85	Gravel road	ls, HSG B		
		15,811	71	Weighted Average			
		10,860		68.69% Pe	rvious Area	а	
		4,951		31.31% lm	pervious Ar	rea	
	То	Longth	Slop	- Volocity	Conosity	Description	
1	Tc	Length	Slope		Capacity		
	nin)	(feet)	(ft/ft	) (ft/sec)	(cfs)		
1	0.0					Direct Entry,	

#### Subcatchment 12S: Infiltration Area #5



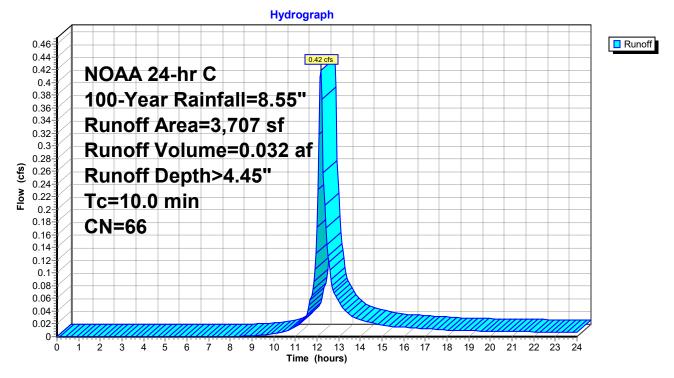
#### Summary for Subcatchment 15S: Infiltration Area #6

Runoff = 0.42 cfs @ 12.18 hrs, Volume= 0.032 af, Depth> 4.45" Routed to Pond 16P : Infiltration Area #6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 100-Year Rainfall=8.55"

	Area (sf)	CN	Description			
*	1,683	98				
	2,024	39	>75% Gras	s cover, Go	ood, HSG A	
	3,707	66	Weighted A	verage		
	2,024		54.60% Per	vious Area	3	
	1,683		45.40% Impervious Area			
- (mi	Гс Length n) (feet)	Slop (ft/f	,	Capacity (cfs)	Description	
10	.0				Direct Entry,	

#### Subcatchment 15S: Infiltration Area #6

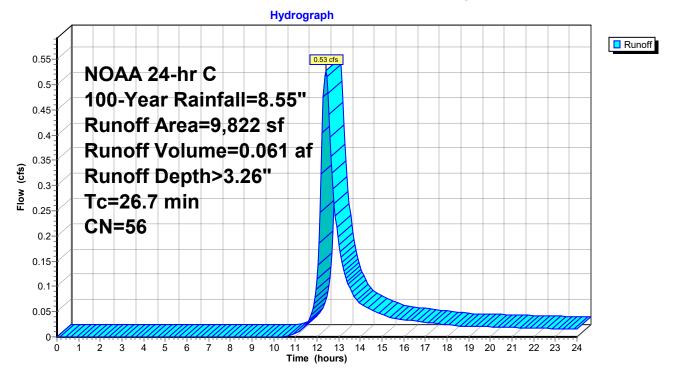


0.53 cfs @ 12.40 hrs, Volume= 0.061 af, Depth> 3.26" Runoff = Routed to Pond 18P : Analysis Point #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs NOAA 24-hr C 100-Year Rainfall=8.55"

A	rea (sf)	CN	Description		
	7,839	55	Woods, Go	od, HSG B	3
	1,983	61	>75% Gras	s cover, Go	ood, HSG B
	9,822	56	Weighted A	verage	
	9,822		100.00% Pe	ervious Are	28
_					
Тс	Length	Slope	,	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
26.7					Direct Entry,
					•

## Subcatchment 17S: Post-Developed Drainage Area #4



Printed 1/30/2024

## Summary for Pond 13P: Infiltration Area #5

Inflow Area = Inflow =		31.31% Impervious, Inflo 12.17 hrs, Volume=	w Depth > 5.05" for 100-Year event 0.153 af			
Outflow =	0.34 cfs @	12.76 hrs, Volume=	0.153 af, Atten= 83%, Lag= 35.2 min			
Discarded =	0.34 cfs @	12.76 hrs, Volume=	0.153 af			
Primary =	0.00 cfs @	0.00 hrs, Volume=	0.000 af			
Routed to Pond 14P : Analysis Point #3						
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs Peak Elev= 137.58' @ 12.76 hrs Surf.Area= 3,428 sf Storage= 2,616 cf						

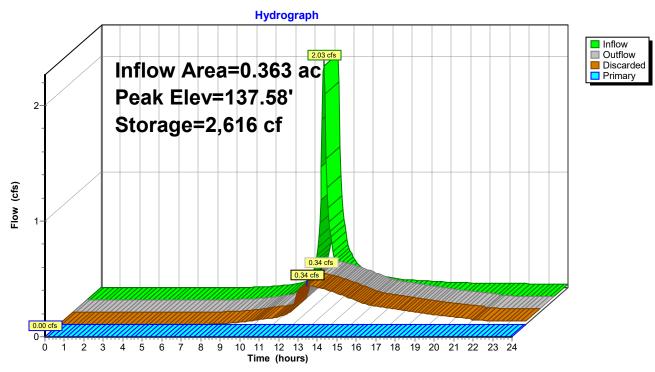
Plug-Flow detention time= 89.6 min calculated for 0.153 af (100% of inflow) Center-of-Mass det. time= 89.1 min (914.4 - 825.3)

Volume	Invert	Avail.Sto	rage Storage D	escription	
#1	136.00'	4,3	10 cf Custom S	tage Data (P	rismatic) Listed below (Recalc)
Elevatio (fee		ırf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	
136.0	0	500	0	0	
137.0	0	1,734	1,117	1,117	
138.0	0	4,651	3,193	4,310	
Device	Routing	Invert	Outlet Devices		
#1	Primary	137.80'	20.0' long Shar	p-Crested Re	ectangular Weir 2 End Contraction(s)
#2	Discarded	136.00'	4.224 in/hr Exfi	Itration over	Surface area
<b>Discarded OutFlow</b> Max=0.34 cfs @ 12.76 hrs HW=137.58' (Free Discharge)					

**2=Exfiltration** (Exfiltration Controls 0.34 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=136.00' (Free Discharge) ☐ 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

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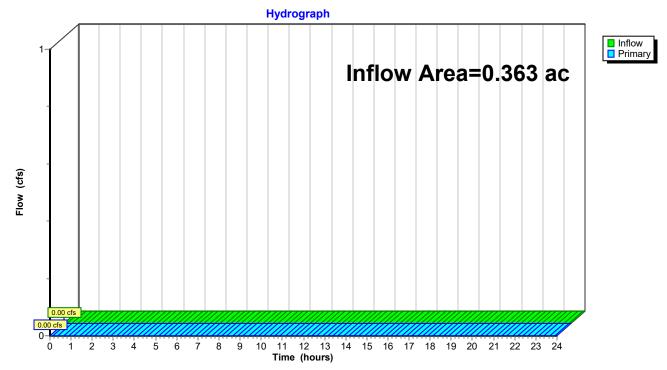


## Pond 13P: Infiltration Area #5

#### Summary for Pond 14P: Analysis Point #3

Inflow Area	a =	0.363 ac, 3	1.31% Impervious,	Inflow Depth =	0.00"	for 100-Year event
Inflow	=	0.00 cfs @	0.00 hrs, Volume	= 0.000	af	
Primary	=	0.00 cfs @	0.00 hrs, Volume	= 0.000	af, Atte	en= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



## Pond 14P: Analysis Point #3

23-105 Stormwater POST INF 5-6

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## Summary for Pond 16P: Infiltration Area #6

Inflow Area =	0.085 ac, 45.40% Impervious, In	flow Depth > 4.45" for 100-Year event				
Inflow =	0.42 cfs @ 12.18 hrs, Volume=	0.032 af				
Outflow =	0.08 cfs @ 12.68 hrs, Volume=	0.032 af, Atten= 80%, Lag= 30.4 min				
Discarded =	0.08 cfs @ 12.68 hrs, Volume=	0.032 af				
-						
Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs						

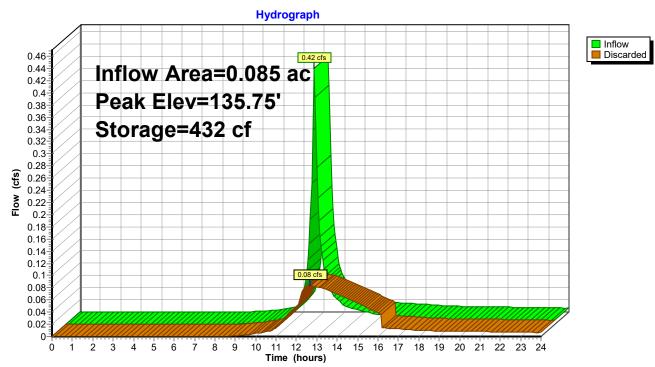
Peak Elev= 135.75' @ 12.68 hrs Surf.Area= 794 sf Storage= 432 cf

Plug-Flow detention time= 43.0 min calculated for 0.032 af (100% of inflow) Center-of-Mass det. time= 42.7 min ( 878.3 - 835.6 )

Volume	Invert	Avail.Sto	rage S	ge Storage Description		
#1	135.00'	64	45 cf <b>C</b>	Custom St	tage Data (Pri	smatic) Listed below (Recalc)
Elevation (feet)	Su	f.Area (sq-ft)	Inc.S (cubic-f		Cum.Store (cubic-feet)	
135.00 136.00		352 938		0 645	0 645	
-	outing	Invert	• • • • • •	Devices		
#1 D	iscarded	135.00'	4.530	in/hr Exfil	tration over S	Surface area

**Discarded OutFlow** Max=0.08 cfs @ 12.68 hrs HW=135.75' (Free Discharge) **1=Exfiltration** (Exfiltration Controls 0.08 cfs)

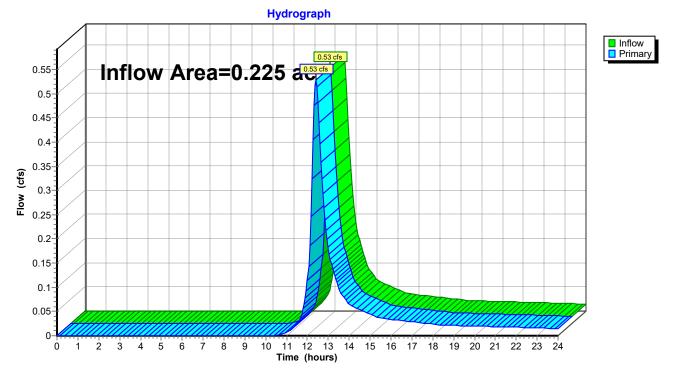
## Pond 16P: Infiltration Area #6



#### Summary for Pond 18P: Analysis Point #4

Inflow Area =	0.225 ac,	0.00% Impervious, Inflo	ow Depth > 3.26"	for 100-Year event
Inflow =	0.53 cfs @	12.40 hrs, Volume=	0.061 af	
Primary =	0.53 cfs @	12.40 hrs, Volume=	0.061 af, Atte	en= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



## Pond 18P: Analysis Point #4

# **III. SOIL REPORT**

	GLO APPLICATION FOR PERMIT TO	UCESTER COUNTY	DEPARTMENT OF HEAL	TH .	*
•	APPLICATION SHALL BE SUBI	WITTED ELECTRON	ICALLY TO CHE FOR OF	Contract of the second second second	AGE
	Septic PAYMENT SHALL	Reviews@cmeusa1.co	m and jalexander@cmeusa1.	VIEW BY DESIGN ENGI	NEER
		NS MUST BE SCHE	SCHD (CHECK OR MONE DULED VIA EMAIL: GCHE	Y ORDER ONLY)	
		Block			
1_Log Numb	erTP1 Method (Check One):	XProfile	Pit Boring		
Existing Grad 2. Soil Log	le Elevation:				
Depth Structure:	Munsel Color Name and Sy	mbol; Estimated Tex	ctural Class; (inches) Estim	ated Volume % Correct	enternantis of Personalis
Top-Bottom	Moist or Dry Consistence; N	Aottling-Abundance	e, Size and Contrast. If Pres		regiment, it Present;
0"-12" 1	0YR 4/3 Sandy loam, Sub-angul				
	7.5YR 6/4 fine Loamy sand, Sub				
31" – 44"	7.5YR 6/6 Sandy clay loam, Sub-	angular blocky	, slightly Firm		
	7.5YR 6/6 Sandy clay loam, Ang			Tavel	
	7.5YR 5/4 Sandy clay loam, Ang with Common, Medium, Distinc	ular blocky. Fu	m (HR)		÷
95" – 107	7.5YR 5/4 Sandy clay loam, An		the second s	% mairel	
	1" 7.5YR 5/4 Sandy loam, Sub-an				
	)" 7.5YR 7/2 fine Loamy sand, Si			• • • • .	
	uin yn de fan skin yn nigenifie genyf frys de an an de fan yn ar yn a	injenijemu načili kilo sime na stavaji i di		efti égi kur ki kan jégangangan kangangan kangangangan kang kang	nya na mana mana mana mana mana mana man
				* .	
	ter Observations:		н 		
Seepage-Indic Pit /Boring Flo	ate Depth N/E ioded-Depth after	* Europe and			
		Hours	• • •		
Fractured Roc	3 Zones (Check Appropriate Categories): k Substratum - Depth to Top	:			
Excessively Co	Substratum - Depth to Top arse Horizon - Depth Top to Bottom				
Excessively Co	arse Substratum - Depth to Top				
Hydraulically I Hydraulically I	Restrictive Harizon - Depth Top to Bottom Restrictive Substratum - Depth to Top	44" - 95"			
Perched Zone	of Saturation - Depth Top to Bottom				
Regional Zone	of Saturation - Depth to Top	86"			
5. Soll Suitabili	ity Classification: IIIHR		•	,	
6. I hereby cer the Water Poll	tify that the information furnished on Form ution Control Act (N.J.S.A. S8: IOA-I et seq.) a	2b of this application and is subject to pen	n is true and accurate. I an alties as prescribed in N.L.	aware that faisification A.C. 7: 14-8.	of data is a violation of
Signature of Si Date			• • •		
( <del>                             </del>					
Signature of Pr	ofessional Engineer	the second s	License # <u>6</u> E2	8106	, . 

	PLICATION FOR PERMIT TO CONSTRUM D PLICATION SHALL BE SUBMITTED ELEC	ASPOSAL SYSTEM CTRONICALLY TO C usel com and <u>jalexande</u> ED TO GCHD (CHEC) SCHEDULEN VIA FI	N INDIVIDUAL SUBSURFACE SEWAGE ME FOR REVIEW BY DESIGN ENGINEER <u>Informations from</u> (OR MONEY ORDER ONLY) Wally COMPARTMENSAL COM
Form 2b - Soil Log and Inte	pretation: Lot 1	Block143	-
1. Log NumberTP2	Method (Check One):xx	Profile Pit	Boring
Existing Grade Elevation:	<del>an an a</del>		
2. Soil Log Depth Structure: Top-Bottom	Munsel Color Name and Symbol; Estima Moist or Dry Consistence; Mottling-Aba	·	nches) Estimated Volume % Coarse Fragment, If Present; ntrast, if Present
0" – 11" 10YR 4/3 S	andy loam, Sub-angular blocky,	, Friable	
11" - 50" 7.5YR 6/4	Sandy clay loam, Sub-angular l	olocky, Friable,	with 10% gravel
50" – 71" 7.5YR 6/6	Sandy clay loam, Angular block	ky, Firm (HR) w	ith 30% gravel
71" – 93" 7.5YR 6/6	Sandy loam, Sub-angular block mon, Medium, Distinct 5YR 5/	y, Friable, with	40% gravel
93" – 144" 7.5YR 7/	3 fine Loamy sand, Angular blo	cky, Friable	www.com/goality will for the line of the fill and an and an and an and an and an and and
3. Ground Water Observati Seepage-Indicate Dej Pit /Boring Flooded-Depth	nth N/E	rs	
Hydraulically Restrictive Sul	- Depth to Top Depth to Top - Depth Top to Bottom um - Depth to Top rizon - Depth Top to Bottom 50" - 7 Sstratum - Depth to Top	71, <sup>#</sup>	
Perched Zone of Saturation Regional Zone of Saturation	- Depth to Top 87"		
5. Soil Suitability Classificati 6. I hereby certify that the I the Water Pollution Contro	·	pplication is true and ct to penalties as pre	accurate. I am aware that faisification of data is a violation of scribed in N.I.A.C. 7: 14-8.
Signature of Site Evaluator Date10/13/2	23	1	
Senature of Professional Fr		: F îns	AF28106

