DRAINAGE CALCULATIONS
&
STORMWATER REPORT

CROSSROADS CARE CENTER
238 & 240 Sandwich Road
East Wareham, MA

May 25, 2021

Prepared For:
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PROPOSED CROSSROADS CARE CENTER

238 & 240 SANDWICH ROAD
EAST WAREHAM, MA

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1. Project Description

Narrative

The project consists of the construction of a 22,250 S.F. ± care center on two parcels of land off Sandwich Road (Route 6) in East Wareham, MA. The site has been developed to meet the Massachusetts Stormwater Standards and applicable Town of Wareham regulations pertaining to Stormwater Management.

Existing Conditions

The project site is known as 238 & 240 Sandwich Road (Assessor's Map 133, lots 1100.A and 1101.A), consists of 83,601 S.F. (1.92 Ac. ±), and is a predominately sloped, vacant & wooded parcel of land. A dilapidated single-family structure exists on the land but will be removed as part of the project. The site generally slopes downward from the Northwest and offsite to Sandwich Road & the southeast.

The property is abutted by residential properties to the north and west, a commercial property to the west, and Sandwich Road (Route 6) and Cranberry Highway (Route 28) to the south and east (both of which are State Highways). There are no wetlands in the vicinity of the project site.

Proposed Conditions

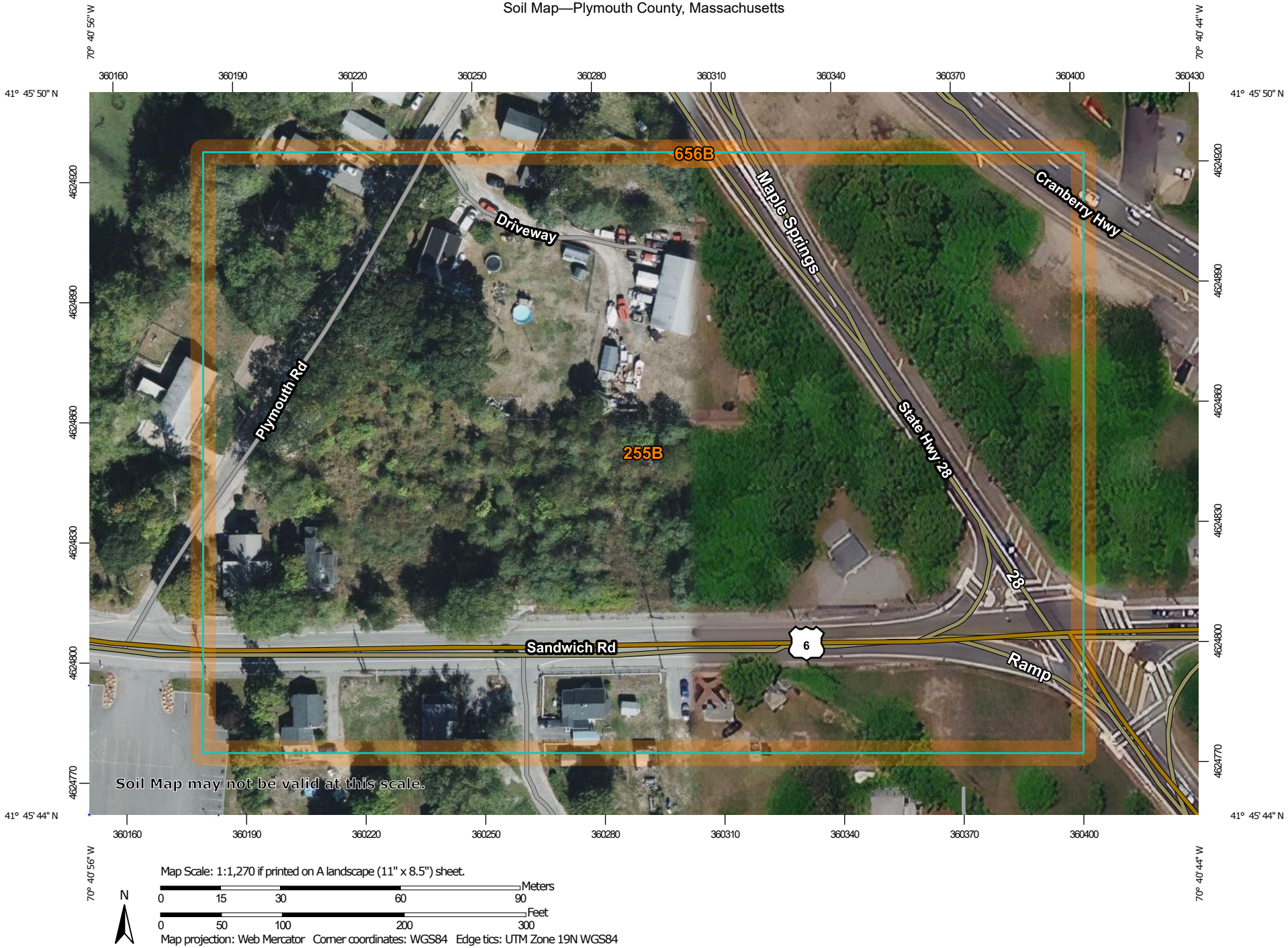
The site will be developed with a five-story elderly care center with associated parking, grading, landscaping, and utilities. Parking will be provided on the surface and within a parking garage beneath the facility. Grading has been designed to minimize significant cuts & fills across the site and landscape/grass areas will be stabilized with loam and seed as well as various landscape plantings. Utilities will consist of connections to existing water, gas, and electric facilities located in Sandwich Road, and a new sewer lift station that will connect to the municipal sewer system. Subsurface drainage facilities are provided for surface and roof runoff.

Soil Description

Existing soil classifications and hydrologic soil groups for the site were obtained from the USDA Soil Conservation Service, Soil Survey of Plymouth County, Massachusetts & The Web Soil Survey. The soil types found within the limits of the drainage analysis are classified as the following:

1.) Windsor loamy sand, 3 to 8 percent slopes (255B)

Windsor loamy sand has a parent material comprised of loose sandy glaciofluvial deposits derived from granite, schist and gneiss. The soil is considered excessively drained, exhibits a hydrological classification group "A", and is the primary soil type over the project site.



Map Scale: 1:1,270 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

Plymouth County, Massachusetts

255B—Windsor loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2svkf
Elevation: 0 to 1,210 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Windsor, loamy sand, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor, Loamy Sand

Setting

Landform: Deltas, outwash plains, dunes, outwash terraces
Landform position (three-dimensional): Riser, tread
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

O - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loamy sand
Bw - 3 to 25 inches: loamy sand
C - 25 to 65 inches: sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s

Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Hinckley, loamy sand
Percent of map unit: 10 percent
Landform: Deltas, outwash plains, eskers, kames
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Deerfield, loamy sand
Percent of map unit: 5 percent
Landform: Outwash plains, terraces, deltas
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Plymouth County, Massachusetts
Survey Area Data: Version 13, Jun 9, 2020

2. Hydrologic Analysis & Stormwater Management

Methodology

Stormwater runoff was evaluated for the 2-year, 10-year, 25-year, and 100-year, Type III, 24-hour storm for both pre-development and post-development conditions. Pre-development and post-development conditions were modeled using HydroCAD software, which combines USDA Soil Conservation Service hydrology and hydraulic techniques (commonly known as SCS TR-55 and TR-20) to generate hydrographs (calculations are provided in the supplemental section of this report). The rainfall amounts used for calculating runoff for the 2-year, 10-year, 25-year and 100-year storm events were obtained from the NOAA Atlas 14 Volume 10 Frequency Estimates.

The drainage calculation provided at the end of this report identify on-site and off-site design points for both existing and proposed conditions. Under both existing and proposed conditions runoff is partially collected and infiltrated onsite, and directed offsite. **Table 1** compares the pre-development and post-development peak runoff rates and volumes for the 2-year, 10-year, and 100-year storm events at the offsite design points for the Type III, 24-hour storm events. For the purpose of this analysis only offsite drainage points will be considered to ensure post development peak runoff and volumes do not exceed pre-development amounts.

Pre-Development Drainage Conditions

The site was modeled into two sub-catchment areas under existing conditions. Area EX-DA-1 comprises the western portion of the site and contributes runoff to DP-1 (Sandwich Road). Area EX-DA-2 comprises the eastern portion of the site and contributes runoff to DP-2 which is offsite to the east (Commercial property & land within the Route 28 State highway layout).

Refer to the Existing Drainage Areas Plan prepared by this office at the end of this report.

Post-Development Drainage Conditions

Post-development drainage conditions and patterns were maintained to the maximum extent possible. PR-DA1a, PR-DA1b, PR-DA2a, PR-DA2b, PR-DA-R1, PR-DA-R2, and PR-DA-R3 all contribute to onsite subsurface drainage systems and are recharged directly. PR-DA1c and PR-DA1d are remaining portions of the property that contribute runoff to DP-1 (Sandwich Road). PR-DA2c is the remaining portion of the property that contributes runoff to DP-2.

Refer to the Proposed Drainage Areas Plan prepared by this office at the end of this report.

Table 1 compares below the pre-development and post-development peak runoff rates and volumes for the 2-year, 10-year, and 100-year storm events at the offsite design points.

	Ex. Flow (cfs)	Prop. Flow (cfs)	Ex. Vol. (af)	Prop. Vol. (cf)
DP-1				
2-Yr Event	0.00	0.00	.000	.001
10-Yr Event	0.02	0.03	.014	.008
25-Yr Event	0.11	0.10	.037	.015
100-Yr Event	0.50	0.32	.090	.030
DP-2				
2-Yr Event	0.00	0.00	.000	.000
10-Yr Event	0.01	0.00	.004	.001
25-Yr Event	0.03	0.01	.018	.004
100-Yr Event	0.22	0.05	.052	.010

Table 1 – Comparison of Off-site Stormwater Flows and Volumes

GROUNDWATER RECHARGE VOLUME CALCULATION

Crossroads Care Center

EAST WAREHAM, MASSACHUSETTS

PR DA-1a, 1b, 2a, 2b, R1 (SC-740 field):

- Total Proposed Impervious Area (Combined) = 40,624 S.F. (0.93 Ac)

- Recharge Factor:
  (A-Soils) = 0.60 inches/s.f. of impervious area

- **Groundwater Recharge Volume Required:**
  40,624 s.f. x (0.60 inches x 1/12) = **2,031 c.f. required**

- **Recharge Volume Provided:**
  Volume Provided in Pond 3P (SC-740 Chambers & Stone in Field Configuration)
  = **9,476 c.f. provided (>2,031 c.f. required)**

PR DA-R2:

- Total Proposed Impervious Area = 8,465 S.F. (0.19 Ac)

- Recharge Factor:
  (A-Soils) = 0.60 inches/s.f. of impervious area

- **Groundwater Recharge Volume Required:**
  8,465 s.f. x (0.60 inches x 1/12) = **423.25 c.f. required**

- **Recharge Volume Provided:**
  Volume Provided in Pond 13P: (7 Total 1,000 Gal. Leaching Pits w/ Stone)
  = **2,186 c.f. provided (>423.25 c.f. required)**

PR DA-R3:

- Total Proposed Impervious Area = 6,758 S.F. (0.16 Ac)

- Recharge Factor:
  (A-Soils) = 0.60 inches/s.f. of impervious area

- **Groundwater Recharge Volume Required:**
  6,758 s.f. x (0.60 inches x 1/12) = **337.90 c.f. required**

- **Recharge Volume Provided:**
  Volume Provided in Pond 15P: (5 Total 1,000 Gal. Leaching Pits w/ Stone)
  = **1,578 c.f. provided (>337.90 c.f. required)**

WATER QUALITY VOLUME CALCULATION

Crossroads Care Center

EAST WAREHAM, MASSACHUSETTS

Water Quality Depth: ***one-inch for exfiltration to soils with infiltration rate greater than 2.4 inches/hour or greater II (D_{WQ})***

PR DA-1a, 1b, 2a, 2b, R1 (SC-740 field):

- Total Proposed Impervious Area (Combined less roof) = 30,665 S.F. (0.70 Ac)

- V_{WQ} = (D_{WQ}/12 inches/foot) * (A_{IMP} * 43,560 square feet/acre)
  = (1"/12) * 30,665 S.F.
  = **2,555 C.F.**

- **Water Quality Volume Provided:**
  Volume Provided in Pond 3P (SC-740 Chambers & Stone in Field Configuration)
  = **9,476 c.f. provided (>2,555 c.f. required)**

OIL/GRIT SEPARATOR SIZING CALCULATIONS

Crossroads Care Center

WAREHAM, MASSACHUSETTS

Oil/Grit Separator Tank #1 - (PR-DA-2a)

Contributing Impervious Area (I) = 11,222 s.f. or 0.26 acres
(Excluding Roof Area)

Sediment Chamber Vol. Req'd = 400 c.f. per Impervious Acre (I)
= 400 c.f. x 0.26 = 104 c.f.
= 104 c.f. x 7.48 gal/c.f. = **778** gallons required

Sediment Chamber Vol. Prov'd
2,500 Gallon tank is 6.00' wide inside and 11.20' long inside, Eff. height is 5.08',
Therefore, utilize 3.50' for first chamber = 3.50' x 6.00' x 5.08' = 107 c.f.
= 107 c.f. x 7.48 gal/c.f. = **800** gallons prov'd

Conclusion: Proposed **800** gallons provided is greater than **778** gallons required; therefore **OK.**

Oil/Grit Separator Tank #2 - (PR-DA-1a, 1b & 2b)

Contributing Impervious Area (I) = 18.818 s.f. or 0.43 acres
(Excluding Roof Area)

Sediment Chamber Vol. Req'd = 400 c.f. per Impervious Acre (I)
= 400 c.f. x 0.43 = 172 c.f.
= 172 c.f. x 7.48 gal/c.f. = **1,287** gallons required

Sediment Chamber Vol. Prov'd
2,500 Gallon tank is 6.00' wide inside and 11.20' long inside, Eff. height is 5.08',
Therefore, utilize 5.70' for first chamber = 5.70' x 6.00' x 5.08' = 174 c.f.
= 174 c.f. x 7.48 gal/c.f. = **1,302** gallons prov'd

Conclusion: Proposed **1,302** gallons provided is greater than **1,287** gallons required; therefore **OK.**

DRAINDOWN TIME CALCULATIONS

Crossroads Care Center

WAREHAM, MASSACHUSETTS

SC-740 Chambers (PR DA-1a, 1b, 2a, 2b, R1):

- Maximum Drain Time = 72 hours
- Provided Drain Time = Storage Volume* / (K x Basin Bottom Area*)

  = 9,476 c.f. / [(8.27 in/hr) (1ft/12 inches) x 4,465 s.f.]

  = **3.08 hours**, which is less than max. drain time of 72 hours, therefore **OK**.

  *Refer to HydroCAD output for Pond 3P

1,000 Gal Leaching Pits (PR DA-R2):

- Maximum Drain Time = 72 hours
- Provided Drain Time = Storage Volume* / (K x Basin Bottom Area*)

  = 2,186 c.f. / [(8.27 in/hr) (1ft/12 inches) x 580 s.f.]

  = **5.47 hours**, which is less than max. drain time of 72 hours, therefore **OK**.

  *Refer to HydroCAD output for Pond 13P

1,000 Gal Leaching Pits (PR DA-R3):

- Maximum Drain Time = 72 hours
- Provided Drain Time = Storage Volume* / (K x Basin Bottom Area*)

  = 1,578 c.f. / [(8.27 in/hr) (1ft/12 inches) x 420 s.f.]

  = **5.45 hours**, which is less than max. drain time of 72 hours, therefore **OK**.

  *Refer to HydroCAD output for Pond 15P

TOTAL SUSPENDED SOLIDS REMOVAL CALCULATIONS

Crossroads Care Center

WAREHAM, MASSACHUSETTS

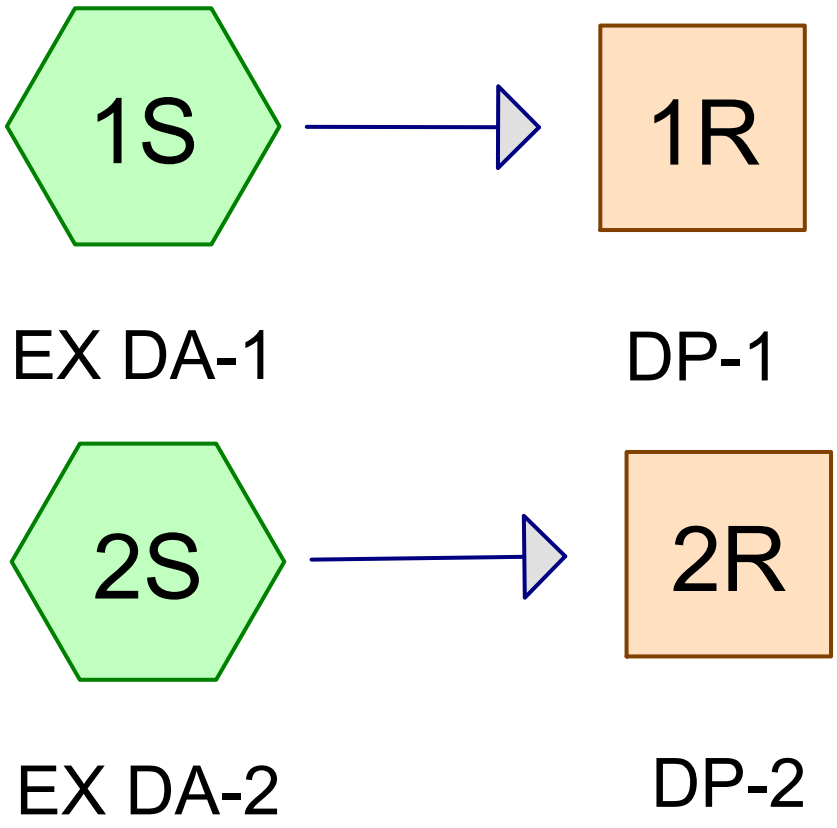
BMP	TSS REMOVAL RATE	STARTING TSS LOAD	AMOUNT REMOVED	REMAINING LOAD
DEEP SUMP CATCH BASIN	0.25	1.00	0.25	0.75
OIL/GRIT/SEPARATOR	0.25	0.75	0.19	0.56
SUBSURFACE INFILTRATION	0.80	0.56	0.45	0.11
		TOTAL =	89%	

Crossroads Care Center
238 + 240 Sandwich Road, Wareham

PIPE SIZING CALCULATIONS

Design for 25 Year Storm Pipe Coeff. "n" = 0.011

Pipe Desc.	Type of Area	RUNOFF							PIPE		
		Tributary Area		Runoff Coeff. "C"	Time of Flow Tc	Rainfall Intensity I	Discharge Q=CIA		Length	Dia.	Design Slope
		A Incr. (acres)	A Total (acres)		(min)	(in/hr)	Q Incr. (cfs)	Total (cfs)	(ft.)	(in.)	(ft/ft)
CB-1	Imp	0.208		0.95							
to DMH-1	Grass A	0.088		0.1							
	Woods A	0.013		0.15							
	Total	0.309		0.674	10	5.7	1.188	1.188	97	7.458	0.010
									Use	***12***	
CB-2	Imp	0.069		0.95							
to DMH-1	Grass A	0.014		0.1							
	Woods A	0.000		0.15							
	Total	0.083		0.807	10	5.7	0.382	0.382	32	4.872	0.010
									Use	***12***	
DMH-1	Imp	0.000		0.95							
to DMH-2	Grass A	0.000		0.1							
	Woods A	0.000		0.15							
	Total	0.000		0	10	5.7	0	1.569	310	7.916	0.013
									Use	***12***	
CB-3	Imp	0.169		0.95							
to DMH-2	Grass A	0.097		0.1							
	Woods A	0.000		0.15							
	Total	0.266		0.64	10	5.7	0.97	0.97	1	6.914	0.010
									Use	***12***	
DMH-2	Imp	0.000		0.95							
to DMH-3	Grass A	0.000		0.1							
	Woods A	0.000		0.15							
	Total	0.000		0	10	5.7	0	2.54	310	9.918	0.010
									Use	***12***	
CB-4	Imp	0.333		0.95							
to DMH-4	Grass A	0.575		0.1							
to DMH-5	Woods A	0.112		0.15							
	Total	1.020		0	10	5.7	0	3.51	27	11.82	0.0075
									Use	***12***	



Subcat Reach Pond Link

Routing Diagram for 238-240 Sandwich Road - Existing Conditions
Prepared by Pesce Engineering & Associates Inc., Printed 5/25/2021

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.408	39	>75% Grass cover, Good, HSG A (1S, 2S)
0.044	98	Paved parking, HSG A (1S, 2S)
0.105	98	Unconnected roofs, HSG A (1S, 2S)
1.048	30	Woods, Good, HSG A (1S, 2S)
1.068	32	Woods/grass comb., Good, HSG A (1S, 2S)
2.674	**36**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
2.674	HSG A	1S, 2S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
2.674		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.408	0.000	0.000	0.000	0.000	0.408	>75% Grass cover, Good	1S, 2S
0.044	0.000	0.000	0.000	0.000	0.044	Paved parking	1S, 2S
0.105	0.000	0.000	0.000	0.000	0.105	Unconnected roofs	1S, 2S
1.048	0.000	0.000	0.000	0.000	1.048	Woods, Good	1S, 2S
1.068	0.000	0.000	0.000	0.000	1.068	Woods/grass comb., Good	1S, 2S
2.674	**0.000**	**0.000**	**0.000**	**0.000**	**2.674**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: EX DA-1 Runoff Area=63,627 sf 7.14% Impervious Runoff Depth=0.00"
Flow Length=350' Tc=11.3 min UI Adjusted CN=36 Runoff=0.00 cfs 0.000 af

Subcatchment 2S: EX DA-2 Runoff Area=52,840 sf 3.75% Impervious Runoff Depth=0.00"
Flow Length=414' Tc=10.5 min UI Adjusted CN=33 Runoff=0.00 cfs 0.000 af

Reach 1R: DP-1 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 2R: DP-2 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 2.674 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
94.40% Pervious = 2.524 ac 5.60% Impervious = 0.150 ac

Summary for Subcatchment 1S: EX DA-1

[45] Hint: Runoff=Zero

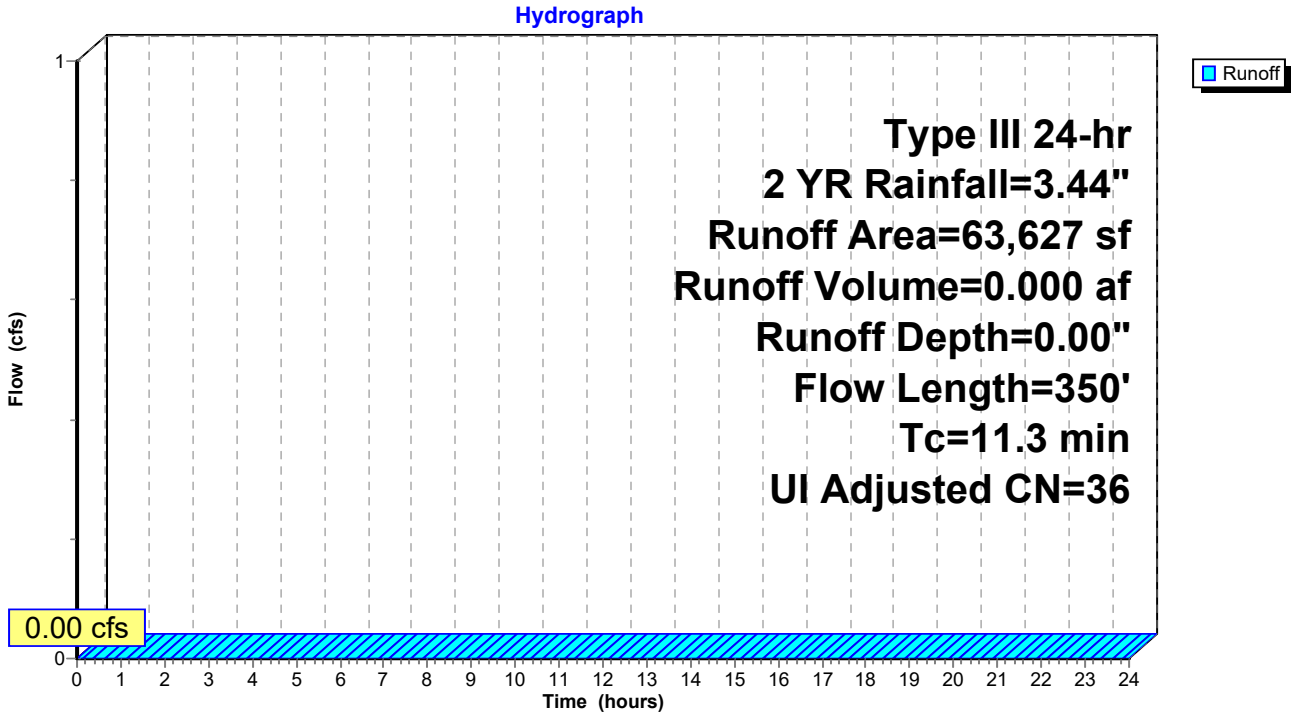
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.44"

Area (sf)	CN	Adj	Description
24,430	30		Woods, Good, HSG A
22,157	32		Woods/grass comb., Good, HSG A
12,500	39		>75% Grass cover, Good, HSG A
2,940	98		Unconnected roofs, HSG A
1,600	98		Paved parking, HSG A
63,627	37	36	Weighted Average, UI Adjusted
59,087			92.86% Pervious Area
4,540			7.14% Impervious Area
2,940			64.76% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0200	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
3.5	150	0.0200	0.71		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
2.3	150	0.0467	1.08		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
11.3	350	Total			

Subcatchment 1S: EX DA-1



Summary for Subcatchment 2S: EX DA-2

[45] Hint: Runoff=Zero

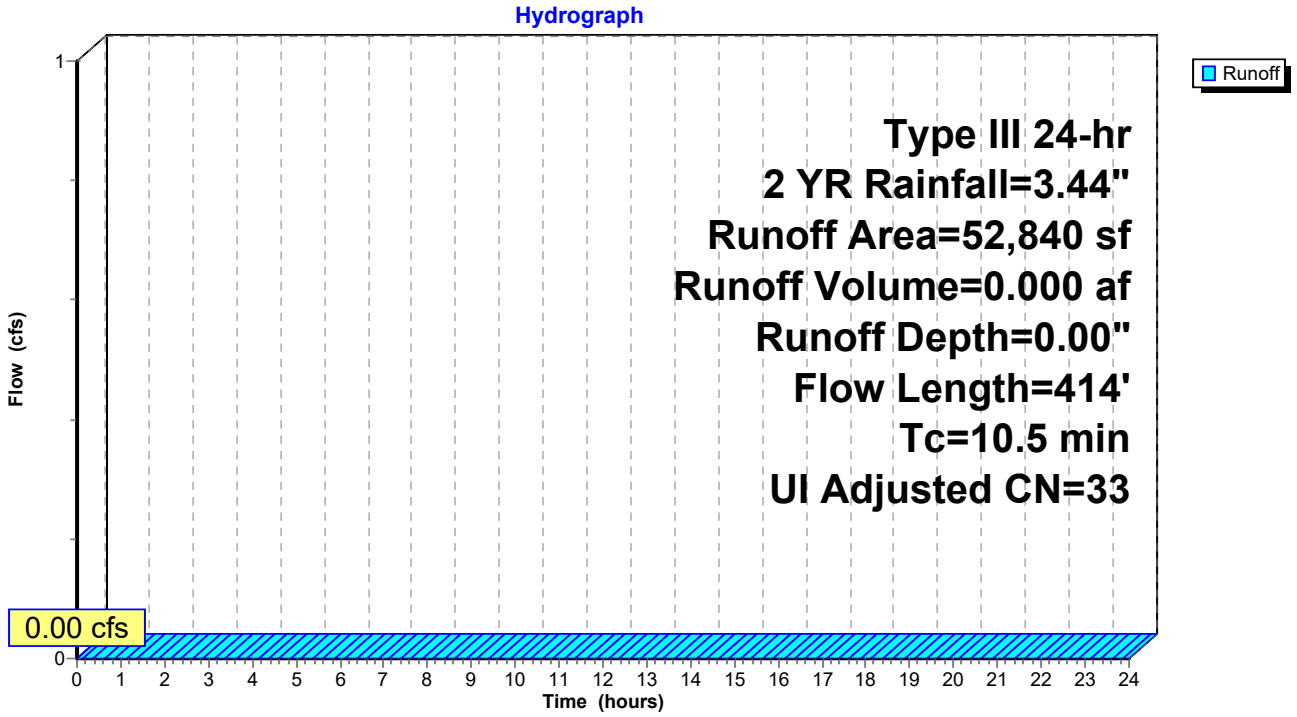
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.44"

Area (sf)	CN	Adj	Description
21,240	30		Woods, Good, HSG A
24,360	32		Woods/grass comb., Good, HSG A
5,256	39		>75% Grass cover, Good, HSG A
1,650	98		Unconnected roofs, HSG A
334	98		Paved parking, HSG A
52,840	34	33	Weighted Average, UI Adjusted
50,856			96.25% Pervious Area
1,984			3.75% Impervious Area
1,650			83.17% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0250	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
2.0	130	0.0250	1.11		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.2	167	0.0650	1.27		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
1.3	67	0.0150	0.86		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
10.5	414	Total			

Subcatchment 2S: EX DA-2



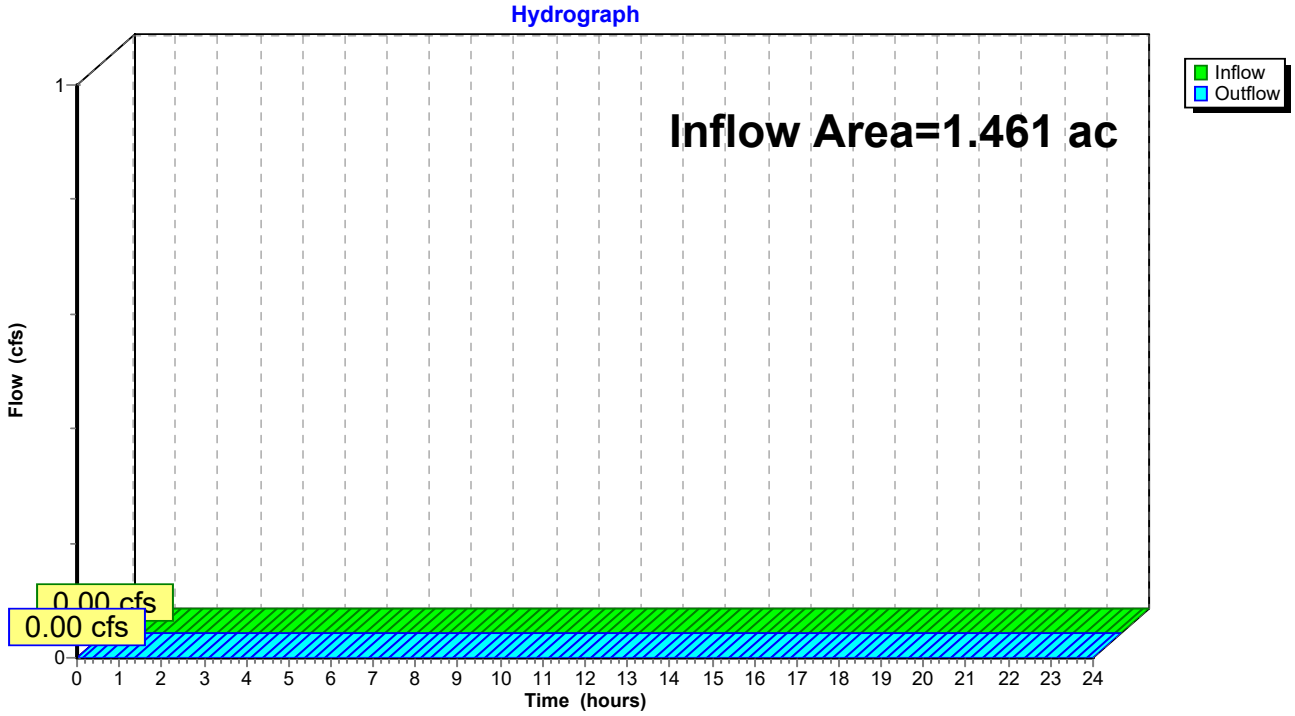
Summary for Reach 1R: DP-1

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

Inflow Area = 1.461 ac, 7.14% 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

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 1R: DP-1



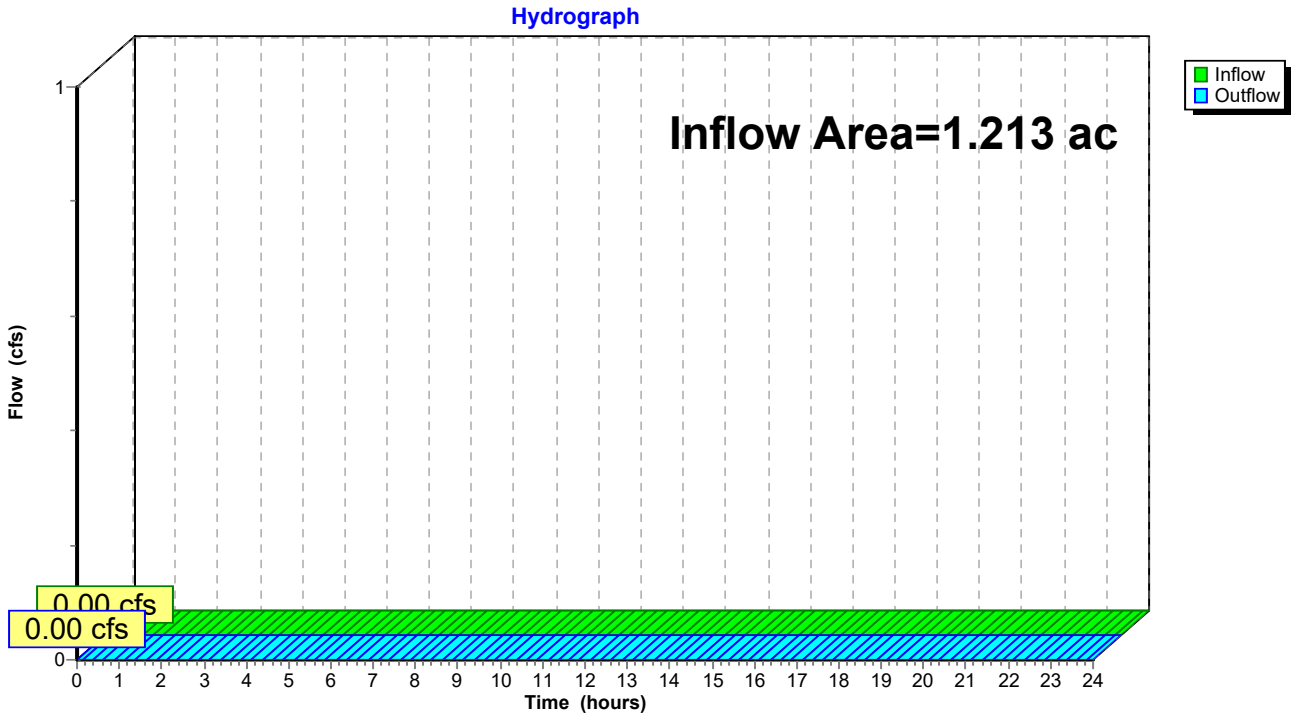
Summary for Reach 2R: DP-2

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

Inflow Area = 1.213 ac, 3.75% 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

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 2R: DP-2



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: EX DA-1 Runoff Area=63,627 sf 7.14% Impervious Runoff Depth>0.11"
Flow Length=350' Tc=11.3 min UI Adjusted CN=36 Runoff=0.02 cfs 0.014 af

Subcatchment 2S: EX DA-2 Runoff Area=52,840 sf 3.75% Impervious Runoff Depth>0.04"
Flow Length=414' Tc=10.5 min UI Adjusted CN=33 Runoff=0.01 cfs 0.004 af

Reach 1R: DP-1 Inflow=0.02 cfs 0.014 af
Outflow=0.02 cfs 0.014 af

Reach 2R: DP-2 Inflow=0.01 cfs 0.004 af
Outflow=0.01 cfs 0.004 af

Total Runoff Area = 2.674 ac Runoff Volume = 0.018 af Average Runoff Depth = 0.08"
94.40% Pervious = 2.524 ac 5.60% Impervious = 0.150 ac

Summary for Subcatchment 1S: EX DA-1

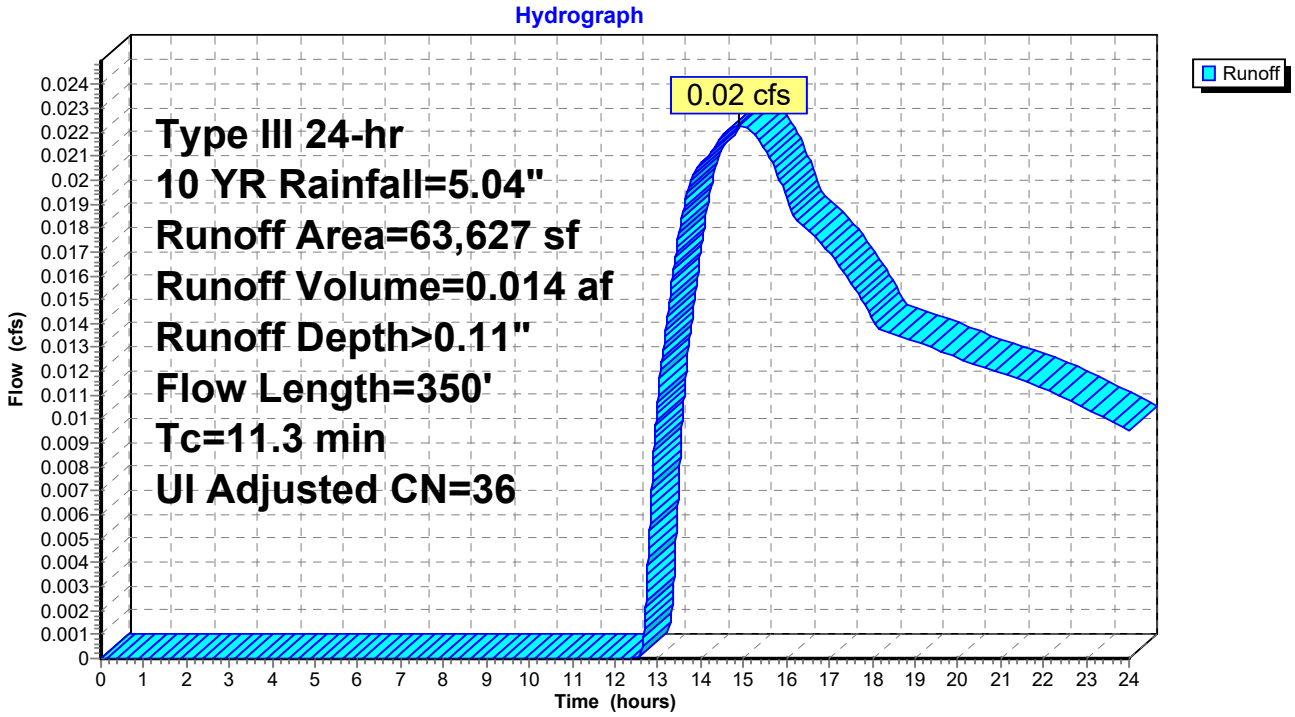
Runoff = 0.02 cfs @ 14.88 hrs, Volume= 0.014 af, Depth> 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=5.04"

Area (sf)	CN	Adj	Description
24,430	30		Woods, Good, HSG A
22,157	32		Woods/grass comb., Good, HSG A
12,500	39		>75% Grass cover, Good, HSG A
2,940	98		Unconnected roofs, HSG A
1,600	98		Paved parking, HSG A
63,627	37	36	Weighted Average, UI Adjusted
59,087			92.86% Pervious Area
4,540			7.14% Impervious Area
2,940			64.76% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0200	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
3.5	150	0.0200	0.71		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
2.3	150	0.0467	1.08		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
11.3	350	Total			

Subcatchment 1S: EX DA-1



Summary for Subcatchment 2S: EX DA-2

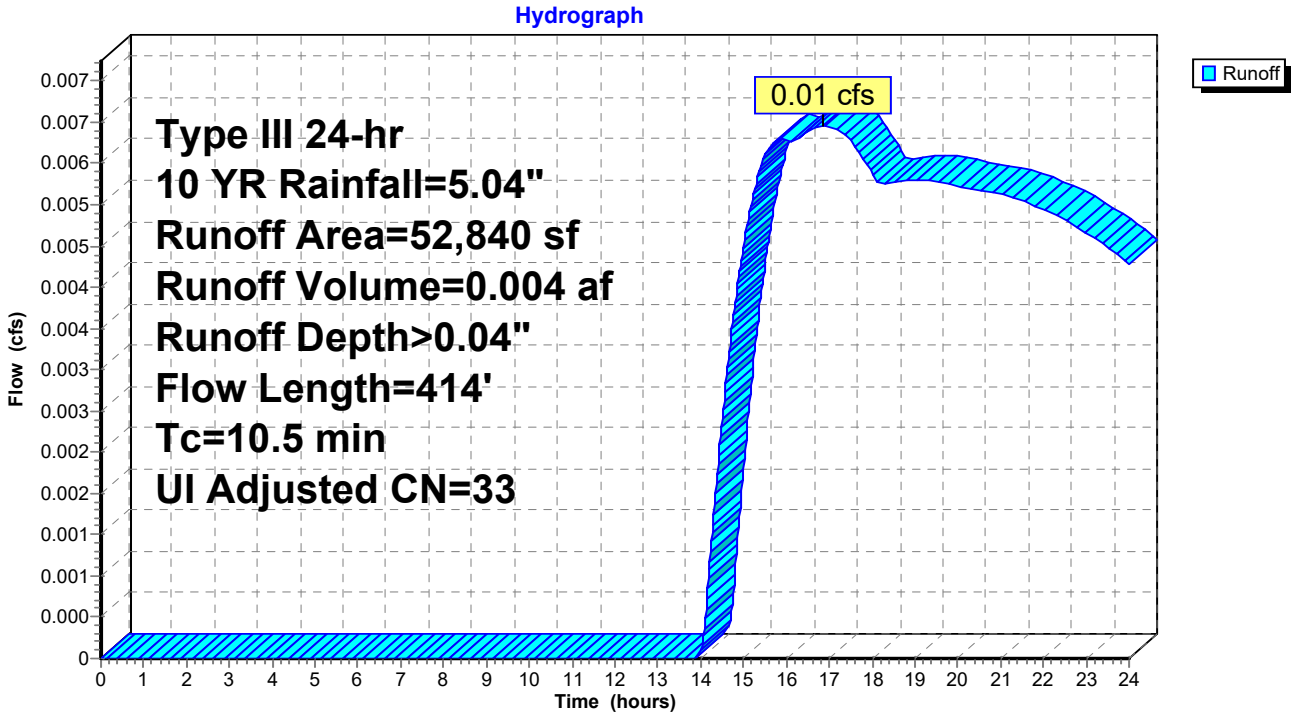
Runoff = 0.01 cfs @ 16.86 hrs, Volume= 0.004 af, Depth> 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=5.04"

Area (sf)	CN	Adj	Description
21,240	30		Woods, Good, HSG A
24,360	32		Woods/grass comb., Good, HSG A
5,256	39		>75% Grass cover, Good, HSG A
1,650	98		Unconnected roofs, HSG A
334	98		Paved parking, HSG A
52,840	34	33	Weighted Average, UI Adjusted
50,856			96.25% Pervious Area
1,984			3.75% Impervious Area
1,650			83.17% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0250	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
2.0	130	0.0250	1.11		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.2	167	0.0650	1.27		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
1.3	67	0.0150	0.86		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
10.5	414	Total			

