Architecture
Engineering
Environmental
Land Surveying
Companies

An Employee-Owned Company

January 27, 2022

Andrew Bevilacqua, P.E. Town Engineer
Town of North Haven
18 Church Street
North Haven, CT 06473

Re: Planning and Zoning Comments
#P21-29 & #P212-29A
48 Giles Avenue

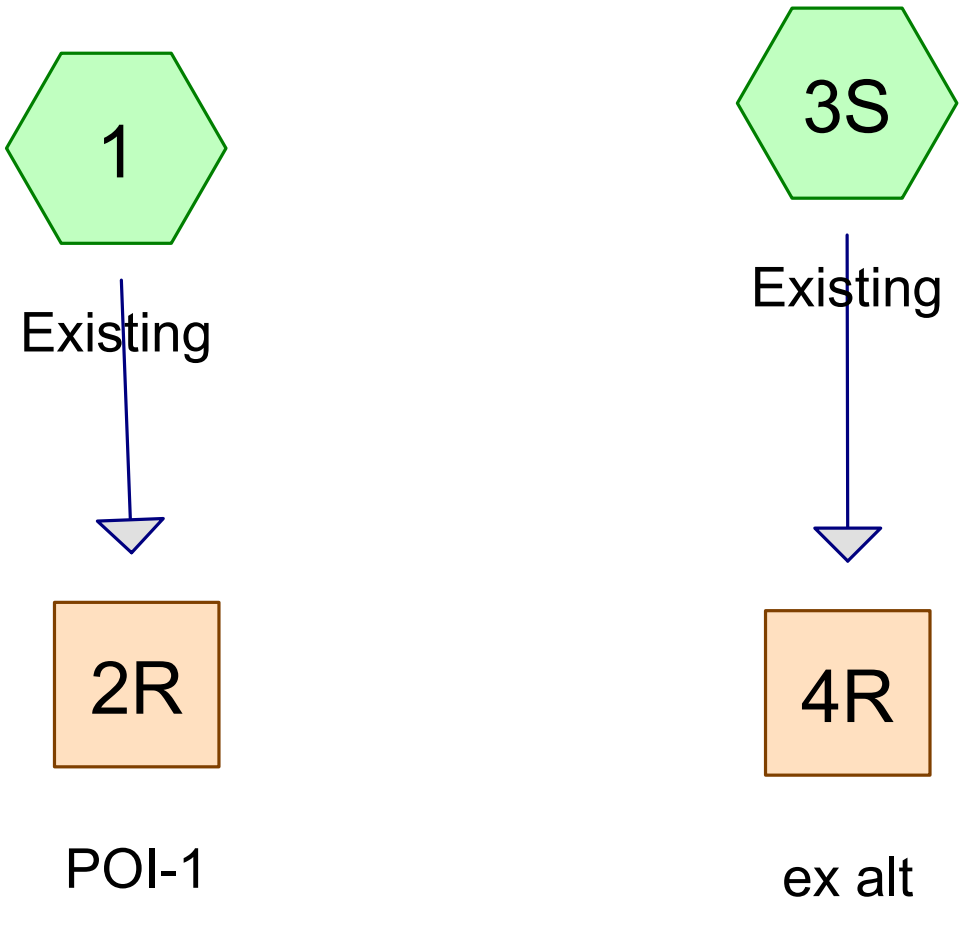
Dear Mr. Bevilacqua:

Below is a summary of our response to your latest comments:

- 1. Adjust TC for post development: **we adjusted the proposed overall TC from 17.8 to 12.3 (to be below the existing 12.8) This resulted in a minor increase in CFS for 2-yr event and maintained reduction in CFS for the remainder of the design storms. See table below:**

PEAK FLOW (CFS)					
STORM	EXISTING (GRASS)	EXISTING (GRAVEL)	PROPOSED	PROPOSED CHANGE VS GRASS	PROPOSED CHANGE VS GRAVEL
2 YEAR	5.07	9.78	10.11	+5.04	+0.33
10 YEAR	12.09	18.33	16.53	+4.44	-1.8
25 YEAR	15.51	22.22	19.34	+3.83	-2.88
100 YEAR	22.74	30.25	24.94	+2.2	-5.31

- 3. Inspection and Maintenance plan: **see attached "Site Operations and Maintenance Plan"**
- 10. Revise sheet GU-1 perforated pipe: **see attached revised plan GU-1**
- 11. Provide construction details: **see attached plan DN-3**



Subcat Reach Pond Link

Routing Diagram for 07c2352 Existing-NEW
Prepared by {enter your company name here}, Printed 12/1/2021

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
8.649	61	>75% Grass cover, Good, HSG B (1, 3S)
4.972	98	Paved parking & roofs (1, 3S)
13.621	**75**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
8.649	HSG B	1, 3S
0.000	HSG C	
0.000	HSG D	
4.972	Other	1, 3S
13.621		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	8.649	0.000	0.000	0.000	8.649	>75% Grass cover, Good	1, 3S
0.000	0.000	0.000	0.000	4.972	4.972	Paved parking & roofs	1, 3S
0.000	**8.649**	**0.000**	**0.000**	**4.972**	**13.621**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Existing Runoff Area=296,670 sf 22.88% Impervious Runoff Depth>0.81"
Flow Length=369' Tc=12.8 min CN=69 Runoff=5.07 cfs 0.457 af

Subcatchment3S: Existing Runoff Area=296,670 sf 50.13% Impervious Runoff Depth>1.44"
Flow Length=369' Tc=12.8 min CN=80 Runoff=9.78 cfs 0.816 af

Reach 2R: POI-1 Inflow=5.07 cfs 0.457 af
Outflow=5.07 cfs 0.457 af

Reach 4R: ex alt Inflow=9.78 cfs 0.816 af
Outflow=9.78 cfs 0.816 af

Total Runoff Area = 13.621 ac Runoff Volume = 1.273 af Average Runoff Depth = 1.12"
63.50% Pervious = 8.649 ac 36.50% Impervious = 4.972 ac

Summary for Subcatchment 1: Existing

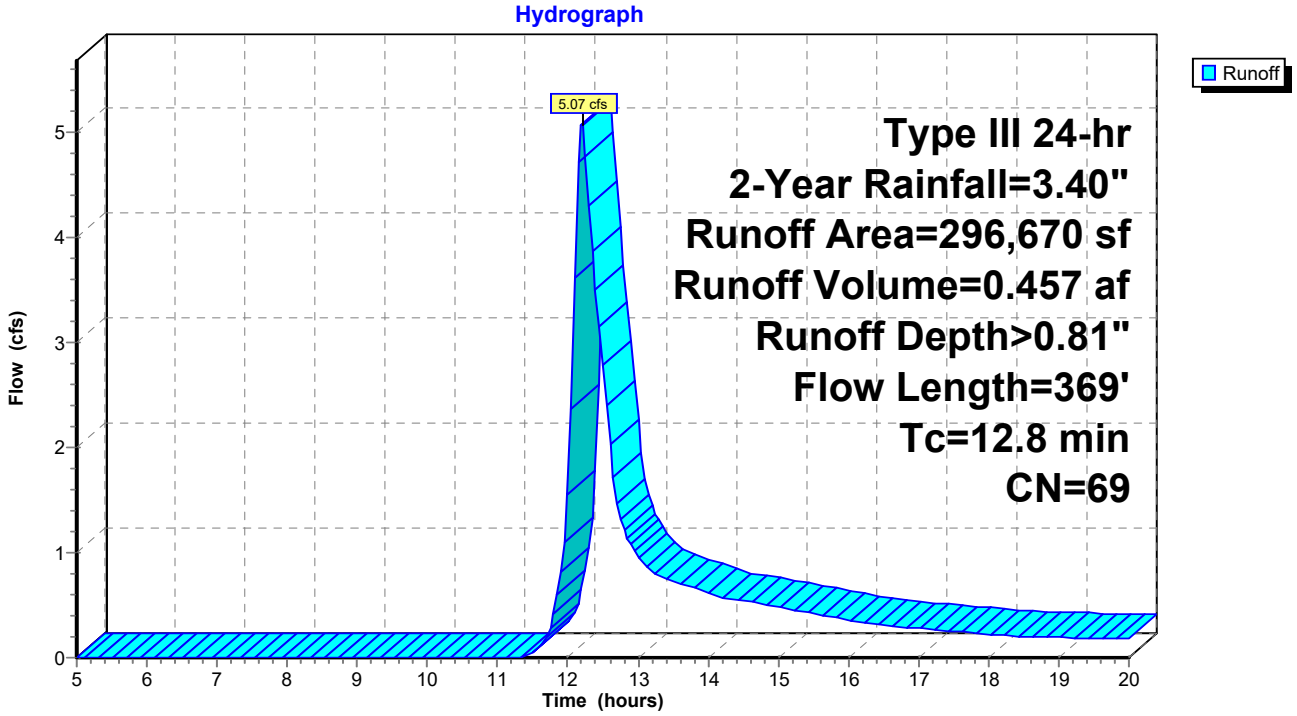
Runoff = 5.07 cfs @ 12.20 hrs, Volume= 0.457 af, Depth> 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (sf)	CN	Description
67,880	98	Paved parking & roofs
228,790	61	>75% Grass cover, Good, HSG B
296,670	69	Weighted Average
228,790		77.12% Pervious Area
67,880		22.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	160	0.0312	0.23		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
1.0	151	0.0265	2.62		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.2	58	0.0369	3.90		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
12.8	369	Total			

Subcatchment 1: Existing



Summary for Subcatchment 3S: Existing

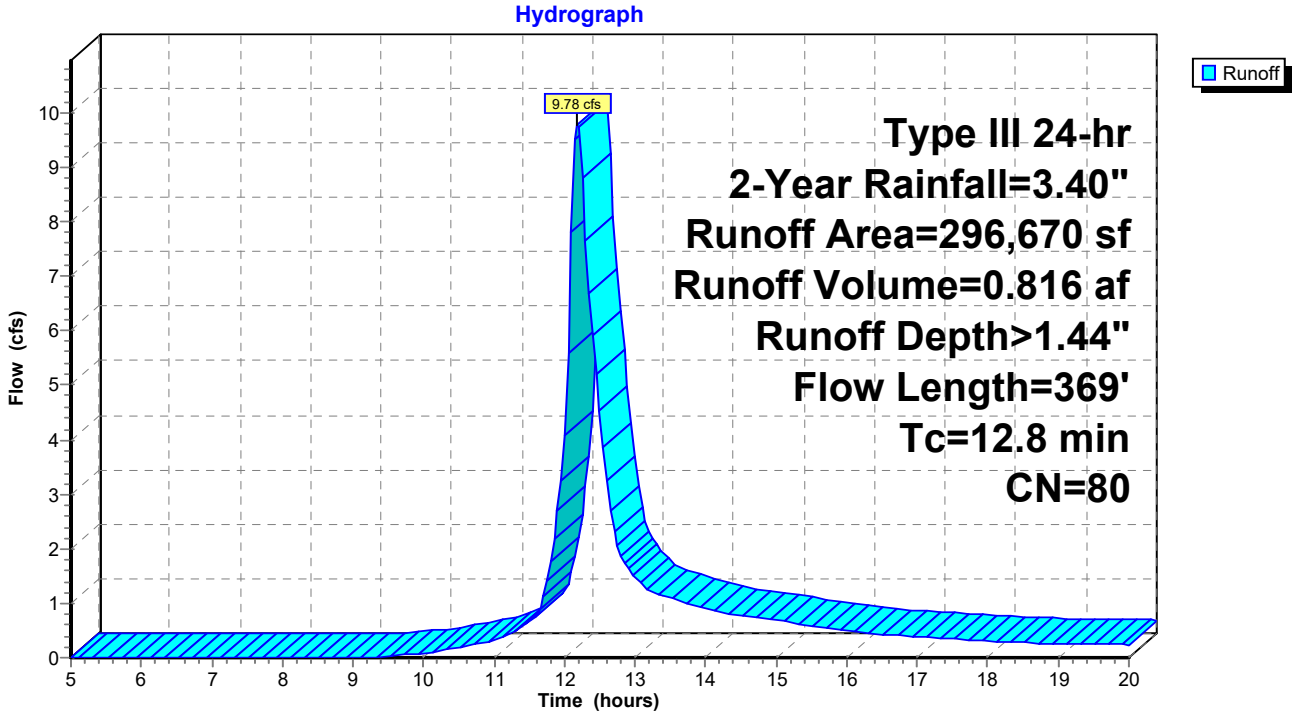
Runoff = 9.78 cfs @ 12.18 hrs, Volume= 0.816 af, Depth> 1.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (sf)	CN	Description
148,715	98	Paved parking & roofs
147,955	61	>75% Grass cover, Good, HSG B
296,670	80	Weighted Average
147,955		49.87% Pervious Area
148,715		50.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	160	0.0312	0.23		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
1.0	151	0.0265	2.62		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.2	58	0.0369	3.90		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
12.8	369	Total			

Subcatchment 3S: Existing

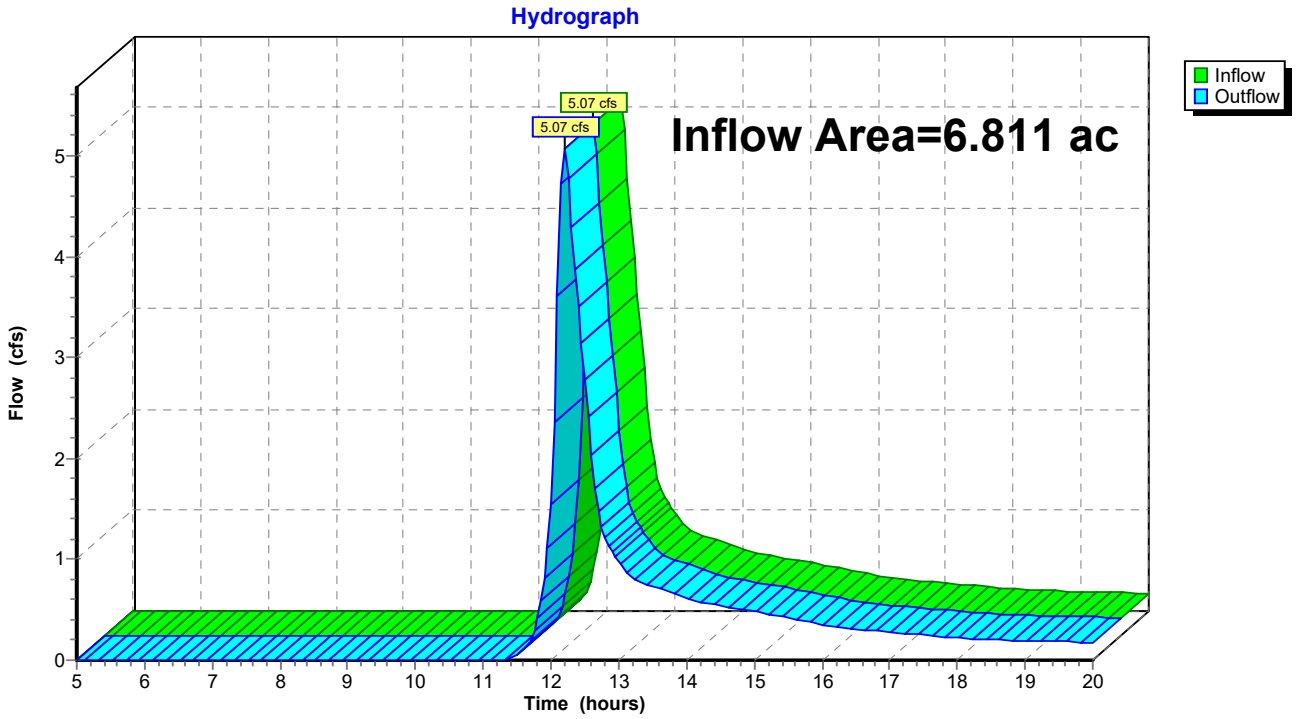


Summary for Reach 2R: POI-1

Inflow Area = 6.811 ac, 22.88% Impervious, Inflow Depth > 0.81" for 2-Year event
Inflow = 5.07 cfs @ 12.20 hrs, Volume= 0.457 af
Outflow = 5.07 cfs @ 12.20 hrs, Volume= 0.457 af, Atten= 0%, Lag= 0.0 min

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

Reach 2R: POI-1

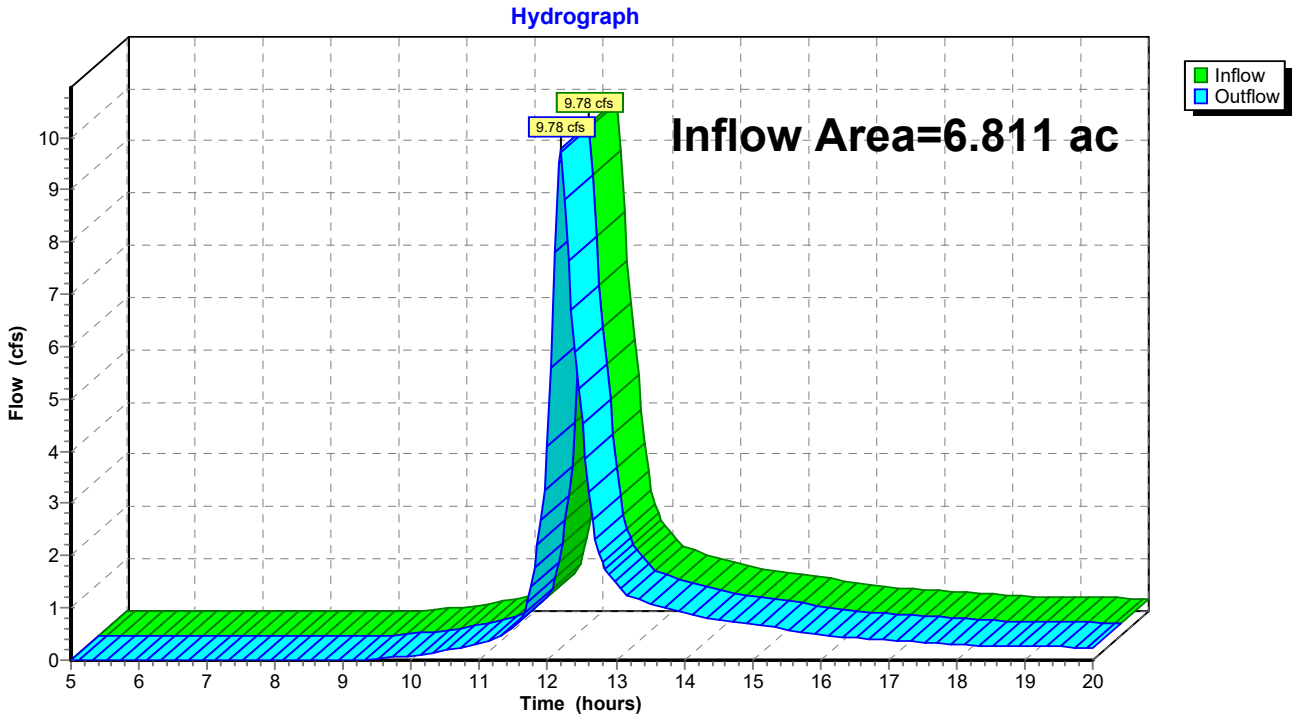


Summary for Reach 4R: ex alt

Inflow Area = 6.811 ac, 50.13% Impervious, Inflow Depth > 1.44" for 2-Year event
Inflow = 9.78 cfs @ 12.18 hrs, Volume= 0.816 af
Outflow = 9.78 cfs @ 12.18 hrs, Volume= 0.816 af, Atten= 0%, Lag= 0.0 min

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

Reach 4R: ex alt



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Existing Runoff Area=296,670 sf 22.88% Impervious Runoff Depth>1.79"
Flow Length=369' Tc=12.8 min CN=69 Runoff=12.09 cfs 1.018 af

Subcatchment3S: Existing Runoff Area=296,670 sf 50.13% Impervious Runoff Depth>2.70"
Flow Length=369' Tc=12.8 min CN=80 Runoff=18.33 cfs 1.530 af

Reach 2R: POI-1 Inflow=12.09 cfs 1.018 af
Outflow=12.09 cfs 1.018 af

Reach 4R: ex alt Inflow=18.33 cfs 1.530 af
Outflow=18.33 cfs 1.530 af

Total Runoff Area = 13.621 ac Runoff Volume = 2.549 af Average Runoff Depth = 2.25"
63.50% Pervious = 8.649 ac 36.50% Impervious = 4.972 ac

Summary for Subcatchment 1: Existing

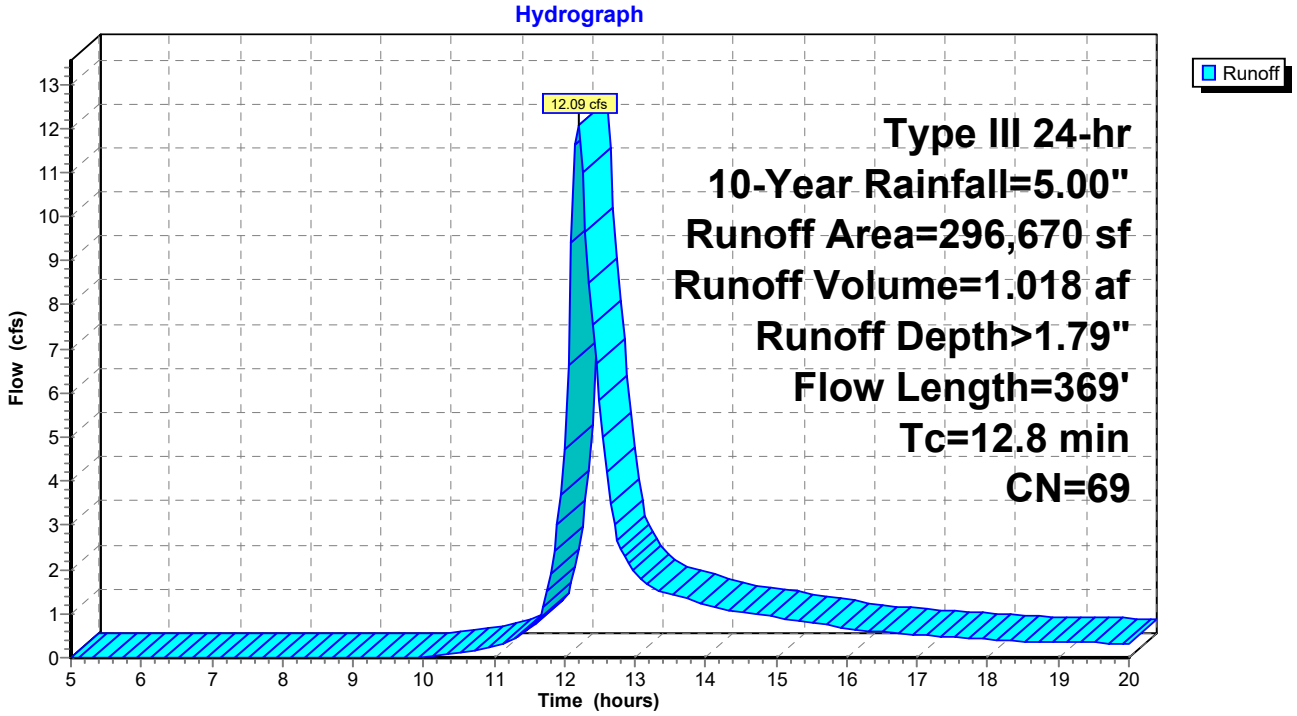
Runoff = 12.09 cfs @ 12.19 hrs, Volume= 1.018 af, Depth> 1.79"

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

Area (sf)	CN	Description
67,880	98	Paved parking & roofs
228,790	61	>75% Grass cover, Good, HSG B
296,670	69	Weighted Average
228,790		77.12% Pervious Area
67,880		22.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	160	0.0312	0.23		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
1.0	151	0.0265	2.62		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.2	58	0.0369	3.90		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
12.8	369	Total			

Subcatchment 1: Existing



Summary for Subcatchment 3S: Existing

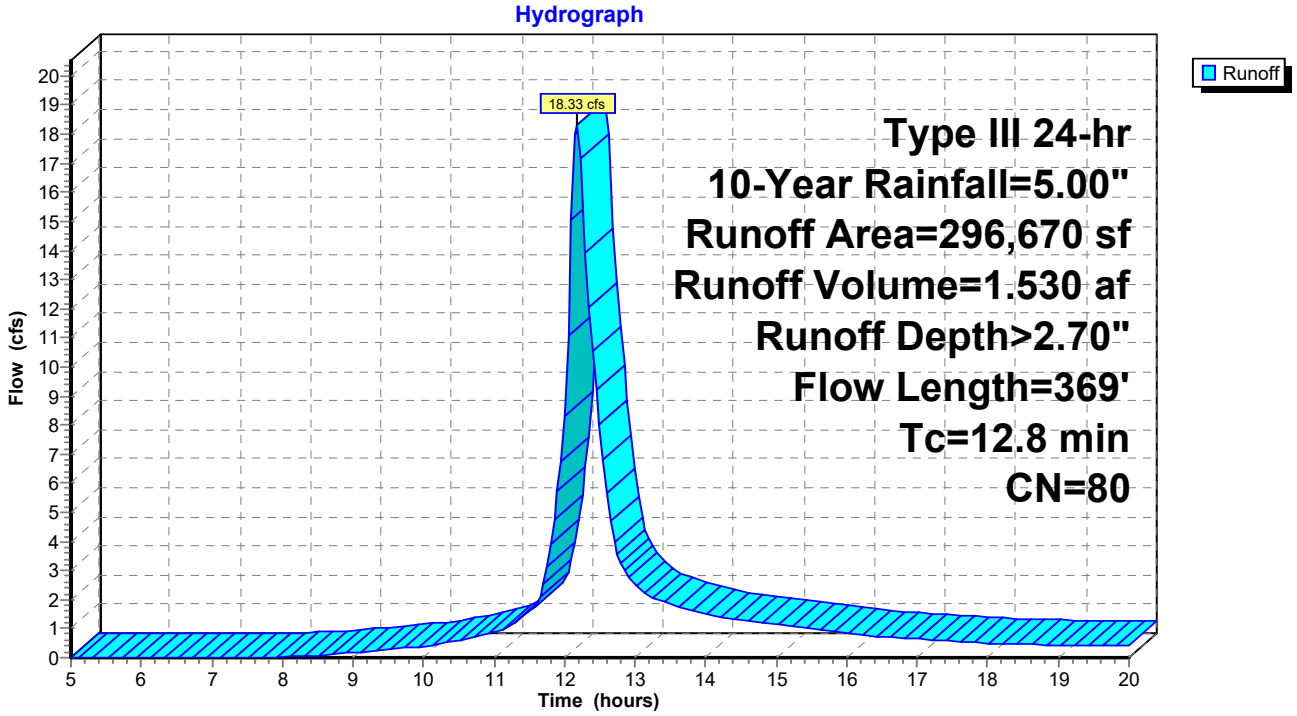
Runoff = 18.33 cfs @ 12.18 hrs, Volume= 1.530 af, Depth> 2.70"