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	APPLICATION FOR PERMIT TO APPLICATION SHALL BE SUBM Septic PAYMENT SHALL B ONSITE INSPECTION	DISPOSAL SYS ITTED ELECTRONICALLY eviews@cmeusa1.com and jab E SUBMTTED TO GCHD (C	AIR AN INDIVIDUAL SUBSURI TEM TO CME FOR REVIEW BY DE <u>exander@cmeusal.com</u> :HECK OR MONEY ORDER OF UA EMAIL: GCHD@CMEUSA1	SIGN ENGINEER ILY)
Form 2b - Soil Log and	Interpretation: Lot	1 Block143_	in agentation of the second	
1. Log NumberTP	3 Method (Check One):	xxProfile Pit	Boring	
Existing Grade Elevation	Mt.			
2. Soil Log Depth Structure: Top-Bottom	Munsel Color Name and Sy Moist or Dry Consistence; M			% Coarse Fragment, If Present;
0" - 14" 10YR 4	/3 Sandy loam, Sub-angula	ar blocky, Friable		
14" - 59" 7.5YR	6/4 Sandy clay loam, Sub	-angular blocky, Fria	ble, with 10% gravel	
59" – 68" 7.5YR	7/2 fine Loamy sand, Sing	gle grain, Loose, with	15% gravel	
	5/4 Sandy loam, Sub-ang			
with (	R 5/8 Sandy clay loam, Su Common, Medium, Distind /R 5/8 Sandy loam, Sub-au	et 5YR 5/6 mottles @	9, 85"	
3. Ground Water Obse Seepage-Indicate Pit /Boring FloodedL	Depth N/E	Hours	na kina na sina na sina na kina kina na na na sina kina dari na kina na na na sina di kina dari na kina na na Na sina na sina na n	ninita a sandalina yén yén yenen ngi nanisi nanisi nanisi nanisi na pangapapanén yén yén yén yén yén yén yén y
4. Soil Limiting Zones i Fractured Rock Substr Massive Rock Substra Excessively Coarse Ho Excessively Coarse Sul Hydraulically Restricti Hydraulically Restricti	(Check Appropriate Categories): atum - Depth to Top tum - Depth to Top rizon - Depth Top to Bottom ostratum - Depth to Top ve Horizon - Depth Top to Bottom ve Substratum - Depth to Top ration - Depth Top to Bottom	85 <sup>7</sup>		
S. Soil Suitability Class	iffication:			
6. I hereby certify that the Water Pollution C Signature of Site Evalu Date10,	ontrol Act (N.J.S.A. 58: 10A-1 et seq uator	m 2b of this application is to .) and is subject to penaltie: 	ue and accurate. I am aware th s as prescribed in N.I.A.C. 7: I4-1	at faisification of data is a violation of 3.
· · · · · · · · · · · · · · · · · · ·		~ ~		1

Signature of Professional Engineer\_\_\_\_

License # 6E28106

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GLOUCESTER COUNTY DEPAR APPLICATION FOR PERMIT TO CONSTRUCTAL TER/REI	AIR AN INDIVIDUAL SUBSURFACE SEWAGE
DISPOSAL SYS APPLICATION SHALL BE SUBMITTED ELECTRONICALLY	TO CME FOR REVIEW BY DESIGN ENGINEED
SepticReviews@cmeosil.com and te PAYMENT SHALL BE SUBMITED TO GCHD ( ONSITE INSPECTIONS MUST BE SCHEDULED	CHECK OR MONEY OPPER ONLY
MUNICIPALITYEik Twp	VIA EMAIL: GCHD@CMEUSA1.COM
Form 2b - Soil Log and Interpretation: Lot Block143	www.iffition.gag
1. Log NumberTP4 Method (Check One):xx Profile Pit	Boring
Existing Grade Elevation:	
2. Soil Log Depth Munsel Color Name and Symbol: Estimated Textural C	lass; (inches) Estimated Volume % Coarse Fragment, If Present;
Structure: Top-Bottom Moist or Dry Consistence; Mottling-Abundance, Size a	
0"-7" 10YR 4/3 Sandy loam, Sub-angular blocky, Friable	
7" - 29" 7.5YR 6/4 Sandy loam, Sub-angular blocky, Friable	
29"-42" 7.5YR 6/4 Sandy clay loam, Sub-angular blocky, Fria	ble
42"-60" 7.5YR 6/6 Loamy sand, Sub-angular blocky, Friable,	with 10% gravel
60" - 87" 7.5YR 5/4 Sandy loam, Sub-angular blocky, Friable, with Common, Medium, Distinct 5YR 5/6 mottles @	with 25% gravel ) 84"
87" - 105" 7.5YR 7/3 fine Loamy sand, Angular blocky, Friable	e, with 25% gravel
105" - 125" 7.5YR 7/3 fine Loamy sand, Single grain, Loose	
125" - 150" 7.5YR 7/1 fine Sand, Single grain, Loose	
ana itan pada pada ing manang mpang pang pang pang pang pang pang pang	n se
3. Ground Water Observations: Seepage-Indicate Depth N/E	
Pit /Boring FloodedDepth afterHours	
4. Soil Limiting Zones (Check Appropriate Categories):	
Fractured Rock Substratum - Depth to Top Massive Rock Substratum - Depth to Top	
Excessively Coarse Horizon - Depth Top to Bottom Excessively Coarse Substratum - Depth to Top	
Hydraulically Restrictive Horizon - Depth Top to Bottom	
Hydraulically Restrictive Substratum - Depth to Top Perched Zone of Saturation - Depth Top to Bottom	
Regional Zone of Saturation - Depth to Top 84"	
5. Soil Suitability Classification:	•
6. I hereby certify that the information furnished on Form 2b of this application is tri the Water Pollution Control Act (NJ.S.A. 58: IOA-I et seq.) and is subject to penalties	ue and accurate. I am aware that falsification of data is a violation of as prescribed in N.J.A.C. 7: I4-8.
Signature of Site Evaluator	
Date10/13/2023	t Ca Diala
Signature of Professional Engineer	License # GE28106

Subtleteriosystemets Loom and JuleanderGenness Loom           Partern SakaL.I.         Descharter Schulz Loom           Porm 2b - Soil Log and Interpretation:         Log Number	APPL		MIT TO CO SUBMITT	ONSTR	DISPOSAL ECTRONIC	VREPAIL SYSTEL	R AN INDIVIDUAL SUBSURFACE SEWAGE M ) CME FOR REVIEW BY DESIGN ENGINEER
<ul> <li>Lag NumberTF5Method (Check One):xx Profile Pit Boring</li> <li>Existing Grade Elevation:</li></ul>		ONSITE INSPE	HALL BE S	SUBMT	TED TO GC BE SCHEDU	HD (CHE	ECK OR MONEY ORDER ONLY)
<ul> <li>Skilling Grade Elevation:</li></ul>	orm 2b - Soil Log and Interp	retation:	Lot	\$	Block	_143	
<ul> <li>2. Soft Log</li> <li>Dept</li> <li>Munsel Color Name and Symbol; Estimated Textural Class; [inches] Estimated Volume &amp; Coarse Fragment, if Present</li> <li>Win Classes</li> <li>Win Set or Dry Consistence: Motiling-Abundance, Size and Contrast, if Present</li> <li>0" - 8" 10YR 4/3 Sandy loam, Sub-angular blocky, Friable</li> <li>8" - 21" 7.5YR 6/4 Sandy loam, Sub-angular blocky, Friable</li> <li>21" - 37" 7.5YR 7/2 Loamy sand, Sub-angular blocky, Friable</li> <li>21" - 37" 7.5YR 7/2 Loamy sand, Sub-angular blocky, Friable</li> <li>21" - 77" 7.5YR 5/8 Sandy clay loam, Angular blocky, Slightly Firm, with 15% gravel</li> <li>77" - 97" 7.5YR 5/4 Sandy clay loam, Sub-angular blocky, slightly Firm, with 25% gravel</li> <li>with Common, Medium, Distinct 5YR 5/6 montles @ 82"</li> <li>97" - 117" 7.5YR 6/4 fine Loamy sand, Sub-angular blocky, Friable</li> <li>117" - 144" 7.5YR 7/1 fine Sand, Single grain, Loose</li> <li>3. Ground Water Observations:</li> <li>Seegage-indicate Depth N/E</li> <li>Morison Constitution - Depth to Top</li> <li>Messive Kods Substratum - Depth to Top</li> <li>Messive Kods Substratum - Depth to Top</li> <li>Messive Coarse Substratum - Depth to Top</li> <li>Megional Zone of Saturation - Depth Top to Bottom</li> <li>Kensalve Coarse Substratum - Depth to Top</li> <li>Megional Zone of Saturation - Depth Top to Bottom</li> <li>Kensalve Coarse Substratum - Depth to Top</li> <li>Saturation - Depth Top to Bottom</li> <li>Kensalve Coarse Substratum - Depth to Top</li> <li>Saturation - Depth Top to Bottom</li> <li>Kensalve Coarse Substratum - Depth to Top</li> <li>Saturation - Depth Top to Bottom</li> <li>Kensalve Coarse Substratum - Depth to Top</li> <li>Saturation - Depth Top to Bottom</li> <li>Kensalve Coarse Substratum - Depth to Top</li> <li>Saturation - Depth Top to Bottom</li> <li>Kensalve Coarse Substratum - Depth to Top</li> <li>Saturation - Depth Top to Bottom</li> <li>Saturation - Depth Top to Bottom</li> <li>Saturation - Depth Top to Bottom</li> <li>Kensalve Coarse Substratum - Depth t</li></ul>	1. Log NumberTPS	Method (Check Or	ie):	XX.	Profile Pit		Boring
Munsel Color Name and Symbol; Estimated Textural Class; (inches) Estimated Volume % Coarse Fragment, if Present;         Top-Bottom       Moist or Dry Consistence: MottlingAbundance, Size and Contrast, if Present;         D" - 8" 10YR 4/3 Sandy loam, Sub-angular blocky, Friable       Bit of Dry Consistence: MottlingAbundance, Size and Contrast, if Present;         D" - 3" 7.5YR 6/4 Sandy loam, Sub-angular blocky, Friable       Bit of Dry Consistence: MottlingAbundance, Size and Contrast, if Present;         21" - 37" 7.5YR 7/2 Loamy sand, Sub-angular blocky, Friable       Bit of Dry Consistence: MottlingAbundance, Size and Contrast, if Present;         37" - 77" 7.5YR 5/8 Sandy clay loam, Angular blocky, Friable       Bit of Dry Consistence: MottlingAbundance, Size and Contrast, if Present;         37" - 77" 7.5YR 5/8 Sandy clay loam, Angular blocky, Friable       Bit of Common, Medium, Distinct 5YR 5/6 mottles @ 82"         97" - 117" 7.5YR 5/4 fine Loamy sand, Sub-angular blocky, Friable       Bit of Common, Medium, Distinct 5YR 5/6 mottles @ 82"         97" - 117" 7.5YR 6/4 fine Loamy sand, Sub-angular blocky, Friable       Bit of Common, Medium, Distinct 5YR 5/6 mottles @ 82"         3. Ground Water Observatione:       Mours       Mours         4. Soll Uniting Zones (Check Appropriate Categories):       Mours         4. Soll Uniting Zones (Check Appropriate Categories):       Mours         4. Soll Uniting Zones (Substratum - Depth to Top       Bit of Top Bit of Top         Massure Rolzan Longen & Substratum - Depth to To	xisting Grade Elevation:		÷				
<ul> <li>Moist or Dry Consistence: Mottling-Abundance, Size and Contrast, if Present</li> <li>" - 8" 10YR 4/3 Sandy loam, Sub-angular blocky, Friable</li> <li>3" - 21" 7.5YR 6/4 Sandy loam, Sub-angular blocky, Friable</li> <li>21" - 37" 7.5YR 7/2 Loainy sand, Sub-angular blocky, Friable</li> <li>21" - 77" 7.5YR 5/8 Sandy clay loam, Angular blocky, Sriable</li> <li>27" - 77" 7.5YR 5/8 Sandy clay loam, Angular blocky, slightly Firm, with 15% gravel</li> <li>77" - 97" 7.5YR 5/4 Sandy clay loam, Sub-angular blocky, slightly Firm, with 25% gravel</li> <li>77" - 97" 7.5YR 5/4 Sandy clay loam, Sub-angular blocky, slightly Firm, with 25% gravel</li> <li>77" - 117" 7.5YR 5/4 Sandy clay loam, Sub-angular blocky, Friable</li> <li>8. Forumt Water Observations:</li> <li>Seepage-Indicate Depth N/č</li> <li>*** (Zorund Water Observations:</li> <li>Seepage-Indicate Depth N/č</li> <li>*** (Zorund Water Observations:</li> <li>Seepage-Indicate Depth N/č</li> <li>**** 7.5YR 7/1 fine Sand, Single grain, Loose</li> <li>3. Ground Water Observations:</li> <li>Seepage-Indicate Depth N/č</li> <li>************************************</li></ul>		Munsel Color Name	and Symb	ol: Esti	mated Texts	urai Class	: linchest Estimated Volume % Coarse Fragment, if Present
<ul> <li>y" - 8" 10YR 4/3 Sandy loam, Sub-angular blocky, Friable</li> <li>S" - 21" 7.5YR 6/4 Sandy loam, Sub-angular blocky, Friable</li> <li>21" - 37" 7.5YR 7/2 Loamy sand, Sub-angular blocky, Friable</li> <li>21" - 77" 7.5YR 5/8 Sandy clay loam, Angular blocky, slightly Firm, with 15% gravel</li> <li>27" - 77" 7.5YR 5/4 Sandy clay loam, Sub-angular blocky, slightly Firm, with 15% gravel</li> <li>27" - 97" 7.5YR 5/4 Sandy clay loam, Sub-angular blocky, slightly Firm, with 25% gravel</li> <li>with Common, Medium, Distinct SYR 5/6 mottles @ 82"</li> <li>27" - 117" 7.5YR 6/4 fine Loamy sand, Sub-angular blocky, Friable</li> <li>217" - 117" 7.5YR 7/1 fine Sand, Single grain, Loose</li> <li>3. Ground Water Observations:</li> <li>Seepage-indicate Depth N/E</li> <li>Mours</li> <li>3. Ground Water Observations:</li> <li>Seepage-indicate Depth N/E</li> <li>Mours</li> <li>4. Soft unting zones (theck Appropriate Categories):</li> <li>Fractured fock Substratum - Depth to Top</li> <li>Mours</li> <li>4. Substratum - Depth to Top</li> <li>Mours</li> <li>4. Soft unting zones (block Appropriate Categories):</li> <li>Fractured fock Substratum - Depth to Top</li> <li>Mours</li> <li>5. Soil Suitability Classification:</li> <li>1</li> <li>5. I hereby cartify that the information furnished on form 2b of this application is true and accurate. I am aware that falsification of data is a violat file Water Follution Control Act (NLSA. 38: 10A : et seq.) and is subject to penalties as prescribed in NLAC. 7: 14-8.</li> <li>Signature of Site Valuator.</li> </ul>	tructure:						
<ul> <li>3" - 21" 7.5YR 6/4 Sandy loam, Sub-angular blocky, Friable</li> <li>21" - 37" 7.5YR 7/2 Loamy sand, Sub-angular blocky, Friable</li> <li>37" - 77" 7.5YR 5/8 Sandy clay loam, Angular blocky, slightly Firm, with 15% gravel</li> <li>77" - 97" 7.5YR 5/4 Sandy clay loam, Sub-angular blocky, slightly Firm, with 25% gravel</li> <li>with Common, Medium, Distinct 5YR 5/6 mottles @ 82"</li> <li>97" - 117" 7.5YR 6/4 fine Loamy sand, Sub-angular blocky, Friable</li> <li>117" - 144" 7.5YR 7/1 fine Sand, Sub-angular blocky, Friable</li> <li>117" - 144" 7.5YR 7/1 fine Sand, Single grain, Loose</li> <li>3. Soft Uniting Zones (Check Appropriate Categories):</li> <li>Practured Rock Substratum - Depth to Top</li> <li>Depth Top to Bottom</li> <li>Excessively Coarse Horizon - Depth Top to Bottom</li> <li>Regional Zone of Saturation - Depth Top to Bottom</li> <li>Regional Zone of Saturation - Depth to Top</li> <li>82"</li> <li>3. Soft Sutability Classification:</li> <li>1</li> <li>5. Isoft Sutation - Depth to Top</li> <li>82"</li> <li>5. Soil Sutability Classification:</li> <li>1</li> <li>5. Isoft Substratum - Depth to Top</li> <li>82"</li> <li>5. Soil Sutability Classification:</li> <li>1</li> <li>5. Soil Sutability Classification:</li> <li>2. Isoft Subtratum - Depth to Top</li> <li>82"</li> <li>5. Soil Sutability Classification:</li> <li>2. Isoft Subtratum - Depth to Top</li> <li>82"</li> <li>5. Soil Sutability Classification:</li> <li>3. Soil Sutability Classification:</li> <li>2. Isoft Subtratum - Depth to Top</li> <li>82"</li> <li>5. Soil Sutability Classification:</li> <li>3. Soil Sutability Classification:</li> <li>4. Isoft Subtratum - Depth to Top</li> <li>82"</li> <li>82"</li> <li>82"</li> <li>83"</li> <li>84"</li> <li>84"</li> <li>84"</li> <li>84"</li> <li>84"</li> <li>84"</li> <li>84"</li> <li>84"</li></ul>							Contrast, if Present
<ul> <li>21" - 37" 7.5YR 7/2 Loamy sand, Sub-angular blocky, Friable</li> <li>37" - 77" 7.5YR 5/8 Sandy clay loam, Angular blocky, slightly Firm, with 15% gravel</li> <li>77" - 97" 7.5YR 5/4 Sandy clay loam, Sub-angular blocky, slightly Firm, with 25% gravel with Common, Medium, Distinct 5YR 5/6 mottles @ 82"</li> <li>97" - 117" 7.5YR 6/4 fine Loamy sand, Sub-angular blocky, Friable</li> <li>117" - 144" 7.5YR 7/1 fine Sand, Single grain, Loose</li> <li>3. Ground Water Observations:</li> <li>beepage-indicate Depth N/E</li> <li>97" Media Depth after</li></ul>	)" – 8" 10YR 4/3 San	dy loam, Sub-ai	ngular b	locky	7, Friable		
<ul> <li>21" - 37" 7.5YR 7/2 Loamy sand, Sub-angular blocky, Friable</li> <li>37" - 77" 7.5YR 5/8 Sandy clay loam, Angular blocky, slightly Firm, with 15% gravel</li> <li>77" - 97" 7.5YR 5/4 Sandy clay loam, Sub-angular blocky, slightly Firm, with 25% gravel with Common, Medium, Distinct 5YR 5/6 mottles @ 82"</li> <li>97" - 117" 7.5YR 6/4 fine Loamy sand, Sub-angular blocky, Friable</li> <li>117" - 144" 7.5YR 7/1 fine Sand, Single grain, Loose</li> <li>3. Ground Water Observations:</li> <li>Seepage-indicate Depth N/E</li> <li>Pfr (Joring Flooded-Depth after</li></ul>	3"-21" 7 5YR 6/4 S	ndy loam Sub-	anonlar	hlor	ky Eriah	le	
<ul> <li>37" - 77" 7.5YR 5/8 Sandy clay loam, Angular blocky, slightly Firm, with 15% gravel</li> <li>77" - 97" 7.5YR 5/4 Sandy clay loam, Sub-angular blocky, slightly Firm, with 25% gravel with Common, Medium, Distinct 5YR 5/6 mottles @ 82"</li> <li>97" - 117" 7.5YR 6/4 fine Loamy sand, Sub-angular blocky, Friable</li> <li>117" - 144" 7.5YR 7/1 fine Sand, Single grain, Loose</li> <li>3. Ground Water Observations:</li> <li>seepage-indicate Depth N/E</li> <li>Pt /Boring Flooded-Depth after</li></ul>	n munit stand in a stand	and the second of the second	Contraction of the second	0100	ay, 1140.	1,W	•
<ul> <li>77" - 97" 7.5YR 5/4 Sandy clay loam, Sub-angular blocky, slightly Firm, with 25% gravel with Common, Medium, Distinct 5YR 5/6 mottles @ 82"</li> <li>97" - 117" 7.5YR 6/4 fine Loamy sand, Sub-angular blocky, Friable</li> <li>117" - 144" 7.5YR 7/1 fine Sand, Single grain, Loose</li> <li>3. Ground Water Observations:</li> <li>seegage-indicate Depth N/E Hours</li> <li>4. Soll Limiting Zones (Check Appropriate Categories):</li> <li>Fractured Rock Substratum - Depth to Top Depth to Top Depth to Top Excessively Coarse Horizon - Depth Top to Bottom Excessively Coarse Horizon - Depth Top to Bottom Excessively Coarse Horizon - Depth Top to Bottom Hydraulically Restrictive Substratum - Depth to Top Perched Zone of Saturation - Depth to Top 82"</li> <li>5. Soll Suitability Classification: 1</li> <li>6. I hereby cartify that the information furnished on form 2b of this application is true and accurate. 1 an aware that falsification of data is a violat the Water Pollution Control Act (NLS.A. 58: 10A+1 et seq.) and is subject to penalties as prescribed in NJ.A.C. 7: 14-8.</li> <li>Signature of Site Valuator</li></ul>	21" – 37" 7.5YR 7/2 I	Loamy sand, Su	b-angula	ar blo	ocky, Fria	ble	
<ul> <li>77" - 97" 7.5YR 5/4 Sandy clay loam, Sub-angular blocky, slightly Firm, with 25% gravel with Common, Medium, Distinct 5YR 5/6 mottles @ 82"</li> <li>97" - 117" 7.5YR 6/4 fine Loamy sand, Sub-angular blocky, Friable</li> <li>117" - 144" 7.5YR 7/1 fine Sand, Single grain, Loose</li> <li>3. Ground Water Observations:</li> <li>seegage-indicate Depth N/E Hours</li> <li>4. Soll Limiting Zones (Check Appropriate Categories):</li> <li>Fractured Rock Substratum - Depth to Top Depth Substratum - Depth to Top Depth Substratum - Depth to Top Depth to Top Depth Substratum - Depth to Top Depth to Top Depth Substratum - Depth to Top Depth to Top Depth Substratum - Depth to Top Depth to Top Depth Substratum - Depth to Top Depth Top Top Startage St</li></ul>	27" - 77" 7 SVP 5/84	andu elan Inan	Anmil	ar fil	ooloo olio	halo Fi	m with 15% annual
with Common, Medium, Distinct SYR 5/6 motiles @ \$2" 97" - 117" 7.5YR 6/4 fine Loamy sand, Sub-angular blocky, Friable 117" - 144" 7.5YR 7/1 fine Sand, Single grain, Loose 3. Ground Water Observations: Seepage-Indicate Depth N/E Prof. Jooing Flooded - Depth after	an an the anti-analysis and a second seco	ming one wan	1, 2 MBM	41. US	ovsy, ang	, <u>1162 y</u> 1 1	uni, with 1370 graver
117" - 144" 7.5YR 7/1 fine Sand, Single grain, Loose         3. Ground Water Observations:         Seepage-indicate       Depth       N/E         Ptt /Boring Flooded-Depth afterHours         4. Soil Limiting Zones (Check Appropriate Categories):       Hours         4. Soil Limiting Zones (Check Appropriate Categories):       Fractured Rock Substratum - Depth to Top         Massive Rock Substratum - Depth to Top       Excessively Coarse Horizon - Depth Top to Bottom         Excessively Coarse Substratum - Depth to Top       Properties Substratum - Depth to Top         Mydraulically Restrictive Substratum - Depth to Top       Perched Zone of Saturation - Depth Top to Bottom         Regional Zone of Saturation - Depth to Top       82"         5. Soil Suitability Classification:       1         6.1 hereby cartify that the information furnished on form 2b of this application is true and accurate. I am aware that falsification of data is a violat the Water Pollution Control Act (N.J.S.A. 58: 10A-I et seq.) and is subject to penalties as prescribed in N.J.A.C. 7: 14-8.         Signature of Site Evaluator							
117" - 144" 7.5YR 7/1 fine Sand, Single grain, Loose         3. Ground Water Observations:         Seepage Indicate Depth N/E         Pit /Boring Flooded-Depth after							
3. Ground Water Observations:         Seepage-indicate       Depth       N/E         Pit / Boring Flooded-Depth after       Hours         4. Soil Limiting Zones (Check Appropriate Categories):       Fractured Rock Substratum - Depth to Top         Massive Rock Substratum - Depth to Top       Bassive Rock Substratum - Depth to Top         Excessively Coarse Substratum - Depth to Top       Excessively Coarse Substratum - Depth to Top         Hydraulically Restrictive Horizon - Depth Top to Bottom       Excessively Coarse Substratum - Depth to Top         Hydraulically Restrictive Botizon - Depth Top to Bottom       Regional Zone of Saturation - Depth to Top         Regional Zone of Saturation - Depth to Top       82*         5. Soil Suitability Classification:       I         6. I hereby certify that the Information furnished on Form 2b of this application is true and accurate. I am aware that falsification of data is a violal the Water Pollution Control Act (N.J.S.A. 58: 10A-I et seq.) and is subject to penalties as prescribed in N.J.A.C. 7: I4-8.         Signature of Site Evaluator	97" – 117" 7.5YR 6/4	fine Loamy sar	id, Sub-	angu	lar blocky	y, Frial	
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		SECUCKEVIEWS	Cmeusa'l com and jak	Vander/Bemourat		IEER
	UNSTEINS	SPECTIONS MUST	TTED TO GCHD (C BE SCHEDULED )	/IA EMAIL: GCH	EY ORDER ONLY) D@CMEUSA1.COM	
	M		Elk Twp			
Form 2b - Soil Log and	Interpretation:	Lot1	8lock143_			
1. Log NumberTP7	/Method (Check					
Existing Grade Elevatio	n:				,	
2. Soil Log					٠	
Depth	Munsel Color Nar	ne and Symbol; Es	timated Textural Cl.	ass; (inches) Estir	nated Volume % Coarse Fr	agment. If Presen
Structure: Top-Bottom			-Abundance, Size a			an Grésamis (n. 1. f. f. anna fra
0"-10" 10YR 4/	'3 Sandy loam, Sul					
			-			
10° – 29″ 7.5YR	6/6 Sandy clay loa	m, Sub-angul	ar blocky, Fria	ble		
29"-61"7.5YR	6/6 fine Loamy sa	nd, Single gra	in, Loose		×.	
2111 1020 7 2575	ne anne anno 1944 i seanna anne an stàitean ann anne anne anne anne anne anne a					
01 - 135 7.5YR	8 7/1 fine Sand, Si	ngle grain, Lo	ose	distant.		
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<ol> <li>Ground Water Obser Seepage-Indicate Pit /Boring FloodedDe</li> <li>Soil Limiting Zones (C Fractured Rock Substratu Excessively Coarse Hori Excessively Coarse Hori Excessively Coarse Subs Hydraulically Restrictive Hydraulically Restrictive Perched Zone of Satura Regional Zone of Satura</li> <li>Soil Suitability Classif</li> <li>I hereby certify that t the Water Pollution Cor Signature of Site Evalua</li> </ol>	vations: Depth N/E opth after heck Appropriate Categ tum - Depth to Top zon - Depth to Top zon - Depth to Top a Horizon - Depth Top to Bott itratum - Depth Top to Bott itratum - Depth Top to Bott ition - Depth Top to Bott ation - Depth to Top lication: I the Information furnishe ntrol Act (N.I.S.A. 58: 104	ories): om Bottom Top om 82* d on Form 2b of th	is application is true	e and accurate. I Is prescribed in N	am aware that faisification J.A.C. 7: 14-8.	) of data is a viola

