

Stormwater Management System Report Addendum 1

SHELL POINT PLACE PROPOSED DEFINITIVE SUBDIVISION PLAN

69 GREAT NECK ROAD
WAREHAM, MASSACHUSETTS

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February 3, 2022
Project No. 2443



Signed and Stamped
Electronically 2/3/2022

FIELD
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CONSULTING ENGINEERS

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Section 1

Project Overview

1.0 Project Overview

1.1 Project Description

The purpose of this Stormwater Management System Report Addendum 1 is to address comments provided to the Town of Wareham Planning Board by their consultant Mr. Charles Rowley on his review of the Form C-Definitive Subdivision Plan entitled "Shell Point Place."

The following shall summarize the additional information provided in this Addendum:

- Revised Design of "Upper Drainage System" of leaching pits.
- Presentation of Revised Post Development Hydrologic Calculations incorporating revised leaching pit design and clarifying breakdown of subcatchment areas.
- Updated Post Development Watershed Plan

1.2 Pre-Development Hydrologic Summary

The summary provided in the Stormwater Management System Report of the pre-development hydrologic conditions for the 2, 10, 25 and 100-year storm events is submitted in Table 1.3 below for comparison to the revised Post Development Hydrologic Summary.

Table 1.2 – Pre-Development Hydrologic Summary

Storm Event	Analysis Point AP-1 Rate of Flow (c.f.s.)
2-year storm	0.01
10-year storm	0.22
25-year storm	0.91
100-year storm	3.24

1.3 Revised Post Development Hydrologic Summary

As mentioned above, the post development hydrologic calculations have been reviewed and revised to address comments made by the Planning Board's peer review consultant. We have reviewed and revised the subcatchment area land cover type breakdown to clarify the allotments of impervious area associated with the roadway, sidewalks, and driveways. We have also revised the calculations to incorporate the revised design of the "Upper Drainage System" with an increased number of leaching pits to maximize the retention of runoff up through the 25-year storm event.

A summary of the post-development hydrologic conditions for the 2, 10, 25, and 100-year storm events is submitted in Table 1.3 below.

Table 1.3 – Revised Post Development Hydrologic Summary

Storm Event	Analysis Point AP-1 Rate of Flow (c.f.s.)
2-year storm	0.00
10-year storm	0.07
25-year storm	0.22
100-year storm	0.87

A summary of the pre and post-development hydrologic conditions for the 2, 10, 25, and 100-year storm events is submitted in Table 1.4 below. Results shown as a “negative” represent a decrease in post development condition rates of runoff.

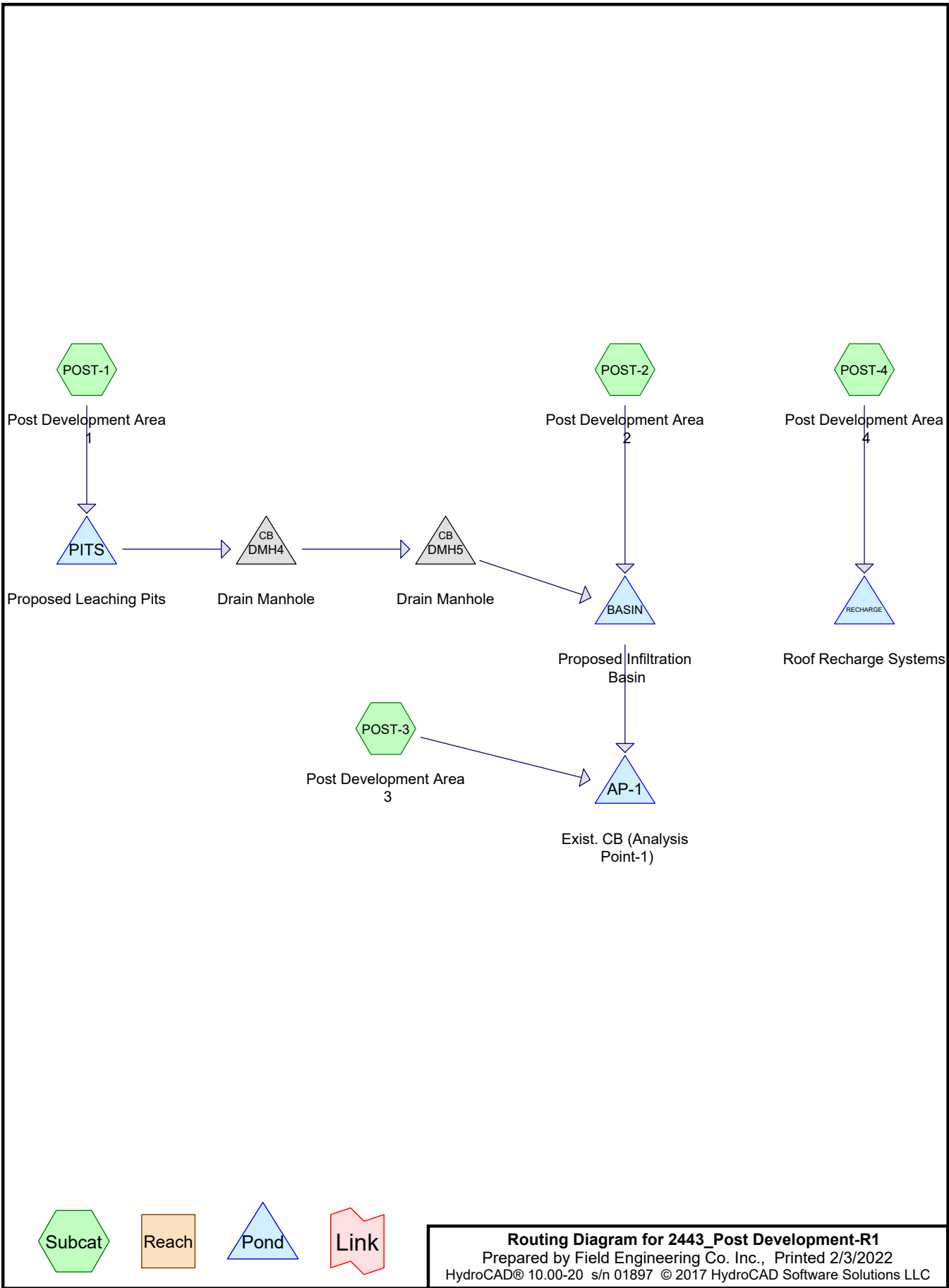
Table 1.4 – Pre-Post Development Hydrologic Results

Storm Event	Analysis Point AP-1 Rate of Flow
2-year storm	-100.0%
10-year storm	-68.2%
25-year storm	-75.8%
100-year storm	-73.1%

The hydrologic analysis indicates that the stormwater management system design for the site meets or reduces peak runoff rates for the 2, 10, 25 and 100-year, 24-hour, Type III storm events from the pre-developed levels at the subject analysis points. The analysis shows the proposed development of this project area will not result in an increase in the rates of runoff from the project site. It should also be noted that the proposed stormwater management system will also reduce the volume of runoff to the subject analysis points by over 80% in the 10-year and 25-year storm events and over 60% in the 100-year storm event.

Section 2

Revised Post Development Hydrologic Analysis



2443_Post Development-R1

Type III 24-hr 2 YR Rainfall=3.45"

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST-1: Post Runoff Area=146,803 sf 13.04% Impervious Runoff Depth=0.11"
 Flow Length=1,203' Tc=28.3 min CN=47 Runoff=0.05 cfs 0.032 af

Subcatchment POST-2: Post Development Runoff Area=190,380 sf 5.35% Impervious Runoff Depth=0.03"
 Flow Length=1,039' Tc=25.3 min CN=42 Runoff=0.02 cfs 0.012 af

Subcatchment POST-3: Post Development Runoff Area=45,857 sf 12.19% Impervious Runoff Depth=0.02"
 Flow Length=625' Tc=24.7 min CN=41 Runoff=0.00 cfs 0.002 af

Subcatchment POST-4: Post Runoff Area=12,600 sf 100.00% Impervious Runoff Depth=3.22"
 Tc=6.0 min CN=98 Runoff=0.95 cfs 0.078 af

Pond AP-1: Exist. CB (Analysis Point-1) Inflow=0.00 cfs 0.002 af
 Primary=0.00 cfs 0.002 af

Pond BASIN: Proposed Infiltration Basin Peak Elev=8.00' Storage=15 cf Inflow=0.02 cfs 0.012 af
 Discarded=0.02 cfs 0.012 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.012 af

Pond DMH4: Drain Manhole Peak Elev=16.10' Inflow=0.00 cfs 0.000 af
 12.0" Round Culvert n=0.013 L=118.0' S=0.0475 '/' Outflow=0.00 cfs 0.000 af

Pond DMH5: Drain Manhole Peak Elev=10.50' Inflow=0.00 cfs 0.000 af
 12.0" Round Culvert n=0.013 L=30.0' S=0.0500 '/' Outflow=0.00 cfs 0.000 af

Pond PITS: Proposed Leaching Pits Peak Elev=11.03' Storage=0.000 af Inflow=0.05 cfs 0.032 af
 Discarded=0.05 cfs 0.032 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.032 af

Pond RECHARGE: Roof Recharge Systems Inflow=0.95 cfs 0.078 af
 Primary=0.95 cfs 0.078 af

Total Runoff Area = 9.083 ac Runoff Volume = 0.123 af Average Runoff Depth = 0.16"
87.99% Pervious = 7.992 ac 12.01% Impervious = 1.091 ac

2443_Post Development-R1

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Type III 24-hr 2 YR Rainfall=3.45"

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Summary for Subcatchment POST-1: Post Development Area 1

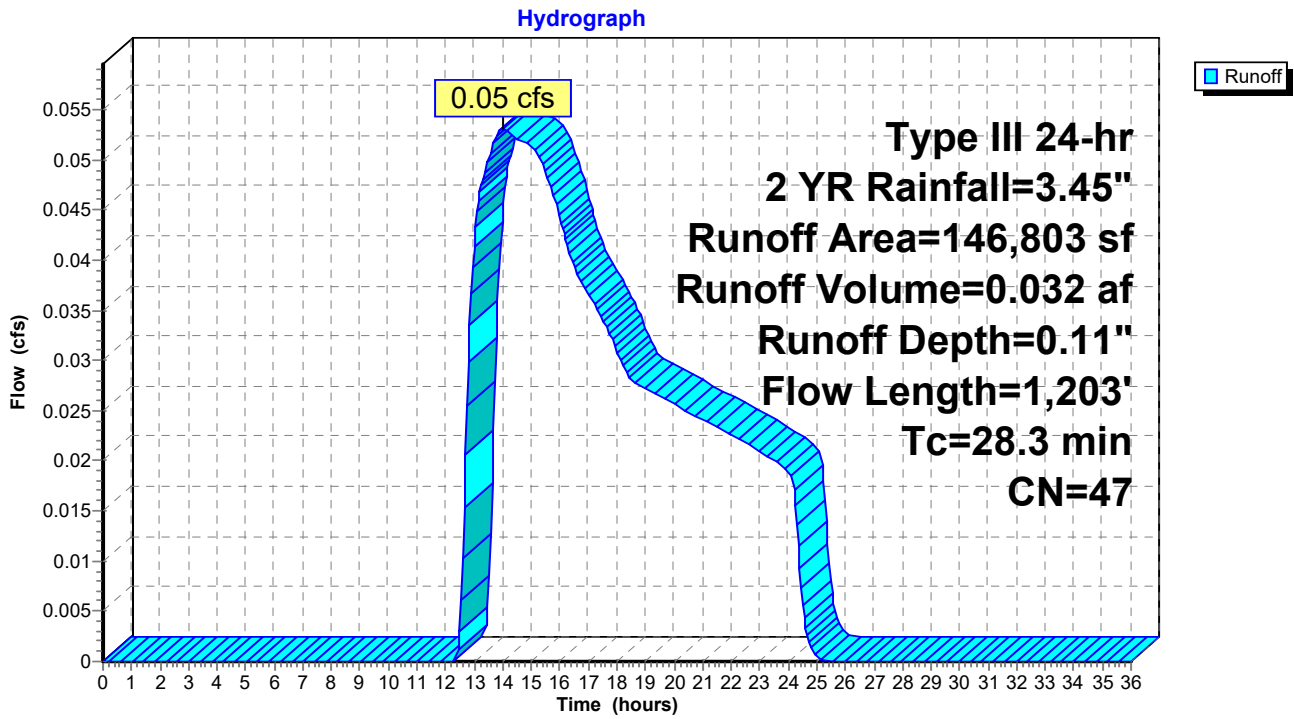
Runoff = 0.05 cfs @ 14.02 hrs, Volume= 0.032 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.45"

Area (sf)	CN	Description
* 11,059	98	Paved Roadway, HSG C
* 8,084	98	Paved Sidewalk & Driveways, HSG C
33,255	39	>75% Grass cover, Good, HSG A
71,874	30	Woods, Good, HSG A
22,531	70	Woods, Good, HSG C
146,803	47	Weighted Average
127,660		86.96% Pervious Area
19,143		13.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	50	0.0200	0.07		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.45"
4.1	352	0.0800	1.41		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
0.1	33	0.0350	3.80		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
11.1	576	0.0300	0.87		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
1.0	175	0.0200	2.87		Shallow Concentrated Flow, E-F Paved Kv= 20.3 fps
0.1	17	0.0130	5.60	4.40	Pipe Channel, F-G 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
28.3	1,203	Total			

Subcatchment POST-1: Post Development Area 1



2443_Post Development-R1

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Type III 24-hr 2 YR Rainfall=3.45"

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Summary for Subcatchment POST-2: Post Development Area 2

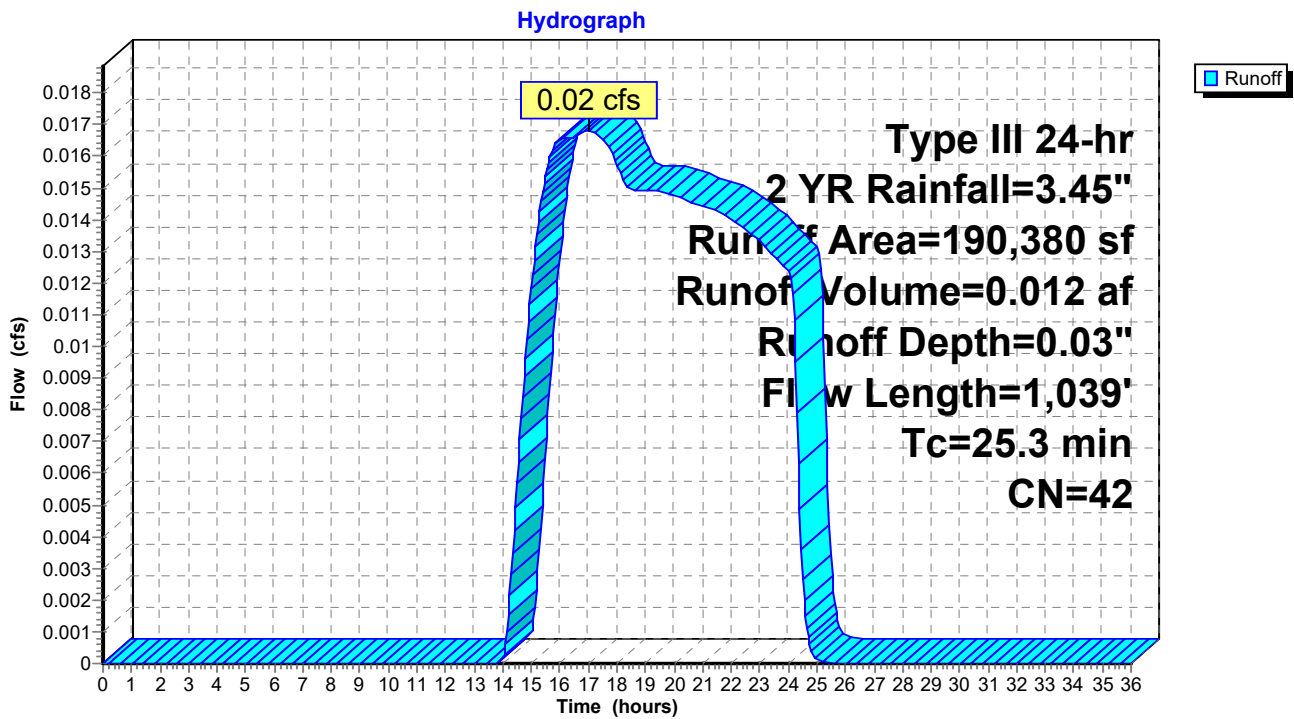
Runoff = 0.02 cfs @ 17.00 hrs, Volume= 0.012 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.45"

Area (sf)	CN	Description
* 6,050	98	Paved Roadway, HSG C
* 4,128	98	Paved Sidewalk and Driveways, HSG C
71,432	39	>75% Grass cover, Good, HSG A
83,600	30	Woods, Good, HSG A
25,170	70	Woods, Good, HSG C
190,380	42	Weighted Average
180,202		94.65% Pervious Area
10,178		5.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	50	0.0250	0.08		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.45"
4.4	370	0.0800	1.41		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
0.2	32	0.0300	3.52		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
9.8	587	0.0400	1.00		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
25.3	1,039	Total			

Subcatchment POST-2: Post Development Area 2



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Type III 24-hr 2 YR Rainfall=3.45"

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Summary for Subcatchment POST-3: Post Development Area 3

Runoff = 0.00 cfs @ 17.56 hrs, Volume= 0.002 af, Depth= 0.02"

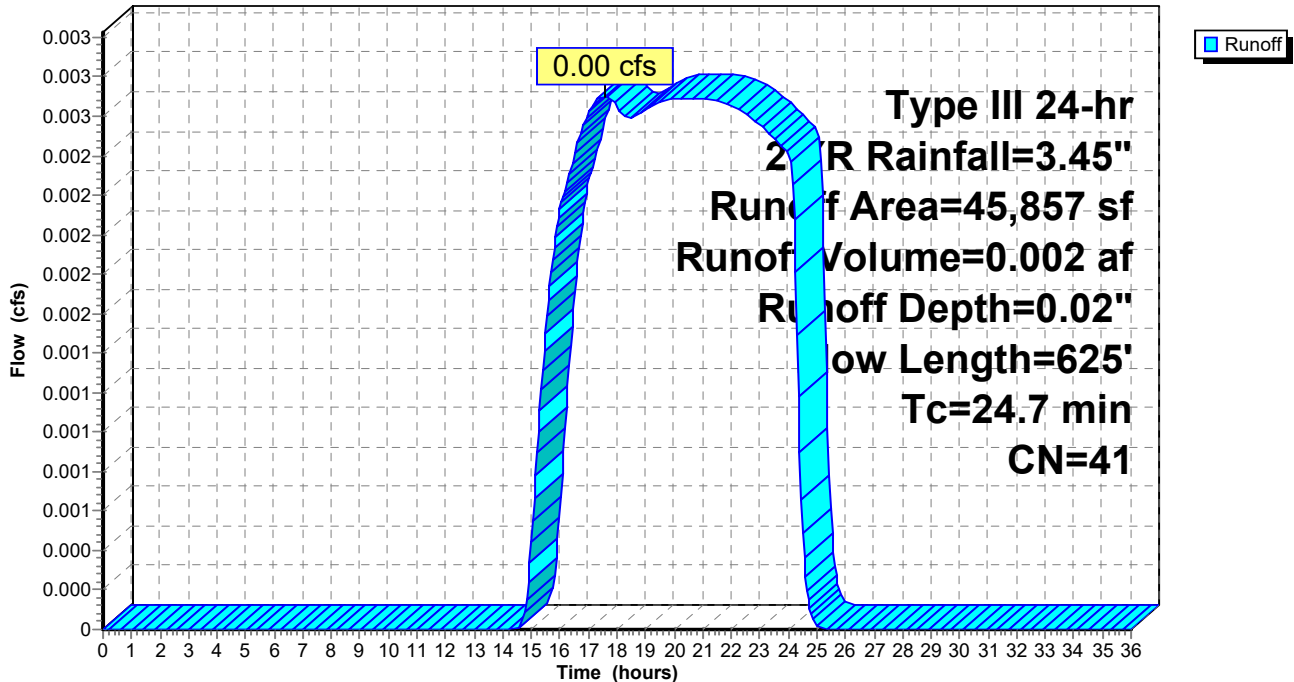
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.45"

Area (sf)	CN	Description
14,260	39	>75% Grass cover, Good, HSG A
5,588	98	Paved parking, HSG A
26,009	30	Woods, Good, HSG A
45,857	41	Weighted Average
40,269		87.81% Pervious Area
5,588		12.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0400	0.11		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.45"
5.3	318	0.0400	1.00		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
0.2	27	0.0100	2.03		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
3.5	180	0.0300	0.87		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
24.7	625	Total			

Subcatchment POST-3: Post Development Area 3

Hydrograph



2443_Post Development-R1

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Type III 24-hr 2 YR Rainfall=3.45"

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Summary for Subcatchment POST-4: Post Development Area 4

Runoff = 0.95 cfs @ 12.09 hrs, Volume= 0.078 af, Depth= 3.22"