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

Area (sf)	CN	Description
148,715	98	Paved parking & roofs
147,955	61	>75% Grass cover, Good, HSG B
296,670	80	Weighted Average
147,955		49.87% Pervious Area
148,715		50.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	160	0.0312	0.23		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
1.0	151	0.0265	2.62		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.2	58	0.0369	3.90		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
12.8	369	Total			

Subcatchment 3S: Existing

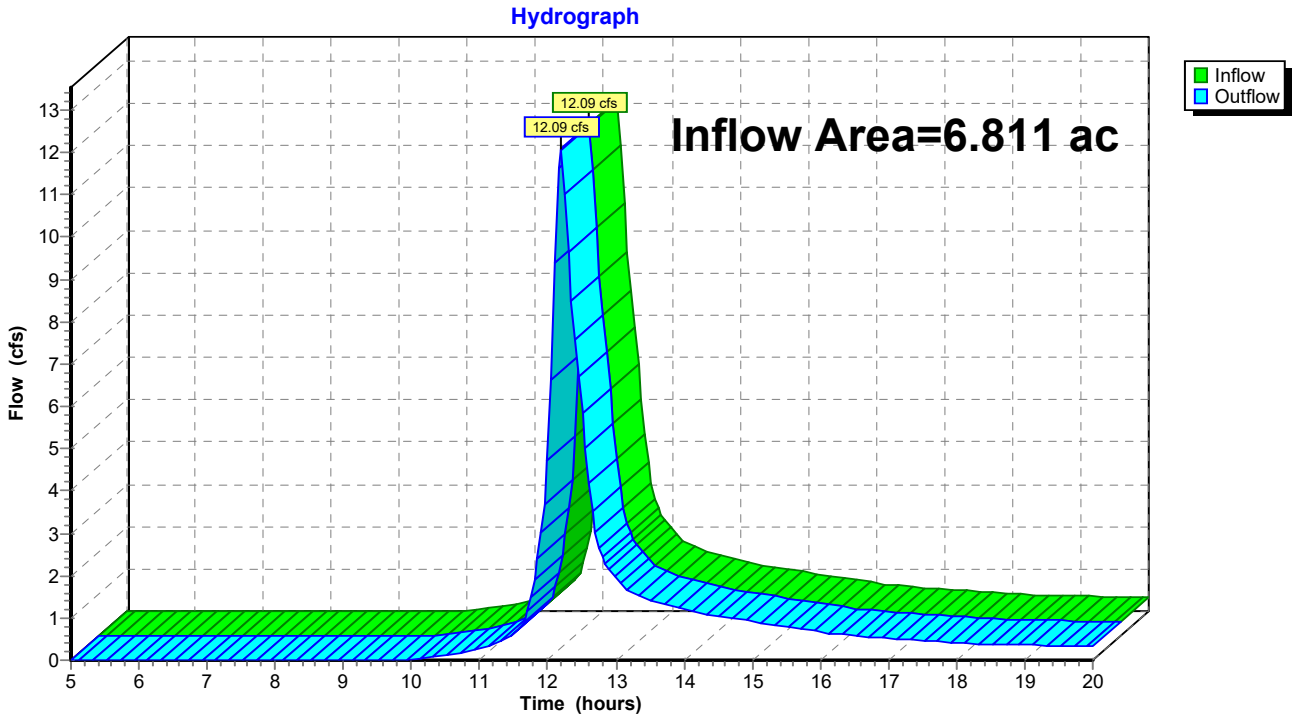


Summary for Reach 2R: POI-1

Inflow Area = 6.811 ac, 22.88% Impervious, Inflow Depth > 1.79" for 10-Year event
Inflow = 12.09 cfs @ 12.19 hrs, Volume= 1.018 af
Outflow = 12.09 cfs @ 12.19 hrs, Volume= 1.018 af, Atten= 0%, Lag= 0.0 min

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

Reach 2R: POI-1

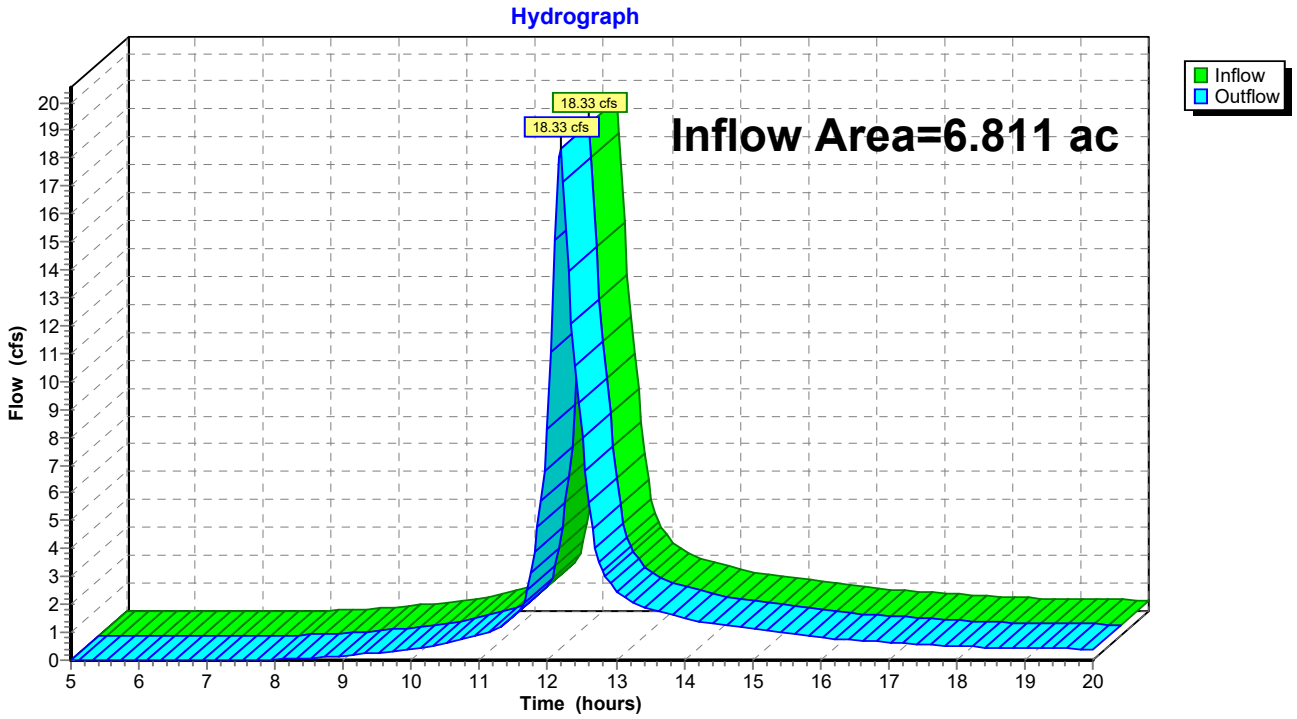


Summary for Reach 4R: ex alt

Inflow Area = 6.811 ac, 50.13% Impervious, Inflow Depth > 2.70" for 10-Year event
Inflow = 18.33 cfs @ 12.18 hrs, Volume= 1.530 af
Outflow = 18.33 cfs @ 12.18 hrs, Volume= 1.530 af, Atten= 0%, Lag= 0.0 min

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

Reach 4R: ex alt



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Existing Runoff Area=296,670 sf 22.88% Impervious Runoff Depth>2.28"
Flow Length=369' Tc=12.8 min CN=69 Runoff=15.51 cfs 1.297 af

Subcatchment3S: Existing Runoff Area=296,670 sf 50.13% Impervious Runoff Depth>3.28"
Flow Length=369' Tc=12.8 min CN=80 Runoff=22.22 cfs 1.863 af

Reach 2R: POI-1 Inflow=15.51 cfs 1.297 af
Outflow=15.51 cfs 1.297 af

Reach 4R: ex alt Inflow=22.22 cfs 1.863 af
Outflow=22.22 cfs 1.863 af

Total Runoff Area = 13.621 ac Runoff Volume = 3.159 af Average Runoff Depth = 2.78"
63.50% Pervious = 8.649 ac 36.50% Impervious = 4.972 ac

Summary for Subcatchment 1: Existing

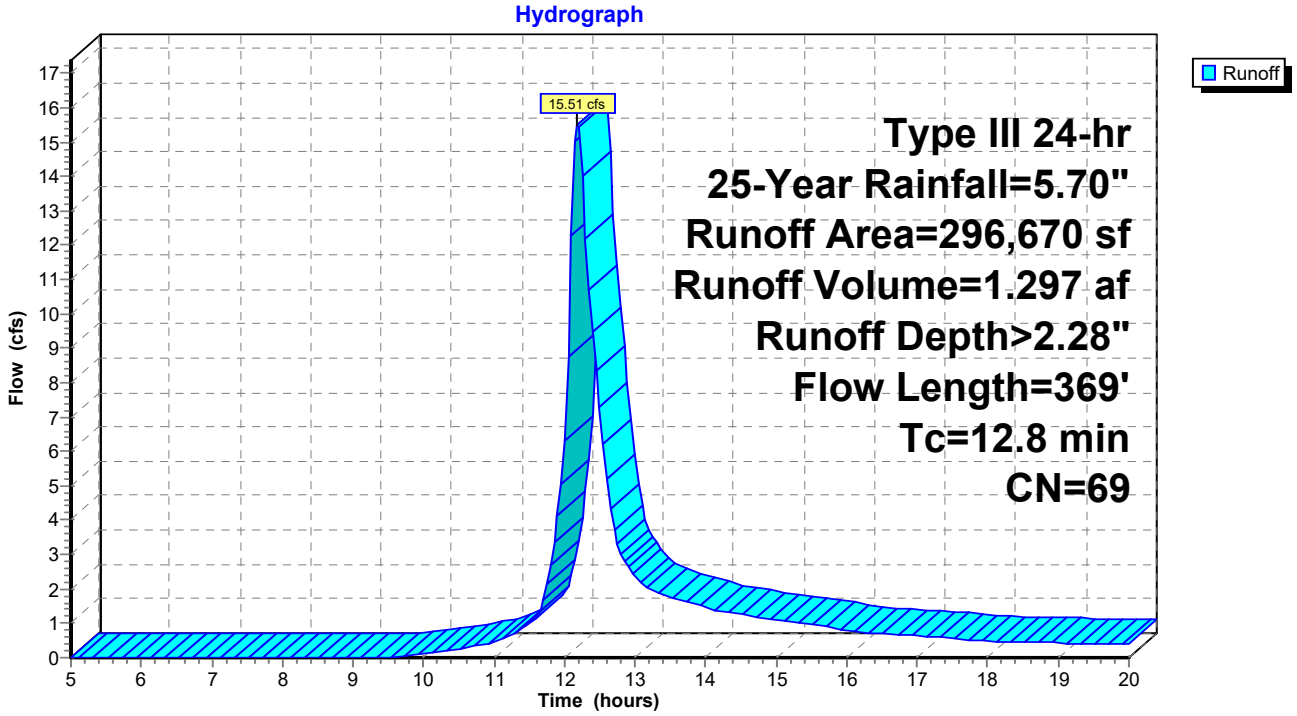
Runoff = 15.51 cfs @ 12.19 hrs, Volume= 1.297 af, Depth> 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (sf)	CN	Description
67,880	98	Paved parking & roofs
228,790	61	>75% Grass cover, Good, HSG B
296,670	69	Weighted Average
228,790		77.12% Pervious Area
67,880		22.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	160	0.0312	0.23		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
1.0	151	0.0265	2.62		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.2	58	0.0369	3.90		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
12.8	369	Total			

Subcatchment 1: Existing



Summary for Subcatchment 3S: Existing

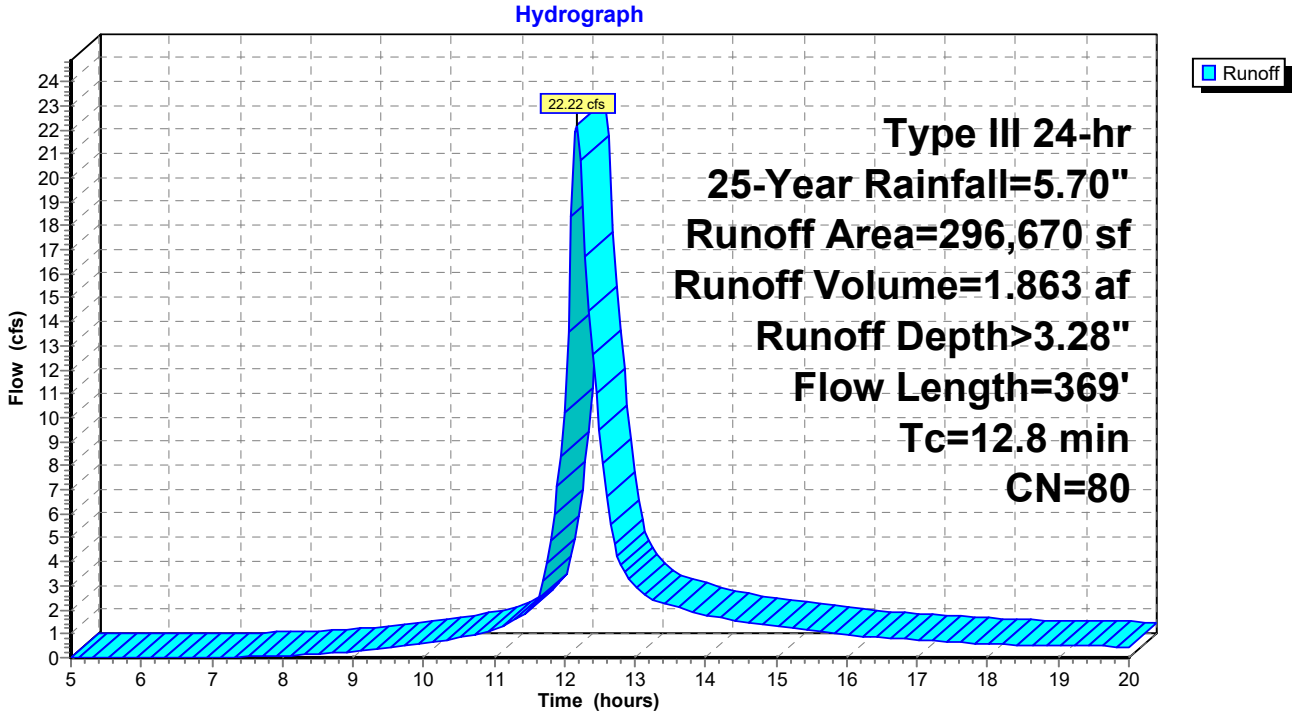
Runoff = 22.22 cfs @ 12.18 hrs, Volume= 1.863 af, Depth> 3.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (sf)	CN	Description
148,715	98	Paved parking & roofs
147,955	61	>75% Grass cover, Good, HSG B
296,670	80	Weighted Average
147,955		49.87% Pervious Area
148,715		50.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	160	0.0312	0.23		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
1.0	151	0.0265	2.62		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.2	58	0.0369	3.90		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
12.8	369	Total			

Subcatchment 3S: Existing

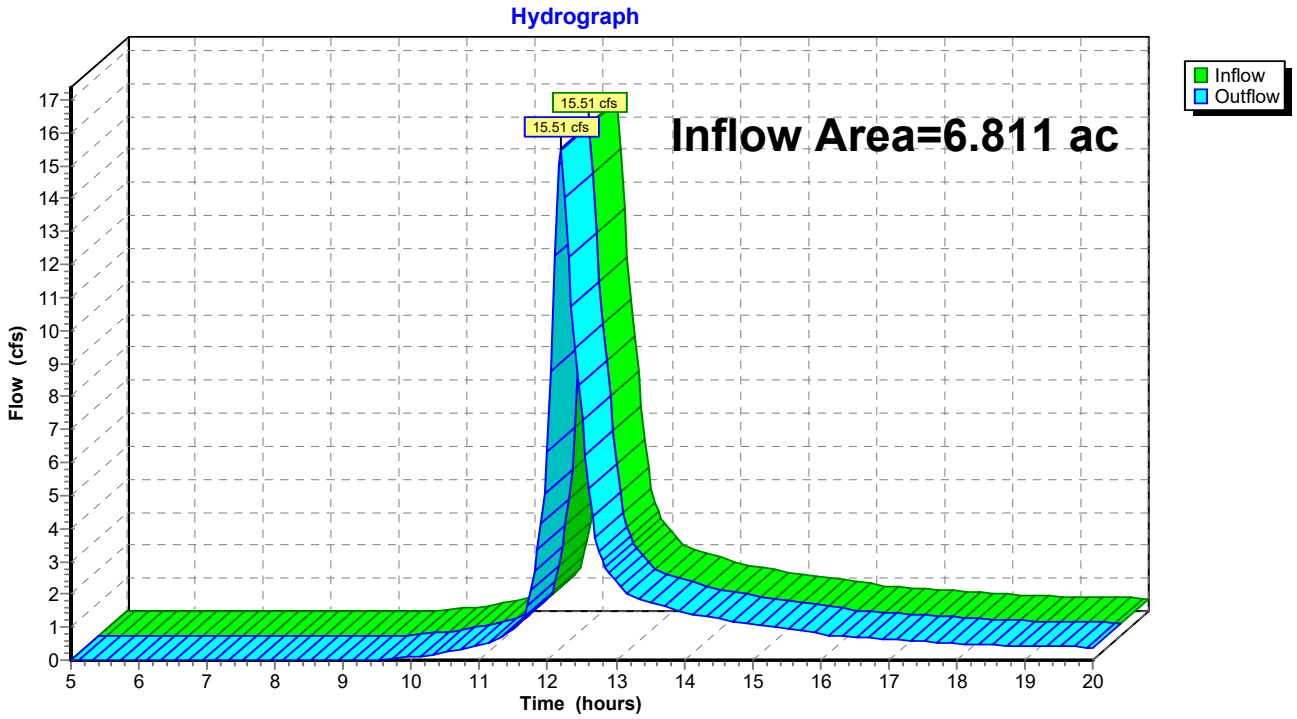


Summary for Reach 2R: POI-1

Inflow Area = 6.811 ac, 22.88% Impervious, Inflow Depth > 2.28" for 25-Year event
Inflow = 15.51 cfs @ 12.19 hrs, Volume= 1.297 af
Outflow = 15.51 cfs @ 12.19 hrs, Volume= 1.297 af, Atten= 0%, Lag= 0.0 min

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

Reach 2R: POI-1

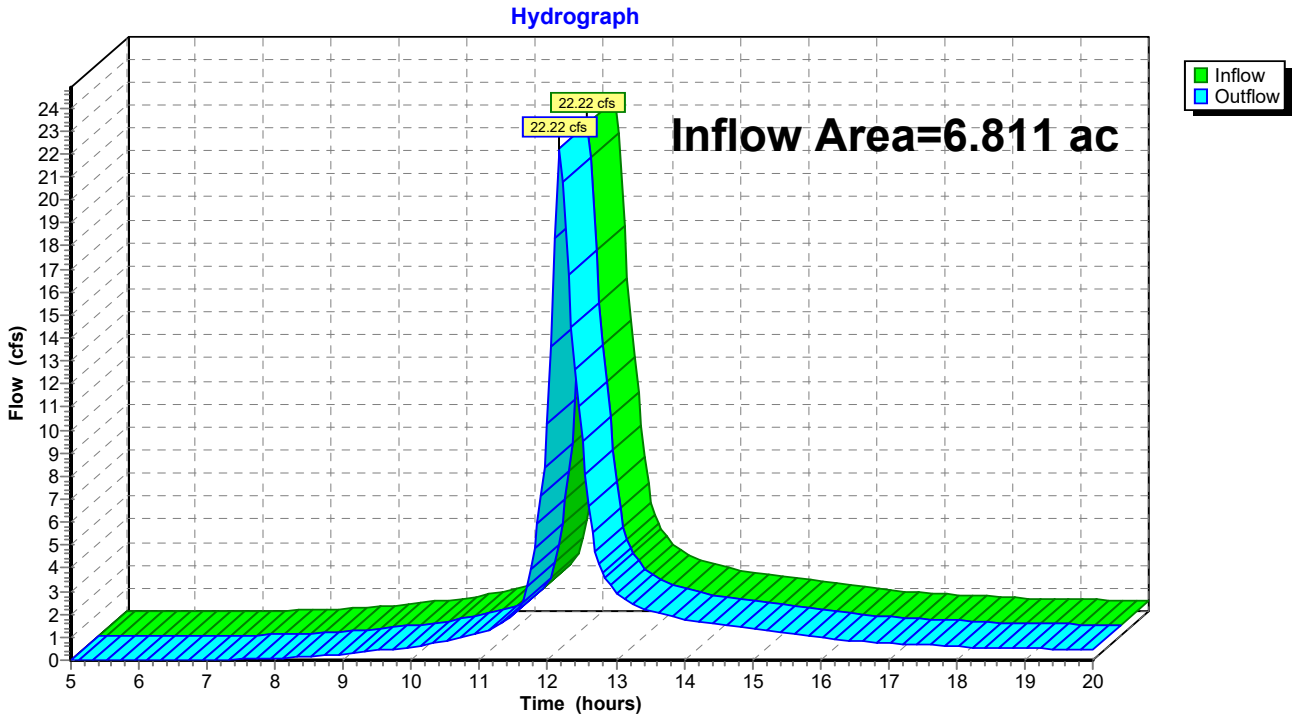


Summary for Reach 4R: ex alt

Inflow Area = 6.811 ac, 50.13% Impervious, Inflow Depth > 3.28" for 25-Year event
Inflow = 22.22 cfs @ 12.18 hrs, Volume= 1.863 af
Outflow = 22.22 cfs @ 12.18 hrs, Volume= 1.863 af, Atten= 0%, Lag= 0.0 min

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

Reach 4R: ex alt



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1: Existing Runoff Area=296,670 sf 22.88% Impervious Runoff Depth>3.33"
Flow Length=369' Tc=12.8 min CN=69 Runoff=22.74 cfs 1.892 af

Subcatchment3S: Existing Runoff Area=296,670 sf 50.13% Impervious Runoff Depth>4.49"
Flow Length=369' Tc=12.8 min CN=80 Runoff=30.25 cfs 2.549 af

Reach 2R: POI-1 Inflow=22.74 cfs 1.892 af
Outflow=22.74 cfs 1.892 af

Reach 4R: ex alt Inflow=30.25 cfs 2.549 af
Outflow=30.25 cfs 2.549 af

Total Runoff Area = 13.621 ac Runoff Volume = 4.440 af Average Runoff Depth = 3.91"
63.50% Pervious = 8.649 ac 36.50% Impervious = 4.972 ac