Subcatchment 2S: EX DA-2



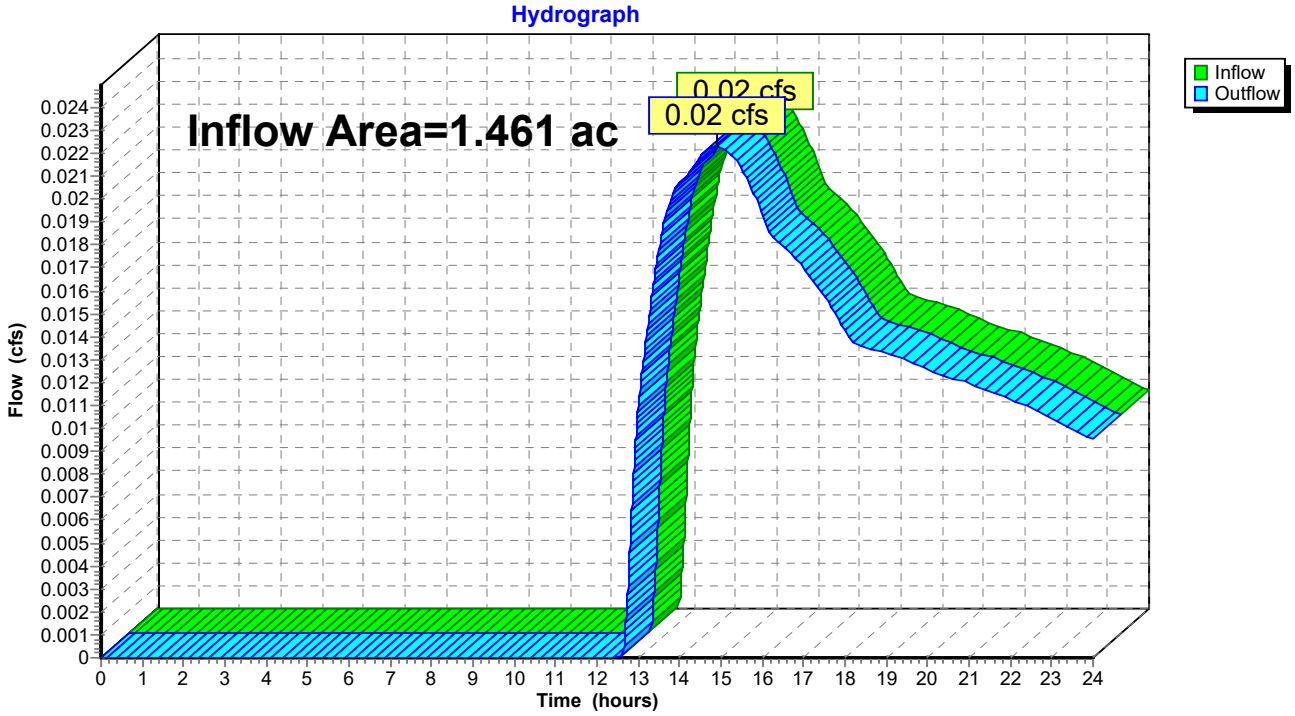
Summary for Reach 1R: DP-1

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

Inflow Area = 1.461 ac, 7.14% Impervious, Inflow Depth > 0.11" for 10 YR event
Inflow = 0.02 cfs @ 14.88 hrs, Volume= 0.014 af
Outflow = 0.02 cfs @ 14.88 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 1R: DP-1



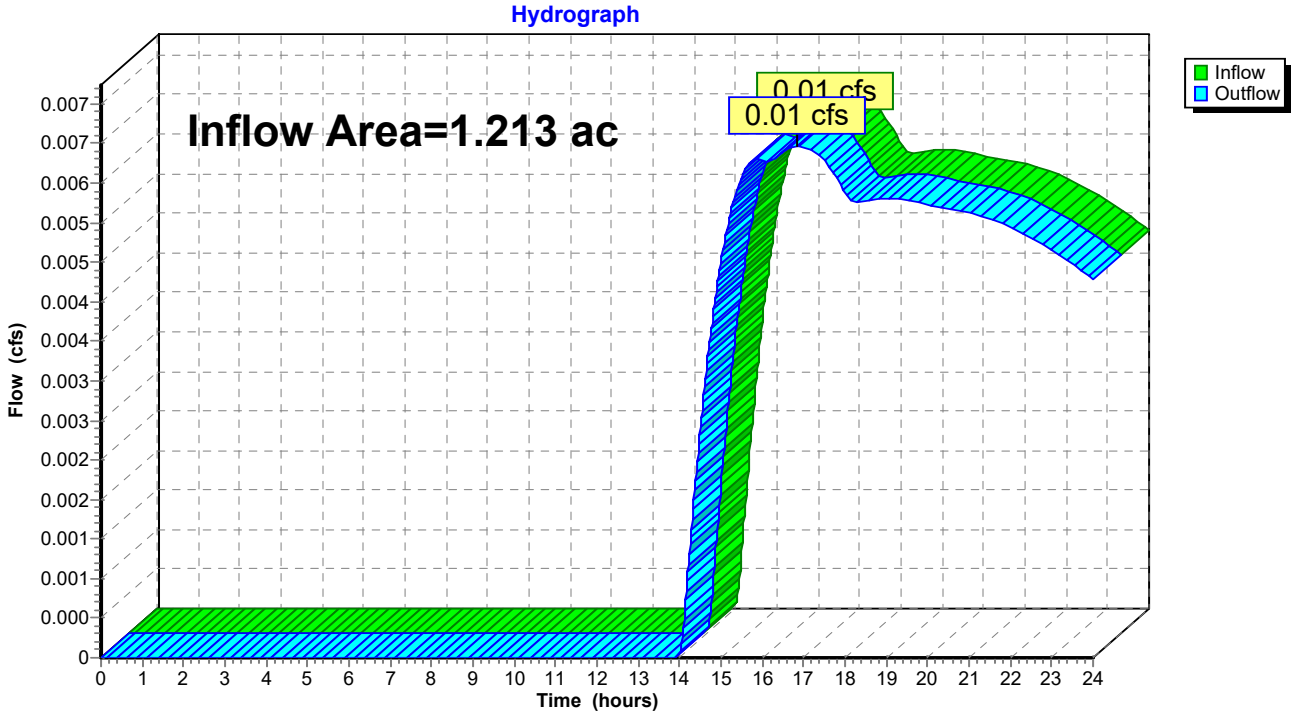
Summary for Reach 2R: DP-2

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

Inflow Area = 1.213 ac, 3.75% Impervious, Inflow Depth > 0.04" for 10 YR event
Inflow = 0.01 cfs @ 16.86 hrs, Volume= 0.004 af
Outflow = 0.01 cfs @ 16.86 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 2R: DP-2



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: EX DA-1 Runoff Area=63,627 sf 7.14% Impervious Runoff Depth>0.30"
Flow Length=350' Tc=11.3 min UI Adjusted CN=36 Runoff=0.11 cfs 0.037 af

Subcatchment 2S: EX DA-2 Runoff Area=52,840 sf 3.75% Impervious Runoff Depth>0.17"
Flow Length=414' Tc=10.5 min UI Adjusted CN=33 Runoff=0.03 cfs 0.018 af

Reach 1R: DP-1 Inflow=0.11 cfs 0.037 af
Outflow=0.11 cfs 0.037 af

Reach 2R: DP-2 Inflow=0.03 cfs 0.018 af
Outflow=0.03 cfs 0.018 af

Total Runoff Area = 2.674 ac Runoff Volume = 0.054 af Average Runoff Depth = 0.24"
94.40% Pervious = 2.524 ac 5.60% Impervious = 0.150 ac

Summary for Subcatchment 1S: EX DA-1

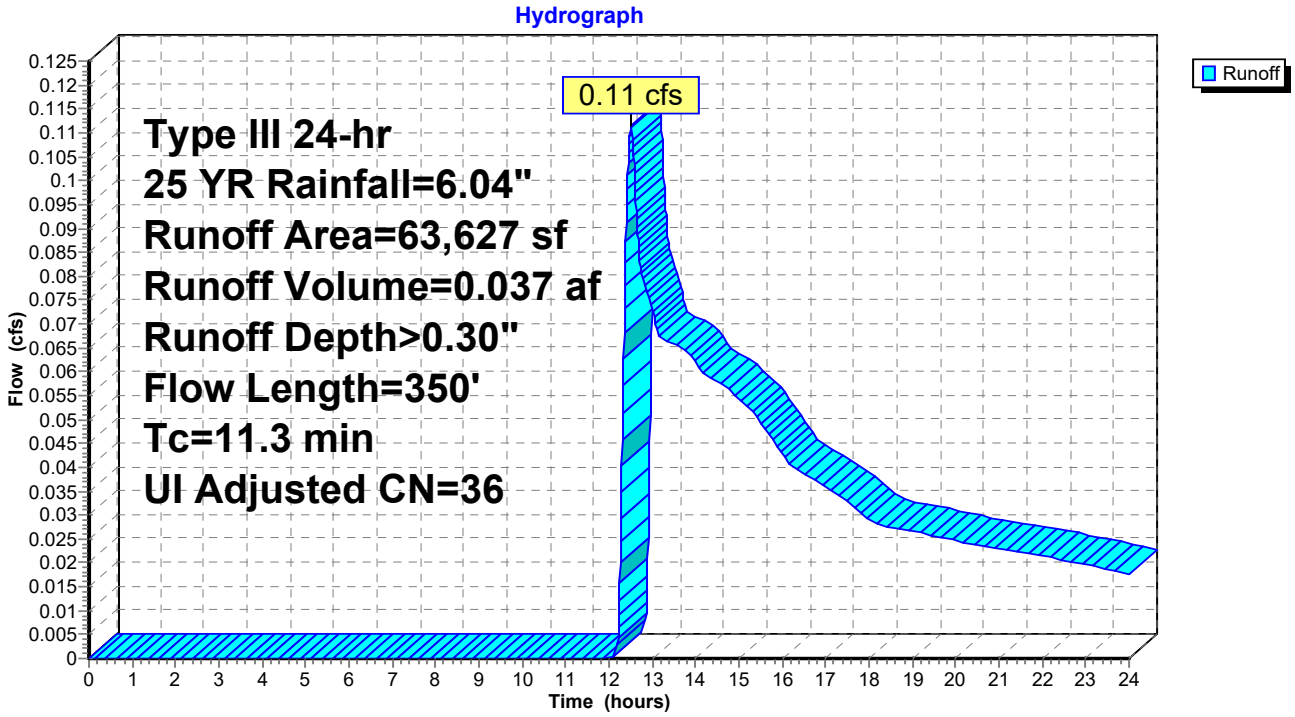
Runoff = 0.11 cfs @ 12.51 hrs, Volume= 0.037 af, Depth> 0.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=6.04"

Area (sf)	CN	Adj	Description
24,430	30		Woods, Good, HSG A
22,157	32		Woods/grass comb., Good, HSG A
12,500	39		>75% Grass cover, Good, HSG A
2,940	98		Unconnected roofs, HSG A
1,600	98		Paved parking, HSG A
63,627	37	36	Weighted Average, UI Adjusted
59,087			92.86% Pervious Area
4,540			7.14% Impervious Area
2,940			64.76% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0200	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
3.5	150	0.0200	0.71		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
2.3	150	0.0467	1.08		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
11.3	350	Total			

Subcatchment 1S: EX DA-1



Summary for Subcatchment 2S: EX DA-2

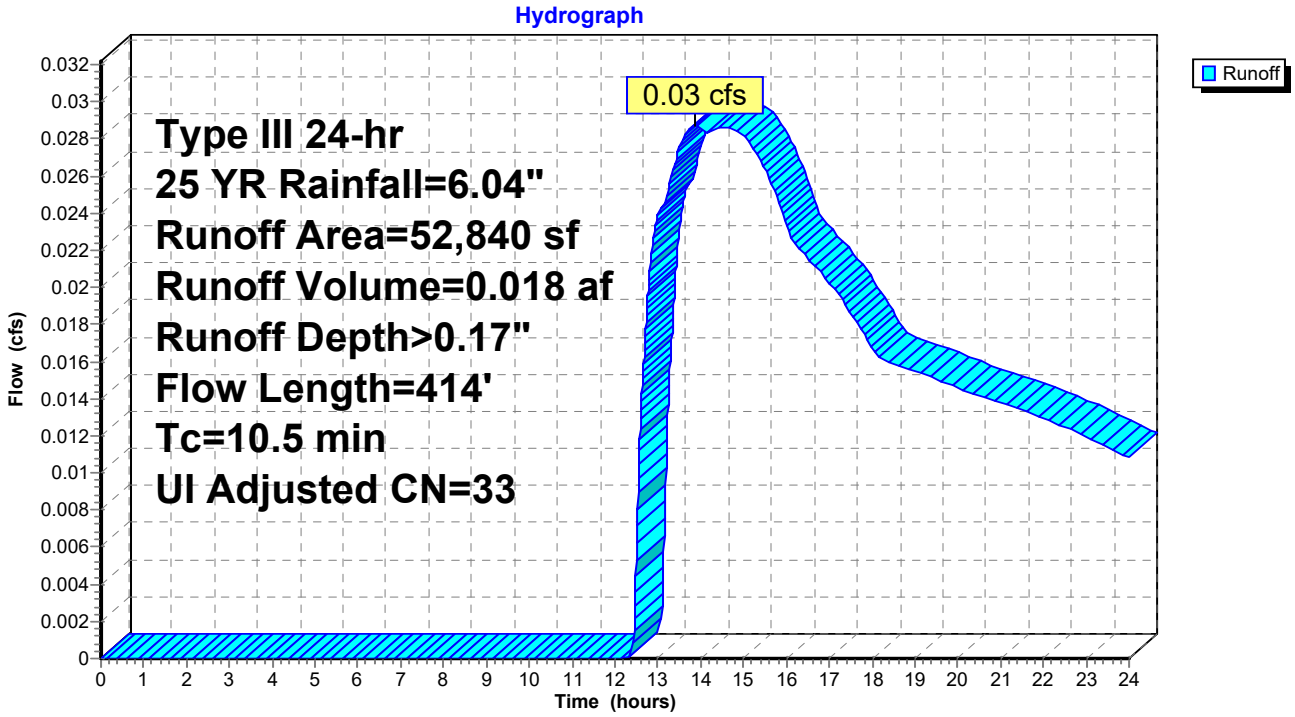
Runoff = 0.03 cfs @ 13.87 hrs, Volume= 0.018 af, Depth> 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=6.04"

Area (sf)	CN	Adj	Description
21,240	30		Woods, Good, HSG A
24,360	32		Woods/grass comb., Good, HSG A
5,256	39		>75% Grass cover, Good, HSG A
1,650	98		Unconnected roofs, HSG A
334	98		Paved parking, HSG A
52,840	34	33	Weighted Average, UI Adjusted
50,856			96.25% Pervious Area
1,984			3.75% Impervious Area
1,650			83.17% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0250	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
2.0	130	0.0250	1.11		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.2	167	0.0650	1.27		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
1.3	67	0.0150	0.86		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
10.5	414	Total			

Subcatchment 2S: EX DA-2



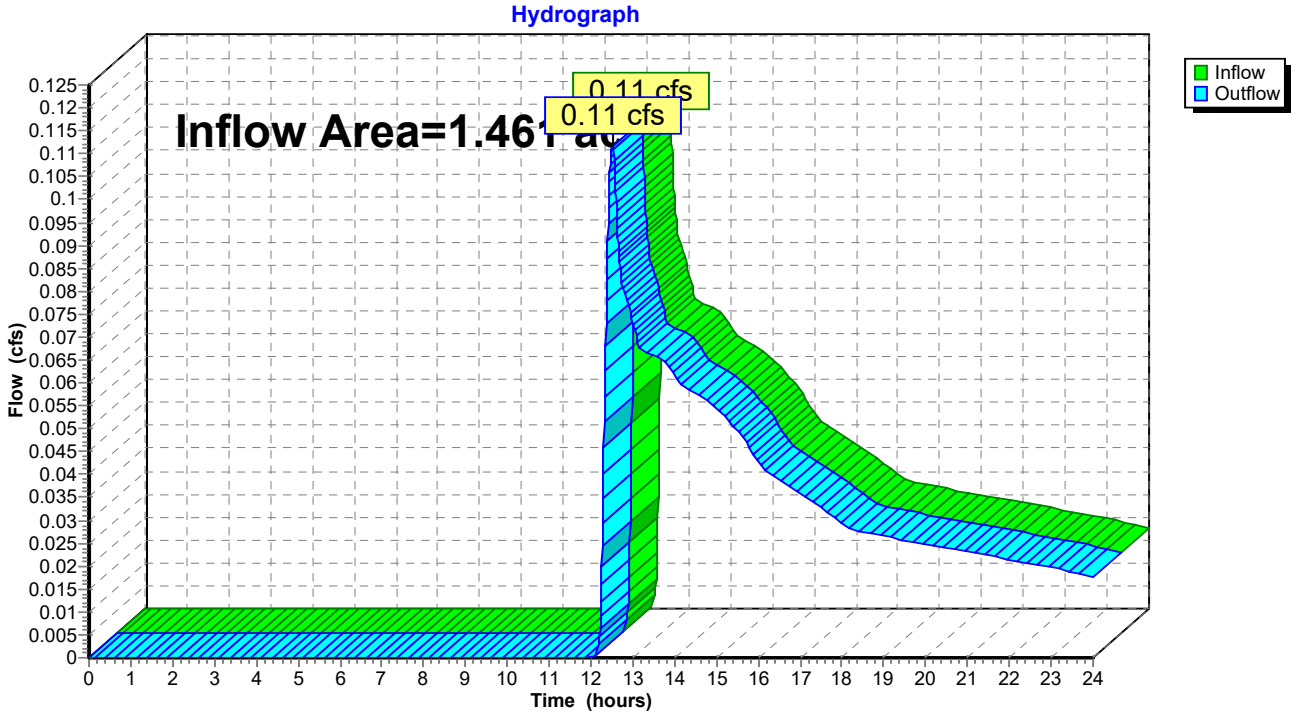
Summary for Reach 1R: DP-1

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

Inflow Area = 1.461 ac, 7.14% Impervious, Inflow Depth > 0.30" for 25 YR event
Inflow = 0.11 cfs @ 12.51 hrs, Volume= 0.037 af
Outflow = 0.11 cfs @ 12.51 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 1R: DP-1



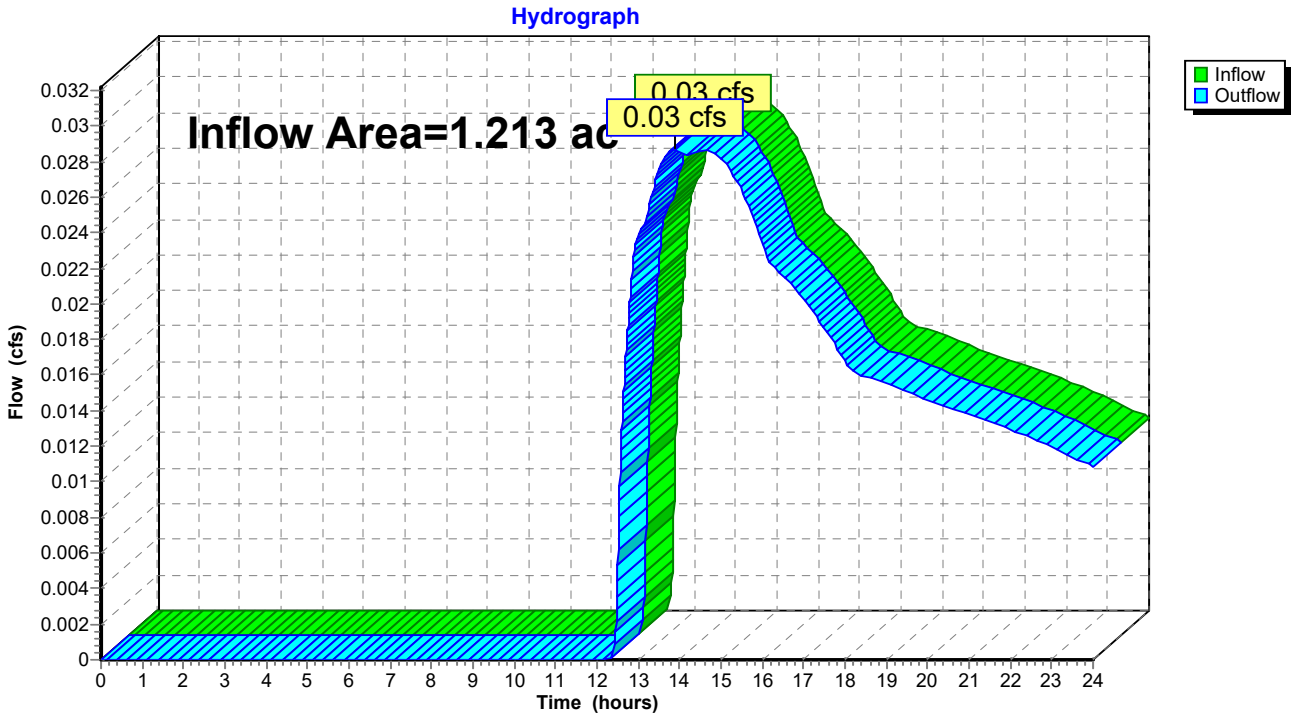
Summary for Reach 2R: DP-2

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

Inflow Area = 1.213 ac, 3.75% Impervious, Inflow Depth > 0.17" for 25 YR event
Inflow = 0.03 cfs @ 13.87 hrs, Volume= 0.018 af
Outflow = 0.03 cfs @ 13.87 hrs, Volume= 0.018 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 2R: DP-2



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: EX DA-1 Runoff Area=63,627 sf 7.14% Impervious Runoff Depth>0.74"
Flow Length=350' Tc=11.3 min UI Adjusted CN=36 Runoff=0.50 cfs 0.090 af

Subcatchment 2S: EX DA-2 Runoff Area=52,840 sf 3.75% Impervious Runoff Depth>0.52"
Flow Length=414' Tc=10.5 min UI Adjusted CN=33 Runoff=0.22 cfs 0.052 af

Reach 1R: DP-1 Inflow=0.50 cfs 0.090 af
Outflow=0.50 cfs 0.090 af

Reach 2R: DP-2 Inflow=0.22 cfs 0.052 af
Outflow=0.22 cfs 0.052 af

Total Runoff Area = 2.674 ac Runoff Volume = 0.142 af Average Runoff Depth = 0.64"
94.40% Pervious = 2.524 ac 5.60% Impervious = 0.150 ac

Summary for Subcatchment 1S: EX DA-1

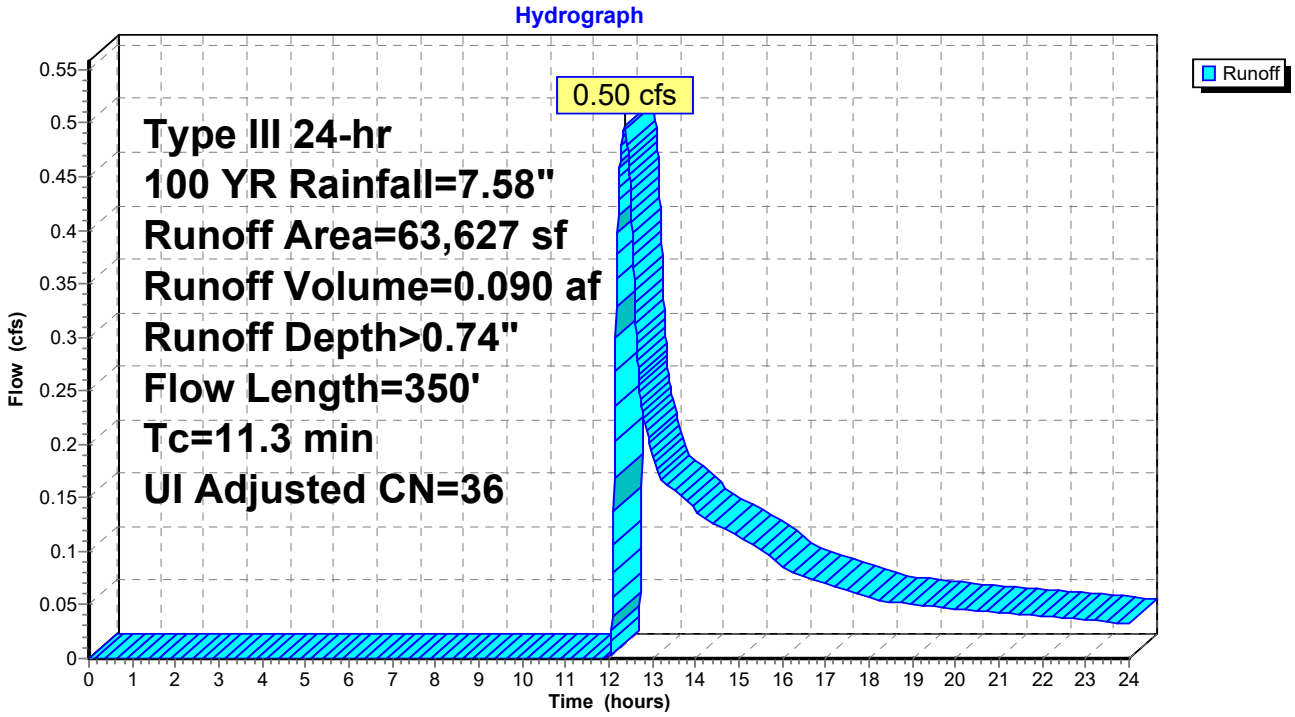
Runoff = 0.50 cfs @ 12.37 hrs, Volume= 0.090 af, Depth> 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=7.58"

Area (sf)	CN	Adj	Description
24,430	30		Woods, Good, HSG A
22,157	32		Woods/grass comb., Good, HSG A
12,500	39		>75% Grass cover, Good, HSG A
2,940	98		Unconnected roofs, HSG A
1,600	98		Paved parking, HSG A
63,627	37	36	Weighted Average, UI Adjusted
59,087			92.86% Pervious Area
4,540			7.14% Impervious Area
2,940			64.76% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0200	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
3.5	150	0.0200	0.71		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
2.3	150	0.0467	1.08		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
11.3	350	Total			

Subcatchment 1S: EX DA-1



Summary for Subcatchment 2S: EX DA-2

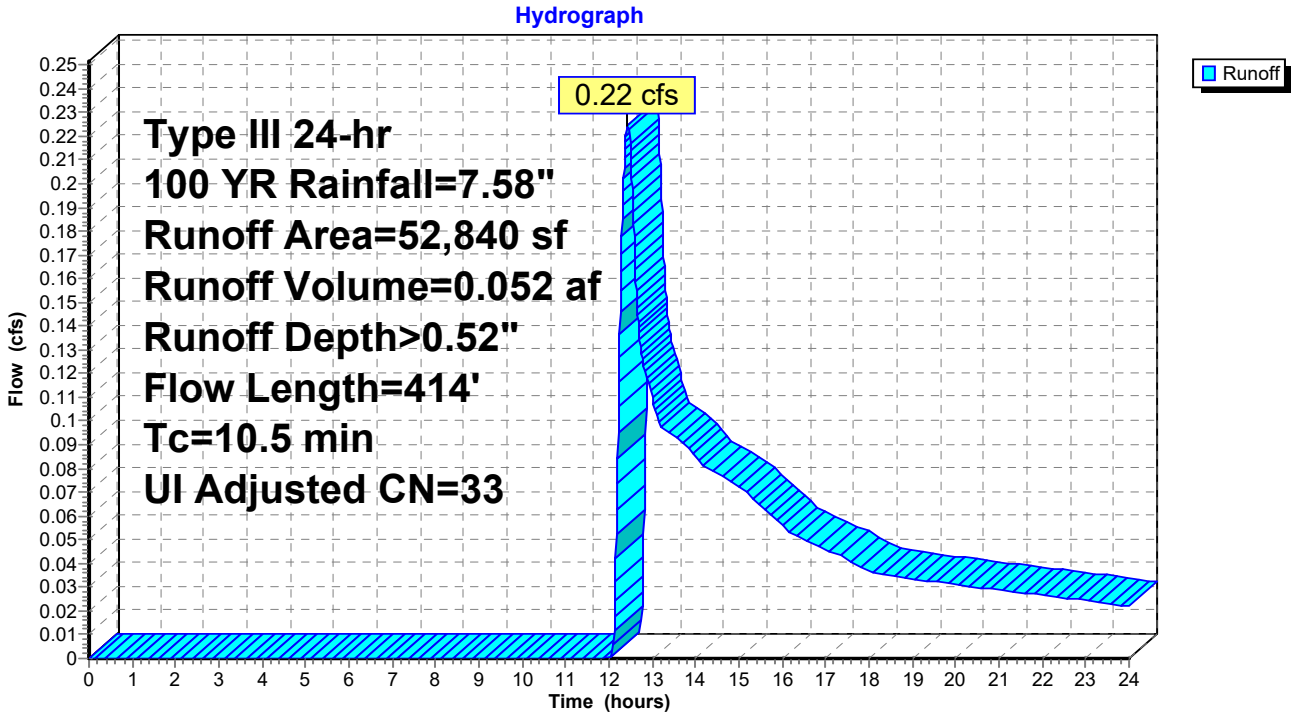
Runoff = 0.22 cfs @ 12.43 hrs, Volume= 0.052 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=7.58"

Area (sf)	CN	Adj	Description
21,240	30		Woods, Good, HSG A
24,360	32		Woods/grass comb., Good, HSG A
5,256	39		>75% Grass cover, Good, HSG A
1,650	98		Unconnected roofs, HSG A
334	98		Paved parking, HSG A
52,840	34	33	Weighted Average, UI Adjusted
50,856			96.25% Pervious Area
1,984			3.75% Impervious Area
1,650			83.17% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	50	0.0250	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
2.0	130	0.0250	1.11		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.2	167	0.0650	1.27		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
1.3	67	0.0150	0.86		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
10.5	414	Total			

Subcatchment 2S: EX DA-2



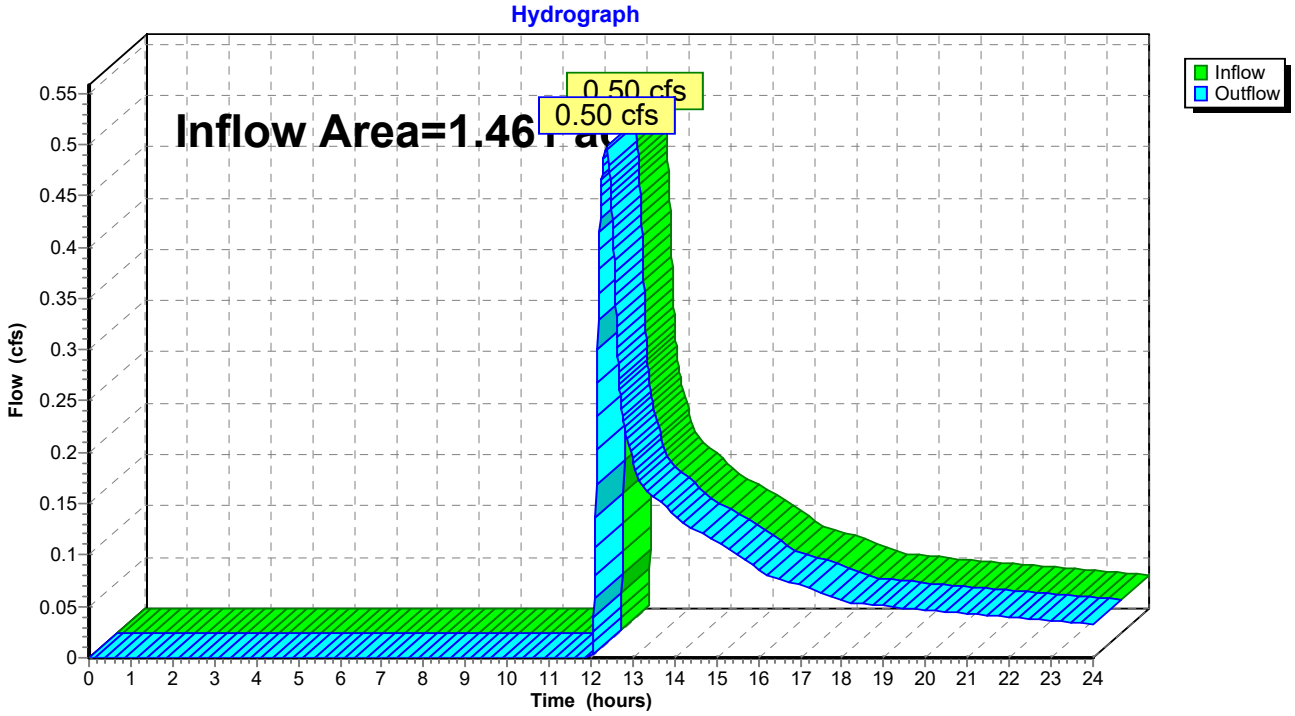
Summary for Reach 1R: DP-1

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

Inflow Area = 1.461 ac, 7.14% Impervious, Inflow Depth > 0.74" for 100 YR event
Inflow = 0.50 cfs @ 12.37 hrs, Volume= 0.090 af
Outflow = 0.50 cfs @ 12.37 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 1R: DP-1



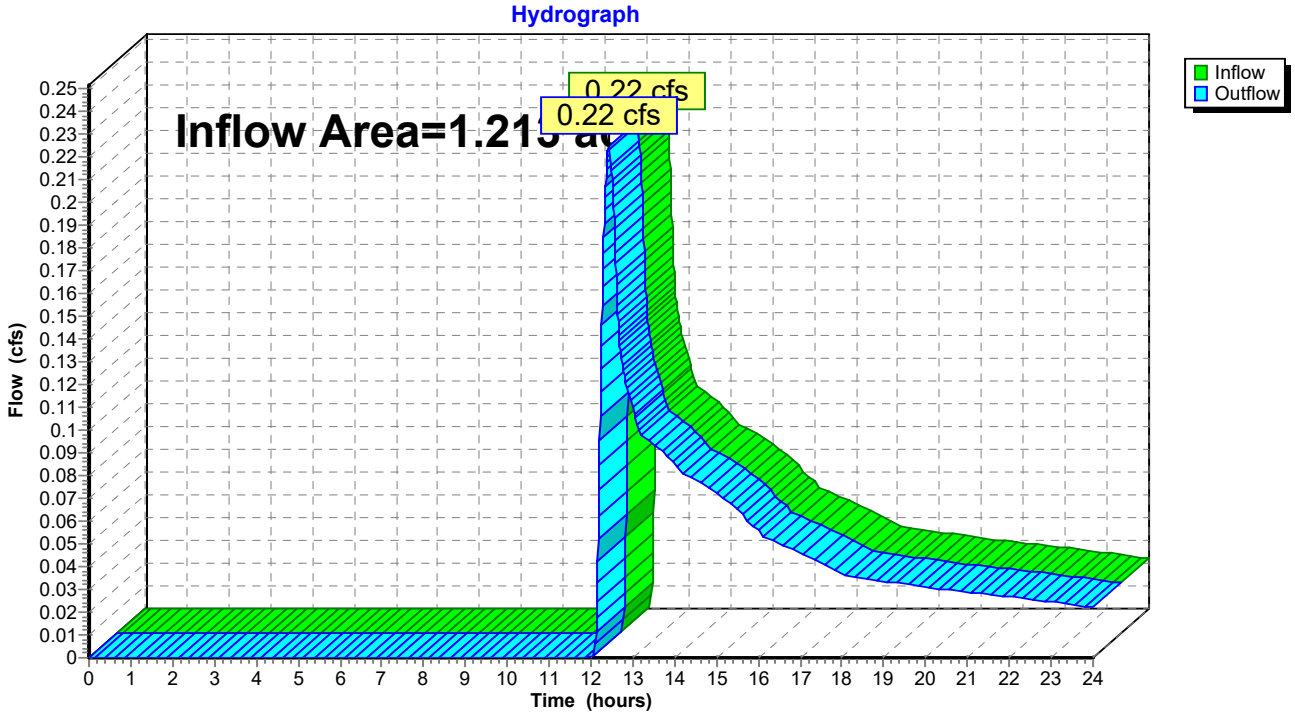
Summary for Reach 2R: DP-2

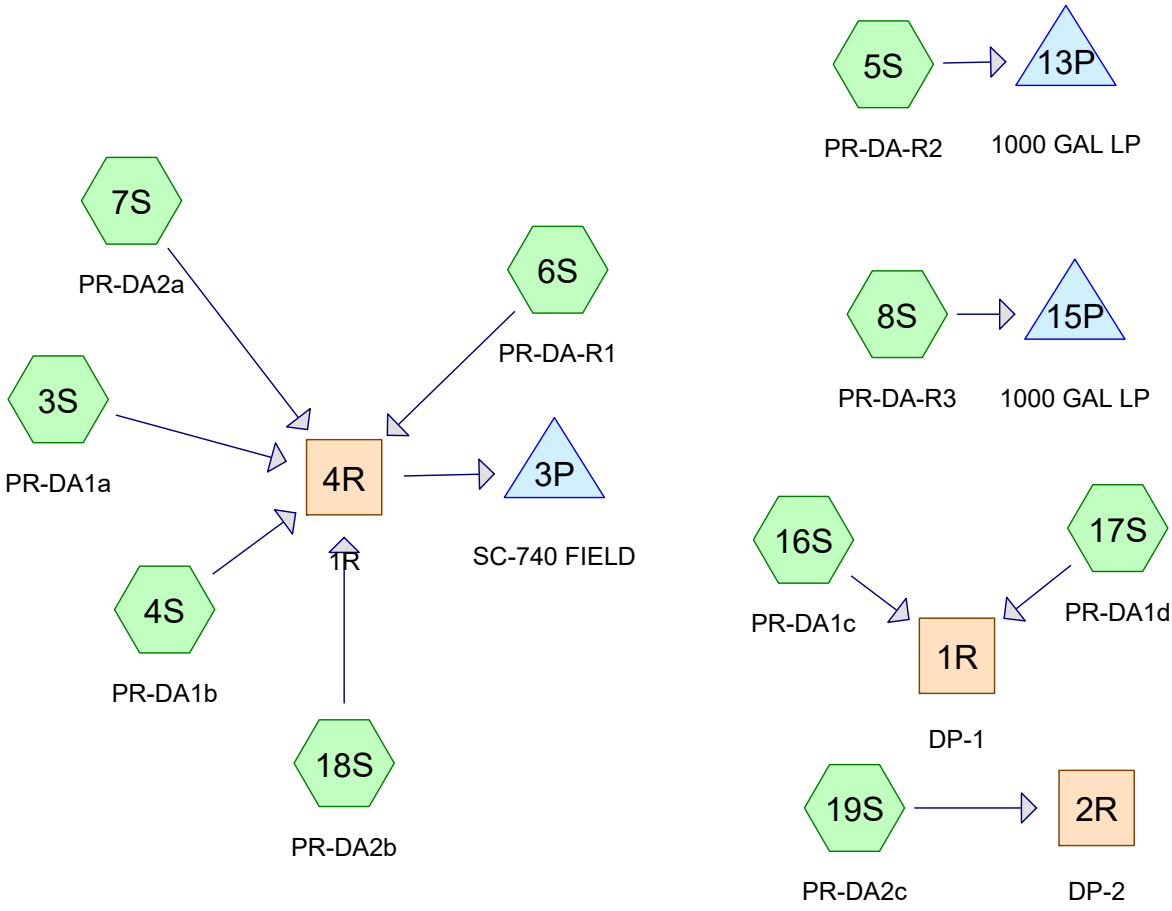
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.213 ac, 3.75% Impervious, Inflow Depth > 0.52" for 100 YR event
Inflow = 0.22 cfs @ 12.43 hrs, Volume= 0.052 af
Outflow = 0.22 cfs @ 12.43 hrs, Volume= 0.052 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 2R: DP-2





Subcat Reach Pond Link

Routing Diagram for 238-240 Sandwich Road - Proposed Conditions
Prepared by Pesce Engineering & Associates Inc., Printed 5/25/2021

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.914	39	>75% Grass cover, Good, HSG A (3S, 4S, 7S, 16S, 17S, 18S)
0.027	98	Gravel Areas (7S)
0.721	98	Paved parking, HSG A (3S, 4S, 7S, 16S, 18S, 19S)
0.612	98	Unconnected roofs, HSG A (5S, 6S, 7S, 8S, 16S)
0.008	30	Woods, Good, HSG A (7S)
0.391	32	Woods/grass comb., Good, HSG A (3S, 7S, 16S, 19S)
2.674	**68**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
2.647	HSG A	3S, 4S, 5S, 6S, 7S, 8S, 16S, 17S, 18S, 19S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.027	Other	7S
2.674		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.914	0.000	0.000	0.000	0.000	0.914	>75% Grass cover, Good	3S, 4S, 7S, 16S, 17S, 18S
0.000	0.000	0.000	0.000	0.027	0.027	Gravel Areas	7S
0.721	0.000	0.000	0.000	0.000	0.721	Paved parking	3S, 4S, 7S, 16S, 18S, 19S
0.612	0.000	0.000	0.000	0.000	0.612	Unconnected roofs	5S, 6S, 7S, 8S, 16S
0.008	0.000	0.000	0.000	0.000	0.008	Woods, Good	7S
0.391	0.000	0.000	0.000	0.000	0.391	Woods/grass comb., Good	3S, 7S, 16S, 19S
2.647	**0.000**	**0.000**	**0.000**	**0.027**	**2.674**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 3S: PR-DA1a Runoff Area=13,444 sf 67.35% Impervious Runoff Depth>1.45"
Flow Length=175' Tc=6.2 min CN=78 Runoff=0.51 cfs 0.037 af

Subcatchment 4S: PR-DA1b Runoff Area=3,615 sf 83.40% Impervious Runoff Depth>2.21"
Flow Length=70' Slope=0.0830 '/' Tc=0.5 min CN=88 Runoff=0.26 cfs 0.015 af

Subcatchment 5S: PR-DA-R2 Runoff Area=8,465 sf 100.00% Impervious Runoff Depth>3.21"
Tc=3.0 min CN=98 Runoff=0.72 cfs 0.052 af

Subcatchment 6S: PR-DA-R1 Runoff Area=7,860 sf 100.00% Impervious Runoff Depth>3.20"
Tc=5.0 min CN=98 Runoff=0.63 cfs 0.048 af

Subcatchment 7S: PR-DA2a Runoff Area=44,443 sf 32.60% Impervious Runoff Depth>0.39"
Flow Length=395' Tc=8.4 min CN=57 Runoff=0.22 cfs 0.033 af

Subcatchment 8S: PR-DA-R3 Runoff Area=6,758 sf 100.00% Impervious Runoff Depth>3.21"
Tc=3.0 min CN=98 Runoff=0.58 cfs 0.041 af

Subcatchment 16S: PR-DA1c Runoff Area=9,508 sf 20.11% Impervious Runoff Depth>0.04"
Flow Length=175' Tc=5.2 min UI Adjusted CN=43 Runoff=0.00 cfs 0.001 af

Subcatchment 17S: PR-DA1d Runoff Area=3,109 sf 0.00% Impervious Runoff Depth>0.01"
Flow Length=20' Slope=0.0500 '/' Tc=1.8 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment 18S: PR-DA2b Runoff Area=11,593 sf 63.60% Impervious Runoff Depth>1.39"
Flow Length=305' Tc=1.9 min CN=77 Runoff=0.49 cfs 0.031 af

Subcatchment 19S: PR-DA2c Runoff Area=7,672 sf 4.35% Impervious Runoff Depth=0.00"
Flow Length=80' Tc=4.4 min CN=35 Runoff=0.00 cfs 0.000 af

Reach 1R: DP-1 Inflow=0.00 cfs 0.001 af
Outflow=0.00 cfs 0.001 af

Reach 2R: DP-2 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach 4R: 1R Inflow=1.79 cfs 0.165 af
Outflow=1.79 cfs 0.165 af

Pond 3P: SC-740 FIELD Peak Elev=16.67' Storage=660 cf Inflow=1.79 cfs 0.165 af
Outflow=0.85 cfs 0.165 af

Pond 13P: 1000 GAL LP Peak Elev=22.31' Storage=588 cf Inflow=0.72 cfs 0.052 af
Outflow=0.11 cfs 0.052 af

Pond 15P: 1000 GAL LP Peak Elev=23.12' Storage=495 cf Inflow=0.58 cfs 0.041 af
Outflow=0.08 cfs 0.041 af

Total Runoff Area = 2.674 ac Runoff Volume = 0.259 af Average Runoff Depth = 1.16"
49.12% Pervious = 1.313 ac 50.88% Impervious = 1.360 ac

Summary for Subcatchment 3S: PR-DA1a

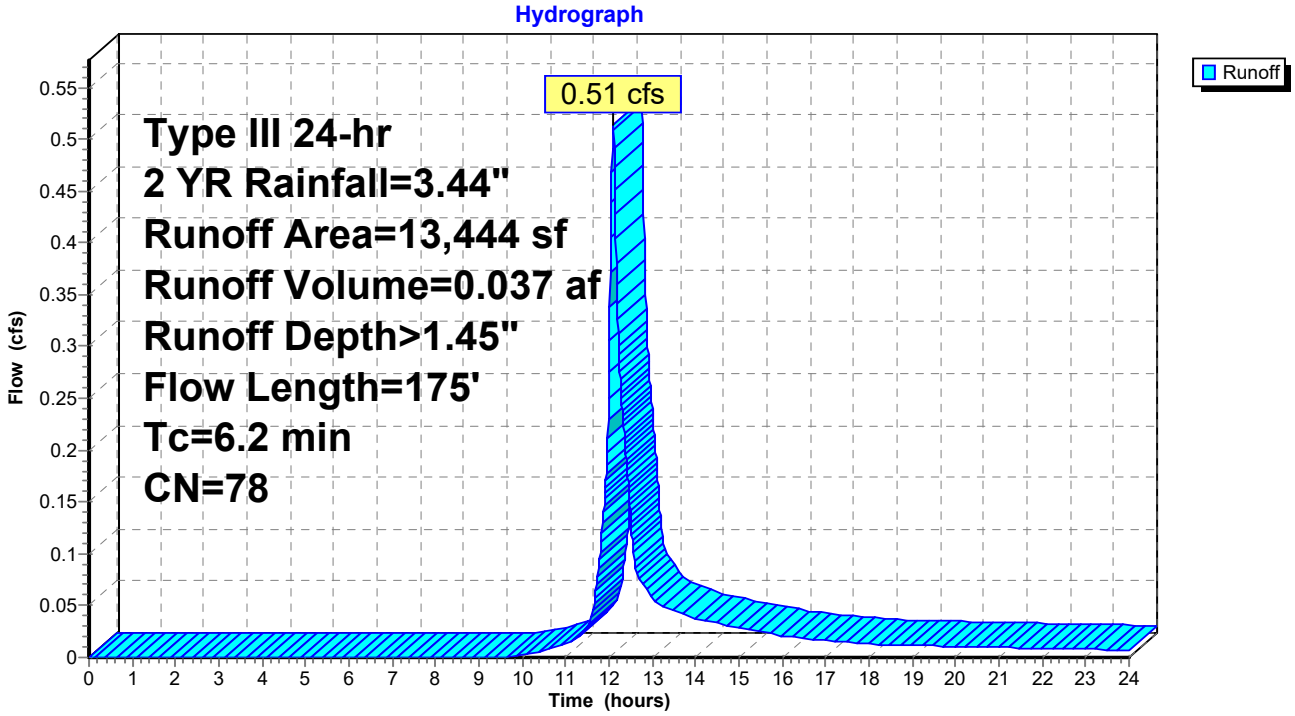
Runoff = 0.51 cfs @ 12.09 hrs, Volume= 0.037 af, Depth> 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.44"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
575	32	Woods/grass comb., Good, HSG A
3,814	39	>75% Grass cover, Good, HSG A
0	98	Unconnected roofs, HSG A
9,055	98	Paved parking, HSG A
13,444	78	Weighted Average
4,389		32.65% Pervious Area
9,055		67.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	35	0.0100	0.11		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
0.8	140	0.0220	3.01		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
6.2	175	Total			