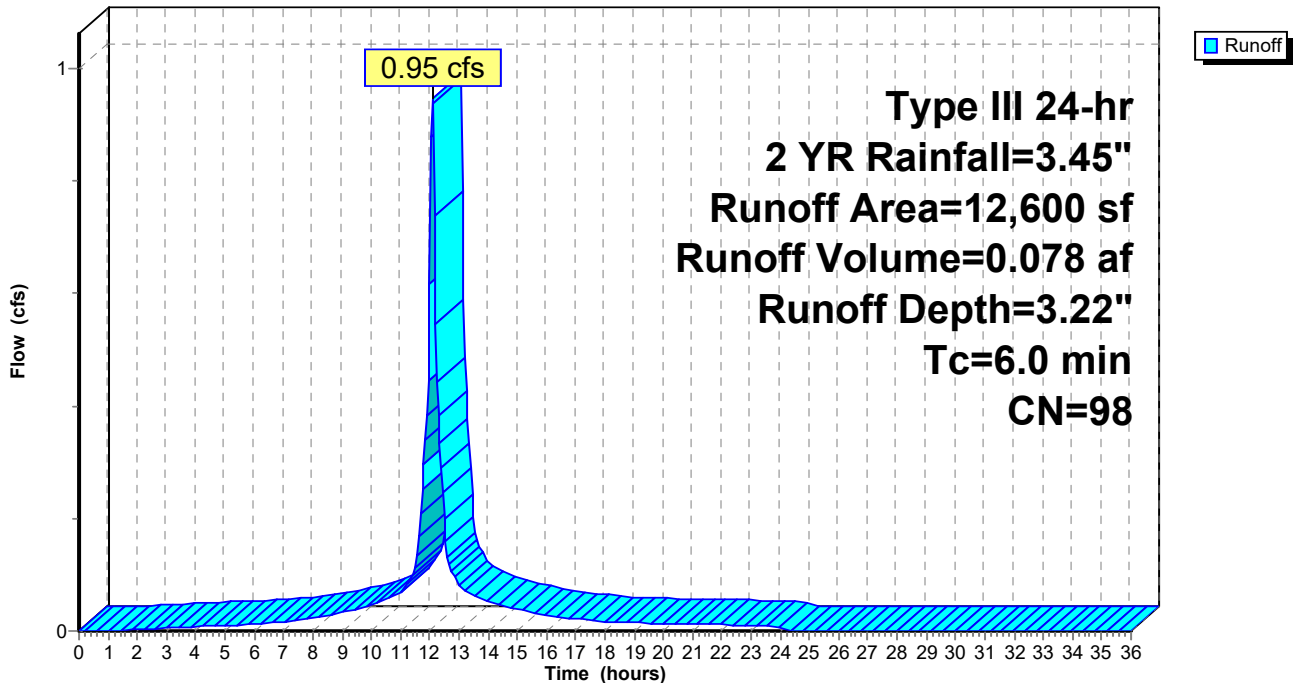
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.45"

Area (sf)	CN	Description
12,600	98	Roofs, HSG A
12,600		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment POST-4: Post Development Area 4

Hydrograph



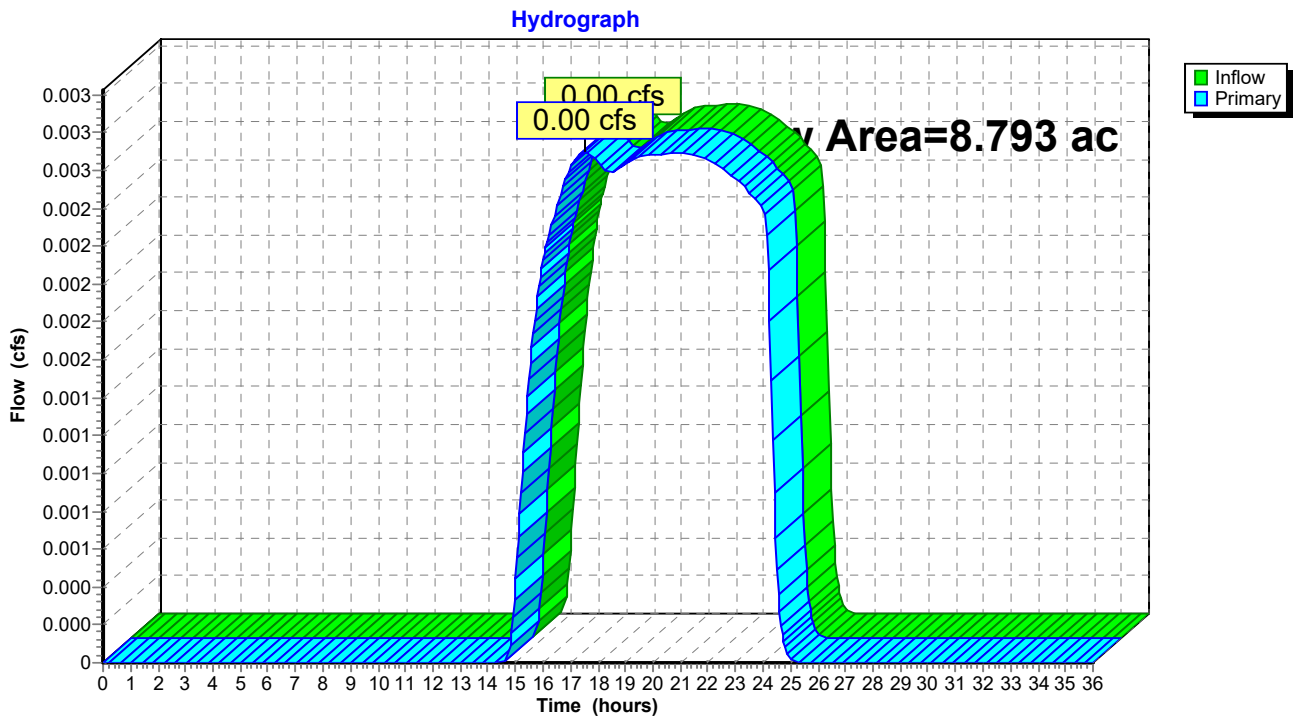
Summary for Pond AP-1: Exist. CB (Analysis Point-1)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 8.793 ac, 9.11% Impervious, Inflow Depth = 0.00" for 2 YR event
Inflow = 0.00 cfs @ 17.56 hrs, Volume= 0.002 af
Primary = 0.00 cfs @ 17.56 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Pond AP-1: Exist. CB (Analysis Point-1)



2443_Post Development-R1

Type III 24-hr 2 YR Rainfall=3.45"

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Summary for Pond BASIN: Proposed Infiltration Basin

Inflow Area = 7.741 ac, 8.70% Impervious, Inflow Depth = 0.02" for 2 YR event
 Inflow = 0.02 cfs @ 17.00 hrs, Volume= 0.012 af
 Outflow = 0.02 cfs @ 17.21 hrs, Volume= 0.012 af, Atten= 0%, Lag= 12.6 min
 Discarded = 0.02 cfs @ 17.21 hrs, Volume= 0.012 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 8.00' @ 17.21 hrs Surf.Area= 3,373 sf Storage= 15 cf

Plug-Flow detention time= 14.9 min calculated for 0.012 af (100% of inflow)
 Center-of-Mass det. time= 14.9 min (1,173.8 - 1,158.8)

Volume	Invert	Avail.Storage	Storage Description
#1	8.00'	19,592 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

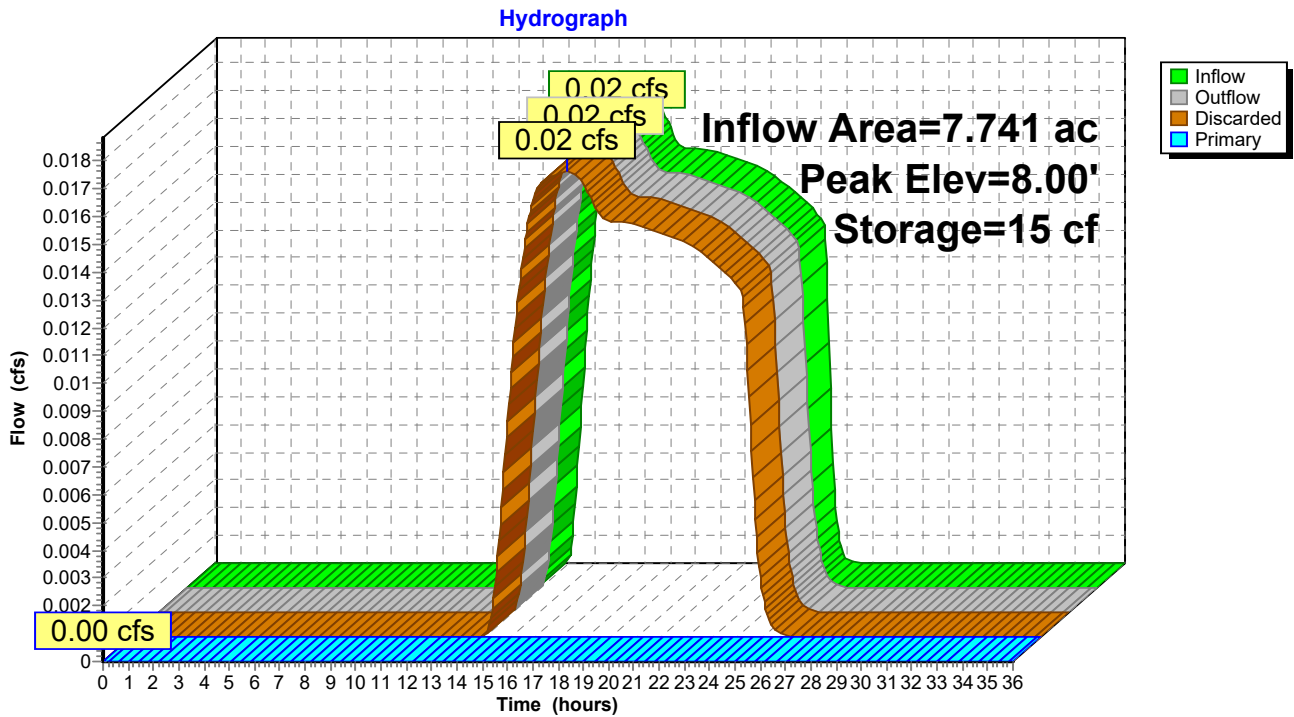
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
8.00	3,370	0	0
9.00	4,085	3,728	3,728
10.00	4,855	4,470	8,198
11.00	5,683	5,269	13,467
12.00	6,567	6,125	19,592

Device	Routing	Invert	Outlet Devices
#1	Discarded	8.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.05'
#2	Primary	10.80'	5.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.02 cfs @ 17.21 hrs HW=8.00' (Free Discharge)
 ↖1=Exfiltration (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=8.00' TW=0.00' (Dynamic Tailwater)
 ↖2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond BASIN: Proposed Infiltration Basin



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Type III 24-hr 2 YR Rainfall=3.45"

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Summary for Pond DMH4: Drain Manhole

Inflow Area = 3.370 ac, 13.04% Impervious, Inflow Depth = 0.00" for 2 YR event
 Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

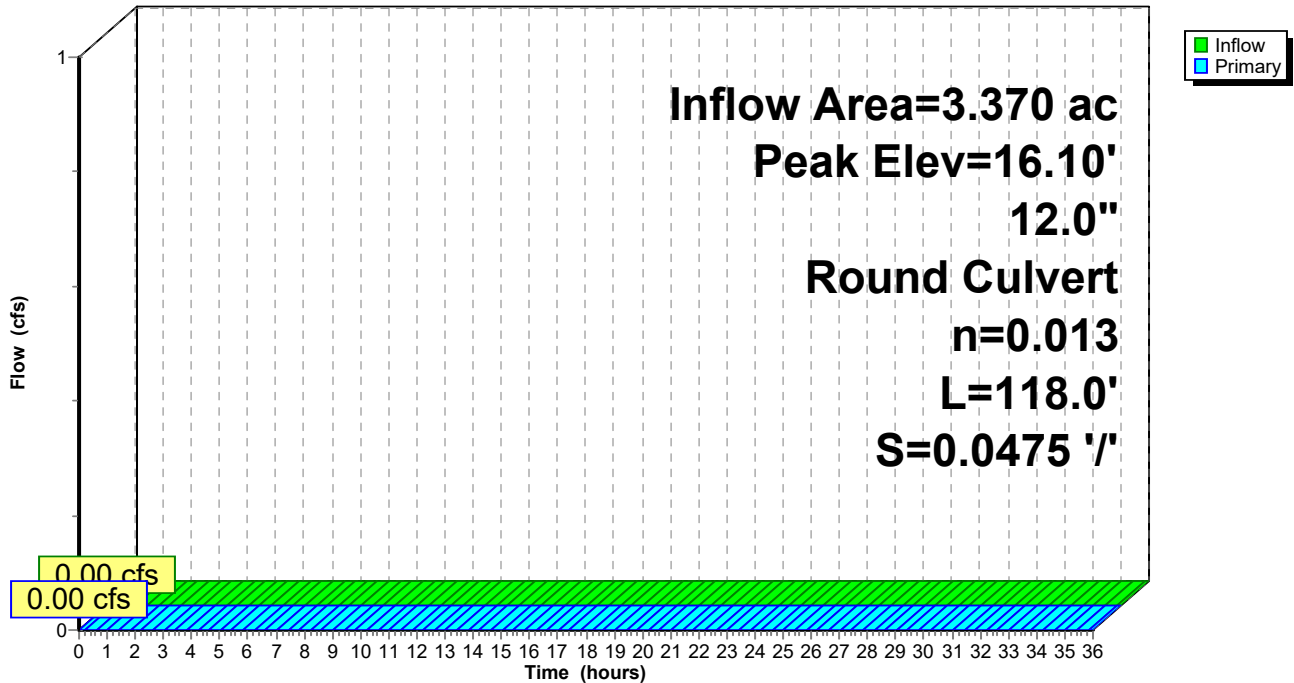
Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 16.10' @ 0.00 hrs
 Flood Elev= 19.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.10'	12.0" Round Culvert L= 118.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.10' / 10.50' S= 0.0475 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=16.10' TW=10.50' (Dynamic Tailwater)
 ↑1=Culvert (Controls 0.00 cfs)

Pond DMH4: Drain Manhole

Hydrograph



2443_Post Development-R1

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Type III 24-hr 2 YR Rainfall=3.45"

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Summary for Pond DMH5: Drain Manhole

Inflow Area = 3.370 ac, 13.04% Impervious, Inflow Depth = 0.00" for 2 YR event
 Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

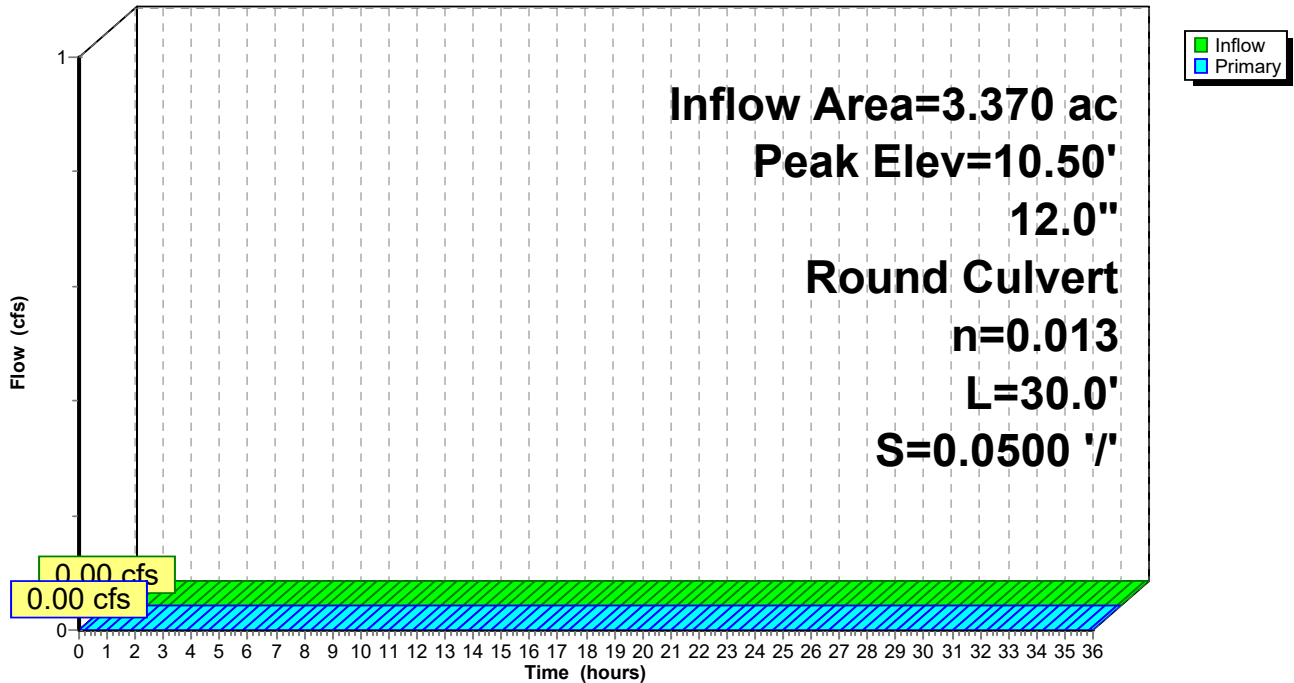
Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.50' @ 0.00 hrs
 Flood Elev= 14.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	10.50'	12.0" Round Culvert L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 10.50' / 9.00' S= 0.0500 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=10.50' TW=8.00' (Dynamic Tailwater)
 ↑1=Culvert (Controls 0.00 cfs)

Pond DMH5: Drain Manhole

Hydrograph



2443_Post Development-R1

Type III 24-hr 2 YR Rainfall=3.45"

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Summary for Pond PITS: Proposed Leaching Pits

Inflow Area = 3.370 ac, 13.04% Impervious, Inflow Depth = 0.11" for 2 YR event
 Inflow = 0.05 cfs @ 14.02 hrs, Volume= 0.032 af
 Outflow = 0.05 cfs @ 14.12 hrs, Volume= 0.032 af, Atten= 0%, Lag= 5.9 min
 Discarded = 0.05 cfs @ 14.12 hrs, Volume= 0.032 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 11.03' @ 14.12 hrs Surf.Area= 0.036 ac Storage= 0.000 af
 Flood Elev= 18.00' Surf.Area= 0.036 ac Storage= 0.143 af

Plug-Flow detention time= 6.0 min calculated for 0.032 af (100% of inflow)
 Center-of-Mass det. time= 6.0 min (1,053.4 - 1,047.5)

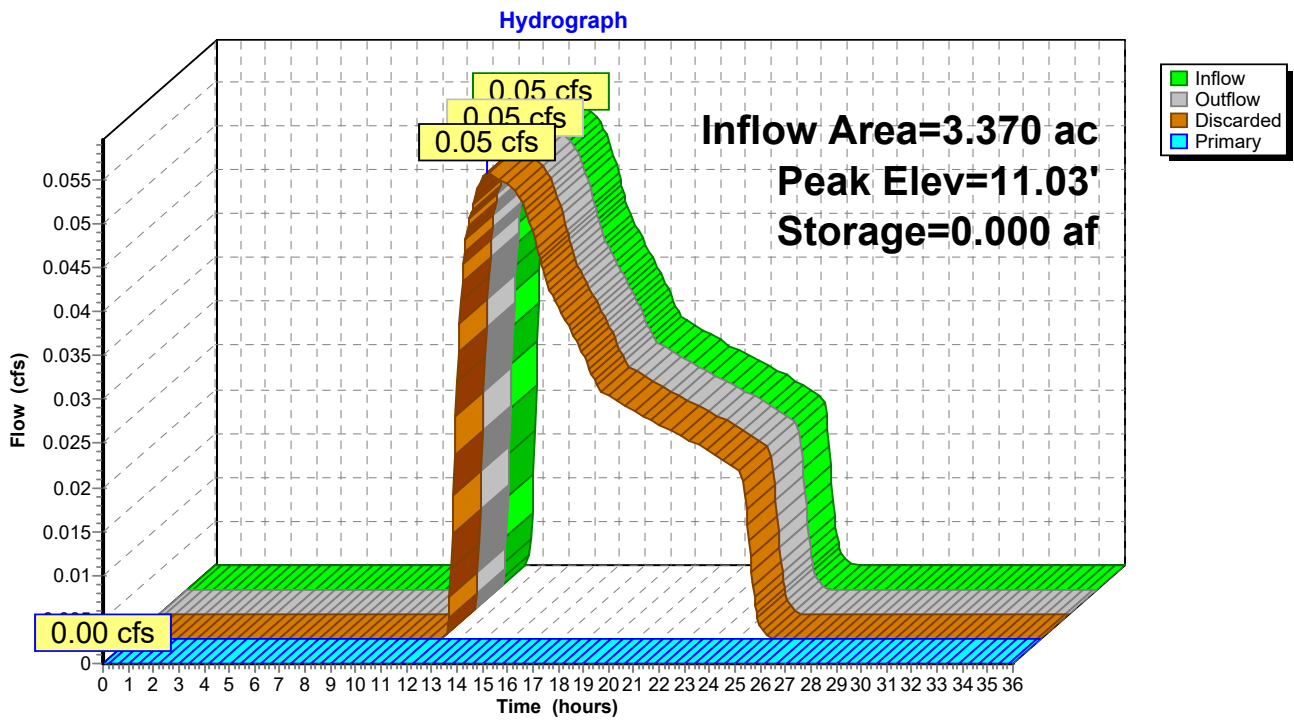
Volume	Invert	Avail.Storage	Storage Description
#1	11.00'	0.079 af	16.00'W x 98.00'L x 7.50'H Prismaoid 0.270 af Overall - 0.072 af Embedded = 0.198 af x 40.0% Voids
#2	11.45'	0.063 af	8.00'D x 5.00'H Vertical Cone/Cylinder x 11 Inside #1
#3	11.45'	0.008 af	8.00'D x 7.00'H Vertical Cone/Cylinder Inside #1
		0.151 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	11.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.05'
#2	Primary	16.75'	12.0" Round Culvert L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.75' / 16.20' S= 0.0550 ' S Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.05 cfs @ 14.12 hrs HW=11.03' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=11.00' TW=16.10' (Dynamic Tailwater)
 ↑2=Culvert (Controls 0.00 cfs)