GLOUCESTER COUNTY DEPARTMEN APPLICATION FOR PERMIT TO CONSTRUCT/ALTER/REPAIR A DISPOSAL SYSTEM APPLICATION SHALL BE SUBMITTED ELECTRONICALLY TO C SepticReviews@cmeusal.com and jalexande PAYMENT SHALL BE SUBMITTED TO GCHD (CHEC) ONSITE INSPECTIONS MUST BE SCHEDULED VIA EI MUNICIPALITYEIK Twp	N INDIVIDUAL SUBSURFACE SEWAGE ME FOR REVIEW BY DESIGN ENGINEER <u>r@cmeusa1.com</u> COR MONEY ORDER ONLY) MAIL: <u>GCHD@CMEUSA1.COM</u>
Form 2b - Soil Log and Interpretation: Lot Block143	
1. Log NumberTP8Method (Check One):xx Profile Pit	Boring
Existing Grade Elevation:	
2. Soil Log Depth Munsel Color Name and Symbol; Estimated Textural Class; (i Structure: Top-Bottom Moist or Dry Consistence; MottlingAbundance, Size and Co	
0" - 8" 10YR 4/3 Sandy loam, Sub-angular blocky, Friable	
8"-34" 7.5YR 6/6 Sandy clay loam, Angular blocky, Friable, with	15% gravel
34" - 76" 7.5YR 6/6 Sandy loam, Sub-angular blocky, Friable	
76" - 91" 7.5YR 7/3 fine Loamy sand, Single grain, Loose with Common, Medium, Distinct 5YR 5/6 mottles @ 79'	· · · * *
91" - 135" 7.5YR 7/1 fine Sand, Single grain, Loose	
Pit discontinued due to collapse / cave-in	
3. Ground Water Observations:	
Seepage-Indicate Depth N/E Pit /Boring FloodedDepth afterHours	
4. Soil Limiting Zones (Check Appropriate Categories): Fractured Rock Substratum - Depth to Top Massive Rock Substratum - Depth to Top Excessively Coarse Horizon - Depth Top to Bottom Excessively Coarse Substratum - Depth to Top Hydraulically Restrictive Horizon - Depth Top to Bottom Hydraulically Restrictive Substratum - Depth to Top Perched Zone of Saturation - Depth Top to Bottom Regional Zone of Saturation - Depth to Top 79"	• • • • •
5. Soil Suitability Classification:	
6. I hereby certify that the information furnished on Form 2b of this application is true ar the Water Pollution Control Act (N.J.S.A. 58: IOA-1 et seq.) and is subject to penalties as p	d accurate. I am aware that faisification of data is a violation of rescribed in N.J.A.C. 7: 14-8.
Signature of Site Evaluator Date10/13/2023	- 
Signature of Professional EngineerL	icense#GEZBIOb

r

South Jersey En	gineers LLC		Tristate Er	igineering	Sample Date:	10/13/23
P.O. Box 1406			Douglass Str	reet	Stormwater - TP	1
Voorhees, NJ 08	3043		Elk Township		Horizon 95"-107'	
<u>.</u>			· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	· .·	
MUNICIPALITY	Elk Township	] :				•
Form 3b. Tube Permea	ameter Test Data					
1. Test Number	1	Replicate Letter	A	] Date Colle	cted 10/13/2023	
2. Material Tested		]Fill	Х	Test in Native So	il - Indicate Depth	102"
3. Type of Sample		Undisturbed		X	Disturbed	
4. Sample Dimensions	Inside Radius of Samp Length of Sample, in i		1.905 3			
Sample Volume (L x 2	ination (Disturbed Sam Tube Containing Samp 2.54 cm/inch x 3.14R²), Wt./Sample Volume),	le - Wt. Empty Tube	145.59 86.83 1.68			
6. Standpipe Used: Indicate internal Rad	x No			-		
<ol> <li>Height of water Leve At the Beginning of E At the End of Each T</li> </ol>	Each Test Interval, H1	asin in inches:	3.0 2.0			
8. Rate of Water Level	Drop (Add additional i	ines if needed):				
Time, Start of Test Interval, T1 (min.sec)	Time, End of Test Interval, T2 (min.sec)	Length of Test Interva T, (min)	I,			
0.00	43.05	43.08	]			
0.00	43.28	43.46	4			
0.00	43.42	43.70	-			
			-			
9. Calculation of Perm	eability:					
K. (in/hr) = 60 min/hr	x r²/R² x L(in)/T(min) x	(In (H1/H2)				
k= 60 min/hr	x x 3		x In(3/2)	]		
k=	1.67			-		
10. Defects in the Sam	ple (Check appropriate	e items):				

÷

\_\_\_\_\_ None \_\_\_\_Cracks \_\_\_\_Worm Channels \_\_\_\_\_Root Channels \_\_\_\_\_\_Root Channels \_\_\_\_\_Large Gravel \_\_\_\_\_Large Roots

\_\_\_\_\_ Dry Soil \_\_\_\_\_Smeering \_\_\_\_Compactation

\_\_\_\_\_ Other---Specify\_\_\_\_\_\_

South Jersey Engineers LLC			Tristate Er	ngineering	Sample Date: 10/13/23		
P.O. Box 1406 Voorhees, NJ 08043			Douglass Sti Elk Townshij		Stormwater - TP1 Horizon 95"-107"		
v 00111003, 140 00			EIK TOWNSHI		Honzon 95 -10	/	
MUNICIPALITY	Elk Township						
Form 3b. Tube Permea	meter Test Data						
1. Test Number	1	Replicate Letter	В	Date Collecte	d 10/13/2023		
2. Material Tested		Fill	X	]Test in Native Soil -	Indicate Depth	102"	
3. Type of Sample		Undisturbed		<u>     Х</u>	Disturbed		
4. Sample Dimensions	Inside Radius of Samp Length of Sample, in in		1.905 3				
Sample Weight (Wt. Sample Volume (L x 2	ination (Disturbed Sam Tube Containing Sample 2.54 cm/inch x 3.14R²), Wt./Sample Volume), g	e - Wt. Empty Tube cc	147.61 86.83 1.70				
	No lius, cm			_			
	el above Rim of Test Ba Each Test Interval, H1 Fest Interval, H2	sin in inches:	<u>3.0</u> 2.0				
8. Rate of Water Level	Drop (Add additional lin	nes if needed):					
Time, Start of Test Interval, T1 (min.sec)	Time, End of Test Interval, T2 (min.sec)	Length of Test Interva T, (min)	1,				
0.00	45.39	45.65	1				
0.00	45.56	45.94	]				
0.00	46.03	46.04	-				
9. Calculation of Perm	eability:						
K, (in/hr) = 60 min/hr	x r²/R² x L(in)/T(min) x	in (H1/H2)		_			
k= 60 min/hr	x x 3/		x ln(3/2)	]			
k≒	1.59			_			
	ple (Check appropriate						
	CracksWorm Ch		annels				
Soil/Tube Co	intactLarge Grav	elLarge Roots					
Dry Soil	SmeeringCom	pactation					