Subcatchment 3S: PR-DA1a



Summary for Subcatchment 4S: PR-DA1b

[49] Hint: Tc<2dt may require smaller dt

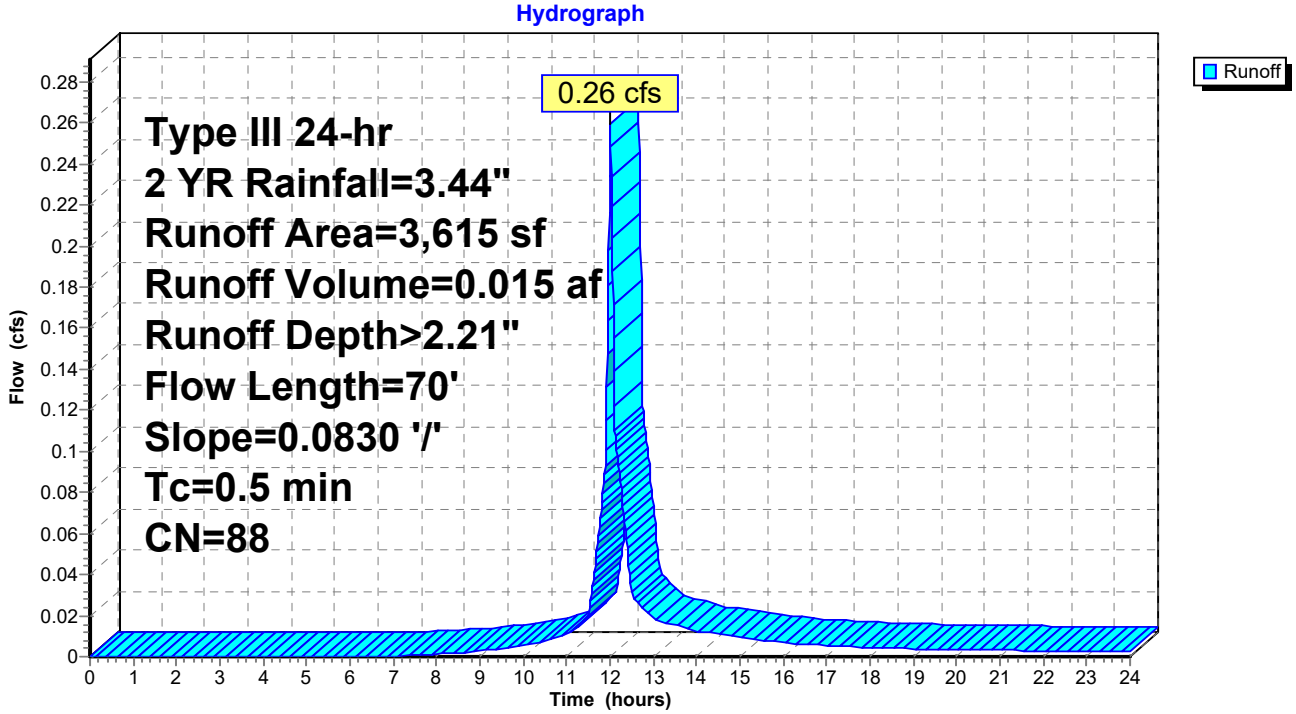
Runoff = 0.26 cfs @ 12.01 hrs, Volume= 0.015 af, Depth> 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.44"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
600	39	>75% Grass cover, Good, HSG A
0	98	Unconnected roofs, HSG A
3,015	98	Paved parking, HSG A
3,615	88	Weighted Average
600		16.60% Pervious Area
3,015		83.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	70	0.0830	2.33		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.40"

Subcatchment 4S: PR-DA1b



Summary for Subcatchment 5S: PR-DA-R2

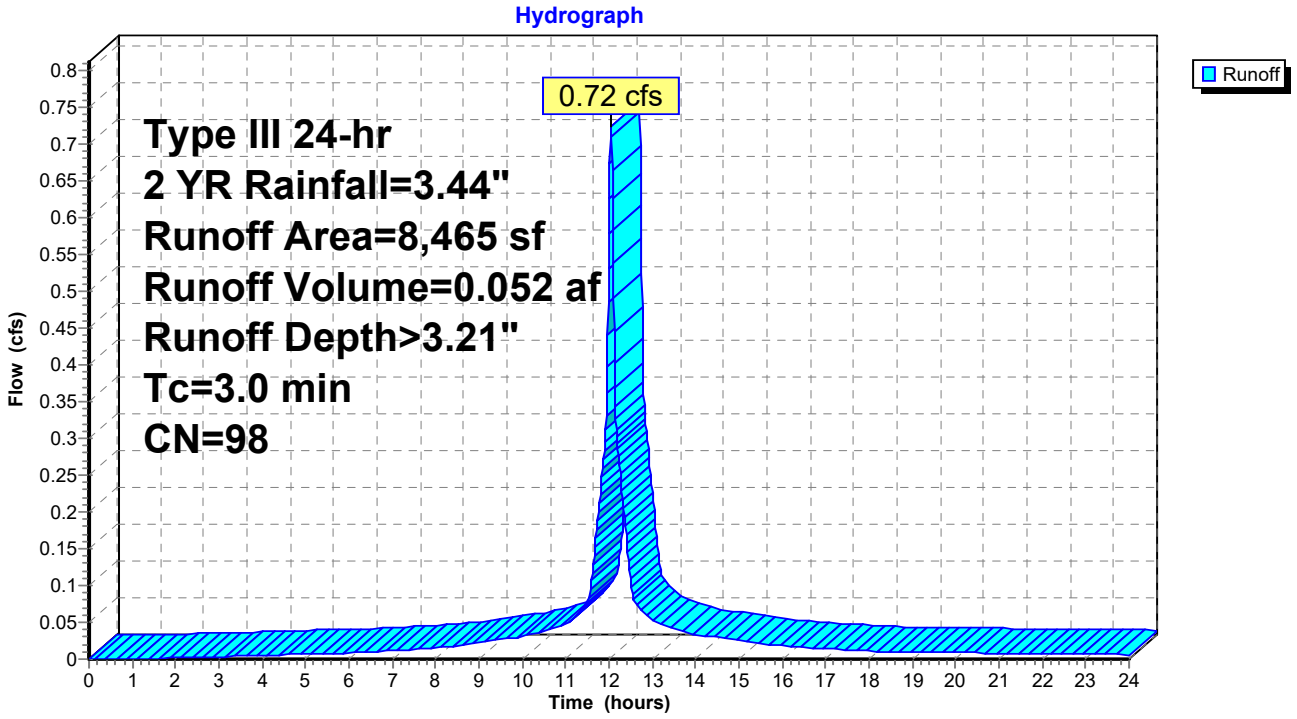
Runoff = 0.72 cfs @ 12.04 hrs, Volume= 0.052 af, Depth> 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.44"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
0	39	>75% Grass cover, Good, HSG A
8,465	98	Unconnected roofs, HSG A
0	98	Paved parking, HSG A
8,465	98	Weighted Average
8,465		100.00% Impervious Area
8,465		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry, Roof Leader**

Subcatchment 5S: PR-DA-R2



Summary for Subcatchment 6S: PR-DA-R1

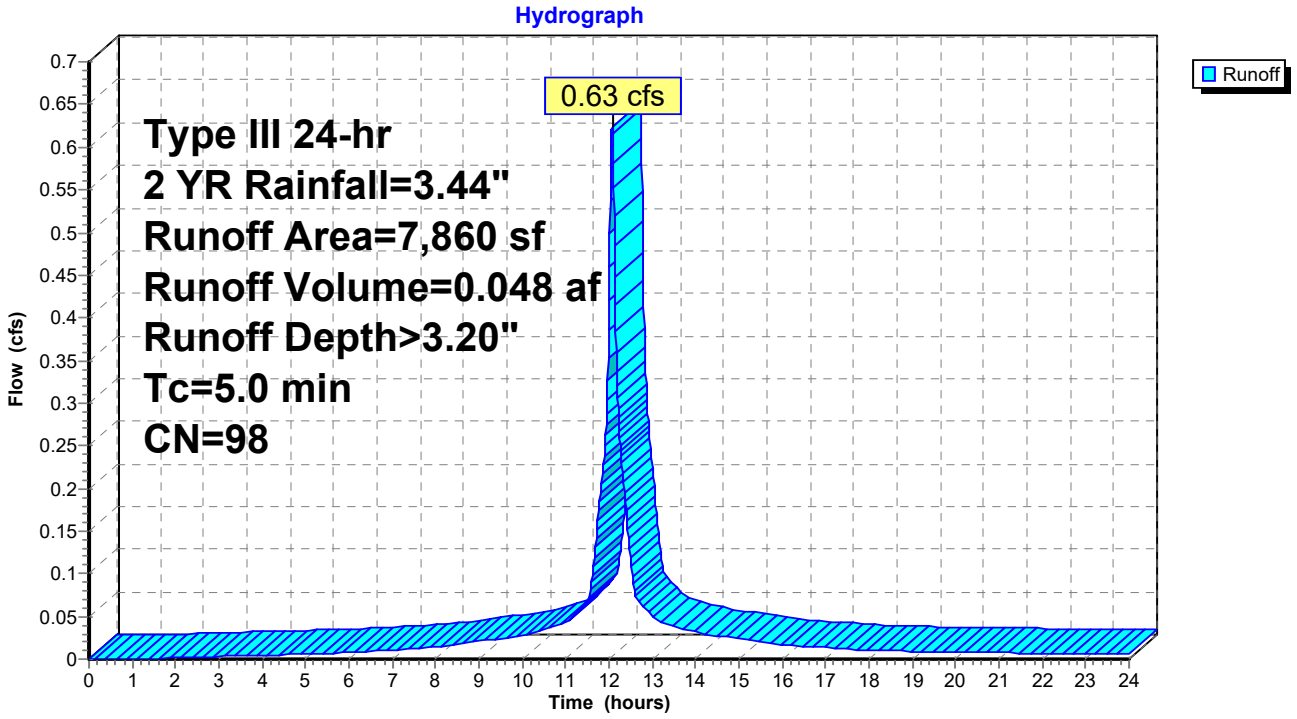
Runoff = 0.63 cfs @ 12.07 hrs, Volume= 0.048 af, Depth> 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.44"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
0	39	>75% Grass cover, Good, HSG A
7,860	98	Unconnected roofs, HSG A
0	98	Paved parking, HSG A
7,860	98	Weighted Average
7,860		100.00% Impervious Area
7,860		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Roof Leader**

Subcatchment 6S: PR-DA-R1



Summary for Subcatchment 7S: PR-DA2a

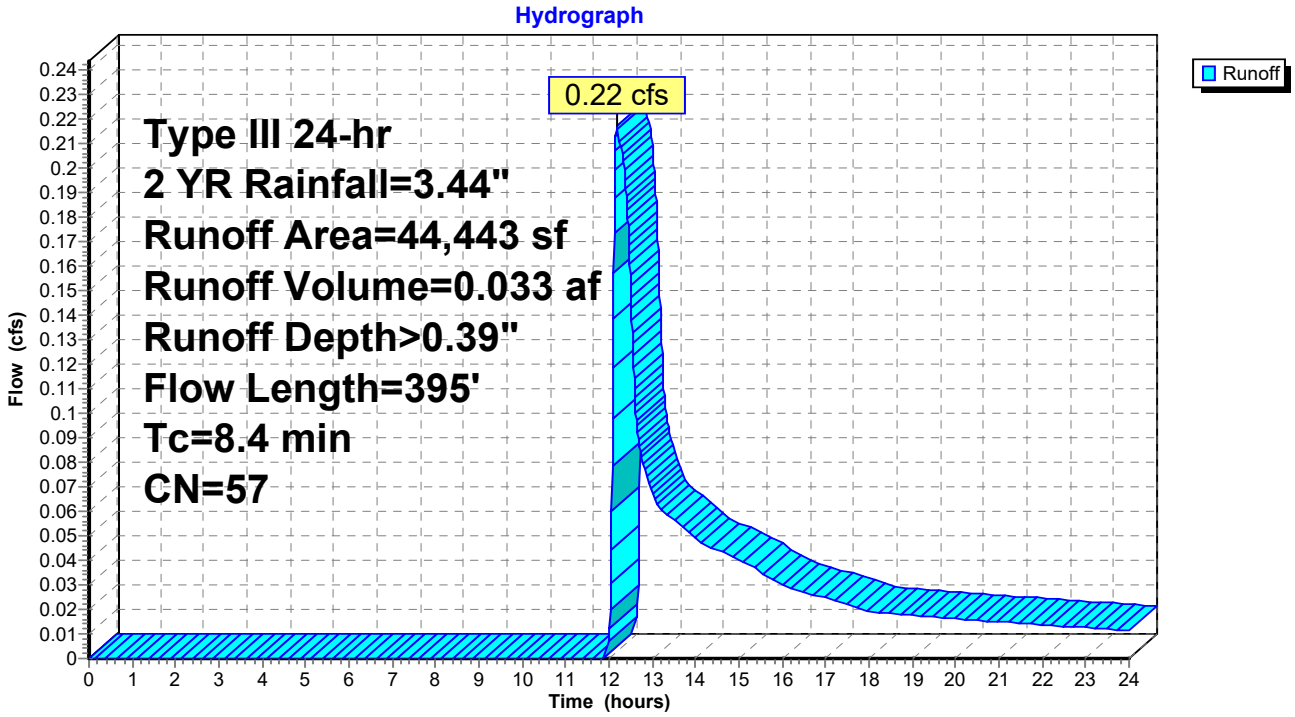
Runoff = 0.22 cfs @ 12.18 hrs, Volume= 0.033 af, Depth> 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.44"

	Area (sf)	CN	Description
	365	30	Woods, Good, HSG A
	4,535	32	Woods/grass comb., Good, HSG A
	25,054	39	>75% Grass cover, Good, HSG A
	2,099	98	Unconnected roofs, HSG A
	11,222	98	Paved parking, HSG A
*	1,168	98	Gravel Areas
	44,443	57	Weighted Average
	29,954		67.40% Pervious Area
	14,489		32.60% Impervious Area
	2,099		14.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0200	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
2.0	120	0.0200	0.99		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.9	225	0.0410	4.11		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
8.4	395	Total			

Subcatchment 7S: PR-DA2a



Summary for Subcatchment 8S: PR-DA-R3

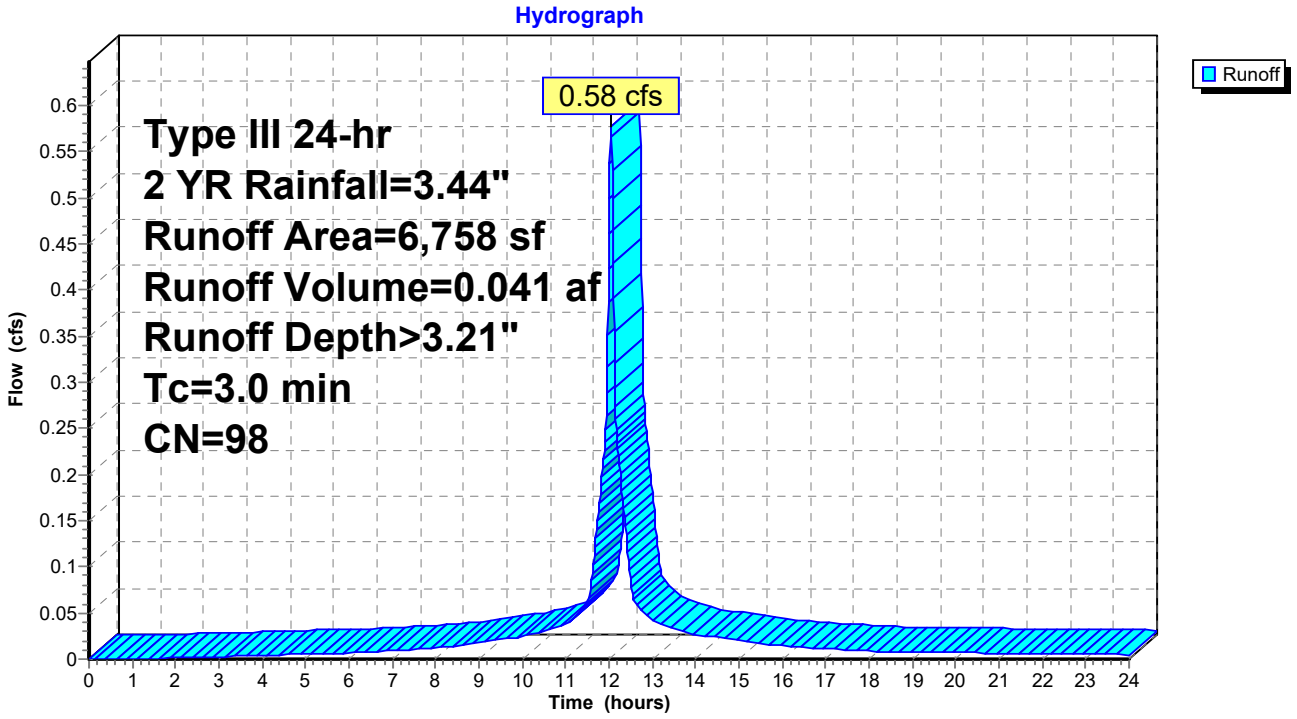
Runoff = 0.58 cfs @ 12.04 hrs, Volume= 0.041 af, Depth> 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.44"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
0	39	>75% Grass cover, Good, HSG A
6,758	98	Unconnected roofs, HSG A
0	98	Paved parking, HSG A
6,758	98	Weighted Average
6,758		100.00% Impervious Area
6,758		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry, Roof Leader**

Subcatchment 8S: PR-DA-R3



Summary for Subcatchment 16S: PR-DA1c

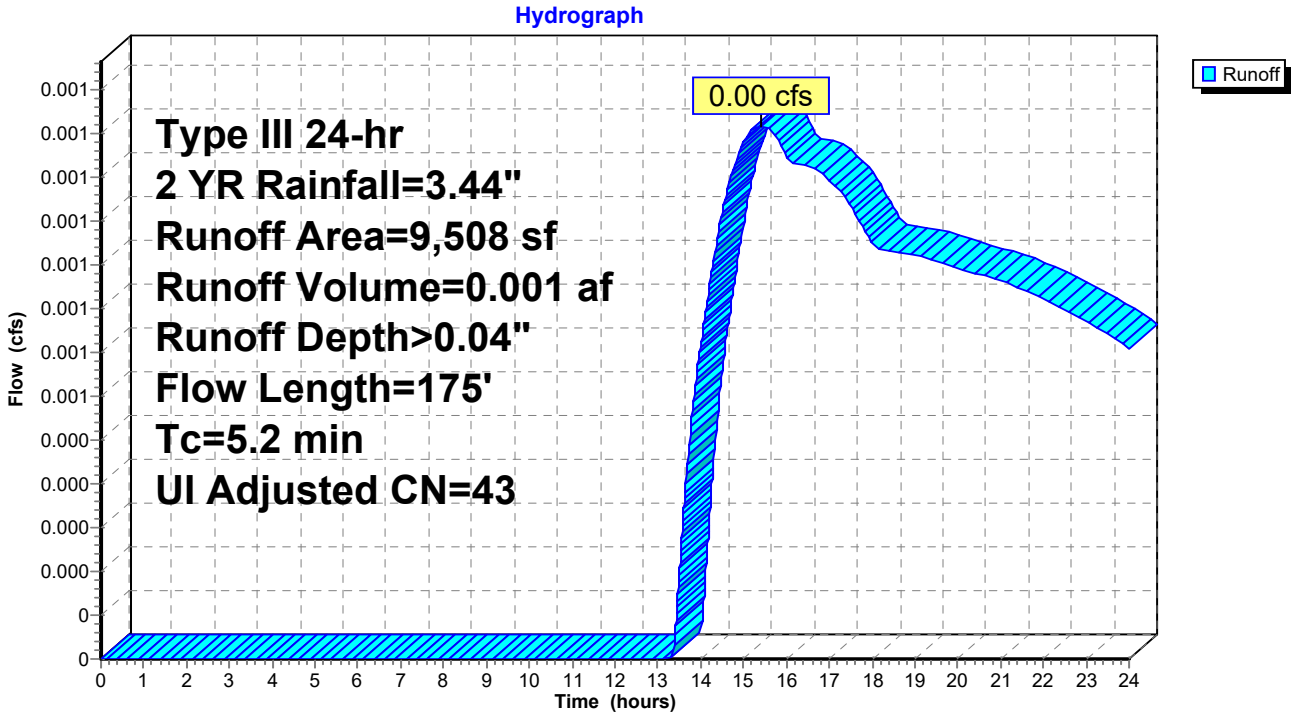
Runoff = 0.00 cfs @ 15.41 hrs, Volume= 0.001 af, Depth> 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.44"

Area (sf)	CN	Adj	Description
0	30		Woods, Good, HSG A
4,575	32		Woods/grass comb., Good, HSG A
3,021	39		>75% Grass cover, Good, HSG A
1,496	98		Unconnected roofs, HSG A
416	98		Paved parking, HSG A
9,508	47	43	Weighted Average, UI Adjusted
7,596			79.89% Pervious Area
1,912			20.11% Impervious Area
1,496			78.24% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	50	0.0322	0.18		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
0.7	125	0.0300	2.79		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
5.2	175	Total			

Subcatchment 16S: PR-DA1c



Summary for Subcatchment 17S: PR-DA1d

[73] Warning: Peak may fall outside time span

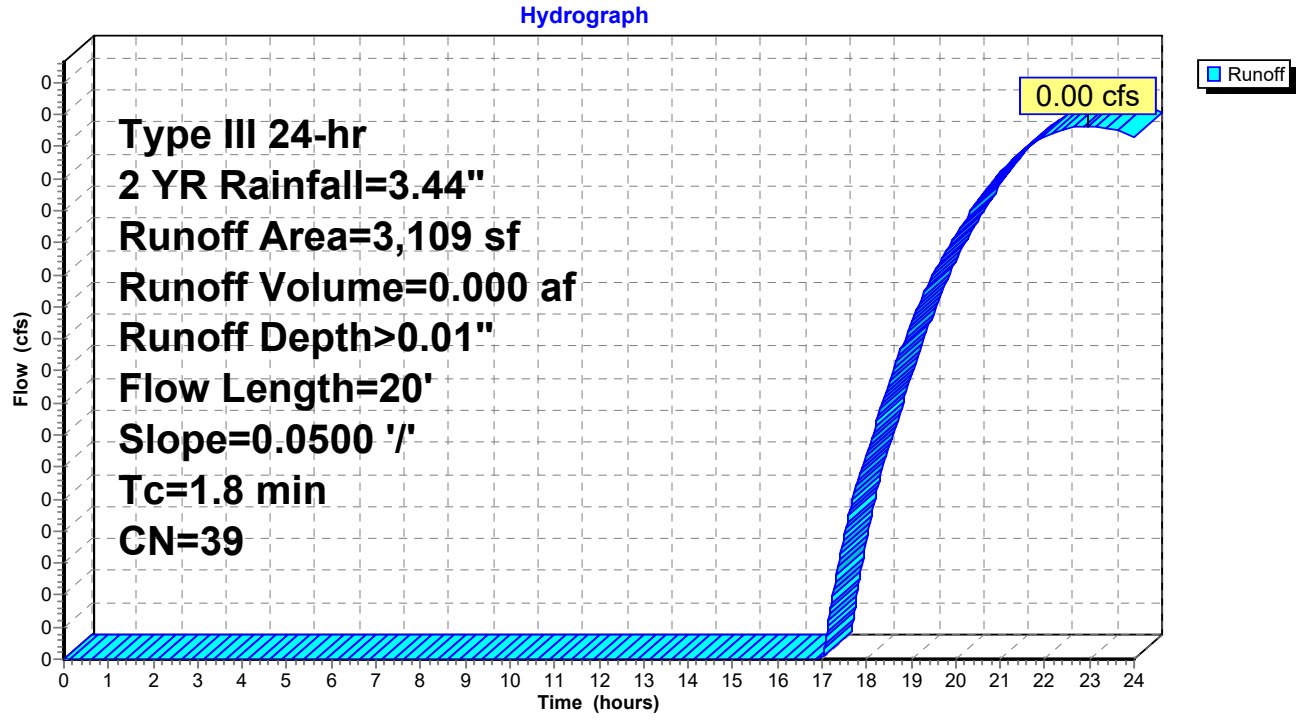
Runoff = 0.00 cfs @ 22.97 hrs, Volume= 0.000 af, Depth> 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.44"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
3,109	39	>75% Grass cover, Good, HSG A
0	98	Unconnected roofs, HSG A
0	98	Paved parking, HSG A
3,109	39	Weighted Average
3,109		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	20	0.0500	0.18		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"

Subcatchment 17S: PR-DA1d



Summary for Subcatchment 18S: PR-DA2b

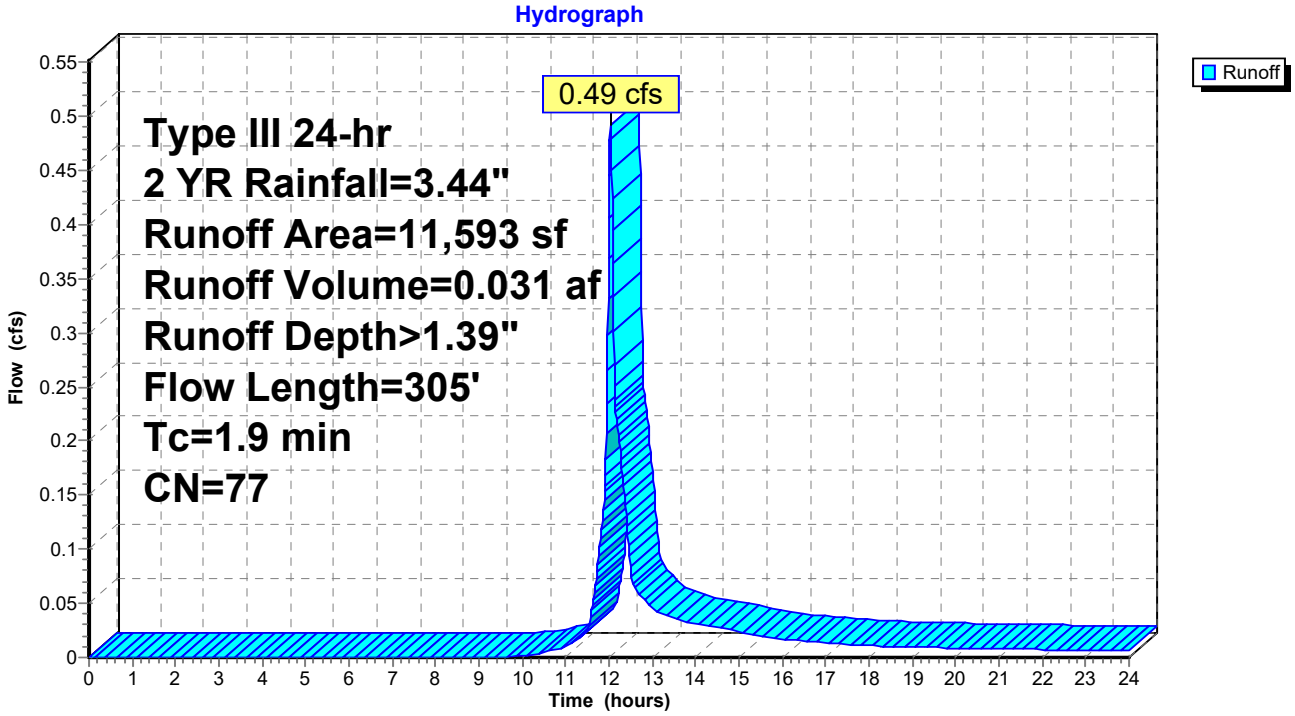
Runoff = 0.49 cfs @ 12.03 hrs, Volume= 0.031 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.44"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
4,220	39	>75% Grass cover, Good, HSG A
0	98	Unconnected roofs, HSG A
7,373	98	Paved parking, HSG A
11,593	77	Weighted Average
4,220		36.40% Pervious Area
7,373		63.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.45		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.40"
1.3	255	0.0250	3.21		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.9	305	Total			

Subcatchment 18S: PR-DA2b



Summary for Subcatchment 19S: PR-DA2c

[45] Hint: Runoff=Zero

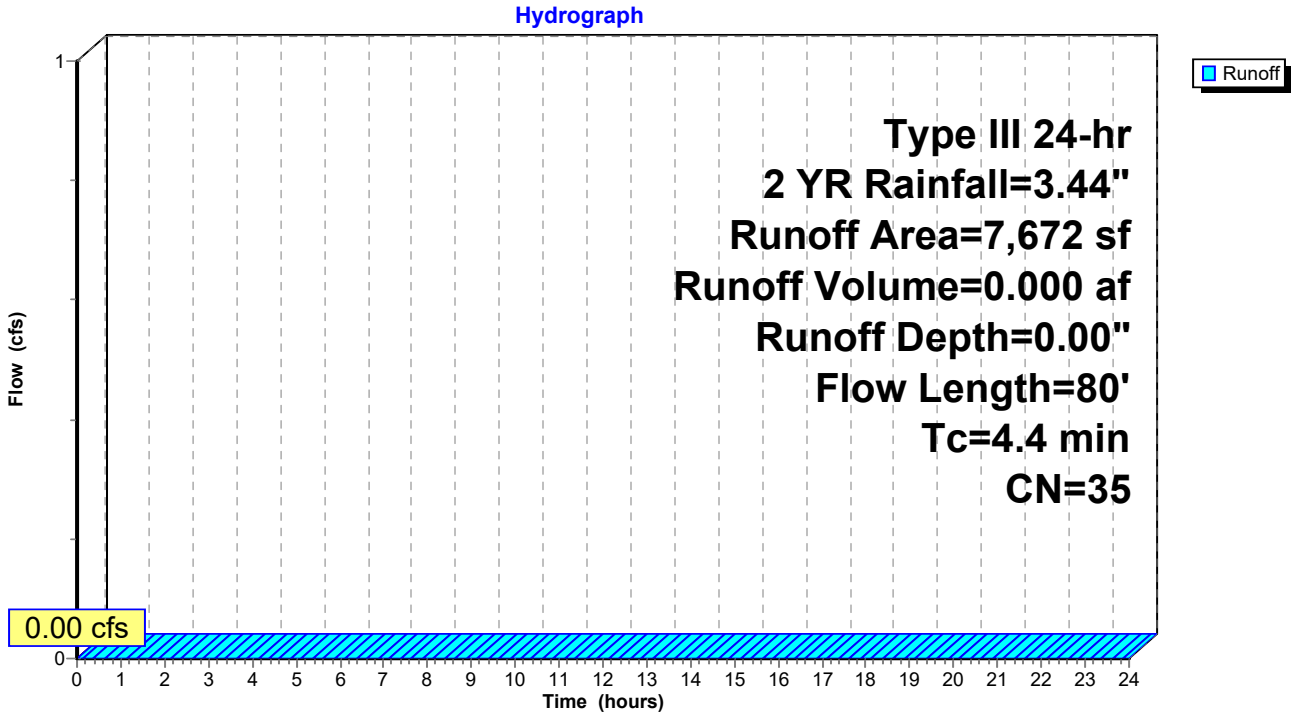
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.44"

	Area (sf)	CN	Description
	0	30	Woods, Good, HSG A
	7,338	32	Woods/grass comb., Good, HSG A
	0	39	>75% Grass cover, Good, HSG A
	0	98	Unconnected roofs, HSG A
	334	98	Paved parking, HSG A
*	0	98	Gravel Area
	7,672	35	Weighted Average
	7,338		95.65% Pervious Area
	334		4.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	50	0.0460	0.21		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
0.5	30	0.0220	1.04		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
4.4	80	Total			

Subcatchment 19S: PR-DA2c



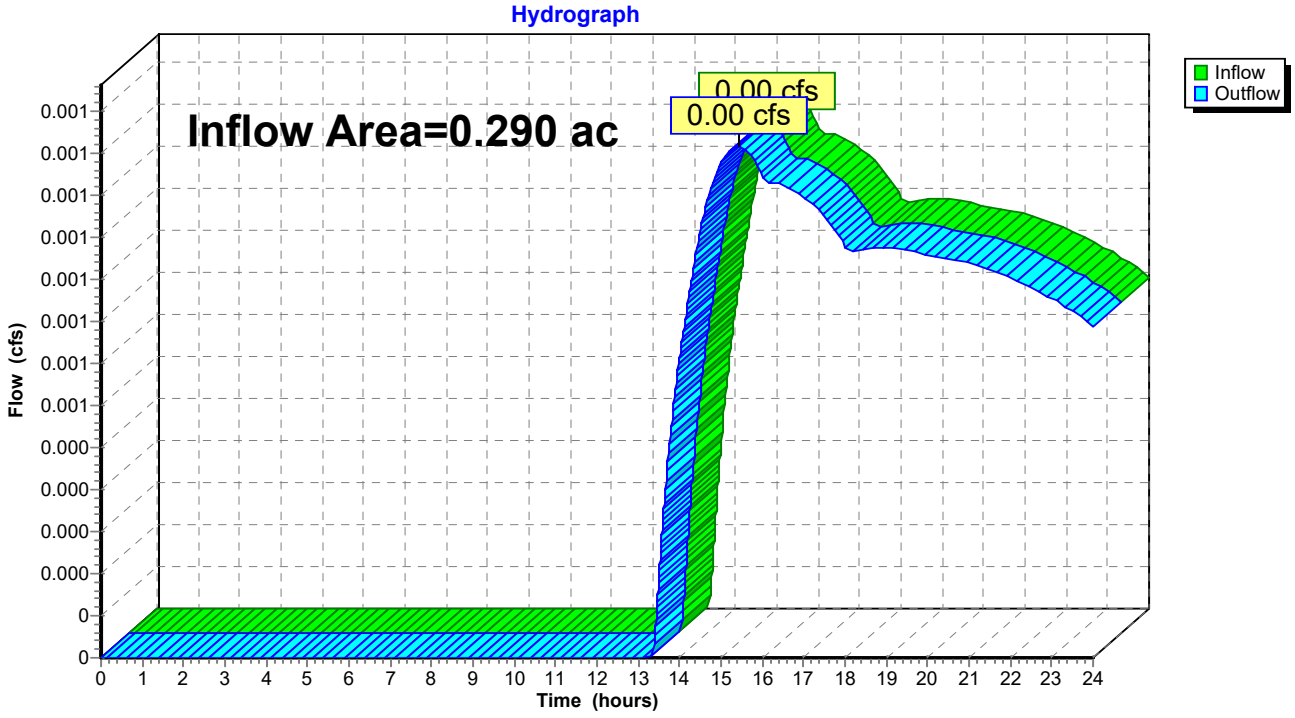
Summary for Reach 1R: DP-1

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

Inflow Area = 0.290 ac, 15.15% Impervious, Inflow Depth > 0.03" for 2 YR event
Inflow = 0.00 cfs @ 15.41 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 15.41 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 1R: DP-1



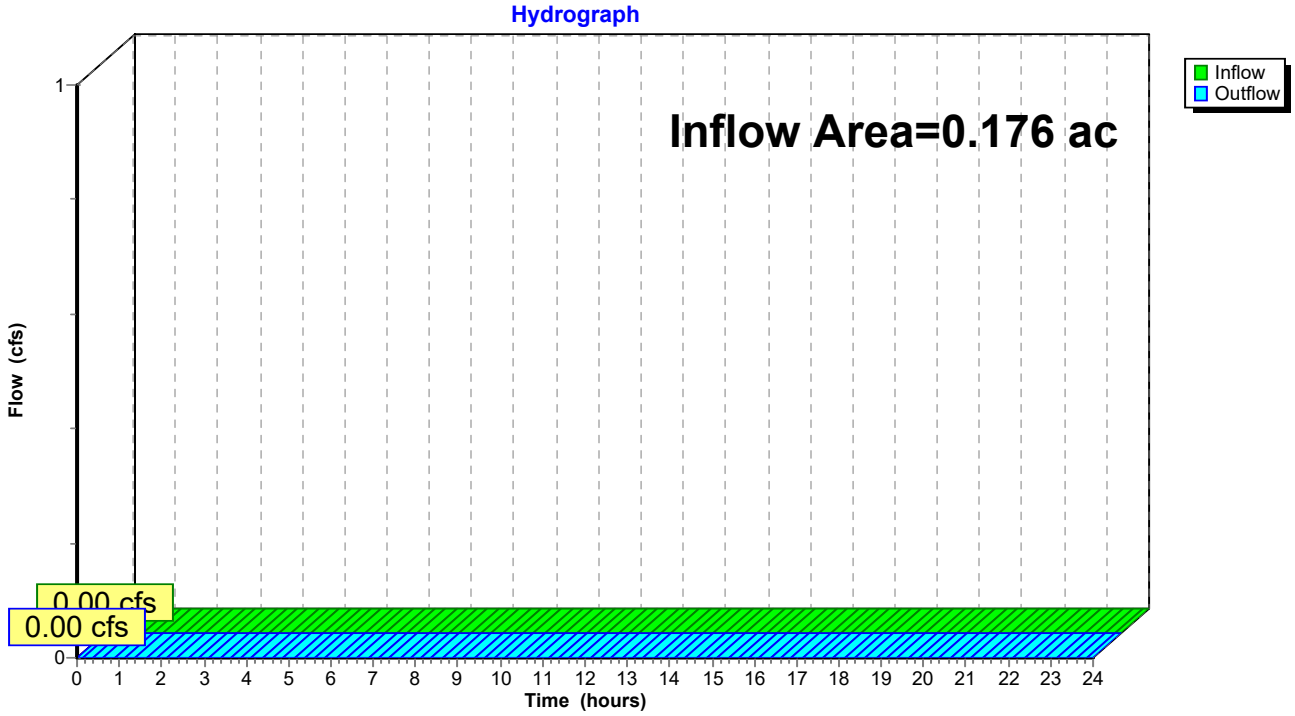
Summary for Reach 2R: DP-2

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

Inflow Area = 0.176 ac, 4.35% 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

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 2R: DP-2



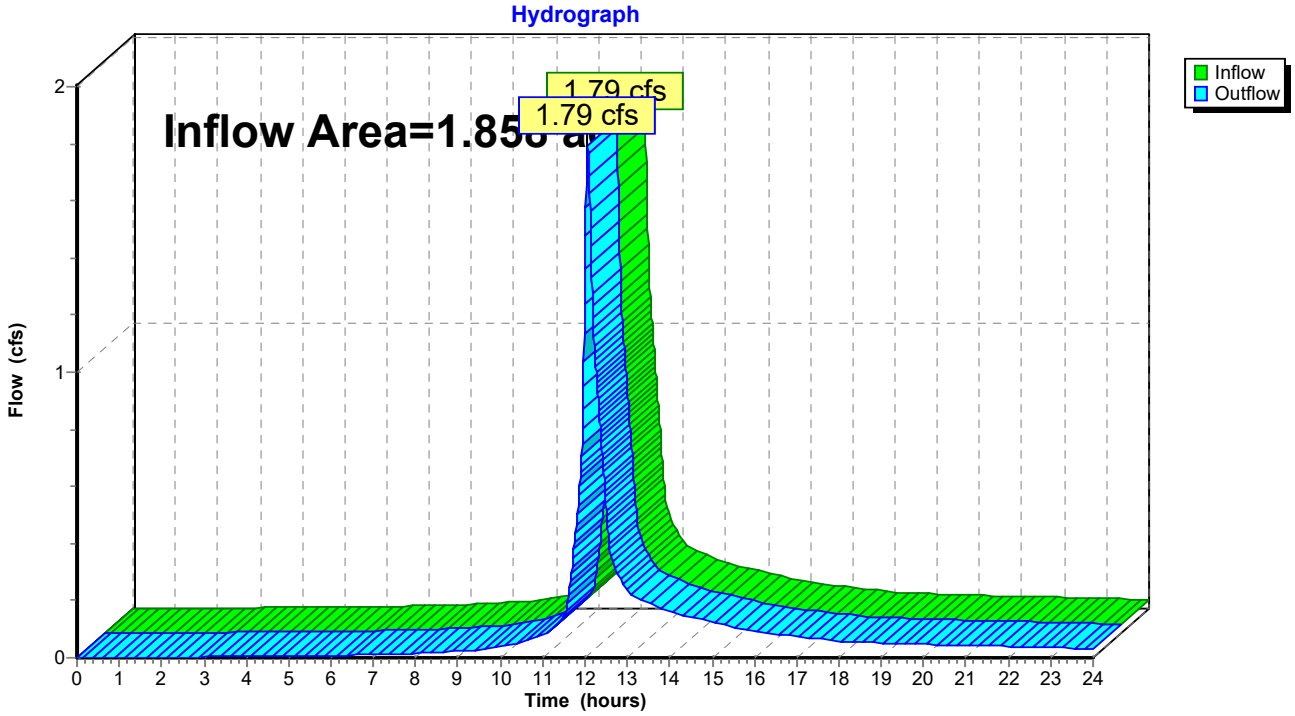
Summary for Reach 4R: 1R

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

Inflow Area = 1.858 ac, 51.62% Impervious, Inflow Depth > 1.06" for 2 YR event
Inflow = 1.79 cfs @ 12.07 hrs, Volume= 0.165 af
Outflow = 1.79 cfs @ 12.07 hrs, Volume= 0.165 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 4R: 1R



Summary for Pond 3P: SC-740 FIELD

Inflow Area = 1.858 ac, 51.62% Impervious, Inflow Depth > 1.06" for 2 YR event
Inflow = 1.79 cfs @ 12.07 hrs, Volume= 0.165 af
Outflow = 0.85 cfs @ 11.97 hrs, Volume= 0.165 af, Atten= 52%, Lag= 0.0 min
Discarded = 0.85 cfs @ 11.97 hrs, Volume= 0.165 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 16.67' @ 12.34 hrs Surf.Area= 4,465 sf Storage= 660 cf

Plug-Flow detention time= 3.8 min calculated for 0.165 af (100% of inflow)
Center-of-Mass det. time= 3.6 min (835.0 - 831.4)

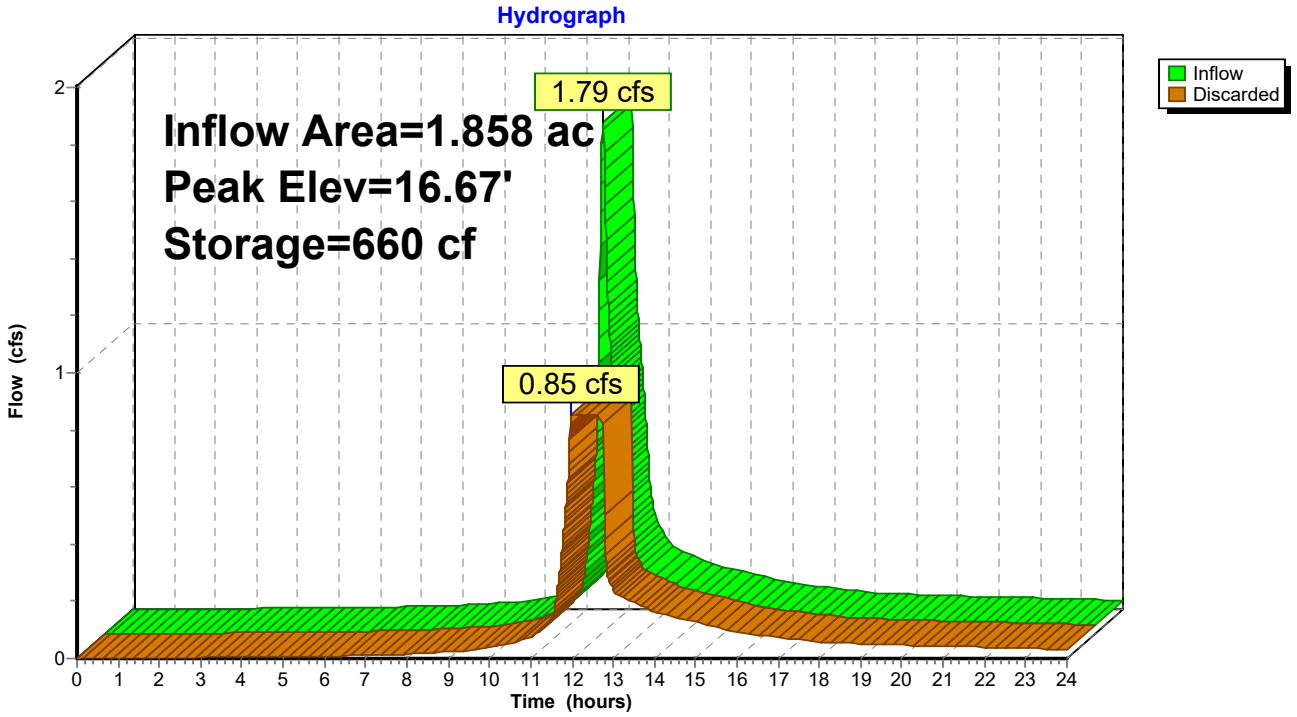
Volume	Invert	Avail.Storage	Storage Description
#1	16.30'	4,101 cf	**Stone (Prismatic)** Listed below (Recalc) 15,628 cf Overall - 5,375 cf Embedded = 10,253 cf x 40.0% Voids
#2	16.80'	5,375 cf	**ADS_StormTech SC-740 +Cap** x 117 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 9 Rows of 13 Chambers
		9,476 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
16.30	4,465	0	0
19.80	4,465	15,628	15,628