Pond PITS: Proposed Leaching Pits



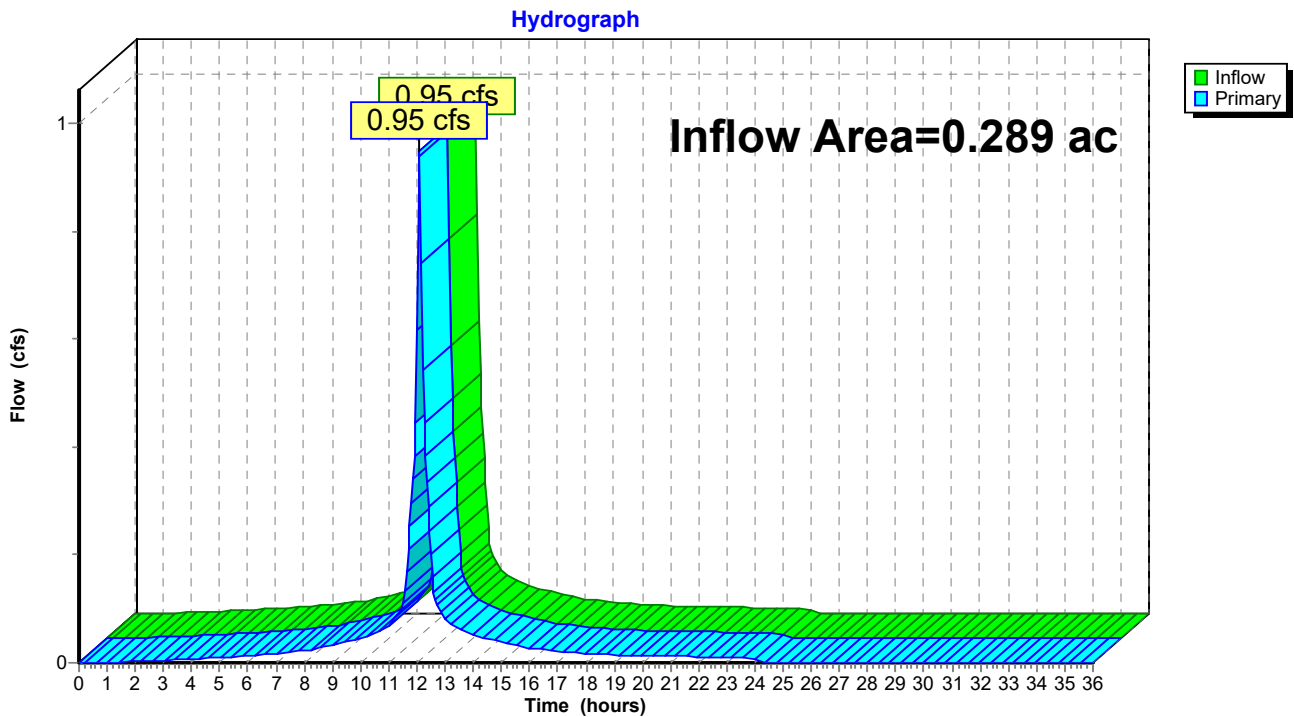
Summary for Pond RECHARGE: Roof Recharge Systems

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.289 ac, 100.00% Impervious, Inflow Depth = 3.22" for 2 YR event
Inflow = 0.95 cfs @ 12.09 hrs, Volume= 0.078 af
Primary = 0.95 cfs @ 12.09 hrs, Volume= 0.078 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Pond RECHARGE: Roof Recharge Systems



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Type III 24-hr 10 YR Rainfall=5.05"

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST-1: Post Runoff Area=146,803 sf 13.04% Impervious Runoff Depth=0.56"
 Flow Length=1,203' Tc=28.3 min CN=47 Runoff=0.74 cfs 0.156 af

Subcatchment POST-2: Post Development Runoff Area=190,380 sf 5.35% Impervious Runoff Depth=0.33"
 Flow Length=1,039' Tc=25.3 min CN=42 Runoff=0.38 cfs 0.118 af

Subcatchment POST-3: Post Development Runoff Area=45,857 sf 12.19% Impervious Runoff Depth=0.28"
 Flow Length=625' Tc=24.7 min CN=41 Runoff=0.07 cfs 0.025 af

Subcatchment POST-4: Post Runoff Area=12,600 sf 100.00% Impervious Runoff Depth=4.81"
 Tc=6.0 min CN=98 Runoff=1.40 cfs 0.116 af

Pond AP-1: Exist. CB (Analysis Point-1) Inflow=0.07 cfs 0.025 af
 Primary=0.07 cfs 0.025 af

Pond BASIN: Proposed Infiltration Basin Peak Elev=8.15' Storage=522 cf Inflow=0.38 cfs 0.118 af
 Discarded=0.19 cfs 0.118 af Primary=0.00 cfs 0.000 af Outflow=0.19 cfs 0.118 af

Pond DMH4: Drain Manhole Peak Elev=16.10' Inflow=0.00 cfs 0.000 af
 12.0" Round Culvert n=0.013 L=118.0' S=0.0475 '/' Outflow=0.00 cfs 0.000 af

Pond DMH5: Drain Manhole Peak Elev=10.50' Inflow=0.00 cfs 0.000 af
 12.0" Round Culvert n=0.013 L=30.0' S=0.0500 '/' Outflow=0.00 cfs 0.000 af

Pond PITS: Proposed Leaching Pits Peak Elev=14.51' Storage=0.076 af Inflow=0.74 cfs 0.156 af
 Discarded=0.09 cfs 0.156 af Primary=0.00 cfs 0.000 af Outflow=0.09 cfs 0.156 af

Pond RECHARGE: Roof Recharge Systems Inflow=1.40 cfs 0.116 af
 Primary=1.40 cfs 0.116 af

Total Runoff Area = 9.083 ac Runoff Volume = 0.415 af Average Runoff Depth = 0.55"
87.99% Pervious = 7.992 ac 12.01% Impervious = 1.091 ac

2443_Post Development-R1

Type III 24-hr 10 YR Rainfall=5.05"

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Summary for Subcatchment POST-1: Post Development Area 1

Runoff = 0.74 cfs @ 12.59 hrs, Volume= 0.156 af, Depth= 0.56"

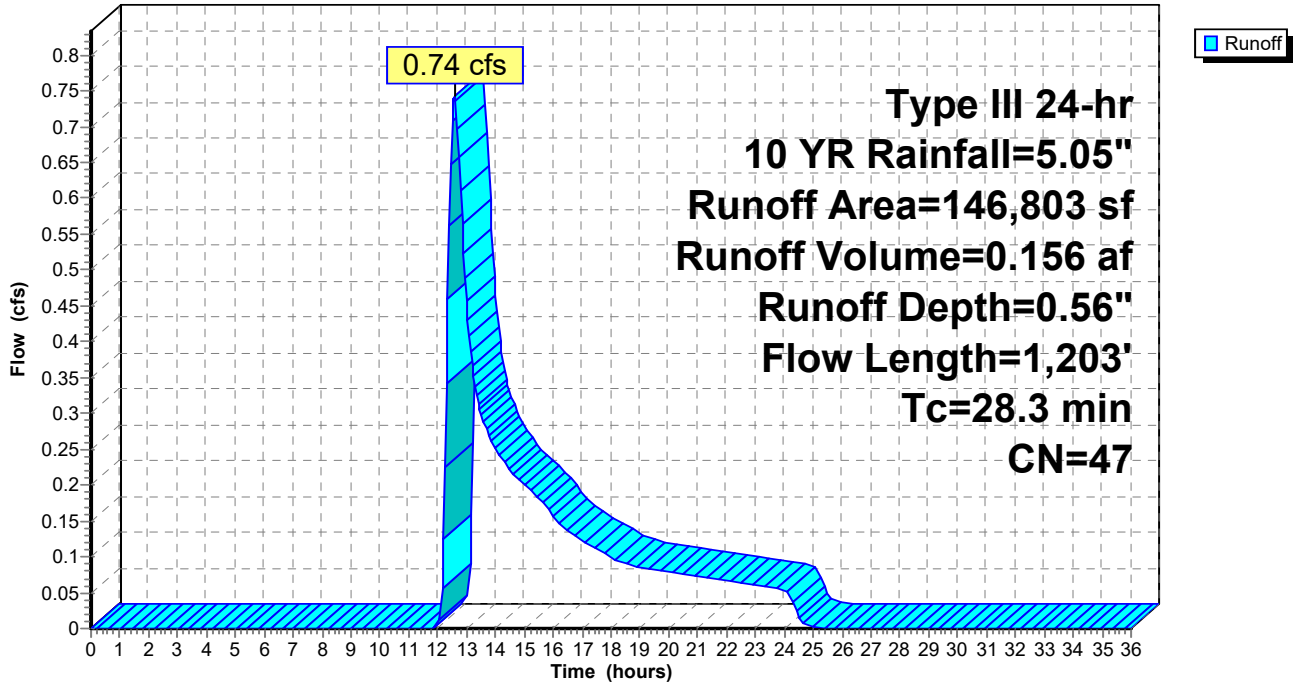
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.05"

Area (sf)	CN	Description
* 11,059	98	Paved Roadway, HSG C
* 8,084	98	Paved Sidewalk & Driveways, HSG C
33,255	39	>75% Grass cover, Good, HSG A
71,874	30	Woods, Good, HSG A
22,531	70	Woods, Good, HSG C
146,803	47	Weighted Average
127,660		86.96% Pervious Area
19,143		13.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	50	0.0200	0.07		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.45"
4.1	352	0.0800	1.41		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
0.1	33	0.0350	3.80		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
11.1	576	0.0300	0.87		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
1.0	175	0.0200	2.87		Shallow Concentrated Flow, E-F Paved Kv= 20.3 fps
0.1	17	0.0130	5.60	4.40	Pipe Channel, F-G 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
28.3	1,203	Total			

Subcatchment POST-1: Post Development Area 1

Hydrograph



2443_Post Development-R1

Type III 24-hr 10 YR Rainfall=5.05"

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Summary for Subcatchment POST-2: Post Development Area 2

Runoff = 0.38 cfs @ 12.66 hrs, Volume= 0.118 af, Depth= 0.33"

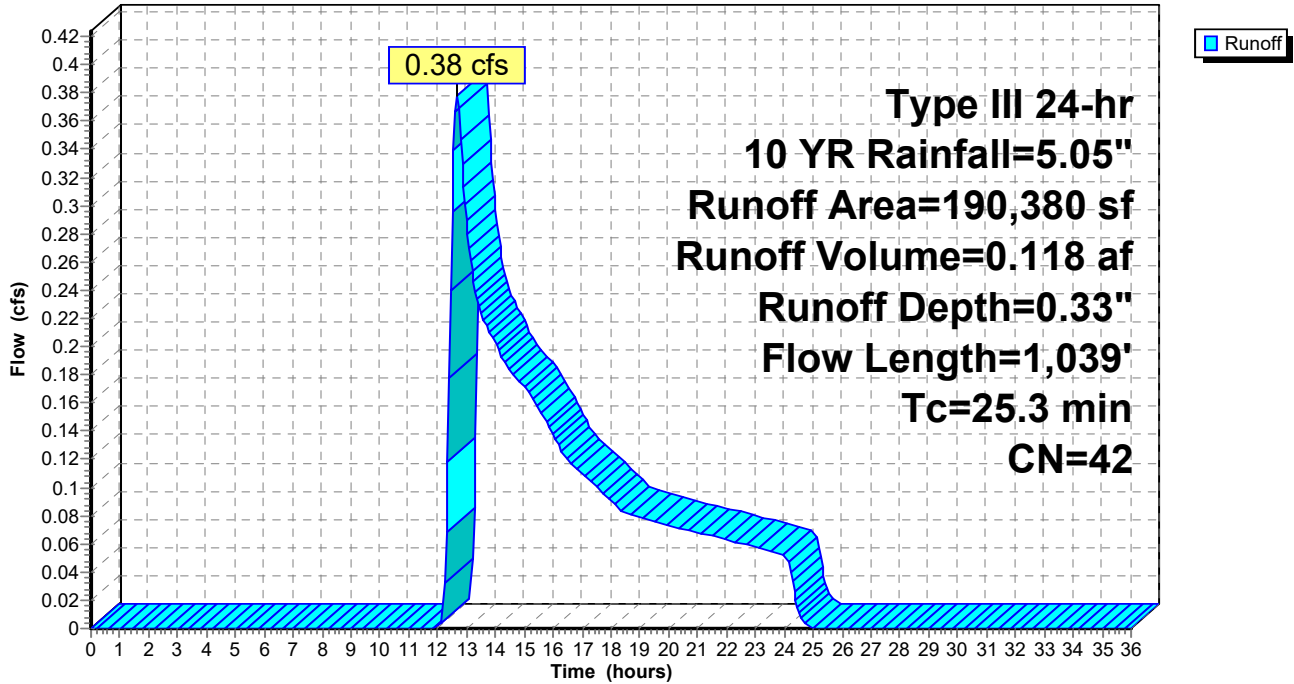
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.05"

Area (sf)	CN	Description
* 6,050	98	Paved Roadway, HSG C
* 4,128	98	Paved Sidewalk and Driveways, HSG C
71,432	39	>75% Grass cover, Good, HSG A
83,600	30	Woods, Good, HSG A
25,170	70	Woods, Good, HSG C
190,380	42	Weighted Average
180,202		94.65% Pervious Area
10,178		5.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	50	0.0250	0.08		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.45"
4.4	370	0.0800	1.41		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
0.2	32	0.0300	3.52		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
9.8	587	0.0400	1.00		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
25.3	1,039	Total			

Subcatchment POST-2: Post Development Area 2

Hydrograph



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Type III 24-hr 10 YR Rainfall=5.05"

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Summary for Subcatchment POST-3: Post Development Area 3

Runoff = 0.07 cfs @ 12.69 hrs, Volume= 0.025 af, Depth= 0.28"

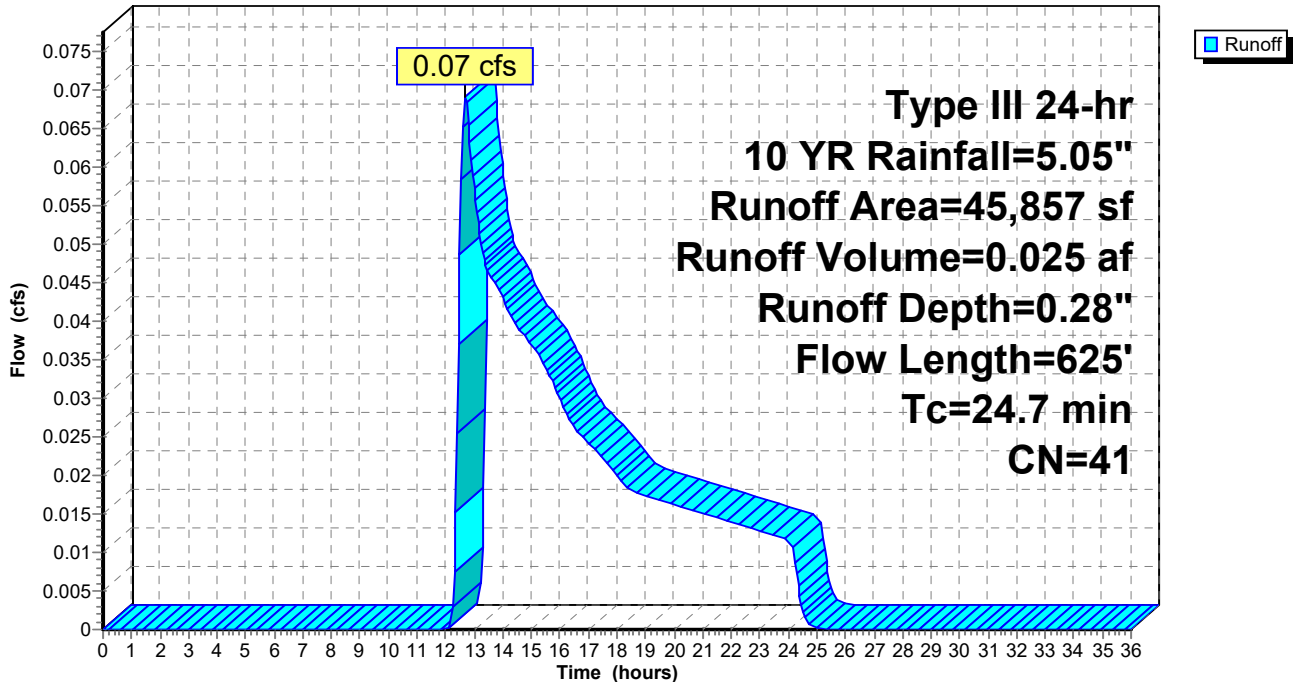
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.05"

Area (sf)	CN	Description
14,260	39	>75% Grass cover, Good, HSG A
5,588	98	Paved parking, HSG A
26,009	30	Woods, Good, HSG A
45,857	41	Weighted Average
40,269		87.81% Pervious Area
5,588		12.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0400	0.11		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.45"
5.3	318	0.0400	1.00		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
0.2	27	0.0100	2.03		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
3.5	180	0.0300	0.87		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
24.7	625	Total			

Subcatchment POST-3: Post Development Area 3

Hydrograph



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Type III 24-hr 10 YR Rainfall=5.05"

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Summary for Subcatchment POST-4: Post Development Area 4

Runoff = 1.40 cfs @ 12.09 hrs, Volume= 0.116 af, Depth= 4.81"

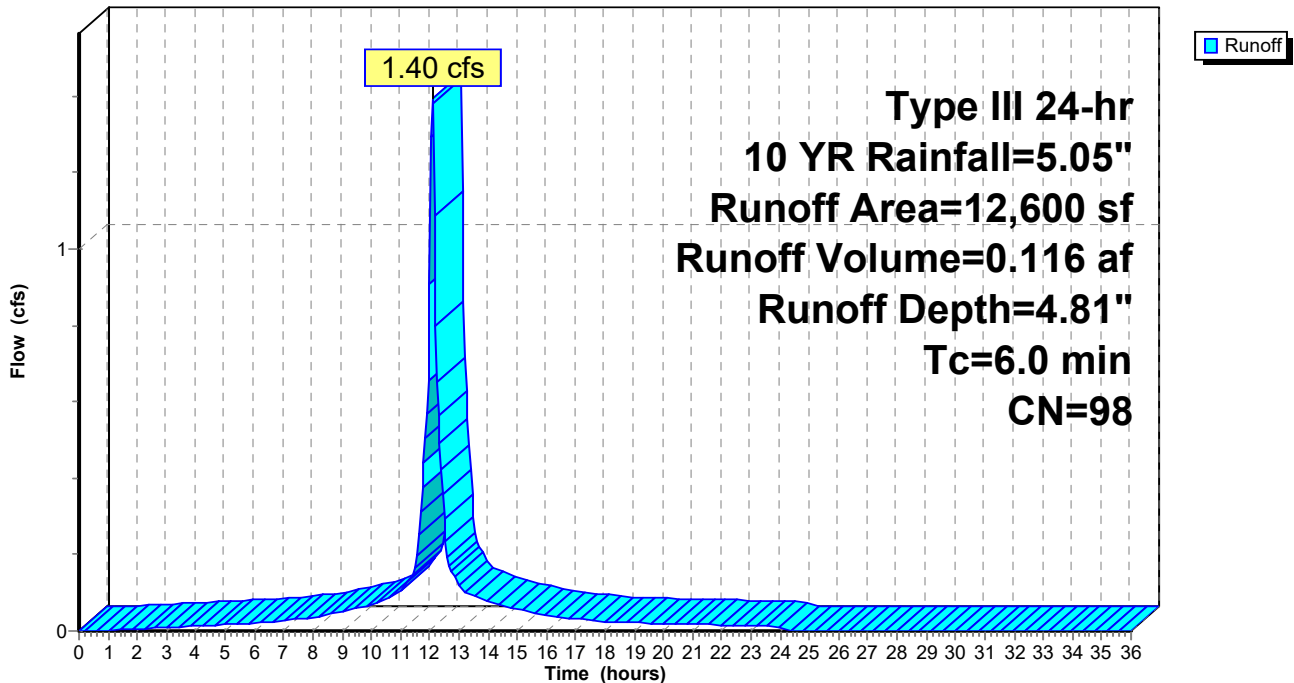
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.05"

Area (sf)	CN	Description
12,600	98	Roofs, HSG A
12,600		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment POST-4: Post Development Area 4

Hydrograph



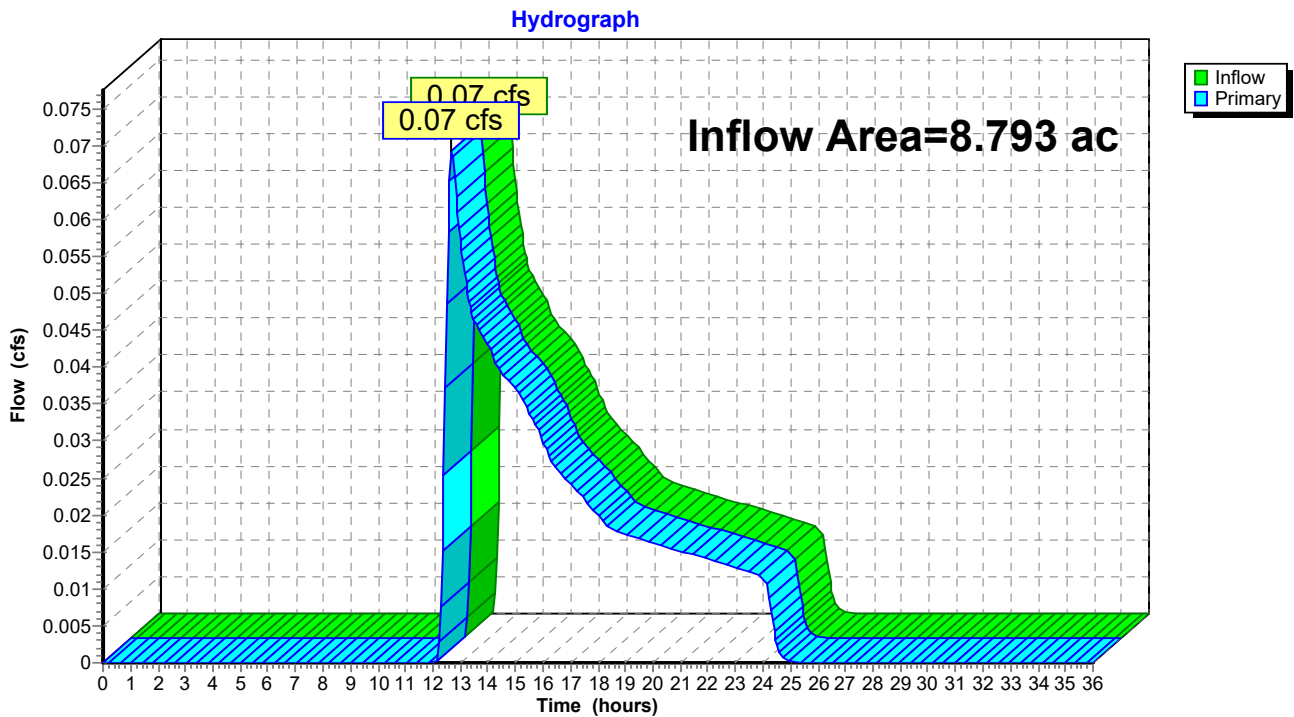
Summary for Pond AP-1: Exist. CB (Analysis Point-1)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 8.793 ac, 9.11% Impervious, Inflow Depth = 0.03" for 10 YR event
Inflow = 0.07 cfs @ 12.69 hrs, Volume= 0.025 af
Primary = 0.07 cfs @ 12.69 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Pond AP-1: Exist. CB (Analysis Point-1)