\_\_\_\_\_ Other--Specify\_\_\_\_

South Jersey Engineers LLC		Tristate Engineering	Sample Date: 10/13/23		
P.O. Box 1406 Voorhees, NJ 08043		Douglass Street	Stormwater - TP2		
		Elk Township	Horizon 71"-93"		
MUNICIPALITY [	Elk Township				
Form 3b. Tube Permea	meter Test Data				
1. Test Number	1 Replicate Lette	er A Date Co	llected 10/13/2023		
2. Material Tested	Fill	X Test in Native S	Soil - Indicate Depth 86"		
3. Type of Sample	Undisturbed	X	Disturbed		
	Inside Radius of Sample Tube, R, in cm Length of Sample, in inches	1.905 3			
Sample Weight (Wt. 1	ination (Disturbed Samples Only): Fube Containing Sample - Wt. Empty Tube 2.54 cm/inch x 3.14R²), cc	146.59 86.83			
	Wt./Sample Volume), grams/cc	1.69			
Bulk Density (Sample 6. Standpipe Used:	Wt./Sample Volume), grams/cc                       No           Yes           lius, cm				
Bulk Density (Sample 6. Standpipe Used: Indicate internal Rac	X NoYes lius, cm el above Rim of Test Basin in inches: each Test Interval, H1				
<ul> <li>Bulk Density (Sample</li> <li>6. Standpipe Used: Indicate internal Rac</li> <li>7. Height of water Leve At the Beginning of E At the End of Each T</li> </ul>	X NoYes lius, cm el above Rim of Test Basin in inches: each Test Interval, H1	3.0			
Bulk Density (Sample 6. Standpipe Used: Indicate internal Rac 7. Height of water Leve At the Beginning of E At the End of Each T 8. Rate of Water Level Time, Start of Test Interval, T1	No Yes lius, cm el above Rim of Test Basin in inches: Each Test Interval, H1 est Interval, H2 Drop (Add additional lines if needed): Time, End of Test Length of Test Interv Interval, T2 T, (min)	1.69 3.0 2.0			
<ul> <li>Bulk Density (Sample</li> <li>6. Standpipe Used: Indicate internal Rad</li> <li>7. Height of water Leve At the Beginning of E At the End of Each T</li> <li>8. Rate of Water Level Time, Start of Test</li> </ul>	No Yes lius, cm el above Rim of Test Basin in inches: tach Test Interval, H1 est Interval, H2 Drop (Add additional lines if needed): Time, End of Test Length of Test Interv	1.69 3.0 2.0			
Bulk Density (Sample 6. Standpipe Used: Indicate internal Rac 7. Height of water Leve At the Beginning of E At the End of Each T 8. Rate of Water Level Time, Start of Test Interval, T1 (min.sec)	No Yes lius, cm el above Rim of Test Basin in inches: tach Test Interval, H1 est Interval, H2 Drop (Add additional lines if needed): Time, End of Test Length of Test Interv Interval, T2 T, (min) (min.sec) 13.00 13.01 13.04 13.06	1.69 3.0 2.0	·		
Bulk Density (Sample 6. Standpipe Used: Indicate internal Rac 7. Height of water Leve At the Beginning of E At the End of Each T 8. Rate of Water Level Time, Start of Test Interval, T1 (min.sec) 0.00	No Yes lius, cm el above Rim of Test Basin in inches: Each Test Interval, H1 est Interval, H2 Drop (Add additional lines if needed): Time, End of Test Length of Test Interv Interval, T2 T, (min) (min.sec) 13.00 13.01	1.69 3.0 2.0			
Bulk Density (Sample 6. Standpipe Used: Indicate internal Rac 7. Height of water Leve At the Beginning of E At the End of Each T 8. Rate of Water Level Time, Start of Test Interval, T1 (min.sec) 0.00 0.00	No Yes lius, cm el above Rim of Test Basin in inches: tach Test Interval, H1 est Interval, H2 Drop (Add additional lines if needed): Time, End of Test Length of Test Interv Interval, T2 T, (min) (min.sec) 13.00 13.01 13.04 13.06	1.69 3.0 2.0			
Bulk Density (Sample 6. Standpipe Used: Indicate internal Rac 7. Height of water Leve At the Beginning of E At the End of Each T 8. Rate of Water Level Time, Start of Test interval, T1 (min.sec) 0.00		1.69 3.0 2.0			
Bulk Density (Sample 6. Standpipe Used: Indicate internal Rac 7. Height of water Leve At the Beginning of E At the End of Each T 8. Rate of Water Level Time, Start of Test Interval, T1 (min.sec) 0.00	NoYes lius, cmYes lius, cmYes labove Rim of Test Basin in inches: iach Test Interval, H1 est Interval, H2 Drop (Add additional lines if needed): Time, End of Test Length of Test Interv Interval, T2 T, (min) (min.sec) 13.00 13.01 13.04 13.06 13.20 13.34	1.69 3.0 2.0			

x None Cracks Worm Channels Root Channels Soil/Tube Contact Large Gravel Large Roots

\_\_\_\_\_Dry Soil \_\_\_\_\_Smeering \_\_\_\_\_Compactation

\_\_\_\_\_Other---Specify\_\_\_\_\_C

South Jersey Er	gineers LLC	Tristate Er	ngineering	Sample Date:	10/13/23
P.O. Box 1406		Douglass St	reet	Stormwater - TP2	
Voorhees, NJ 08	3043	Elk Townshi		Horizon 71"-93"	
100111000,110-01		2			
MUNICIPALITY	Elk Township				
Form 3b. Tube Permea	ameter Test Data				
1. Test Number	1 Replicate Lette	r B	] Date Collected	10/13/2023	
2. Material Tested	Fill	X	Test in Native Soil - I	ndicate Depth	86"
3. Type of Sample	Undisturbed		X	Disturbed	
4. Sample Dimensions	Inside Radius of Sample Tube, R, in cm Length of Sample, in inches	1.905 3	].		
Sample Weight (Wt. Sample Volume (L x :	nination (Disturbed Samples Only): Tube Containing Sample - Wt. Empty Tube 2.54 cm/inch x 3.14R²), cc 9 Wt./Sample Volume), grams/cc	145.48 86.83 1.68			
	X No Yes dius, cm		_		
	el above Rim of Test Basin in inches: Each Test Interval, H1 Fest Interval, H2	3.0 2.0			
8. Rate of Water Leve	I Drop (Add additional lines if needed):				
Time, Start of Test Interval, T1 (min.sec)	Time, End of Test Length of Test Interva Interval, T2 T, (min) (min.sec)	al,			
0.00	12.48 12.80				
0.00	13.15 13.25				
0.00	13.42 13.69	_			
		$\neg$			
9. Calculation of Perm	eability:	<u> </u>			
$V_{\rm c}$ (in/hr) = 60 min/hr	v r²/D² v [ /in)/T/min) v In /U1/iJ0)				
k = 60  min/hr	x r²/R² x L(in)/T(min) x ln (H1/H2) x x 3/ 13.69	x In(3/2)	٦		
	5.33		<b></b>		
4- <u></u>					
<u>     x    None  </u>	nple (Check appropriate items): _CracksWorm ChannelsRoot Ch ontactLarge GravelLarge Roots SmeeringCompactation	annels			

\_\_\_\_Other---Specify\_\_\_\_\_

South Jersey Engineers LLC		Tristate Er	gineering	Sample Date: 10/13/23			
P.O. Box 1406 Voorhees, NJ 08043			Douglass Str	eet	Stormwater - TP3		
			Elk Township		Horizon 102"-14	Horizon 102"-144"	
MUNICIPALITY [	Elk Township						
Form 3b. Tube Permea	meter Test Data						
1. Test Number	11	Replicate Lette	r A	] Date Collec	ted 10/13/2023		
2. Material Tested		Fill	X	Test in Native Soil	- Indicate Depth	114"	
3. Type of Sample		Undisturbed		X	Disturbed		
	Inside Radius of Sample Length of Sample, in in-		1.905 3				
Sample Weight (Wt. Sample Volume (L x 2	ination (Disturbed Samı Fube Containing Sample 2.54 cm/inch x 3.14R²), ( Wt./Sample Volume), g	e - Wt. Empty Tube cc	145.37 86.83 1.67				
Indicate internal Rac 7. Height of water Leve	x No lius, cm labove Rim of Test Ba ach Test Interval, H1 est Interval, H2		3.0 2.0				
8. Rate of Water Leve	Drop (Add additional lir	nes if needed):					
Time, Start of Test Interval, T1 (min.sec) 0.00 0.00 0.00	Time, End of Test Interval, T2 (min.sec) 12.46 12.53 13.08	Length of Test Interv T, (min) 12.77 12.88 13.14					
9. Calculation of Perm K, (in/hr) = 60 min/hr k= 60 min/hr k=	x r²/R² x L(in)/T(min) x x x 3/		x ln(3/2)				
10. Defects in the Sar None Soil/Tube Co	5.55 nple (Check appropriate CracksWorm Ch ontactLarge Grav SmeeringCorr	nannelsRoot Cl /elLarge Roots					

÷

\_\_\_\_\_ Other---Specify\_

South Jersey En	gineers LLC	Tristate Engineering	Sample Date: 10/13/23
P.O. Box 1406	× .	Douglass Street	Stormwater - TP3
Voorhees, NJ 08	3043	Elk Township	Horizon 102"-144"
, , , , , , , , , , , , , , , , , , , ,			
MUNICIPALITY	Elk Township		
Form 3b. Tube Permea	ameter Test Data		
1. Test Number	1 Replicate Lette	er B Date Collecte	d 10/13/2023
2. Material Tested	Fill	X Test in Native Soil -	Indicate Depth 114"
3. Type of Sample	Undisturbed	X	Disturbed
4. Sample Dimensions	Inside Radius of Sample Tube, R, in cm Length of Sample, in inches	<u>1.905</u> <u>3</u>	
Sample Weight (Wt. Sample Volume (L x :	nination (Disturbed Samples Only): Tube Containing Sample - Wt. Empty Tube 2.54 cm/inch x 3.14R²), cc Wt./Sample Volume), grams/cc	147.06 86.83 1.69	
	X No Yes dius, cm		
	el above Rim of Test Basin in inches: Each Test Interval, H1 Fest Interval, H2	3.0 2.0	
8. Rate of Water Leve	I Drop (Add additional lines if needed):		
Time, Start of Test	Time, End of Test Length of Test Interv	al	
Interval, T1	Interval, T2 T, (min)	o,	
(min.sec)	(min.sec)		
0.00	12.12 12.20		
0.00	12.14 12.23		
0.00	12.32 12.53		
,		_	
9. Calculation of Perm	eability:		
K, (in/hr) = 60 min/hr	x r²/R² x L(in)/T(min) x ln (H1/H2)		
k= 60 min/hr	x/ x 3/ 12.53	x ln(3/2)	
k=	5.82		
x None	nple (Check appropriate items): _CracksWorm ChannelsRoot Ch	nannels	
	ontactLarge GravelLarge Roots		
	SmeeringCompactation		
OtherSpe	cify		

South Jersey En	gineers LLC		Tristate En	gineering	Sample Date: 10/13/23
P.O. Box 1406			Douglass Str	eet	Stormwater - TP4
Voorhees, NJ 08	8043		Elk Township		Horizon 42"-60"
vooniees, no ee			Lik Township	, 	
MUNICIPALITY	Elk Township	]			
Form 3b. Tube Permea	ameter Test Data				
1. Test Number	1	] Replicate Lette	r A	Date Collected	10/13/2023
2. Material Tested		Fill	X	Test in Native Soil - I	ndicate Depth 51"
3. Type of Sample		Undisturbed		X	Disturbed
4. Sample Dimensions	Inside Radius of Sam Length of Sample, in i		1.905 3	]	
Sample Volume (L x 2	ination (Disturbed Sar Tube Containing Samp 2.54 cm/inch x 3.14R²) Wt./Sample Volume),	ble - Wt. Empty Tube	150.01 86.83 1.73		
6. Standpipe Used: Indicate internal Rad	No dius, cm			-	
7. Height of water Leve At the Beginning of E At the End of Each T	Each Test Interval, H1	asin in inches:	3.0 2.0	]	
8. Rate of Water Leve	Drop (Add additional	lines if needed):			
Time, Start of Test Interval, T1 (min.sec)	Time, End of Test Interval, T2 (min.sec)	Length of Test Interva T, (min)	al,		
0.00	5.59	5.99			
0.00	6.01	6.01	_		
0.00	6.01	6.01			
9. Calculation of Perm	eability:				
K, (in/hr) = 60 min/hr	x r²/R² x L(in)/T(min)	x ln (H1/H2)			
k= 60 min/hr	x x :		x ln(3/2)	]	
k=	12.14				

10. Defects in the Sample (Check appropriate items):

x None Cracks Worm Channels Root Channels Soil/Tube Contact Large Gravel Large Roots

\_\_\_\_\_ Dry Soil \_\_\_\_\_ Smeering \_\_\_\_ Compactation

\_\_\_\_\_ Other---Specify\_\_\_\_\_

South Jersey Engineers LLC	Tristate Engineering	Sample Date: 10/13/23		
P.O. Box 1406	Douglass Street	Stormwater - TP4		
Voorhees, NJ 08043	Elk Township	Horizon 42"-60"		
en en la companya de la companya de la companya de la companya de la companya de la companya de la companya de				
MUNICIPALITY Elk Township				
Form 3b. Tube Permeameter Test Data				
1. Test Number 1 Replicate Lette	Date Collected	10/13/2023		
2. Material Tested	X Test in Native Soil - I	ndicate Depth 51"		
3. Type of Sample Undisturbed	X	Disturbed		
<ol> <li>Sample Dimensions Inside Radius of Sample Tube, R, in cm Length of Sample, in inches</li> </ol>	1.905			
<ol> <li>Bulk Density Determination (Disturbed Samples Only): Sample Weight (Wt. Tube Containing Sample - Wt. Empty Tube Sample Volume (L x 2.54 cm/inch x 3.14R<sup>2</sup>), cc Bulk Density (Sample Wt./Sample Volume), grams/cc</li> </ol>	152.15 86.83 1.75			
6. Standpipe Used: <u>x</u> No <u>Yes</u> Indicate internal Radius, cm				
<ol> <li>Height of water Level above Rim of Test Basin in inches: At the Beginning of Each Test Interval, H1 At the End of Each Test Interval, H2</li> </ol>	3.0 2.0			
8. Rate of Water Level Drop (Add additional lines if needed):				
Time, Start of Test Time, End of Test Length of Test Interva Interval, T1 Interval, T2 T, (min) (min.sec) (min.sec)	il,			
0.00 5.40 5.67				
0.00 5.52 5.87	/			
0.00 5.57 5.96	_			
9. Calculation of Permeability:	_			
K, (in/hr) = 60 min/hr x $r^2/R^2$ x L(in)/T(min) x ln (H1/H2) k= 60 min/hr x/	x In(3/2)			
k= 00 min/m x/ x 3/ 5.96 k= 12.25	<u> </u>			
10. Defects in the Sample (Check appropriate items):	annels			

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South Jersey Engineers LLC		Tristate Engineering	Sample Date: 10/13/23
P.O. Box 1406		Douglass Street	Stormwater - TP5
Voorhees, NJ 08043		Elk Township	Horizon 97"-117"
- <u> </u>			
MUNICIPALITY Elk Tow	Inship		
Form 3b. Tube Permeameter Test I	Data		
1. Test Number 1	Replicate L	etter A Date (	Collected 10/13/2023
2. Material Tested	Fill	X Test in Nativ	e Soil - Indicate Depth 108"
3. Type of Sample	Undisturbed	X	Disturbed
4. Sample Dimensions Inside Radiu Length of Sa	is of Sample Tube, R, in cm ample, in inches	1.905 3	
5. Bulk Density Determination (Distr Sample Weight (Wt. Tube Contair Sample Volume (L x 2.54 cm/inch Bulk Density (Sample Wt./Sample	iing Sample - Wt. Empty Tub x 3.14R²), cc	e 146.26 86.83 1.68	,
6. Standpipe Used:x Indicate internal Radius, cm	_ No Yes	·····	
<ol> <li>Height of water Level above Rim At the Beginning of Each Test Inter At the End of Each Test Interval.</li> </ol>	erval, H1	3.0 2.0	
8. Rate of Water Level Drop (Add a	dditional lines if needed):		
Time, Start of Test Time, End c Interval, T1 Interva (min.sec) (min.	al, T2 T, (min)	ierval,	
0.00 5.2			
0.00 5.3	36 5.59		
0.00 5.5	52 5.87		
9. Calculation of Permeability:			
9. Calculation of Permeability: K. (in/hr) = 60 min/hr x $r^2/R^2$ x L(ir	n)/T(min) x ln (H1/H2)		
9. Calculation of Permeability: K, (in/hr) = 60 min/hr x r²/R² x L(ir k= 60 min/hr x/	n)/T(min) x ln (H1/H2) x 3/ 5.87	x In(3/2)	

.