Summary for Subcatchment 1: Existing

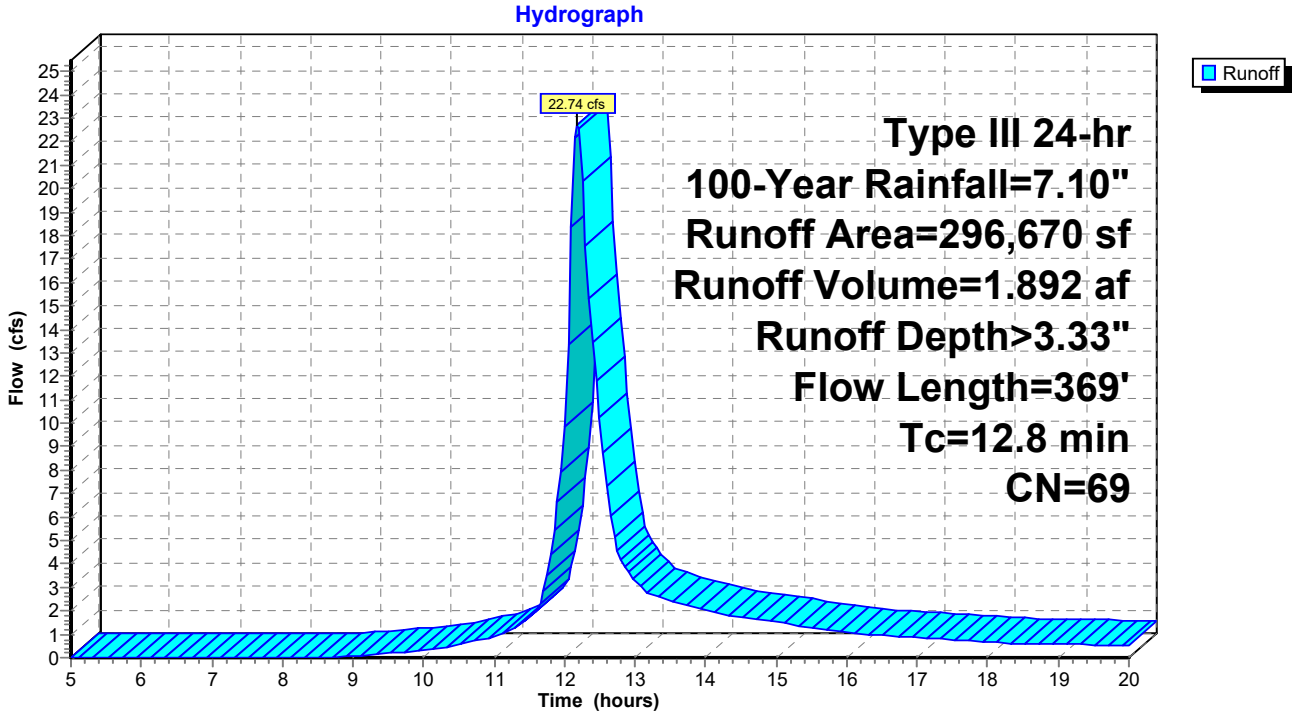
Runoff = 22.74 cfs @ 12.18 hrs, Volume= 1.892 af, Depth> 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (sf)	CN	Description
67,880	98	Paved parking & roofs
228,790	61	>75% Grass cover, Good, HSG B
296,670	69	Weighted Average
228,790		77.12% Pervious Area
67,880		22.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	160	0.0312	0.23		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
1.0	151	0.0265	2.62		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.2	58	0.0369	3.90		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
12.8	369	Total			

Subcatchment 1: Existing



Summary for Subcatchment 3S: Existing

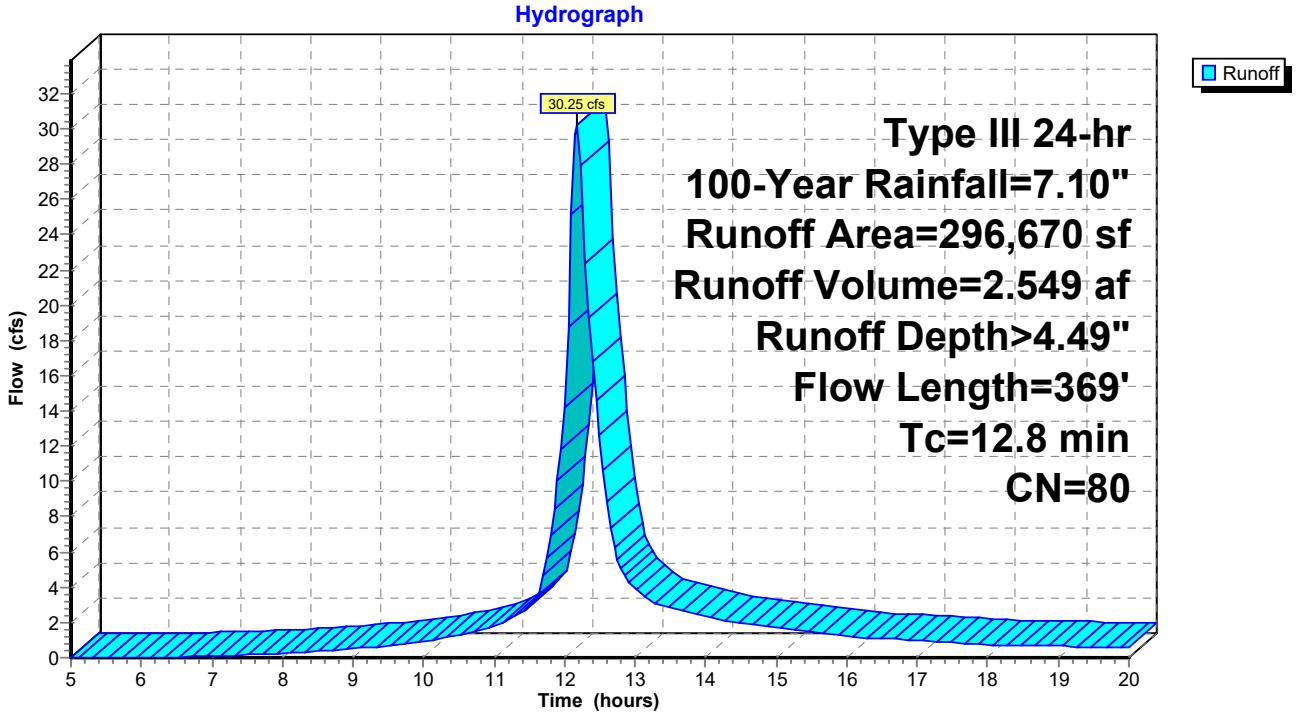
Runoff = 30.25 cfs @ 12.17 hrs, Volume= 2.549 af, Depth> 4.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (sf)	CN	Description
148,715	98	Paved parking & roofs
147,955	61	>75% Grass cover, Good, HSG B
296,670	80	Weighted Average
147,955		49.87% Pervious Area
148,715		50.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.6	160	0.0312	0.23		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
1.0	151	0.0265	2.62		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.2	58	0.0369	3.90		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
12.8	369	Total			

Subcatchment 3S: Existing

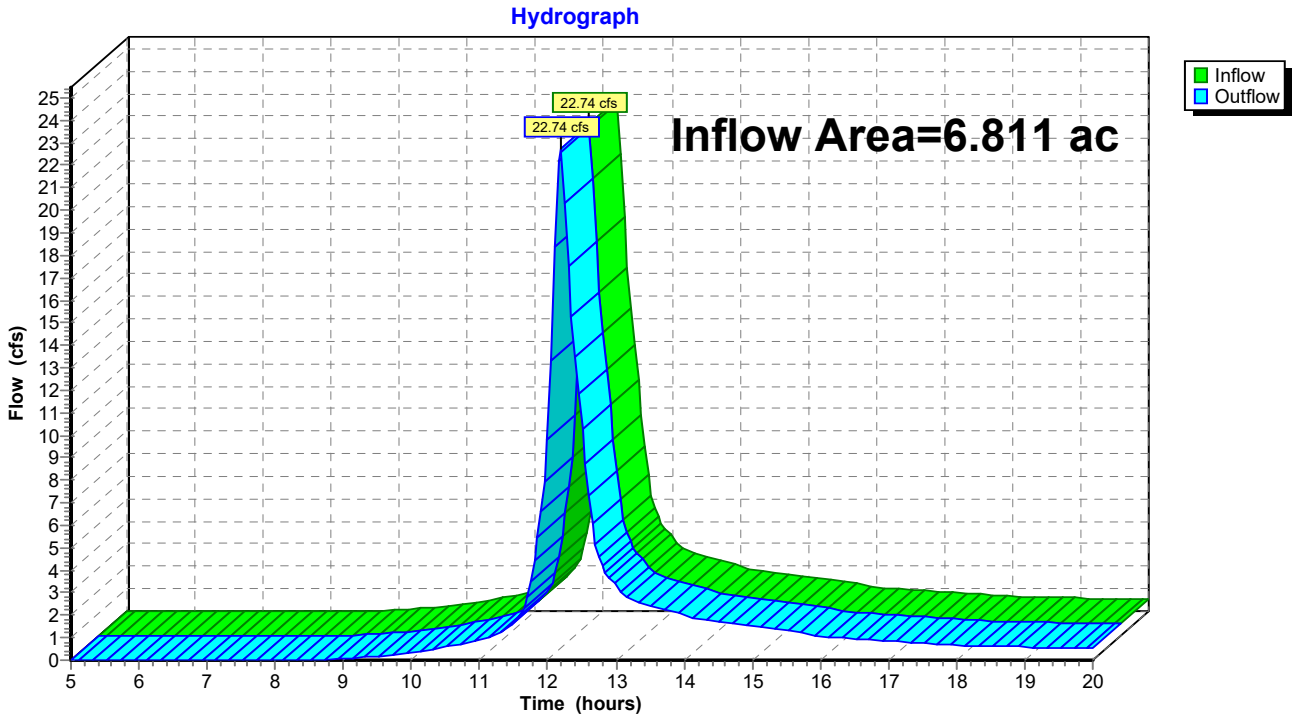


Summary for Reach 2R: POI-1

Inflow Area = 6.811 ac, 22.88% Impervious, Inflow Depth > 3.33" for 100-Year event
Inflow = 22.74 cfs @ 12.18 hrs, Volume= 1.892 af
Outflow = 22.74 cfs @ 12.18 hrs, Volume= 1.892 af, Atten= 0%, Lag= 0.0 min

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

Reach 2R: POI-1

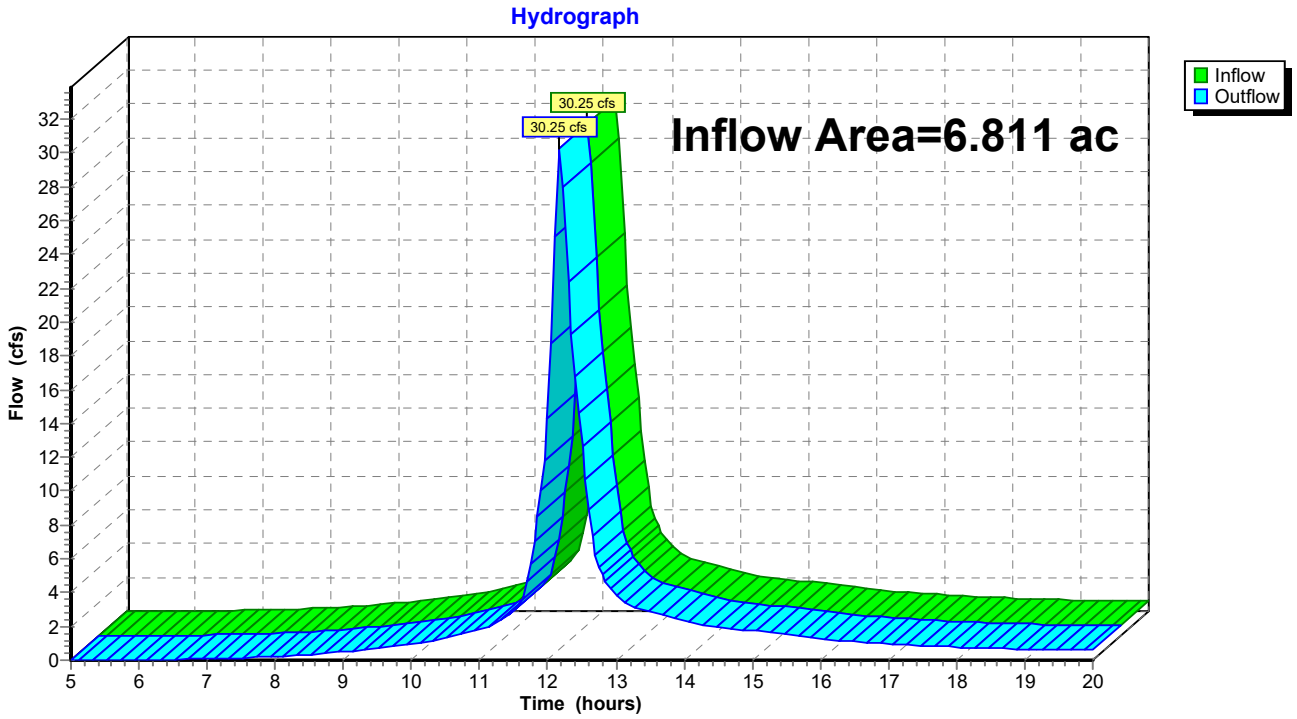


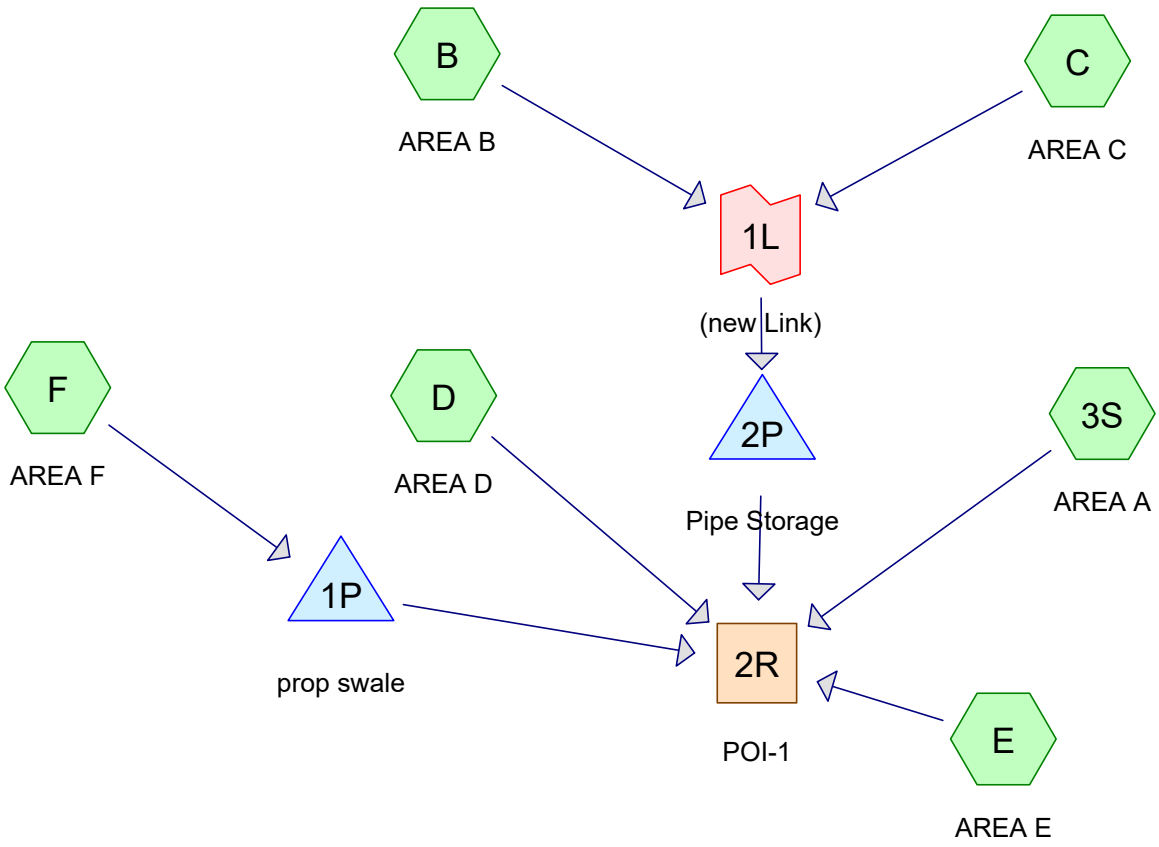
Summary for Reach 4R: ex alt

Inflow Area = 6.811 ac, 50.13% Impervious, Inflow Depth > 4.49" for 100-Year event
Inflow = 30.25 cfs @ 12.17 hrs, Volume= 2.549 af
Outflow = 30.25 cfs @ 12.17 hrs, Volume= 2.549 af, Atten= 0%, Lag= 0.0 min

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

Reach 4R: ex alt





Subcat Reach Pond Link

Routing Diagram for 07c2352 Proposed-NEW
Prepared by {enter your company name here}, Printed 1/26/2022

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.258	98	(3S, B, C, D, E, F)
2.683	74	>75% Grass cover, Good, HSG C (3S, B, C, D, E, F)
6.940	**89**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
2.683	HSG C	3S, B, C, D, E, F
0.000	HSG D	
4.258	Other	3S, B, C, D, E, F
6.940		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	4.258	4.258		3S, B, C, D, E, F
0.000	0.000	2.683	0.000	0.000	2.683	>75% Grass cover, Good	3S, B, C, D, E, F
0.000	**0.000**	**2.683**	**0.000**	**4.258**	**6.940**	**TOTAL AREA**	

Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: AREA A Runoff Area=89,620 sf 28.40% Impervious Runoff Depth>1.51"
Flow Length=340' Tc=12.3 min CN=81 Runoff=3.16 cfs 0.258 af

SubcatchmentB: AREA B Runoff Area=10,575 sf 75.61% Impervious Runoff Depth>2.40"
Tc=5.0 min CN=92 Runoff=0.71 cfs 0.049 af

SubcatchmentC: AREA C Runoff Area=14,414 sf 55.43% Impervious Runoff Depth>1.96"
Tc=5.0 min CN=87 Runoff=0.81 cfs 0.054 af

SubcatchmentD: AREA D Runoff Area=31,369 sf 87.60% Impervious Runoff Depth>2.70"
Tc=5.0 min CN=95 Runoff=2.27 cfs 0.162 af

SubcatchmentE: AREA E Runoff Area=75,577 sf 71.94% Impervious Runoff Depth>2.31"
Tc=5.0 min CN=91 Runoff=4.91 cfs 0.334 af

SubcatchmentF: AREA F Runoff Area=80,759 sf 76.99% Impervious Runoff Depth>2.40"
Tc=5.0 min CN=92 Runoff=5.41 cfs 0.371 af

Reach 2R: POI-1 Inflow=10.11 cfs 0.840 af
Outflow=10.11 cfs 0.840 af

Pond 1P: prop swale Peak Elev=12.38' Storage=16,141 cf Inflow=5.41 cfs 0.371 af
Outflow=0.00 cfs 0.000 af

Pond 2P: Pipe Storage Peak Elev=18.36' Storage=1,521 cf Inflow=1.52 cfs 0.103 af
Outflow=0.74 cfs 0.086 af

Link 1L: (new Link) Inflow=1.52 cfs 0.103 af
Primary=1.52 cfs 0.103 af

Total Runoff Area = 6.940 ac Runoff Volume = 1.227 af Average Runoff Depth = 2.12"
38.65% Pervious = 2.683 ac 61.35% Impervious = 4.258 ac

Summary for Subcatchment 3S: AREA A

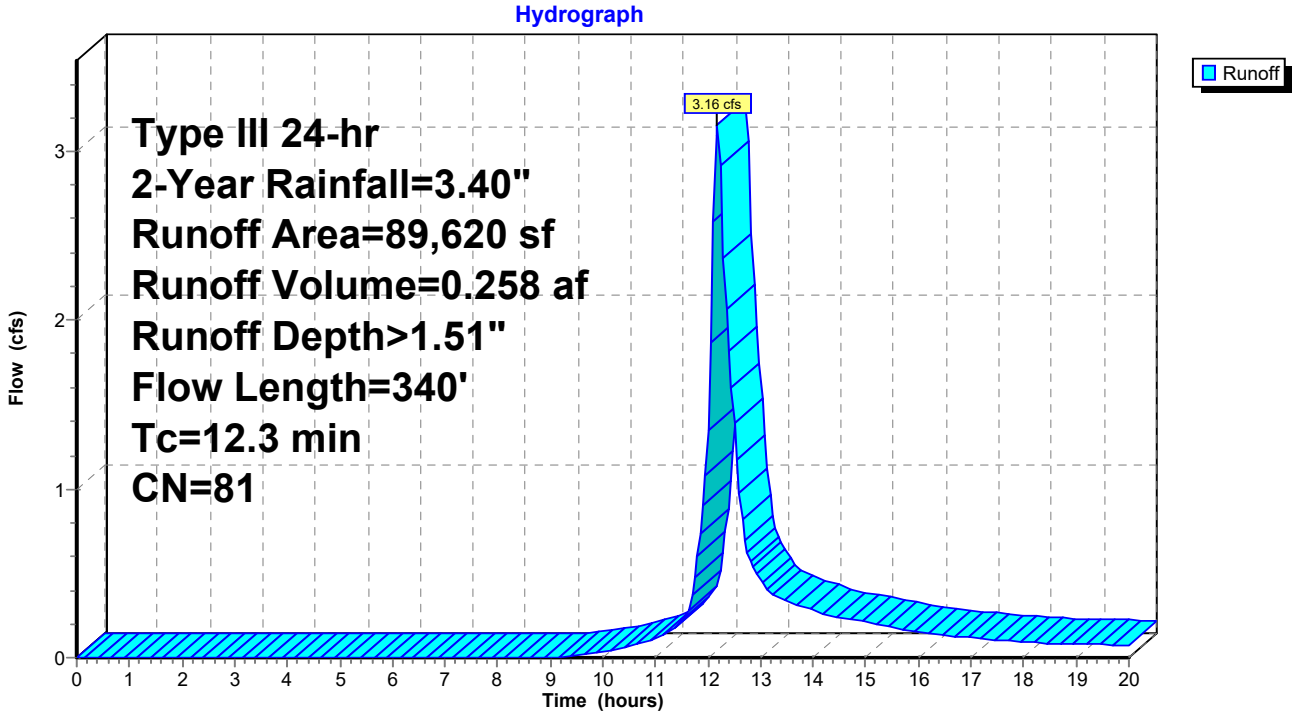
Runoff = 3.16 cfs @ 12.17 hrs, Volume= 0.258 af, Depth> 1.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (sf)	CN	Description
	64,169	74	>75% Grass cover, Good, HSG C
*	25,451	98	
	89,620	81	Weighted Average
	64,169		71.60% Pervious Area
	25,451		28.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	153	0.0312	0.23		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
0.7	129	0.0388	3.17		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.4	58	0.0179	2.72		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
12.3	340	Total			

Subcatchment 3S: AREA A



Summary for Subcatchment B: AREA B

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

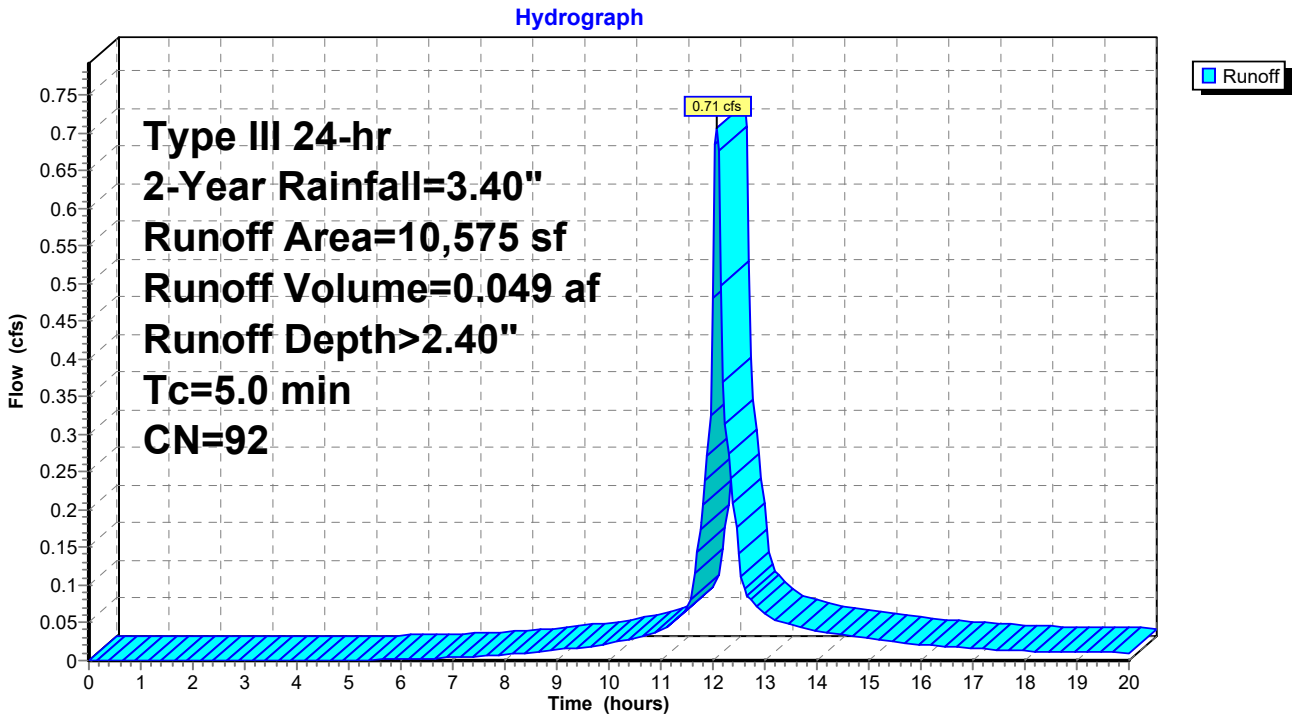
Runoff = 0.71 cfs @ 12.07 hrs, Volume= 0.049 af, Depth> 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (sf)	CN	Description
*	7,996	98	
	2,579	74	>75% Grass cover, Good, HSG C
	10,575	92	Weighted Average
	2,579		24.39% Pervious Area
	7,996		75.61% Impervious Area