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Type III 24-hr 10 YR Rainfall=5.05"

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Summary for Pond BASIN: Proposed Infiltration Basin

Inflow Area = 7.741 ac, 8.70% Impervious, Inflow Depth = 0.18" for 10 YR event
 Inflow = 0.38 cfs @ 12.66 hrs, Volume= 0.118 af
 Outflow = 0.19 cfs @ 14.19 hrs, Volume= 0.118 af, Atten= 49%, Lag= 91.7 min
 Discarded = 0.19 cfs @ 14.19 hrs, Volume= 0.118 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 8.15' @ 14.19 hrs Surf.Area= 3,479 sf Storage= 522 cf

Plug-Flow detention time= 26.7 min calculated for 0.118 af (100% of inflow)
 Center-of-Mass det. time= 26.7 min (1,015.3 - 988.6)

Volume	Invert	Avail.Storage	Storage Description
#1	8.00'	19,592 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

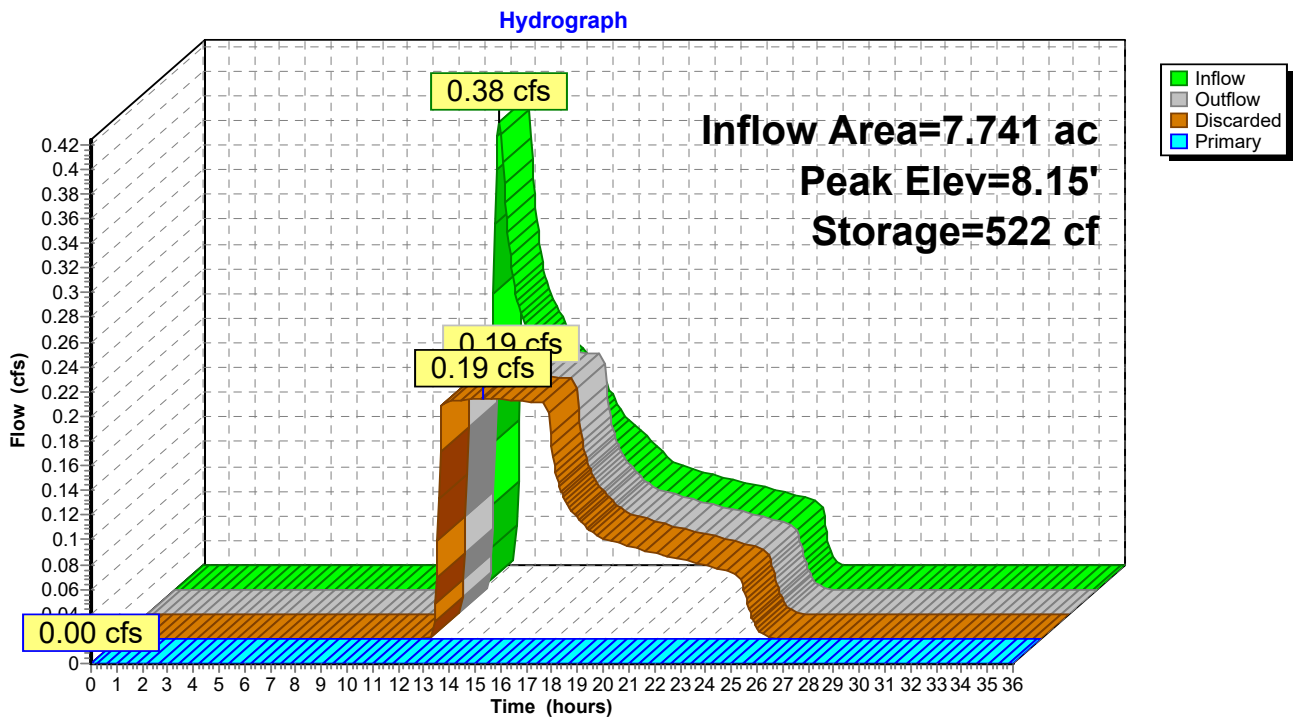
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
8.00	3,370	0	0
9.00	4,085	3,728	3,728
10.00	4,855	4,470	8,198
11.00	5,683	5,269	13,467
12.00	6,567	6,125	19,592

Device	Routing	Invert	Outlet Devices
#1	Discarded	8.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.05'
#2	Primary	10.80'	5.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.19 cfs @ 14.19 hrs HW=8.15' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=8.00' TW=0.00' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond BASIN: Proposed Infiltration Basin



Summary for Pond DMH4: Drain Manhole

Inflow Area = 3.370 ac, 13.04% Impervious, Inflow Depth = 0.00" for 10 YR event
 Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

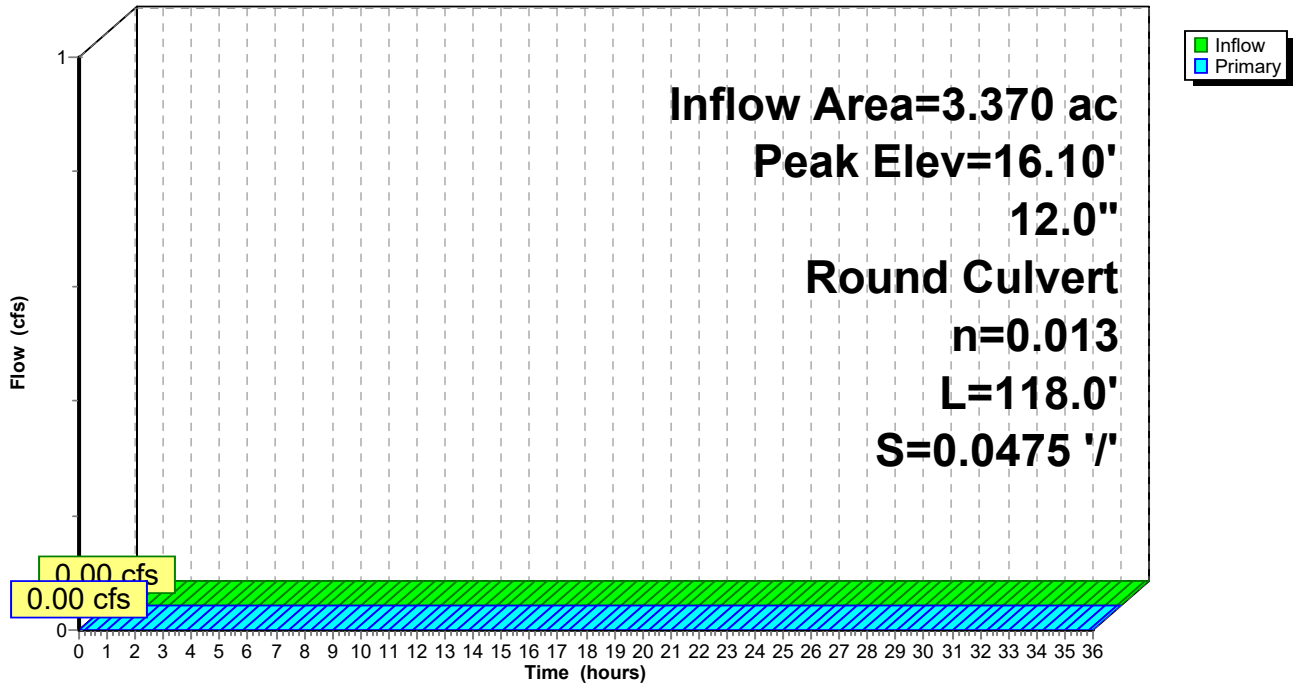
Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 16.10' @ 0.00 hrs
 Flood Elev= 19.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.10'	12.0" Round Culvert L= 118.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.10' / 10.50' S= 0.0475 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=16.10' TW=10.50' (Dynamic Tailwater)
 ↑1=Culvert (Controls 0.00 cfs)

Pond DMH4: Drain Manhole

Hydrograph



Summary for Pond DMH5: Drain Manhole

Inflow Area = 3.370 ac, 13.04% Impervious, Inflow Depth = 0.00" for 10 YR event
 Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

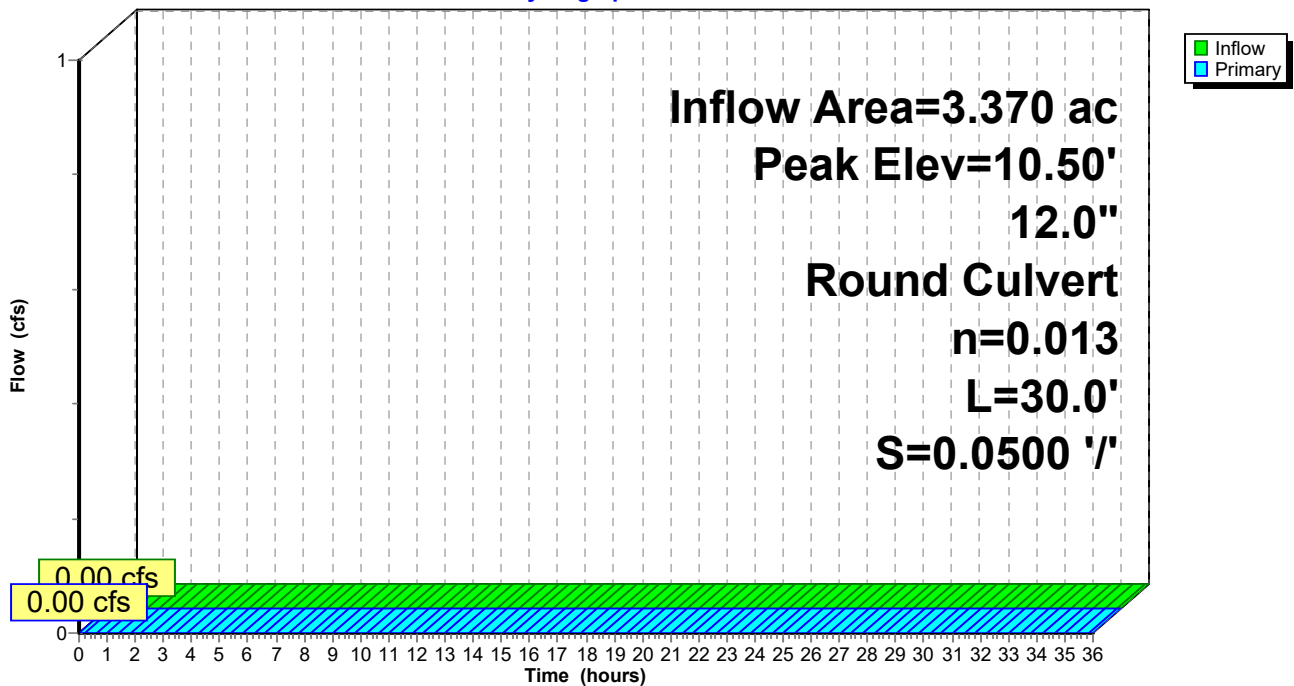
Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.50' @ 0.00 hrs
 Flood Elev= 14.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	10.50'	12.0" Round Culvert L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 10.50' / 9.00' S= 0.0500 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=10.50' TW=8.00' (Dynamic Tailwater)
 ↑1=Culvert (Controls 0.00 cfs)

Pond DMH5: Drain Manhole

Hydrograph



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Type III 24-hr 10 YR Rainfall=5.05"

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Summary for Pond PITS: Proposed Leaching Pits

Inflow Area = 3.370 ac, 13.04% Impervious, Inflow Depth = 0.56" for 10 YR event
 Inflow = 0.74 cfs @ 12.59 hrs, Volume= 0.156 af
 Outflow = 0.09 cfs @ 12.30 hrs, Volume= 0.156 af, Atten= 88%, Lag= 0.0 min
 Discarded = 0.09 cfs @ 12.30 hrs, Volume= 0.156 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 14.51' @ 18.70 hrs Surf.Area= 0.036 ac Storage= 0.076 af
 Flood Elev= 18.00' Surf.Area= 0.036 ac Storage= 0.143 af

Plug-Flow detention time= 426.6 min calculated for 0.156 af (100% of inflow)
 Center-of-Mass det. time= 426.6 min (1,377.9 - 951.3)

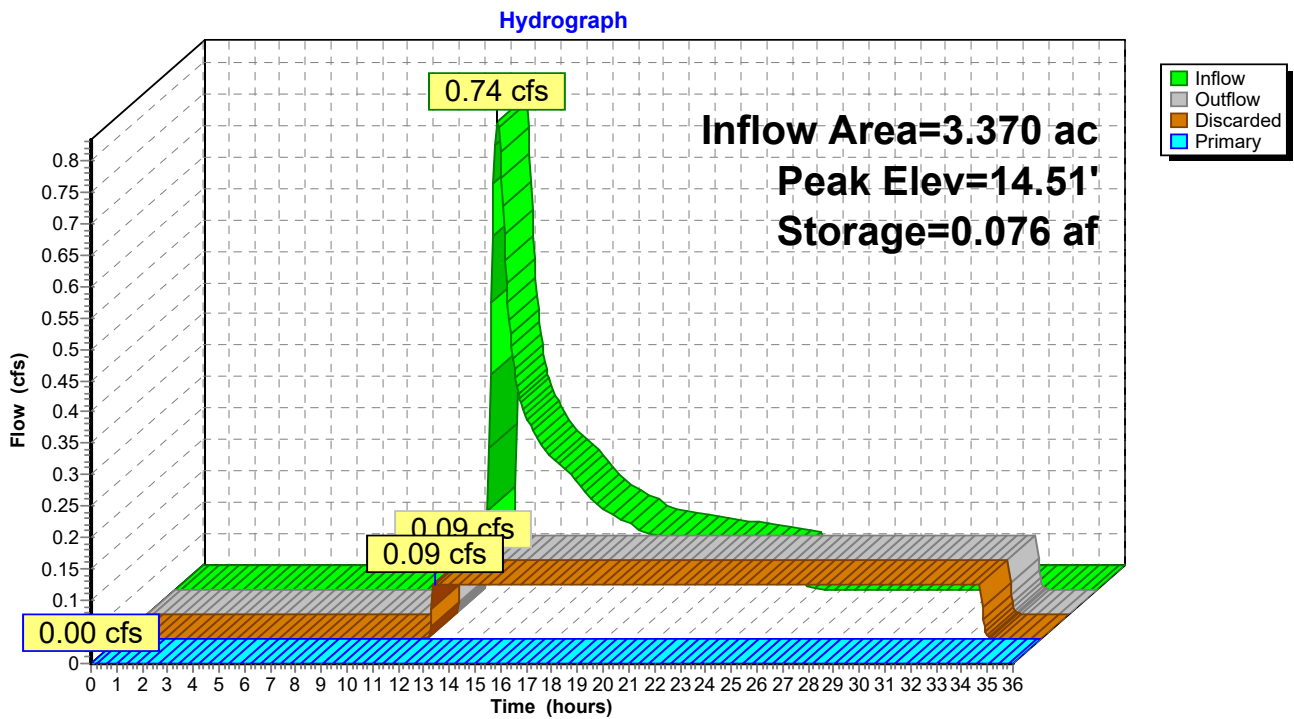
Volume	Invert	Avail.Storage	Storage Description
#1	11.00'	0.079 af	16.00'W x 98.00'L x 7.50'H Prismatic 0.270 af Overall - 0.072 af Embedded = 0.198 af x 40.0% Voids
#2	11.45'	0.063 af	8.00'D x 5.00'H Vertical Cone/Cylinder x 11 Inside #1
#3	11.45'	0.008 af	8.00'D x 7.00'H Vertical Cone/Cylinder Inside #1
		0.151 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	11.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.05'
#2	Primary	16.75'	12.0" Round Culvert L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.75' / 16.20' S= 0.0550 ' S Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.09 cfs @ 12.30 hrs HW=11.11' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=11.00' TW=16.10' (Dynamic Tailwater)
 ↑2=Culvert (Controls 0.00 cfs)

Pond PITS: Proposed Leaching Pits



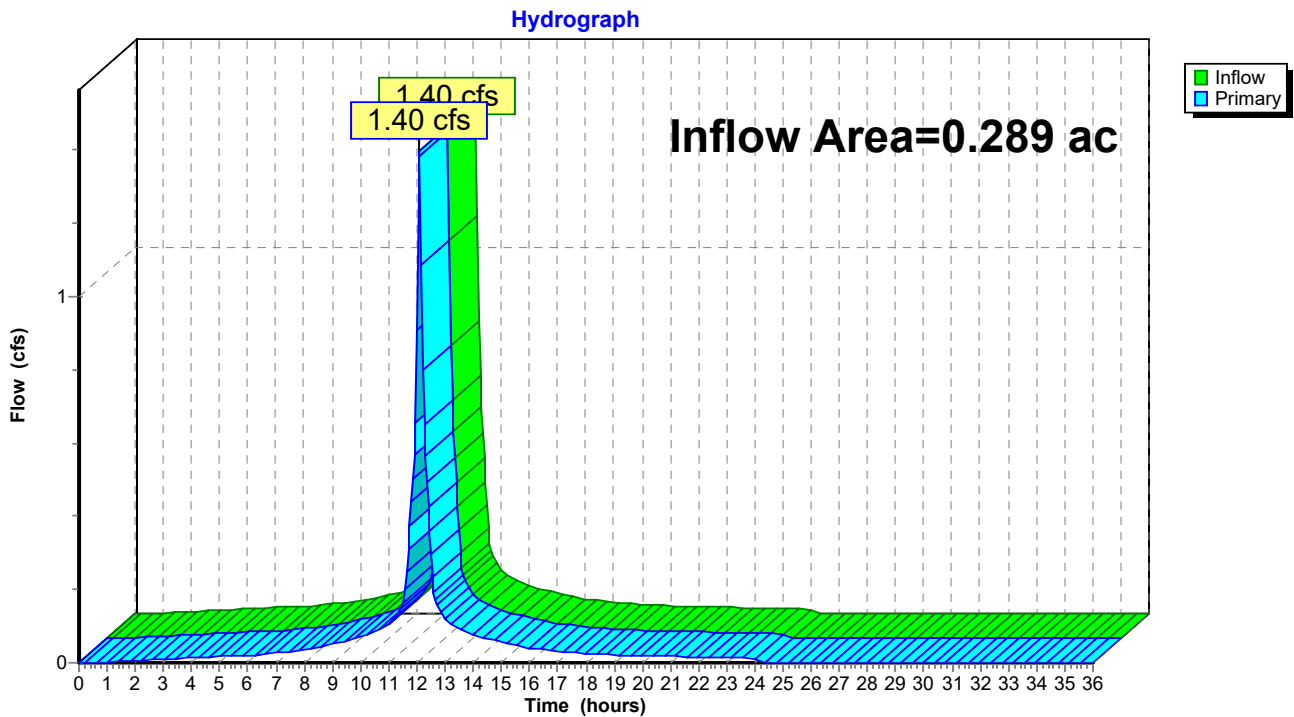
Summary for Pond RECHARGE: Roof Recharge Systems

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.289 ac, 100.00% Impervious, Inflow Depth = 4.81" for 10 YR event
Inflow = 1.40 cfs @ 12.09 hrs, Volume= 0.116 af
Primary = 1.40 cfs @ 12.09 hrs, Volume= 0.116 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Pond RECHARGE: Roof Recharge Systems



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Type III 24-hr 25 YR Rainfall=6.04"

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST-1: Post Runoff Area=146,803 sf 13.04% Impervious Runoff Depth=0.95"
 Flow Length=1,203' Tc=28.3 min CN=47 Runoff=1.59 cfs 0.267 af

Subcatchment POST-2: Post Development Runoff Area=190,380 sf 5.35% Impervious Runoff Depth=0.63"
 Flow Length=1,039' Tc=25.3 min CN=42 Runoff=1.10 cfs 0.229 af

Subcatchment POST-3: Post Development Runoff Area=45,857 sf 12.19% Impervious Runoff Depth=0.57"
 Flow Length=625' Tc=24.7 min CN=41 Runoff=0.22 cfs 0.050 af

Subcatchment POST-4: Post Runoff Area=12,600 sf 100.00% Impervious Runoff Depth=5.80"
 Tc=6.0 min CN=98 Runoff=1.67 cfs 0.140 af

Pond AP-1: Exist. CB (Analysis Point-1) Inflow=0.22 cfs 0.050 af
 Primary=0.22 cfs 0.050 af