\_\_\_\_\_\_Soil/Tube Contact \_\_\_\_\_Large Gravel \_\_\_\_\_Large Roots

\_\_\_\_\_ Dry Soil \_\_\_\_\_Smeering \_\_\_\_Compactation

\_\_\_\_\_Other---Specify\_\_\_\_\_\_

Could be sey En	gineers LLC		Tristate Engine	ering	Sample Dat	e: 10/13/23
P.O. Box 1406			Douglass Street		Stormwater - T	<b>P</b> 5
Voorhees, NJ 08	043		Elk Township		Horizon 97"-11	
······						
MUNICIPALITY [	Elk Township					
Form 3b. Tube Permea	meter Test Data					
1. Test Number	1	Replicate Lette	rВ	Date Collecte	d 10/13/2023	
2. Material Tested	Fi		X Test	in Native Soil -	Indicate Depth	108"
3. Type of Sample [	U	ndisturbed		X	Disturbed	
	Inside Radius of Sample Length of Sample, in inch		1.905 3			
Sample Weight (Wt. T Sample Volume (L x 2	ination (Disturbed Sample Fube Containing Sample - 2.54 cm/inch x 3.14R <sup>2</sup> ), cc Wt./Sample Volume), gra	Wt. Empty Tube	145.53 86.83 1.68			
	wurdampie volume), gra		<u></u>			
6. Standpipe Used:	No					
6. Standpipe Used: Indicate internal Rad	No lius, cm al above Rim of Test Basir ach Test Interval, H1	Yes	3.0 2.0			
<ol> <li>6. Standpipe Used: Indicate internal Rad</li> <li>7. Height of water Leve At the Beginning of E At the End of Each Te</li> </ol>	No lius, cm al above Rim of Test Basir ach Test Interval, H1	Yes	3.0			
<ol> <li>Standpipe Used: Indicate internal Rad</li> <li>Height of water Leve At the Beginning of E At the End of Each Te</li> <li>Rate of Water Level Time, Start of Test Interval, T1 (min.sec)</li> </ol>	No lius, cm al above Rim of Test Basir Each Test Interval, H1 est Interval, H2 Drop (Add additional lines Time, End of Test Le Interval, T2 (min.sec)	Yes n in inches: s if needed): ength of Test Interva T, (min)	3.0			
<ol> <li>Standpipe Used: Indicate internal Rad</li> <li>Height of water Leve At the Beginning of E At the End of Each Te</li> <li>Rate of Water Level Time, Start of Test Interval, T1 (min.sec) 0.00</li> </ol>	No lius, cm el above Rim of Test Basir cach Test Interval, H1 est Interval, H2 Drop (Add additional lines Time, End of Test Le Interval, T2 (min.sec) 5.15	Yes n in inches: s if needed): ength of Test Interva	3.0			
<ol> <li>6. Standpipe Used: Indicate internal Rad</li> <li>7. Height of water Leve At the Beginning of E At the End of Each Te</li> <li>8. Rate of Water Level Time, Start of Test Interval, T1 (min.sec)</li> </ol>	No lius, cm al above Rim of Test Basir Each Test Interval, H1 est Interval, H2 Drop (Add additional lines Time, End of Test Le Interval, T2 (min.sec)	Yes n in inches: s if needed): ength of Test Interva T, (min) 5.26	3.0			
<ol> <li>Standpipe Used: Indicate internal Rad</li> <li>Height of water Leve At the Beginning of E At the End of Each To</li> <li>Rate of Water Level Time, Start of Test Interval, T1 (min.sec) 0.00</li> </ol>	No lius, cm el above Rim of Test Basir ach Test Interval, H1 est Interval, H2 Drop (Add additional lines Time, End of Test Le Interval, T2 (min.sec) 5.15 5.45	Yes n in inches: s if needed): ength of Test Interva T, (min) 5.26 5.74	3.0			
<ol> <li>Standpipe Used: Indicate internal Rad</li> <li>Height of water Leve At the Beginning of E At the End of Each To</li> <li>Rate of Water Level Time, Start of Test Interval, T1 (min.sec) 0.00</li> </ol>	No lius, cm al above Rim of Test Basir Each Test Interval, H1 est Interval, H2 Drop (Add additional lines Time, End of Test Le Interval, T2 (min.sec) 5.15 5.45 5.56	Yes n in inches: s if needed): ength of Test Interva T, (min) 5.26 5.74	3.0			
<ol> <li>Standpipe Used: Indicate internal Rad</li> <li>Height of water Leve At the Beginning of E At the End of Each To</li> <li>Rate of Water Level Time, Start of Test Interval, T1 (min.sec) 0.00 0.00 0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li> <li>0.00</li></ol>	No lius, cm al above Rim of Test Basir Each Test Interval, H1 est Interval, H2 Drop (Add additional lines Time, End of Test Le Interval, T2 (min.sec) 5.15 5.45 5.56	Yes n in inches: s if needed): ength of Test Interva T, (min) 5.26 5.74 5.93	3.0			

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X None \_\_\_\_Cracks \_\_\_\_Worm Channels \_\_\_\_Root Channels
 Soil/Tube Contact \_\_\_\_Large Gravel \_\_\_\_Large Roots
 Dry Soil \_\_\_\_Smeering \_\_\_Compactation
 Other---Specify\_\_\_\_\_

South Jersey Engineers LLC		Tristate Engineering		Sample Date: 10/13/23			
P.O. Box 1406 Voorhees, NJ 08043			Douglass Street Elk Township		Stormwater - TP6 Horizon 42"-83"		
· · · · · · · · · · · · · · · · · · ·	·····				·······		
MUNICIPALITY	Elk Township						
Form 3b. Tube Permea	ameter Test Data						
1. Test Number	1	Replicate Lette	r A	] Date Collected	10/13/2023		
2. Material Tested	F F	-ill	X	Test in Native Soil - I	ndicate Depth 63"		
3. Type of Sample	[]u	Indisturbed		X	Disturbed		
4. Sample Dimensions	Inside Radius of Sample Length of Sample, in inc		1.905 3				
Sample Weight (Wt. Sample Volume (L x :	nination (Disturbed Samp Tube Containing Sample 2.54 cm/inch x 3.14R²), c wt./Sample Volume), gr	- Wt. Empty Tube c	151.53 86.83 1.75				
6. Standpipe Used: Indicate internal Rad	X No dius, cm	Yes		_			
	el above Rim of Test Bas Each Test Interval, H1 Fest Interval, H2	in in inches:	3.0 2.0				
8. Rate of Water Leve	I Drop (Add additional line	es if needed):					
Time, Start of Test Interval, T1 (min.sec)	Time, End of Test I Interval, T2 (min.sec)	∟ength of Test Interva T, (min)	l <b>i</b> ,				
0.00	5.24	5.39	-				
0.00	5.48 6.02	5.81 6.04					
9. Calculation of Perm	eability:		_				
	x $r^2/R^2 x L(in)/T(min) x lr$			-			
k= 60 min/hr	x x 3/	6.04	x In(3/2)	_			
k=	12.09						
	nple (Check appropriate i CracksWorm Cha ontactLarge Grave	,	annels				

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Dry Soil \_\_\_\_\_Smeering \_\_\_\_\_Compactation

\_\_\_\_\_Other---Specify\_\_\_\_\_\_

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South Jersey Er	ngineers LLC	Tristate Engineering	Sample Date: 10/13/23
P.O. Box 1406	-	Douglass Street	Stormwater - TP6
Voorhees, NJ 08	5043	Elk Township	Horizon 42"-83"
MUNICIPALITY	Elk Township		
Form 3b. Tube Perme	ameter Test Data		
1. Test Number	1 Replicate Lett	er B Date Collecte	ed 10/13/2023
2. Material Tested	F H	X Test in Native Soil -	Indicate Depth 63"
3. Type of Sample	Undisturbed	X	Disturbed
4. Sample Dimensions	Inside Radius of Sample Tube, R, in cm Length of Sample, in inches	1.905	
Sample Weight (Wt. Sample Volume (L x	nination (Disturbed Samples Only): Tube Containing Sample - Wt. Empty Tube 2.54 cm/inch x 3.14R²), cc e Wt./Sample Volume), grams/cc	145.35 86.83 1.67	
	x NoYes dius, cm		
	el above Rim of Test Basin in inches: Each Test Interval, H1 Test Interval, H2	3.0 2.0	
8. Rate of Water Leve	I Drop (Add additional lines if needed):		
Time, Start of Test Interval, T1 (min.sec)	Time, End of Test Length of Test Interv Interval, T2 T, (min) (min.sec)	/ai,	
0.00	5.19 5.31		
0.00	5.42 5.69		
0.00	5.58 5.97		
9. Calculation of Perm	neability:		
	r x r²/R² x L(in)/T(min) x ln (H1/H2)		
k= 60 min/hr		x ln(3/2)	
k=	12.23		
<u> </u>	mple (Check appropriate items): _CracksWorm ChannelsRoot C ontactLarge GravelLarge Roots SmeeringCompactation		

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Other---Specify\_\_\_\_

South Jersey Engineers LLC		Tristate Er	igineering	Sample Date: 10/13/23		
P.O. Box 1406 Voorhees, NJ 08043		Douglass Str		Stormwater - TP7		
voomees, NJ oo	0040	Elk Townshir		Horizon 29"-61"		
MUNICIPALITY	Elk Township					
Form 3b. Tube Permea	ameter Test Data					
1. Test Number	1 Replicate I	_etter A	] Date Collected	10/13/2023	]	
2. Material Tested	Fill	Х	]Test in Native Soil - I	ndicate Depth	48"	
3. Type of Sample	Undisturbed		X	Disturbed		
4. Sample Dimensions	Inside Radius of Sample Tube, R, in cm Length of Sample, in inches	1.905 3				
Sample Weight (Wt. Sample Volume (L x	nination (Disturbed Samples Only): Tube Containing Sample - Wt. Empty Tut 2.54 cm/inch x 3.14R²), cc 9 Wt./Sample Volume), grams/cc	be 146.49 86.83 1.69				
6. Standpipe Used: Indicate internal Rad	X No Yes dius, cm		-			
	el above Rim of Test Basin in inches: Each Test Interval, H1 'est Interval, H2	3.0 2.0				
8. Rate of Water Leve	I Drop (Add additional lines if needed):					
Time, Start of Test Interval, T1 (min.sec)	Time, End of Test Length of Test In Interval, T2 T, (min) (min.sec)	terval,				
0.00	5.30 5.50					
0.00	5.31 5.51					
0.00	5.49 5.81					
9. Calculation of Perm	eability:					
V(in/bx) = 00	$x = \frac{2}{102} \times \frac{1}{10} / \frac{1}{100} = \frac{1}{100} \times \frac{1}{100} + \frac{1}{100} = \frac{1}{100} + \frac{1}{100} + \frac{1}{100} = \frac{1}{100} + \frac$					
$K_{\rm r}$ (in/nr) = 60 min/nr k= 60 min/hr	x r²/R² x L(in)/T(min) x ln (H1/H2) x/x 3/ 5.81	x In(3/2)	7			
k= 00 min/m	·····	× in(3/2)				
	<u>_</u>					
	nple (Check appropriate items): CracksRoc	t Channels				
	ontactLarge GravelLarge Ro					
Dry Soil	· · · · ·	1010				
Dry 30ii						

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\_\_\_\_\_ Other---Specify\_\_\_\_\_

South Jersey En	gineers LLC	Tristate Engineering	Sample Date: 10/13/23
P.O. Box 1406		Douglass Street	Stormwater - TP7
Voorhees, NJ 08	3043	Elk Township	Horizon 29"-61"
<u>.</u>	a ann g mar an anna dha bana dha bana na Manahan marra83 ak b ""	–	<u></u>
MUNICIPALITY	Elk Township		
Form 3b. Tube Permea	ameter Test Data		
1. Test Number	1 Replicate Lette	er B Date Collecte	ed 10/13/2023
2. Material Tested	Fill	X Test in Native Soil -	Indicate Depth 48"
3. Type of Sample	Undisturbed	X	Disturbed
4. Sample Dimensions	Inside Radius of Sample Tube, R, in cm Length of Sample, in inches	1.905 3	
Sample Weight (Wt. Sample Volume (L x 2	ination (Disturbed Samples Only): Tube Containing Sample - Wt. Empty Tube 2.54 cm/inch x 3.14R <sup>2</sup> ), cc Wt./Sample Volume), grams/cc	147 19 86.83 1.70	
6. Standpipe Used: Indicate internal Rad	x NoYes Jius, cm		
	el above Rim of Test Basin in inches: Each Test Interval, H1 est Interval, H2	3.0 2.0	
8. Rate of Water Leve	Drop (Add additional lines if needed):		
Time, Start of Test Interval, T1 (min.sec)	Time, End of Test Length of Test Interv Interval, T2 T, (min) (min.sec)	al,	
0.00	5.27 5.45		
0.00	5.30 5.50		
0.00	5.52 5.87		
	······		
9. Calculation of Perm		_	
K, (in/hr) = 60 min/hr k= 60 min/hr	x r <sup>2</sup> /R <sup>2</sup> x L(in)/T(min) x ln (H1/H2) x x 3/ 5.87	x ln(3/2)	
k=	12.42		
<u>x</u> None Soil/Tube Co Dry Soil	nple (Check appropriate items): CracksWorm ChannelsRoot Cl ontactLarge GravelLarge Roots SmeeringCompactation cify	nanneis	

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South Jersey Enginee	ers LLC		Tristate Er	ngineering	Sample Date: 1	0/13/23
P.O. Box 1406			Douglass Str	reet	Stormwater - TP8	
Voorhees, NJ 08043			Eik Townshi		Horizon 34"-76"	
		······································		-		
	k Township					
Form 3b. Tube Permeameter	Test Data					
1. Test Number	1	Replicate Letter	A	] Date Collect	ed 10/13/2023	
2. Material Tested	F		X	]Test in Native Soil	- Indicate Depth	60"
3. Type of Sample	]U	Indisturbed		X	Disturbed	
4. Sample Dimensions Inside Length	Radius of Sample of Sample, in incl		1.905 3			
5. Bulk Density Determination Sample Weight (Wt. Tube C Sample Volume (L x 2.54 cm Bulk Density (Sample Wt./Sa	ontaining Sample	- Wt. Empty Tube	147.64 86.83 1.70	]		
6. Standpipe Used:	<u>د                                     </u>			_		
<ol> <li>Height of water Level above At the Beginning of Each Te At the End of Each Test Inter</li> </ol>	est Interval, H1	n in inches:	3.0 2.0			
8. Rate of Water Level Drop (	Add additional line	es if needed):				
	Interval, T2	ength of Test Interva T, (min)	i,			
(min.sec) 0.00	(min.sec) 12.25	12.42	7			
0.00	12.27	12.45				
0.00	12.38	12.63	]			
		·····	-			
9. Calculation of Permeability	:	<u></u>	_1			
K, (in/hr) = 60 min/hr $\times r^2/R^2$						
k= 60 min/hr x	x 3/	12.63	x ln(3/2)			
k= 5.78		,				
k=         5.78           10. Defects in the Sample (C			annels			

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\_\_\_\_\_Soil/Tube Contact \_\_\_\_Large Gravel \_\_\_\_\_Large Roots \_\_\_\_\_Large Roots

\_\_\_\_\_Other---Specify\_\_\_\_\_

South Jersey En	gineers LLC		Tristate Er	ngineering	Sample Date:	10/13/23
P.O. Box 1406			Douglass Str	reet	Stormwater - TP8	3
Voorhees, NJ 08	3043		Elk Township		Herizon 34"-76"	
100111000, 110 00			Lak TOwnshi	J	31012011 04 -70	· · · · · · · · ·
MUNICIPALITY	Elk Township					
Form 3b. Tube Permea	meter Test Data					
1. Test Number	1	Replicate Letter	В	Date Collected	10/13/2023	
2. Material Tested	Fil	I	X	]Test in Native Soil - I	ndicate Depth	60"
3. Type of Sample	Ur	ndisturbed		X	Disturbed	
4. Sample Dimensions	Inside Radius of Sample Length of Sample, in inch		1.905 3			
Sample Weight (Wt. Sample Volume (L x 2	ination (Disturbed Sample Tube Containing Sample - 2.54 cm/inch x 3.14R <sup>2</sup> ), cc 9 Wt./Sample Volume), gra	Wt. Empty Tube	149.24 86.83 1.72			
6. Standpipe Used: Indicate internal Rad	No dius, cm	Yes		_		
	el above Rim of Test Basir Each Test Interval, H1 Fest Interval, H2	n in inches:	3.0 2.0	]		
8. Rate of Water Leve	l Drop (Add additional lines	s if needed):				
Time, Start of Test Interval, T1 (min.sec)	Time, End of Test Le Interval, T2 (min.sec)	ength of Test Interva T, (min)	ıl,			
0.00	12.26	12.43				
0.00	12.49	12.82				
0.00	13.15	13.26	4			
9. Calculation of Perm	eability:					
$K_{\rm in}$ (in/br) = 60 min/br	x r²/R² x L(in)/T(min) x In	(H1/H2)				
k = 60  min/hr	x x 3/	13.26	x In(3/2)	7		
k= 00 min/m		10.20	A m(V/4/	_1		
<u>к</u> –	5.51					
10. Defects in the San	nple (Check appropriate ite	ems):				
	CracksWorm Chan		annels			

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\_\_\_\_\_\_Soil/Tube Contact \_\_\_\_Large Gravel \_\_\_\_Large Roots