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.30'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.85 cfs @ 11.97 hrs HW=16.34' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.85 cfs)

Pond 3P: SC-740 FIELD



Summary for Pond 13P: 1000 GAL LP

Inflow Area = 0.194 ac,100.00% Impervious, Inflow Depth > 3.21" for 2 YR event
Inflow = 0.72 cfs @ 12.04 hrs, Volume= 0.052 af
Outflow = 0.11 cfs @ 11.65 hrs, Volume= 0.052 af, Atten= 85%, Lag= 0.0 min
Discarded = 0.11 cfs @ 11.65 hrs, Volume= 0.052 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 22.31' @ 12.49 hrs Surf.Area= 580 sf Storage= 588 cf

Plug-Flow detention time= 29.2 min calculated for 0.052 af (100% of inflow)
Center-of-Mass det. time= 28.9 min (780.8 - 751.9)

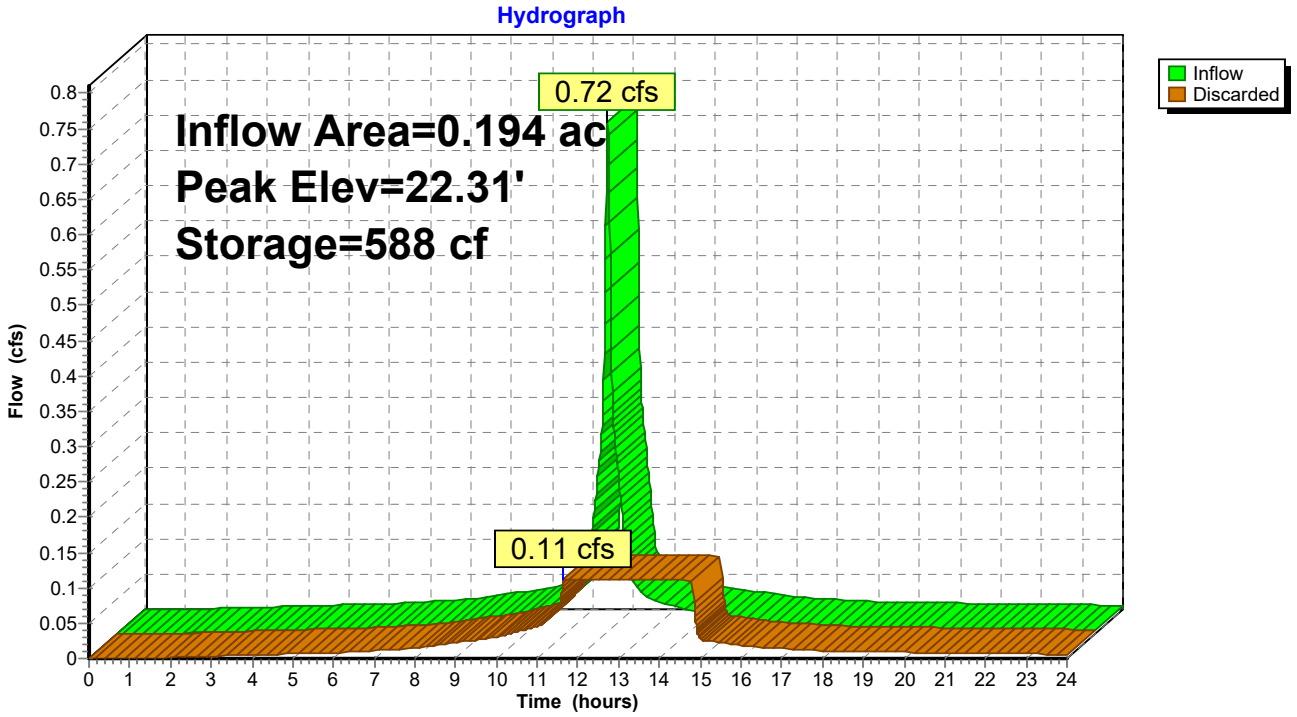
Volume	Invert	Avail.Storage	Storage Description
#1	20.33'	1,188 cf	**Stone (Prismatic)** Listed below (Recalc) 4,159 cf Overall - 1,188 cf Embedded = 2,971 cf x 40.0% Voids
#2	20.83'	998 cf	**5.50'D x 6.00'H 1000 GAL LP** x 7 Inside #1 1,188 cf Overall - 3.0" Wall Thickness = 998 cf
		2,186 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
20.33	580	0	0
27.50	580	4,159	4,159

Device	Routing	Invert	Outlet Devices
#1	Discarded	20.33'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.11 cfs @ 11.65 hrs HW=20.41' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Pond 13P: 1000 GAL LP



Summary for Pond 15P: 1000 GAL LP

Inflow Area = 0.155 ac,100.00% Impervious, Inflow Depth > 3.21" for 2 YR event
Inflow = 0.58 cfs @ 12.04 hrs, Volume= 0.041 af
Outflow = 0.08 cfs @ 11.62 hrs, Volume= 0.041 af, Atten= 86%, Lag= 0.0 min
Discarded = 0.08 cfs @ 11.62 hrs, Volume= 0.041 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 23.12' @ 12.51 hrs Surf.Area= 420 sf Storage= 495 cf

Plug-Flow detention time= 35.2 min calculated for 0.041 af (100% of inflow)
Center-of-Mass det. time= 34.9 min (786.7 - 751.9)

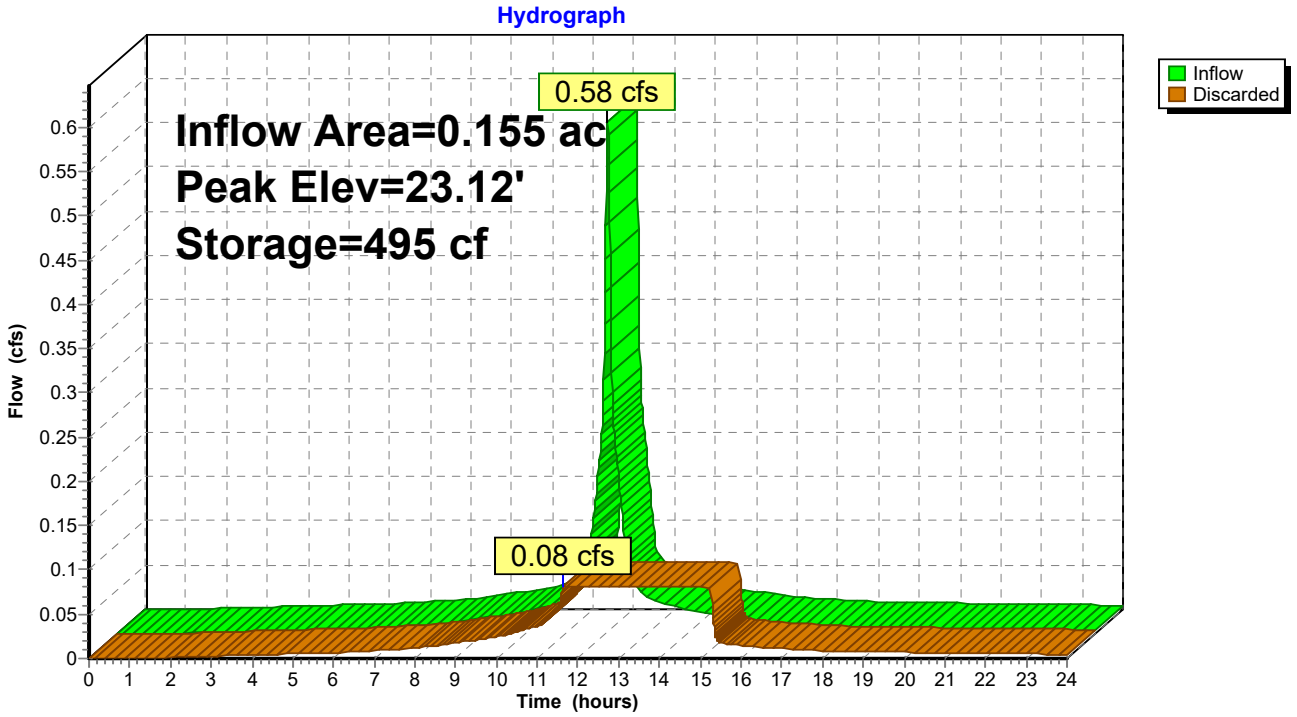
Volume	Invert	Avail.Storage	Storage Description
#1	20.83'	865 cf	**Stone (Prismatic)** Listed below (Recalc) 3,011 cf Overall - 848 cf Embedded = 2,163 cf x 40.0% Voids
#2	21.33'	713 cf	**5.50'D x 6.00'H 1000 GAL LP** x 5 Inside #1 848 cf Overall - 3.0" Wall Thickness = 713 cf
		1,578 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
20.83	420	0	0
28.00	420	3,011	3,011

Device	Routing	Invert	Outlet Devices
#1	Discarded	20.83'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.08 cfs @ 11.62 hrs HW=20.90' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Pond 15P: 1000 GAL LP



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 3S: PR-DA1a Runoff Area=13,444 sf 67.35% Impervious Runoff Depth>2.74"
Flow Length=175' Tc=6.2 min CN=78 Runoff=0.99 cfs 0.071 af

Subcatchment 4S: PR-DA1b Runoff Area=3,615 sf 83.40% Impervious Runoff Depth>3.71"
Flow Length=70' Slope=0.0830 '/' Tc=0.5 min CN=88 Runoff=0.43 cfs 0.026 af

Subcatchment 5S: PR-DA-R2 Runoff Area=8,465 sf 100.00% Impervious Runoff Depth>4.80"
Tc=3.0 min CN=98 Runoff=1.07 cfs 0.078 af

Subcatchment 6S: PR-DA-R1 Runoff Area=7,860 sf 100.00% Impervious Runoff Depth>4.80"
Tc=5.0 min CN=98 Runoff=0.92 cfs 0.072 af

Subcatchment 7S: PR-DA2a Runoff Area=44,443 sf 32.60% Impervious Runoff Depth>1.12"
Flow Length=395' Tc=8.4 min CN=57 Runoff=1.05 cfs 0.095 af

Subcatchment 8S: PR-DA-R3 Runoff Area=6,758 sf 100.00% Impervious Runoff Depth>4.80"
Tc=3.0 min CN=98 Runoff=0.85 cfs 0.062 af

Subcatchment 16S: PR-DA1c Runoff Area=9,508 sf 20.11% Impervious Runoff Depth>0.36"
Flow Length=175' Tc=5.2 min UI Adjusted CN=43 Runoff=0.03 cfs 0.007 af

Subcatchment 17S: PR-DA1d Runoff Area=3,109 sf 0.00% Impervious Runoff Depth>0.21"
Flow Length=20' Slope=0.0500 '/' Tc=1.8 min CN=39 Runoff=0.00 cfs 0.001 af

Subcatchment 18S: PR-DA2b Runoff Area=11,593 sf 63.60% Impervious Runoff Depth>2.66"
Flow Length=305' Tc=1.9 min CN=77 Runoff=0.96 cfs 0.059 af

Subcatchment 19S: PR-DA2c Runoff Area=7,672 sf 4.35% Impervious Runoff Depth>0.09"
Flow Length=80' Tc=4.4 min CN=35 Runoff=0.00 cfs 0.001 af

Reach 1R: DP-1 Inflow=0.03 cfs 0.008 af
Outflow=0.03 cfs 0.008 af

Reach 2R: DP-2 Inflow=0.00 cfs 0.001 af
Outflow=0.00 cfs 0.001 af

Reach 4R: 1R Inflow=3.75 cfs 0.323 af
Outflow=3.75 cfs 0.323 af

Pond 3P: SC-740 FIELD Peak Elev=17.44' Storage=3,203 cf Inflow=3.75 cfs 0.323 af
Outflow=0.85 cfs 0.323 af

Pond 13P: 1000 GAL LP Peak Elev=23.74' Storage=1,044 cf Inflow=1.07 cfs 0.078 af
Outflow=0.11 cfs 0.078 af

Pond 15P: 1000 GAL LP Peak Elev=24.74' Storage=869 cf Inflow=0.85 cfs 0.062 af
Outflow=0.08 cfs 0.062 af

Total Runoff Area = 2.674 ac Runoff Volume = 0.472 af Average Runoff Depth = 2.12"
49.12% Pervious = 1.313 ac 50.88% Impervious = 1.360 ac

Summary for Subcatchment 3S: PR-DA1a

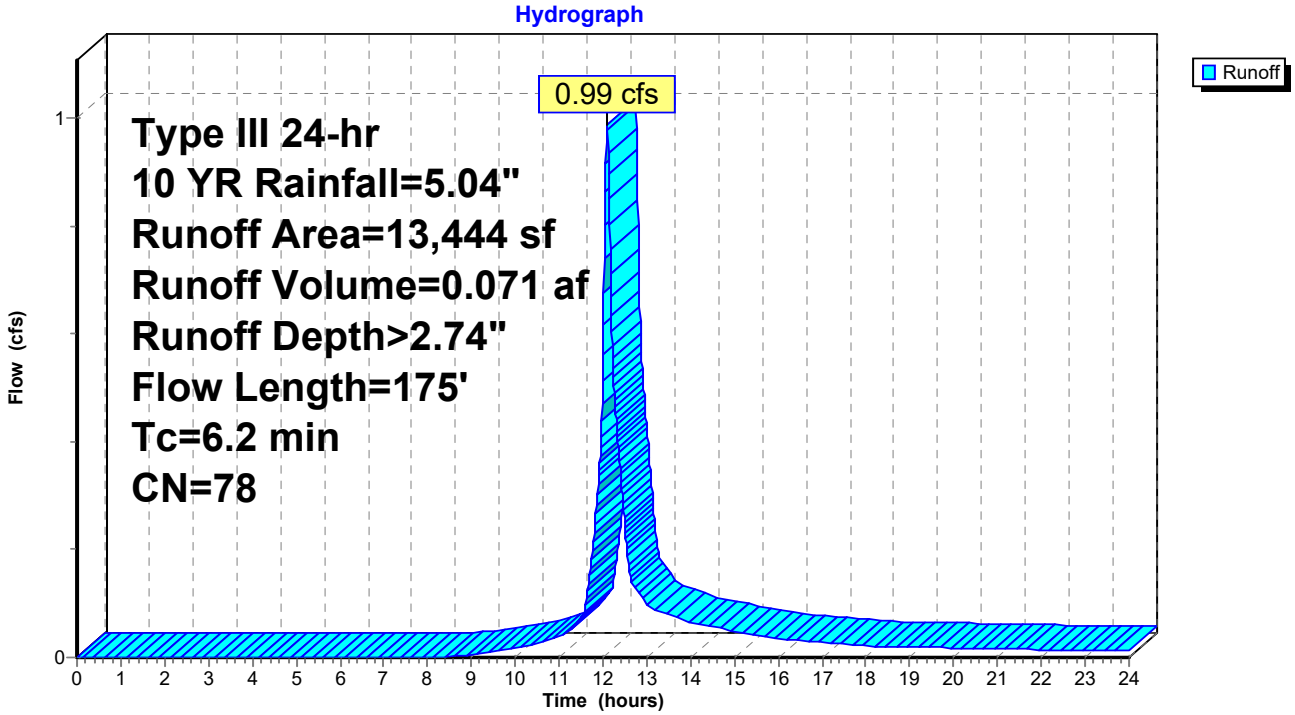
Runoff = 0.99 cfs @ 12.09 hrs, Volume= 0.071 af, Depth> 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=5.04"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
575	32	Woods/grass comb., Good, HSG A
3,814	39	>75% Grass cover, Good, HSG A
0	98	Unconnected roofs, HSG A
9,055	98	Paved parking, HSG A
13,444	78	Weighted Average
4,389		32.65% Pervious Area
9,055		67.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	35	0.0100	0.11		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
0.8	140	0.0220	3.01		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
6.2	175	Total			

Subcatchment 3S: PR-DA1a



Summary for Subcatchment 4S: PR-DA1b

[49] Hint: Tc<2dt may require smaller dt

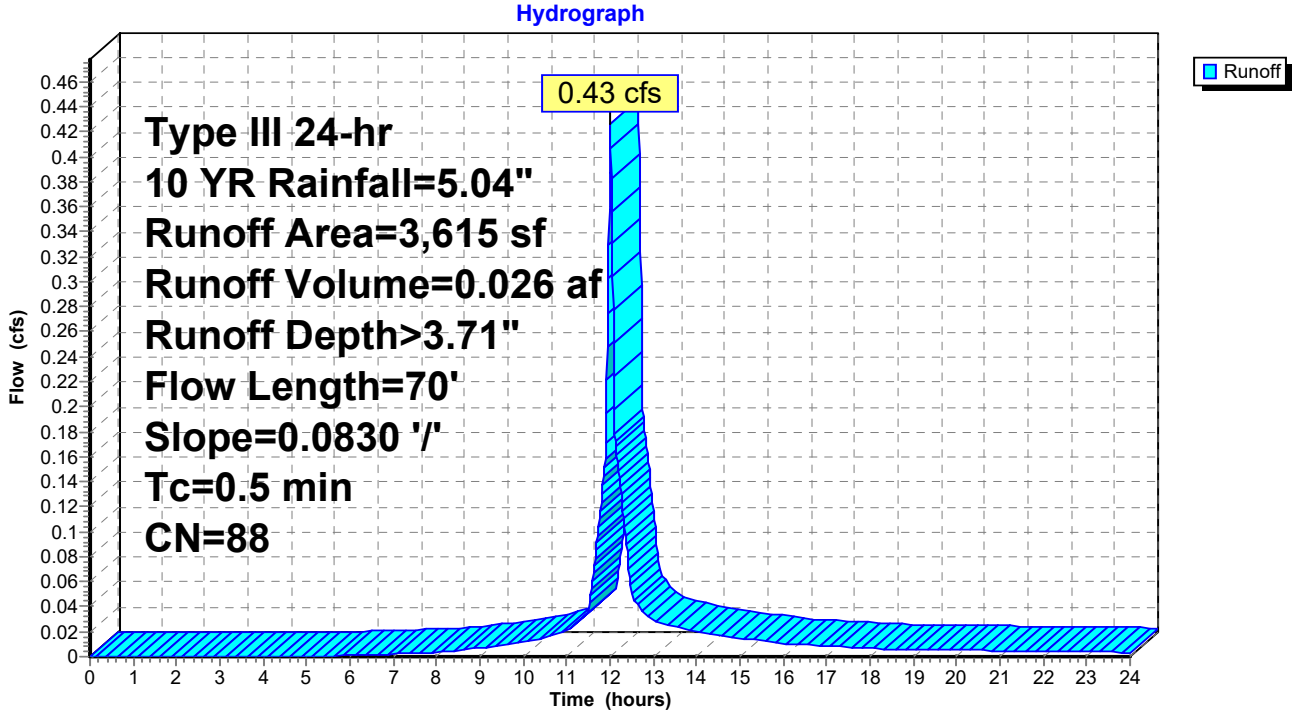
Runoff = 0.43 cfs @ 12.01 hrs, Volume= 0.026 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=5.04"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
600	39	>75% Grass cover, Good, HSG A
0	98	Unconnected roofs, HSG A
3,015	98	Paved parking, HSG A
3,615	88	Weighted Average
600		16.60% Pervious Area
3,015		83.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	70	0.0830	2.33		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.40"

Subcatchment 4S: PR-DA1b



Summary for Subcatchment 5S: PR-DA-R2

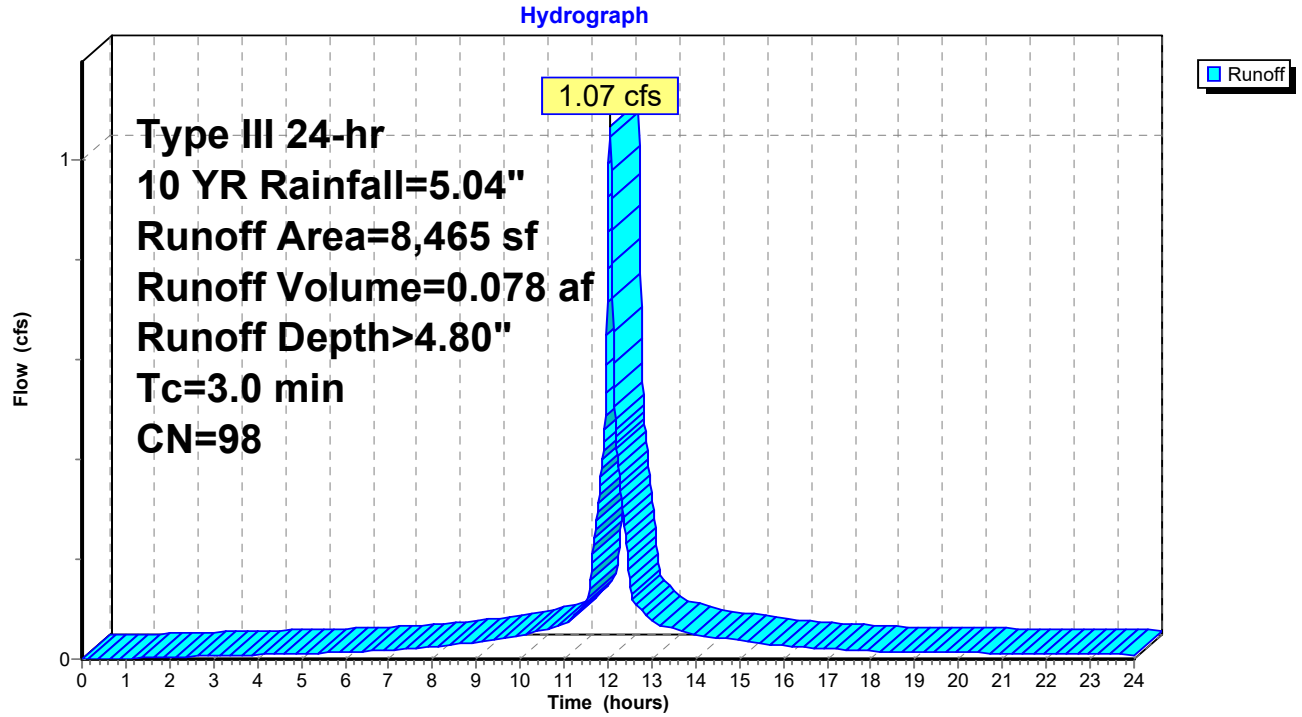
Runoff = 1.07 cfs @ 12.04 hrs, Volume= 0.078 af, Depth> 4.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=5.04"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
0	39	>75% Grass cover, Good, HSG A
8,465	98	Unconnected roofs, HSG A
0	98	Paved parking, HSG A
8,465	98	Weighted Average
8,465		100.00% Impervious Area
8,465		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry, Roof Leader**

Subcatchment 5S: PR-DA-R2



Summary for Subcatchment 6S: PR-DA-R1

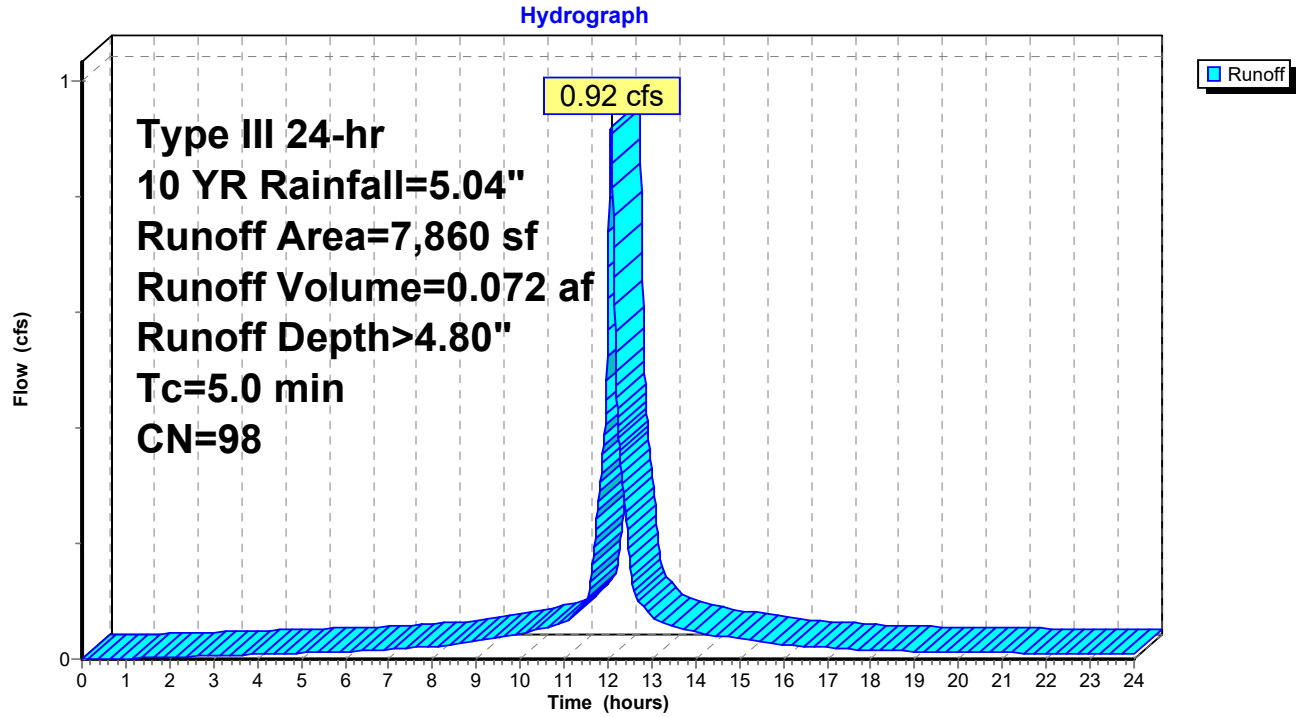
Runoff = 0.92 cfs @ 12.07 hrs, Volume= 0.072 af, Depth> 4.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=5.04"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
0	39	>75% Grass cover, Good, HSG A
7,860	98	Unconnected roofs, HSG A
0	98	Paved parking, HSG A
7,860	98	Weighted Average
7,860		100.00% Impervious Area
7,860		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Roof Leader**

Subcatchment 6S: PR-DA-R1



Summary for Subcatchment 7S: PR-DA2a

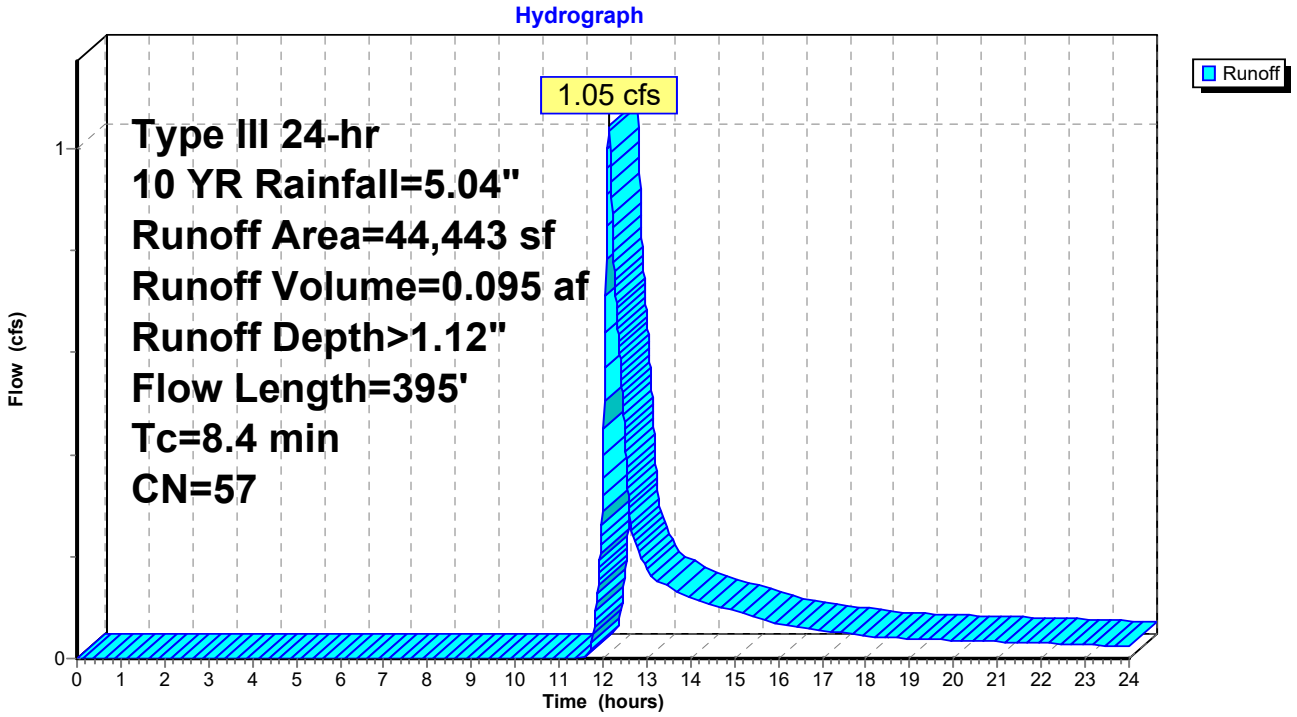
Runoff = 1.05 cfs @ 12.14 hrs, Volume= 0.095 af, Depth> 1.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=5.04"

	Area (sf)	CN	Description
	365	30	Woods, Good, HSG A
	4,535	32	Woods/grass comb., Good, HSG A
	25,054	39	>75% Grass cover, Good, HSG A
	2,099	98	Unconnected roofs, HSG A
	11,222	98	Paved parking, HSG A
*	1,168	98	Gravel Areas
	44,443	57	Weighted Average
	29,954		67.40% Pervious Area
	14,489		32.60% Impervious Area
	2,099		14.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0200	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
2.0	120	0.0200	0.99		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.9	225	0.0410	4.11		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
8.4	395	Total			

Subcatchment 7S: PR-DA2a



Summary for Subcatchment 8S: PR-DA-R3

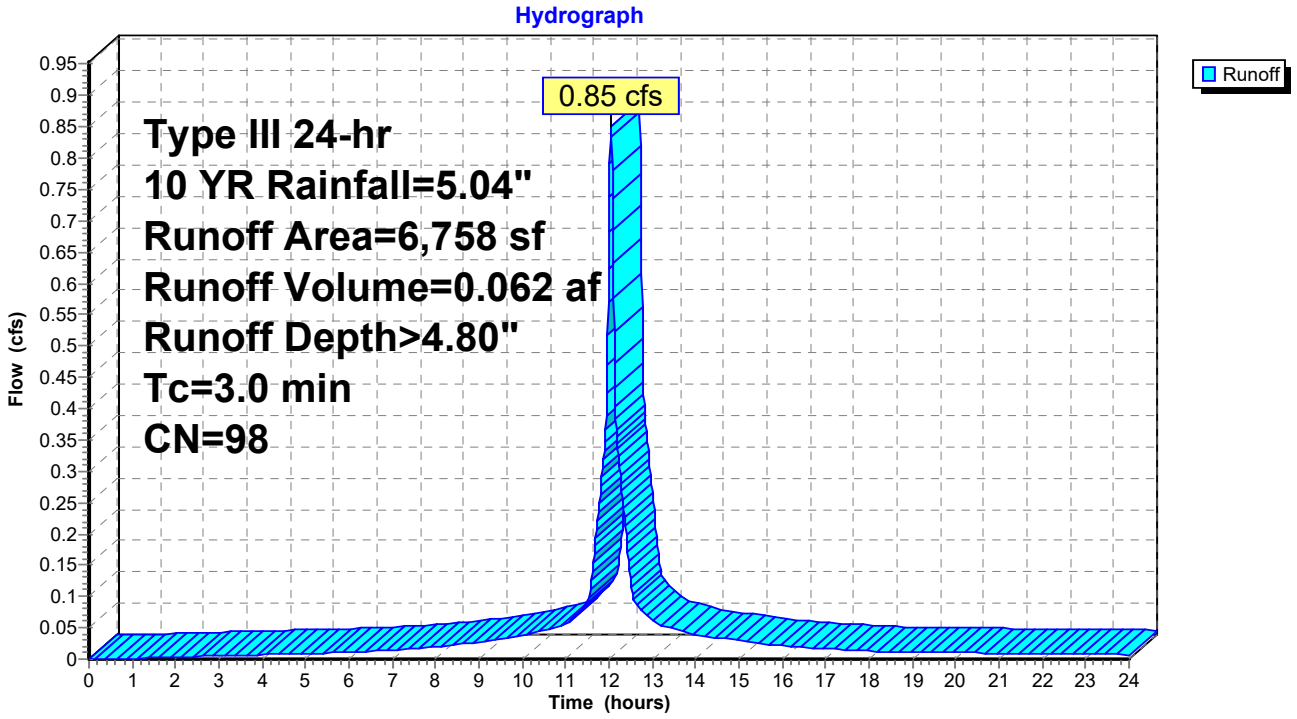
Runoff = 0.85 cfs @ 12.04 hrs, Volume= 0.062 af, Depth> 4.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=5.04"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
0	39	>75% Grass cover, Good, HSG A
6,758	98	Unconnected roofs, HSG A
0	98	Paved parking, HSG A
6,758	98	Weighted Average
6,758		100.00% Impervious Area
6,758		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry, Roof Leader**

Subcatchment 8S: PR-DA-R3



Summary for Subcatchment 16S: PR-DA1c

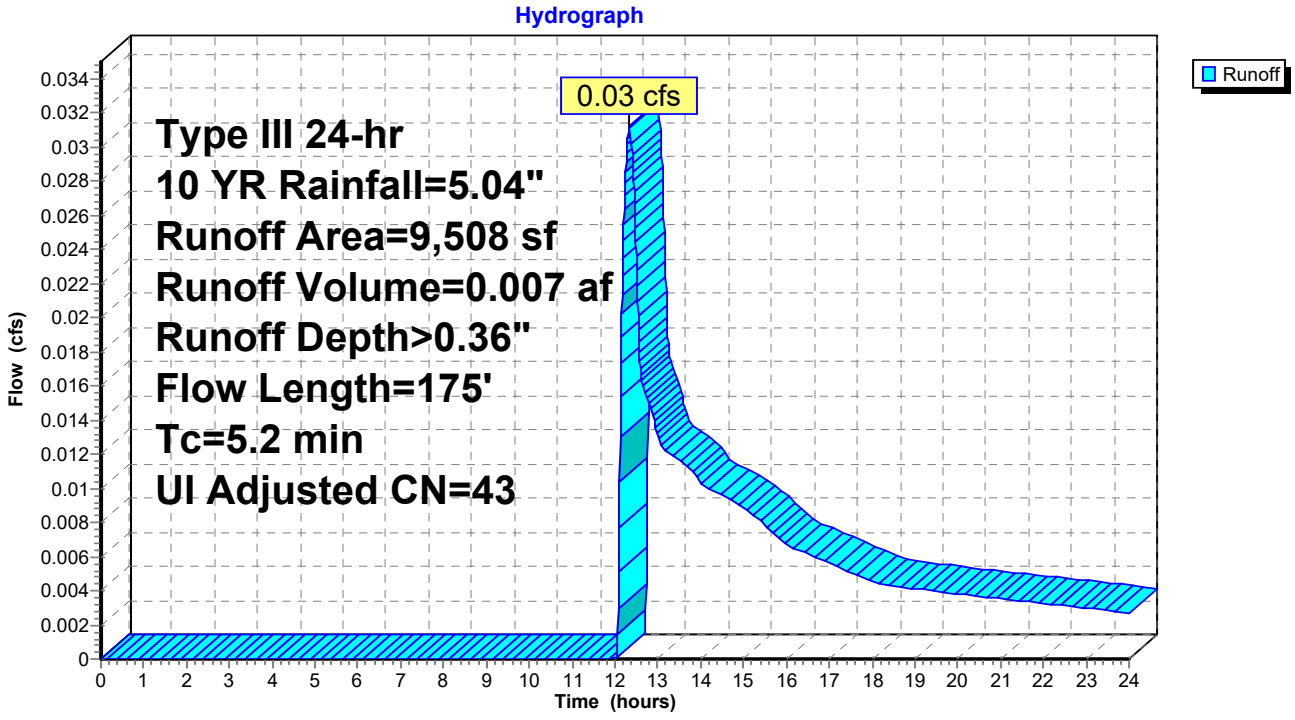
Runoff = 0.03 cfs @ 12.34 hrs, Volume= 0.007 af, Depth> 0.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=5.04"

Area (sf)	CN	Adj	Description
0	30		Woods, Good, HSG A
4,575	32		Woods/grass comb., Good, HSG A
3,021	39		>75% Grass cover, Good, HSG A
1,496	98		Unconnected roofs, HSG A
416	98		Paved parking, HSG A
9,508	47	43	Weighted Average, UI Adjusted
7,596			79.89% Pervious Area
1,912			20.11% Impervious Area
1,496			78.24% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	50	0.0322	0.18		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
0.7	125	0.0300	2.79		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
5.2	175	Total			

Subcatchment 16S: PR-DA1c



Summary for Subcatchment 17S: PR-DA1d

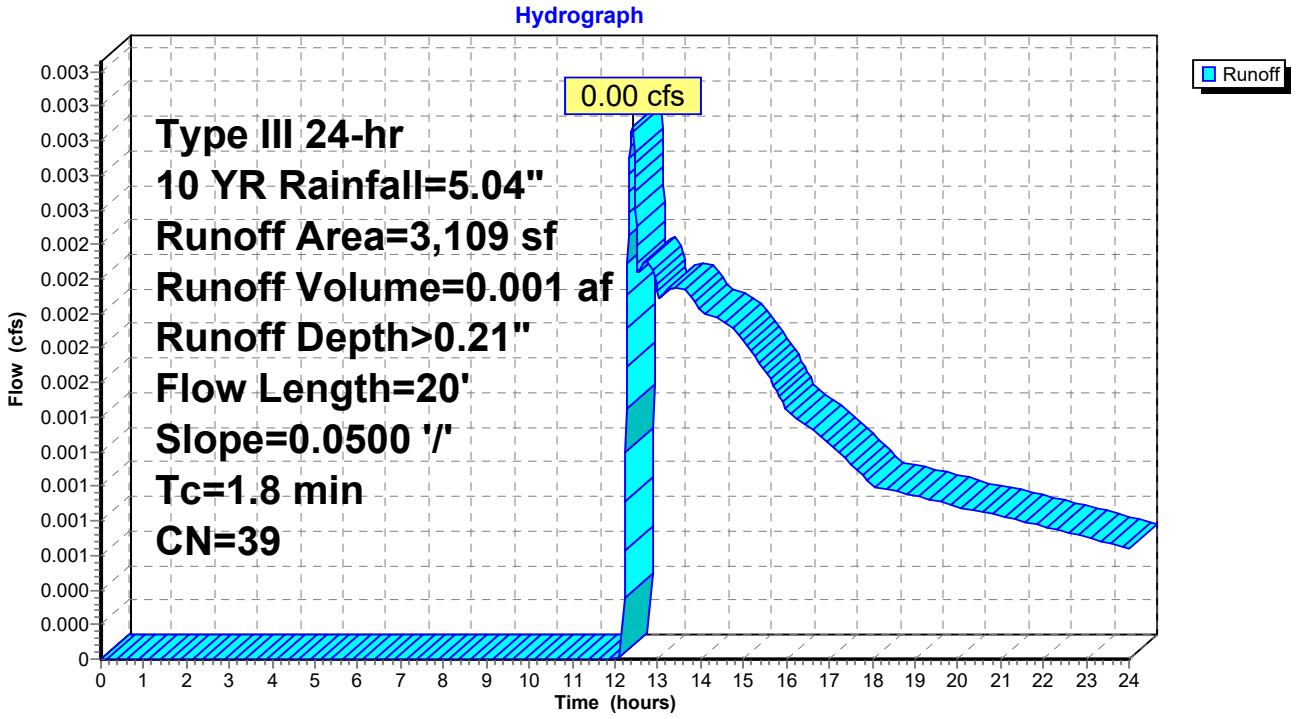
Runoff = 0.00 cfs @ 12.40 hrs, Volume= 0.001 af, Depth> 0.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=5.04"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
3,109	39	>75% Grass cover, Good, HSG A
0	98	Unconnected roofs, HSG A
0	98	Paved parking, HSG A
3,109	39	Weighted Average
3,109		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	20	0.0500	0.18		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"

Subcatchment 17S: PR-DA1d



Summary for Subcatchment 18S: PR-DA2b

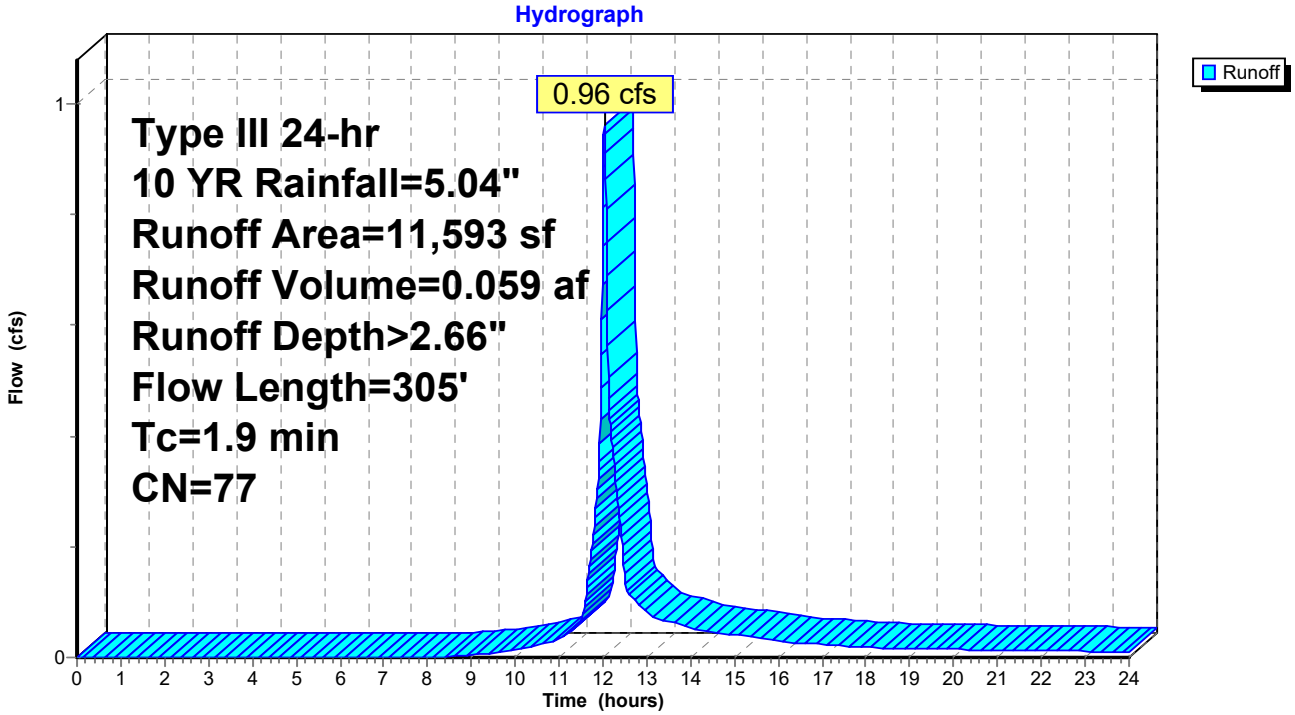
Runoff = 0.96 cfs @ 12.03 hrs, Volume= 0.059 af, Depth> 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=5.04"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
4,220	39	>75% Grass cover, Good, HSG A
0	98	Unconnected roofs, HSG A
7,373	98	Paved parking, HSG A
11,593	77	Weighted Average
4,220		36.40% Pervious Area
7,373		63.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.45		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.40"
1.3	255	0.0250	3.21		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.9	305	Total			