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

Subcatchment B: AREA B



Summary for Subcatchment C: AREA C

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

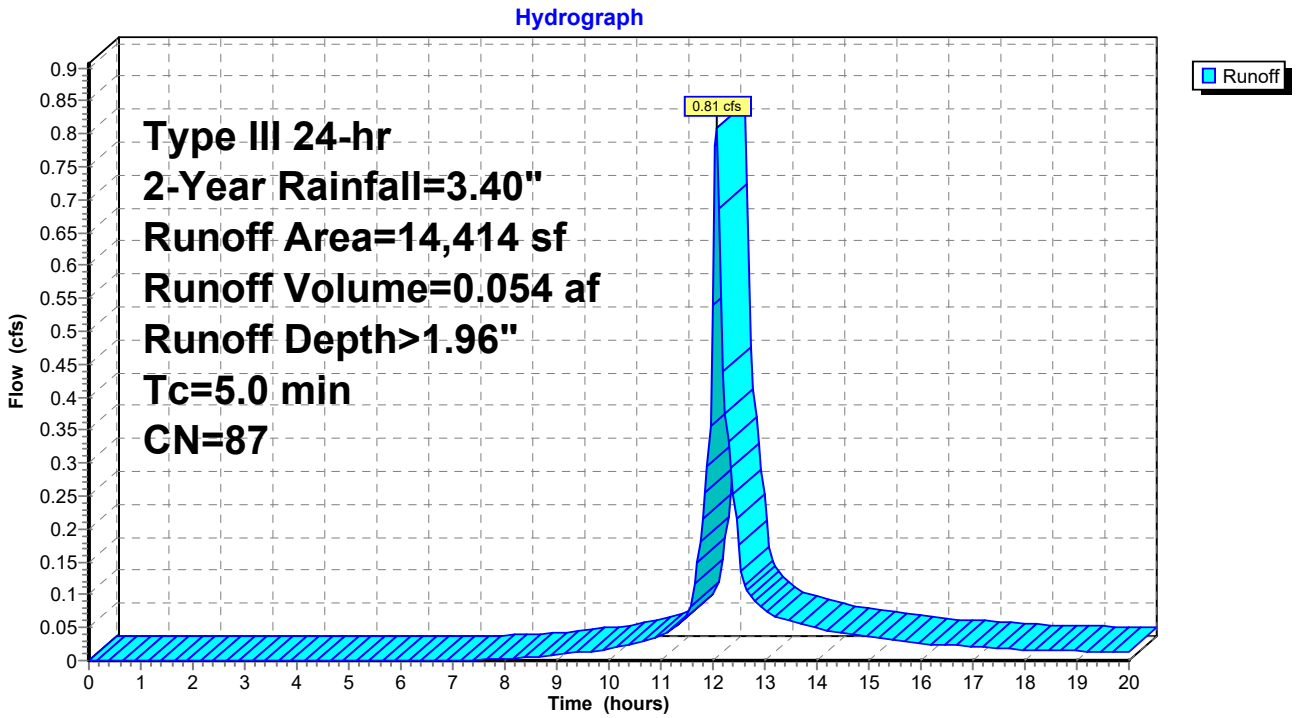
Runoff = 0.81 cfs @ 12.08 hrs, Volume= 0.054 af, Depth> 1.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (sf)	CN	Description
*	7,989	98	
	6,425	74	>75% Grass cover, Good, HSG C
	14,414	87	Weighted Average
	6,425		44.57% Pervious Area
	7,989		55.43% Impervious Area

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

Subcatchment C: AREA C



Summary for Subcatchment D: AREA D

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

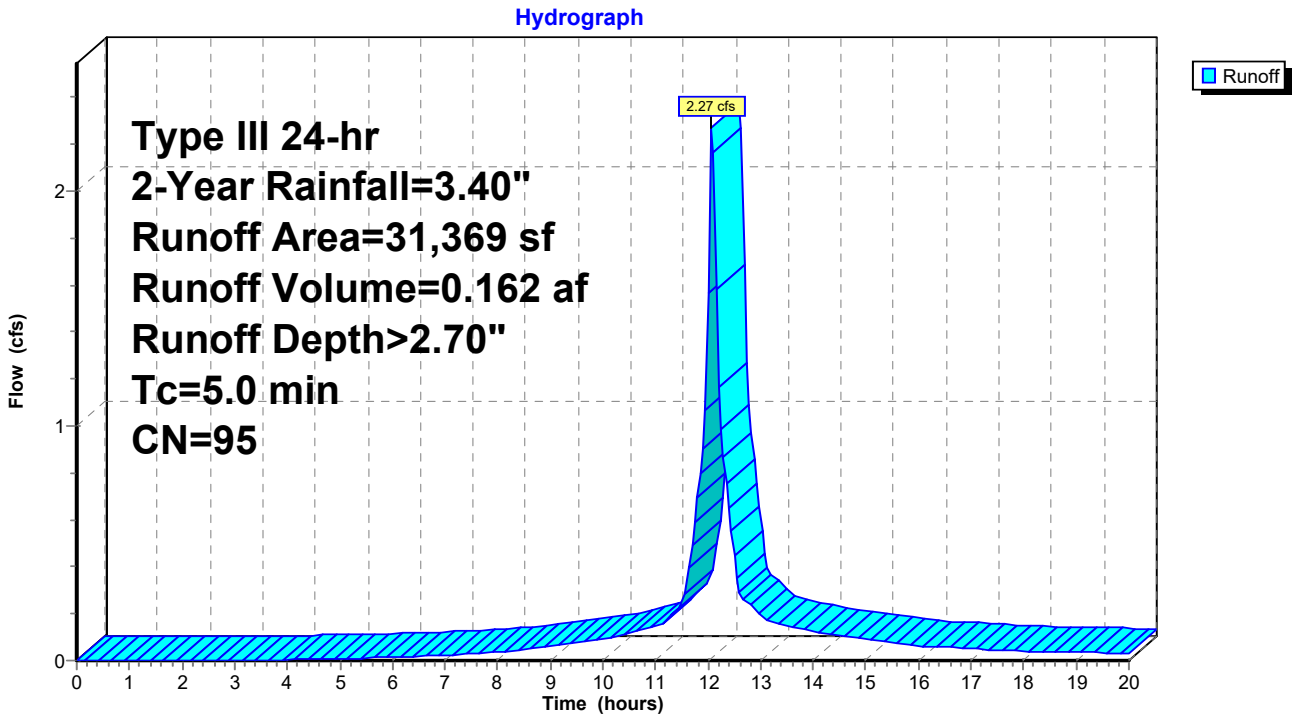
Runoff = 2.27 cfs @ 12.07 hrs, Volume= 0.162 af, Depth> 2.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (sf)	CN	Description
*	27,479	98	
	3,890	74	>75% Grass cover, Good, HSG C
	31,369	95	Weighted Average
	3,890		12.40% Pervious Area
	27,479		87.60% Impervious Area

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

Subcatchment D: AREA D



Summary for Subcatchment E: AREA E

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

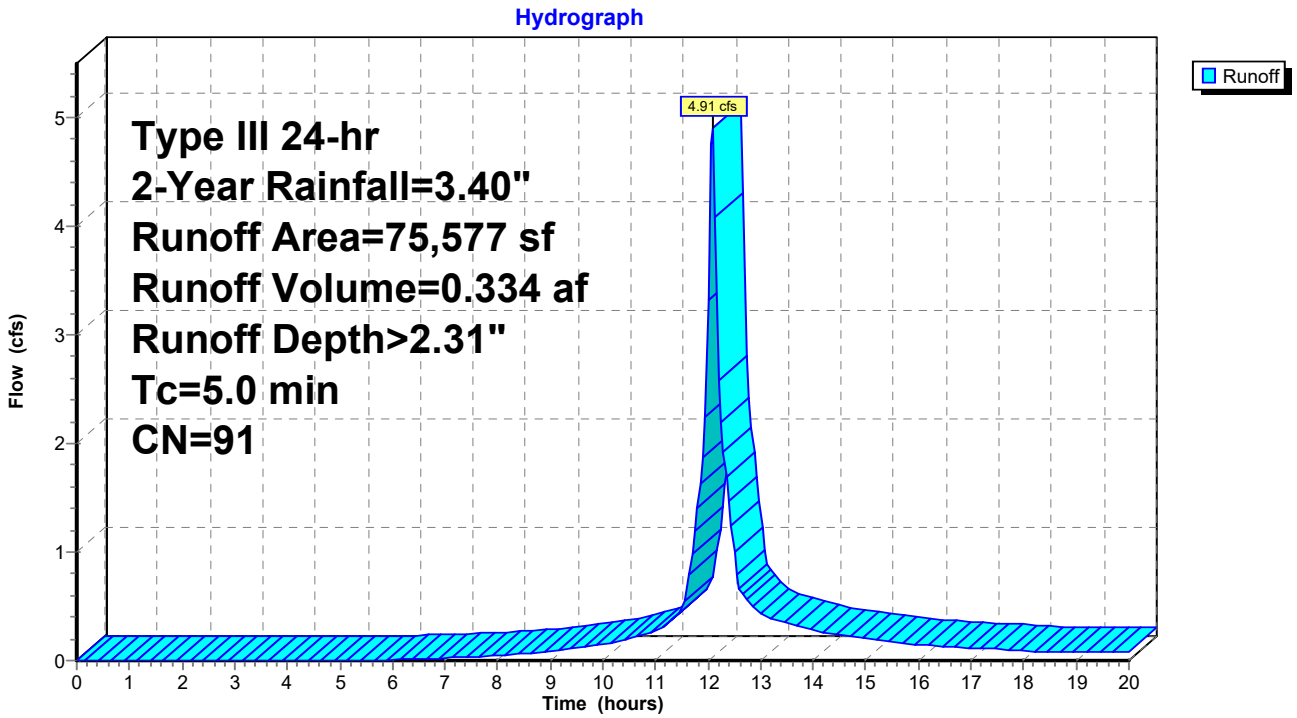
Runoff = 4.91 cfs @ 12.07 hrs, Volume= 0.334 af, Depth> 2.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (sf)	CN	Description
*	54,371	98	
	21,206	74	>75% Grass cover, Good, HSG C
	75,577	91	Weighted Average
	21,206		28.06% Pervious Area
	54,371		71.94% Impervious Area

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

Subcatchment E: AREA E



Summary for Subcatchment F: AREA F

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

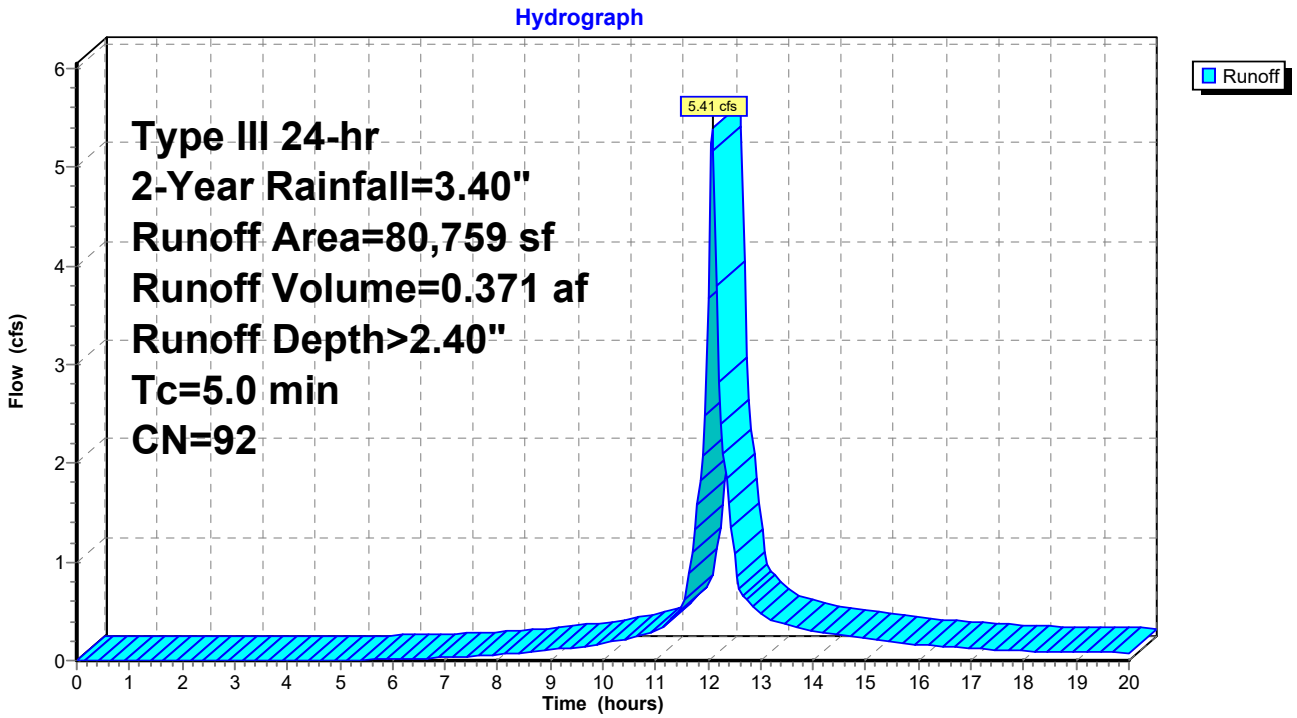
Runoff = 5.41 cfs @ 12.07 hrs, Volume= 0.371 af, Depth> 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (sf)	CN	Description
*	62,177	98	
	18,582	74	>75% Grass cover, Good, HSG C
	80,759	92	Weighted Average
	18,582		23.01% Pervious Area
	62,177		76.99% Impervious Area

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

Subcatchment F: AREA F



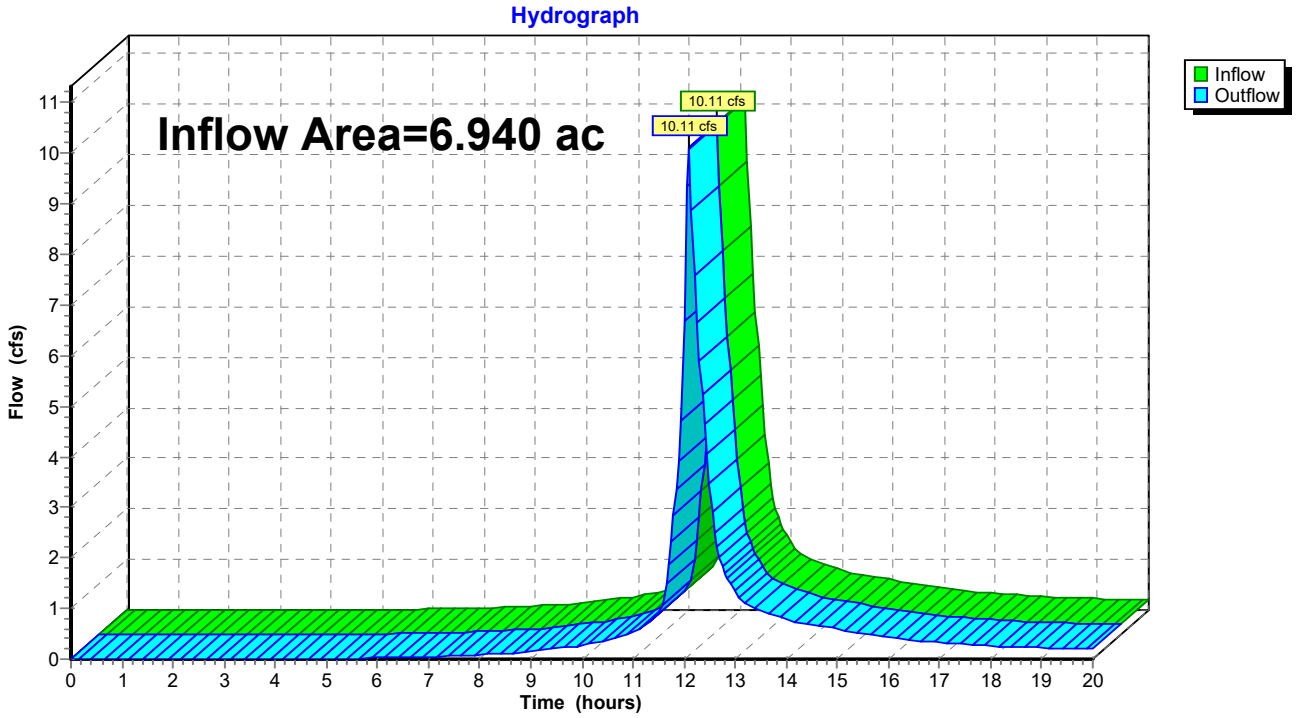
Summary for Reach 2R: POI-1

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

Inflow Area = 6.940 ac, 61.35% Impervious, Inflow Depth > 1.45" for 2-Year event
Inflow = 10.11 cfs @ 12.09 hrs, Volume= 0.840 af
Outflow = 10.11 cfs @ 12.09 hrs, Volume= 0.840 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Reach 2R: POI-1



Summary for Pond 1P: prop swale

Inflow Area = 1.854 ac, 76.99% Impervious, Inflow Depth > 2.40" for 2-Year event
Inflow = 5.41 cfs @ 12.07 hrs, Volume= 0.371 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 12.38' @ 20.00 hrs Surf.Area= 5,971 sf Storage= 16,141 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

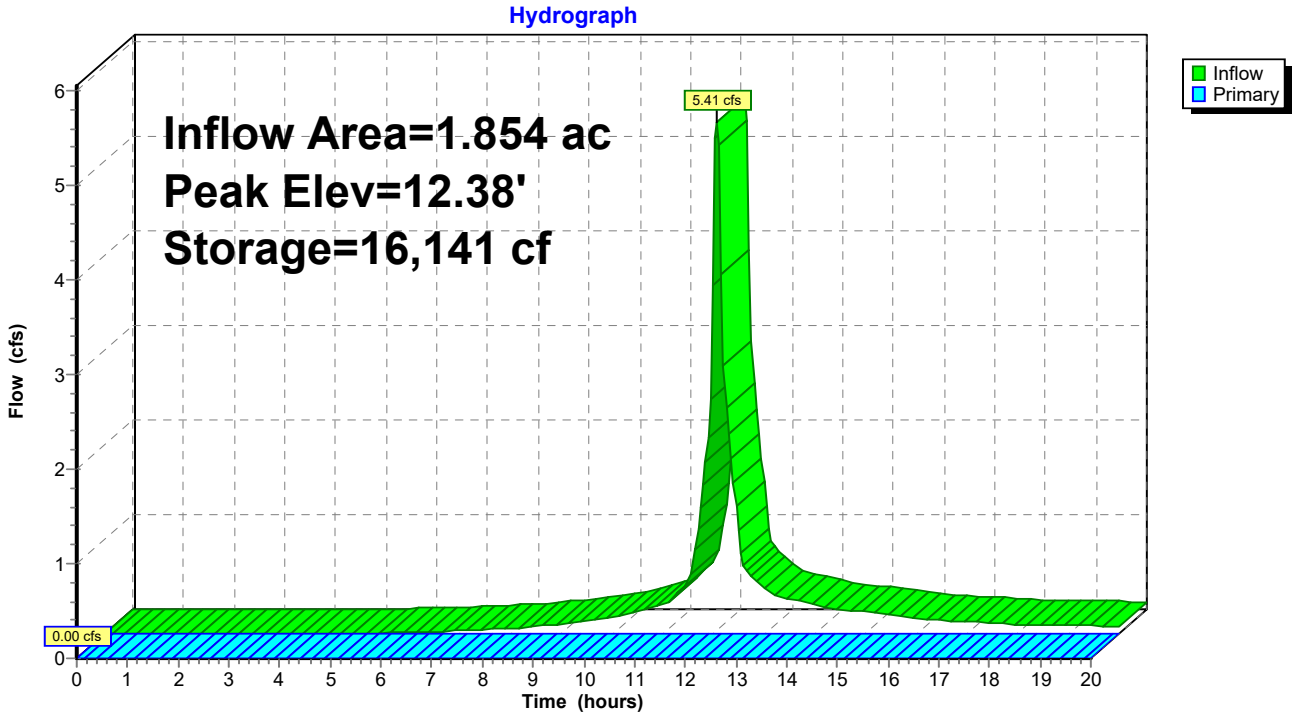
Volume	Invert	Avail.Storage	Storage Description
#1	6.00'	28,176 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.00	540	0	0
8.00	1,482	2,022	2,022
10.00	2,580	4,062	6,084
12.00	5,330	7,910	13,994
13.00	7,017	6,174	20,168
14.00	9,000	8,009	28,176

Device	Routing	Invert	Outlet Devices
#1	Primary	13.00'	**20.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=6.00' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: prop swale



Summary for Pond 2P: Pipe Storage

Inflow Area = 0.574 ac, 63.97% Impervious, Inflow Depth > 2.15" for 2-Year event
Inflow = 1.52 cfs @ 12.07 hrs, Volume= 0.103 af
Outflow = 0.74 cfs @ 12.23 hrs, Volume= 0.086 af, Atten= 52%, Lag= 9.5 min
Primary = 0.74 cfs @ 12.23 hrs, Volume= 0.086 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 18.36' @ 12.23 hrs Surf.Area= 1,615 sf Storage= 1,521 cf

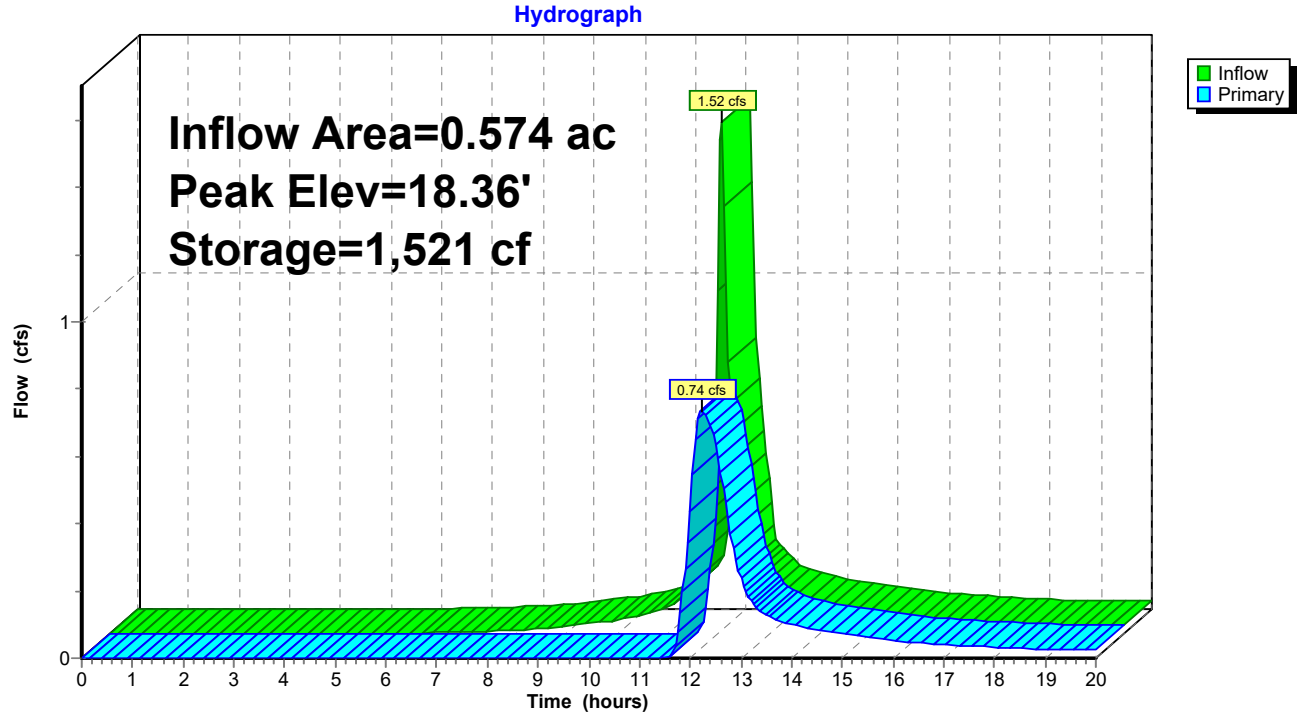
Plug-Flow detention time= 88.1 min calculated for 0.086 af (84% of inflow)
Center-of-Mass det. time= 42.9 min (816.2 - 773.3)

Volume	Invert	Avail.Storage	Storage Description
#1	17.50'	2,283 cf	**36.0" Round Pipe Storage** Inside #2 L= 323.0'
#2	16.50'	2,317 cf	**5.00'W x 323.00'L x 5.00'H Prismatoid** 8,075 cf Overall - 2,283 cf Embedded = 5,792 cf x 40.0% Voids
		4,600 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	17.50'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=0.73 cfs @ 12.23 hrs HW=18.35' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.73 cfs @ 3.74 fps)

Pond 2P: Pipe Storage

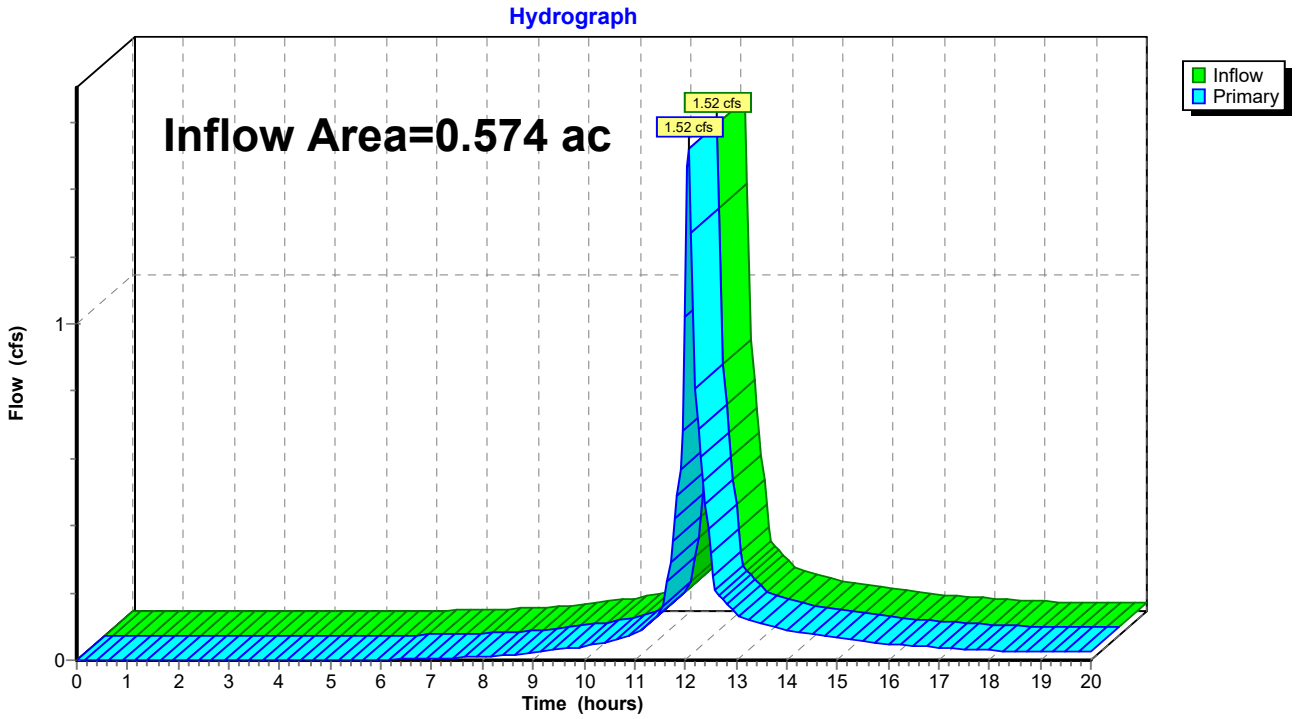


Summary for Link 1L: (new Link)