Dry Soil \_\_\_\_Smeering \_\_\_\_Compactation

\_\_\_\_\_ Other---Specify\_\_\_\_\_

# **IV. RECHARGE SPREADSHEETS**

New Jersey Groundwat		Annual Groundwater Red		nalysis	(based on GS	R-32)			Project Name:	7th Ave and	Douglas	Street
Recharge Spreadshee Version 2.0	et	Select Township $\downarrow$	Average Annual P (in)	Climatic Factor					Description:	Rain Garder	n #1	
November 2	003	GLOUCESTER CO., ELK TWP	43.8	1.35					Analysis Date:	01/24/24		
		Pre-Developed Cond	litions						Post-Develope	d Conditions		
Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)		Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	0.48	Woods	Aura	11.6	20,214		1	0.34	Open space	Keyport	10.9	13,482
2	0						2	0.05	Gravel, dirt	Aura	8.1	1,468
3	0						3	0.09	Impervious areas	Aura	0.0	-
4	0						4	0				
5	0						5	0				
6	0						6	0				
7	0						7	0				
8	0						8	0				
9	0						9	0				
10	0						10	0				
11	0						11	0				
12	0						12	0				
13	0						13	0				
14	0						14	0				
15	0						15	0				
Total =	0.5			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)		Total =	0.5			Total Annual Recharge (in)	Total Annual Recharge (cu.ft)
				11.6	20,214		Annual	Recharg	je Requirements Calculat	ion ↓	8.6	14,950
Procedure 1	to fill the	Pre-Development and Post-Development Con	ditions Tables			% of Pre-	Developed /	Annual Re	charge to Preserve =	100%	Total Impervious Area (sq.ft)	3,920
For each land s	For each land segment, first enter the area, then select TR-55 Land Cover, then select Soil. Start from the top of the table					Post-D	evelopme	ent Ann	ual Recharge Deficit=	5,265	(cubic feet)	
and proceed do	ownward. Do	on't leave blank rows (with A=0) in between your segment en	tries. Rows with A=0 w	vill not be		Rech	arge Effici	iency Pa	rameters Calculations (ar	ea averages)		
displayed or us	ed in calcul	ations. For impervious areas outside of standard lots select	"Impervious Areas" as	the Land Cover.		RWC=	4.02	(in)	DRWC=	4.02	(in)	
Soil type for im	pervious are	eas are only required if an infiltration facility will be built withi	n these areas.			ERWC =	1.31	(in)	EDRWC=	1.31	(in)	

Project Name		Description	on		Analysis	Date	BMP or L	ID Type				
7th Ave and Dougl	as Stree	Rain Gard	den #1		01/24/24							
Recharge BMP Input Pa	arameters			Root Zone Water cap	acity Calcu	ilated Paran	neters	<b>Recharge Design Pa</b>	rameters			
Parameter Parameter	<u>Symbol</u>	<u>Value</u>	<u>Unit</u>	Parameter	Symbol	<u>Value</u>	<u>Unit</u>	Parameter	<u>Symbol</u>	<u>Value</u>	<u>Unit</u>	
BMP Area	ABMP	1774.0	sq.ft	Empty Portion of RWC under Post-D Natural Recharge	ERWC	1.31	in	Inches of Runoff to capture	Qdesign	2.70	in	
BMP Effective Depth, this is the design variable	dBMP	24.0	in	ERWC Modified to consider dEXC	EDRWC	0.73	in	Inches of Rainfall to capture	Pdesign	2.93	in	
Upper level of the BMP surface (negative if above ground)	dBMPu	-5.2	in	Empty Portion of RWC under Infilt. BMP	RERWC	0.62	in	Recharge Provided Avg. over Imp. Area		17.6	in	
Depth of lower surface of BMP, must be>=dBMPu	dEXC	24.0	in			<u>.</u>		Runoff Captured Avg. over imp. Area		34.0	in	
Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	0	unitless									
				<b>BMP</b> Calculated Size	Parameter	S		CALCULATION C	HECK MES	SAGES		
				ABMP/Aimp	Aratio	0.45	unitless	Volume Balance->		em to satis	fy Annu	al Recharge
				BMP Volume	VBMP	3,548	cu.ft	dBMP Check>				
Parameters from Annua	I Recharge	e Worksheet		System Performance	Calculated	Parameters		dEXC Check>	OK			
Post-D Deficit Recharge (or desired recharge volume)	Vdef	5,265	cu.ft	Annual BMP Recharge Volume		5,737	cu.ft					uted or undetermined
								BMP Location>	Location is	selected as	s distrib	alea or undelermined
	Aimp	3,920	sq.ft	Avg BMP Recharge Efficiency		51.7%	Represents % Infiltration Recharged	BMP Location> OTHER NOTES	Location is	selected as	s distrib	
(or target Impervious Area) Root Zone Water Capacity	Aimp RWC	3,920 4.02	sq.ft in	Efficiency %Rainfall became Runoff		51.7% 77.5%	% Infiltration					
(or target Impervious Area) Root Zone Water Capacity RWC Modified to				Efficiency %Rainfall became Runoff %Runoff Infiltrated			% Infiltration Recharged	OTHER NOTES	r BMP dimension:	s are updated t	o make re	ch volume= deficit volume. Th
(or target Impervious Area) Root Zone Water Capacity RWC Modified to consider dEXC	RWC	4.02	in	Efficiency %Rainfall became Runoff %Runoff Infiltrated %Runoff Recharged		77.5%	% Infiltration Recharged %	OTHER NOTES Pdesign is accurate only after	r BMP dimension	s are updated t	o make re P are igno	ch volume= deficit volume. Th red in these calculations. Res
Post-D Impervious Area (or target Impervious Area) Root Zone Water Capacity RWC Modified to consider dEXC Climatic Factor Average Annual P Recharge Requirement	RWC	4.02	in in	Efficiency %Rainfall became Runoff %Runoff Infiltrated %Runoff		77.5%	% Infiltration Recharged %	OTHER NOTES Pdesign is accurate only after of BMP infiltration prior to fillir	r BMP dimension: ng and the area o re dBMP selected	s are updated t ccupied by BM I is small enoug	o make re P are igno gh for BMF	ch volume≃ deficit volume. Th red in these calculations. Res t to empty in less than 3 days.

New Jersey Groundwat		Annual Groundwater Red	harge Ar	nalysis	(based on GS	R-32)			Project Name:	7th Ave and	Douglas	Street
Recharge Spreadshee Version 2.0	et	Select Township $\downarrow$	Average Annual P (in)	Climatic Factor					Description:	Rain Garde	ו #2	
November 2	003	GLOUCESTER CO., ELK TWP	43.8	1.35					Analysis Date:	01/24/24		
		Pre-Developed Cond	itions						Post-Develope	d Conditions		
Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)		Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	0.595	Woods	Aura	11.6	25,057		1	0.14	Impervious areas	Aura	0.0	-
2	0.375	Woods	Downer	12.1	16,407		2	0.455	Open space	Aura	11.9	19,611
3	0						3	0.375	Open space	Downer	12.8	17,464
4	0						4	0				
5	0						5	0				
6	0						6	0				
7	0						7	0				
8	0						8	0				
9	0						9	0				
10	0						10	0				
11	0						11	0				
12	0						12	0				
13	0						13	0				
14	0						14	0				
15	0						15	0				
Total =	1.0			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)		Total =	1.0			Total Annual Recharge (in)	Total Annual Recharge (cu.ft)
				11.8	41,465		Annual	Recharg	ge Requirements Calculat	ion↓	10.5	37,075
Procedure	rocedure to fill the Pre-Development and Post-Development Conditions Tables						Developed /	Annual Re	charge to Preserve =	100%	Total Impervious Area (sq.ft)	6,098
For each land s	segment, firs	st enter the area, then select TR-55 Land Cover, then select :	Soil. Start from the to	p of the table		Post-Development Annual Recharge Deficit= 4,39					(cubic feet)	
and proceed de	ownward. Do	on't leave blank rows (with A=0) in between your segment ent	ries. Rows with A=0 w	vill not be		Rech	arge Effici	iency Pa	rameters Calculations (ar	ea averages)		
displayed or us	ed in calcul	ations. For impervious areas outside of standard lots select "	Impervious Areas" as	the Land Cover.		RWC=	3.53	(in)	DRWC=	3.53	(in)	
Soil type for im	pervious are	eas are only required if an infiltration facility will be built within	these areas.			ERWC =	1.15	(in)	EDRWC=	1.15	(in)	

Project Name		Description	<u>on</u>		Analysis	<u>Date</u>	BMP or L	<u>ID Type</u>				
7th Ave and Dougla	as Stree	Rain Gard	den #2		01/24/24							
Recharge BMP Input Pa	arameters			Root Zone Water cap	pacity Calcu	ilated Paran	neters	<b>Recharge Design Pa</b>	rameters			
Parameter	Symbol	<u>Value</u>	<u>Unit</u>	Parameter	<u>Symbol</u>	<u>Value</u>	<u>Unit</u>	Parameter	<u>Symbol</u>	<u>Value</u>	Unit	
BMP Area	ABMP	1670.0	sq.ft	Empty Portion of RWC under Post-D Natural Recharge	ERWC	1.15	in	Inches of Runoff to capture	Qdesign	2.70	in	
BMP Effective Depth, this is the design variable	dBMP	24.0	in	ERWC Modified to consider dEXC	EDRWC	1.15	in	Inches of Rainfall to capture	Pdesign	2.93	in	
Upper level of the BMP surface (negative if above ground)	dBMPu	-5.2	in	Empty Portion of RWC under Infilt. BMP	RERWC	0.97	in	Recharge Provided Avg. over Imp. Area		18.2	in	
Depth of lower surface of BMP, must be>=dBMPu	dEXC	0.0	in					Runoff Captured Avg. over imp. Area		34.0	in	
Post-development Land Segment Location of BMP , , nput Zero if Location is distributed	SegBMP	0	unitless									
or undetermined												
or undetermined				BMP Calculated Size	e Parameter	'S		CALCULATION C	HECK MES	SSAGES	-	
or undetermined				ABMP/Aimp	Aratio	0.27	unitless	Volume Balance->	Solve Probl	em to satis		
				ABMP/Aimp BMP Volume	Aratio VBMP	0.27 3,340		Volume Balance-> dBMP Check>	Solve Probl dBMP must	em to satis		ial Recharge J, adjust parameters
Parameters from Annua	l Recharg	e Worksheet		ABMP/Aimp	Aratio VBMP	0.27 3,340		Volume Balance->	Solve Probl dBMP must	em to satis		
	<b>il Recharg</b> Vdef	e Worksheet 4,390	cu.ft	ABMP/Aimp BMP Volume	Aratio VBMP	0.27 3,340	cu.ft	Volume Balance-> dBMP Check> dEXC Check>	Solve Proble dBMP must OK	em to satis be<=dEXC	-dBMP	
Parameters from Annua Post-D Deficit Recharge (or desired recharge		4,390	cu.ft	ABMP/Aimp BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency	Aratio VBMP	0.27 3,340 Parameters	cu.ft	Volume Balance-> dBMP Check> dEXC Check> BMP Location>	Solve Proble dBMP must OK	em to satis be<=dEXC	-dBMP	ı, adjust parameters
Parameters from Annua Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area (or target Impervious Area) Root Zone Water Capacity	Vdef	4,390		ABMP/Aimp BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff	Aratio VBMP	0.27 3,340 Parameters 9,250	cu.ft cu.ft Represents % Infiltration	Volume Balance-> dBMP Check> dEXC Check> BMP Location> OTHER NOTES	Solve Probl dBMP must OK Location is	em to satis be<=dEXC selected as	-dBMP	ı, adjust parameters
Parameters from Annua Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area (or target Impervious Area) Root Zone Water Capacity RWC Modified to	Vdef Aimp	<b>4,390</b> 6,098	sq.ft	ABMP/Aimp BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff %Runoff Infiltrated	Aratio VBMP	0.27 3,340 Parameters 9,250 53.6%	cu.ft cu.ft Represents % Infiltration Recharged	Volume Balance-> dBMP Check> dEXC Check> BMP Location> OTHER NOTES	Solve Probl dBMP must OK Location is	em to satis be<=dEXC selected as	-dBMPt	u, adjust parameters uted or undetermined ch volume= deficit volume. Tr
Parameters from Annua Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area	Vdef Aimp RWC	4,390 6,098 3.53	sq.ft in	ABMP/Aimp BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff %Runoff Infiltrated %Runoff Recharged	Aratio VBMP	0.27 3,340 Parameters 9,250 53.6% 77.5%	cu.ft cu.ft Represents % Infiltration Recharged	Volume Balance-> dBMP Check> dEXC Check> BMP Location> OTHER NOTES Pdesign is accurate only afte of BMP infiltration prior to filli	Solve Problet dBMP must OK Location is	em to satis be<=dEXC selected as s are updated t	o make re	u, adjust parameters uted or undetermined ch volume= deficit volume. Tr
Parameters from Annua Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area (or target Impervious Area) Root Zone Water Capacity RWC Modified to consider dEXC	Vdef Aimp RWC DRWC	4,390 6,098 3.53 3.53	sq.ft in in	ABMP/Aimp BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff %Runoff %Runoff	Aratio VBMP	0.27 3,340 Parameters 9,250 53.6% 77.5% 100.0%	cu.ft cu.ft Represents % Infiltration Recharged %	Volume Balance-> dBMP Check> dEXC Check> BMP Location> OTHER NOTES Pdesign is accurate only afte of BMP infiltration prior to fillin sensetive to dBMP, make sur	Solve Probled BMP must	em to satis be<=dEXC selected as s are updated t occupied by BM d is small enoug	-dBMP o make re P are igno	u, adjust parameters uted or undetermined ch volume= deficit volume. Tr ored in these calculations. Res

New Jersey Groundwat		Annual Groundwater Rec		nalysis	(based on GS	R-32)			Project Name:	7th Ave and	Douglas	Street
Recharge Spreadshee Version 2.0	et	Select Township $\downarrow$	Average Annual P (in)	Climatic Factor					Description:	Rain Garder	n #3	
November 2	2003	GLOUCESTER CO., ELK TWP	43.8	1.35					Analysis Date:	01/24/24		
		Pre-Developed Cond	itions						Post-Develope	d Conditions		
Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)		Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	0.828	Woods	Downer	12.1	36,227		1	0.11	Impervious areas	Downer	0.0	-
2	0						2	0.718	Open space	Downer	12.8	33,438
3	0						3	0				
4	0						4	0				
5	0						5	0				
6	0						6	0				
7	0						7	0				
8	0						8	0				
9	0						9	0				
10	0						10	0				
11	0						11	0				
12	0						12	0				
13	0						13	0				
14	0						14	0				
15	0						15	0				
Total =	0.8			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)		Total =	0.8			Total Annual Recharge (in)	Total Annual Recharge (cu.ft)
				12.1	36,227		Annual	Recharg	je Requirements Calculat	ion ↓	11.1	33,438
Procedure	ocedure to fill the Pre-Development and Post-Development Conditions Tables						Developed /	Annual Re	charge to Preserve =	100%	Total Impervious Area (sq.ft)	4,792
For each land	and segment, first enter the area, then select TR-55 Land Cover, then select Soil. Start from the top of the table						evelopme	ent Ann	ual Recharge Deficit=	2,789	(cubic feet)	
and proceed d	ownward. Do	on't leave blank rows (with A=0) in between your segment ent	ries. Rows with A=0 w	ill not be		Rech	arge Effici	iency Pa	rameters Calculations (ar	ea averages)		
displayed or us	sed in calcul	ations. For impervious areas outside of standard lots select "	Impervious Areas" as	the Land Cover.		RWC=	2.53	(in)	DRWC=	1.47	(in)	
Soil type for im	npervious are	eas are only required if an infiltration facility will be built within	these areas.			ERWC =	0.82	(in)	EDRWC=	0.48	(in)	