Subcatchment 18S: PR-DA2b



Summary for Subcatchment 19S: PR-DA2c

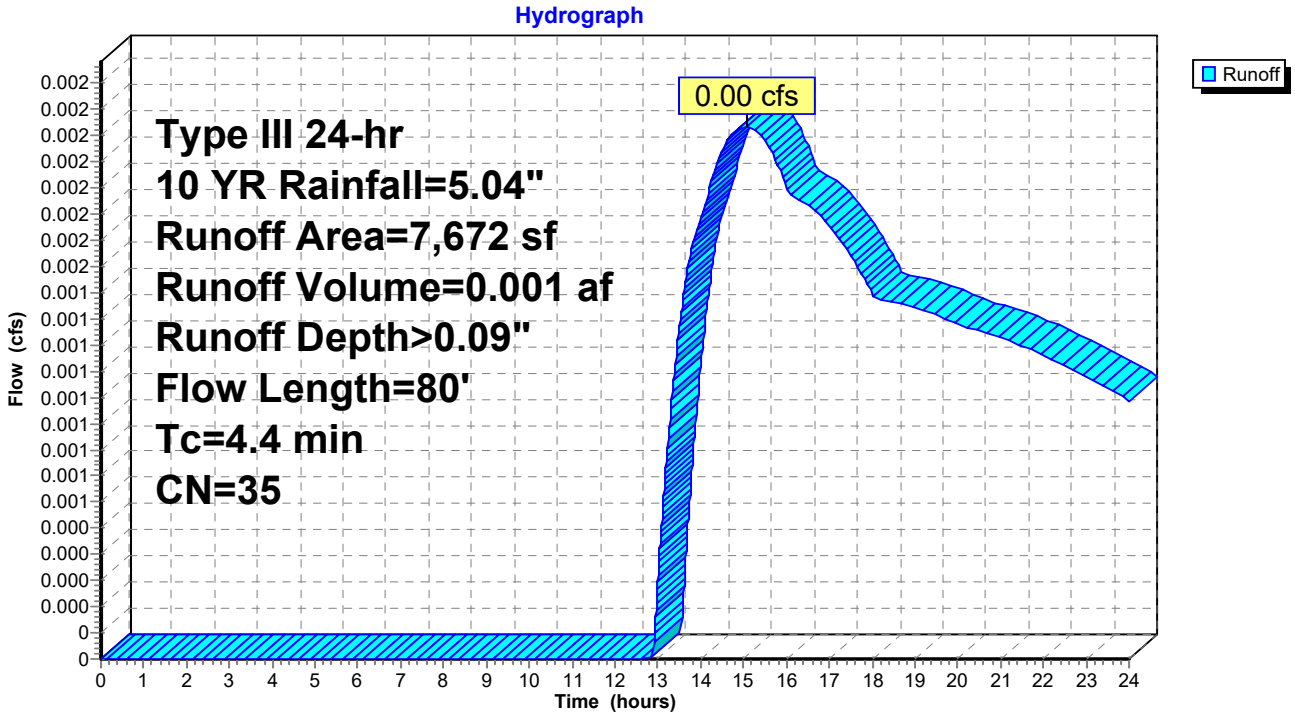
Runoff = 0.00 cfs @ 15.06 hrs, Volume= 0.001 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=5.04"

	Area (sf)	CN	Description
	0	30	Woods, Good, HSG A
	7,338	32	Woods/grass comb., Good, HSG A
	0	39	>75% Grass cover, Good, HSG A
	0	98	Unconnected roofs, HSG A
	334	98	Paved parking, HSG A
*	0	98	Gravel Area
	7,672	35	Weighted Average
	7,338		95.65% Pervious Area
	334		4.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	50	0.0460	0.21		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
0.5	30	0.0220	1.04		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
4.4	80	Total			

Subcatchment 19S: PR-DA2c



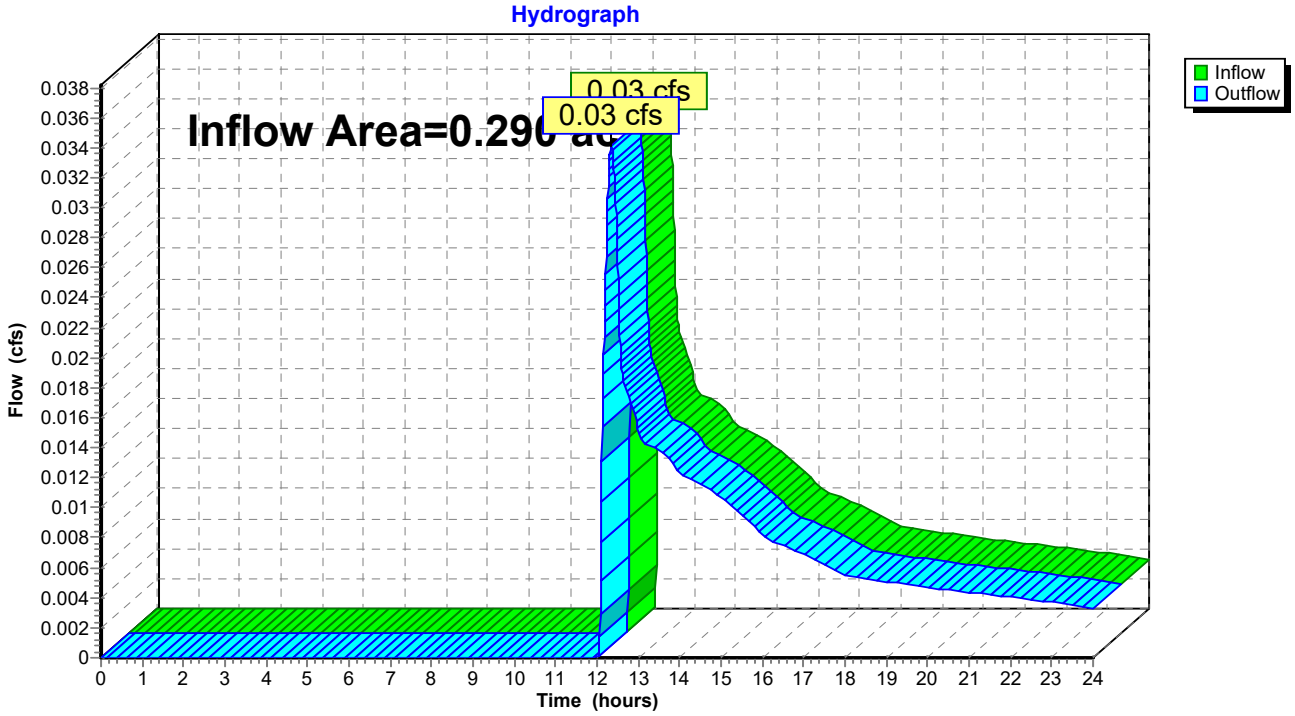
Summary for Reach 1R: DP-1

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

Inflow Area = 0.290 ac, 15.15% Impervious, Inflow Depth > 0.33" for 10 YR event
Inflow = 0.03 cfs @ 12.35 hrs, Volume= 0.008 af
Outflow = 0.03 cfs @ 12.35 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 1R: DP-1



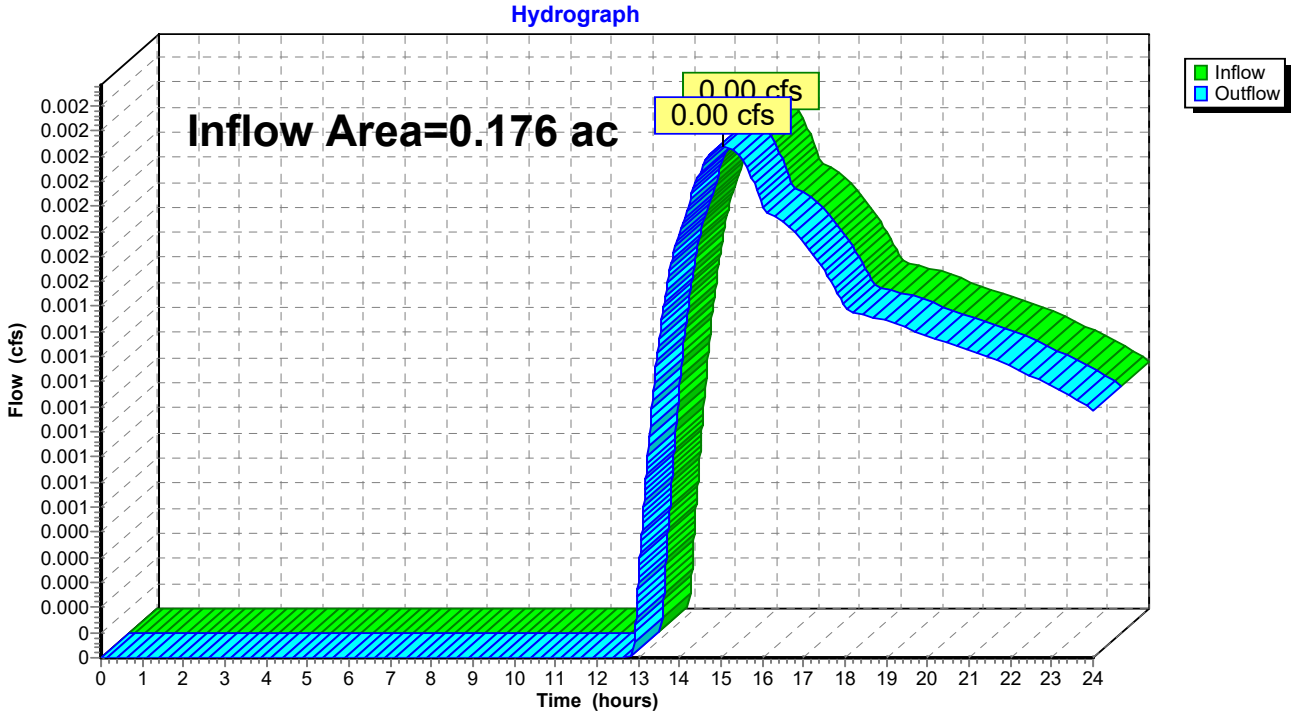
Summary for Reach 2R: DP-2

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

Inflow Area = 0.176 ac, 4.35% Impervious, Inflow Depth > 0.09" for 10 YR event
Inflow = 0.00 cfs @ 15.06 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 15.06 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 2R: DP-2



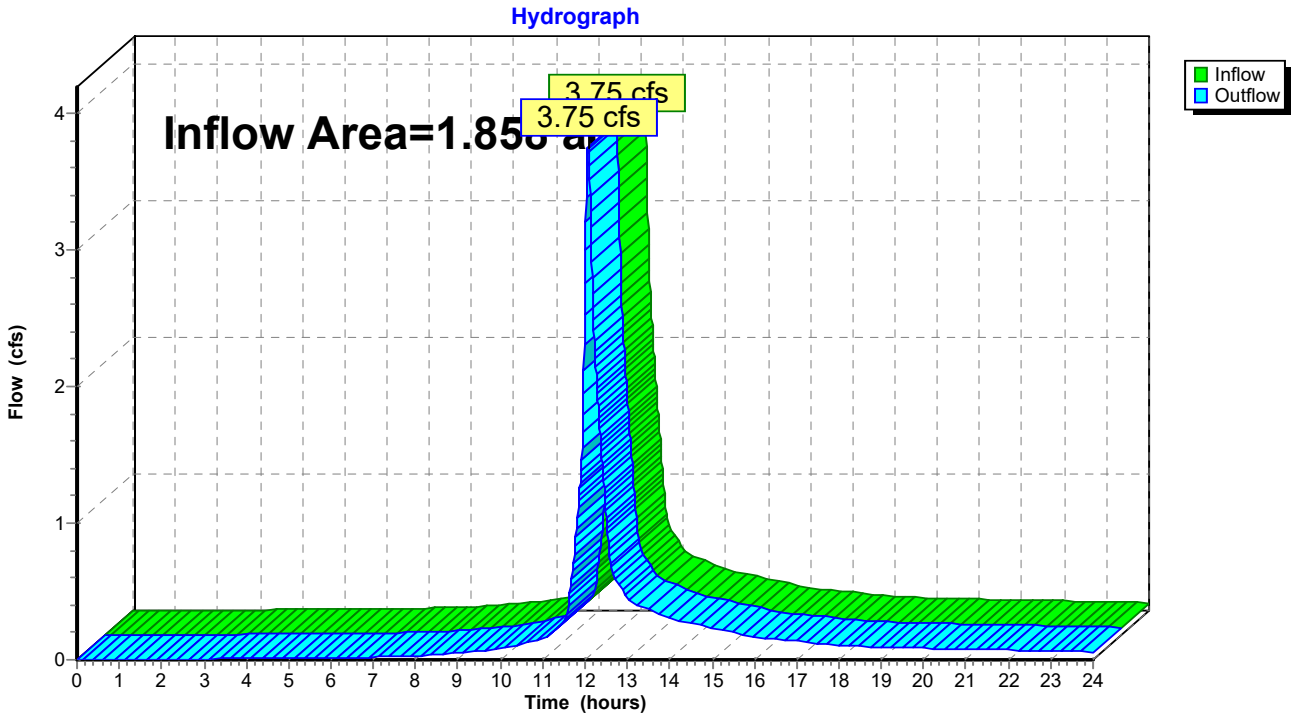
Summary for Reach 4R: 1R

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

Inflow Area = 1.858 ac, 51.62% Impervious, Inflow Depth > 2.08" for 10 YR event
Inflow = 3.75 cfs @ 12.07 hrs, Volume= 0.323 af
Outflow = 3.75 cfs @ 12.07 hrs, Volume= 0.323 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 4R: 1R



Summary for Pond 3P: SC-740 FIELD

Inflow Area = 1.858 ac, 51.62% Impervious, Inflow Depth > 2.08" for 10 YR event
Inflow = 3.75 cfs @ 12.07 hrs, Volume= 0.323 af
Outflow = 0.85 cfs @ 11.80 hrs, Volume= 0.323 af, Atten= 77%, Lag= 0.0 min
Discarded = 0.85 cfs @ 11.80 hrs, Volume= 0.323 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 17.44' @ 12.55 hrs Surf.Area= 4,465 sf Storage= 3,203 cf

Plug-Flow detention time= 21.4 min calculated for 0.322 af (100% of inflow)
Center-of-Mass det. time= 21.2 min (844.3 - 823.1)

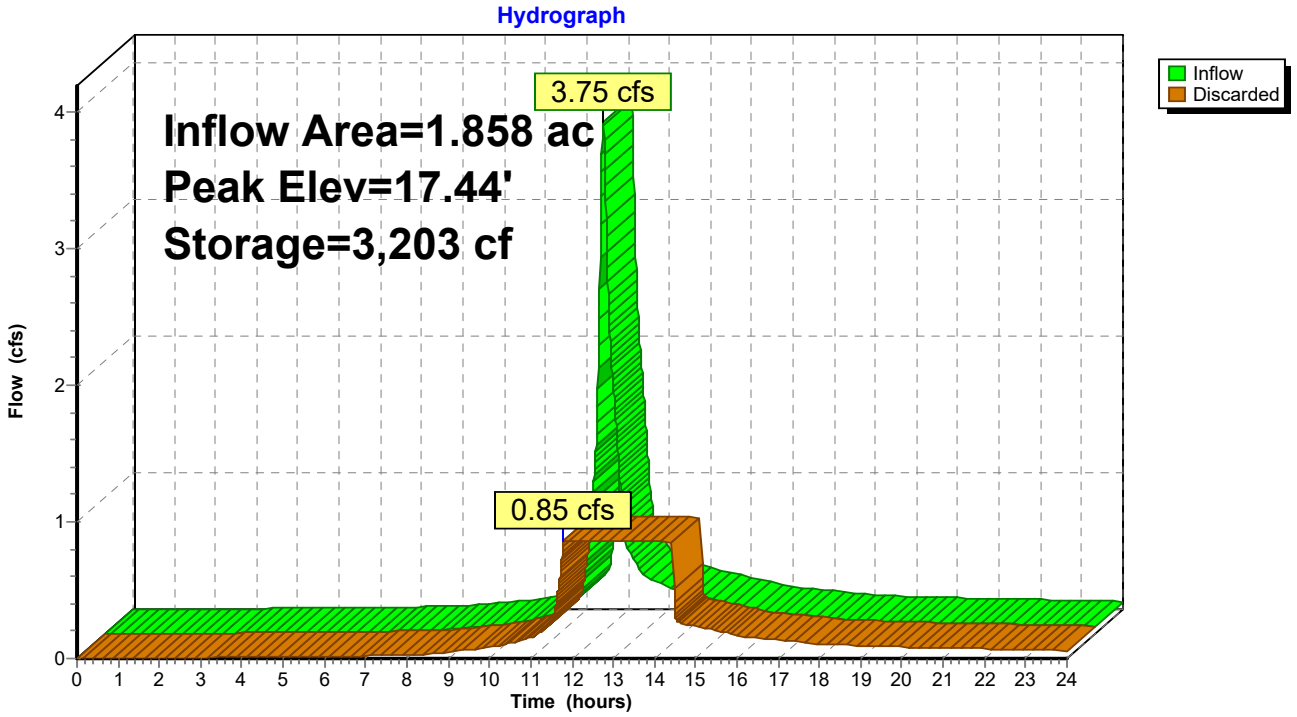
Volume	Invert	Avail.Storage	Storage Description
#1	16.30'	4,101 cf	**Stone (Prismatic)** Listed below (Recalc) 15,628 cf Overall - 5,375 cf Embedded = 10,253 cf x 40.0% Voids
#2	16.80'	5,375 cf	**ADS_StormTech SC-740 +Cap** x 117 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 9 Rows of 13 Chambers
		9,476 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
16.30	4,465	0	0
19.80	4,465	15,628	15,628

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.30'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.85 cfs @ 11.80 hrs HW=16.34' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.85 cfs)

Pond 3P: SC-740 FIELD



Summary for Pond 13P: 1000 GAL LP

Inflow Area = 0.194 ac,100.00% Impervious, Inflow Depth > 4.80" for 10 YR event
Inflow = 1.07 cfs @ 12.04 hrs, Volume= 0.078 af
Outflow = 0.11 cfs @ 11.54 hrs, Volume= 0.078 af, Atten= 90%, Lag= 0.0 min
Discarded = 0.11 cfs @ 11.54 hrs, Volume= 0.078 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 23.74' @ 12.62 hrs Surf.Area= 580 sf Storage= 1,044 cf

Plug-Flow detention time= 58.9 min calculated for 0.078 af (100% of inflow)
Center-of-Mass det. time= 58.6 min (803.5 - 744.8)

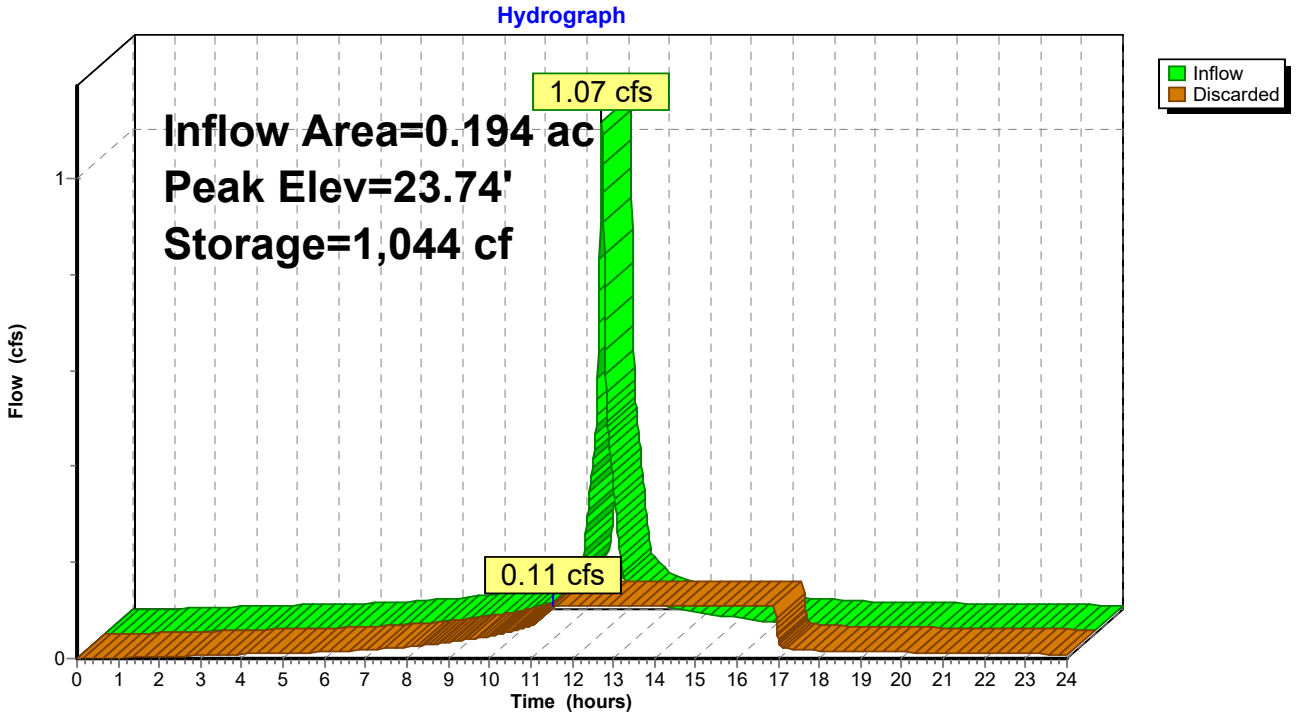
Volume	Invert	Avail.Storage	Storage Description
#1	20.33'	1,188 cf	**Stone (Prismatic)** Listed below (Recalc) 4,159 cf Overall - 1,188 cf Embedded = 2,971 cf x 40.0% Voids
#2	20.83'	998 cf	**5.50'D x 6.00'H 1000 GAL LP** x 7 Inside #1 1,188 cf Overall - 3.0" Wall Thickness = 998 cf
		2,186 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
20.33	580	0	0
27.50	580	4,159	4,159

Device	Routing	Invert	Outlet Devices
#1	Discarded	20.33'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.11 cfs @ 11.54 hrs HW=20.40' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Pond 13P: 1000 GAL LP



Summary for Pond 15P: 1000 GAL LP

Inflow Area = 0.155 ac,100.00% Impervious, Inflow Depth > 4.80" for 10 YR event
Inflow = 0.85 cfs @ 12.04 hrs, Volume= 0.062 af
Outflow = 0.08 cfs @ 11.43 hrs, Volume= 0.062 af, Atten= 91%, Lag= 0.0 min
Discarded = 0.08 cfs @ 11.43 hrs, Volume= 0.062 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 24.74' @ 12.73 hrs Surf.Area= 420 sf Storage= 869 cf

Plug-Flow detention time= 70.1 min calculated for 0.062 af (100% of inflow)
Center-of-Mass det. time= 69.9 min (814.7 - 744.8)

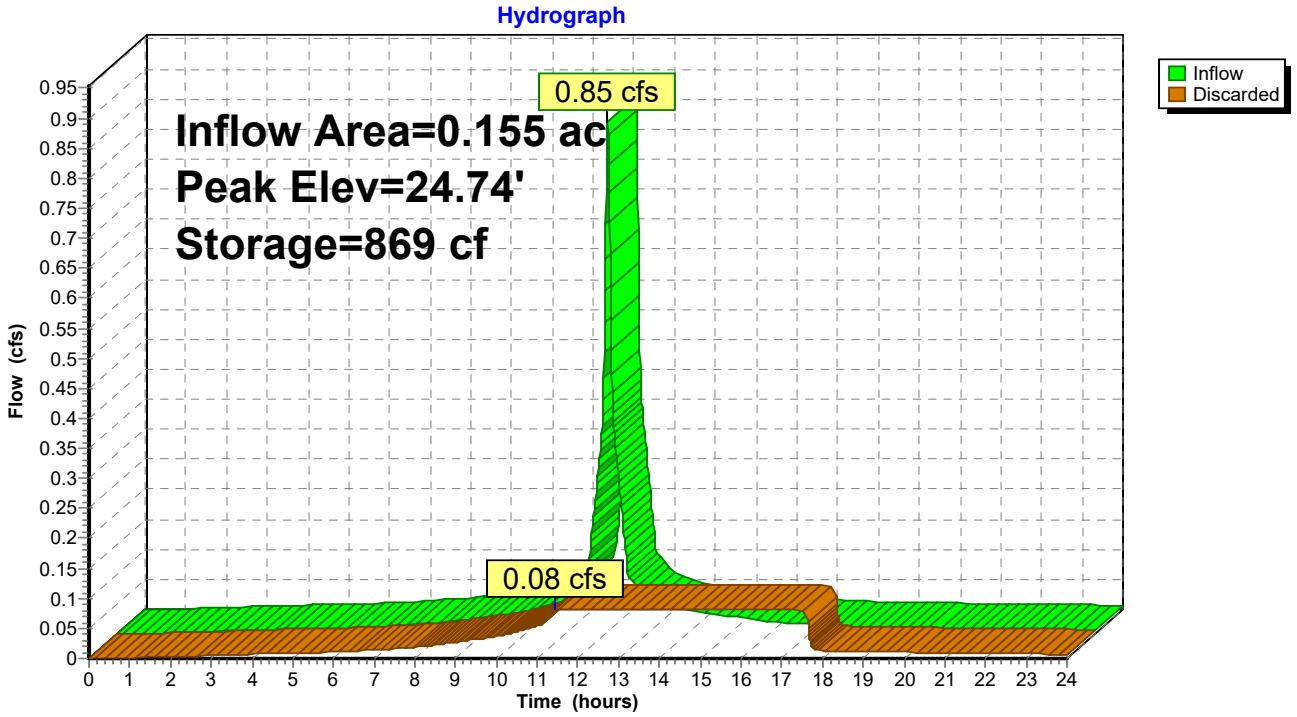
Volume	Invert	Avail.Storage	Storage Description
#1	20.83'	865 cf	**Stone (Prismatic)** Listed below (Recalc) 3,011 cf Overall - 848 cf Embedded = 2,163 cf x 40.0% Voids
#2	21.33'	713 cf	**5.50'D x 6.00'H 1000 GAL LP** x 5 Inside #1 848 cf Overall - 3.0" Wall Thickness = 713 cf
		1,578 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
20.83	420	0	0
28.00	420	3,011	3,011

Device	Routing	Invert	Outlet Devices
#1	Discarded	20.83'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.08 cfs @ 11.43 hrs HW=20.90' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Pond 15P: 1000 GAL LP



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 3S: PR-DA1a Runoff Area=13,444 sf 67.35% Impervious Runoff Depth>3.61"
Flow Length=175' Tc=6.2 min CN=78 Runoff=1.30 cfs 0.093 af

Subcatchment 4S: PR-DA1b Runoff Area=3,615 sf 83.40% Impervious Runoff Depth>4.66"
Flow Length=70' Slope=0.0830 '/' Tc=0.5 min CN=88 Runoff=0.53 cfs 0.032 af

Subcatchment 5S: PR-DA-R2 Runoff Area=8,465 sf 100.00% Impervious Runoff Depth>5.80"
Tc=3.0 min CN=98 Runoff=1.28 cfs 0.094 af

Subcatchment 6S: PR-DA-R1 Runoff Area=7,860 sf 100.00% Impervious Runoff Depth>5.80"
Tc=5.0 min CN=98 Runoff=1.11 cfs 0.087 af

Subcatchment 7S: PR-DA2a Runoff Area=44,443 sf 32.60% Impervious Runoff Depth>1.70"
Flow Length=395' Tc=8.4 min CN=57 Runoff=1.71 cfs 0.144 af

Subcatchment 8S: PR-DA-R3 Runoff Area=6,758 sf 100.00% Impervious Runoff Depth>5.80"
Tc=3.0 min CN=98 Runoff=1.02 cfs 0.075 af

Subcatchment 16S: PR-DA1c Runoff Area=9,508 sf 20.11% Impervious Runoff Depth>0.69"
Flow Length=175' Tc=5.2 min UI Adjusted CN=43 Runoff=0.09 cfs 0.013 af

Subcatchment 17S: PR-DA1d Runoff Area=3,109 sf 0.00% Impervious Runoff Depth>0.46"
Flow Length=20' Slope=0.0500 '/' Tc=1.8 min CN=39 Runoff=0.01 cfs 0.003 af

Subcatchment 18S: PR-DA2b Runoff Area=11,593 sf 63.60% Impervious Runoff Depth>3.51"
Flow Length=305' Tc=1.9 min CN=77 Runoff=1.27 cfs 0.078 af

Subcatchment 19S: PR-DA2c Runoff Area=7,672 sf 4.35% Impervious Runoff Depth>0.26"
Flow Length=80' Tc=4.4 min CN=35 Runoff=0.01 cfs 0.004 af

Reach 1R: DP-1 Inflow=0.10 cfs 0.015 af
Outflow=0.10 cfs 0.015 af

Reach 2R: DP-2 Inflow=0.01 cfs 0.004 af
Outflow=0.01 cfs 0.004 af

Reach 4R: 1R Inflow=5.13 cfs 0.434 af
Outflow=5.13 cfs 0.434 af

Pond 3P: SC-740 FIELD Peak Elev=18.09' Storage=5,376 cf Inflow=5.13 cfs 0.434 af
Outflow=0.85 cfs 0.434 af

Pond 13P: 1000 GAL LP Peak Elev=24.72' Storage=1,357 cf Inflow=1.28 cfs 0.094 af
Outflow=0.11 cfs 0.094 af

Pond 15P: 1000 GAL LP Peak Elev=25.88' Storage=1,130 cf Inflow=1.02 cfs 0.075 af
Outflow=0.08 cfs 0.075 af

Total Runoff Area = 2.674 ac Runoff Volume = 0.622 af Average Runoff Depth = 2.79"
49.12% Pervious = 1.313 ac 50.88% Impervious = 1.360 ac

Summary for Subcatchment 3S: PR-DA1a

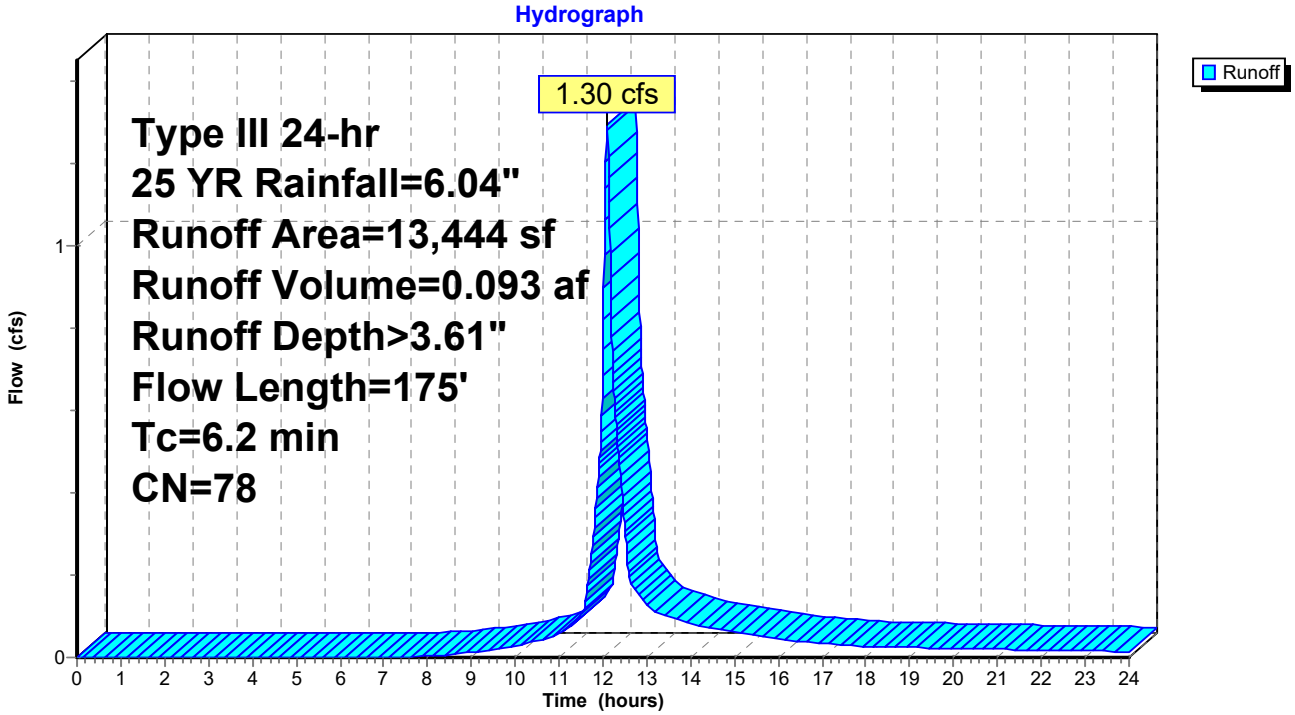
Runoff = 1.30 cfs @ 12.09 hrs, Volume= 0.093 af, Depth> 3.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=6.04"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
575	32	Woods/grass comb., Good, HSG A
3,814	39	>75% Grass cover, Good, HSG A
0	98	Unconnected roofs, HSG A
9,055	98	Paved parking, HSG A
13,444	78	Weighted Average
4,389		32.65% Pervious Area
9,055		67.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	35	0.0100	0.11		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
0.8	140	0.0220	3.01		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
6.2	175	Total			

Subcatchment 3S: PR-DA1a



Summary for Subcatchment 4S: PR-DA1b

[49] Hint: Tc<2dt may require smaller dt

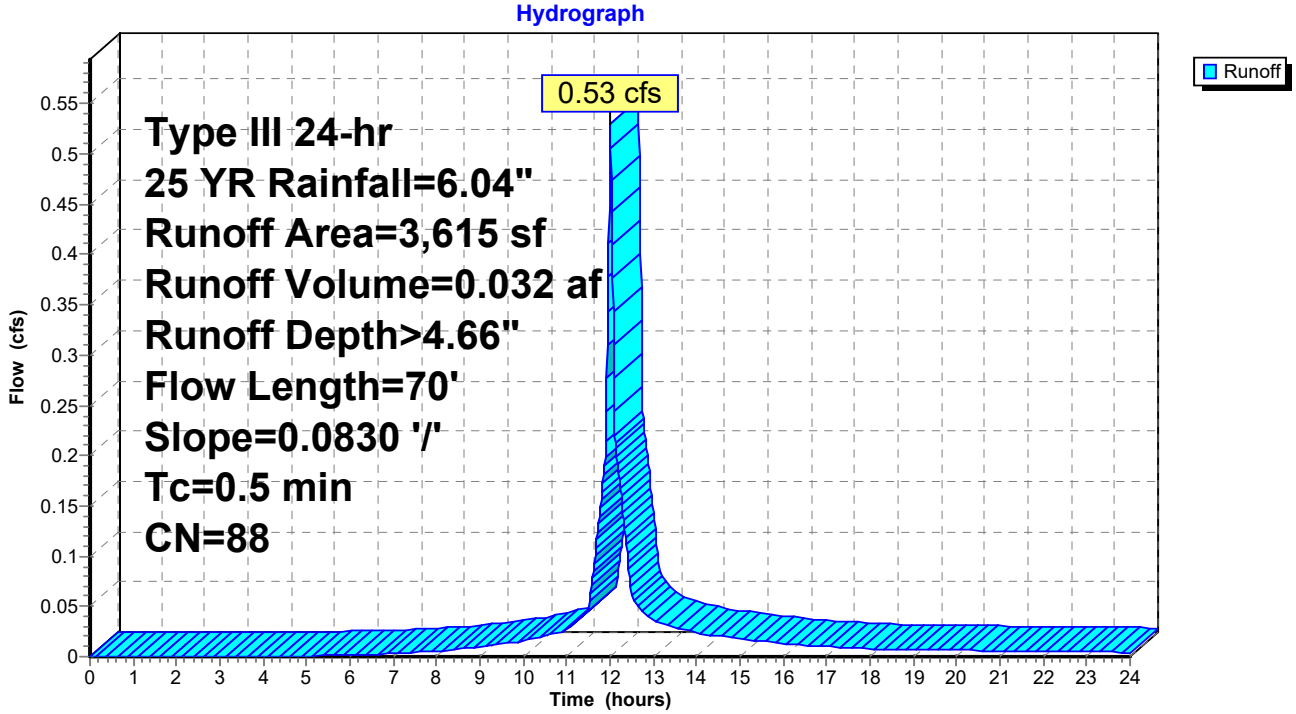
Runoff = 0.53 cfs @ 12.01 hrs, Volume= 0.032 af, Depth> 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=6.04"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
600	39	>75% Grass cover, Good, HSG A
0	98	Unconnected roofs, HSG A
3,015	98	Paved parking, HSG A
3,615	88	Weighted Average
600		16.60% Pervious Area
3,015		83.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	70	0.0830	2.33		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.40"

Subcatchment 4S: PR-DA1b



Summary for Subcatchment 5S: PR-DA-R2

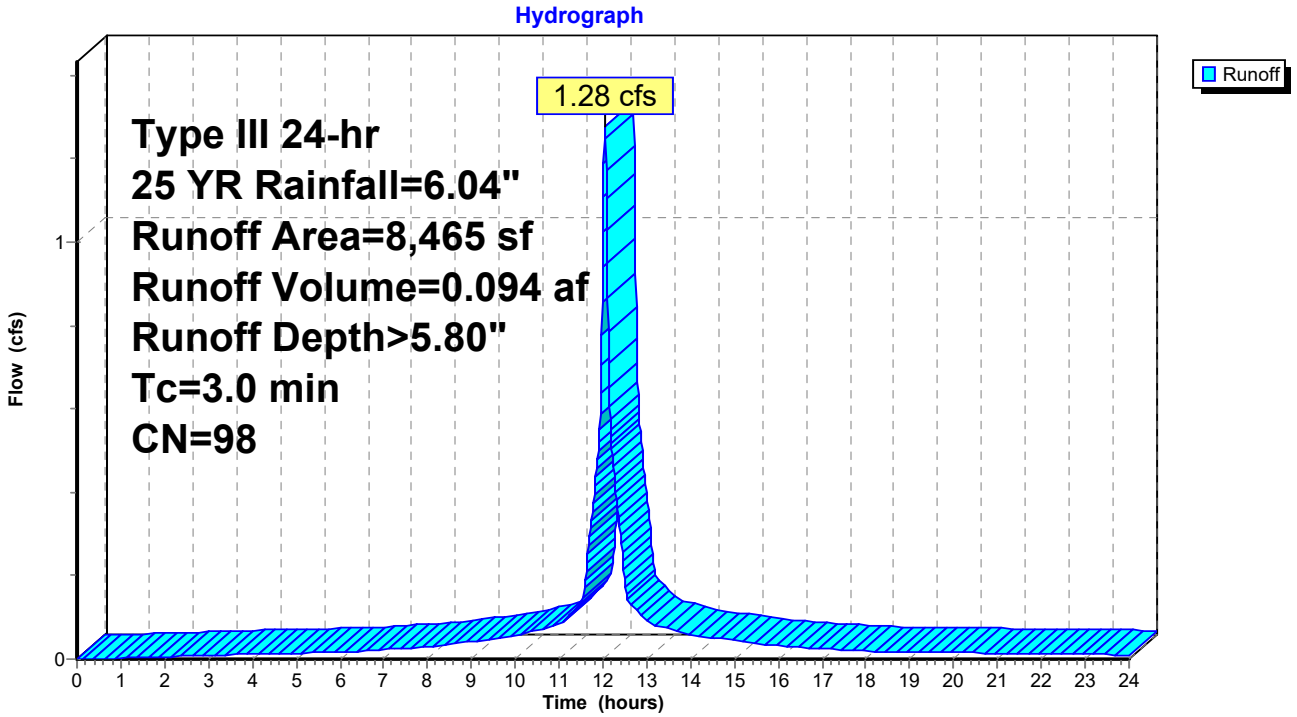
Runoff = 1.28 cfs @ 12.04 hrs, Volume= 0.094 af, Depth> 5.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=6.04"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
0	39	>75% Grass cover, Good, HSG A
8,465	98	Unconnected roofs, HSG A
0	98	Paved parking, HSG A
8,465	98	Weighted Average
8,465		100.00% Impervious Area
8,465		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry, Roof Leader**

Subcatchment 5S: PR-DA-R2



Summary for Subcatchment 6S: PR-DA-R1

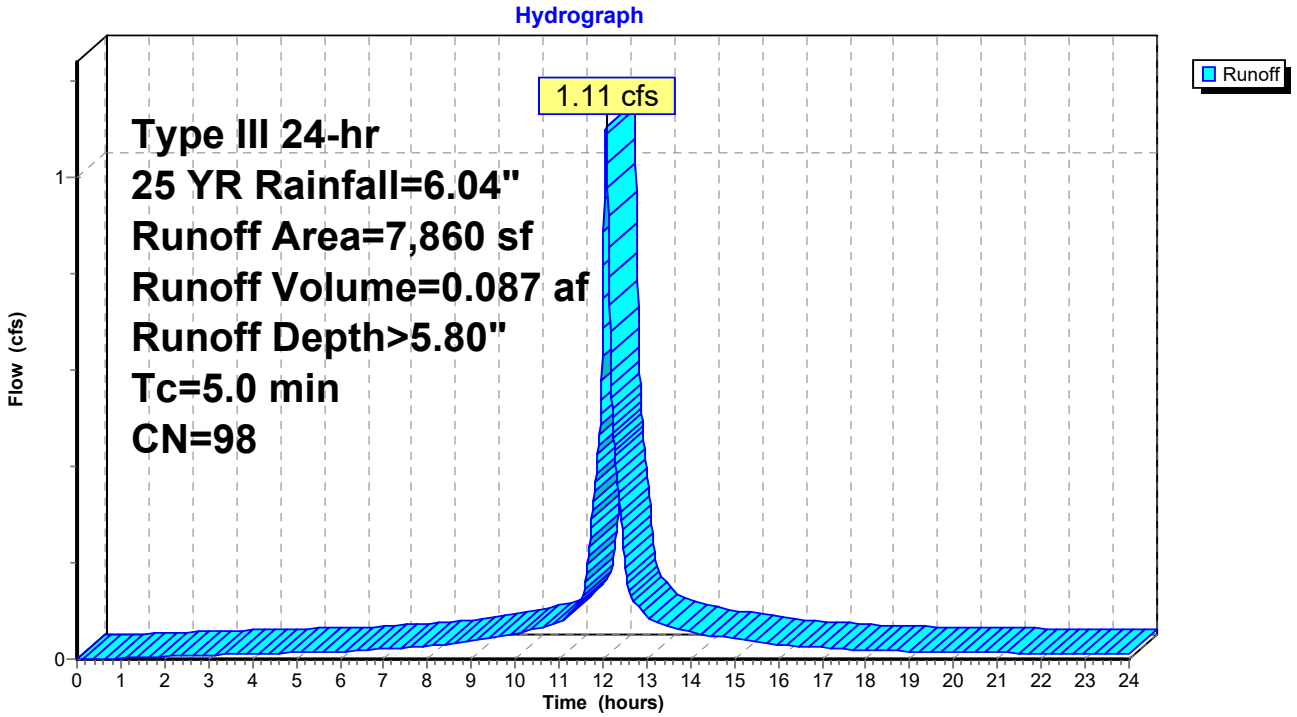
Runoff = 1.11 cfs @ 12.07 hrs, Volume= 0.087 af, Depth> 5.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=6.04"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
0	39	>75% Grass cover, Good, HSG A
7,860	98	Unconnected roofs, HSG A
0	98	Paved parking, HSG A
7,860	98	Weighted Average
7,860		100.00% Impervious Area
7,860		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Roof Leader**

Subcatchment 6S: PR-DA-R1



Summary for Subcatchment 7S: PR-DA2a

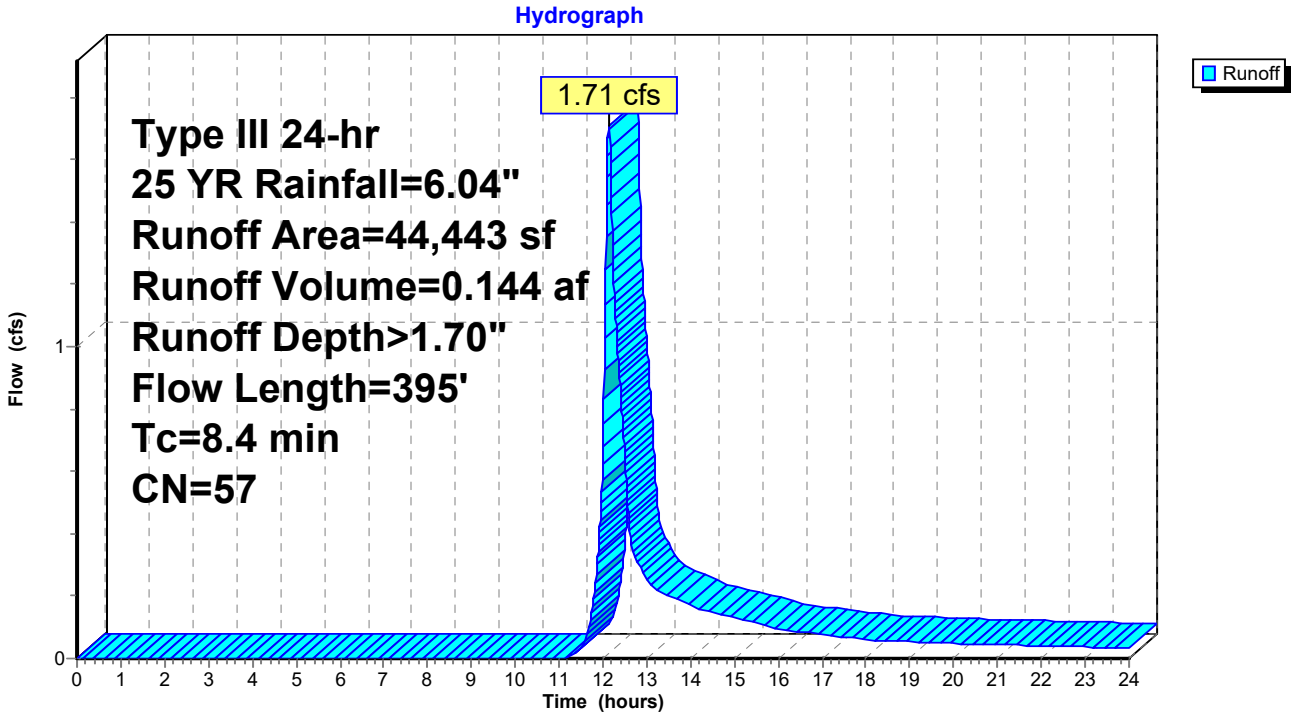
Runoff = 1.71 cfs @ 12.13 hrs, Volume= 0.144 af, Depth> 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=6.04"