Inflow Area = 0.574 ac, 63.97% Impervious, Inflow Depth > 2.15" for 2-Year event
Inflow = 1.52 cfs @ 12.07 hrs, Volume= 0.103 af
Primary = 1.52 cfs @ 12.07 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Link 1L: (new Link)



Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: AREA A Runoff Area=89,620 sf 28.40% Impervious Runoff Depth>2.79"
Flow Length=340' Tc=12.3 min CN=81 Runoff=5.82 cfs 0.478 af

SubcatchmentB: AREA B Runoff Area=10,575 sf 75.61% Impervious Runoff Depth>3.88"
Tc=5.0 min CN=92 Runoff=1.11 cfs 0.078 af

SubcatchmentC: AREA C Runoff Area=14,414 sf 55.43% Impervious Runoff Depth>3.36"
Tc=5.0 min CN=87 Runoff=1.37 cfs 0.093 af

SubcatchmentD: AREA D Runoff Area=31,369 sf 87.60% Impervious Runoff Depth>4.20"
Tc=5.0 min CN=95 Runoff=3.45 cfs 0.252 af

SubcatchmentE: AREA E Runoff Area=75,577 sf 71.94% Impervious Runoff Depth>3.77"
Tc=5.0 min CN=91 Runoff=7.80 cfs 0.545 af

SubcatchmentF: AREA F Runoff Area=80,759 sf 76.99% Impervious Runoff Depth>3.88"
Tc=5.0 min CN=92 Runoff=8.49 cfs 0.599 af

Reach 2R: POI-1 Inflow=16.53 cfs 1.564 af
Outflow=16.53 cfs 1.564 af

Pond 1P: prop swale Peak Elev=13.04' Storage=20,454 cf Inflow=8.49 cfs 0.599 af
Outflow=0.48 cfs 0.134 af

Pond 2P: Pipe Storage Peak Elev=18.96' Storage=2,247 cf Inflow=2.48 cfs 0.171 af
Outflow=1.04 cfs 0.154 af

Link 1L: (new Link) Inflow=2.48 cfs 0.171 af
Primary=2.48 cfs 0.171 af

Total Runoff Area = 6.940 ac Runoff Volume = 2.045 af Average Runoff Depth = 3.54"
38.65% Pervious = 2.683 ac 61.35% Impervious = 4.258 ac

Summary for Subcatchment 3S: AREA A

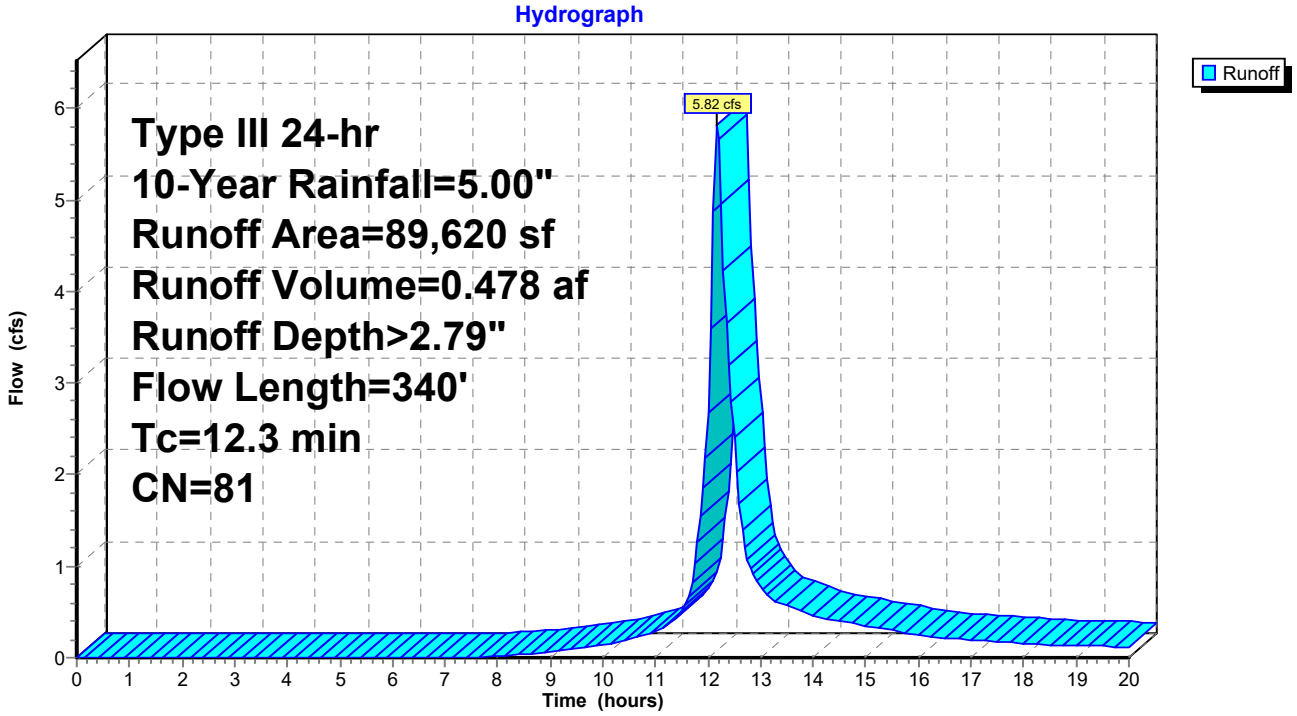
Runoff = 5.82 cfs @ 12.17 hrs, Volume= 0.478 af, Depth> 2.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (sf)	CN	Description
	64,169	74	>75% Grass cover, Good, HSG C
*	25,451	98	
	89,620	81	Weighted Average
	64,169		71.60% Pervious Area
	25,451		28.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	153	0.0312	0.23		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
0.7	129	0.0388	3.17		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.4	58	0.0179	2.72		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
12.3	340	Total			

Subcatchment 3S: AREA A



Summary for Subcatchment B: AREA B

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

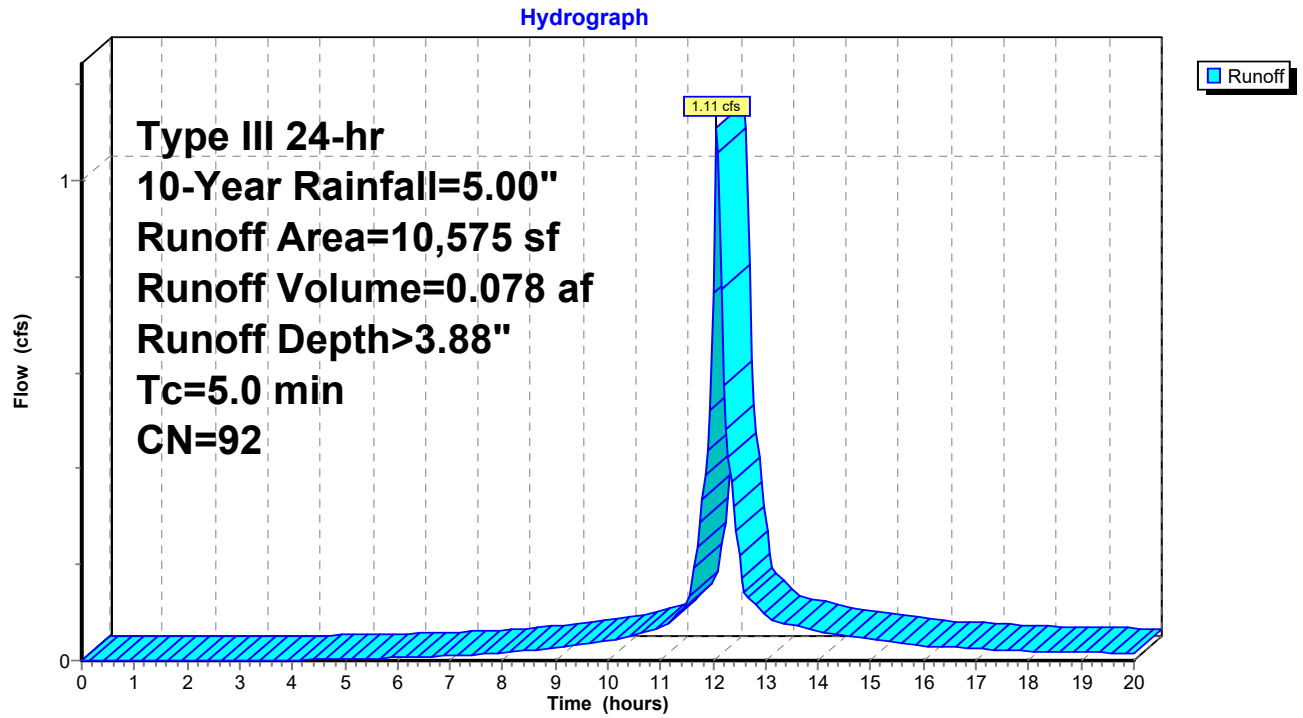
Runoff = 1.11 cfs @ 12.07 hrs, Volume= 0.078 af, Depth> 3.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (sf)	CN	Description
*	7,996	98	
	2,579	74	>75% Grass cover, Good, HSG C
	10,575	92	Weighted Average
	2,579		24.39% Pervious Area
	7,996		75.61% Impervious Area

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

Subcatchment B: AREA B



Summary for Subcatchment C: AREA C

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

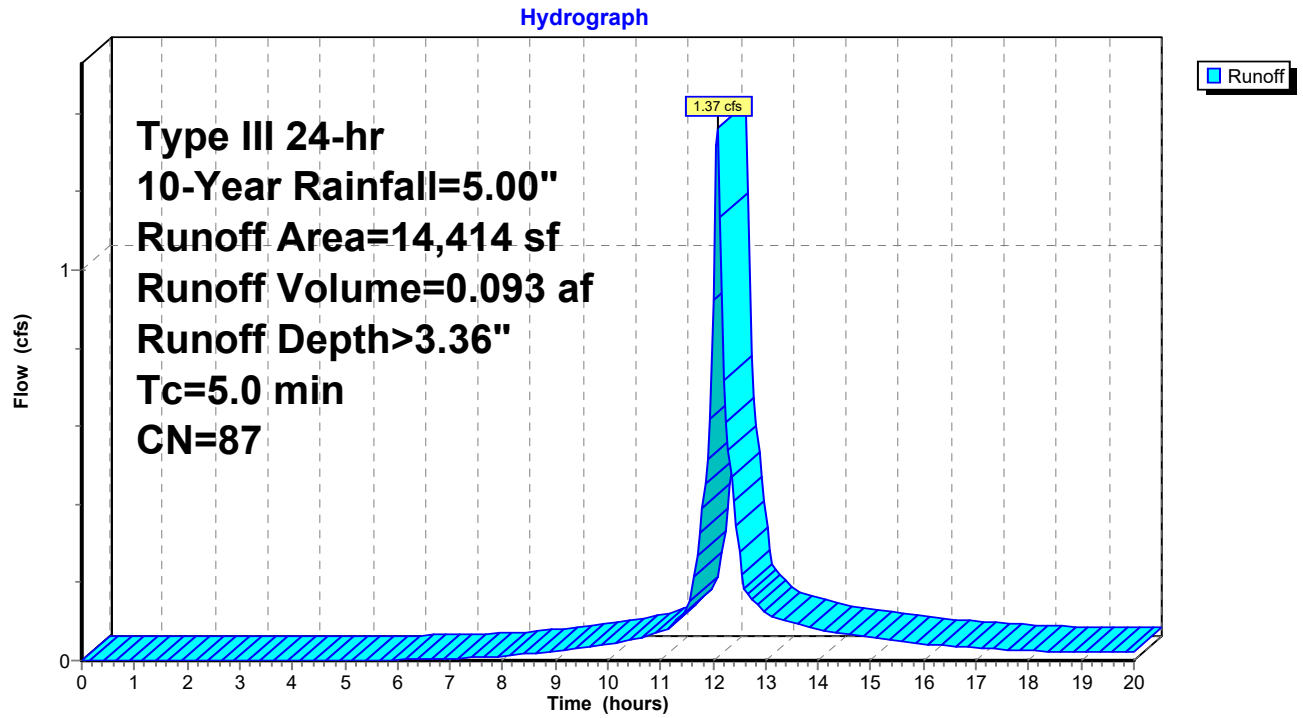
Runoff = 1.37 cfs @ 12.07 hrs, Volume= 0.093 af, Depth> 3.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (sf)	CN	Description
*	7,989	98	
	6,425	74	>75% Grass cover, Good, HSG C
	14,414	87	Weighted Average
	6,425		44.57% Pervious Area
	7,989		55.43% Impervious Area

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

Subcatchment C: AREA C



Summary for Subcatchment D: AREA D

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

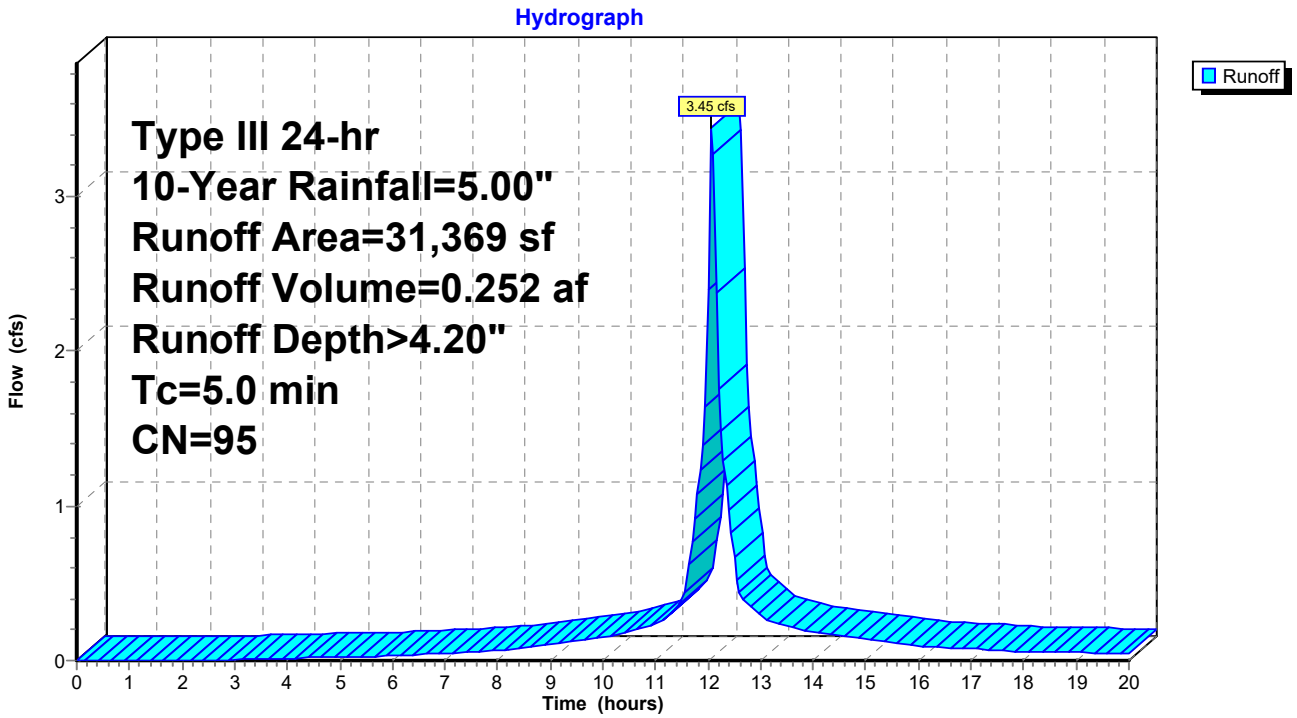
Runoff = 3.45 cfs @ 12.07 hrs, Volume= 0.252 af, Depth> 4.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (sf)	CN	Description
*	27,479	98	
	3,890	74	>75% Grass cover, Good, HSG C
	31,369	95	Weighted Average
	3,890		12.40% Pervious Area
	27,479		87.60% Impervious Area

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

Subcatchment D: AREA D



Summary for Subcatchment E: AREA E

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

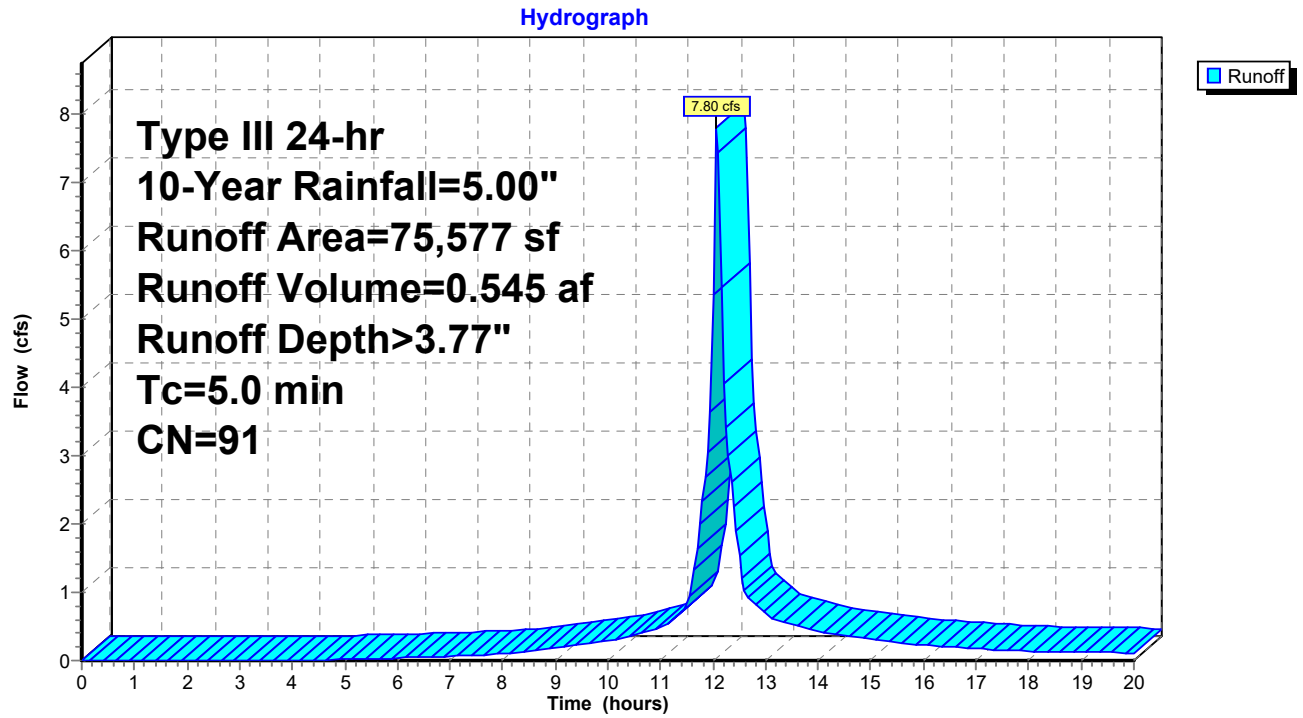
Runoff = 7.80 cfs @ 12.07 hrs, Volume= 0.545 af, Depth> 3.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (sf)	CN	Description
*	54,371	98	
	21,206	74	>75% Grass cover, Good, HSG C
	75,577	91	Weighted Average
	21,206		28.06% Pervious Area
	54,371		71.94% Impervious Area

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

Subcatchment E: AREA E



Summary for Subcatchment F: AREA F

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

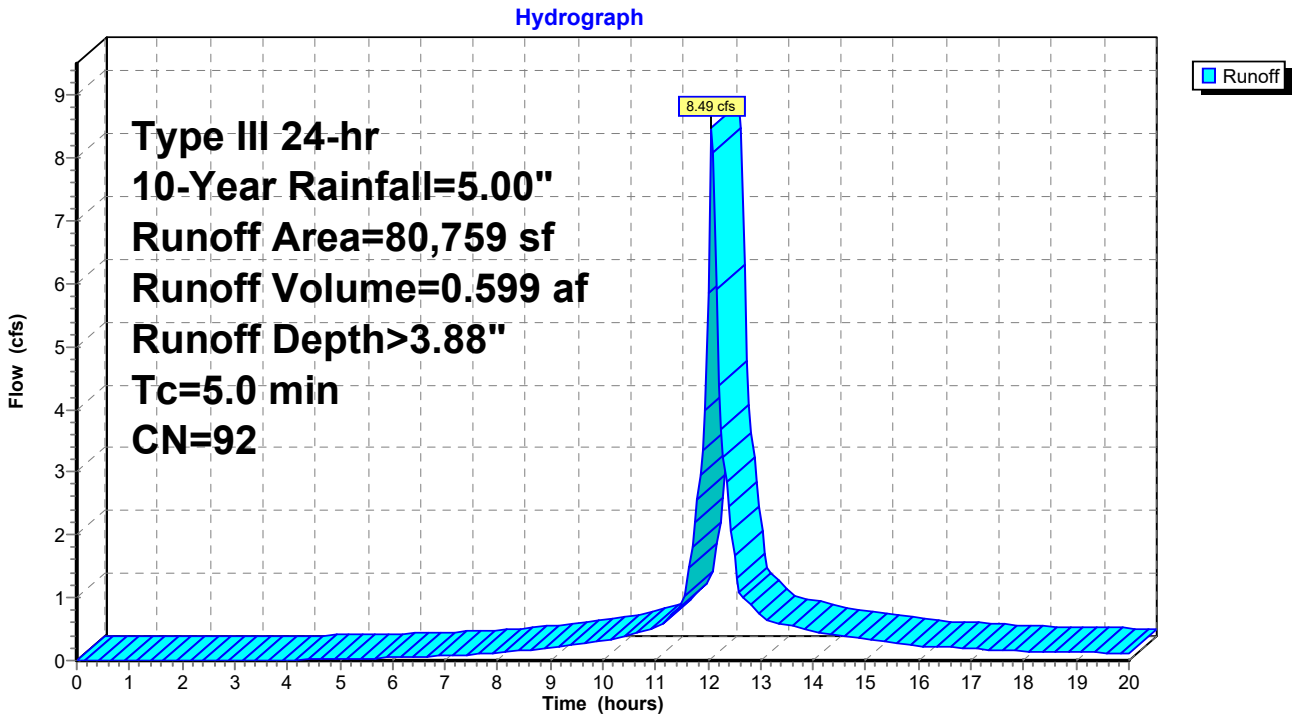
Runoff = 8.49 cfs @ 12.07 hrs, Volume= 0.599 af, Depth> 3.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (sf)	CN	Description
*	62,177	98	
	18,582	74	>75% Grass cover, Good, HSG C
	80,759	92	Weighted Average
	18,582		23.01% Pervious Area
	62,177		76.99% Impervious Area

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

Subcatchment F: AREA F



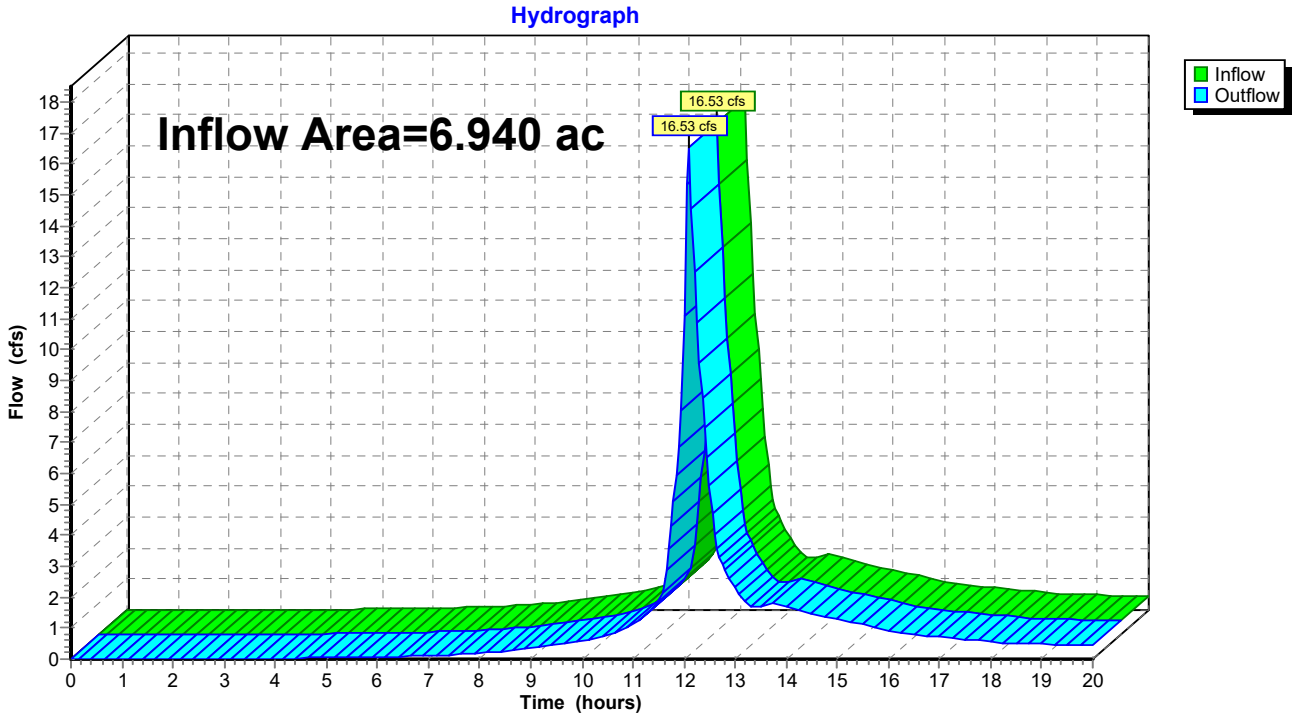
Summary for Reach 2R: POI-1

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

Inflow Area = 6.940 ac, 61.35% Impervious, Inflow Depth > 2.70" for 10-Year event
Inflow = 16.53 cfs @ 12.09 hrs, Volume= 1.564 af
Outflow = 16.53 cfs @ 12.09 hrs, Volume= 1.564 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Reach 2R: POI-1