Project Name		Descriptio	<u>on</u>		Analysis	Date	<b>BMP</b> or L	ID Type				
7th Ave and Dougla	as Stree	Rain Garc	len #3		01/24/24							
Recharge BMP Input Pa	arameters			Root Zone Water cap	oacity Calcu	ilated Paran	neters	<b>Recharge Design Pa</b>	rameters			
Parameter	<u>Symbol</u>	<u>Value</u>	<u>Unit</u>	Parameter	Symbol	<u>Value</u>	<u>Unit</u>	Parameter	<u>Symbol</u>	<u>Value</u>	<u>Unit</u>	
BMP Area	ABMP	1690.0	sq.ft	Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.82	in	Inches of Runoff to capture	Qdesign	2.70	in	
BMP Effective Depth, this is the design variable	dBMP	24.0	in	ERWC Modified to consider dEXC	EDRWC	0.48	in	Inches of Rainfall to capture	Pdesign	2.93	in	
Upper level of the BMP surface (negative if above ground)	dBMPu	24.0	in	Empty Portion of RWC under Infilt. BMP	RERWC	0.39	in	Recharge Provided Avg. over Imp. Area		24.4	in	
Depth of lower surface of BMP, must be>=dBMPu	dEXC	0.0	in					Runoff Captured Avg. over imp. Area		34.0	in	
Post-development Land Segment Location of BMP , nput Zero if Location is distributed or undetermined	SegBMP	0	unitless									
				<b>BMP Calculated Size</b>	e Parameter	S		CALCULATION C	HECK MES	SSAGES		
				ABMP/Aimp	Aratio	0.35	unitless	Volume Balance->				
				BMP Volume	VBMP	3,380		dBMP Check>	dBMP must	be<=dEXC	-dBMP	ı, adjust parameters
Parameters from Annua	l Recharg	e Worksheet			VBMP	3,380			dBMP must	be<=dEXC	-dBMP	ı, adjust parameters
Parameters from Annua Post-D Deficit Recharge (or desired recharge volume)	<b>l Recharg</b> Vdef	e Worksheet 2,789	cu.ft	BMP Volume	VBMP	3,380	cu.ft	dBMP Check> dEXC Check>	dBMP must make dEXC	be<=dEXC	-dBMPu dBMP	ı, adjust parameters
Post-D Deficit Recharge (or desired recharge		2,789	cu.ft sq.ft	BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency	VBMP	3,380 Parameters	cu.ft	dBMP Check> dEXC Check>	dBMP must make dEXC	be<=dEXC	-dBMPu dBMP	ı, adjust parameters ı
Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area (or target Impervious Area) Root Zone Water Capacity	Vdef	2,789		BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff	VBMP	3,380 Parameters 9,725	cu.ft cu.ft Represents % Infiltration	dBMP Check> dEXC Check> BMP Location>	dBMP must make dEXC	∷be<=dEXC larger than selected as	-dBMP dBMP s distrib	ı, adjust parameters ı uted or undetermine
Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area (or target Impervious Area) Root Zone Water Capacity RWC Modified to	Vdef Aimp	2,789 4,792	sq.ft	BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff %Runoff Infiltrated	VBMP	3,380 Parameters 9,725 71.7%	cu.ft cu.ft Represents % Infiltration Recharged	dBMP Check> dEXC Check> BMP Location> OTHER NOTES	dBMP must make dEXC Location is	s are updated t	-dBMP( a dBMP) s distrib	I, adjust parameters
Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area (or target Impervious Area) Root Zone Water Capacity RWC Modified to consider dEXC	Vdef Aimp RWC	2,789 4,792 2.53	sq.ft in	BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff %Runoff Infiltrated %Runoff Recharged	VBMP	3,380 Parameters 9,725 71.7% 77.5%	cu.ft cu.ft Represents % Infiltration Recharged	dBMP Check> dEXC Check> BMP Location> OTHER NOTES Pdesign is accurate only afte	dBMP must make dEXC Location is r BMP dimension ng and the area of	s are updated to	o make re	I, adjust parameters I uted or undetermine ch volume= deficit volume. red in these calculations. R
Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area	Vdef Aimp RWC DRWC	2,789 4,792 2.53 1.47	sq.ft in in	BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff %Runoff Infiltrated %Runoff	VBMP	3,380 Parameters 9,725 71.7% 77.5% 100.0%	cu.ft cu.ft Represents % Infiltration Recharged %	dBMP Check> dEXC Check> BMP Location> OTHER NOTES Pdesign is accurate only afte of BMP infiltration prior to filli	dBMP must make dEXC Location is r BMP dimension ng and the area of re dBMP selected	s are updated to be cupied by BM	- dBMP( a dBMP) a distrib	a, adjust parameters a uted or undetermine ch volume= deficit volume. red in these calculations. R t o empty in less than 3 day

New Jersey Groundwat		Annual Groundwater Red		nalysis	(based on GS	R-32)			Project Name:	7th Ave and	Douglas	Street
Recharge Spreadshee Version 2.0	et	Select Township $\downarrow$	Average Annual P (in)	Climatic Factor					Description:	Rain Garder	ו #4	
November 2	003	GLOUCESTER CO., ELK TWP	43.8	1.35					Analysis Date:	01/24/24		
		Pre-Developed Cond	itions						Post-Develope	d Conditions		
Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)		Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	0.514	Woods	Downer	12.1	22,489		1	0.146	Impervious areas	Downer	0.0	-
2	0						2	0.368	Open space	Downer	12.8	17,138
3	0						3	0				
4	0						4	0				
5	0						5	0				
6	0						6	0				
7	0						7	0				
8	0						8	0				
9	0						9	0				
10	0						10	0				
11	0						11	0				
12	0						12	0				
13	0						13	0				
14	0						14	0				
15	0						15	0				
Total =	0.5			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)		Total =	0.5			Total Annual Recharge (in)	Total Annual Recharge (cu.ft)
				12.1	22,489		Annual	Recharg	je Requirements Calculat	ion ↓	9.2	17,138
Procedure	edure to fill the Pre-Development and Post-Development Conditions Tables						Developed /	Annual Re	charge to Preserve =	100%	Total Impervious Area (sq.ft)	6,360
For each land	segment, fir	st enter the area, then select TR-55 Land Cover, then select :	Soil. Start from the to	p of the table		Post-Development Annual Recharge Deficit= 5,35					(cubic feet)	
and proceed d	ownward. De	on't leave blank rows (with A=0) in between your segment ent	ries. Rows with A=0 w	ill not be		Rech	arge Effici	iency Pa	rameters Calculations (ar	ea averages)		
displayed or us	sed in calcul	ations. For impervious areas outside of standard lots select "	Impervious Areas" as	the Land Cover.		RWC=	2.42	(in)	DRWC=	2.42	(in)	
Soil type for im	pervious ar	eas are only required if an infiltration facility will be built within	these areas.			ERWC =	0.79	(in)	EDRWC=	0.79	(in)	

Project Name		Description	on		Analysis	Date	BMP or L	ID Type				
7th Ave and Dougla	as Stree	Rain Gard	den #4		01/24/24							
Recharge BMP Input Pa	rameters			Root Zone Water cap	acity Calcu	lated Paran	ieters	Recharge Design Pa	rameters			
Parameter	Symbol	<u>Value</u>	<u>Unit</u>	Parameter	Symbol	<u>Value</u>	<u>Unit</u>	Parameter	Symbol	<u>Value</u>	<u>Unit</u>	
BMP Area	ABMP	4597.0	sq.ft	Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.79	in	Inches of Runoff to capture	Qdesign	2.70	in	
BMP Effective Depth, this is the design variable	dBMP	24.0	in	ERWC Modified to consider dEXC	EDRWC	0.79	in	Inches of Rainfall to capture	Pdesign	2.93	in	
Upper level of the BMP surface (negative if above ground)	dBMPu	-5.2	in	Empty Portion of RWC under Infilt. BMP	RERWC	0.70	in	Recharge Provided Avg. over Imp. Area		11.0	in	
Depth of lower surface of BMP, must be>=dBMPu	dEXC	0.0	in			<u>.</u>		Runoff Captured Avg. over imp. Area		34.0	in	
Post-development Land Segment Location of BMP nput Zero if Location is distributed or undetermined	SegBMP	0	unitless									
											_	
				<b>BMP</b> Calculated Size	Parameter	'S		CALCULATION C	HECK MES	SAGES		
				ABMP/Aimp	Aratio	0.72	unitless	Volume Balance->	Solve Proble	em to satis		
				ABMP/Aimp BMP Volume	Aratio VBMP	0.72 9,194		Volume Balance-> dBMP Check>	Solve Proble dBMP must	em to satis		al Recharge ı, adjust parameters
Parameters from Annua	l Recharg	e Worksheet		ABMP/Aimp	Aratio VBMP	0.72 9,194		Volume Balance->	Solve Proble dBMP must	em to satis		
Parameters from Annua Post-D Deficit Recharge (or desired recharge volume)	<b>l Recharg</b> Vdef		cu.ft	ABMP/Aimp BMP Volume	Aratio VBMP	0.72 9,194	cu.ft	Volume Balance-> dBMP Check> dEXC Check>	Solve Proble dBMP must OK	em to satis be<=dEXC	-dBMPt	
Parameters from Annua Post-D Deficit Recharge (or desired recharge		5,351	cu.ft	ABMP/Aimp BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency	Aratio VBMP	0.72 9,194 Parameters	cu.ft	Volume Balance-> dBMP Check> dEXC Check>	Solve Proble dBMP must OK	em to satis be<=dEXC	-dBMPt	ı, adjust parameters
Parameters from Annua Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area (or target Impervious Area) Root Zone Water Capacity	Vdef	5,351		ABMP/Aimp BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff	Aratio VBMP	0.72 9,194 Parameters 5,810	cu.ft cu.ft Represents % Infiltration	Volume Balance-> dBMP Check> dEXC Check> BMP Location> OTHER NOTES	Solve Proble dBMP must OK Location is	em to satis be<=dEXC selected as	-dBMPu	ı, adjust parameters
Parameters from Annua Post-D Deficit Recharge (or desired recharge <i>v</i> olume) Post-D Impervious Area	Vdef Aimp	5,351 6,360	sq.ft	ABMP/Aimp BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff MRunoff Infiltrated	Aratio VBMP	0.72 9,194 Parameters 5,810 32.3%	cu.ft cu.ft Represents % Infiltration Recharged	Volume Balance-> dBMP Check> dEXC Check> BMP Location> OTHER NOTES	Solve Proble dBMP must OK Location is	em to satis be<=dEXC selected as	-dBMPt	I, adjust parameters uted or undetermined ch volume= deficit volume. Th
Parameters from Annua Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area (or target Impervious Area) Root Zone Water Capacity RWC Modified to	Vdef Aimp RWC	5,351 6,360 2.42	sq.ft in	ABMP/Aimp BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff %Runoff Recharged	Aratio VBMP	0.72 9,194 Parameters 5,810 32.3% 77.5%	cu.ft cu.ft Represents % Infiltration Recharged	Volume Balance-> dBMP Check> dEXC Check> BMP Location> OTHER NOTES Pdesign is accurate only after of BMP infiltration prior to filling	Solve Proble dBMP must OK Location is r BMP dimensions	em to satis be<=dEXC selected as s are updated t ccupied by BM	o make re	I, adjust parameters uted or undetermined ch volume= deficit volume. Th
Parameters from Annua Post-D Deficit Recharge (or desired recharge <i>volume</i> ) Post-D Impervious Area (or target Impervious Area) Root Zone Water Capacity RWC Modified to consider dEXC	Vdef Aimp RWC DRWC	5,351 6,360 2.42 2.42	sq.ft in in	ABMP/Aimp BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff %Runoff Infiltrated %Runoff	Aratio VBMP	0.72 9,194 Parameters 5,810 32.3% 77.5% 100.0%	cu.ft cu.ft Represents % Infiltration Recharged %	Volume Balance-> dBMP Check> dEXC Check> BMP Location> OTHER NOTES Pdesign is accurate only after of BMP infiltration prior to fillin sensetive to dBMP, make sur	Solve Proble dBMP must OK Location is r BMP dimensions ng and the area o re dBMP selected	em to satis be<=dEXC selected as s are updated t ccupied by BM	o make re P are igno	I, adjust parameters uted or undetermined ch volume= deficit volume. Th red in these calculations. Res

New Jersey Groundwat		Annual Groundwater Red		nalysis	(based on GS	R-32)			Project Name:	7th Ave and	Douglas	Street
Recharge Spreadshee Version 2.0	et	Select Township $\downarrow$	Average Annual P (in)	Climatic Factor					Description:	Infiltration A	rea #5	
November 2	2003	GLOUCESTER CO., ELK TWP	43.8	1.35					Analysis Date:	01/24/24		
		Pre-Developed Cond	itions						Post-Develope	d Conditions		
Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)		Land Segment	Area (acres)	TR-55 Land Cover	Soil	Annual Recharge (in)	Annual Recharge (cu.ft)
1	0.365	Woods	Aura	11.6	15,371		1	0.171	Impervious areas	Downer	0.0	-
2							2	0.084	Open space	Downer	12.8	3,912
3	0						3	0.11	Open space	Aura	11.9	4,741
4	0						4	0				
5	0						5	0				
6	0						6	0				
7	0						7	0				
8	0						8	0				
9	0						9	0				
10	0						10	0				
11	0						11	0				
12	0						12	0				
13	0						13	0				
14	0						14	0				
15	0						15	0				
Total =	0.4			Total Annual Recharge (in)	Total Annual Recharge (cu-ft)		Total =	0.4			Total Annual Recharge (in)	Total Annual Recharge (cu.ft)
				11.6	15,371		Annual	Recharg	ge Requirements Calculat	ion↓	6.5	8,653
Procedure	edure to fill the Pre-Development and Post-Development Conditions Tables						Developed /	Annual Re	charge to Preserve =	100%	Total Impervious Area (sq.ft)	7,449
For each land	segment, firs	st enter the area, then select TR-55 Land Cover, then select :	Soil. Start from the to	p of the table		Post-Development Annual Recharge Deficit= 6,7					(cubic feet)	
and proceed d	ownward. Do	on't leave blank rows (with A=0) in between your segment ent	ries. Rows with A=0 w	ill not be		Rech	arge Effici	ency Pa	rameters Calculations (ar	ea averages)		
displayed or us	sed in calcul	ations. For impervious areas outside of standard lots select "	Impervious Areas" as	the Land Cover.		RWC=	2.88	(in)	DRWC=	1.69	(in)	
Soil type for im	pervious are	eas are only required if an infiltration facility will be built within	these areas.			ERWC =	0.94	(in)	EDRWC=	0.55	(in)	

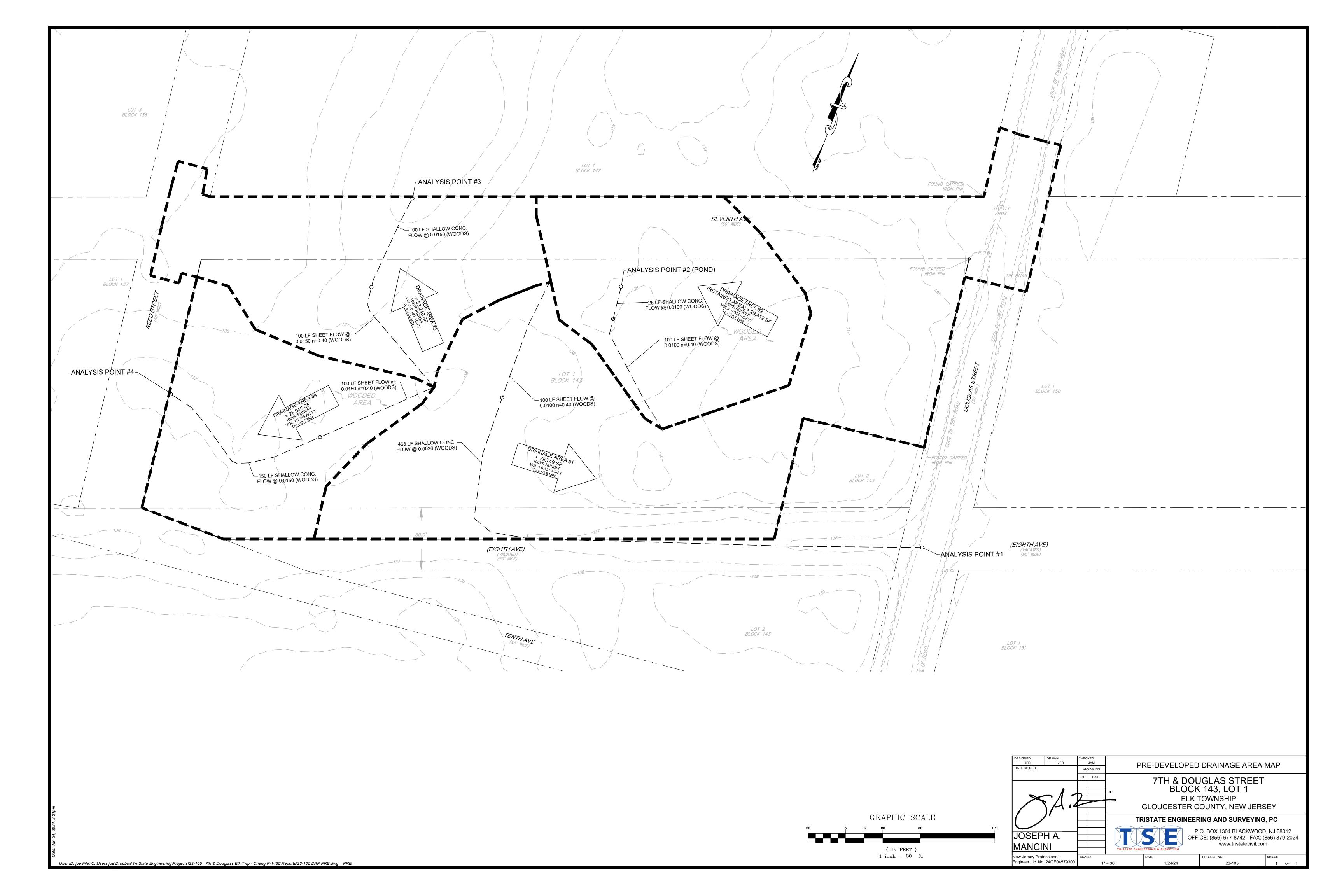
Project Name		Description	on		Analysis	Date	<b>BMP or L</b>	ID Type				
7th Ave and Dougla	as Stree	Infiltration	n Area #5	5	01/24/24							
Recharge BMP Input Pa	arameters			Root Zone Water cap	acity Calcu	lated Paran	neters	<b>Recharge Design Pa</b>	rameters			
Parameter	<u>Symbol</u>	<u>Value</u>	<u>Unit</u>	Parameter	Symbol	<u>Value</u>	<u>Unit</u>	Parameter	<u>Symbol</u>	<u>Value</u>	<u>Unit</u>	
BMP Area	ABMP	4651.0	sq.ft	Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.94	in	Inches of Runoff to capture	Qdesign	2.70	in	
BMP Effective Depth, this is the design variable	dBMP	22.0	in	ERWC Modified to consider dEXC	EDRWC	0.55	in	Inches of Rainfall to capture	Pdesign	2.93	in	
Upper level of the BMP surface (negative if above ground)	dBMPu	-5.2	in	Empty Portion of RWC under Infilt. BMP	RERWC	0.47	in	Recharge Provided Avg. over Imp. Area		17.2	in	
Depth of lower surface of BMP, must be>=dBMPu	dEXC	24.0	in			<u>.</u>		Runoff Captured Avg. over imp. Area		34.0	in	
Post-development Land Segment Location of BMP nut Zero if Location is distributed or undetermined	SegBMP	0	unitless									
				<b>BMP</b> Calculated Size	Parameter	S		CALCULATION C	HECK MES	SAGES		
								CHECCENTION C		0110110		
				ABMP/Aimp	Aratio	0.62	unitless	Volume Balance->	Solve Proble		fy Annu	al Recharge
Donomotons from Annua	l Dachang	Workshoot	<b></b>	BMP Volume	Aratio VBMP	0.62 8,527		Volume Balance-> dBMP Check>	Solve Proble OK		fy Annu	al Recharge
Parameters from Annua Post-D Deficit Recharge (or desired recharge volume)	<mark>I Recharg</mark> Vdef	e Worksheet 6,718	cu.ft		Aratio VBMP	0.62 8,527	cu.ft	Volume Balance-> dBMP Check> dEXC Check>	Solve Proble OK OK	em to satis	-	al Recharge uted or undetermined
Post-D Deficit Recharge (or desired recharge			cu.ft sq.ft	BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency	Aratio VBMP	0.62 8,527 <mark>Parameters</mark>	cu.ft	Volume Balance-> dBMP Check> dEXC Check>	Solve Proble OK OK	em to satis	-	-
Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area (or target Impervious Area) Root Zone Water Capacity	Vdef	6,718		BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff	Aratio VBMP	0.62 8,527 Parameters 10,682	cu.ft cu.ft Represents % Infiltration	Volume Balance-> dBMP Check> dEXC Check> BMP Location> OTHER NOTES	Solve Proble OK OK Location is	em to satis	s distrib	-
Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area (or target Impervious Area)	Vdef Aimp	6,718 7,449	sq.ft	BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff %Runoff Infiltrated	Aratio VBMP	0.62 8,527 Parameters 10,682 50.7%	cu.ft cu.ft Represents % Infiltration Recharged	Volume Balance-> dBMP Check> dEXC Check> BMP Location> OTHER NOTES	Solve Proble OK OK Location is	em to satis selected as	s distrib	uted or undetermined
Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area (or target Impervious Area) Root Zone Water Capacity RWC Modified to consider dEXC	Vdef Aimp RWC	6,718 7,449 2.88	sq.ft in	BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff %Runoff Infiltrated %Runoff Recharged	Aratio VBMP	0.62 8,527 Parameters 10,682 50.7% 77.5%	cu.ft cu.ft Represents % Infiltration Recharged %	Volume Balance-> dBMP Check> dEXC Check> BMP Location> OTHER NOTES Pdesign is accurate only after of BMP infiltration prior to filling	Solve Proble OK OK Location is r BMP dimensions	em to satis selected as s are updated t ccupied by BM	s distrib	uted or undetermined
Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area (or target Impervious Area) Root Zone Water Capacity RWC Modified to	Vdef Aimp RWC DRWC	6,718 7,449 2.88 1.69	sq.ft in in	BMP Volume System Performance Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff %Runoff Infiltrated %Runoff	Aratio VBMP	0.62 8,527 Parameters 10,682 50.7% 77.5% 100.0%	cu.ft cu.ft Represents % Infiltration Recharged %	Volume Balance-> dBMP Check> dEXC Check> BMP Location> OTHER NOTES Pdesign is accurate only after of BMP infiltration prior to fillin sensetive to dBMP, make sur	Solve Proble OK OK Location is r BMP dimensions ng and the area o re dBMP selected	em to satis selected as s are updated t ccupied by BM	o make re P are igno	uted or undetermined