	Area (sf)	CN	Description
	365	30	Woods, Good, HSG A
	4,535	32	Woods/grass comb., Good, HSG A
	25,054	39	>75% Grass cover, Good, HSG A
	2,099	98	Unconnected roofs, HSG A
	11,222	98	Paved parking, HSG A
*	1,168	98	Gravel Areas
	44,443	57	Weighted Average
	29,954		67.40% Pervious Area
	14,489		32.60% Impervious Area
	2,099		14.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0200	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
2.0	120	0.0200	0.99		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.9	225	0.0410	4.11		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
8.4	395	Total			

Subcatchment 7S: PR-DA2a



Summary for Subcatchment 8S: PR-DA-R3

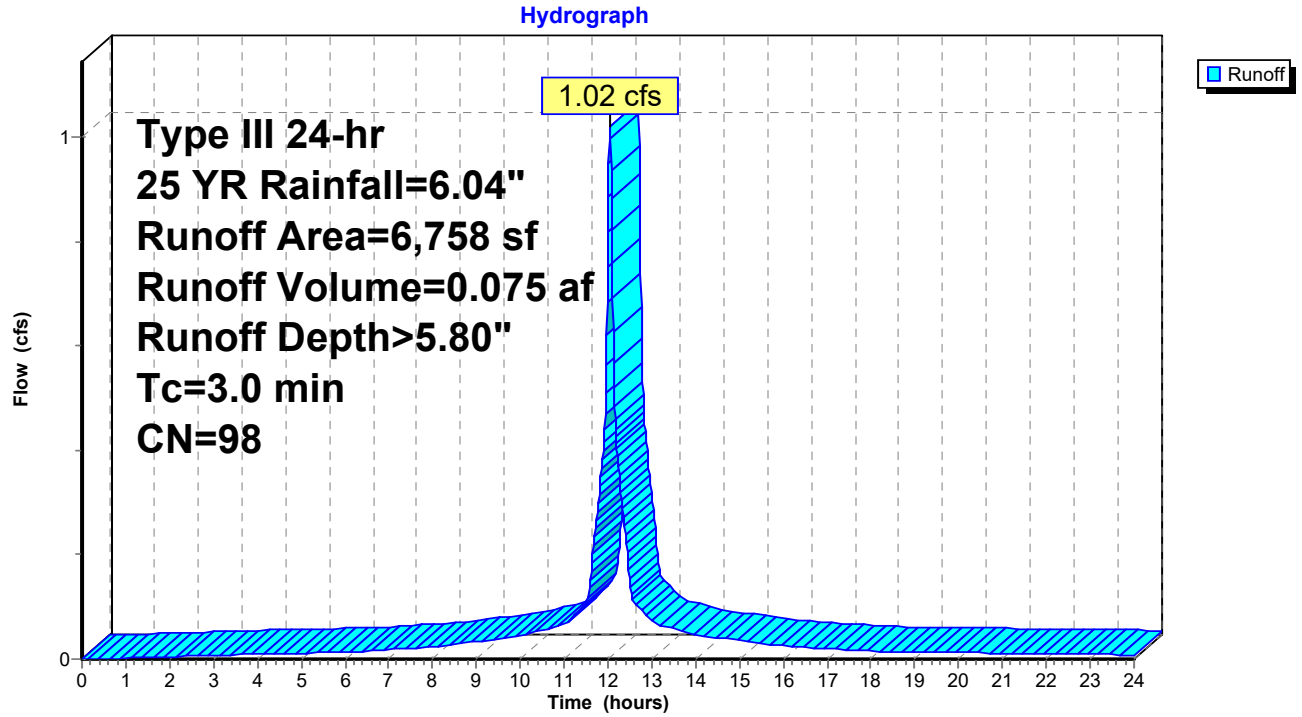
Runoff = 1.02 cfs @ 12.04 hrs, Volume= 0.075 af, Depth> 5.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=6.04"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
0	39	>75% Grass cover, Good, HSG A
6,758	98	Unconnected roofs, HSG A
0	98	Paved parking, HSG A
6,758	98	Weighted Average
6,758		100.00% Impervious Area
6,758		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry, Roof Leader**

Subcatchment 8S: PR-DA-R3



Summary for Subcatchment 16S: PR-DA1c

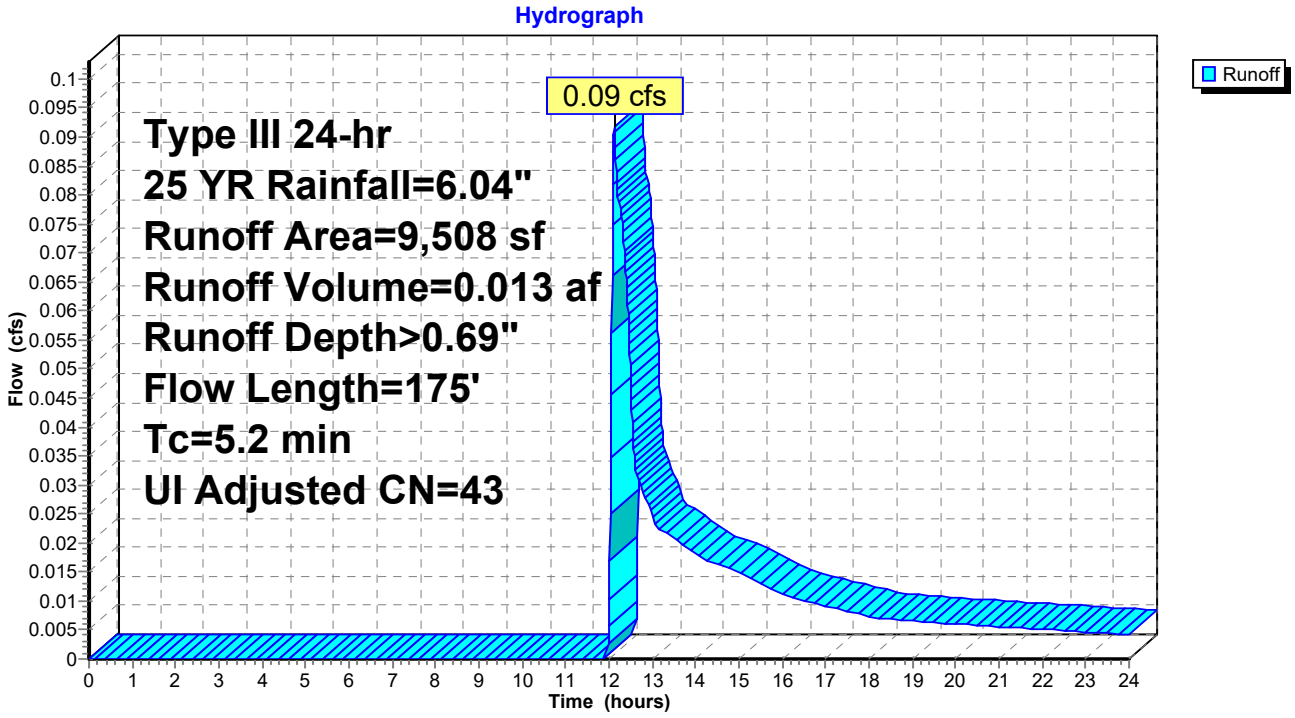
Runoff = 0.09 cfs @ 12.12 hrs, Volume= 0.013 af, Depth> 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=6.04"

Area (sf)	CN	Adj	Description
0	30		Woods, Good, HSG A
4,575	32		Woods/grass comb., Good, HSG A
3,021	39		>75% Grass cover, Good, HSG A
1,496	98		Unconnected roofs, HSG A
416	98		Paved parking, HSG A
9,508	47	43	Weighted Average, UI Adjusted
7,596			79.89% Pervious Area
1,912			20.11% Impervious Area
1,496			78.24% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	50	0.0322	0.18		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
0.7	125	0.0300	2.79		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
5.2	175	Total			

Subcatchment 16S: PR-DA1c



Summary for Subcatchment 17S: PR-DA1d

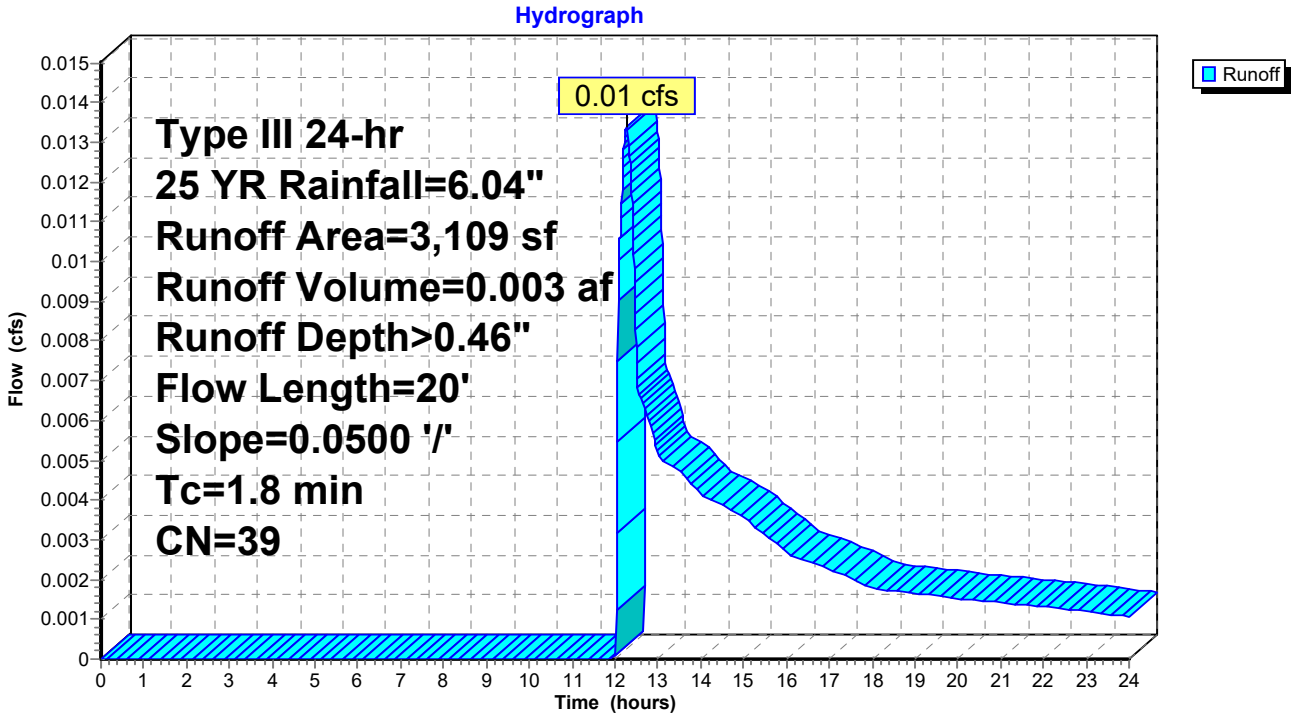
Runoff = 0.01 cfs @ 12.27 hrs, Volume= 0.003 af, Depth> 0.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=6.04"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
3,109	39	>75% Grass cover, Good, HSG A
0	98	Unconnected roofs, HSG A
0	98	Paved parking, HSG A
3,109	39	Weighted Average
3,109		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	20	0.0500	0.18		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"

Subcatchment 17S: PR-DA1d



Summary for Subcatchment 18S: PR-DA2b

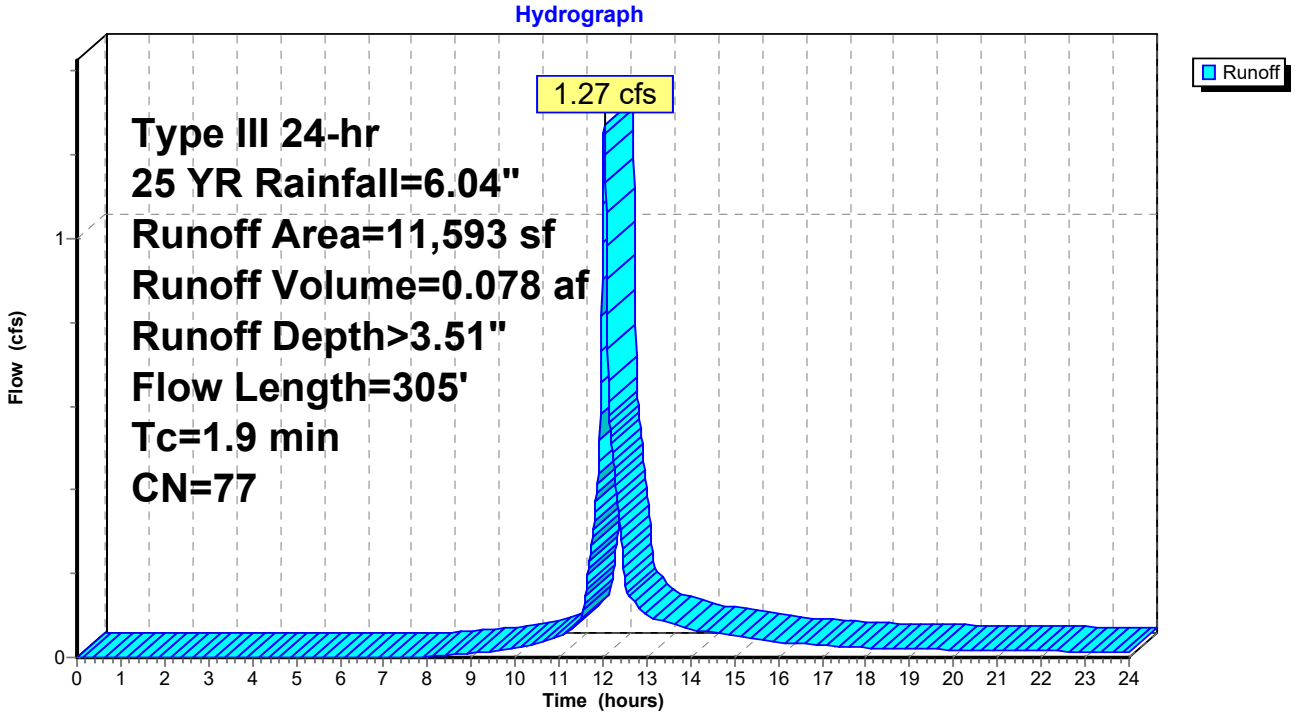
Runoff = 1.27 cfs @ 12.03 hrs, Volume= 0.078 af, Depth> 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=6.04"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
4,220	39	>75% Grass cover, Good, HSG A
0	98	Unconnected roofs, HSG A
7,373	98	Paved parking, HSG A
11,593	77	Weighted Average
4,220		36.40% Pervious Area
7,373		63.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.45		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.40"
1.3	255	0.0250	3.21		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.9	305	Total			

Subcatchment 18S: PR-DA2b



Summary for Subcatchment 19S: PR-DA2c

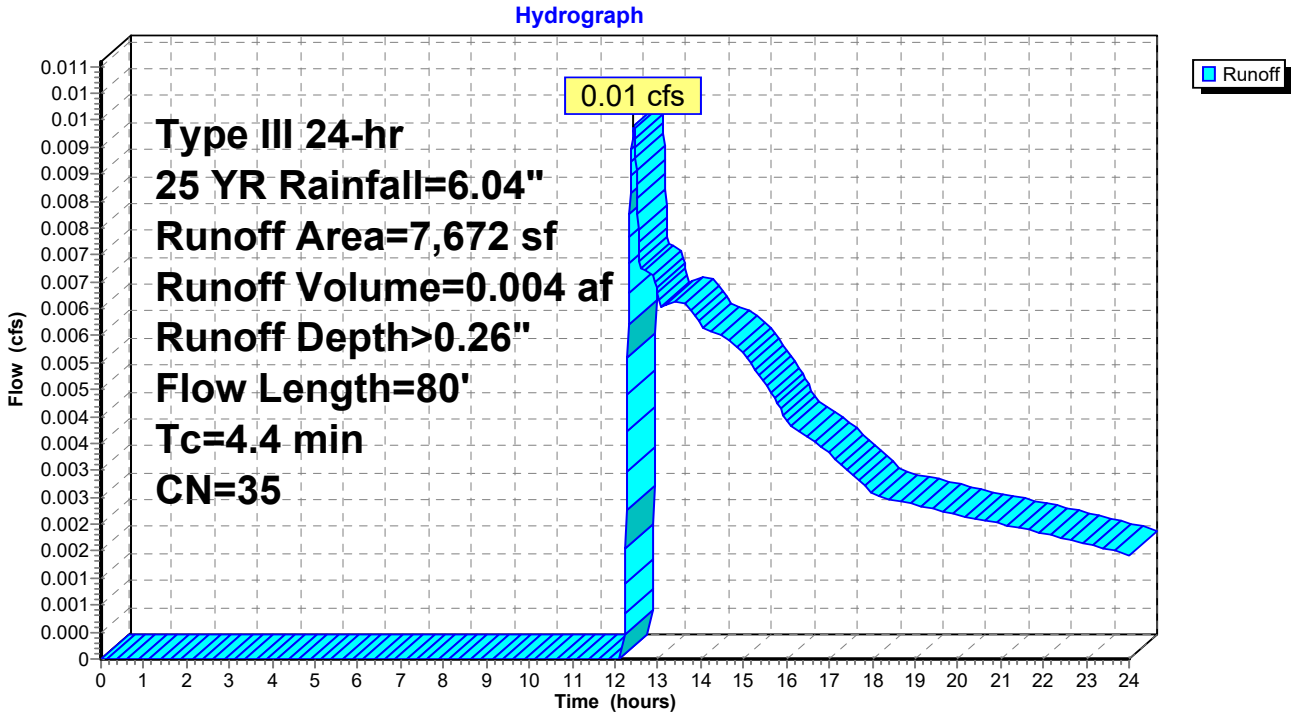
Runoff = 0.01 cfs @ 12.43 hrs, Volume= 0.004 af, Depth> 0.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=6.04"

	Area (sf)	CN	Description
	0	30	Woods, Good, HSG A
	7,338	32	Woods/grass comb., Good, HSG A
	0	39	>75% Grass cover, Good, HSG A
	0	98	Unconnected roofs, HSG A
	334	98	Paved parking, HSG A
*	0	98	Gravel Area
	7,672	35	Weighted Average
	7,338		95.65% Pervious Area
	334		4.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	50	0.0460	0.21		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
0.5	30	0.0220	1.04		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
4.4	80	Total			

Subcatchment 19S: PR-DA2c



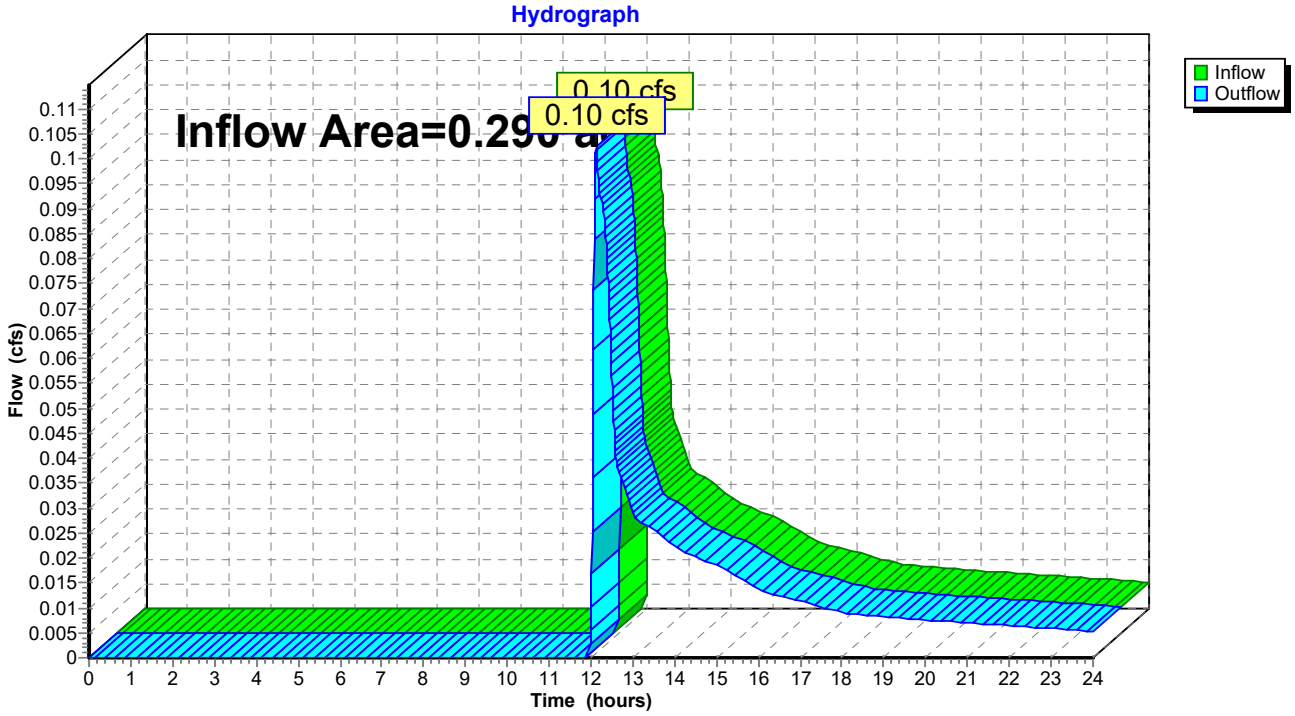
Summary for Reach 1R: DP-1

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

Inflow Area = 0.290 ac, 15.15% Impervious, Inflow Depth > 0.63" for 25 YR event
Inflow = 0.10 cfs @ 12.12 hrs, Volume= 0.015 af
Outflow = 0.10 cfs @ 12.12 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 1R: DP-1



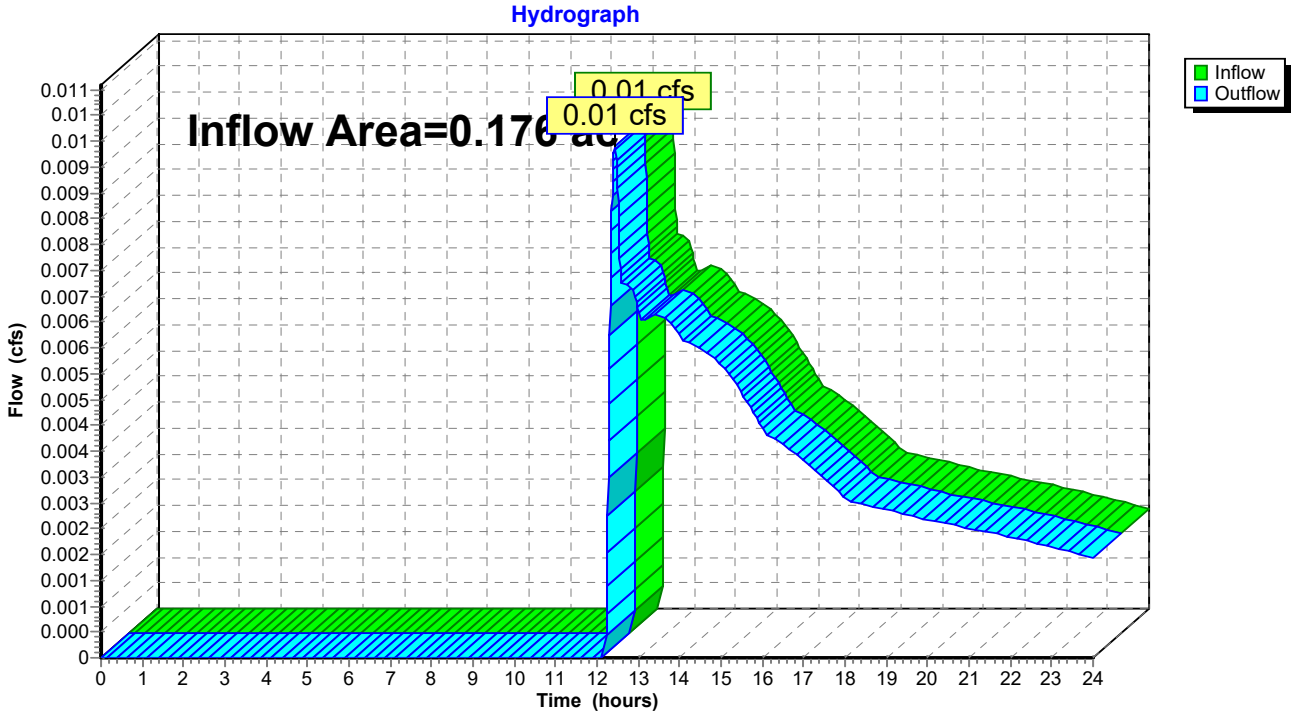
Summary for Reach 2R: DP-2

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

Inflow Area = 0.176 ac, 4.35% Impervious, Inflow Depth > 0.26" for 25 YR event
Inflow = 0.01 cfs @ 12.43 hrs, Volume= 0.004 af
Outflow = 0.01 cfs @ 12.43 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 2R: DP-2



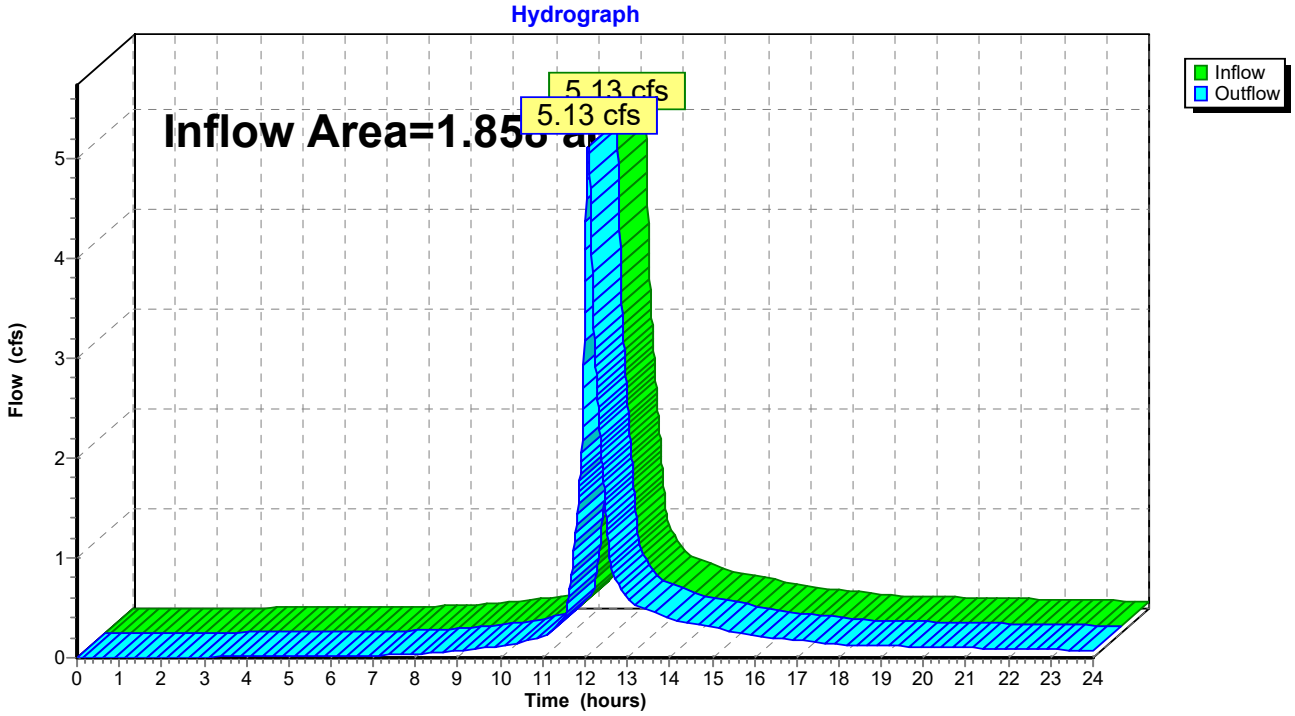
Summary for Reach 4R: 1R

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

Inflow Area = 1.858 ac, 51.62% Impervious, Inflow Depth > 2.81" for 25 YR event
Inflow = 5.13 cfs @ 12.08 hrs, Volume= 0.434 af
Outflow = 5.13 cfs @ 12.08 hrs, Volume= 0.434 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 4R: 1R



Summary for Pond 3P: SC-740 FIELD

Inflow Area = 1.858 ac, 51.62% Impervious, Inflow Depth > 2.81" for 25 YR event
Inflow = 5.13 cfs @ 12.08 hrs, Volume= 0.434 af
Outflow = 0.85 cfs @ 11.71 hrs, Volume= 0.434 af, Atten= 83%, Lag= 0.0 min
Discarded = 0.85 cfs @ 11.71 hrs, Volume= 0.434 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 18.09' @ 12.66 hrs Surf.Area= 4,465 sf Storage= 5,376 cf

Plug-Flow detention time= 42.4 min calculated for 0.434 af (100% of inflow)
Center-of-Mass det. time= 42.2 min (860.6 - 818.4)

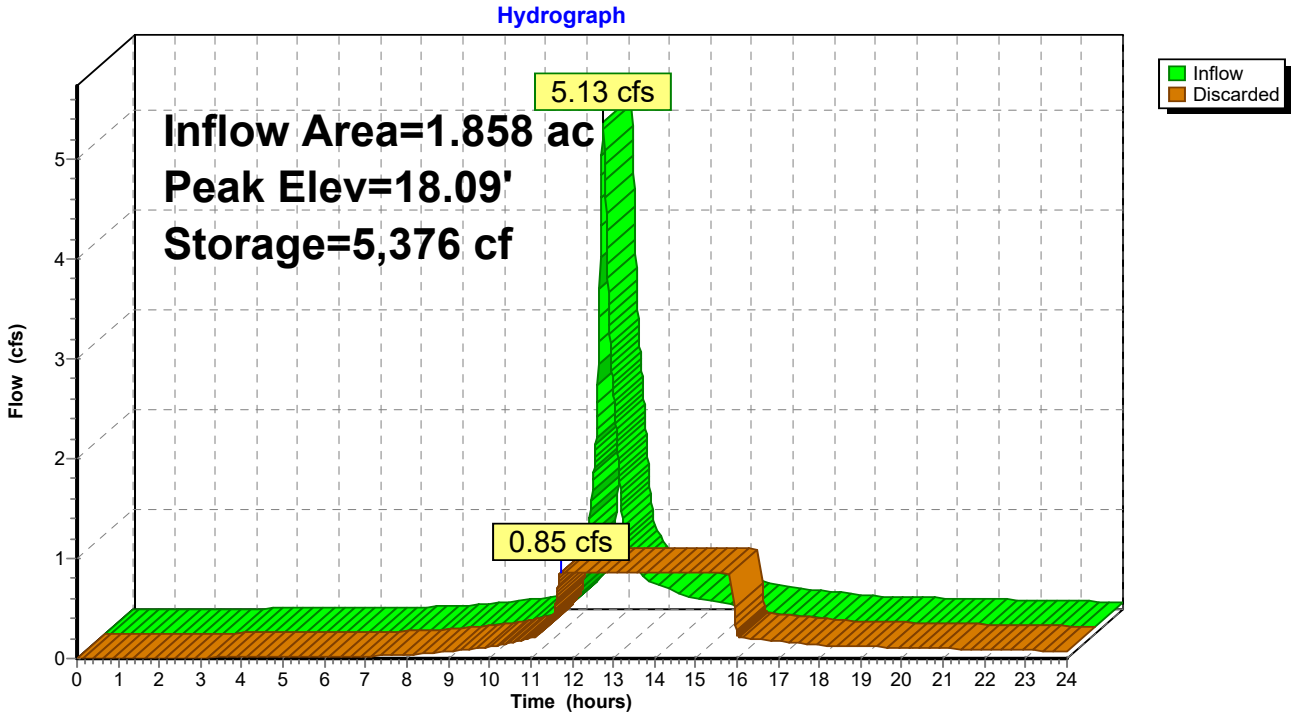
Volume	Invert	Avail.Storage	Storage Description
#1	16.30'	4,101 cf	**Stone (Prismatic)** Listed below (Recalc) 15,628 cf Overall - 5,375 cf Embedded = 10,253 cf x 40.0% Voids
#2	16.80'	5,375 cf	**ADS_StormTech SC-740 +Cap** x 117 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 9 Rows of 13 Chambers
		9,476 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
16.30	4,465	0	0
19.80	4,465	15,628	15,628

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.30'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.85 cfs @ 11.71 hrs HW=16.34' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.85 cfs)

Pond 3P: SC-740 FIELD



Summary for Pond 13P: 1000 GAL LP

Inflow Area = 0.194 ac,100.00% Impervious, Inflow Depth > 5.80" for 25 YR event
Inflow = 1.28 cfs @ 12.04 hrs, Volume= 0.094 af
Outflow = 0.11 cfs @ 11.33 hrs, Volume= 0.094 af, Atten= 91%, Lag= 0.0 min
Discarded = 0.11 cfs @ 11.33 hrs, Volume= 0.094 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 24.72' @ 12.82 hrs Surf.Area= 580 sf Storage= 1,357 cf

Plug-Flow detention time= 81.2 min calculated for 0.094 af (100% of inflow)
Center-of-Mass det. time= 80.9 min (822.9 - 742.0)

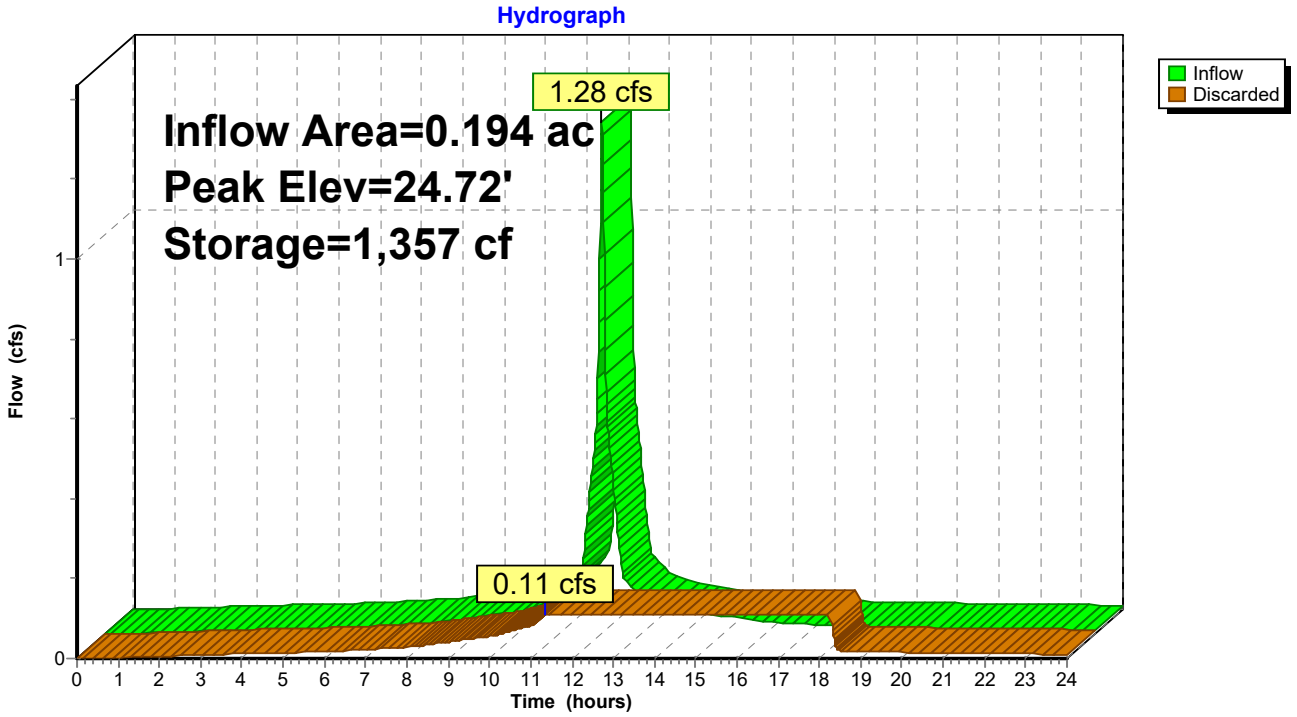
Volume	Invert	Avail.Storage	Storage Description
#1	20.33'	1,188 cf	**Stone (Prismatic)** Listed below (Recalc) 4,159 cf Overall - 1,188 cf Embedded = 2,971 cf x 40.0% Voids
#2	20.83'	998 cf	**5.50'D x 6.00'H 1000 GAL LP** x 7 Inside #1 1,188 cf Overall - 3.0" Wall Thickness = 998 cf
		2,186 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
20.33	580	0	0
27.50	580	4,159	4,159

Device	Routing	Invert	Outlet Devices
#1	Discarded	20.33'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.11 cfs @ 11.33 hrs HW=20.40' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Pond 13P: 1000 GAL LP



Summary for Pond 15P: 1000 GAL LP

Inflow Area = 0.155 ac,100.00% Impervious, Inflow Depth > 5.80" for 25 YR event
Inflow = 1.02 cfs @ 12.04 hrs, Volume= 0.075 af
Outflow = 0.08 cfs @ 11.24 hrs, Volume= 0.075 af, Atten= 92%, Lag= 0.0 min
Discarded = 0.08 cfs @ 11.24 hrs, Volume= 0.075 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 25.88' @ 12.91 hrs Surf.Area= 420 sf Storage= 1,130 cf

Plug-Flow detention time= 96.5 min calculated for 0.075 af (100% of inflow)
Center-of-Mass det. time= 96.3 min (838.3 - 742.0)

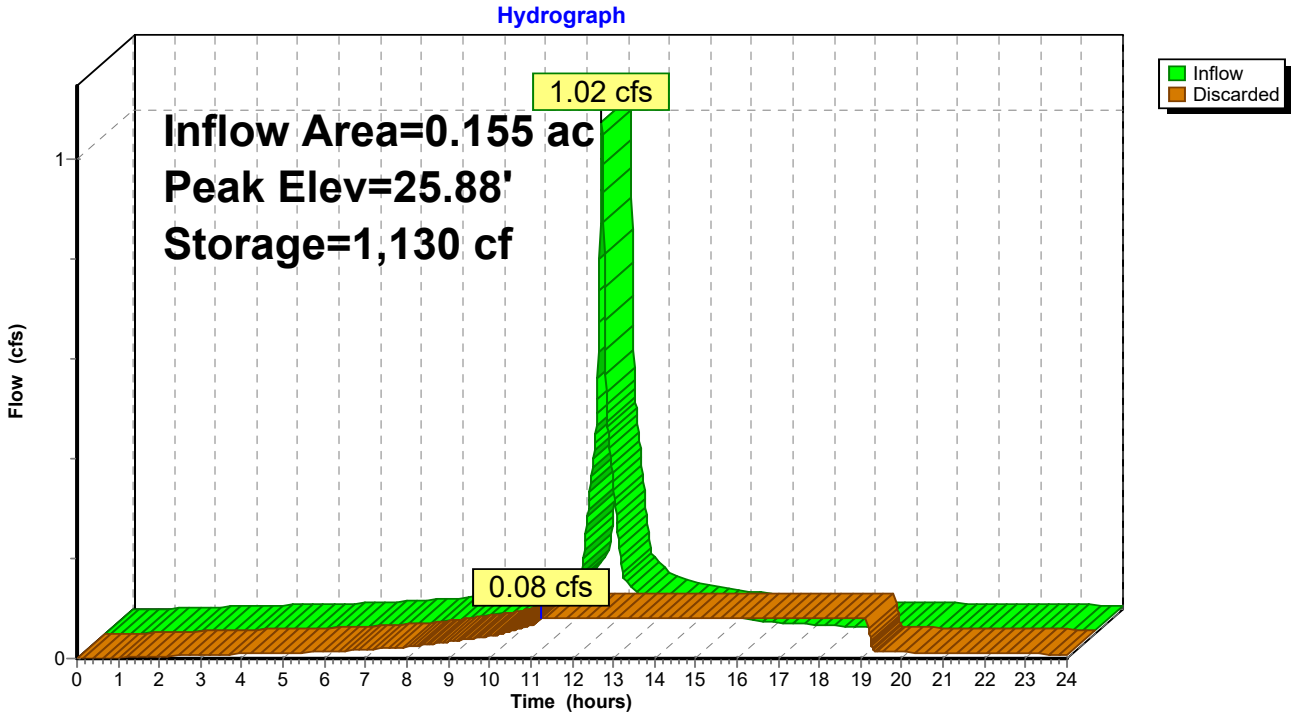
Volume	Invert	Avail.Storage	Storage Description
#1	20.83'	865 cf	**Stone (Prismatic)** Listed below (Recalc) 3,011 cf Overall - 848 cf Embedded = 2,163 cf x 40.0% Voids
#2	21.33'	713 cf	**5.50'D x 6.00'H 1000 GAL LP** x 5 Inside #1 848 cf Overall - 3.0" Wall Thickness = 713 cf
		1,578 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
20.83	420	0	0
28.00	420	3,011	3,011

Device	Routing	Invert	Outlet Devices
#1	Discarded	20.83'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.08 cfs @ 11.24 hrs HW=20.90' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Pond 15P: 1000 GAL LP



Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 3S: PR-DA1a Runoff Area=13,444 sf 67.35% Impervious Runoff Depth>5.00"
Flow Length=175' Tc=6.2 min CN=78 Runoff=1.78 cfs 0.129 af

Subcatchment 4S: PR-DA1b Runoff Area=3,615 sf 83.40% Impervious Runoff Depth>6.16"
Flow Length=70' Slope=0.0830 '/' Tc=0.5 min CN=88 Runoff=0.69 cfs 0.043 af

Subcatchment 5S: PR-DA-R2 Runoff Area=8,465 sf 100.00% Impervious Runoff Depth>7.34"
Tc=3.0 min CN=98 Runoff=1.61 cfs 0.119 af

Subcatchment 6S: PR-DA-R1 Runoff Area=7,860 sf 100.00% Impervious Runoff Depth>7.34"
Tc=5.0 min CN=98 Runoff=1.39 cfs 0.110 af

Subcatchment 7S: PR-DA2a Runoff Area=44,443 sf 32.60% Impervious Runoff Depth>2.70"
Flow Length=395' Tc=8.4 min CN=57 Runoff=2.87 cfs 0.230 af

Subcatchment 8S: PR-DA-R3 Runoff Area=6,758 sf 100.00% Impervious Runoff Depth>7.34"
Tc=3.0 min CN=98 Runoff=1.29 cfs 0.095 af

Subcatchment 16S: PR-DA1c Runoff Area=9,508 sf 20.11% Impervious Runoff Depth>1.33"
Flow Length=175' Tc=5.2 min UI Adjusted CN=43 Runoff=0.27 cfs 0.024 af

Subcatchment 17S: PR-DA1d Runoff Area=3,109 sf 0.00% Impervious Runoff Depth>0.99"
Flow Length=20' Slope=0.0500 '/' Tc=1.8 min CN=39 Runoff=0.06 cfs 0.006 af

Subcatchment 18S: PR-DA2b Runoff Area=11,593 sf 63.60% Impervious Runoff Depth>4.89"
Flow Length=305' Tc=1.9 min CN=77 Runoff=1.76 cfs 0.108 af

Subcatchment 19S: PR-DA2c Runoff Area=7,672 sf 4.35% Impervious Runoff Depth>0.66"
Flow Length=80' Tc=4.4 min CN=35 Runoff=0.05 cfs 0.010 af

Reach 1R: DP-1 Inflow=0.32 cfs 0.030 af
Outflow=0.32 cfs 0.030 af

Reach 2R: DP-2 Inflow=0.05 cfs 0.010 af
Outflow=0.05 cfs 0.010 af

Reach 4R: 1R Inflow=7.41 cfs 0.620 af
Outflow=7.41 cfs 0.620 af

Pond 3P: SC-740 FIELD Peak Elev=19.73' Storage=9,355 cf Inflow=7.41 cfs 0.620 af
Outflow=0.85 cfs 0.619 af

Pond 13P: 1000 GAL LP Peak Elev=26.36' Storage=1,881 cf Inflow=1.61 cfs 0.119 af
Outflow=0.11 cfs 0.119 af

Pond 15P: 1000 GAL LP Peak Elev=27.92' Storage=1,564 cf Inflow=1.29 cfs 0.095 af
Outflow=0.08 cfs 0.095 af

Total Runoff Area = 2.674 ac Runoff Volume = 0.873 af Average Runoff Depth = 3.92"
49.12% Pervious = 1.313 ac 50.88% Impervious = 1.360 ac