Summary for Pond 1P: prop swale

Inflow Area = 1.854 ac, 76.99% Impervious, Inflow Depth > 3.88" for 10-Year event
Inflow = 8.49 cfs @ 12.07 hrs, Volume= 0.599 af
Outflow = 0.48 cfs @ 13.90 hrs, Volume= 0.134 af, Atten= 94%, Lag= 109.5 min
Primary = 0.48 cfs @ 13.90 hrs, Volume= 0.134 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 13.04' @ 13.90 hrs Surf.Area= 7,098 sf Storage= 20,454 cf

Plug-Flow detention time= 360.4 min calculated for 0.134 af (22% of inflow)
Center-of-Mass det. time= 204.6 min (957.1 - 752.5)

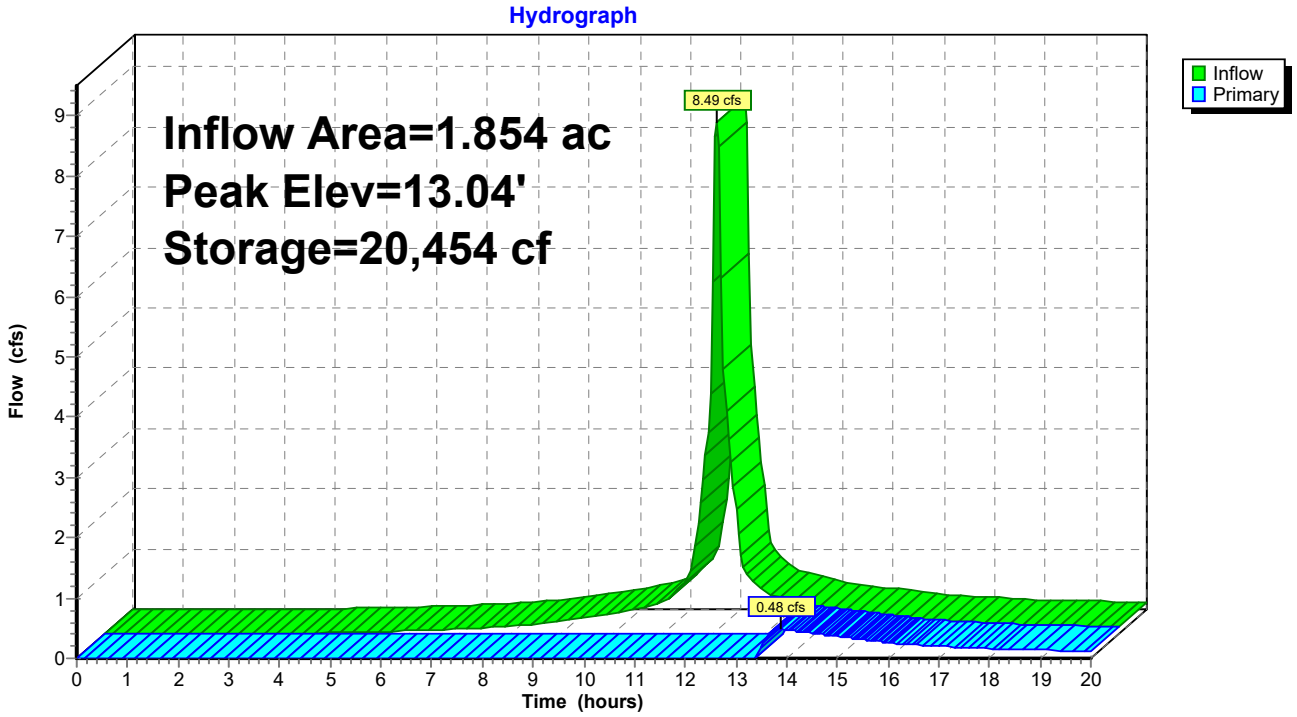
Volume	Invert	Avail.Storage	Storage Description
#1	6.00'	28,176 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.00	540	0	0
8.00	1,482	2,022	2,022
10.00	2,580	4,062	6,084
12.00	5,330	7,910	13,994
13.00	7,017	6,174	20,168
14.00	9,000	8,009	28,176

Device	Routing	Invert	Outlet Devices
#1	Primary	13.00'	**20.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=0.48 cfs @ 13.90 hrs HW=13.04' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.48 cfs @ 0.59 fps)

Pond 1P: prop swale



Summary for Pond 2P: Pipe Storage

Inflow Area = 0.574 ac, 63.97% Impervious, Inflow Depth > 3.58" for 10-Year event
Inflow = 2.48 cfs @ 12.07 hrs, Volume= 0.171 af
Outflow = 1.04 cfs @ 12.27 hrs, Volume= 0.154 af, Atten= 58%, Lag= 12.0 min
Primary = 1.04 cfs @ 12.27 hrs, Volume= 0.154 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 18.96' @ 12.27 hrs Surf.Area= 1,615 sf Storage= 2,247 cf

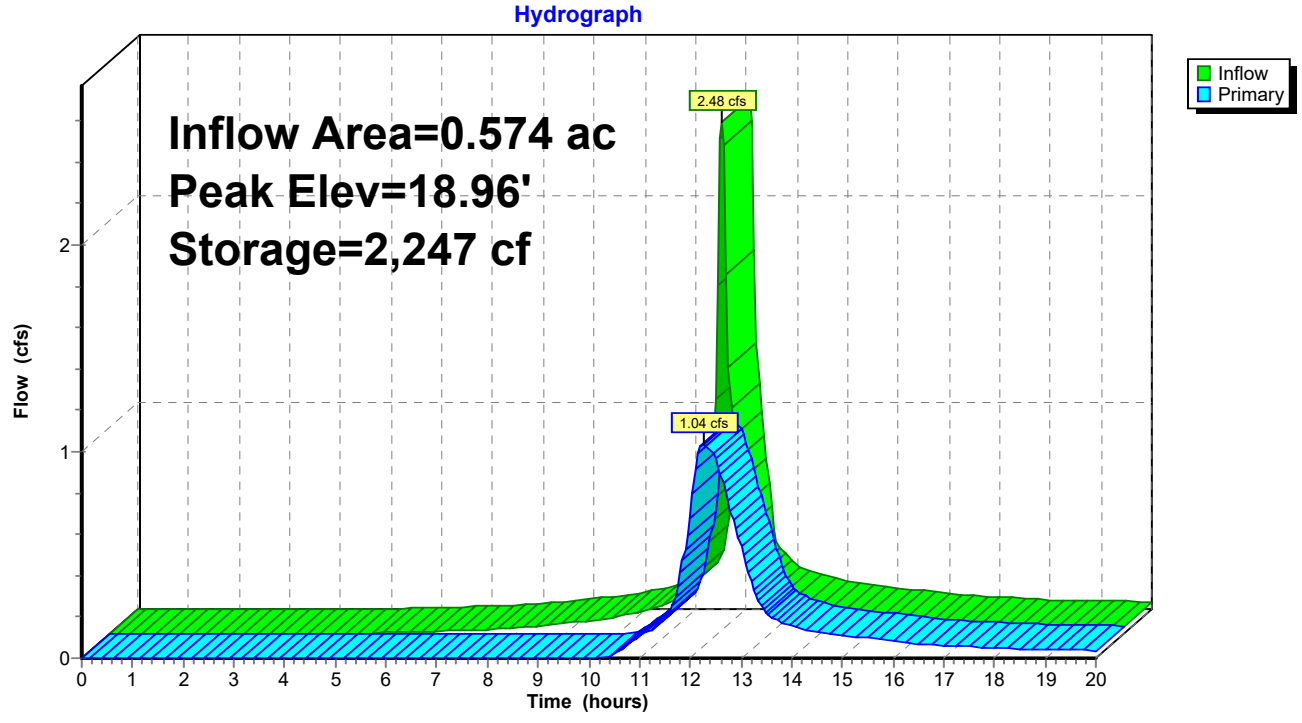
Plug-Flow detention time= 72.0 min calculated for 0.154 af (90% of inflow)
Center-of-Mass det. time= 40.0 min (801.4 - 761.4)

Volume	Invert	Avail.Storage	Storage Description
#1	17.50'	2,283 cf	**36.0" Round Pipe Storage** Inside #2 L= 323.0'
#2	16.50'	2,317 cf	**5.00'W x 323.00'L x 5.00'H Prismatoid** 8,075 cf Overall - 2,283 cf Embedded = 5,792 cf x 40.0% Voids
		4,600 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	17.50'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.04 cfs @ 12.27 hrs HW=18.95' (Free Discharge)
1=Orifice/Grate (Orifice Controls 1.04 cfs @ 5.28 fps)

Pond 2P: Pipe Storage

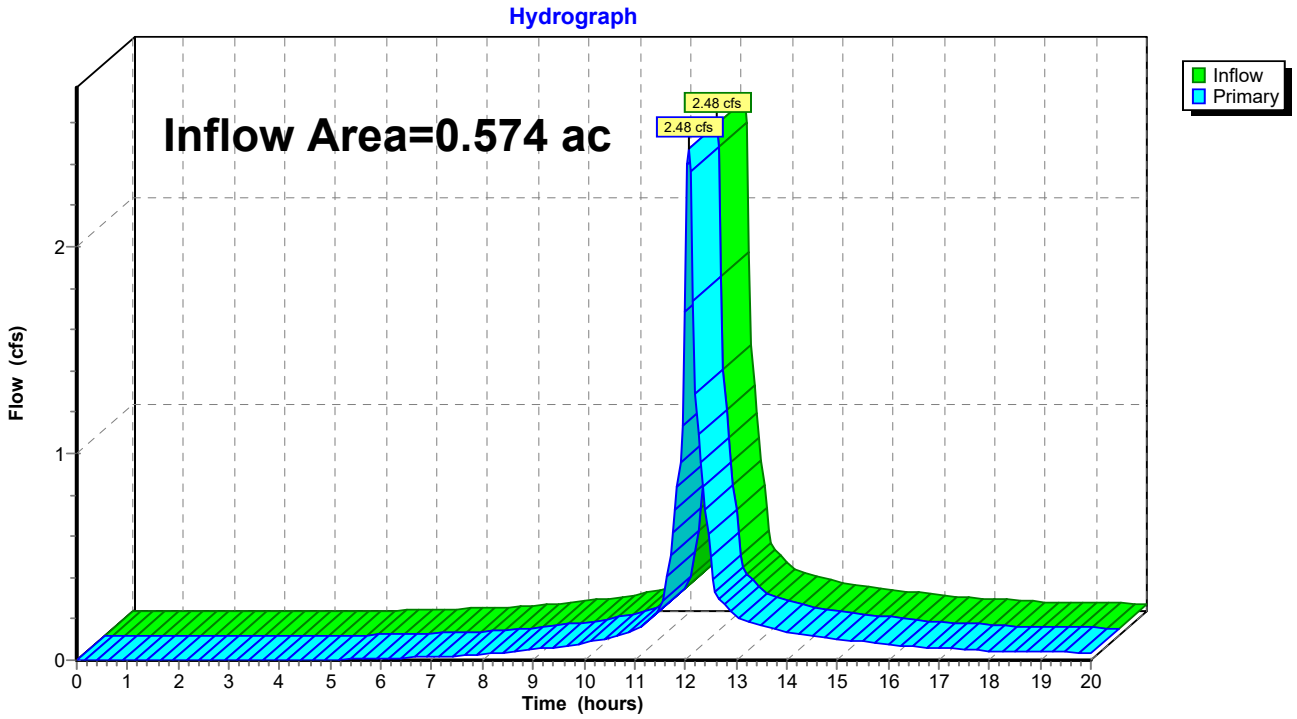


Summary for Link 1L: (new Link)

Inflow Area = 0.574 ac, 63.97% Impervious, Inflow Depth > 3.58" for 10-Year event
Inflow = 2.48 cfs @ 12.07 hrs, Volume= 0.171 af
Primary = 2.48 cfs @ 12.07 hrs, Volume= 0.171 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Link 1L: (new Link)



Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: AREA A Runoff Area=89,620 sf 28.40% Impervious Runoff Depth>3.38"
Flow Length=340' Tc=12.3 min CN=81 Runoff=7.03 cfs 0.579 af

SubcatchmentB: AREA B Runoff Area=10,575 sf 75.61% Impervious Runoff Depth>4.53"
Tc=5.0 min CN=92 Runoff=1.29 cfs 0.092 af

SubcatchmentC: AREA C Runoff Area=14,414 sf 55.43% Impervious Runoff Depth>3.99"
Tc=5.0 min CN=87 Runoff=1.61 cfs 0.110 af

SubcatchmentD: AREA D Runoff Area=31,369 sf 87.60% Impervious Runoff Depth>4.87"
Tc=5.0 min CN=95 Runoff=3.96 cfs 0.292 af

SubcatchmentE: AREA E Runoff Area=75,577 sf 71.94% Impervious Runoff Depth>4.42"
Tc=5.0 min CN=91 Runoff=9.06 cfs 0.639 af

SubcatchmentF: AREA F Runoff Area=80,759 sf 76.99% Impervious Runoff Depth>4.53"
Tc=5.0 min CN=92 Runoff=9.82 cfs 0.700 af

Reach 2R: POI-1 Inflow=19.34 cfs 1.930 af
Outflow=19.34 cfs 1.930 af

Pond 1P: prop swale Peak Elev=13.07' Storage=20,676 cf Inflow=9.82 cfs 0.700 af
Outflow=1.24 cfs 0.235 af

Pond 2P: Pipe Storage Peak Elev=19.24' Storage=2,588 cf Inflow=2.90 cfs 0.202 af
Outflow=1.15 cfs 0.185 af

Link 1L: (new Link) Inflow=2.90 cfs 0.202 af
Primary=2.90 cfs 0.202 af

Total Runoff Area = 6.940 ac Runoff Volume = 2.412 af Average Runoff Depth = 4.17"
38.65% Pervious = 2.683 ac 61.35% Impervious = 4.258 ac

Summary for Subcatchment 3S: AREA A

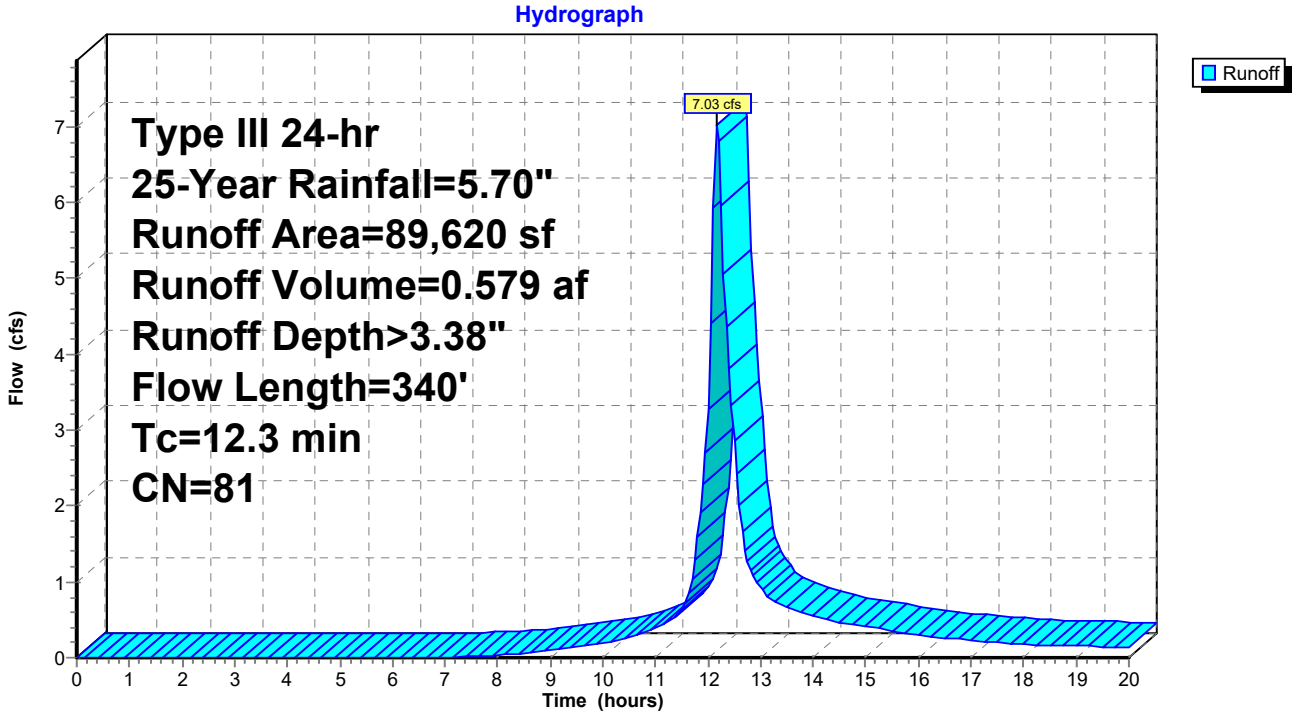
Runoff = 7.03 cfs @ 12.17 hrs, Volume= 0.579 af, Depth> 3.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (sf)	CN	Description
	64,169	74	>75% Grass cover, Good, HSG C
*	25,451	98	
	89,620	81	Weighted Average
	64,169		71.60% Pervious Area
	25,451		28.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	153	0.0312	0.23		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
0.7	129	0.0388	3.17		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.4	58	0.0179	2.72		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
12.3	340	Total			

Subcatchment 3S: AREA A



Summary for Subcatchment B: AREA B

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

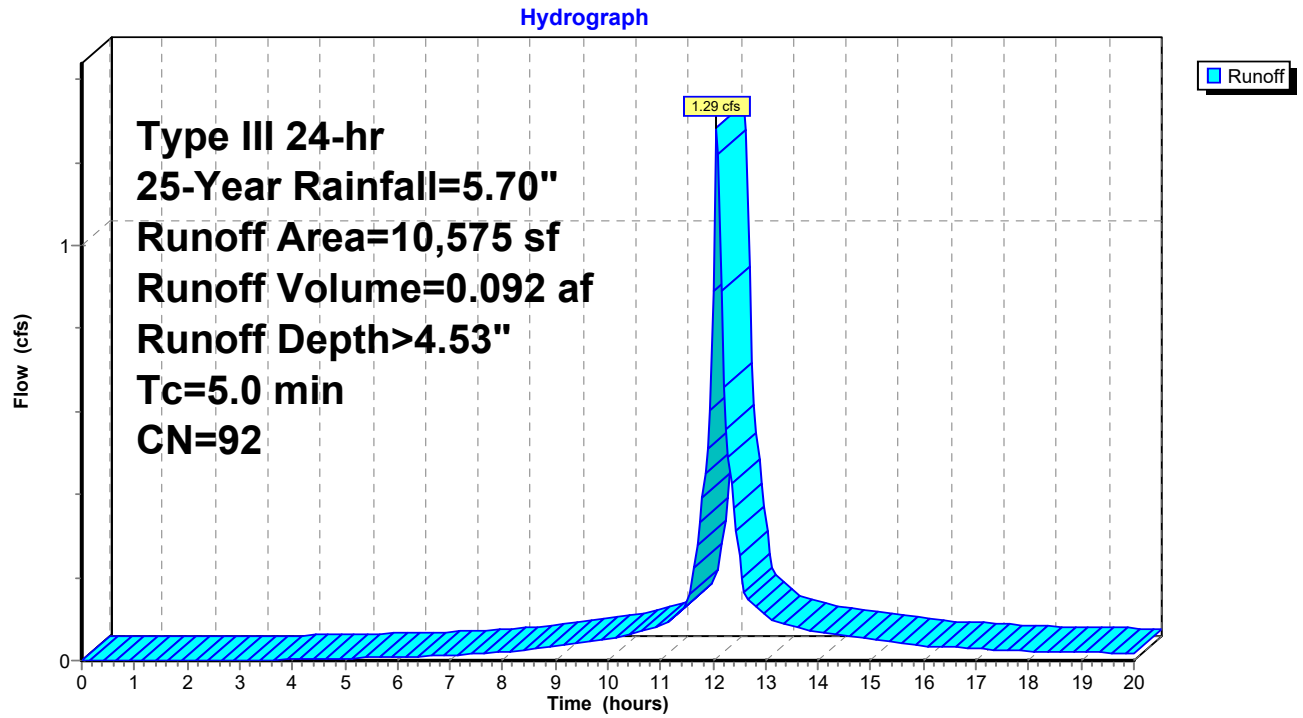
Runoff = 1.29 cfs @ 12.07 hrs, Volume= 0.092 af, Depth> 4.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (sf)	CN	Description
*	7,996	98	
	2,579	74	>75% Grass cover, Good, HSG C
	10,575	92	Weighted Average
	2,579		24.39% Pervious Area
	7,996		75.61% Impervious Area

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

Subcatchment B: AREA B



Summary for Subcatchment C: AREA C

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

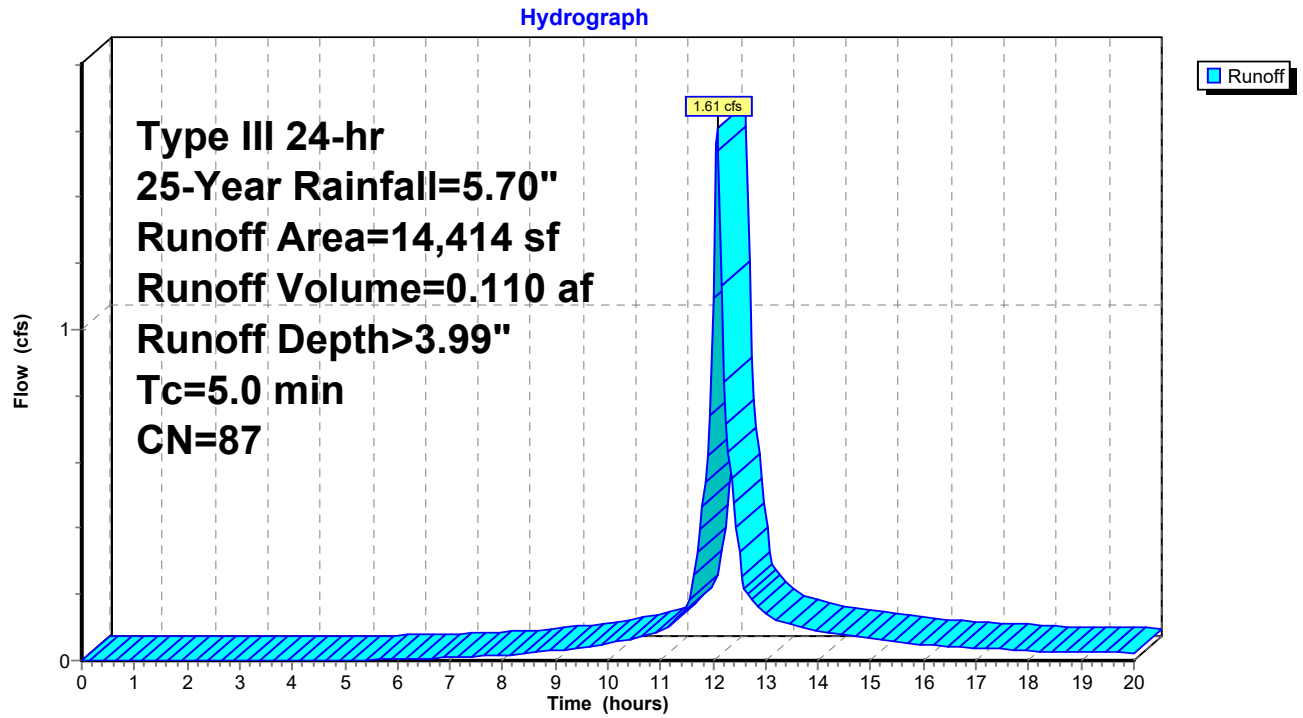
Runoff = 1.61 cfs @ 12.07 hrs, Volume= 0.110 af, Depth> 3.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (sf)	CN	Description
*	7,989	98	
	6,425	74	>75% Grass cover, Good, HSG C
	14,414	87	Weighted Average
	6,425		44.57% Pervious Area
	7,989		55.43% Impervious Area