Pond BASIN: Proposed Infiltration Basin Peak Elev=9.22' Storage=4,663 cf Inflow=1.10 cfs 0.282 af
 Discarded=0.24 cfs 0.282 af Primary=0.00 cfs 0.000 af Outflow=0.24 cfs 0.282 af

Pond DMH4: Drain Manhole Peak Elev=16.33' Inflow=0.23 cfs 0.053 af
 12.0" Round Culvert n=0.013 L=118.0' S=0.0475 '/' Outflow=0.23 cfs 0.053 af

Pond DMH5: Drain Manhole Peak Elev=10.73' Inflow=0.23 cfs 0.053 af
 12.0" Round Culvert n=0.013 L=30.0' S=0.0500 '/' Outflow=0.23 cfs 0.053 af

Pond PITS: Proposed Leaching Pits Peak Elev=16.98' Storage=0.128 af Inflow=1.59 cfs 0.267 af
 Discarded=0.09 cfs 0.173 af Primary=0.23 cfs 0.053 af Outflow=0.32 cfs 0.226 af

Pond RECHARGE: Roof Recharge Systems Inflow=1.67 cfs 0.140 af
 Primary=1.67 cfs 0.140 af

Total Runoff Area = 9.083 ac Runoff Volume = 0.686 af Average Runoff Depth = 0.91"
87.99% Pervious = 7.992 ac 12.01% Impervious = 1.091 ac

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Type III 24-hr 25 YR Rainfall=6.04"

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Summary for Subcatchment POST-1: Post Development Area 1

Runoff = 1.59 cfs @ 12.51 hrs, Volume= 0.267 af, Depth= 0.95"

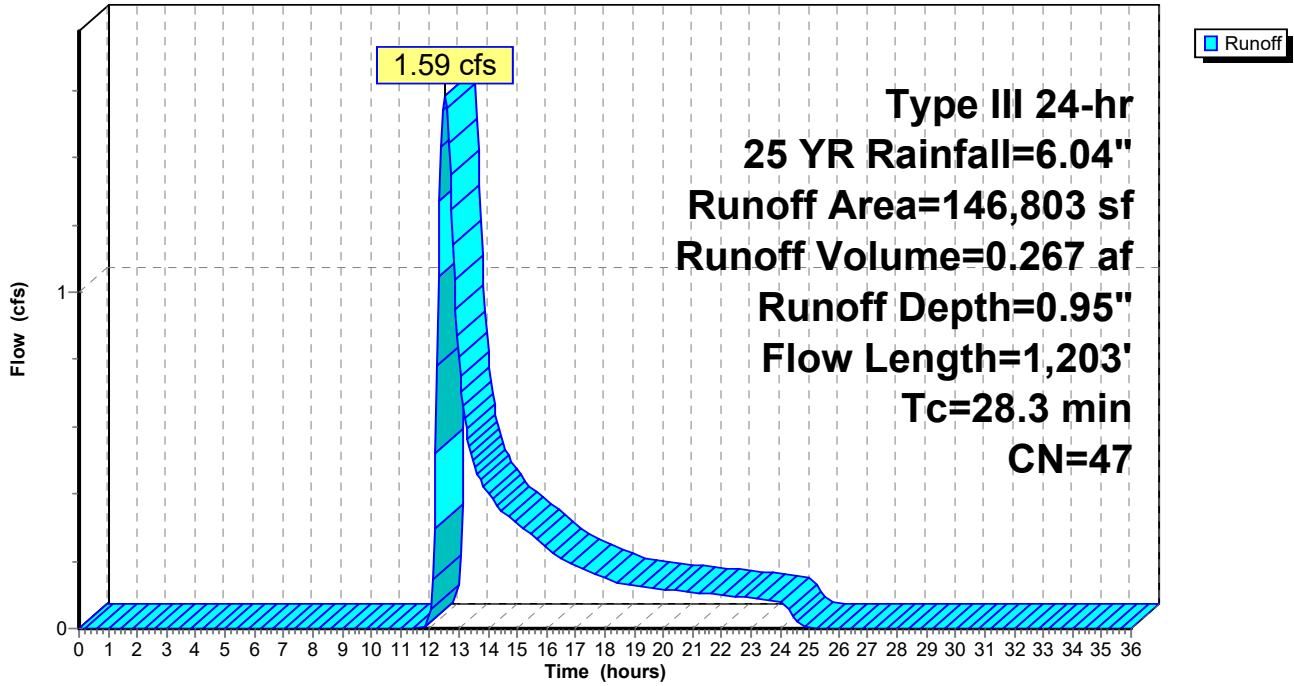
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.04"

Area (sf)	CN	Description
* 11,059	98	Paved Roadway, HSG C
* 8,084	98	Paved Sidewalk & Driveways, HSG C
33,255	39	>75% Grass cover, Good, HSG A
71,874	30	Woods, Good, HSG A
22,531	70	Woods, Good, HSG C
146,803	47	Weighted Average
127,660		86.96% Pervious Area
19,143		13.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	50	0.0200	0.07		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.45"
4.1	352	0.0800	1.41		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
0.1	33	0.0350	3.80		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
11.1	576	0.0300	0.87		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
1.0	175	0.0200	2.87		Shallow Concentrated Flow, E-F Paved Kv= 20.3 fps
0.1	17	0.0130	5.60	4.40	Pipe Channel, F-G 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
28.3	1,203	Total			

Subcatchment POST-1: Post Development Area 1

Hydrograph



2443_Post Development-R1

Type III 24-hr 25 YR Rainfall=6.04"

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Summary for Subcatchment POST-2: Post Development Area 2

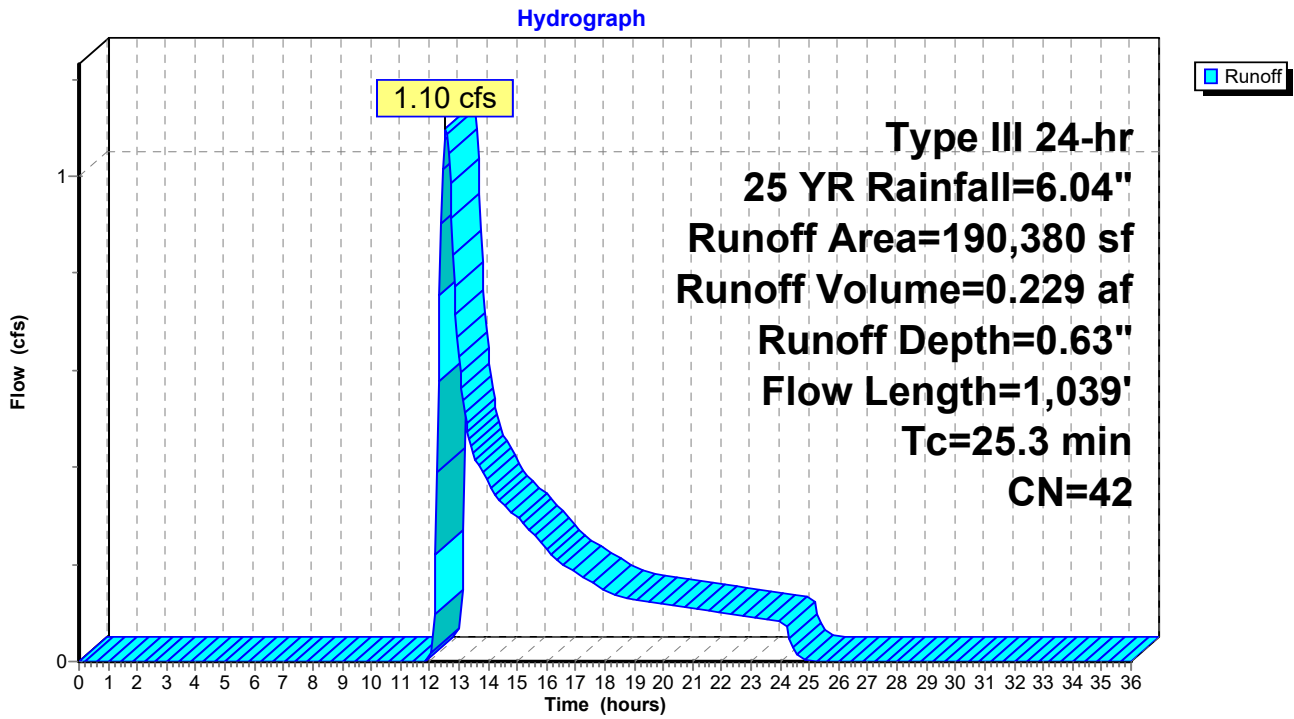
Runoff = 1.10 cfs @ 12.56 hrs, Volume= 0.229 af, Depth= 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.04"

Area (sf)	CN	Description
* 6,050	98	Paved Roadway, HSG C
* 4,128	98	Paved Sidewalk and Driveways, HSG C
71,432	39	>75% Grass cover, Good, HSG A
83,600	30	Woods, Good, HSG A
25,170	70	Woods, Good, HSG C
190,380	42	Weighted Average
180,202		94.65% Pervious Area
10,178		5.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	50	0.0250	0.08		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.45"
4.4	370	0.0800	1.41		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
0.2	32	0.0300	3.52		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
9.8	587	0.0400	1.00		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
25.3	1,039	Total			

Subcatchment POST-2: Post Development Area 2



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Type III 24-hr 25 YR Rainfall=6.04"

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Summary for Subcatchment POST-3: Post Development Area 3

Runoff = 0.22 cfs @ 12.57 hrs, Volume= 0.050 af, Depth= 0.57"

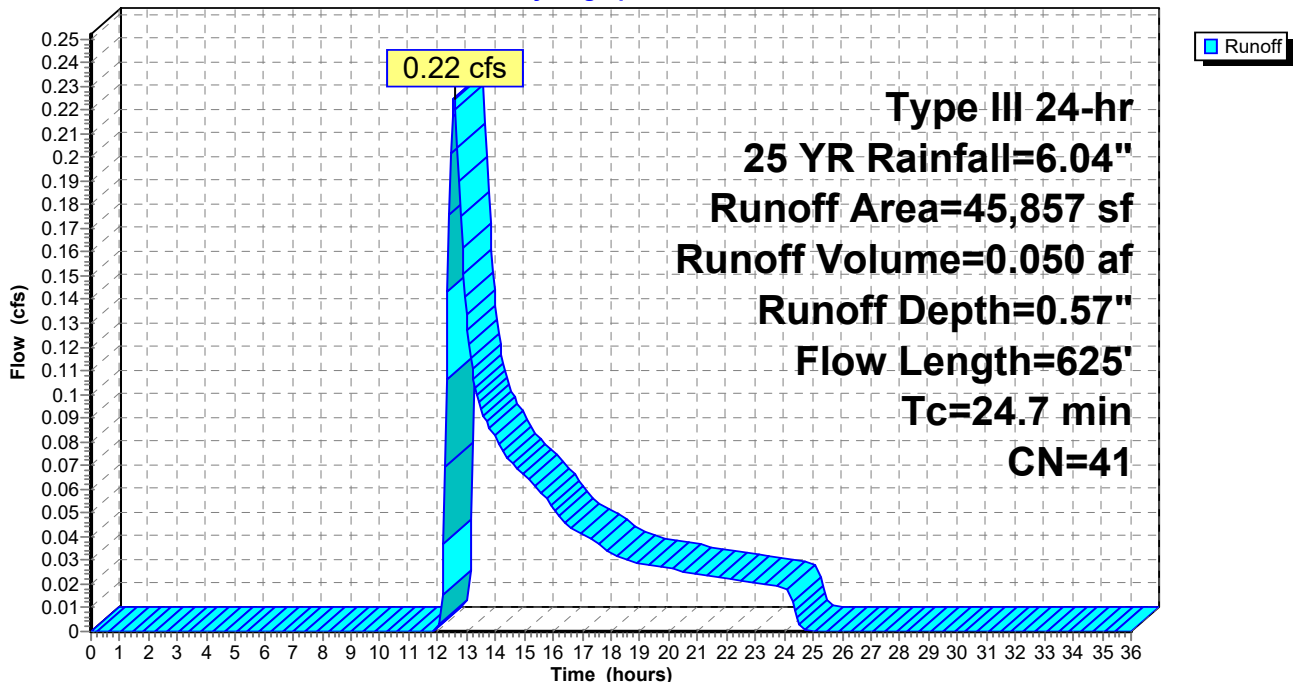
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.04"

Area (sf)	CN	Description
14,260	39	>75% Grass cover, Good, HSG A
5,588	98	Paved parking, HSG A
26,009	30	Woods, Good, HSG A
45,857	41	Weighted Average
40,269		87.81% Pervious Area
5,588		12.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0400	0.11		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.45"
5.3	318	0.0400	1.00		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
0.2	27	0.0100	2.03		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
3.5	180	0.0300	0.87		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
24.7	625	Total			

Subcatchment POST-3: Post Development Area 3

Hydrograph



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Type III 24-hr 25 YR Rainfall=6.04"

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Summary for Subcatchment POST-4: Post Development Area 4

Runoff = 1.67 cfs @ 12.09 hrs, Volume= 0.140 af, Depth= 5.80"

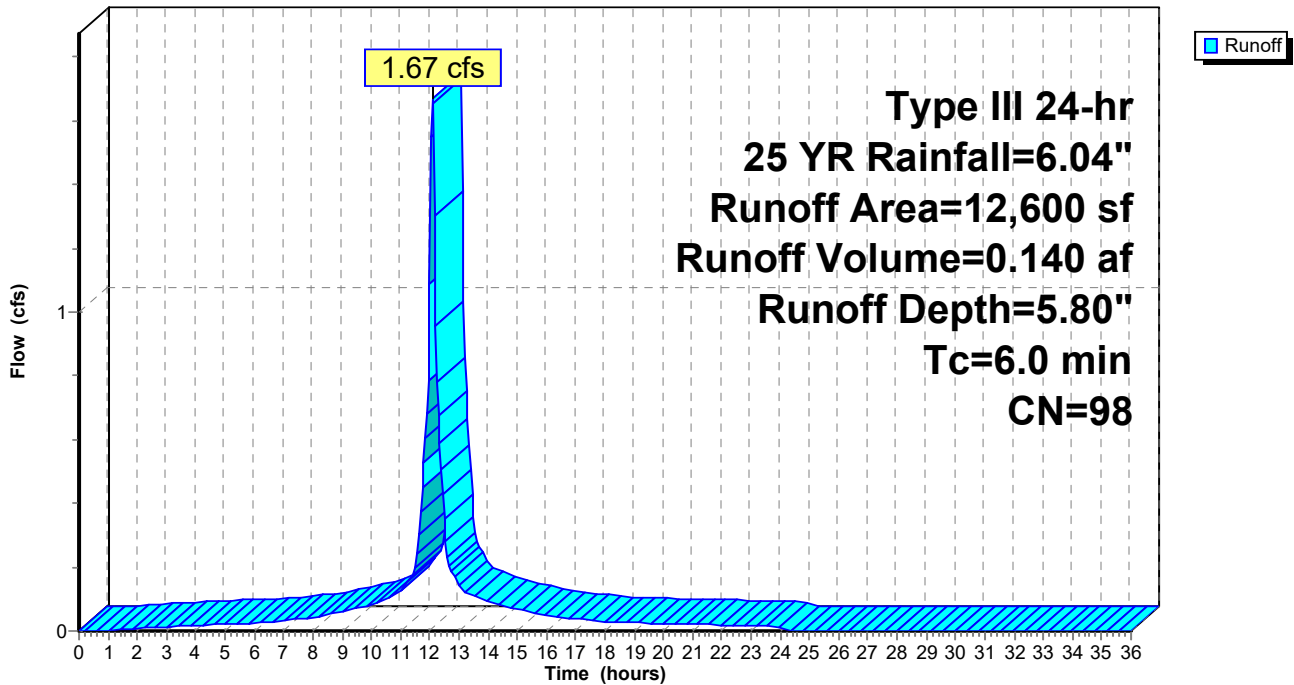
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.04"

Area (sf)	CN	Description
12,600	98	Roofs, HSG A
12,600		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment POST-4: Post Development Area 4

Hydrograph



Summary for Pond AP-1: Exist. CB (Analysis Point-1)

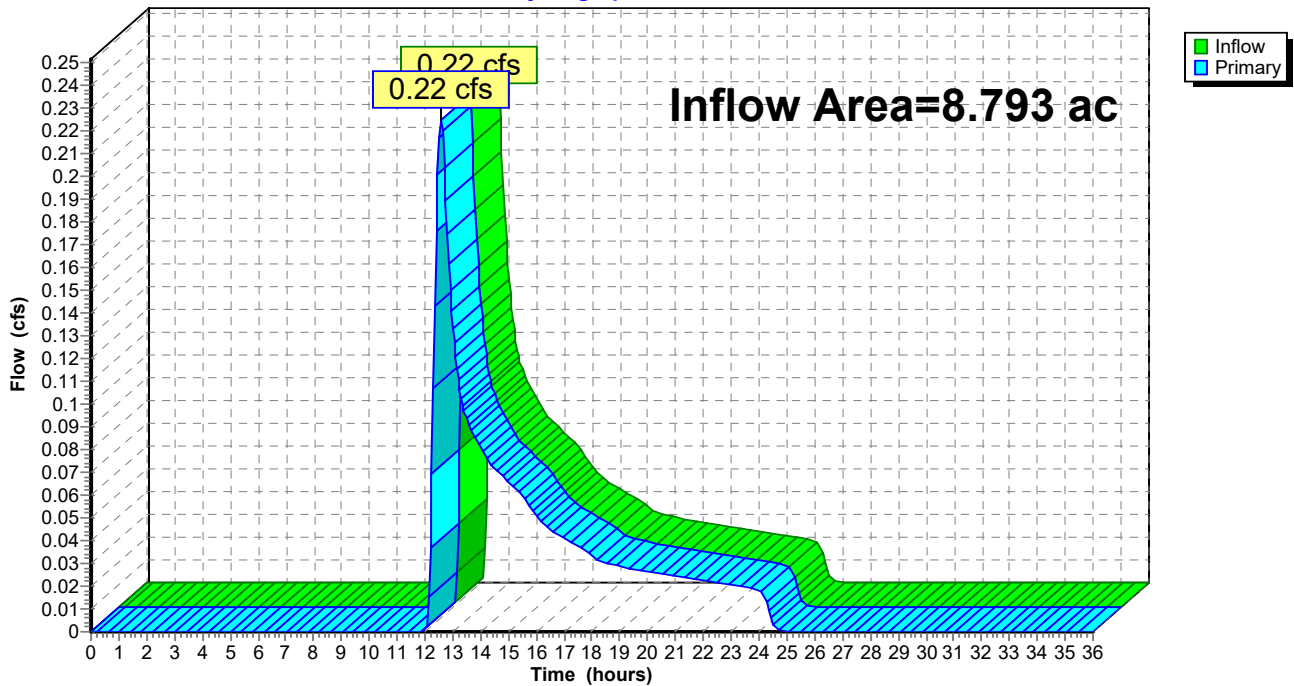
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 8.793 ac, 9.11% Impervious, Inflow Depth = 0.07" for 25 YR event
Inflow = 0.22 cfs @ 12.57 hrs, Volume= 0.050 af
Primary = 0.22 cfs @ 12.57 hrs, Volume= 0.050 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Pond AP-1: Exist. CB (Analysis Point-1)

Hydrograph



2443_Post Development-R1

Type III 24-hr 25 YR Rainfall=6.04"

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Summary for Pond BASIN: Proposed Infiltration Basin

Inflow Area = 7.741 ac, 8.70% Impervious, Inflow Depth = 0.44" for 25 YR event
 Inflow = 1.10 cfs @ 12.56 hrs, Volume= 0.282 af
 Outflow = 0.24 cfs @ 17.70 hrs, Volume= 0.282 af, Atten= 78%, Lag= 308.8 min
 Discarded = 0.24 cfs @ 17.70 hrs, Volume= 0.282 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 9.22' @ 17.70 hrs Surf.Area= 4,258 sf Storage= 4,663 cf

Plug-Flow detention time= 228.6 min calculated for 0.282 af (100% of inflow)
 Center-of-Mass det. time= 228.6 min (1,192.1 - 963.5)

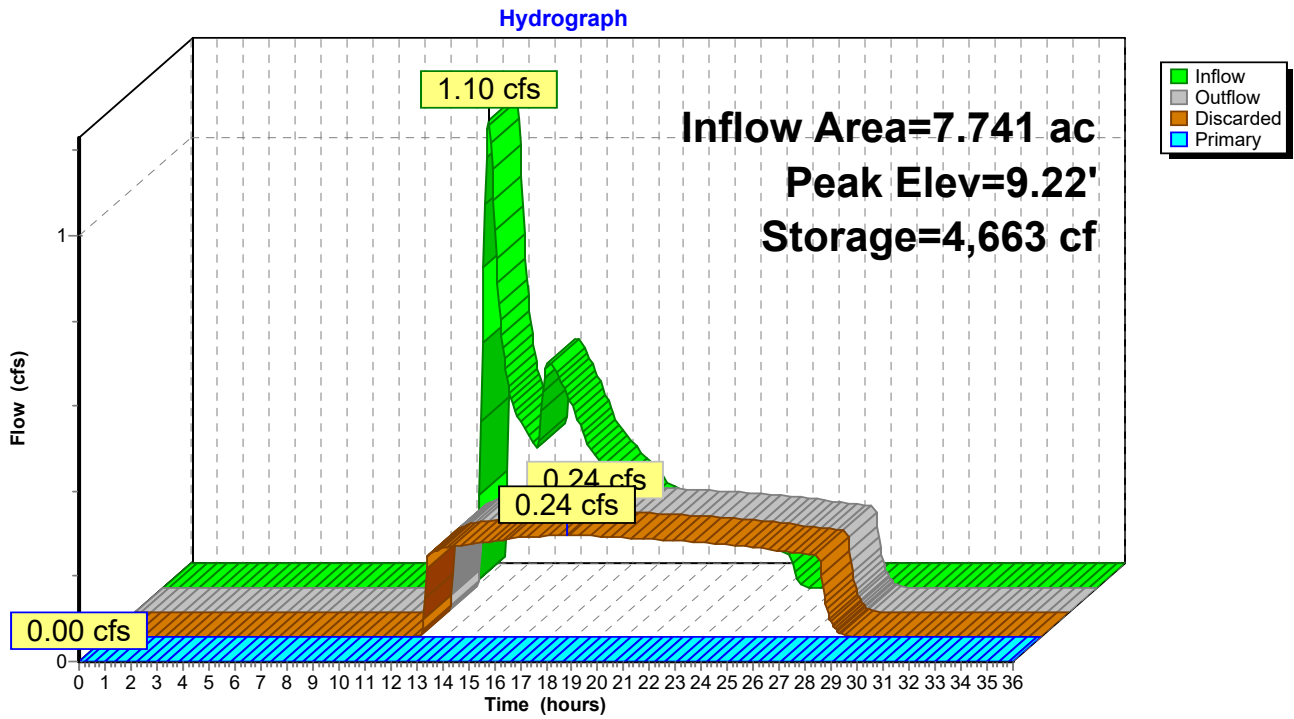
Volume	Invert	Avail.Storage	Storage Description
#1	8.00'	19,592 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
8.00	3,370	0	0
9.00	4,085	3,728	3,728
10.00	4,855	4,470	8,198
11.00	5,683	5,269	13,467
12.00	6,567	6,125	19,592