Summary for Subcatchment 3S: PR-DA1a

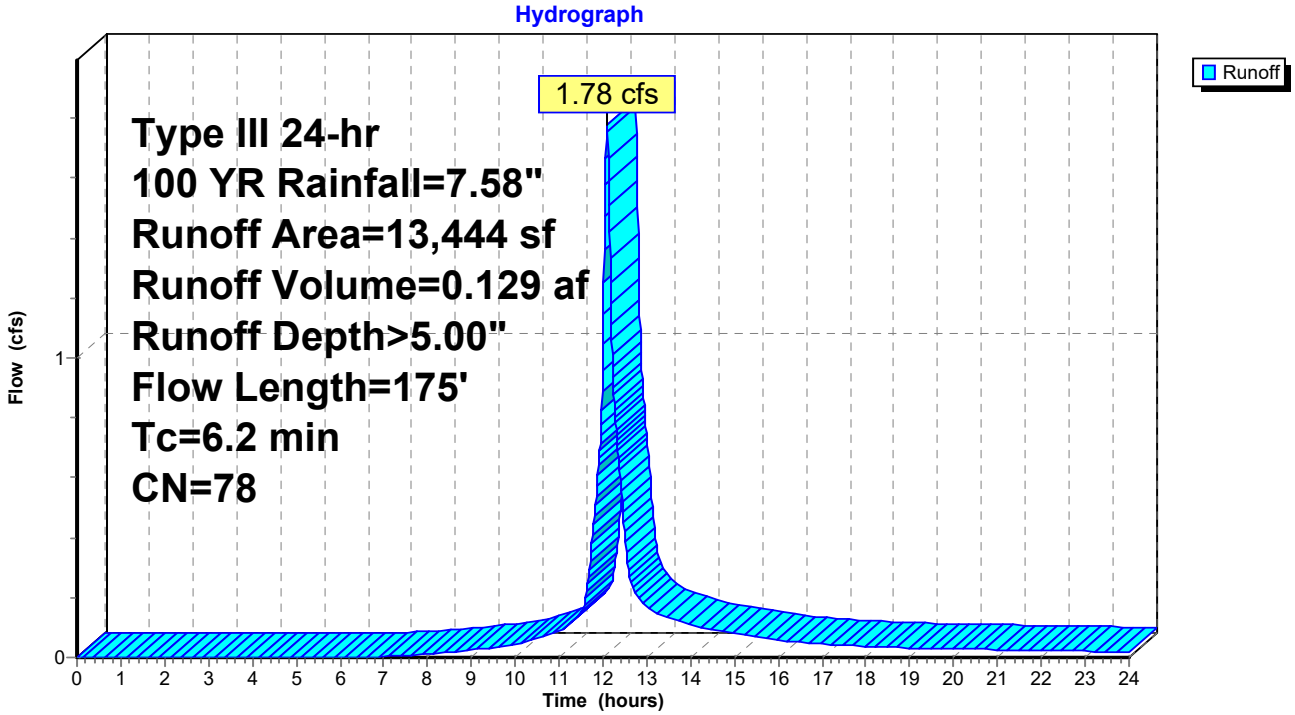
Runoff = 1.78 cfs @ 12.09 hrs, Volume= 0.129 af, Depth> 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=7.58"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
575	32	Woods/grass comb., Good, HSG A
3,814	39	>75% Grass cover, Good, HSG A
0	98	Unconnected roofs, HSG A
9,055	98	Paved parking, HSG A
13,444	78	Weighted Average
4,389		32.65% Pervious Area
9,055		67.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.4	35	0.0100	0.11		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
0.8	140	0.0220	3.01		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
6.2	175	Total			

Subcatchment 3S: PR-DA1a



Summary for Subcatchment 4S: PR-DA1b

[49] Hint: Tc<2dt may require smaller dt

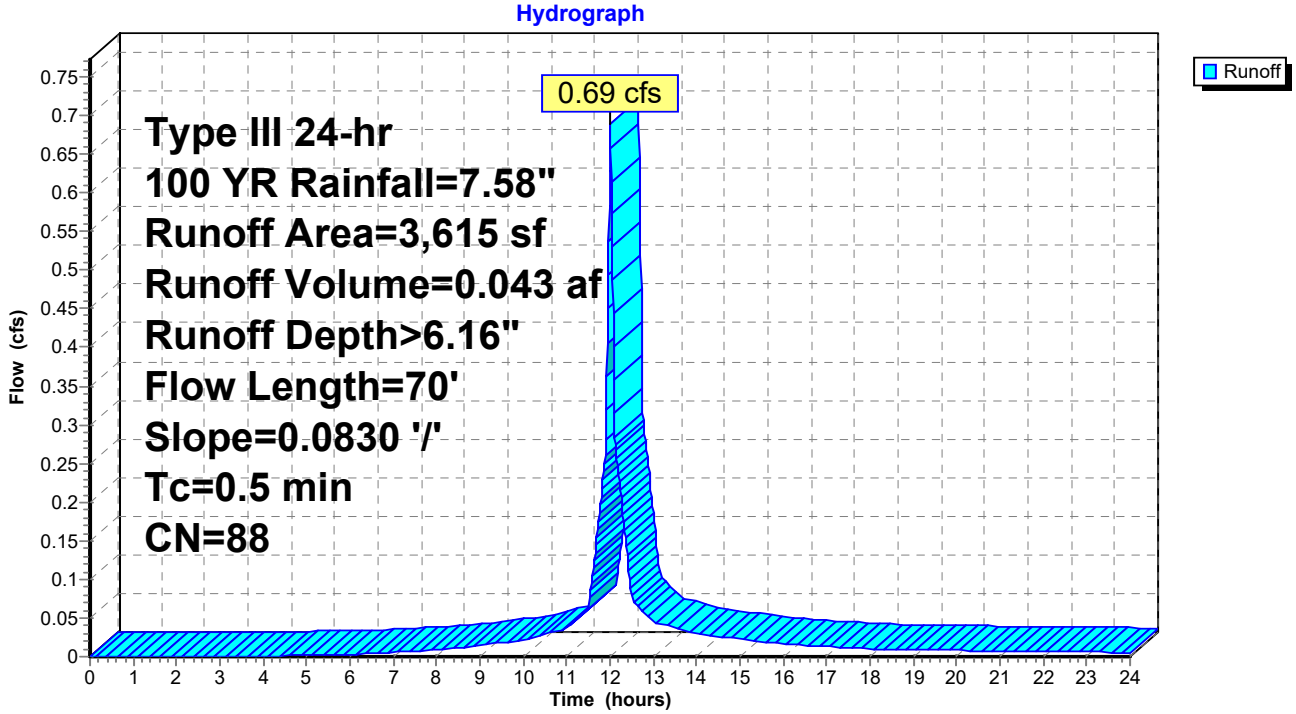
Runoff = 0.69 cfs @ 12.01 hrs, Volume= 0.043 af, Depth> 6.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=7.58"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
600	39	>75% Grass cover, Good, HSG A
0	98	Unconnected roofs, HSG A
3,015	98	Paved parking, HSG A
3,615	88	Weighted Average
600		16.60% Pervious Area
3,015		83.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	70	0.0830	2.33		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.40"

Subcatchment 4S: PR-DA1b



Summary for Subcatchment 5S: PR-DA-R2

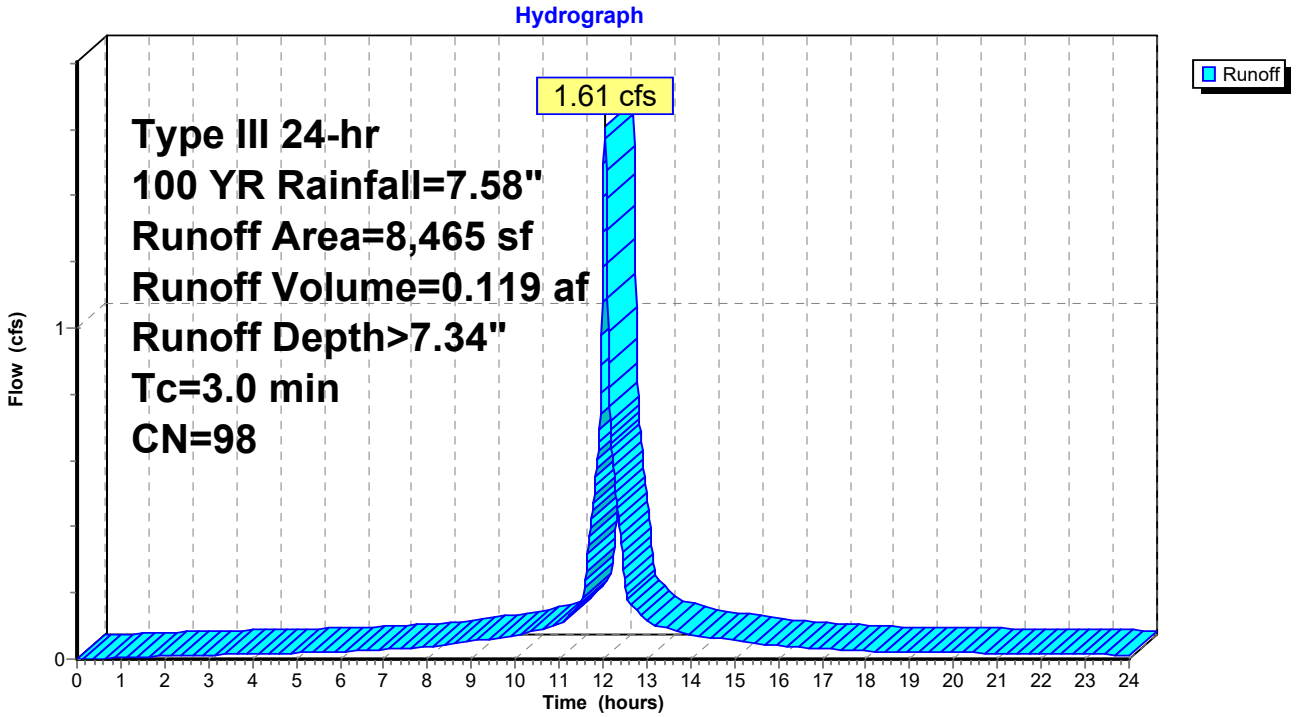
Runoff = 1.61 cfs @ 12.04 hrs, Volume= 0.119 af, Depth> 7.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=7.58"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
0	39	>75% Grass cover, Good, HSG A
8,465	98	Unconnected roofs, HSG A
0	98	Paved parking, HSG A
8,465	98	Weighted Average
8,465		100.00% Impervious Area
8,465		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry, Roof Leader**

Subcatchment 5S: PR-DA-R2



Summary for Subcatchment 6S: PR-DA-R1

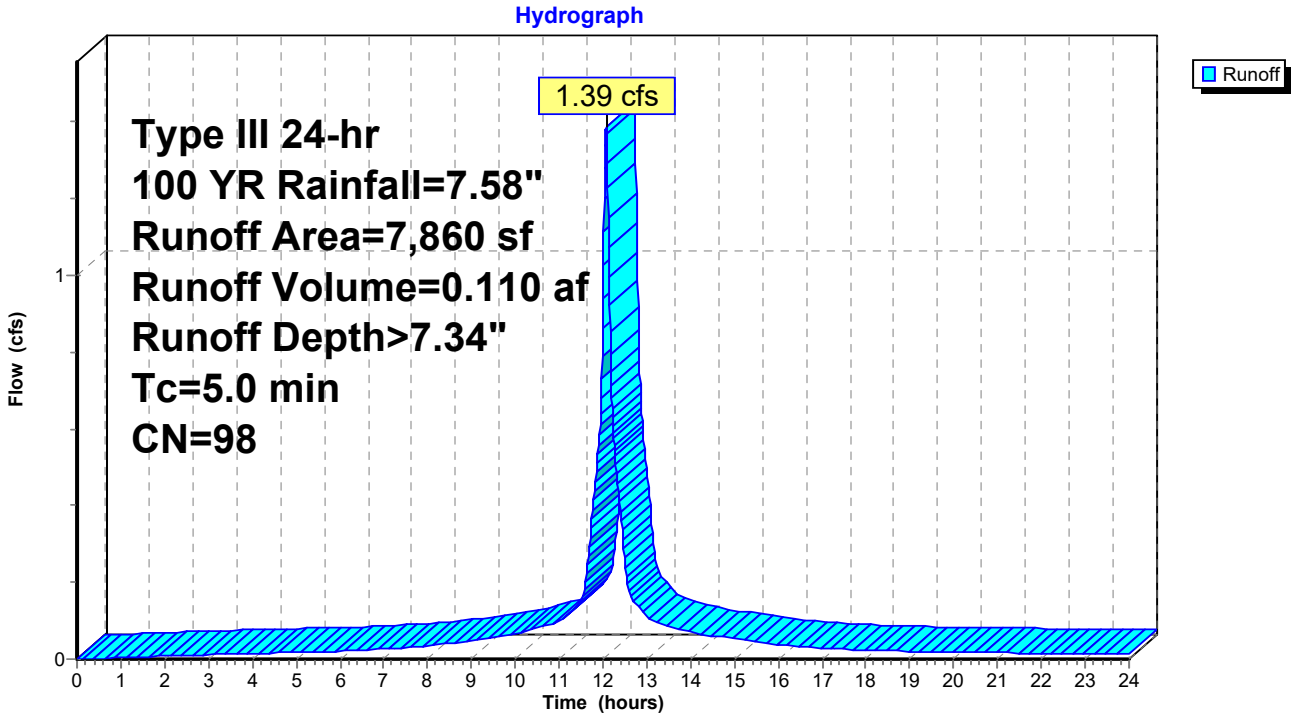
Runoff = 1.39 cfs @ 12.07 hrs, Volume= 0.110 af, Depth> 7.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=7.58"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
0	39	>75% Grass cover, Good, HSG A
7,860	98	Unconnected roofs, HSG A
0	98	Paved parking, HSG A
7,860	98	Weighted Average
7,860		100.00% Impervious Area
7,860		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Roof Leader**

Subcatchment 6S: PR-DA-R1



Summary for Subcatchment 7S: PR-DA2a

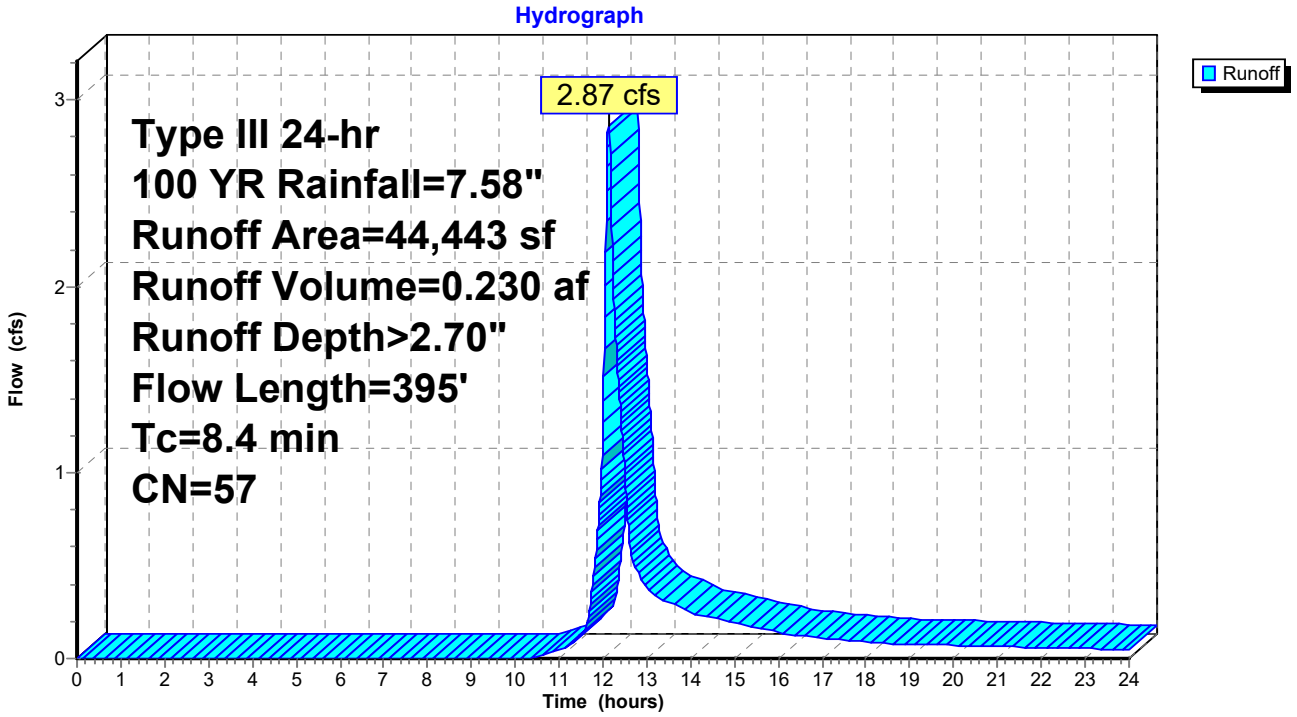
Runoff = 2.87 cfs @ 12.13 hrs, Volume= 0.230 af, Depth> 2.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=7.58"

	Area (sf)	CN	Description
	365	30	Woods, Good, HSG A
	4,535	32	Woods/grass comb., Good, HSG A
	25,054	39	>75% Grass cover, Good, HSG A
	2,099	98	Unconnected roofs, HSG A
	11,222	98	Paved parking, HSG A
*	1,168	98	Gravel Areas
	44,443	57	Weighted Average
	29,954		67.40% Pervious Area
	14,489		32.60% Impervious Area
	2,099		14.49% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.0200	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
2.0	120	0.0200	0.99		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.9	225	0.0410	4.11		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
8.4	395	Total			

Subcatchment 7S: PR-DA2a



Summary for Subcatchment 8S: PR-DA-R3

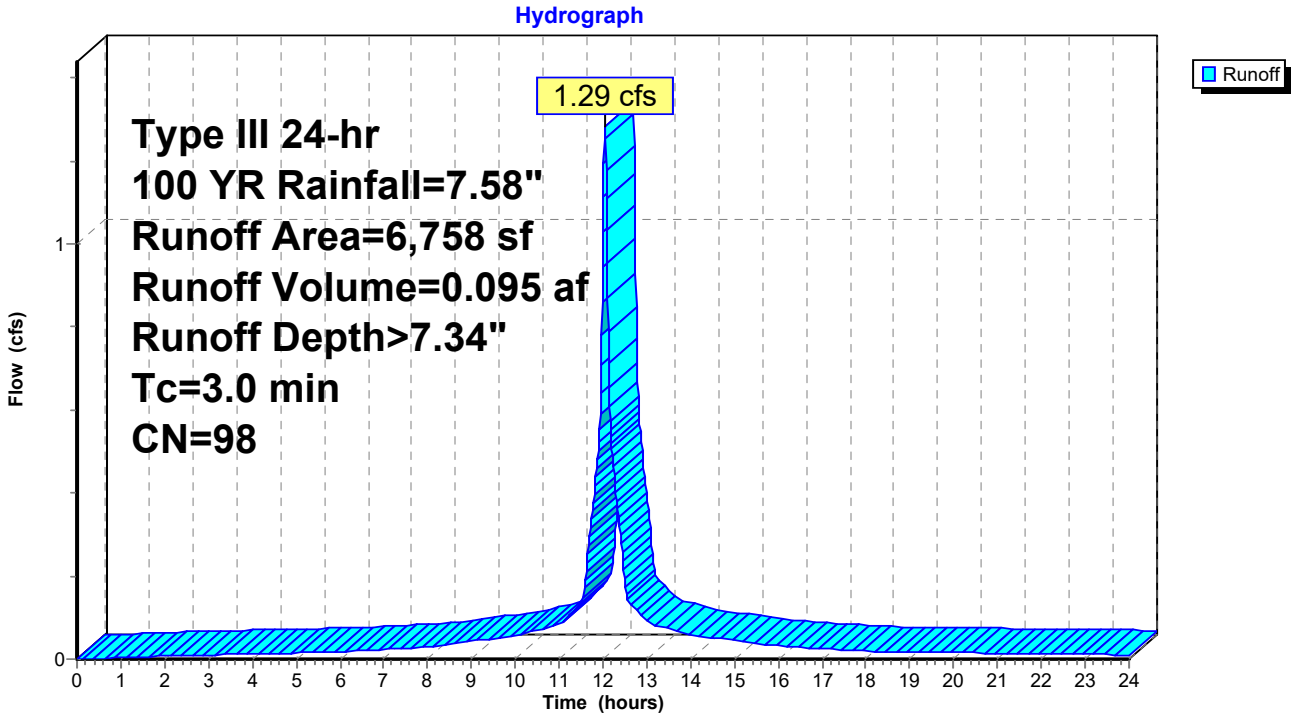
Runoff = 1.29 cfs @ 12.04 hrs, Volume= 0.095 af, Depth> 7.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=7.58"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
0	39	>75% Grass cover, Good, HSG A
6,758	98	Unconnected roofs, HSG A
0	98	Paved parking, HSG A
6,758	98	Weighted Average
6,758		100.00% Impervious Area
6,758		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0					**Direct Entry, Roof Leader**

Subcatchment 8S: PR-DA-R3



Summary for Subcatchment 16S: PR-DA1c

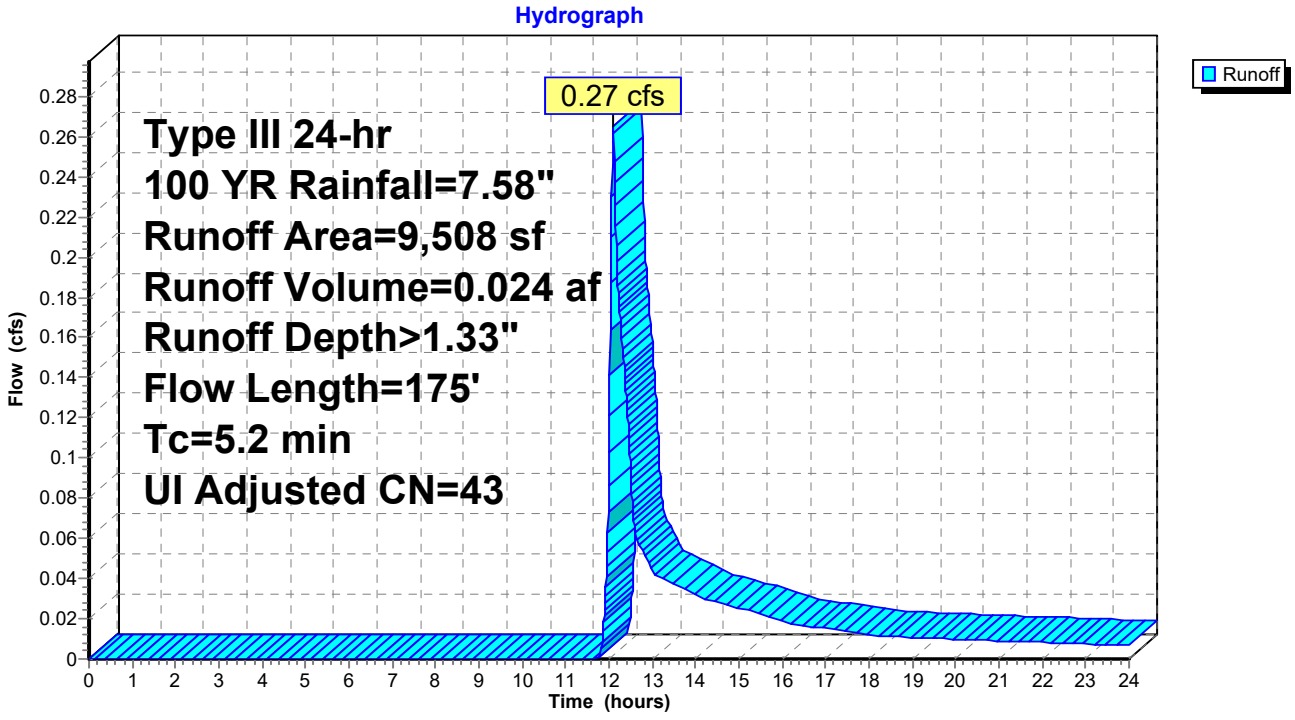
Runoff = 0.27 cfs @ 12.10 hrs, Volume= 0.024 af, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=7.58"

Area (sf)	CN	Adj	Description
0	30		Woods, Good, HSG A
4,575	32		Woods/grass comb., Good, HSG A
3,021	39		>75% Grass cover, Good, HSG A
1,496	98		Unconnected roofs, HSG A
416	98		Paved parking, HSG A
9,508	47	43	Weighted Average, UI Adjusted
7,596			79.89% Pervious Area
1,912			20.11% Impervious Area
1,496			78.24% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	50	0.0322	0.18		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
0.7	125	0.0300	2.79		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
5.2	175	Total			

Subcatchment 16S: PR-DA1c



Summary for Subcatchment 17S: PR-DA1d

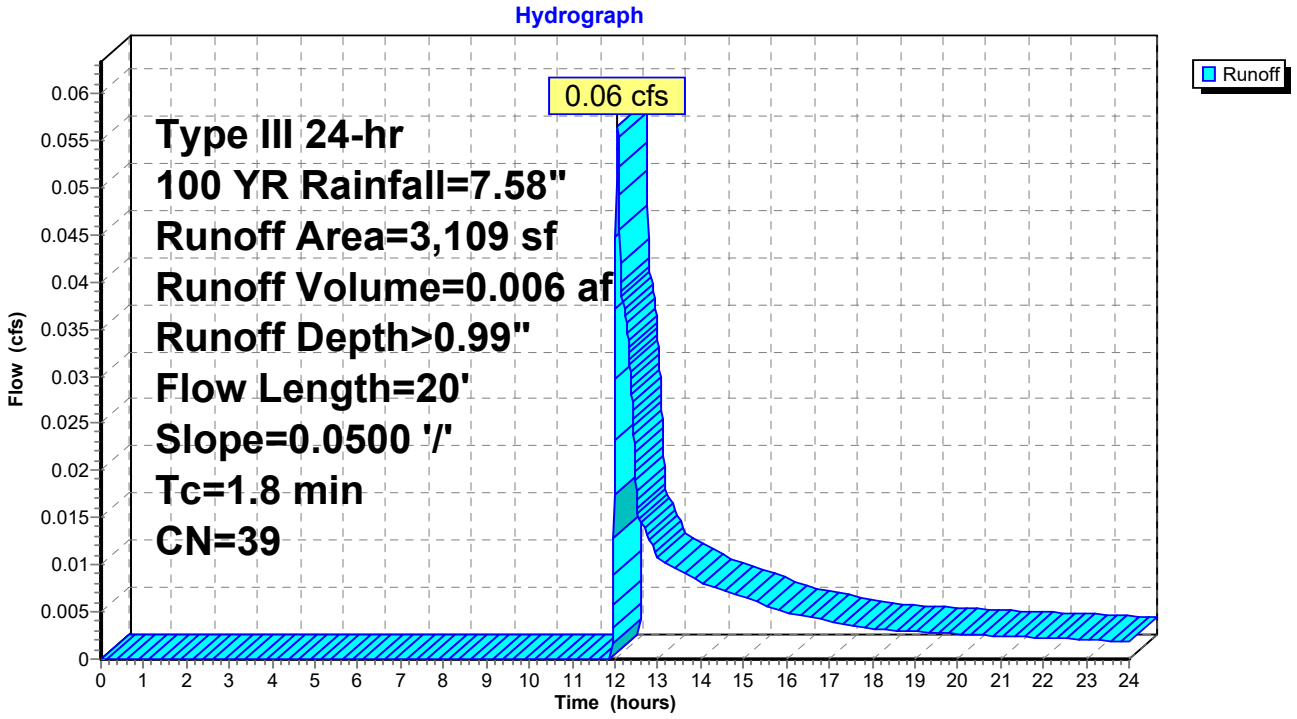
Runoff = 0.06 cfs @ 12.06 hrs, Volume= 0.006 af, Depth> 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=7.58"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
3,109	39	>75% Grass cover, Good, HSG A
0	98	Unconnected roofs, HSG A
0	98	Paved parking, HSG A
3,109	39	Weighted Average
3,109		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	20	0.0500	0.18		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"

Subcatchment 17S: PR-DA1d



Summary for Subcatchment 18S: PR-DA2b

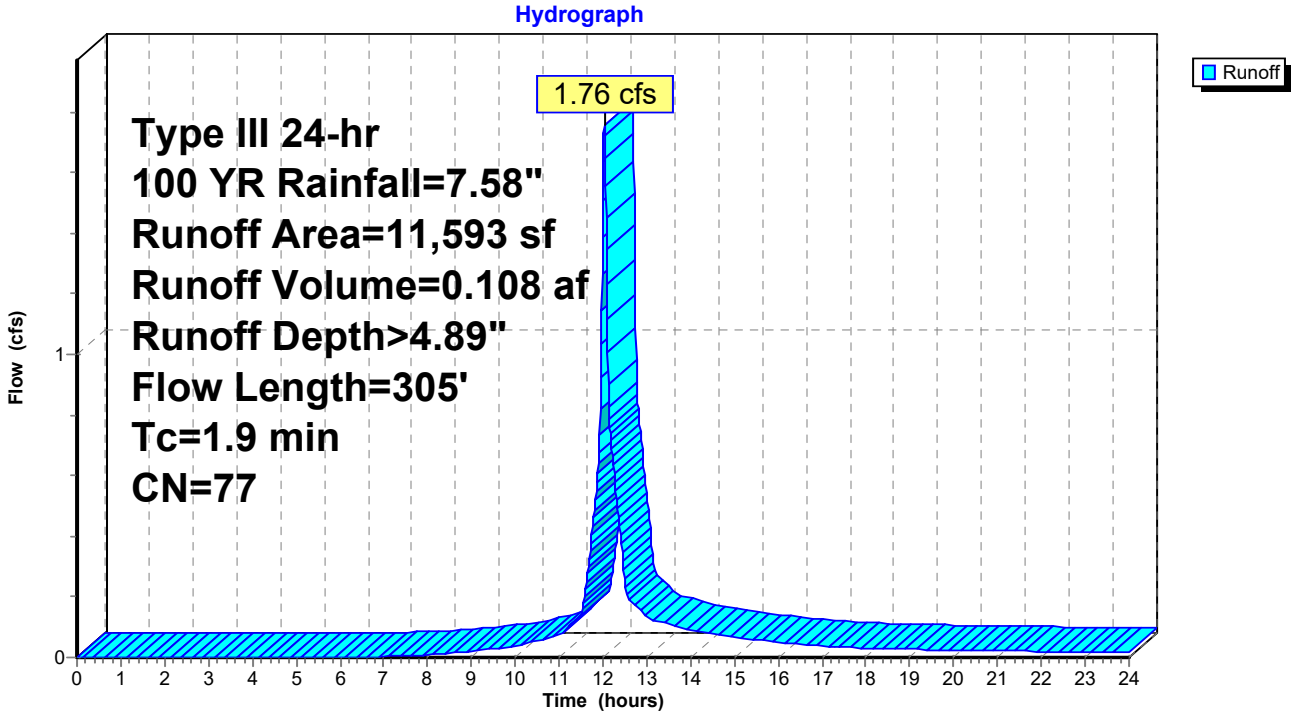
Runoff = 1.76 cfs @ 12.03 hrs, Volume= 0.108 af, Depth> 4.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=7.58"

Area (sf)	CN	Description
0	30	Woods, Good, HSG A
0	32	Woods/grass comb., Good, HSG A
4,220	39	>75% Grass cover, Good, HSG A
0	98	Unconnected roofs, HSG A
7,373	98	Paved parking, HSG A
11,593	77	Weighted Average
4,220		36.40% Pervious Area
7,373		63.60% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.45		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.40"
1.3	255	0.0250	3.21		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
1.9	305	Total			

Subcatchment 18S: PR-DA2b



Summary for Subcatchment 19S: PR-DA2c

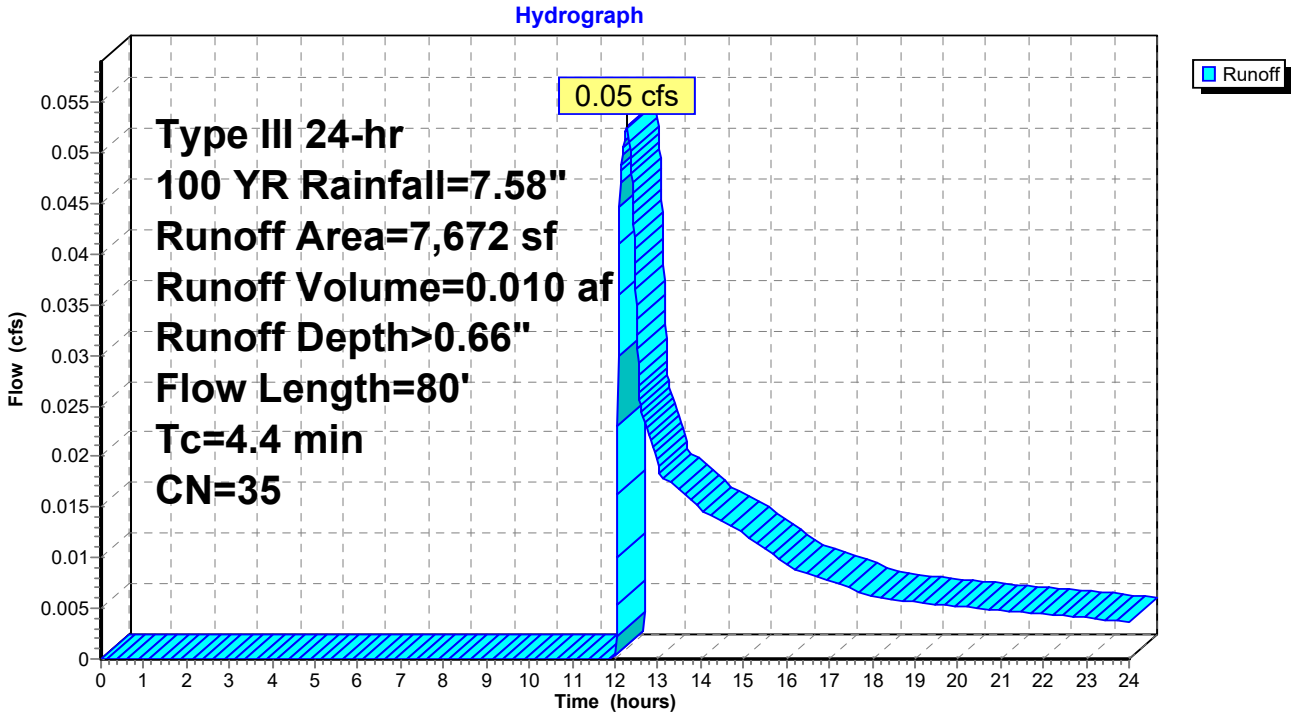
Runoff = 0.05 cfs @ 12.28 hrs, Volume= 0.010 af, Depth> 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=7.58"

	Area (sf)	CN	Description
	0	30	Woods, Good, HSG A
	7,338	32	Woods/grass comb., Good, HSG A
	0	39	>75% Grass cover, Good, HSG A
	0	98	Unconnected roofs, HSG A
	334	98	Paved parking, HSG A
*	0	98	Gravel Area
	7,672	35	Weighted Average
	7,338		95.65% Pervious Area
	334		4.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.9	50	0.0460	0.21		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
0.5	30	0.0220	1.04		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
4.4	80	Total			

Subcatchment 19S: PR-DA2c



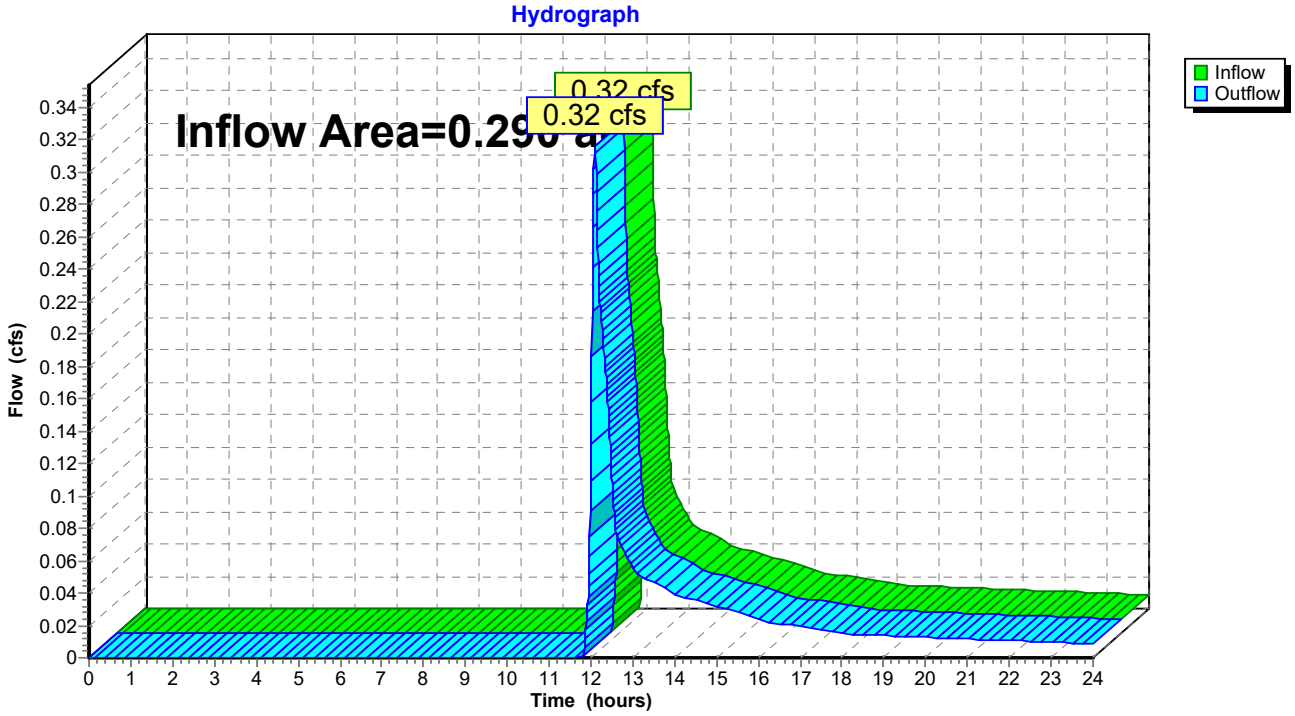
Summary for Reach 1R: DP-1

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

Inflow Area = 0.290 ac, 15.15% Impervious, Inflow Depth > 1.25" for 100 YR event
Inflow = 0.32 cfs @ 12.09 hrs, Volume= 0.030 af
Outflow = 0.32 cfs @ 12.09 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 1R: DP-1



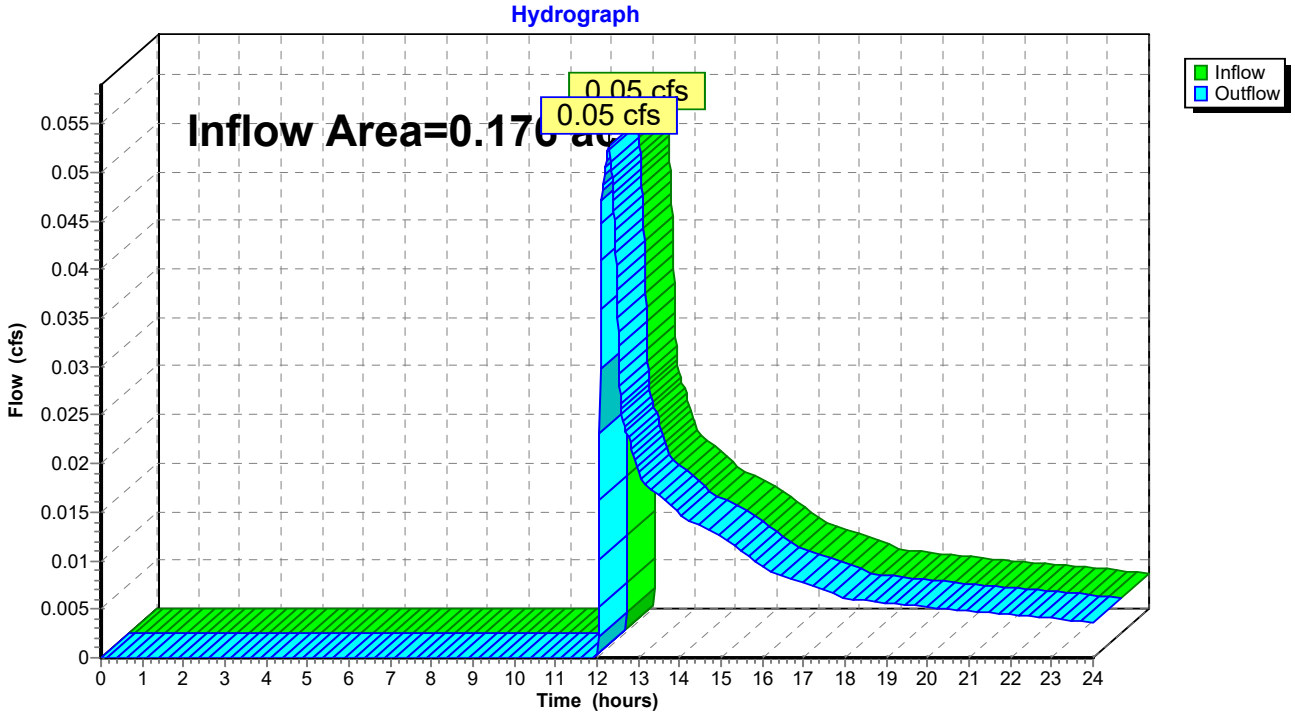
Summary for Reach 2R: DP-2

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

Inflow Area = 0.176 ac, 4.35% Impervious, Inflow Depth > 0.66" for 100 YR event
Inflow = 0.05 cfs @ 12.28 hrs, Volume= 0.010 af
Outflow = 0.05 cfs @ 12.28 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 2R: DP-2



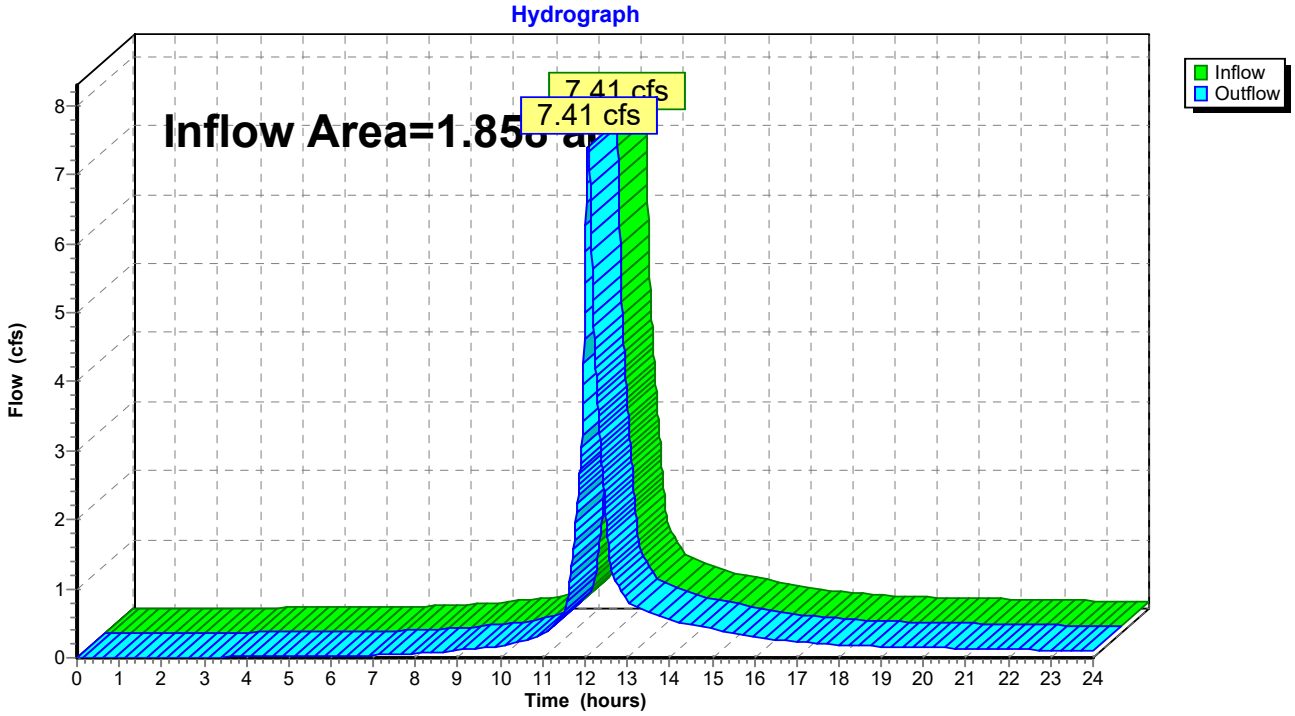
Summary for Reach 4R: 1R

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

Inflow Area = 1.858 ac, 51.62% Impervious, Inflow Depth > 4.00" for 100 YR event
Inflow = 7.41 cfs @ 12.08 hrs, Volume= 0.620 af
Outflow = 7.41 cfs @ 12.08 hrs, Volume= 0.620 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach 4R: 1R



Summary for Pond 3P: SC-740 FIELD

Inflow Area = 1.858 ac, 51.62% Impervious, Inflow Depth > 4.00" for 100 YR event
Inflow = 7.41 cfs @ 12.08 hrs, Volume= 0.620 af
Outflow = 0.85 cfs @ 11.62 hrs, Volume= 0.619 af, Atten= 88%, Lag= 0.0 min
Discarded = 0.85 cfs @ 11.62 hrs, Volume= 0.619 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 19.73' @ 12.98 hrs Surf.Area= 4,465 sf Storage= 9,355 cf