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

Subcatchment C: AREA C



Summary for Subcatchment D: AREA D

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

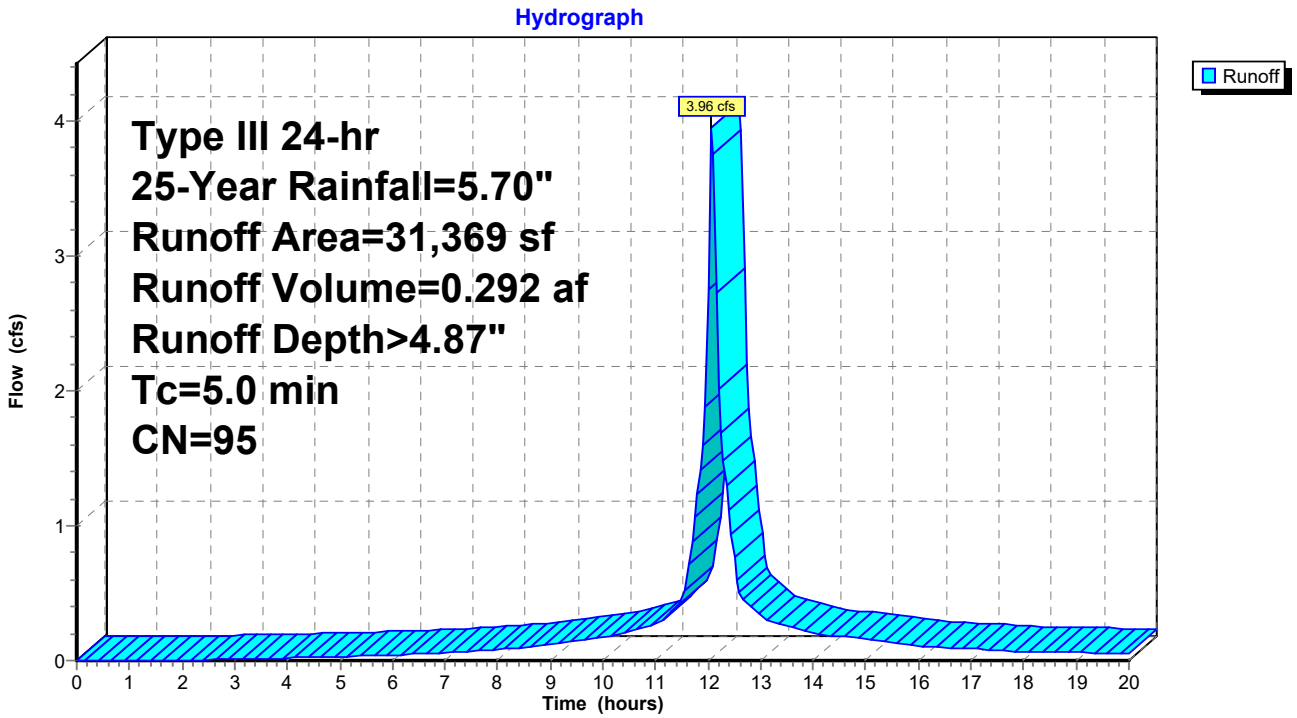
Runoff = 3.96 cfs @ 12.07 hrs, Volume= 0.292 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (sf)	CN	Description
*	27,479	98	
	3,890	74	>75% Grass cover, Good, HSG C
	31,369	95	Weighted Average
	3,890		12.40% Pervious Area
	27,479		87.60% Impervious Area

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

Subcatchment D: AREA D



Summary for Subcatchment E: AREA E

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

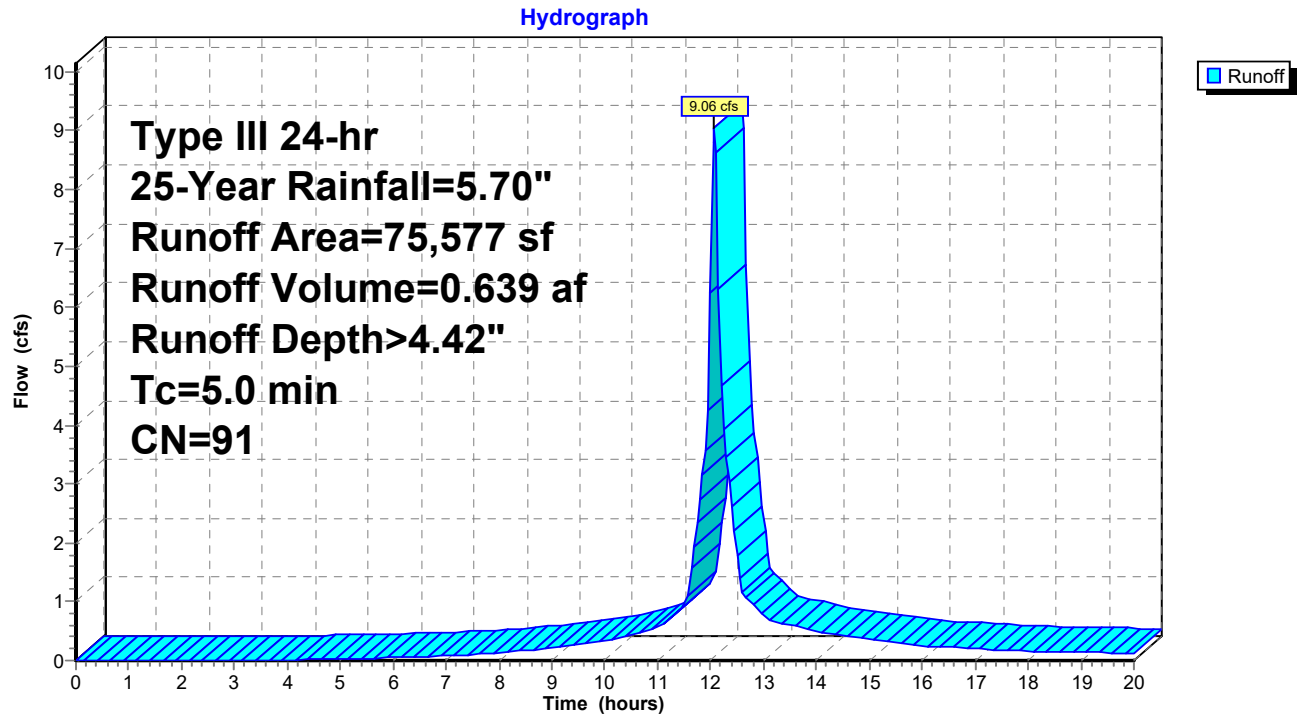
Runoff = 9.06 cfs @ 12.07 hrs, Volume= 0.639 af, Depth> 4.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (sf)	CN	Description
*	54,371	98	
	21,206	74	>75% Grass cover, Good, HSG C
	75,577	91	Weighted Average
	21,206		28.06% Pervious Area
	54,371		71.94% Impervious Area

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

Subcatchment E: AREA E



Summary for Subcatchment F: AREA F

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

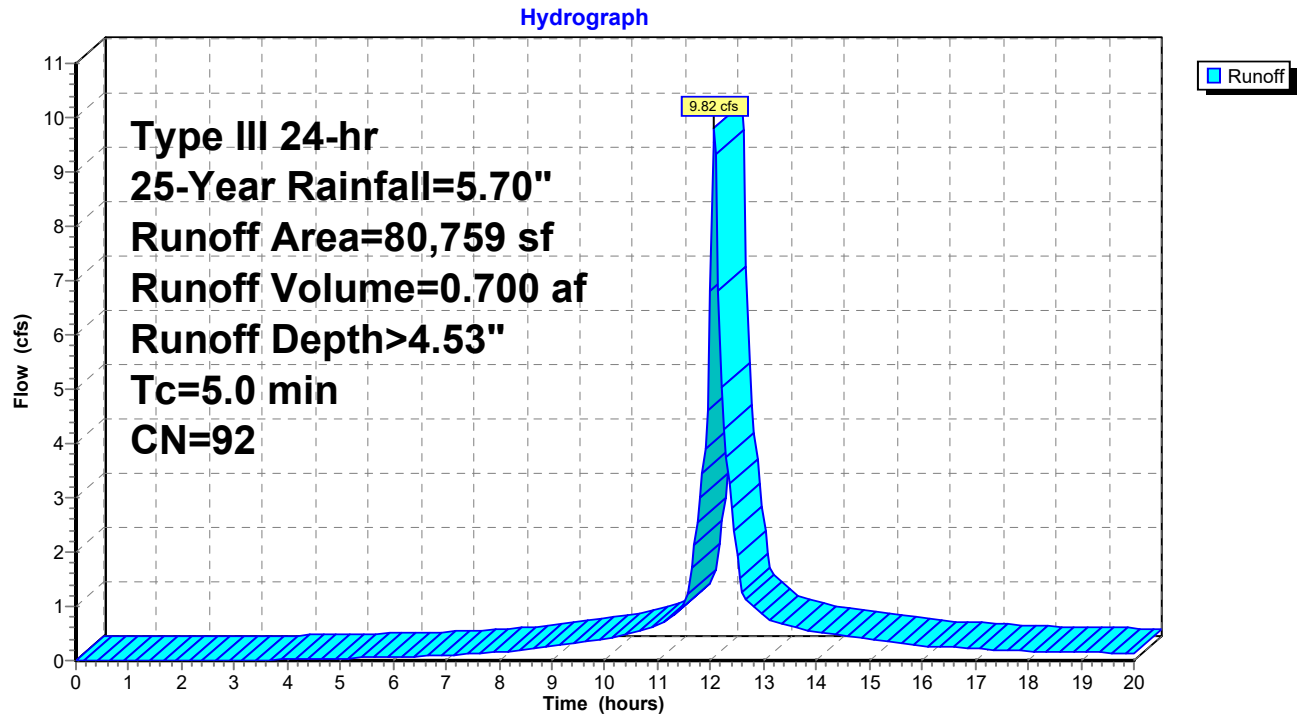
Runoff = 9.82 cfs @ 12.07 hrs, Volume= 0.700 af, Depth> 4.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (sf)	CN	Description
*	62,177	98	
	18,582	74	>75% Grass cover, Good, HSG C
	80,759	92	Weighted Average
	18,582		23.01% Pervious Area
	62,177		76.99% Impervious Area

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

Subcatchment F: AREA F



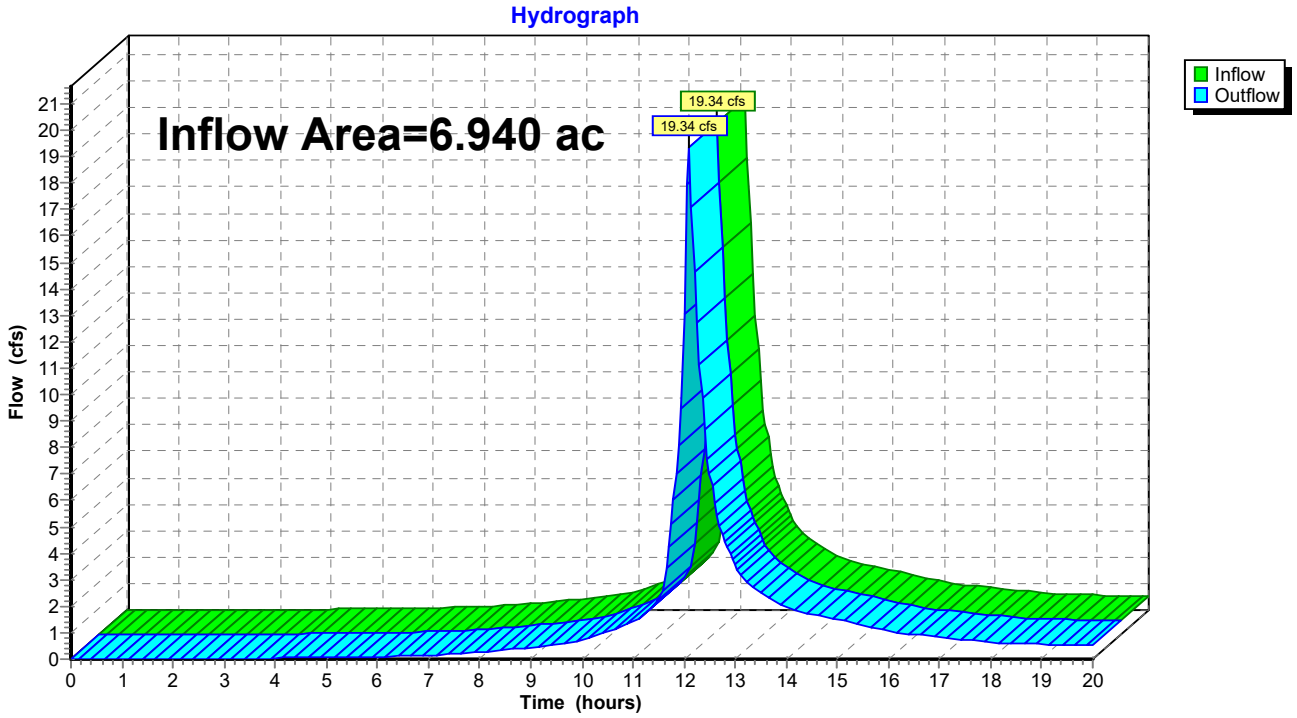
Summary for Reach 2R: POI-1

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

Inflow Area = 6.940 ac, 61.35% Impervious, Inflow Depth > 3.34" for 25-Year event
Inflow = 19.34 cfs @ 12.09 hrs, Volume= 1.930 af
Outflow = 19.34 cfs @ 12.09 hrs, Volume= 1.930 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Reach 2R: POI-1



Summary for Pond 1P: prop swale

Inflow Area = 1.854 ac, 76.99% Impervious, Inflow Depth > 4.53" for 25-Year event
Inflow = 9.82 cfs @ 12.07 hrs, Volume= 0.700 af
Outflow = 1.24 cfs @ 12.62 hrs, Volume= 0.235 af, Atten= 87%, Lag= 33.1 min
Primary = 1.24 cfs @ 12.62 hrs, Volume= 0.235 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 13.07' @ 12.62 hrs Surf.Area= 7,159 sf Storage= 20,676 cf

Plug-Flow detention time= 268.2 min calculated for 0.235 af (34% of inflow)
Center-of-Mass det. time= 146.7 min (895.5 - 748.8)

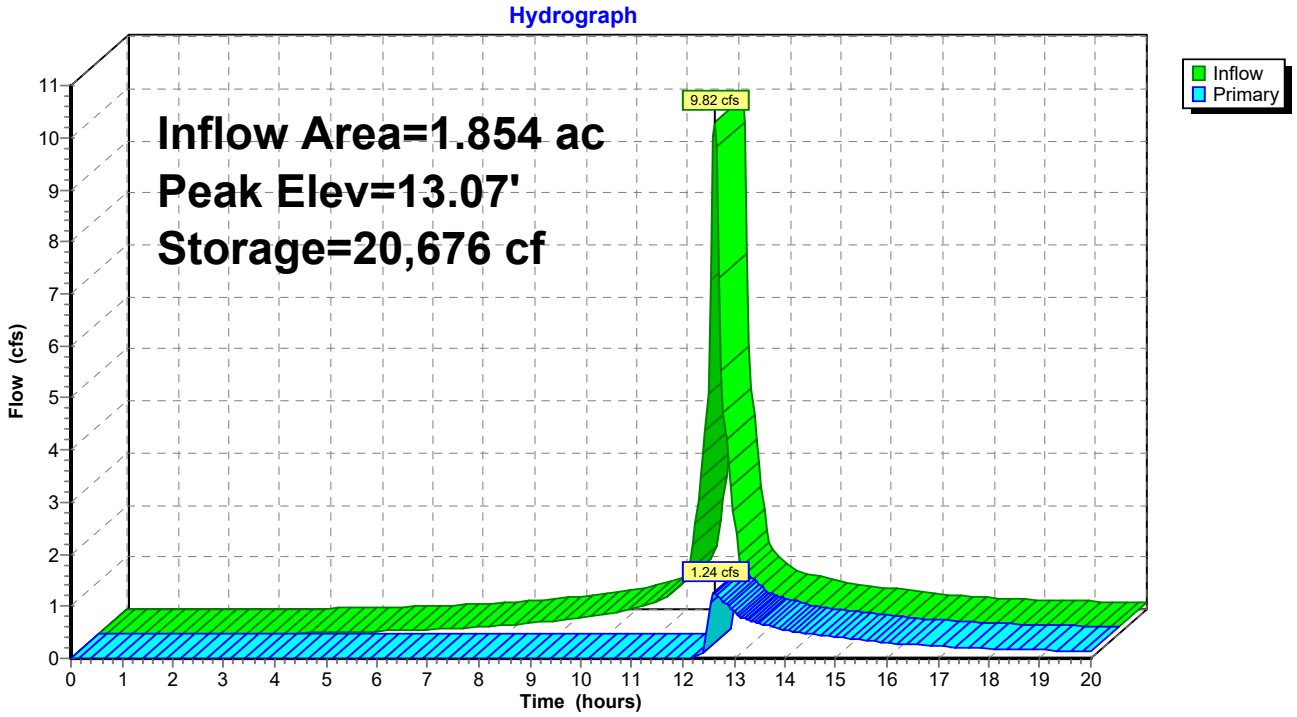
Volume	Invert	Avail.Storage	Storage Description
#1	6.00'	28,176 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.00	540	0	0
8.00	1,482	2,022	2,022
10.00	2,580	4,062	6,084
12.00	5,330	7,910	13,994
13.00	7,017	6,174	20,168
14.00	9,000	8,009	28,176

Device	Routing	Invert	Outlet Devices
#1	Primary	13.00'	**20.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=1.10 cfs @ 12.62 hrs HW=13.07' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 1.10 cfs @ 0.78 fps)

Pond 1P: prop swale



Summary for Pond 2P: Pipe Storage

Inflow Area = 0.574 ac, 63.97% Impervious, Inflow Depth > 4.22" for 25-Year event
Inflow = 2.90 cfs @ 12.07 hrs, Volume= 0.202 af
Outflow = 1.15 cfs @ 12.29 hrs, Volume= 0.185 af, Atten= 60%, Lag= 13.0 min
Primary = 1.15 cfs @ 12.29 hrs, Volume= 0.185 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 19.24' @ 12.29 hrs Surf.Area= 1,615 sf Storage= 2,588 cf

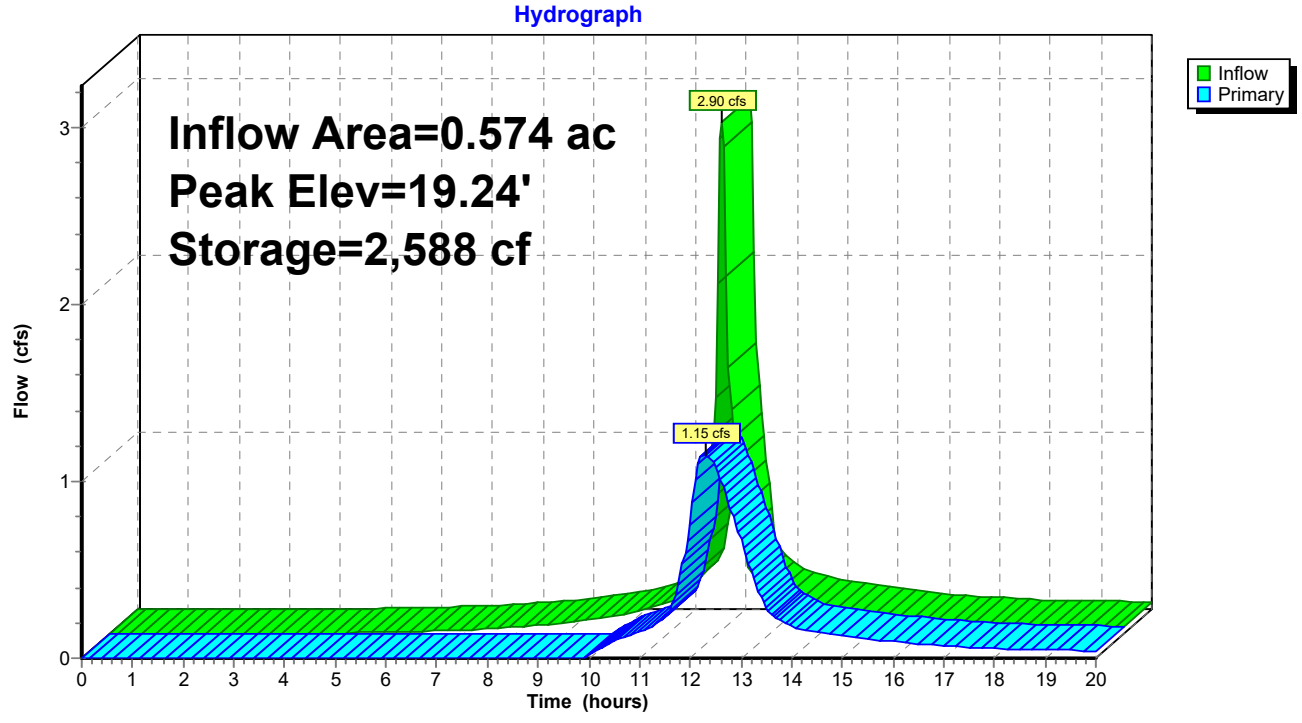
Plug-Flow detention time= 68.3 min calculated for 0.185 af (92% of inflow)
Center-of-Mass det. time= 39.4 min (796.9 - 757.5)

Volume	Invert	Avail.Storage	Storage Description
#1	17.50'	2,283 cf	**36.0" Round Pipe Storage** Inside #2 L= 323.0'
#2	16.50'	2,317 cf	**5.00'W x 323.00'L x 5.00'H Prismatoid** 8,075 cf Overall - 2,283 cf Embedded = 5,792 cf x 40.0% Voids
		4,600 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	17.50'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.15 cfs @ 12.29 hrs HW=19.23' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 1.15 cfs @ 5.86 fps)

Pond 2P: Pipe Storage

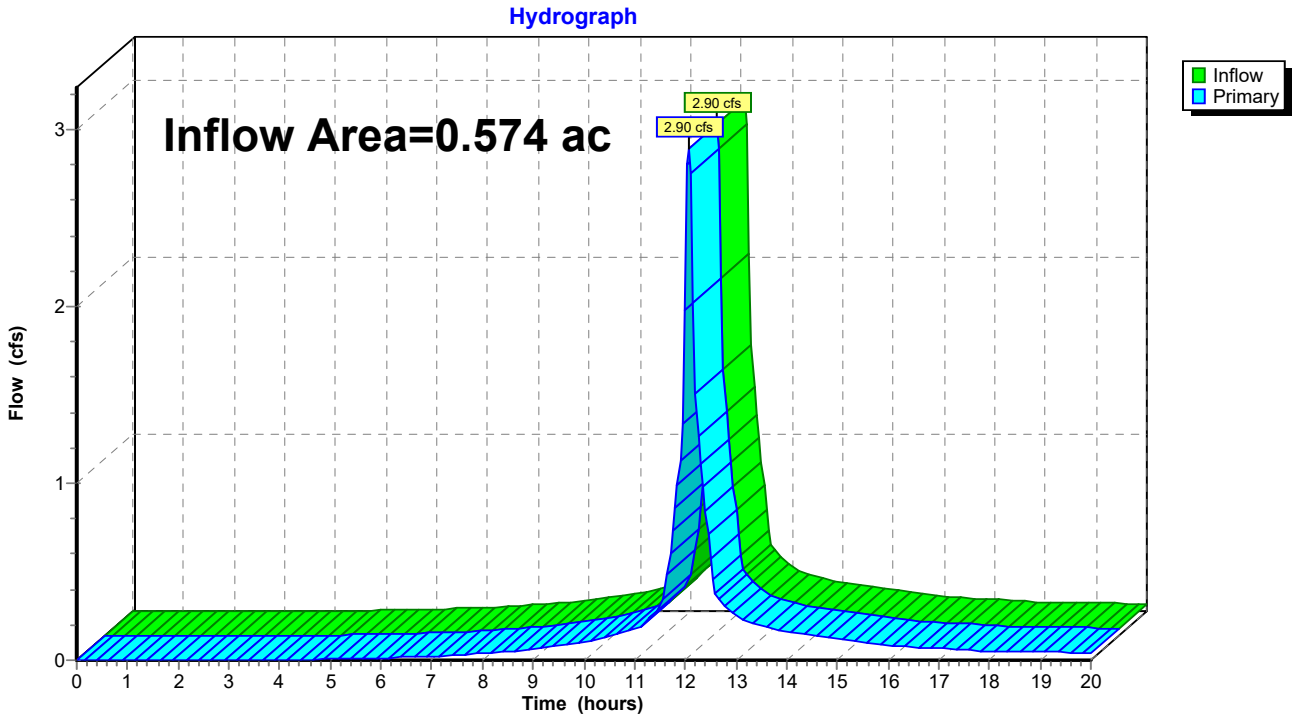


Summary for Link 1L: (new Link)

Inflow Area = 0.574 ac, 63.97% Impervious, Inflow Depth > 4.22" for 25-Year event
Inflow = 2.90 cfs @ 12.07 hrs, Volume= 0.202 af
Primary = 2.90 cfs @ 12.07 hrs, Volume= 0.202 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Link 1L: (new Link)



Time span=0.00-20.00 hrs, dt=0.05 hrs, 401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment3S: AREA A Runoff Area=89,620 sf 28.40% Impervious Runoff Depth>4.60"
Flow Length=340' Tc=12.3 min CN=81 Runoff=9.46 cfs 0.789 af

SubcatchmentB: AREA B Runoff Area=10,575 sf 75.61% Impervious Runoff Depth>5.85"
Tc=5.0 min CN=92 Runoff=1.63 cfs 0.118 af