Device	Routing	Invert	Outlet Devices
#1	Discarded	8.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.05'
#2	Primary	10.80'	5.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.24 cfs @ 17.70 hrs HW=9.22' (Free Discharge)
 ↖1=Exfiltration (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=8.00' TW=0.00' (Dynamic Tailwater)
 ↖2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond BASIN: Proposed Infiltration Basin



2443_Post Development-R1

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Type III 24-hr 25 YR Rainfall=6.04"

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Summary for Pond DMH4: Drain Manhole

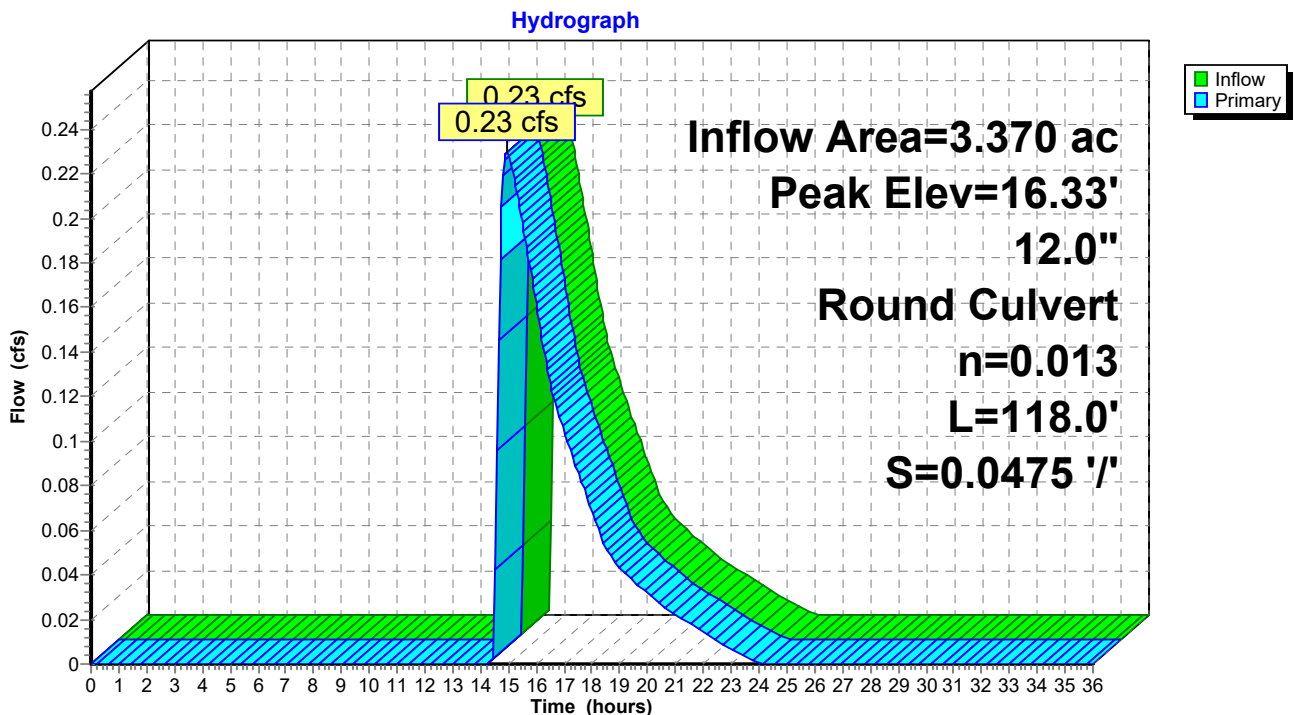
Inflow Area = 3.370 ac, 13.04% Impervious, Inflow Depth = 0.19" for 25 YR event
Inflow = 0.23 cfs @ 14.94 hrs, Volume= 0.053 af
Outflow = 0.23 cfs @ 14.94 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.0 min
Primary = 0.23 cfs @ 14.94 hrs, Volume= 0.053 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 16.33' @ 14.94 hrs
Flood Elev= 19.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.10'	12.0" Round Culvert L= 118.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.10' / 10.50' S= 0.0475 ' / ' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.23 cfs @ 14.94 hrs HW=16.33' TW=10.73' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.23 cfs @ 1.65 fps)

Pond DMH4: Drain Manhole



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Type III 24-hr 25 YR Rainfall=6.04"

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Summary for Pond DMH5: Drain Manhole

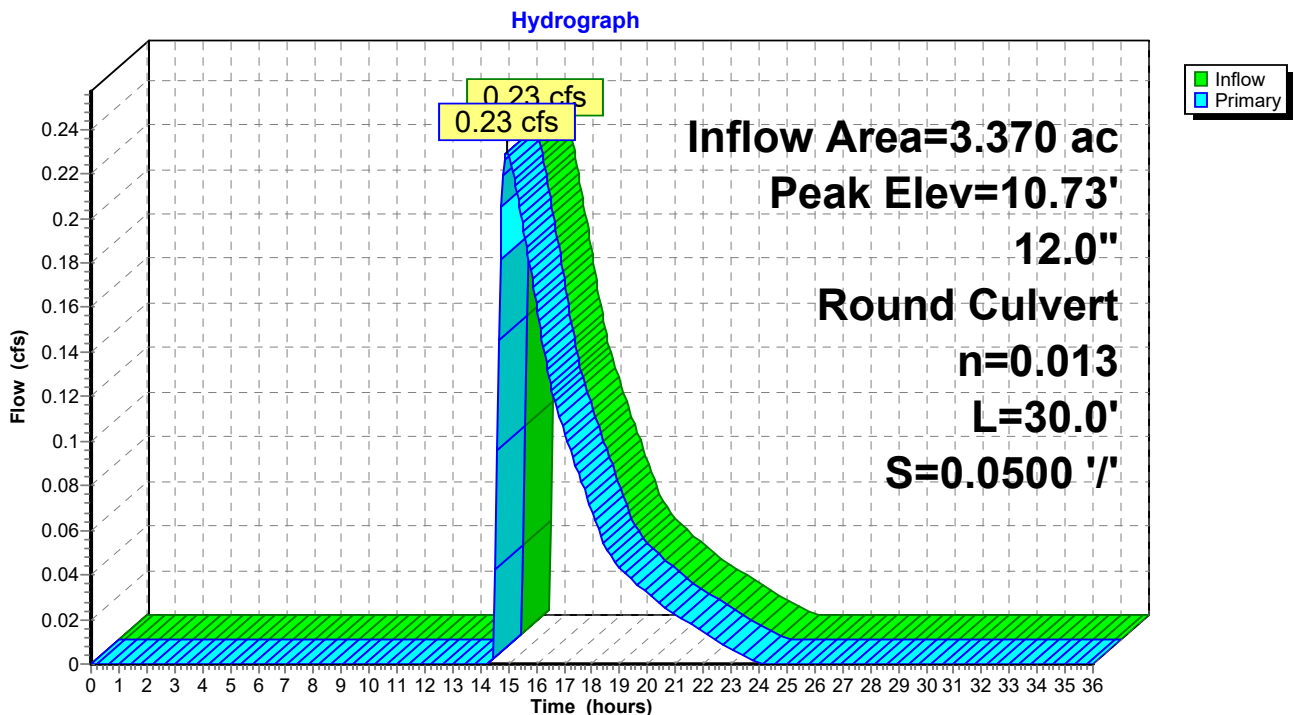
Inflow Area = 3.370 ac, 13.04% Impervious, Inflow Depth = 0.19" for 25 YR event
Inflow = 0.23 cfs @ 14.94 hrs, Volume= 0.053 af
Outflow = 0.23 cfs @ 14.94 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.0 min
Primary = 0.23 cfs @ 14.94 hrs, Volume= 0.053 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 10.73' @ 14.94 hrs
Flood Elev= 14.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	10.50'	12.0" Round Culvert L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 10.50' / 9.00' S= 0.0500 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.23 cfs @ 14.94 hrs HW=10.73' TW=8.91' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.23 cfs @ 1.65 fps)

Pond DMH5: Drain Manhole



2443_Post Development-R1

Type III 24-hr 25 YR Rainfall=6.04"

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Summary for Pond PITS: Proposed Leaching Pits

Inflow Area = 3.370 ac, 13.04% Impervious, Inflow Depth = 0.95" for 25 YR event
 Inflow = 1.59 cfs @ 12.51 hrs, Volume= 0.267 af
 Outflow = 0.32 cfs @ 14.94 hrs, Volume= 0.226 af, Atten= 80%, Lag= 145.4 min
 Discarded = 0.09 cfs @ 12.20 hrs, Volume= 0.173 af
 Primary = 0.23 cfs @ 14.94 hrs, Volume= 0.053 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 16.98' @ 14.94 hrs Surf.Area= 0.036 ac Storage= 0.128 af
 Flood Elev= 18.00' Surf.Area= 0.036 ac Storage= 0.143 af

Plug-Flow detention time= 481.6 min calculated for 0.226 af (85% of inflow)
 Center-of-Mass det. time= 414.2 min (1,341.4 - 927.2)

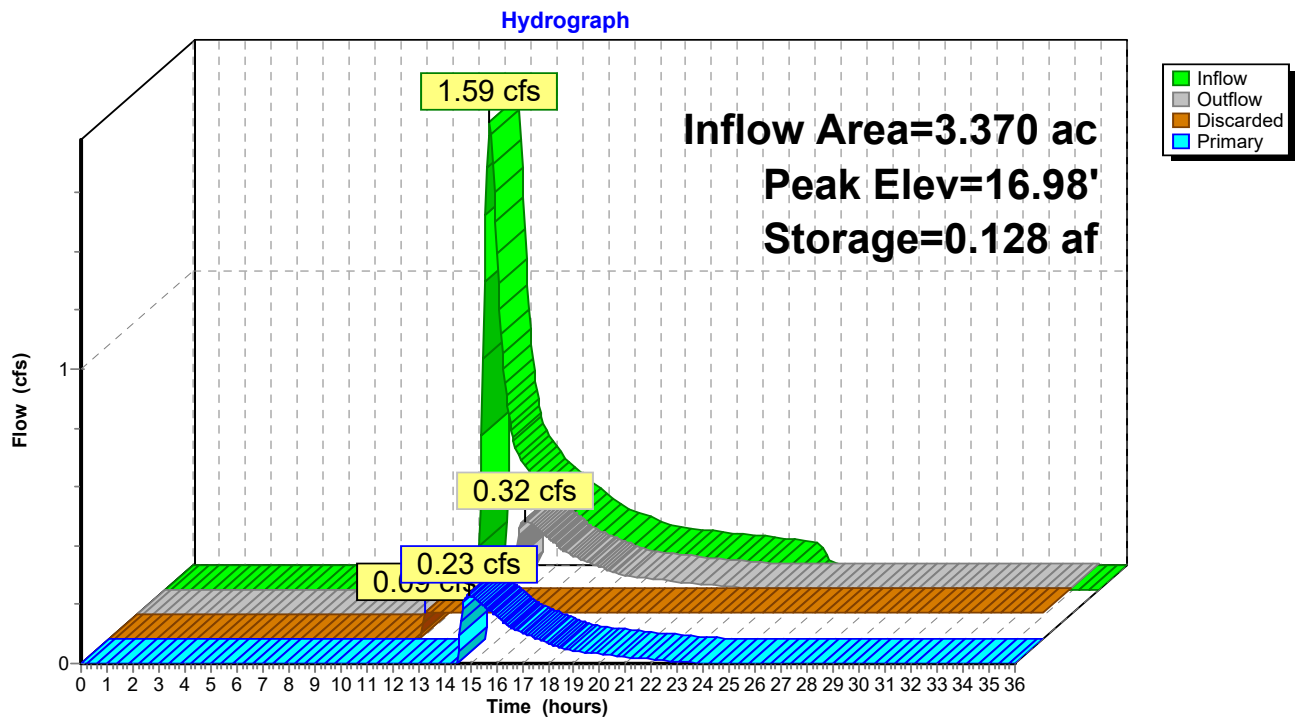
Volume	Invert	Avail.Storage	Storage Description
#1	11.00'	0.079 af	16.00'W x 98.00'L x 7.50'H Prismatic 0.270 af Overall - 0.072 af Embedded = 0.198 af x 40.0% Voids
#2	11.45'	0.063 af	8.00'D x 5.00'H Vertical Cone/Cylinder x 11 Inside #1
#3	11.45'	0.008 af	8.00'D x 7.00'H Vertical Cone/Cylinder Inside #1
		0.151 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	11.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.05'
#2	Primary	16.75'	12.0" Round Culvert L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.75' / 16.20' S= 0.0550 ' S Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.09 cfs @ 12.20 hrs HW=11.17' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.23 cfs @ 14.94 hrs HW=16.98' TW=16.33' (Dynamic Tailwater)
 ↑2=Culvert (Inlet Controls 0.23 cfs @ 1.65 fps)

Pond PITS: Proposed Leaching Pits



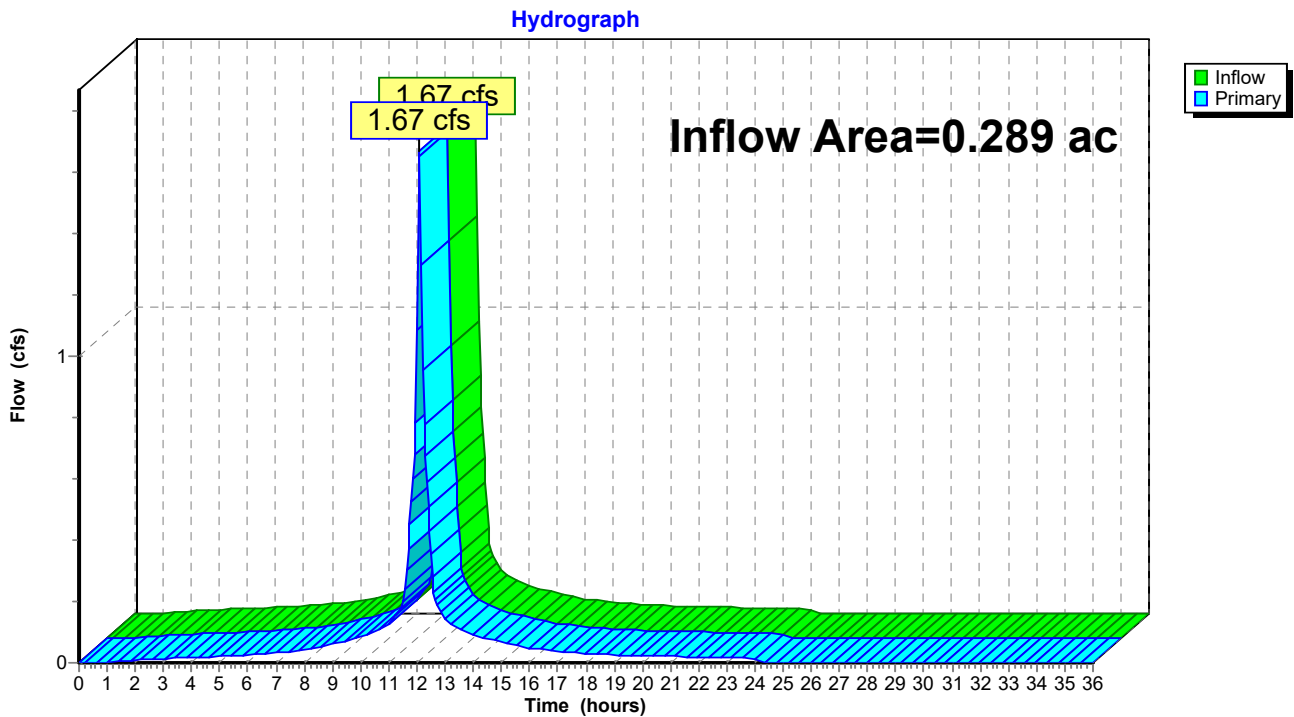
Summary for Pond RECHARGE: Roof Recharge Systems

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.289 ac, 100.00% Impervious, Inflow Depth = 5.80" for 25 YR event
Inflow = 1.67 cfs @ 12.09 hrs, Volume= 0.140 af
Primary = 1.67 cfs @ 12.09 hrs, Volume= 0.140 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Pond RECHARGE: Roof Recharge Systems



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Type III 24-hr 100 YR Rainfall=7.58"

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Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST-1: Post Runoff Area=146,803 sf 13.04% Impervious Runoff Depth=1.71"
 Flow Length=1,203' Tc=28.3 min CN=47 Runoff=3.34 cfs 0.480 af

Subcatchment POST-2: Post Development Runoff Area=190,380 sf 5.35% Impervious Runoff Depth=1.25"
 Flow Length=1,039' Tc=25.3 min CN=42 Runoff=2.88 cfs 0.454 af

Subcatchment POST-3: Post Development Runoff Area=45,857 sf 12.19% Impervious Runoff Depth=1.16"
 Flow Length=625' Tc=24.7 min CN=41 Runoff=0.63 cfs 0.102 af

Subcatchment POST-4: Post Runoff Area=12,600 sf 100.00% Impervious Runoff Depth=7.34"
 Tc=6.0 min CN=98 Runoff=2.10 cfs 0.177 af

Pond AP-1: Exist. CB (Analysis Point-1) Inflow=0.87 cfs 0.257 af
 Primary=0.87 cfs 0.257 af

Pond BASIN: Proposed Infiltration Basin Peak Elev=10.95' Storage=13,196 cf Inflow=3.77 cfs 0.717 af
 Discarded=0.31 cfs 0.542 af Primary=0.74 cfs 0.155 af Outflow=1.05 cfs 0.697 af

Pond DMH4: Drain Manhole Peak Elev=16.89' Inflow=2.00 cfs 0.263 af
 12.0" Round Culvert n=0.013 L=118.0' S=0.0475 '/' Outflow=2.00 cfs 0.263 af

Pond DMH5: Drain Manhole Peak Elev=11.29' Inflow=2.00 cfs 0.263 af
 12.0" Round Culvert n=0.013 L=30.0' S=0.0500 '/' Outflow=2.00 cfs 0.263 af

Pond PITS: Proposed Leaching Pits Peak Elev=17.54' Storage=0.136 af Inflow=3.34 cfs 0.480 af
 Discarded=0.09 cfs 0.175 af Primary=2.00 cfs 0.263 af Outflow=2.09 cfs 0.437 af

Pond RECHARGE: Roof Recharge Systems Inflow=2.10 cfs 0.177 af
 Primary=2.10 cfs 0.177 af

Total Runoff Area = 9.083 ac Runoff Volume = 1.212 af Average Runoff Depth = 1.60"
87.99% Pervious = 7.992 ac 12.01% Impervious = 1.091 ac

2443_Post Development-R1

Type III 24-hr 100 YR Rainfall=7.58"

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Summary for Subcatchment POST-1: Post Development Area 1

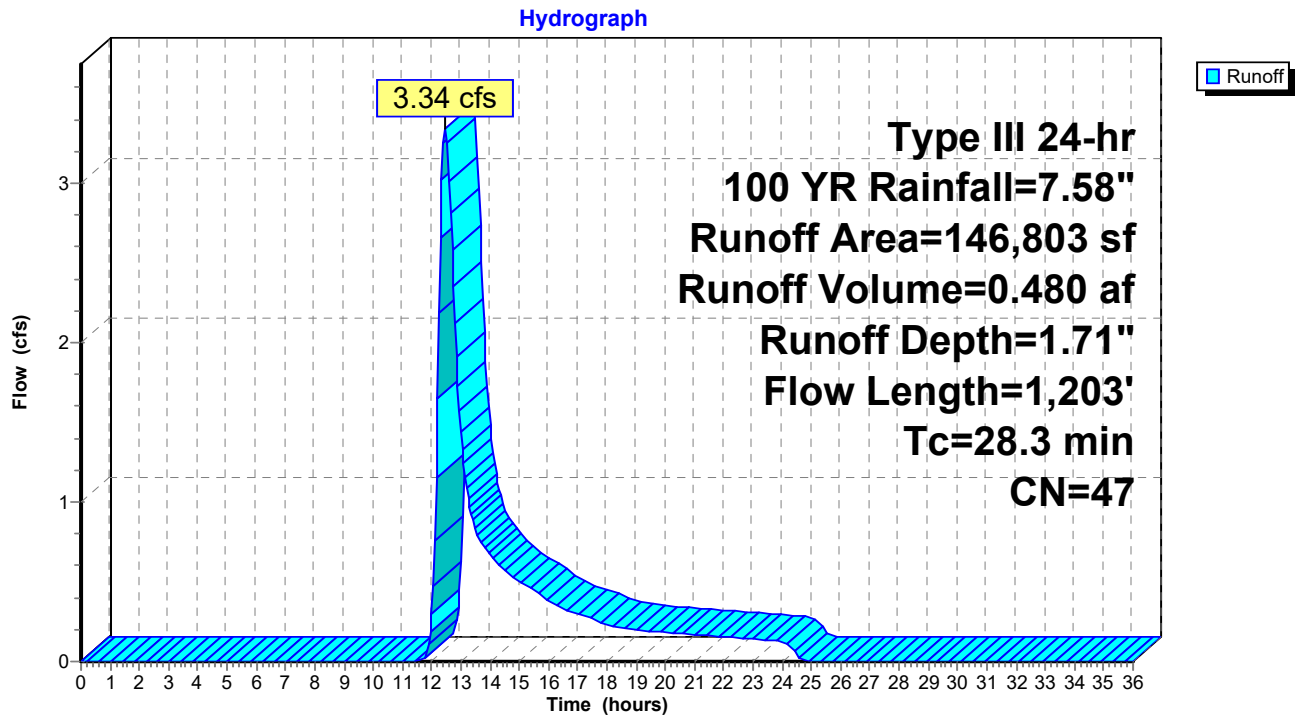
Runoff = 3.34 cfs @ 12.46 hrs, Volume= 0.480 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=7.58"