Plug-Flow detention time= 86.2 min calculated for 0.619 af (100% of inflow)
Center-of-Mass det. time= 86.0 min (898.4 - 812.4)

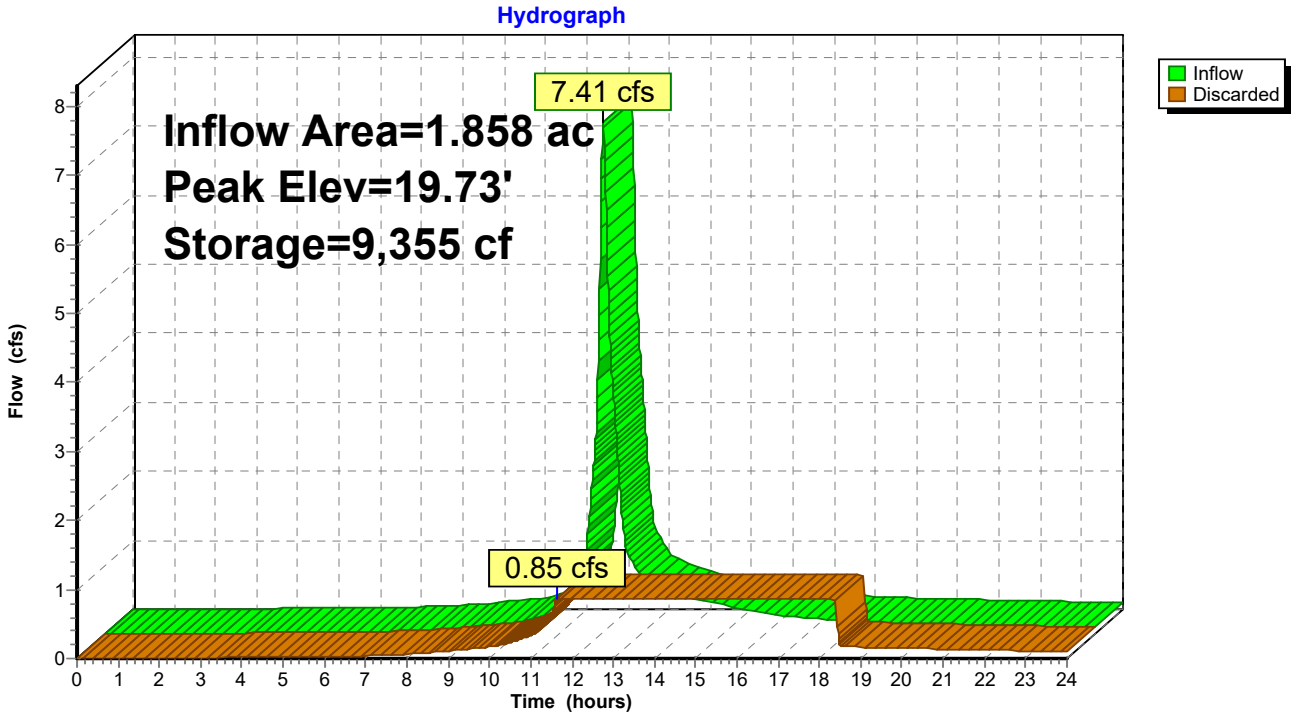
Volume	Invert	Avail.Storage	Storage Description
#1	16.30'	4,101 cf	**Stone (Prismatic)** Listed below (Recalc) 15,628 cf Overall - 5,375 cf Embedded = 10,253 cf x 40.0% Voids
#2	16.80'	5,375 cf	**ADS_StormTech SC-740 +Cap** x 117 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 9 Rows of 13 Chambers
		9,476 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
16.30	4,465	0	0
19.80	4,465	15,628	15,628

Device	Routing	Invert	Outlet Devices
#1	Discarded	16.30'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.85 cfs @ 11.62 hrs HW=16.34' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.85 cfs)

Pond 3P: SC-740 FIELD



Summary for Pond 13P: 1000 GAL LP

Inflow Area = 0.194 ac,100.00% Impervious, Inflow Depth > 7.34" for 100 YR event
Inflow = 1.61 cfs @ 12.04 hrs, Volume= 0.119 af
Outflow = 0.11 cfs @ 11.11 hrs, Volume= 0.119 af, Atten= 93%, Lag= 0.0 min
Discarded = 0.11 cfs @ 11.11 hrs, Volume= 0.119 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 26.36' @ 13.03 hrs Surf.Area= 580 sf Storage= 1,881 cf

Plug-Flow detention time= 120.7 min calculated for 0.119 af (100% of inflow)
Center-of-Mass det. time= 120.4 min (859.3 - 738.9)

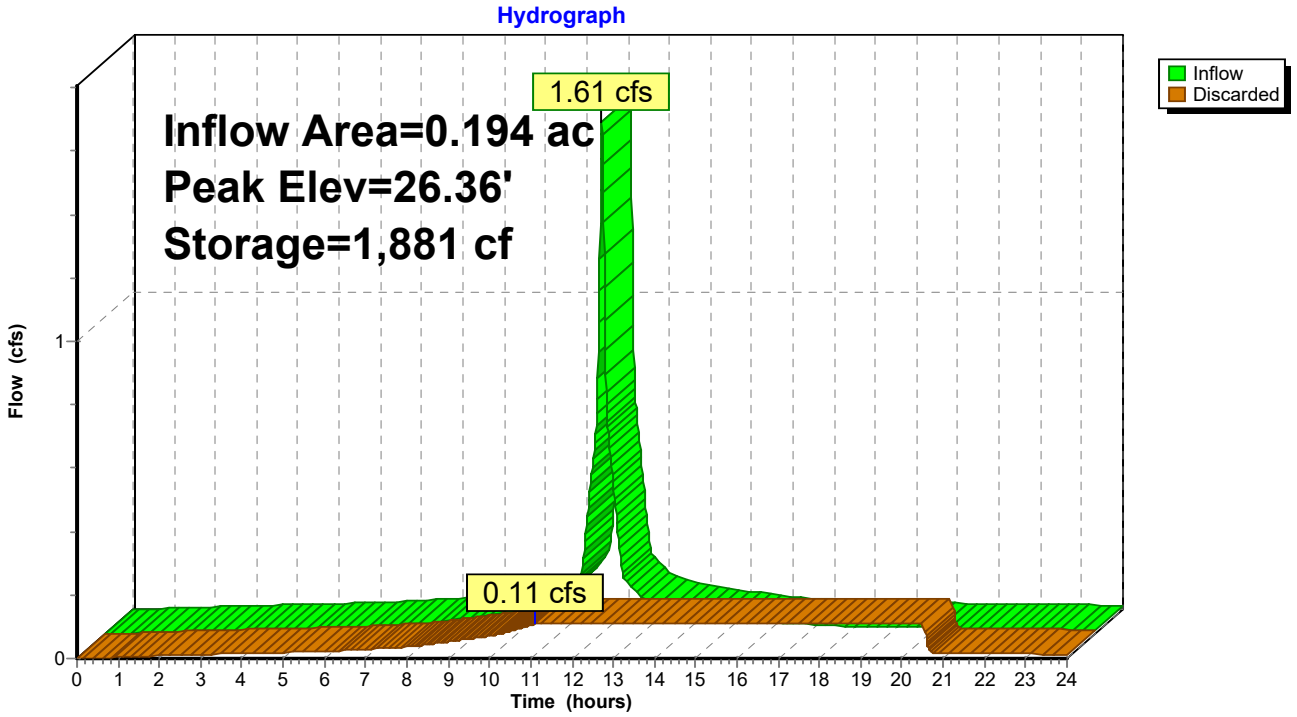
Volume	Invert	Avail.Storage	Storage Description
#1	20.33'	1,188 cf	**Stone (Prismatic)** Listed below (Recalc) 4,159 cf Overall - 1,188 cf Embedded = 2,971 cf x 40.0% Voids
#2	20.83'	998 cf	**5.50'D x 6.00'H 1000 GAL LP** x 7 Inside #1 1,188 cf Overall - 3.0" Wall Thickness = 998 cf
		2,186 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
20.33	580	0	0
27.50	580	4,159	4,159

Device	Routing	Invert	Outlet Devices
#1	Discarded	20.33'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.11 cfs @ 11.11 hrs HW=20.40' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Pond 13P: 1000 GAL LP



Summary for Pond 15P: 1000 GAL LP

Inflow Area = 0.155 ac,100.00% Impervious, Inflow Depth > 7.34" for 100 YR event
Inflow = 1.29 cfs @ 12.04 hrs, Volume= 0.095 af
Outflow = 0.08 cfs @ 10.91 hrs, Volume= 0.095 af, Atten= 94%, Lag= 0.0 min
Discarded = 0.08 cfs @ 10.91 hrs, Volume= 0.095 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 27.92' @ 13.26 hrs Surf.Area= 420 sf Storage= 1,564 cf

Plug-Flow detention time= 143.0 min calculated for 0.095 af (100% of inflow)
Center-of-Mass det. time= 142.6 min (881.5 - 738.9)

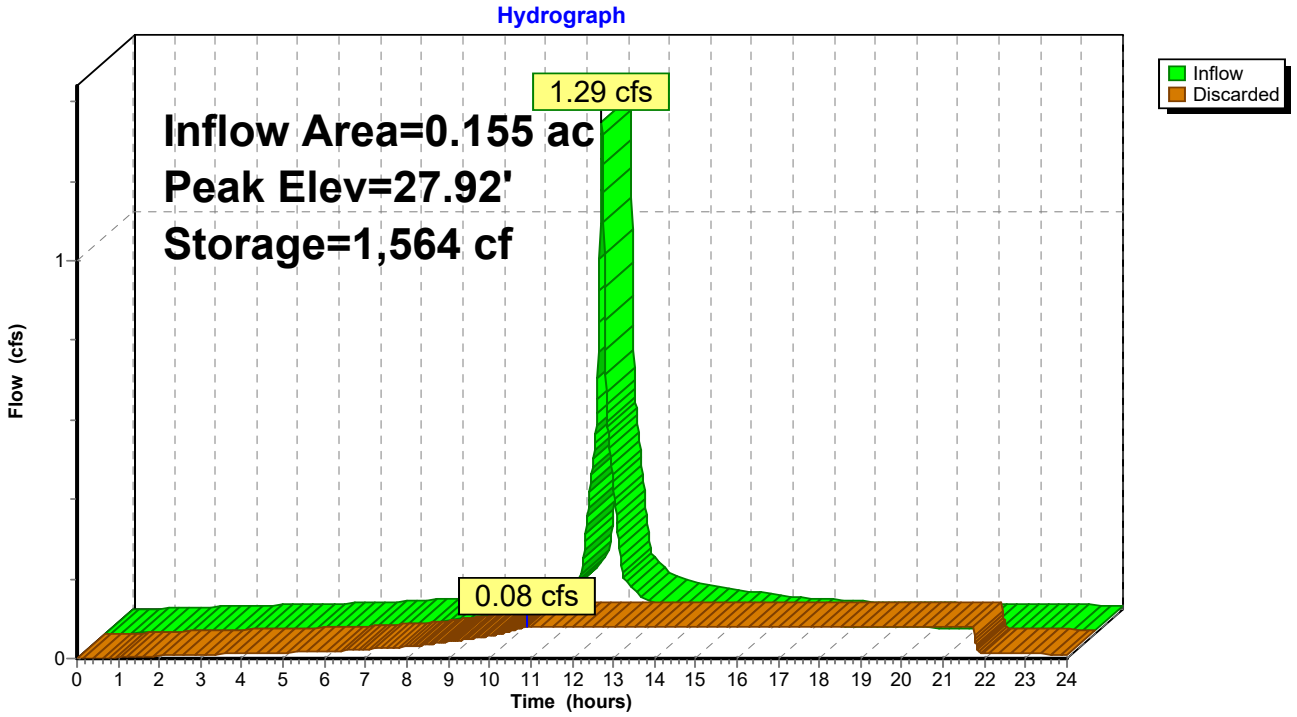
Volume	Invert	Avail.Storage	Storage Description
#1	20.83'	865 cf	**Stone (Prismatic)** Listed below (Recalc) 3,011 cf Overall - 848 cf Embedded = 2,163 cf x 40.0% Voids
#2	21.33'	713 cf	**5.50'D x 6.00'H 1000 GAL LP** x 5 Inside #1 848 cf Overall - 3.0" Wall Thickness = 713 cf
		1,578 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
20.83	420	0	0
28.00	420	3,011	3,011

Device	Routing	Invert	Outlet Devices
#1	Discarded	20.83'	**8.270 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.08 cfs @ 10.91 hrs HW=20.90' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Pond 15P: 1000 GAL LP

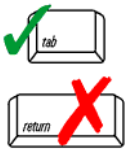


Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

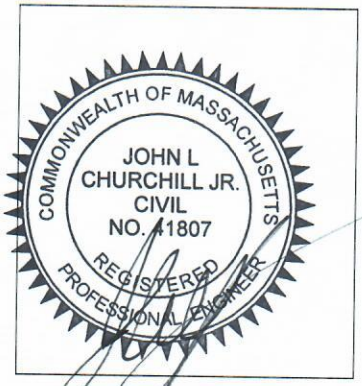
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature



5/25/21

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

- ☒ No disturbance to any Wetland Resource Areas
- ☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- ☐ Reduced Impervious Area (Redevelopment Only)
- ☐ Minimizing disturbance to existing trees and shrubs
- ☐ LID Site Design Credit Requested:
  - ☐ Credit 1
  - ☐ Credit 2
  - ☐ Credit 3
- ☐ Use of “country drainage” versus curb and gutter conveyance and pipe
- ☐ Bioretention Cells (includes Rain Gardens)
- ☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- ☐ Treebox Filter
- ☐ Water Quality Swale
- ☐ Grass Channel
- ☐ Green Roof
- ☐ Other (describe): _____

Standard 1: No New Untreated Discharges

- ☒ No new untreated discharges
- ☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- ☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☒ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☒ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☒ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☒ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☐ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☐ An Illicit Discharge Compliance Statement is attached;

☒ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

Stormwater Operations and Maintenance Plan

DATE: May 21, 2021

The project site will be privately owned and maintained. The responsible party will be responsible for the required inspections and maintenance of the stormwater management system including catch basins, proprietary treatment devices, bioretention areas, and infiltration system.

Owner of record:
F.C. Mannix
P.O. Box 85
Boston, MA 02113

Responsible party:
F.C. Mannix
P.O. Box 85
Boston, MA 02113

Project Address:
238 & 240 Sandwich Road
East Wareham, MA 02538

Engineering By:
JC Engineering, Inc.
2854 Cranberry Highway
East Wareham, MA 02538

Pre-Construction Requirements

Prior to the start of any construction on the site the following procedures are to be implemented.

- Hay bale dikes and silt fence are to be installed down gradient of all earthwork proposed in that particular phase of work. Hay bales and silt fence are to be installed at the limit of work and/or adjacent to the wetland resource areas and/or natural areas to be protected as shown on the plans.

- All major trees designated to be saved are to be flagged in the field and fenced off as necessary to prevent damage during construction.

- A temporary settling pool is to be constructed on the up-gradient side of silt fences and hay bale dikes at the limit of work such that stormwater runoff is channeled to the temporary settling pool and filtered through the hay bales prior to leaving the site.

- Safety barriers, warnings and fences to be installed as necessary to protect the general public prior to the start of the work adjacent to the roadway.

- A temporary construction entrance is to be constructed at the access point to the site. The entrance is to be stabilized in such a manner as to prevent the tracking of soil onto the public way. (see detail on site plan)

- A dust monitoring plan will be established prior to the start of construction.

- Weekly training sessions will be conducted for all site contractors at the job.

- A person responsible for daily inspection of all erosion control methodologies and action plan for corrections/repairs when needed will be established.

Construction Period Pollution Prevention

- The contractor must install erosion control measures as shown on the plans and details prior to starting any other work on the site construction. Erosion control must be installed at every inlet structure and inlet swale and maintained for the duration of the project. Silt fence and/or haybales as shown on plans shall be inspected, repaired and/or maintained by the contractor weekly and within 12 hours of each storm event.

- Water and/or covers to minimize dust and erosion from newly graded areas and stock piles of earth will be implemented during construction as needed or when conditions are anticipated to be greater than 20 m.p.h. Application rate of water shall be enough to moisten soil to not create runoff and/or ponding. No surfactants shall be used.

- A regular street sweeping schedule of hard surfaces will be established prior to construction and will be continued until the completion of the full site development.

- A person will be assigned to monitor the perimeter erosion control methodologies on a daily basis.

- Owner or its representative shall perform weekly review/training sessions.

- Construction of a temporary settling area is to be utilized as a method of controlling concentrated flows from areas that are under construction.

- Temporary settling areas are to be constructed on an as needed basis and located throughout the construction phase as required by earthwork activities.

- At the beginning of earthwork operations on the site a mechanical on-site sweeper is to be maintained such that the public way can be kept clean during the construction phase.

- As elements of the drainage system are installed, silt fences and "silt sacs" are to be installed around all catch basins and under grates until the tributary area to that basin is completely stabilized.

- As general earthwork is completed the exterior perimeters of the areas that have been completed are to be stabilized using erosion control grass.

- Stabilize slopes steeper than 3:1 (horizontal to vertical) with seed, secured geotextile fabric, or rock rip-rap as required to prevent erosion during construction.

- Sediment shall be contained within the construction site and shall be removed when they reach a depth of 6 inches.

- Clean out catch basins, drain manholes and storm drain pipes after completion of construction.

- No stormwater shall be allowed to enter the structures until all catch basins, drain manholes and storm drain pipes have been cleaned, the binder course is installed, and all disturbed areas are stabilized.

- If the binder course is in place for more than 3 months without a wearing course, the contractor shall set the rim elevation of the drainage structures level with the binder course. The rim elevations shall be reset just prior to placing the wearing course.

- The contractor is responsible for all stormwater best management practices being in place to contain stormwater in the event that drainage structures are not at pavement grade during a storm event, and all cleanup in the event that such measures fail during said storm event.

- Temporary surfaces should be stabilized with as soon as active grading is suspended. Temporary measures include seeding with grass, jute netting, or straw mulch. Permanent stabilization should be established early in the Fall to allow good cover before cold weather comes.

- A construction entrance in accordance with construction details shall be installed at the site entrance to prevent sediments from being tracked offsite.

- It is the responsibility of the contractor to maintain and supplement the specified sedimentation controls as necessary to prevent sedimentation of off-site areas and/or any regulated resource areas. Failure by the contractor to

control erosion, pollution and/or siltation shall be cause for the owner to employ outside assistance or to use own forces to provide the necessary corrective measures, the cost of such assistance plus project engineering costs will be the contractor's responsibility. If the owner shall fail their responsibility of this Plan, the Town has the right to enter upon property after 15 days notice to take corrective actions and bill the Owner for their Services.

- Haybales and Silt Fence shall be installed at the following locations: Toe of slope of embankment construction, Toe of temporary earthwork stockpiles. All locations as indicated on the Plans.

- A log of regular inspections and maintenance is to be maintained by the construction superintendent.

- When all areas tributary to any catch basin on the site are stabilized with permanent plantings and paving, that catch basin is to be cleaned of all sediment and debris that has accumulated during construction and the "silt sacs" removed.

- During construction of the project, the owner and/or its representative, is to be the responsible party for enforcing the installation and maintenance of all erosion control devices. A permanent file is to be established for recording daily inspections, problems and maintenance of the erosion control devices. A 24 hour emergency hotline is to be established with the number posted on a sign at the construction entrance to the project and on the construction trailer indicating who can be contacted in case of an emergency on the site.

Long-Term Operation and Maintenance Program

- At the end of construction on the project, the owner is to be provided with a certified as built plan of all utilities constructed on the site.

- **Street Sweeping:**

  At least four times a year all roadways and surface parking areas are to be swept. At least one of these times is to be between April 1st and April 15th of each year.

- **Catch Basin Maintenance**

  All Catch basins shall be inspected by the owner/operator on a quarterly basis or after a major storm event. Catch basins sumps will be cleaned annually during the early spring or when the sediment rises to within half the available sump height of the catch basin, whichever comes first.

- **Oil Grit Separator Maintenance**

  Inspections of the oil / grit separator tank should occur after every major storm event for the first few months. After the system is in operation, inspections should occur every month. Special attention should be directed towards the depth of sediment in the tank. There should be no more than 2 feet of sediment accumulation within the bottom of both tanks. Sedimentation should be removed from the tanks once accumulation reaches 2 feet. Regardless of accumulation, tanks shall be cleaned a minimum of twice a year. Polluted water or sediments removed from tanks should be disposed of in accordance with all applicable local, state and federal laws and regulations including M.G.L.c. 21c and 310 CMR 30.00.

- **Subsurface Infiltration System**

  Once the system is operational, inspections of the Infiltration should occur after every major storm event for the first few months. After the system is in operation, inspections should be every six months. Special attention should be directed towards the depth of sediment in the leaching chambers. Sediment removal from the leaching chambers should be accomplished as needed by means of a labor crew. Sediment shall be removed off-site and disposed of in a legal manner. Inspections should also include checking for potential problems that include but are not limited to, settlement of the leaching chamber bottom, any forms of erosion, tree growth in the leaching area, and sediment accumulation, etc. Trash and debris accumulated within any portion of the Infiltration Structures should be removed at this time. Silt and debris are to be removed using vacuum pumping techniques as required.

- An annual report on the status of each inspection and the completion of the required maintenance shall be filed with the Planning Department on or by June 1st each year.

- The Owner, is to be responsible for the maintenance of the project after construction has been completed. The owner is to provide the appropriate r with a contact name and telephone number for purposes of communication between the owner and the Town Boards and Commissions. At each time that the contact person changes, the above Boards and Commission are to be notified of the new contact information.

- The Owner shall hire a Stormwater Professional to inspect the system as required.

- This Operations and Maintenance plan is to be incorporated into all necessary documents with the Stormwater operations and maintenance plan to ensure that a long-term maintenance program is adhered to by the developer and all future property owners.

- Waste shall be properly stored in sealed containers if stored outside. The preferred method is to store waste either indoors or in a structure with a locking cover to prevent entrance from animals. The containers shall be covered to prevent rainfall from leaching through the household waste.

- Yard maintenance equipment, including lawn mowers and chainsaws shall be stored in a covered area. Periodic maintenance shall be performed on all equipment to ensure that no gas or oil leak into the ground.

- Yard waste shall be disposed in an approved off-site disposal facility or stored on-site in a composting pile.

- Septic systems shall be properly maintained and inspected in accordance with the state environmental code, title 5. A failing septic systems shall be repaired immediately to prevent effluent from discharging into the storm drains. Never discharge gasoline, oils or chemicals into septic systems.

- Gasoline and oils shall be stored in sealed containers and in a covered, secure, and level area to prevent accidental spills. All gasoline, oil, and chemical spills shall be reported to the Fire Department and Regional DEP office.

- Lawn fertilizers and pesticides shall be in sealed containers within a covered area and remain dry. Slow release lawn fertilizers shall be used to limit the amount of fertilizer entering the groundwater. Limit the application of fertilizers to lawn area only. Sweep up any spills on impervious material to prevent runoff into the storm drains.

- Pet waste shall be properly disposed of to prevent bacteria from washing into storm drains. Small amounts of waste can be buried or sealed in a plastic bag and thrown into the trash. The preferred method is to flush the waste down the toilet.

- Snow shall be removed from all parking surfaces and fire truck clearance areas to provide adequate access for all safety vehicles. Snow shall be removed from all catch basin grates to avoid flooding during snow melt. Snow shall be plowed and stored off pavement surface to allow debris and sand to be filtered and removed during the springtime.

- All sand and loam piles stored on-site shall be properly stabilized or covered to prevent sediment from entering the storm drains. All piles shall be contained in a level, upland area and surrounded by a silt fence and/or haybales.

- All structural and non-structural stormwater management facilities shall be maintained to ensure proper working condition during construction and shall be fully maintained in accordance with this plan. The owner shall be responsible for maintaining the site's storm water management system in compliance with Federal, state, and local requirements and in accordance with best management practices. In the event that the Town determines that the owner has materially failed in its obligation to maintain the drainage system in accordance with best management practices and the Stormwater Operation and Maintenance Plan, the Town shall have the right, upon written notice to the Owner, and Owner's failure to remedy the maintenance issue within fifteen (15) days' notice thereof, to enter upon the site to perform the required maintenance. All costs incurred by the Town in connection with its performance of such required maintenance on the site shall be reimbursed by the Owner to the Town within thirty (30) days of the Owner's receipt of the Town's invoice for such costs.

NOAA Atlas 14, Volume 10, Version 3
Location name: Wareham, Massachusetts, USA*
Latitude: 41.763°, Longitude: -70.6817°
Elevation: 27.51 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.294** (0.239-0.358)	**0.364** (0.295-0.444)	**0.479** (0.387-0.585)	**0.574** (0.461-0.704)	**0.705** (0.551-0.894)	**0.803** (0.616-1.03)	**0.907** (0.681-1.20)	**1.03** (0.729-1.37)	**1.21** (0.828-1.65)	**1.36** (0.912-1.88)
10-min	**0.416** (0.338-0.507)	**0.516** (0.418-0.629)	**0.679** (0.549-0.830)	**0.814** (0.654-0.998)	**0.999** (0.781-1.27)	**1.14** (0.873-1.46)	**1.29** (0.964-1.70)	**1.46** (1.03-1.94)	**1.71** (1.17-2.33)	**1.93** (1.29-2.66)
15-min	**0.490** (0.398-0.597)	**0.607** (0.492-0.740)	**0.798** (0.645-0.975)	**0.957** (0.769-1.17)	**1.18** (0.919-1.49)	**1.34** (1.03-1.72)	**1.51** (1.13-2.00)	**1.72** (1.22-2.28)	**2.02** (1.38-2.75)	**2.27** (1.52-3.13)
30-min	**0.707** (0.574-0.861)	**0.874** (0.709-1.07)	**1.15** (0.927-1.40)	**1.37** (1.11-1.68)	**1.69** (1.32-2.14)	**1.92** (1.48-2.47)	**2.17** (1.63-2.87)	**2.46** (1.74-3.27)	**2.89** (1.98-3.94)	**3.25** (2.18-4.49)
60-min	**0.924** (0.750-1.13)	**1.14** (0.925-1.39)	**1.50** (1.21-1.83)	**1.79** (1.44-2.20)	**2.20** (1.72-2.79)	**2.50** (1.92-3.22)	**2.83** (2.12-3.74)	**3.20** (2.27-4.26)	**3.77** (2.58-5.13)	**4.24** (2.84-5.84)
2-hr	**1.24** (1.02-1.51)	**1.55** (1.26-1.87)	**2.04** (1.66-2.47)	**2.44** (1.98-2.98)	**3.00** (2.37-3.79)	**3.42** (2.65-4.38)	**3.87** (2.94-5.11)	**4.41** (3.15-5.82)	**5.22** (3.60-7.05)	**5.92** (4.00-8.10)
3-hr	**1.47** (1.20-1.77)	**1.82** (1.49-2.19)	**2.38** (1.95-2.88)	**2.86** (2.32-3.47)	**3.51** (2.78-4.41)	**3.99** (3.11-5.10)	**4.51** (3.44-5.94)	**5.14** (3.69-6.76)	**6.10** (4.22-8.19)	**6.91** (4.69-9.41)
6-hr	**1.91** (1.58-2.29)	**2.33** (1.92-2.79)	**3.02** (2.48-3.62)	**3.58** (2.93-4.32)	**4.37** (3.48-5.44)	**4.95** (3.88-6.26)	**5.57** (4.27-7.25)	**6.32** (4.56-8.23)	**7.43** (5.18-9.90)	**8.36** (5.72-11.3)
12-hr	**2.42** (2.01-2.88)	**2.89** (2.40-3.44)	**3.66** (3.03-4.36)	**4.30** (3.54-5.14)	**5.17** (4.14-6.37)	**5.83** (4.58-7.28)	**6.52** (5.00-8.36)	**7.31** (5.33-9.45)	**8.45** (5.95-11.2)	**9.40** (6.48-12.6)
24-hr	**2.91** (2.43-3.44)	**3.44** (2.88-4.07)	**4.32** (3.60-5.11)	**5.04** (4.18-5.99)	**6.04** (4.87-7.38)	**6.80** (5.37-8.41)	**7.58** (5.84-9.60)	**8.45** (6.21-10.8)	**9.68** (6.87-12.7)	**10.7** (7.42-14.2)
2-day	**3.35** (2.82-3.93)	**3.98** (3.35-4.67)	**5.01** (4.20-5.89)	**5.86** (4.89-6.92)	**7.04** (5.71-8.54)	**7.93** (6.32-9.74)	**8.86** (6.88-11.1)	**9.88** (7.32-12.6)	**11.3** (8.12-14.7)	**12.5** (8.77-16.5)
3-day	**3.68** (3.11-4.29)	**4.34** (3.67-5.08)	**5.43** (4.57-6.36)	**6.33** (5.31-7.44)	**7.58** (6.17-9.15)	**8.52** (6.81-10.4)	**9.50** (7.40-11.9)	**10.6** (7.87-13.4)	**12.1** (8.69-15.6)	**13.3** (9.37-17.4)
4-day	**3.97** (3.36-4.62)	**4.65** (3.94-5.42)	**5.77** (4.87-6.73)	**6.69** (5.62-7.84)	**7.97** (6.50-9.57)	**8.93** (7.16-10.9)	**9.93** (7.75-12.4)	**11.0** (8.23-13.9)	**12.5** (9.04-16.1)	**13.7** (9.70-17.9)
7-day	**4.74** (4.04-5.49)	**5.45** (4.64-6.31)	**6.61** (5.61-7.67)	**7.57** (6.40-8.82)	**8.90** (7.30-10.6)	**9.91** (7.98-11.9)	**10.9** (8.56-13.4)	**12.0** (9.04-15.0)	**13.5** (9.80-17.2)	**14.6** (10.4-18.9)
10-day	**5.45** (4.66-6.29)	**6.18** (5.28-7.14)	**7.38** (6.29-8.54)	**8.38** (7.10-9.73)	**9.75** (8.03-11.6)	**10.8** (8.72-13.0)	**11.9** (9.30-14.5)	**12.9** (9.78-16.1)	**14.3** (10.5-18.2)	**15.4** (11.0-19.9)
20-day	**7.55** (6.50-8.66)	**8.37** (7.20-9.60)	**9.72** (8.33-11.2)	**10.8** (9.24-12.5)	**12.4** (10.2-14.5)	**13.6** (11.0-16.1)	**14.7** (11.6-17.7)	**15.8** (12.1-19.5)	**17.2** (12.7-21.7)	**18.2** (13.1-23.2)
30-day	**9.32** (8.06-10.6)	**10.2** (8.82-11.7)	**11.7** (10.1-13.4)	**12.9** (11.1-14.8)	**14.6** (12.1-17.0)	**15.9** (12.9-18.7)	**17.2** (13.5-20.5)	**18.3** (14.0-22.5)	**19.7** (14.6-24.7)	**20.7** (15.0-26.2)
45-day	**11.5** (10.0-13.1)	**12.5** (10.9-14.3)	**14.2** (12.2-16.1)	**15.5** (13.3-17.7)	**17.4** (14.5-20.2)	**18.8** (15.4-22.1)	**20.2** (16.0-24.0)	**21.4** (16.5-26.2)	**22.9** (17.0-28.5)	**23.8** (17.3-30.0)
60-day	**13.4** (11.7-15.2)	**14.5** (12.6-16.4)	**16.3** (14.1-18.5)	**17.7** (15.3-20.2)	**19.7** (16.5-22.8)	**21.3** (17.5-24.9)	**22.8** (18.1-26.9)	**24.1** (18.6-29.3)	**25.5** (19.1-31.7)	**26.4** (19.3-33.3)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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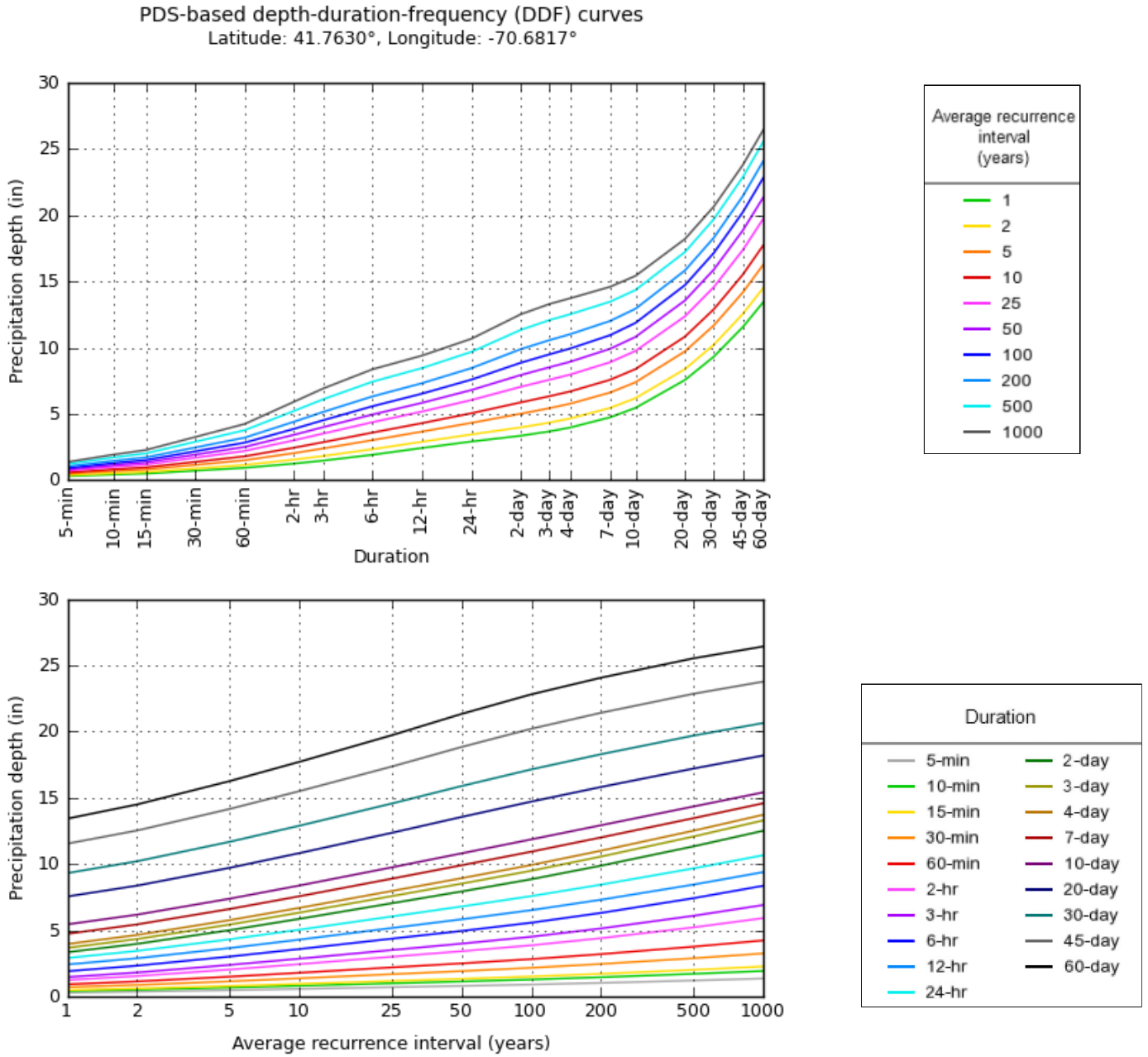
PF graphical



NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Wed May 5 14:52:15 2021

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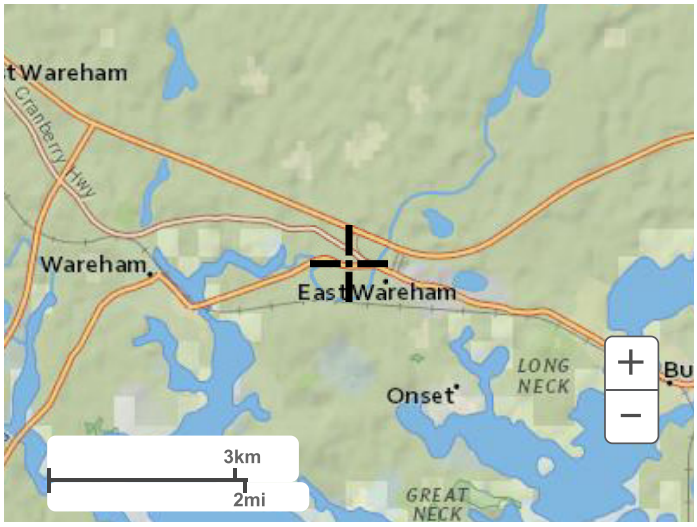
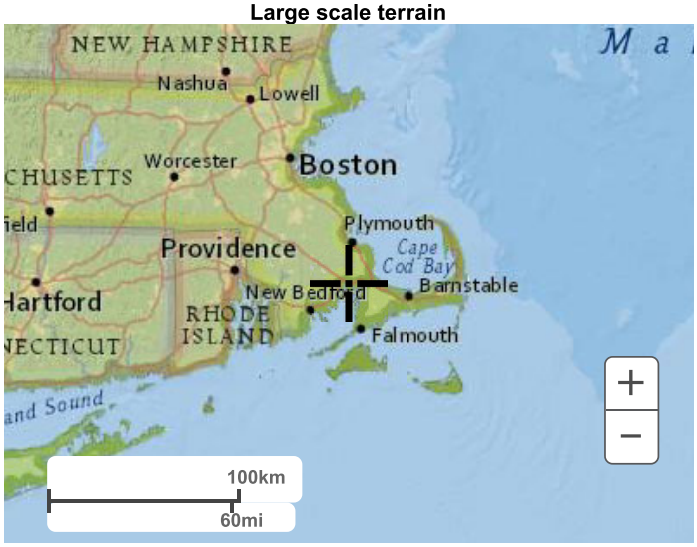
Maps & aerials

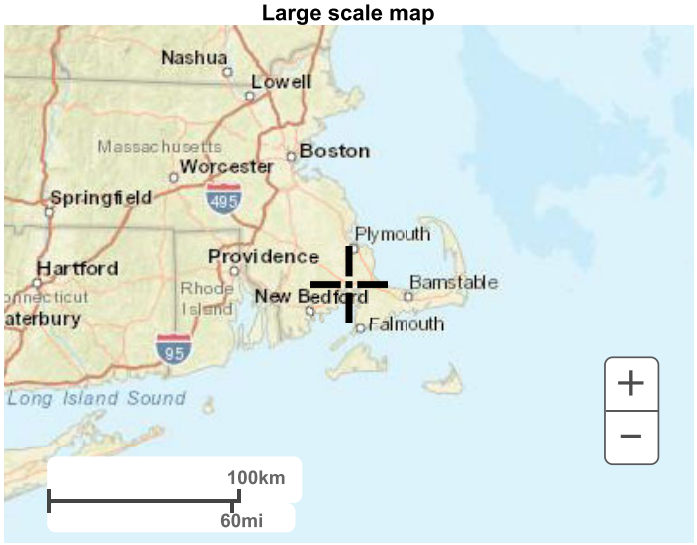
Small scale terrain



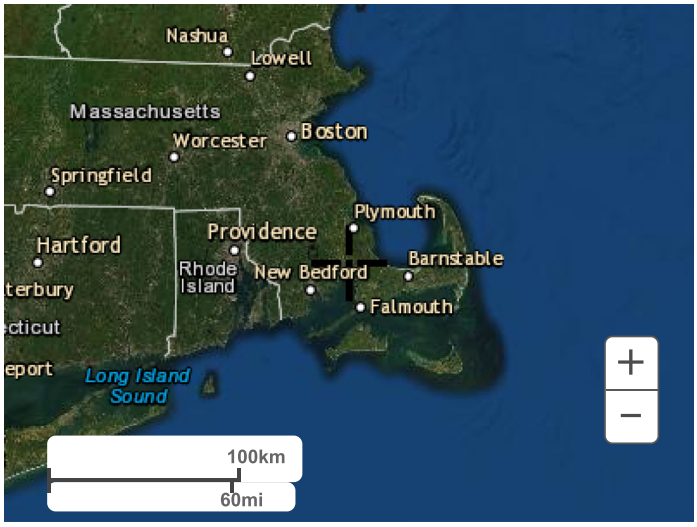
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

P.B. 49 PG 1049

EX-DA1
63,627 S.F.

EX-DA2
52,840 S.F.

DP-1
(OFFSITE- ROUTE 6)

DP-2
(OFFSITE-EAST)

MAP 133
LOT 1099
N/F
WESTGATE

MAP 133
LOT 1100A
AREA = 35,417± SQ.FT.

MAP 133
LOT 1097
N/F DIXON

MAP 133
LOT 1101A
AREA = 48,184± SQ.FT.

MAP 133
LOT 1078
N/F ANGUS

PLYMOUTH ROAD (PRIVATE-ANCIENT WAY)

SANDWICH ROAD (ROUTE 6)
(1933 STATE HIGHWAY LAYOUT - PUBLIC - 50' WIDE)

CRANBERRY HIGHWAY (ROUTE 28)
(1949 STATE HIGHWAY LAYOUT - PUBLIC - VARIABLE WIDTH)

1949 S.H.L.O BASELINE

1933 S.H.L.O BASELINE

CAMPINHA WAY

Tc PATH →

A
B
C
D
E

S78° 26' 08"E 82.09'
S31° 34' 20"W 126.76'
N00° 13' 10"W 146.49'
S05° 13' 52"E 75.36'
N89° 22' 27"E 229.54'
N03° 32' 33"W 79.46'
S35° 03' 30"E 166.76'
S88° 59' 50"W 223.31'
S88° 59' 50"W 226.50'
S88° 59' 50"W 25.96'
S01° 15' 10"E 100.00'
S54°56'30"W 53.68'
S54°56'30"W 80.00'
S54°56'30"W 80.00'
+ 864.47
+ 928.55

#5 EXISTING DWELLING
#1 EXISTING DWELLING
#246 EXISTING OFFICE BUILDING
EXISTING STRUCTURE (LOCATION APPROX.)
EXISTING DWELLING (LOCATION APPROX.)
EXISTING DWELLING (LOCATION APPROX.)
EXISTING DWELLING (LOCATION APPROX.)

EXISTING TREELINE
EXISTING LOT LINE
EDGE OF PAVEMENT
EDGE OF CURB
EX. STONE WALL
EX. 5-FT BIT SIDEWALK
BIT. DRIVE
EX. WATER SHUTOFF (TYP)
UP #751
EX. CB (CURB INLET) RIM=20.92'
EX. CB (CURB INLET) RIM=20.76'
EX. DMH
EX. EOP
'EMMANUEL CHURCH OF THE NAZARENE' SIGN TO REMAIN
'SPEED LIMIT 45' SIGN (R2-1)
'ROUTE 6 WEST' SIGN (M1-4)
'UPPER CAPE REALTY' SIGN
W11-2
UP # 748
UP # 749
UP # 19-75
UP # 19-76
UP # 19-77

24" OAK
48" OAK
36" OAK
18" OAK
32" OAK
24" PINE
36" OAK
16" MAPLE
18" PINE

Benchmark #1
Nail in U.P 749'
Elevation = 26.56'
Approx. M.S.L.

Benchmark #2
Nail in Utility Pole
Elevation = 23.14'
Approx. M.S.L

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

EXISTING DRAINAGE AREAS PLAN

AT

238 & 240 SANDWICH ROAD (ROUTE 6)

IN

WAREHAM, MASSACHUSETTS

(PLYMOUTH COUNTY)

DATE: MAY 21, 2021

JCE: 435

P.B. 49 PG 1049

PR-DA1a
13,444 S.F.

PR-DA2a
44,443 S.F.

PR-DA-R2
8,465 S.F.

PR-DA-R3
6,758 S.F.

PR-DA-R1
7,860 S.F.

PR-DA1b
3,615 S.F.

PR-DA2b
11,593 S.F.

PR-DA1c
9,508 S.F.

PR-DA1d
3,109 S.F.

PR-DA2c
7,672 S.F.

DP-1
(OFFSITE- ROUTE 6)

DP-2
(OFFSITE-EAST)

MAP 133
LOT 1097
N/F DIXON

MAP 133
LOT 1099
N/F
WESTGATE

MAP 133
LOT 1078
N/F ANGUS

PLYMOUTH ROAD (PRIVATE-ANCIENT WAY)

EDGE OF PAVEMENT

CRANBERRY HIGHWAY (ROUTE 28)
(1949 STATE HIGHWAY LAYOUT - PUBLIC - VARIABLE WIDTH)

1949 S.H.L.O BASELINE

SANDWICH ROAD (ROUTE 6)
(1933 STATE HIGHWAY LAYOUT - PUBLIC - 50' WIDE)

1933 S.H.L.O BASELINE

CAMPINHA WAY

Benchmark #1
Nail in U.P 749
Elevation = 26.56'
Approx. M.S.L.

Benchmark #2
Nail in Utility Pole
Elevation = 23.14'
Approx. M.S.L

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

PROPOSED DRAINAGE AREAS PLAN

AT

238 & 240 SANDWICH ROAD (ROUTE 6)

IN

WAREHAM, MASSACHUSETTS

(PLYMOUTH COUNTY)

DATE: MAY 21, 2021

JCE: 435