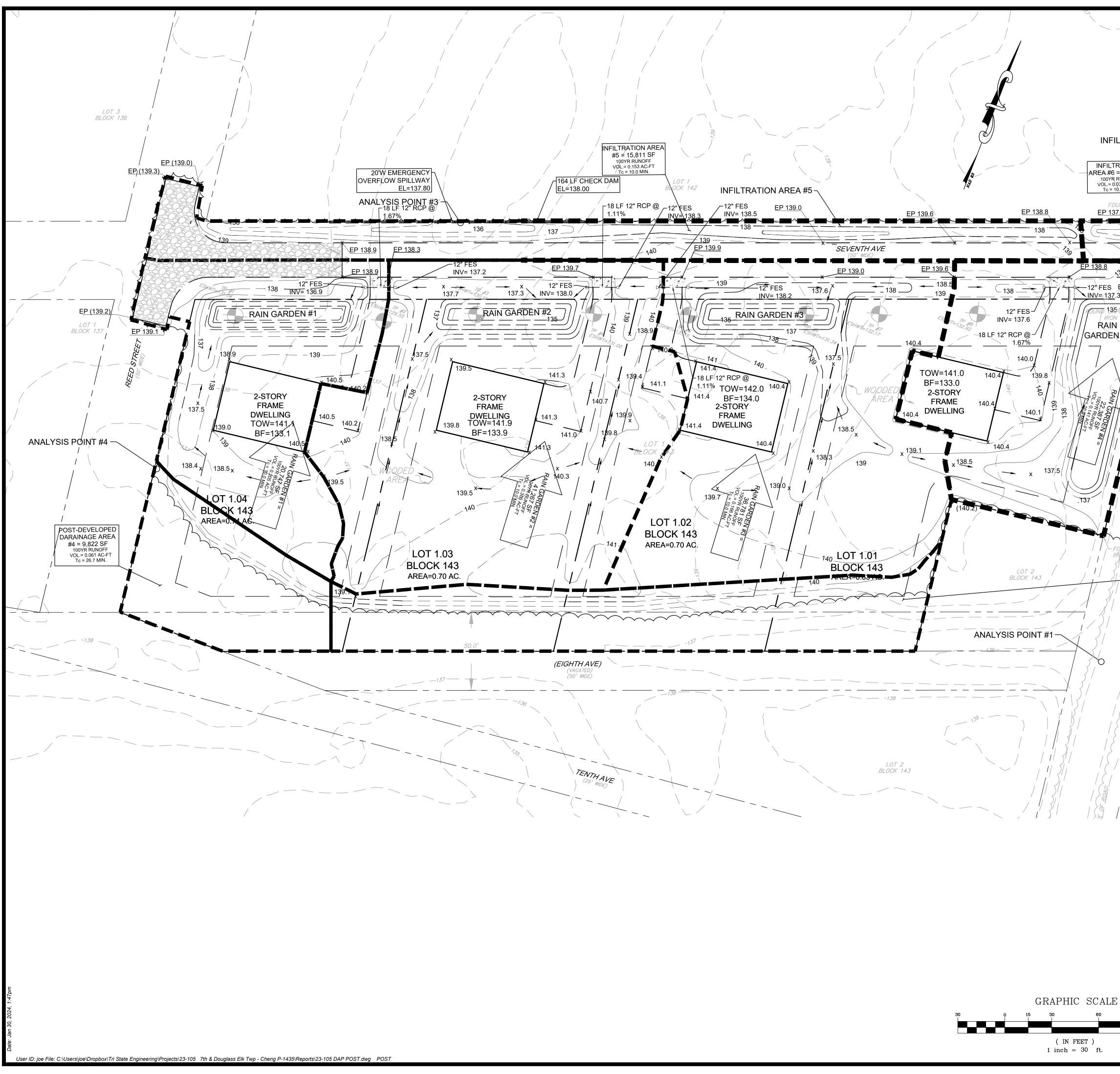
Project Name		Description	on		Analysis	Date	BMP or L	ID Type				
7th Ave and Dougla	as Stree	Rain Gard	den #6		01/24/24							
Recharge BMP Input Pa	arameters			Root Zone Water cap	acity Calcu	lated Paran	neters	Recharge Design Pa	rameters			
Parameter	Symbol	Value	<u>Unit</u>	Parameter	Symbol	<u>Value</u>	Unit	Parameter	Symbol	<u>Value</u>	Unit	
BMP Area	ABMP	1016.0	sq.ft	Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.75	in	Inches of Runoff to capture	Qdesign	2.70	in	
BMP Effective Depth, this is the design variable	dBMP	22.0	in	ERWC Modified to consider dEXC	EDRWC	0.39	in	Inches of Rainfall to capture	Pdesign	2.93	in	
Upper level of the BMP surface (negative if above ground)	dBMPu	-5.2	in	Empty Portion of RWC under Infilt. BMP	RERWC	0.33	in	Recharge Provided Avg. over Imp. Area		21.4	in	
Depth of lower surface of BMP, must be>=dBMPu	dEXC	24.0	in					Runoff Captured Avg. over imp. Area		34.0	in	
Post-development Land Segment Location of BMP nut Zero if Location is distributed or undetermined	SegBMP	0	unitless									
				<b>BMP Calculated Size</b>	Parameter	S		CALCULATION C	HECK MES	SAGES		
				ABMP/Aimp	Aratio	0.60	unitless	Volume Balance->		em to satis	fy Annu	al Recharge
				BMP Volume	VBMP	1,863	I cu ft	dBMP Check>	OK			
	1.D 1	XX7 1 1 4				D	ount					
Parameters from Annua Post-D Deficit Recharge (or desired recharge volume)	l Recharge Vdef	e Worksheet 1,577	cu.ft	System Performance Annual BMP Recharge Volume	Calculated	Parameters 3,025		dEXC Check>	ок	selected as	s distrib	uted or undetermined
Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area	0		cu.ft sq.ft	Annual BMP Recharge Volume Avg BMP Recharge Efficiency	Calculated			dEXC Check>	ок	selected as	s distrib	uted or undetermined
Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area (or target Impervious Area) Root Zone Water Capacity	Vdef	1,577		Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff	Calculated	3,025	cu.ft Represents % Infiltration	dEXC Check> BMP Location>	OK Location is			
Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area (or target Impervious Area)	Vdef Aimp	1,577 1,699	sq.ft	Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff %Runoff Infiltrated		3,025 62.9%	cu.ft Represents % Infiltration Recharged	dEXC Check> BMP Location> OTHER NOTES	OK Location is	s are updated t	o make re	ch volume= deficit volume. Th
Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area (or target Impervious Area) Root Zone Water Capacity RWC Modified to	Vdef Aimp RWC	1,577 1,699 2.30	sq.ft in	Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff %Runoff Infiltrated %Runoff Recharged		3,025 62.9% 77.5%	cu.ft Represents % Infiltration Recharged %	dEXC Check> BMP Location> OTHER NOTES Pdesign is accurate only after	OK Location is r BMP dimensions	s are updated t	o make re P are igno	ch volume= deficit volume. Th red in these calculations. Res
Post-D Deficit Recharge (or desired recharge volume) Post-D Impervious Area (or target Impervious Area) Root Zone Water Capacity RWC Modified to consider dEXC	Vdef Aimp RWC DRWC	1,577 1,699 2.30 1.20	sq.ft in in	Annual BMP Recharge Volume Avg BMP Recharge Efficiency %Rainfall became Runoff %Runoff Infiltrated %Runoff		3,025 62.9% 77.5% 100.0%	cu.ft Represents % Infiltration Recharged %	dEXC Check> BMP Location> OTHER NOTES Pdesign is accurate only after of BMP infiltration prior to fillin	OK Location is r BMP dimensions ng and the area o re dBMP selected	s are updated t ccupied by BM is small enoug	o make re P are igno gh for BMF	ch volume= deficit volume. Th red in these calculations. Res to empty in less than 3 days.

Project Name		Description	on		Analysis	B Date	BMP or L	ID Type				
7th Ave and Dougla	as Stree	Rain Gard	den #6		01/24/24							
Recharge BMP Input Pa	rameters			Root Zone Water cap	oacity Calcu	ilated Paran	neters	<b>Recharge Design Pa</b>	rameters			
Parameter	Symbol	<u>Value</u>	<u>Unit</u>	Parameter	<u>Symbol</u>	<u>Value</u>	<u>Unit</u>	Parameter	<u>Symbol</u>	<u>Value</u>	<u>Unit</u>	
BMP Area	ABMP	1016.0	sq.ft	Empty Portion of RWC under Post-D Natural Recharge	ERWC	0.75	in	Inches of Runoff to capture	Qdesign	2.70	in	
BMP Effective Depth, this is the design variable	dBMP	22.0	in	ERWC Modified to consider dEXC	EDRWC	0.39	in	Inches of Rainfall to capture	Pdesign	2.93	in	
Upper level of the BMP surface (negative if above ground)	dBMPu	-5.2	in	Empty Portion of RWC under Infilt. BMP	RERWC	0.33	in	Recharge Provided Avg. over Imp. Area		21.4	in	
Depth of lower surface of BMP, must be>=dBMPu	dEXC	24.0	in		<u>.</u>			Runoff Captured Avg. over imp. Area		34.0	in	
Post-development Land Segment Location of BMP , Input Zero if Location is distributed or undetermined	SegBMP	0	unitless									
				<b>BMP Calculated Size</b>	Parameter	'S		CALCULATION C	HECK MES	SAGES		
				ABMP/Aimp	Aratio	0.60	unitless	Volume Balance->		em to satis	fy Annu	al Recharge
			1	BMP Volume	VBMP	1,863	cu.ft	dBMP Check>				
Parameters from Annua	I Recharge	e Worksheet		System Performance	Calculated	Parameters	r	dEXC Check>	OK			
Post-D Deficit Recharge (or desired recharge volume)	Vdef	1,577	cu.ft	Annual BMP Recharge Volume		3,025	cu.ft	BMP Location>	Location is	selected as	s distrib	uted or undetermined
Post-D Impervious Area				Avg BMP Recharge			Represents					
	Aimp	1,699	sq.ft	Efficiency		62.9%	% Infiltration Recharged	OTHER NOTES				
(or target Impervious Area) Root Zone Water Capacity	Aimp RWC	2.30	sq.ft in	Efficiency %Rainfall became Runoff		62.9% 77.5%			r BMP dimension	s are updated t	o make re	ch volume= deficit volume. The
(or target Impervious Area) Root Zone Water Capacity RWC Modified to				Efficiency %Rainfall became Runoff %Runoff Infiltrated			Recharged					
(or target Impervious Area) Root Zone Water Capacity RWC Modified to consider dEXC	RWC	2.30	in	Efficiency %Rainfall became Runoff %Runoff Infiltrated %Runoff Recharged		77.5%	Recharged	Pdesign is accurate only after of BMP infiltration prior to fillin	ng and the area o	occupied by BM	P are igno	
(or target Impervious Area) Root Zone Water Capacity RWC Modified to consider dEXC Climatic Factor Average Annual P Recharge Requirement	RWC	2.30	in in	Efficiency %Rainfall became Runoff %Runoff Infiltrated %Runoff		77.5%	Recharged	Pdesign is accurate only after of BMP infiltration prior to fillin sensetive to dBMP, make sur	ng and the area o re dBMP selected	ccupied by BM	P are igno gh for BMF	red in these calculations. Rest

How to solve for different recharge volumes: By default the spreadsheet assigns the values of total deficit recharge volume "Vdef" and total proposed impervious area "Aimp" from the "Annual Recharge" sheet to "Vdef" and "Aimp" on this page. This allows solution for a single BMP to handle the entire recharge requirement assuming the runoff from entire impervious area is available to the BMP. To solve for a small the RMP, as a UD IMP to recharge only part of the recharge requirement assuming the runoff from entire impervious area is available to the BMP.

## V. DRAINAGE MAPS





EP 136.2					
LTRATION AREA #6 RATION = 3,707 SF RUNOFF 032 AC-FT 0.0 MIN. EP 136.8 DND CAPPED 7.5 /RON PIN 136	EP (136.5)	<u>36.2</u> / / / / / / / / / / / / / / / / / / /			
3% EP 137.5 BP 137.5 EP (36.0) EP (36.0) FPN FPN FPN FPN FPN FPN FPN FPN FPN FPN	18: <b>1</b> +				
EDGE OF DIRT ROAD DOUGLAS STREET (50' MUE) TREET	LOT 1 BLOCK 150 POST-DEVELOPED DARAINAGE AREA				
	#1 = 19,178 SF 100YR RUNOFF VOL.= 0.054 AC-FT Tc = 42.7 MIN. <i>EIGHTH AVE)</i> (VACATED) (50' WDE)				
	РТ 1 Ж 151				
	DESIGNED: DRAWN: JFR JFR DATE SIGNED:	CHECKED: JAM REVISIONS NO. DATE		D DRAINAGE AREA	
120	JOSEPH A. MANCINI New Jersey Professional Engineer Lic. No. 24GE04579300		BLOCK ELK 1 GLOUCESTER C ISTATE ENGINEER	OUNTY, NEW JER OUNTY, NEW JER OUNTY, NEW JER OUNTY, NEW JER O. BOX 1304 BLACKWOO CE: (856) 677-8742 FAX: www.tristatecivil.cc	SEY <b>G, PC</b> D, NJ 08012 (856) 879-2024