Area (sf)	CN	Description
* 11,059	98	Paved Roadway, HSG C
* 8,084	98	Paved Sidewalk & Driveways, HSG C
33,255	39	>75% Grass cover, Good, HSG A
71,874	30	Woods, Good, HSG A
22,531	70	Woods, Good, HSG C
146,803	47	Weighted Average
127,660		86.96% Pervious Area
19,143		13.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.9	50	0.0200	0.07		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.45"
4.1	352	0.0800	1.41		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
0.1	33	0.0350	3.80		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
11.1	576	0.0300	0.87		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
1.0	175	0.0200	2.87		Shallow Concentrated Flow, E-F Paved Kv= 20.3 fps
0.1	17	0.0130	5.60	4.40	Pipe Channel, F-G 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Corrugated PP, smooth interior
28.3	1,203	Total			

Subcatchment POST-1: Post Development Area 1



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Type III 24-hr 100 YR Rainfall=7.58"

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Summary for Subcatchment POST-2: Post Development Area 2

Runoff = 2.88 cfs @ 12.46 hrs, Volume= 0.454 af, Depth= 1.25"

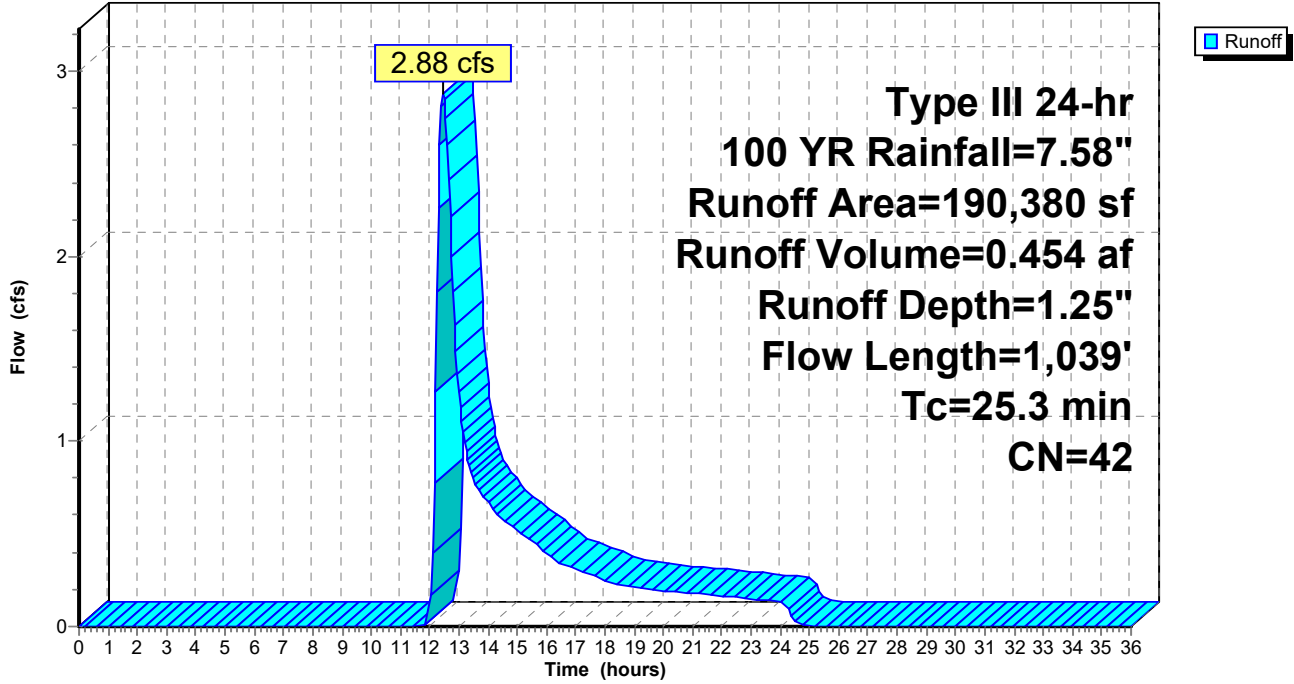
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=7.58"

Area (sf)	CN	Description
* 6,050	98	Paved Roadway, HSG C
* 4,128	98	Paved Sidewalk and Driveways, HSG C
71,432	39	>75% Grass cover, Good, HSG A
83,600	30	Woods, Good, HSG A
25,170	70	Woods, Good, HSG C
190,380	42	Weighted Average
180,202		94.65% Pervious Area
10,178		5.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9	50	0.0250	0.08		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.45"
4.4	370	0.0800	1.41		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
0.2	32	0.0300	3.52		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
9.8	587	0.0400	1.00		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
25.3	1,039	Total			

Subcatchment POST-2: Post Development Area 2

Hydrograph



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Type III 24-hr 100 YR Rainfall=7.58"

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Summary for Subcatchment POST-3: Post Development Area 3

Runoff = 0.63 cfs @ 12.46 hrs, Volume= 0.102 af, Depth= 1.16"

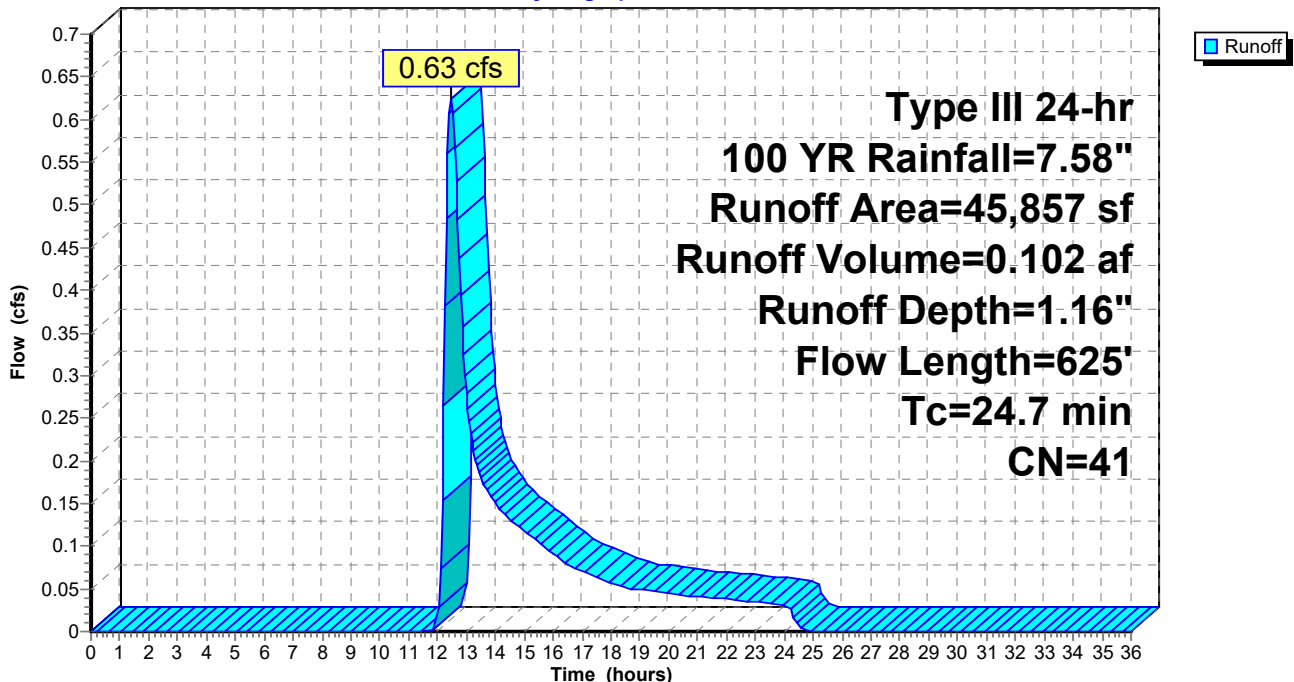
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=7.58"

Area (sf)	CN	Description
14,260	39	>75% Grass cover, Good, HSG A
5,588	98	Paved parking, HSG A
26,009	30	Woods, Good, HSG A
45,857	41	Weighted Average
40,269		87.81% Pervious Area
5,588		12.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	100	0.0400	0.11		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.45"
5.3	318	0.0400	1.00		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
0.2	27	0.0100	2.03		Shallow Concentrated Flow, C-D Paved Kv= 20.3 fps
3.5	180	0.0300	0.87		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
24.7	625	Total			

Subcatchment POST-3: Post Development Area 3

Hydrograph



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Type III 24-hr 100 YR Rainfall=7.58"

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Summary for Subcatchment POST-4: Post Development Area 4

Runoff = 2.10 cfs @ 12.09 hrs, Volume= 0.177 af, Depth= 7.34"

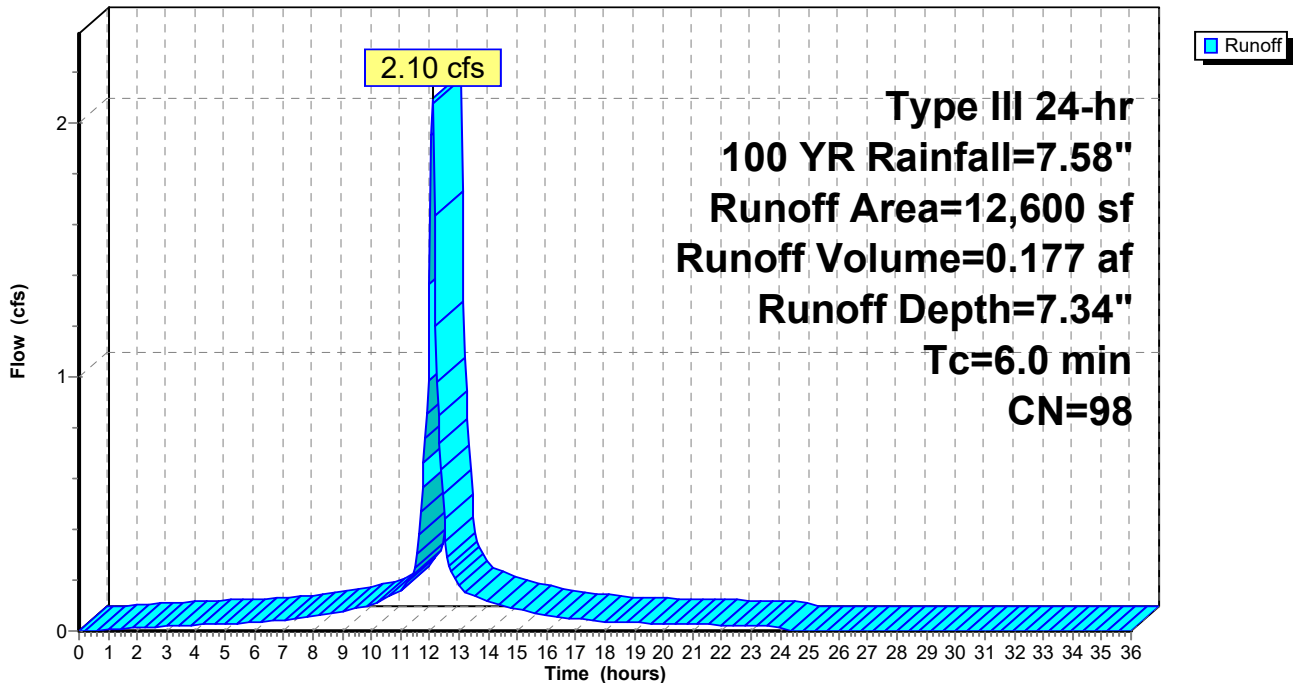
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=7.58"

Area (sf)	CN	Description
12,600	98	Roofs, HSG A
12,600		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment POST-4: Post Development Area 4

Hydrograph



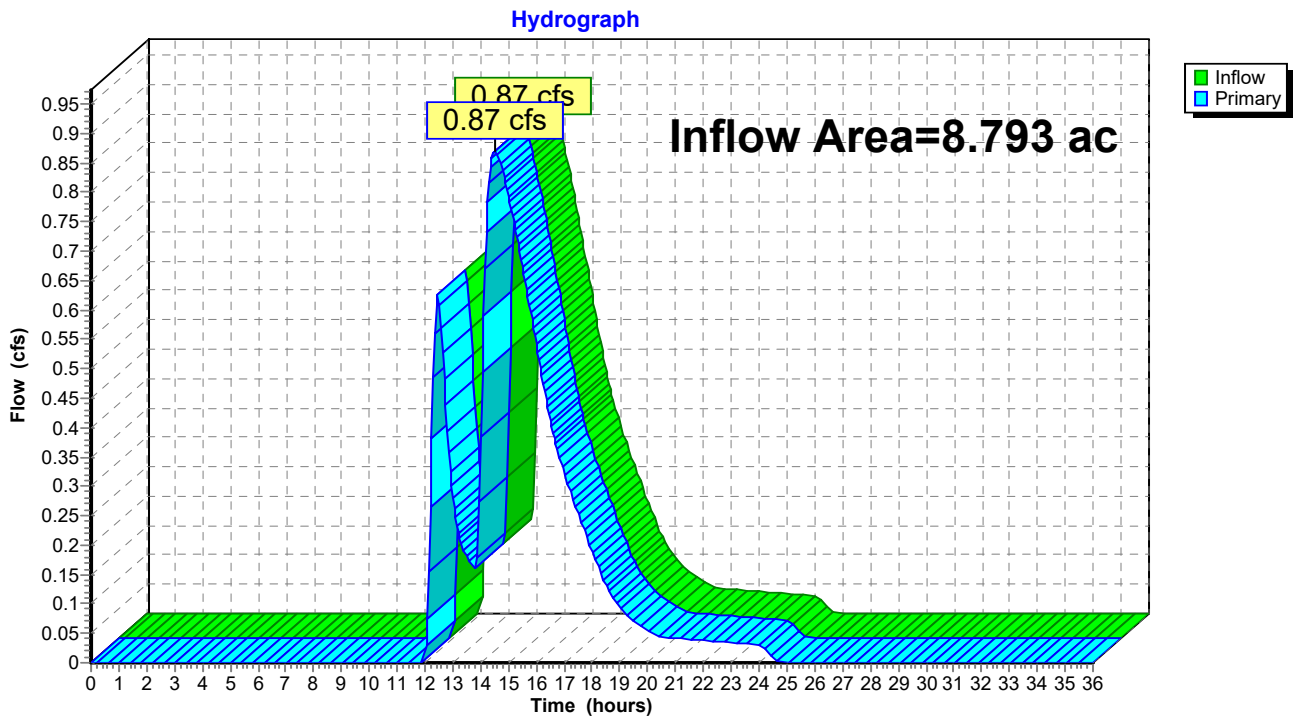
Summary for Pond AP-1: Exist. CB (Analysis Point-1)

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 8.793 ac, 9.11% Impervious, Inflow Depth = 0.35" for 100 YR event
Inflow = 0.87 cfs @ 14.52 hrs, Volume= 0.257 af
Primary = 0.87 cfs @ 14.52 hrs, Volume= 0.257 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Pond AP-1: Exist. CB (Analysis Point-1)



Summary for Pond BASIN: Proposed Infiltration Basin

[80] Warning: Exceeded Pond DMH5 by 0.03' @ 24.65 hrs (0.00 cfs 0.000 af)

Inflow Area = 7.741 ac, 8.70% Impervious, Inflow Depth = 1.11" for 100 YR event
 Inflow = 3.77 cfs @ 12.80 hrs, Volume= 0.717 af
 Outflow = 1.05 cfs @ 14.54 hrs, Volume= 0.697 af, Atten= 72%, Lag= 104.5 min
 Discarded = 0.31 cfs @ 14.54 hrs, Volume= 0.542 af
 Primary = 0.74 cfs @ 14.54 hrs, Volume= 0.155 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 10.95' @ 14.54 hrs Surf.Area= 5,643 sf Storage= 13,196 cf

Plug-Flow detention time= 391.1 min calculated for 0.697 af (97% of inflow)
 Center-of-Mass det. time= 377.2 min (1,299.2 - 922.0)

Volume	Invert	Avail.Storage	Storage Description
#1	8.00'	19,592 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
8.00	3,370	0	0
9.00	4,085	3,728	3,728
10.00	4,855	4,470	8,198
11.00	5,683	5,269	13,467
12.00	6,567	6,125	19,592

Device	Routing	Invert	Outlet Devices
#1	Discarded	8.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.05'
#2	Primary	10.80'	5.0' long x 10.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

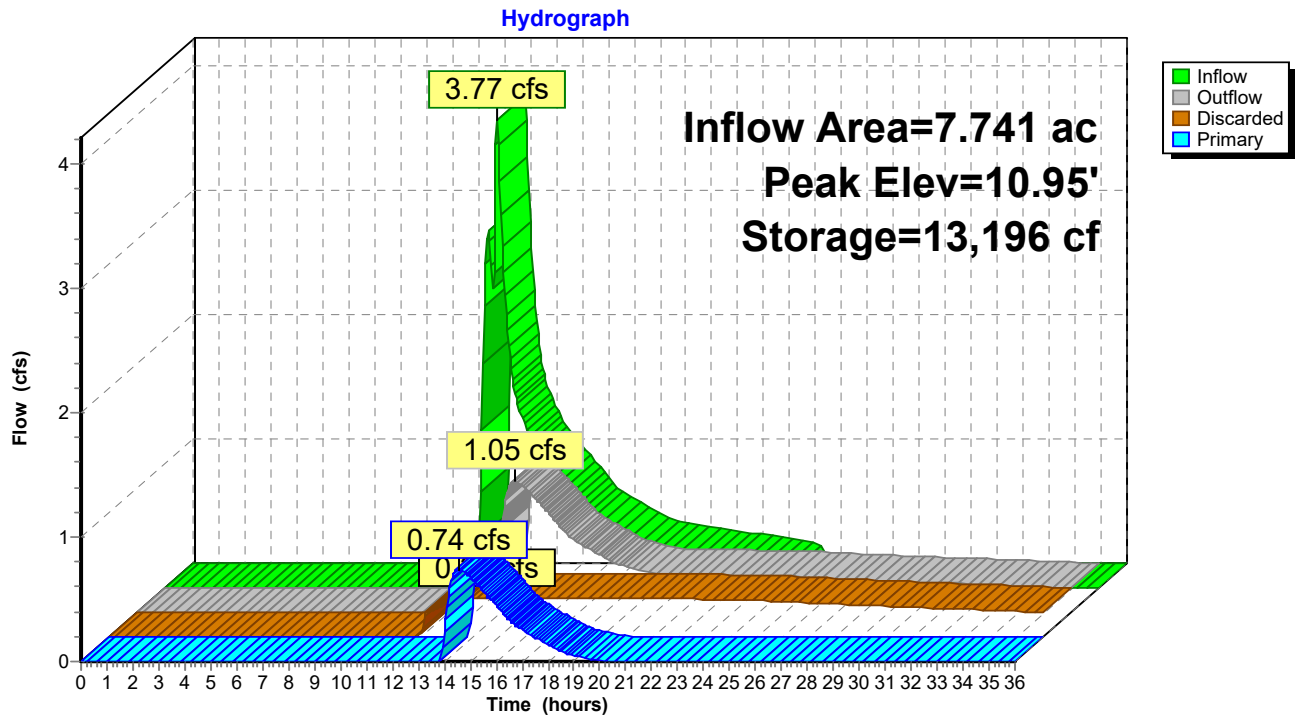
Discarded OutFlow Max=0.31 cfs @ 14.54 hrs HW=10.95' (Free Discharge)

↑**1=Exfiltration** (Exfiltration Controls 0.31 cfs)

Primary OutFlow Max=0.74 cfs @ 14.54 hrs HW=10.95' TW=0.00' (Dynamic Tailwater)

↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.74 cfs @ 0.97 fps)

Pond BASIN: Proposed Infiltration Basin



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Type III 24-hr 100 YR Rainfall=7.58"

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Summary for Pond DMH4: Drain Manhole

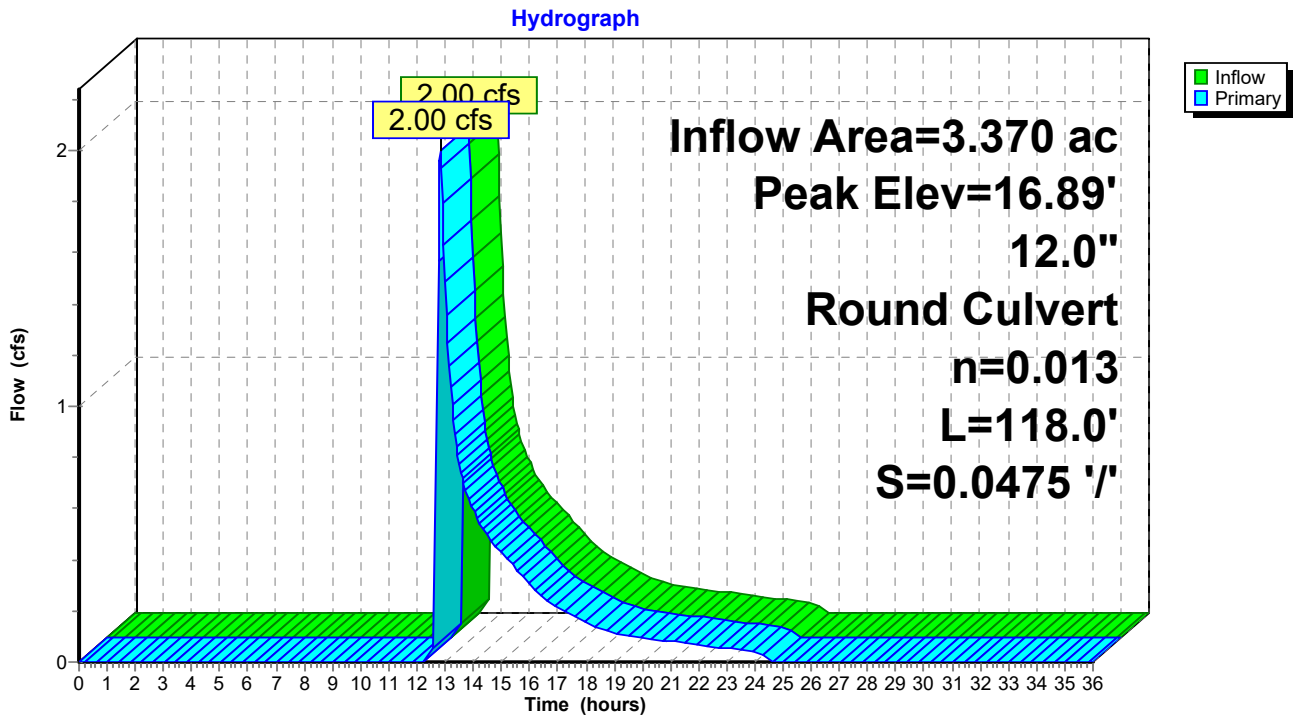
Inflow Area = 3.370 ac, 13.04% Impervious, Inflow Depth = 0.94" for 100 YR event
Inflow = 2.00 cfs @ 12.82 hrs, Volume= 0.263 af
Outflow = 2.00 cfs @ 12.82 hrs, Volume= 0.263 af, Atten= 0%, Lag= 0.0 min
Primary = 2.00 cfs @ 12.82 hrs, Volume= 0.263 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 16.89' @ 12.82 hrs
Flood Elev= 19.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	16.10'	12.0" Round Culvert L= 118.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.10' / 10.50' S= 0.0475 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.95 cfs @ 12.82 hrs HW=16.87' TW=11.27' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.95 cfs @ 2.99 fps)

Pond DMH4: Drain Manhole



2443_Post Development-R1

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Type III 24-hr 100 YR Rainfall=7.58"

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Summary for Pond DMH5: Drain Manhole

Inflow Area = 3.370 ac, 13.04% Impervious, Inflow Depth = 0.94" for 100 YR event
Inflow = 2.00 cfs @ 12.82 hrs, Volume= 0.263 af
Outflow = 2.00 cfs @ 12.82 hrs, Volume= 0.263 af, Atten= 0%, Lag= 0.0 min
Primary = 2.00 cfs @ 12.82 hrs, Volume= 0.263 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

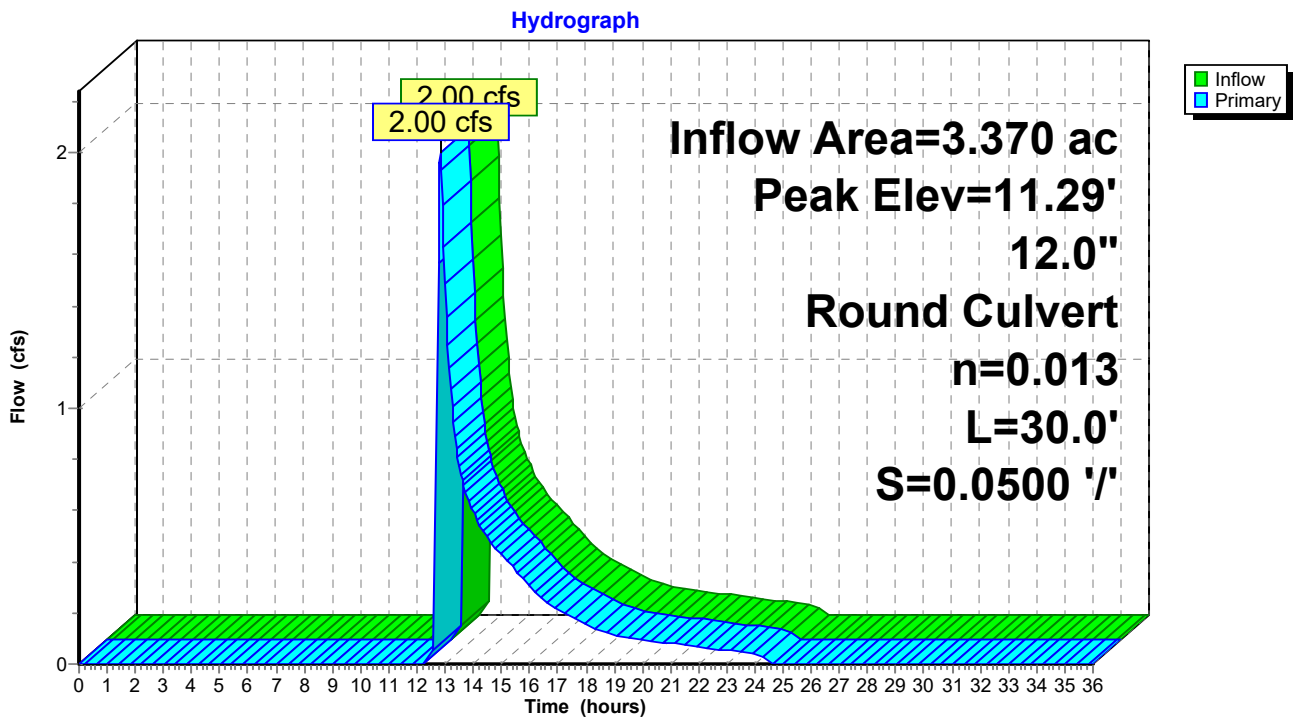
Peak Elev= 11.29' @ 12.82 hrs

Flood Elev= 14.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	10.50'	12.0" Round Culvert L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 10.50' / 9.00' S= 0.0500 '/ Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=1.95 cfs @ 12.82 hrs HW=11.27' TW=9.48' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.95 cfs @ 2.99 fps)

Pond DMH5: Drain Manhole



2443_Post Development-R1

Type III 24-hr 100 YR Rainfall=7.58"

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Summary for Pond PITS: Proposed Leaching Pits

Inflow Area = 3.370 ac, 13.04% Impervious, Inflow Depth = 1.71" for 100 YR event
 Inflow = 3.34 cfs @ 12.46 hrs, Volume= 0.480 af
 Outflow = 2.09 cfs @ 12.82 hrs, Volume= 0.437 af, Atten= 37%, Lag= 21.5 min
 Discarded = 0.09 cfs @ 12.00 hrs, Volume= 0.175 af
 Primary = 2.00 cfs @ 12.82 hrs, Volume= 0.263 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
 Peak Elev= 17.54' @ 12.82 hrs Surf.Area= 0.036 ac Storage= 0.136 af
 Flood Elev= 18.00' Surf.Area= 0.036 ac Storage= 0.143 af

Plug-Flow detention time= 265.7 min calculated for 0.437 af (91% of inflow)
 Center-of-Mass det. time= 223.2 min (1,128.0 - 904.8)

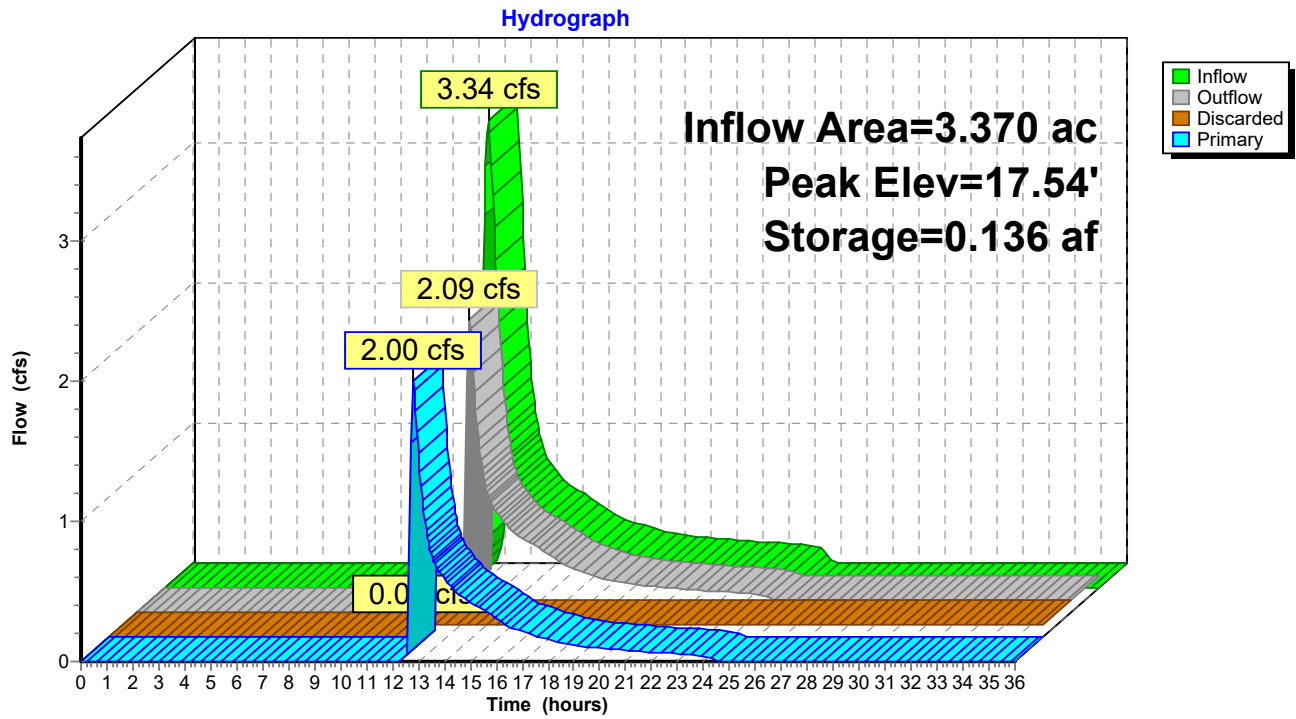
Volume	Invert	Avail.Storage	Storage Description
#1	11.00'	0.079 af	16.00'W x 98.00'L x 7.50'H Prismaoid 0.270 af Overall - 0.072 af Embedded = 0.198 af x 40.0% Voids
#2	11.45'	0.063 af	8.00'D x 5.00'H Vertical Cone/Cylinder x 11 Inside #1
#3	11.45'	0.008 af	8.00'D x 7.00'H Vertical Cone/Cylinder Inside #1
		0.151 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	11.00'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.05'
#2	Primary	16.75'	12.0" Round Culvert L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 16.75' / 16.20' S= 0.0550 ' S Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.09 cfs @ 12.00 hrs HW=11.09' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=1.95 cfs @ 12.82 hrs HW=17.52' TW=16.87' (Dynamic Tailwater)
 ↑2=Culvert (Inlet Controls 1.95 cfs @ 2.99 fps)

Pond PITS: Proposed Leaching Pits



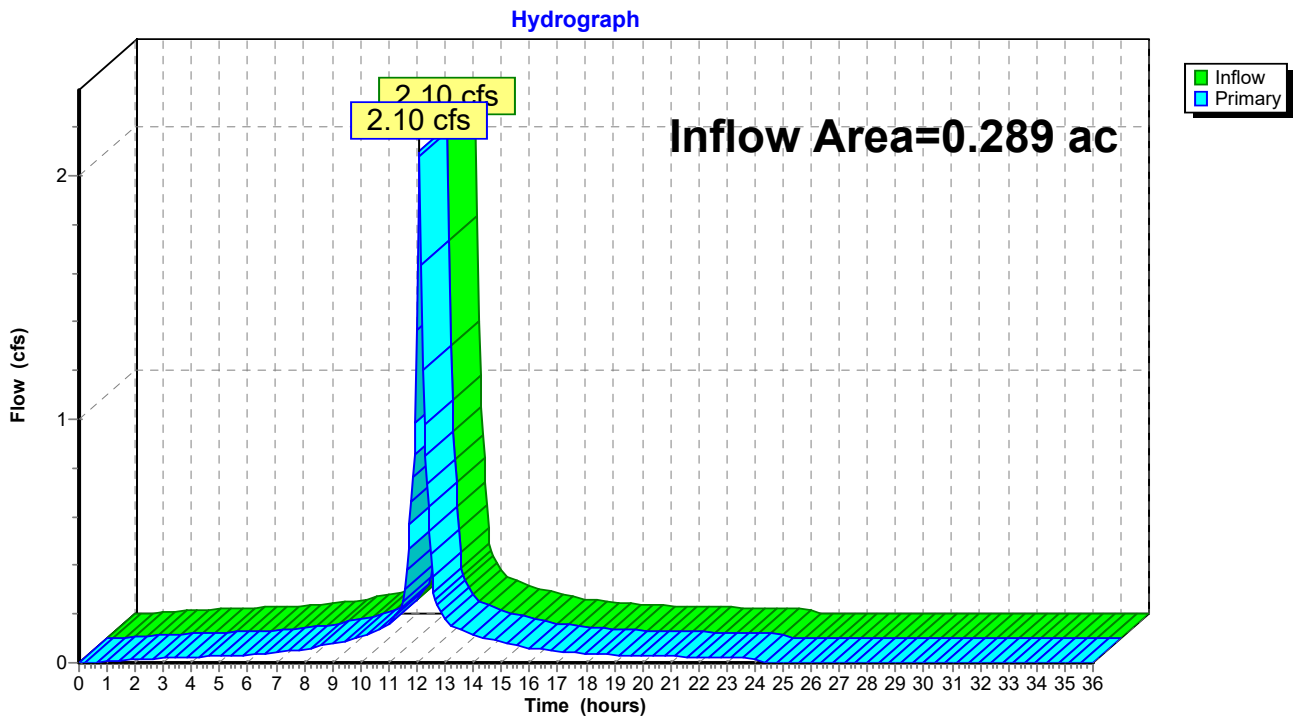
Summary for Pond RECHARGE: Roof Recharge Systems

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.289 ac, 100.00% Impervious, Inflow Depth = 7.34" for 100 YR event
Inflow = 2.10 cfs @ 12.09 hrs, Volume= 0.177 af
Primary = 2.10 cfs @ 12.09 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Pond RECHARGE: Roof Recharge Systems



Section 3

Supplemental Data

RECHARGE VOLUME CALCULATIONS

Client:	DAVID ANDRADE	Job No.	2443
Project:	PROPOSED ROADWAY	Date:	2/3/2022
Location:	GREAT NECK ROAD	Design by:	R. RICCIO

RECHARGE VOLUME CALCULATIONS-LEACHING PITS

HYDROLOGIC SOIL GROUP	A
UNIT VOLUME (in.) =	0.60
IMPERVIOUS AREA (s.f.) =	19,143
RECHARGE VOLUME (cu.ft.) =	957

AVAILABLE VOLUME CALCULATION (LEACHING PITS)

ELEV (ft.)	VOL (cu.ft.)	CUM. VOL (cu.ft.)	CUM. VOL (ac.ft.)	
**				
11.45	0.0	0.0	0.000	
16.75	5,129.0	5,129.0	0.118	
RECHARGE VOLUME PROVIDED			5,129.0	0.118
RECHARGE VOLUME REQUIRED			957.2	0.022 OK

DRAWDOWN TIME CALCULATION

$$\text{DRAWDOWN TIME} = (\text{REQ. RECH. VOL.}) / (\text{DES. INFILTRATION RATE "K" * BOTTOM AREA})$$

RECHARGE VOLUME PROVIDED (CF)=	5,129.0	
DESIGN INFILTRATION RATE (IN/HR)=	2.4	
BOTTOM AREA(SF)=	1,568.0	
DRAWDOWN TIME (HRS)=	16.3	OK

Appendix A

Revised Post Development Watershed Plans

Revisions			
No.	Description	Date	Appvd.
1	REVISE PER PEER REVIEW COMMENTS	2/2/2022	RRR

Date: 10/7/2021

Scale: 1"=50'

Drawn By: PGT
Designed By: PGT
Checked By: RRR

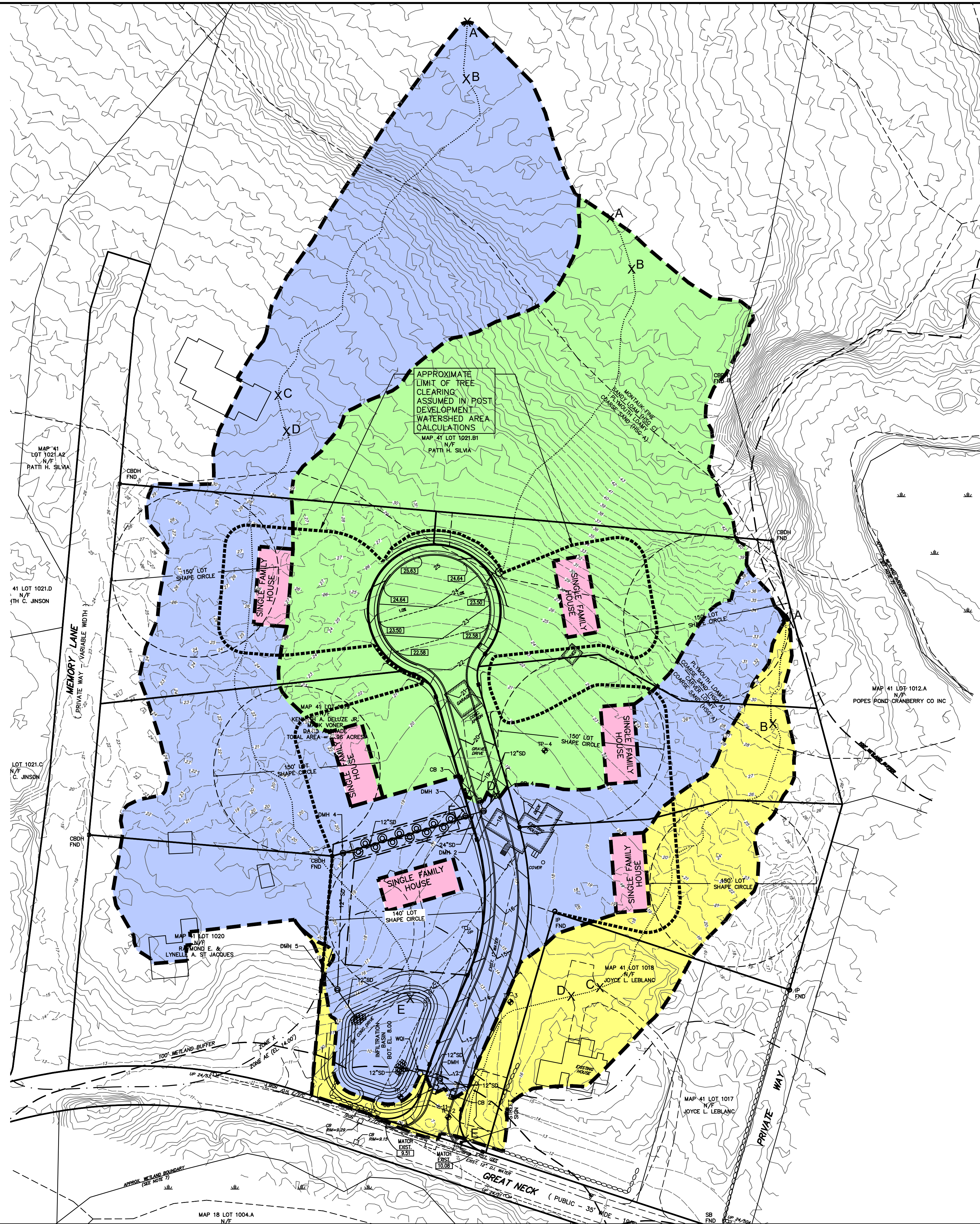
Issued For:
PERMITTING

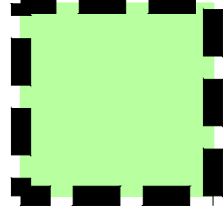
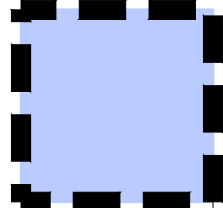
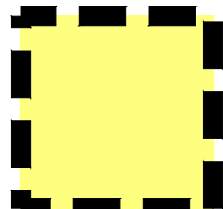
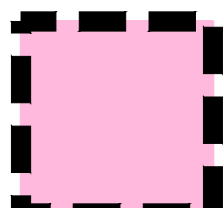
DEFINITIVE SUBDIVISION PLAN OF LAND
SHELL POINT PLACE
DAVID ANDRADE
69 GREAT NECK ROAD
WAREHAM, MASSACHUSETTS

Drawing Title:
POST DEVELOPMENT WATERSHED PLAN

Project No. 2443
Sheet 1 OF 1

Sheet No.
POST-1



-  WATERSHED AREA POST 1 3.37 AC.
-  WATERSHED AREA POST 2 4.37 AC.
-  WATERSHED AREA POST 3 1.05 AC.
-  WATERSHED AREA POST 4 0.29 AC.