SubcatchmentC: AREA C Runoff Area=14,414 sf 55.43% Impervious Runoff Depth>5.28"
Tc=5.0 min CN=87 Runoff=2.09 cfs 0.145 af

SubcatchmentD: AREA D Runoff Area=31,369 sf 87.60% Impervious Runoff Depth>6.20"
Tc=5.0 min CN=95 Runoff=4.97 cfs 0.372 af

SubcatchmentE: AREA E Runoff Area=75,577 sf 71.94% Impervious Runoff Depth>5.73"
Tc=5.0 min CN=91 Runoff=11.55 cfs 0.829 af

SubcatchmentF: AREA F Runoff Area=80,759 sf 76.99% Impervious Runoff Depth>5.85"
Tc=5.0 min CN=92 Runoff=12.48 cfs 0.903 af

Reach 2R: POI-1 Inflow=24.94 cfs 2.674 af
Outflow=24.94 cfs 2.674 af

Pond 1P: prop swale Peak Elev=13.21' Storage=21,669 cf Inflow=12.48 cfs 0.903 af
Outflow=5.55 cfs 0.438 af

Pond 2P: Pipe Storage Peak Elev=19.85' Storage=3,312 cf Inflow=3.73 cfs 0.264 af
Outflow=1.37 cfs 0.246 af

Link 1L: (new Link) Inflow=3.73 cfs 0.264 af
Primary=3.73 cfs 0.264 af

Total Runoff Area = 6.940 ac Runoff Volume = 3.157 af Average Runoff Depth = 5.46"
38.65% Pervious = 2.683 ac 61.35% Impervious = 4.258 ac

Summary for Subcatchment 3S: AREA A

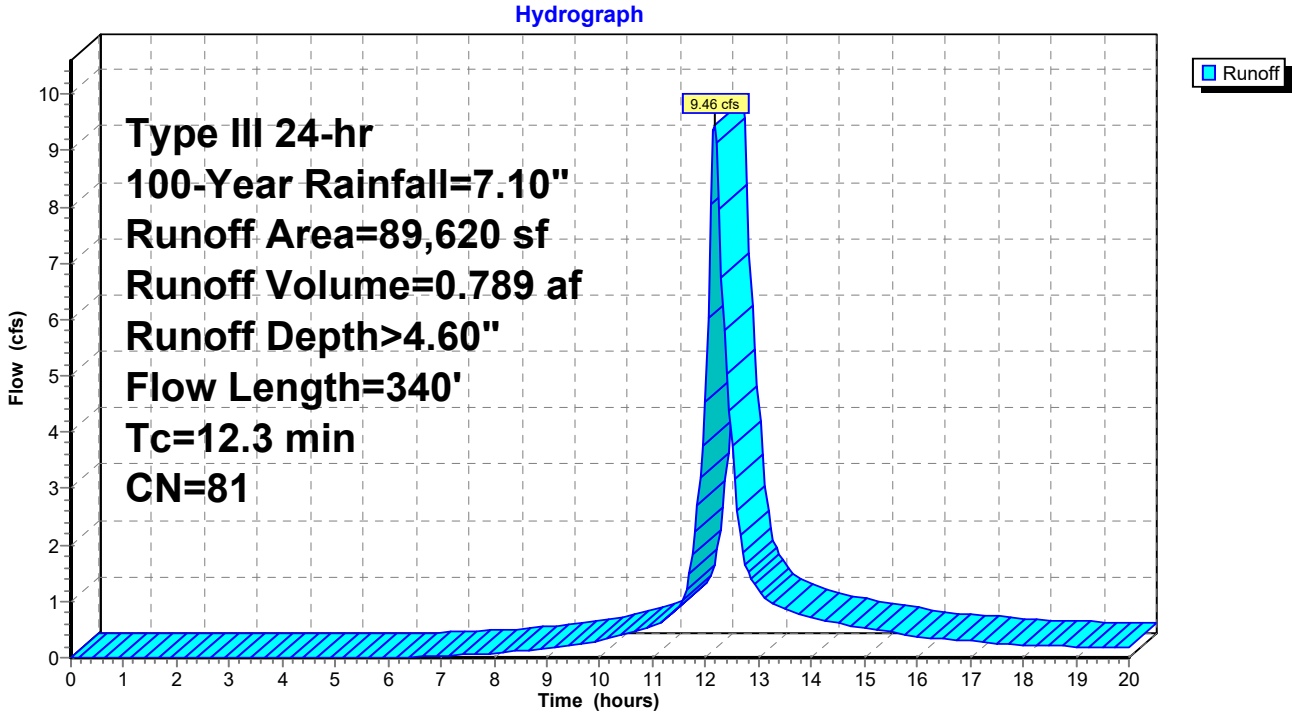
Runoff = 9.46 cfs @ 12.17 hrs, Volume= 0.789 af, Depth> 4.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (sf)	CN	Description
	64,169	74	>75% Grass cover, Good, HSG C
*	25,451	98	
	89,620	81	Weighted Average
	64,169		71.60% Pervious Area
	25,451		28.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	153	0.0312	0.23		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.40"
0.7	129	0.0388	3.17		**Shallow Concentrated Flow, B-C** Unpaved Kv= 16.1 fps
0.4	58	0.0179	2.72		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
12.3	340	Total			

Subcatchment 3S: AREA A



Summary for Subcatchment B: AREA B

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

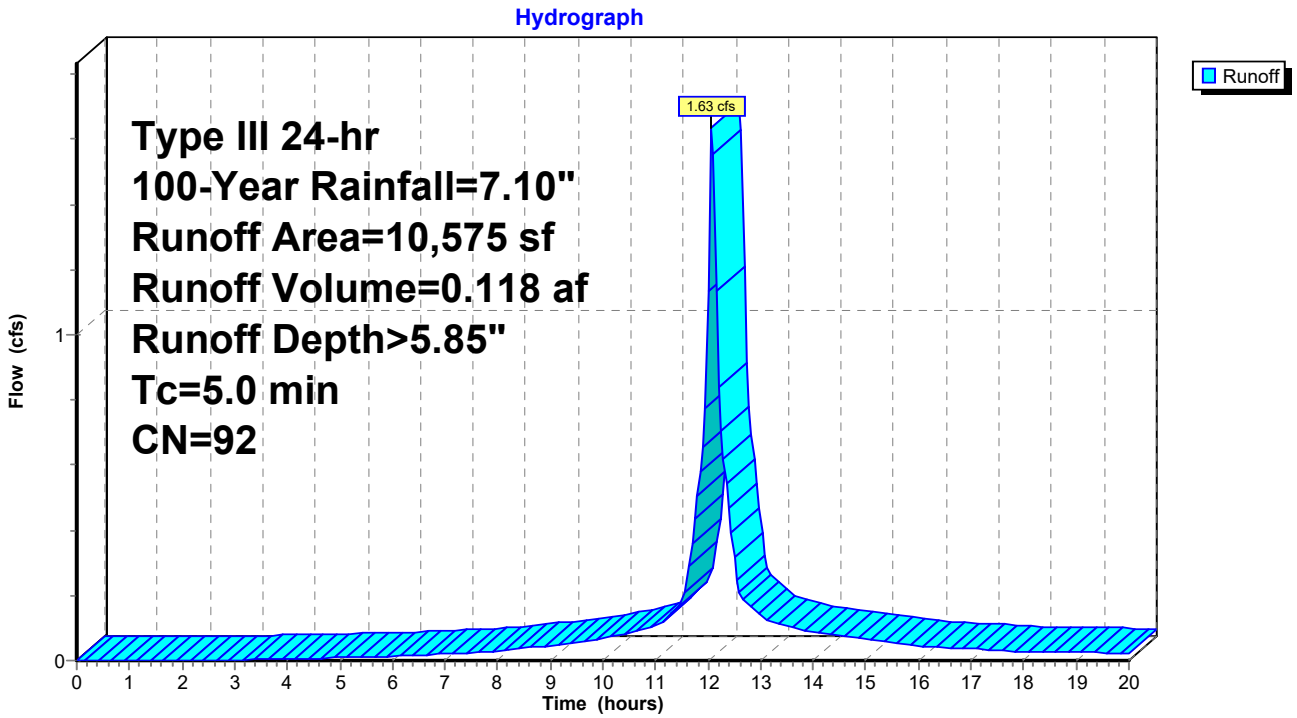
Runoff = 1.63 cfs @ 12.07 hrs, Volume= 0.118 af, Depth> 5.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (sf)	CN	Description
*	7,996	98	
	2,579	74	>75% Grass cover, Good, HSG C
	10,575	92	Weighted Average
	2,579		24.39% Pervious Area
	7,996		75.61% Impervious Area

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

Subcatchment B: AREA B



Summary for Subcatchment C: AREA C

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

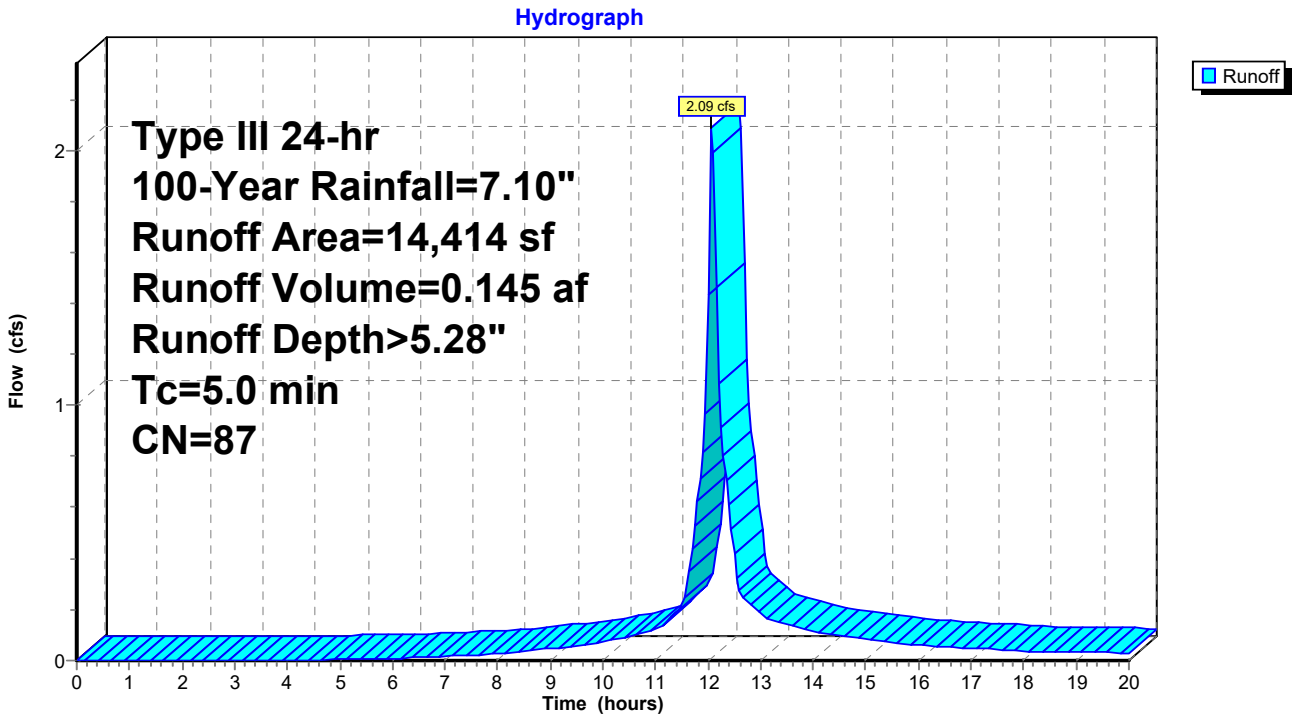
Runoff = 2.09 cfs @ 12.07 hrs, Volume= 0.145 af, Depth> 5.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (sf)	CN	Description
*	7,989	98	
	6,425	74	>75% Grass cover, Good, HSG C
	14,414	87	Weighted Average
	6,425		44.57% Pervious Area
	7,989		55.43% Impervious Area

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

Subcatchment C: AREA C



Summary for Subcatchment D: AREA D

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

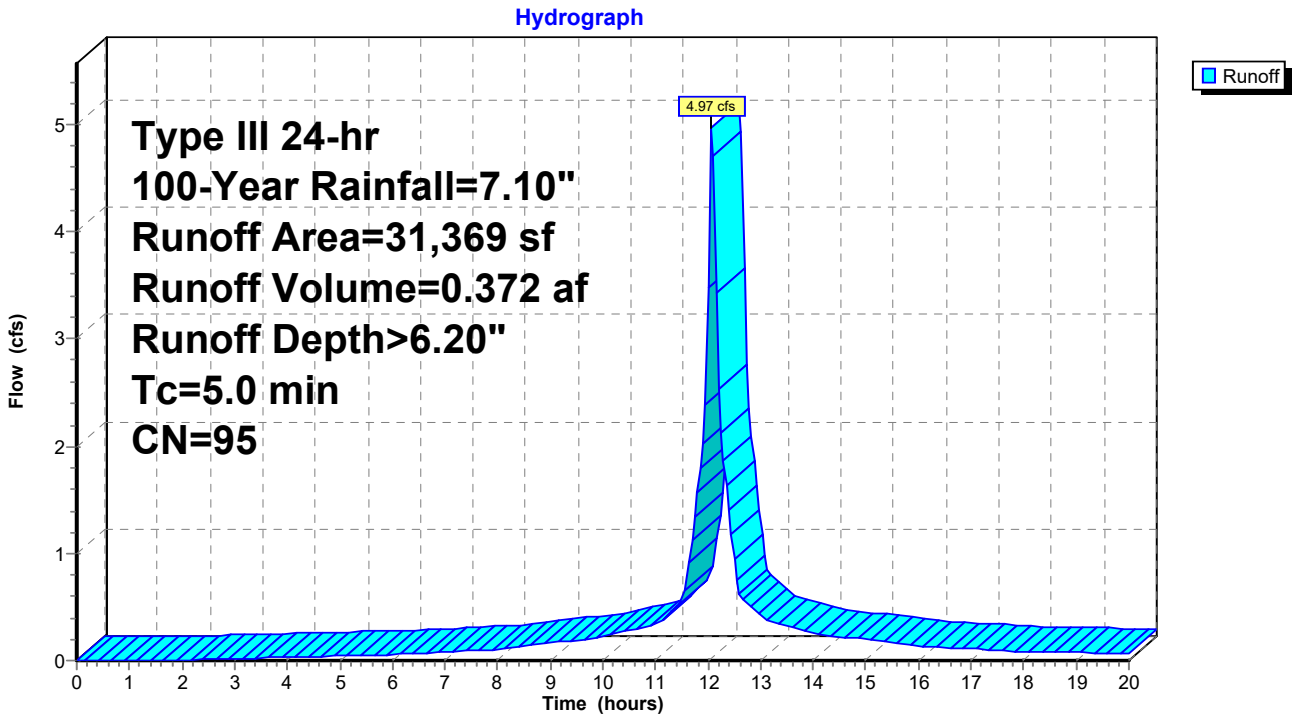
Runoff = 4.97 cfs @ 12.07 hrs, Volume= 0.372 af, Depth> 6.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (sf)	CN	Description
*	27,479	98	
	3,890	74	>75% Grass cover, Good, HSG C
	31,369	95	Weighted Average
	3,890		12.40% Pervious Area
	27,479		87.60% Impervious Area

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

Subcatchment D: AREA D



Summary for Subcatchment E: AREA E

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

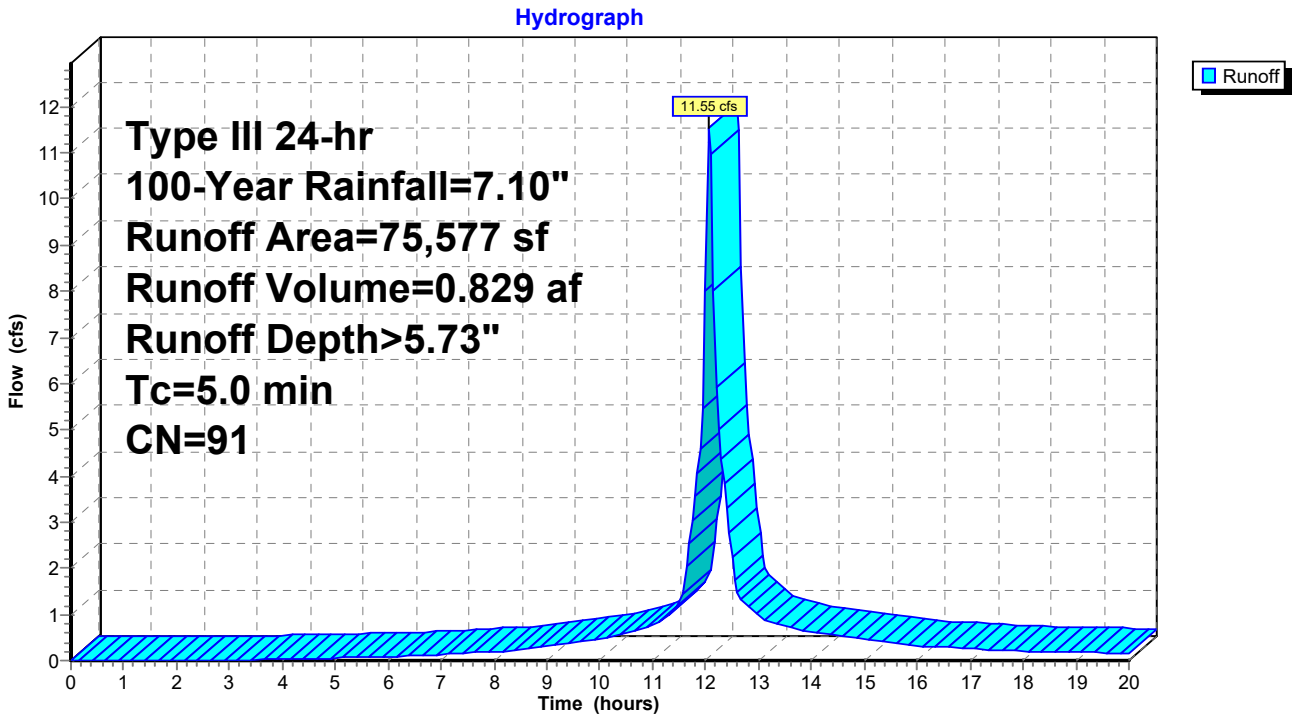
Runoff = 11.55 cfs @ 12.07 hrs, Volume= 0.829 af, Depth> 5.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (sf)	CN	Description
*	54,371	98	
	21,206	74	>75% Grass cover, Good, HSG C
	75,577	91	Weighted Average
	21,206		28.06% Pervious Area
	54,371		71.94% Impervious Area

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

Subcatchment E: AREA E



Summary for Subcatchment F: AREA F

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

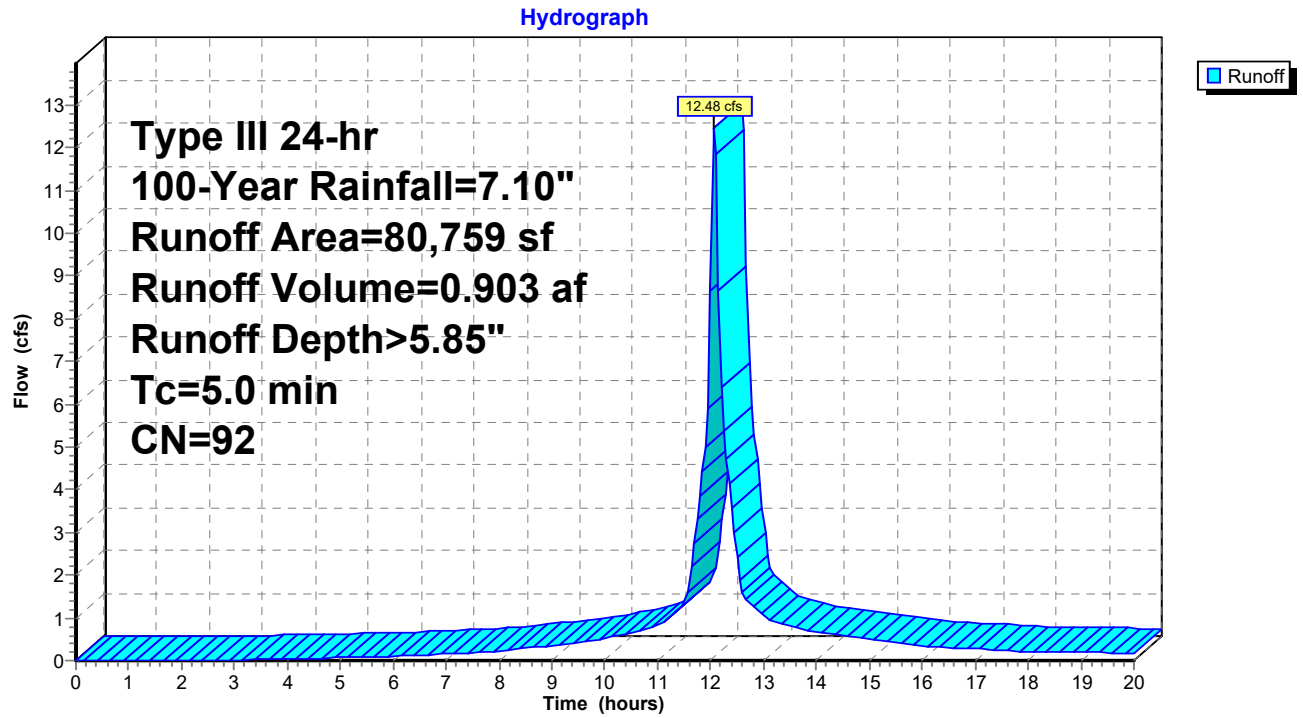
Runoff = 12.48 cfs @ 12.07 hrs, Volume= 0.903 af, Depth> 5.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (sf)	CN	Description
*	62,177	98	
	18,582	74	>75% Grass cover, Good, HSG C
	80,759	92	Weighted Average
	18,582		23.01% Pervious Area
	62,177		76.99% Impervious Area

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

Subcatchment F: AREA F



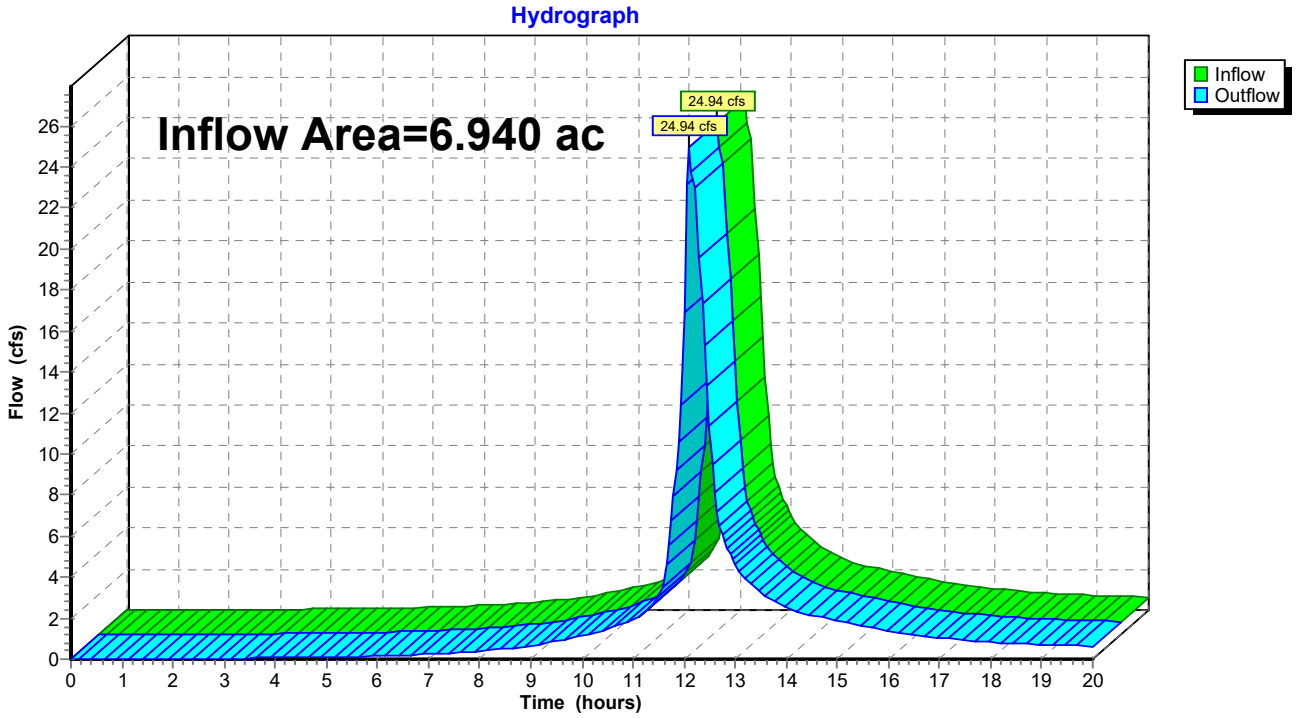
Summary for Reach 2R: POI-1

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

Inflow Area = 6.940 ac, 61.35% Impervious, Inflow Depth > 4.62" for 100-Year event
Inflow = 24.94 cfs @ 12.11 hrs, Volume= 2.674 af
Outflow = 24.94 cfs @ 12.11 hrs, Volume= 2.674 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Reach 2R: POI-1



Summary for Pond 1P: prop swale

Inflow Area = 1.854 ac, 76.99% Impervious, Inflow Depth > 5.85" for 100-Year event
Inflow = 12.48 cfs @ 12.07 hrs, Volume= 0.903 af
Outflow = 5.55 cfs @ 12.26 hrs, Volume= 0.438 af, Atten= 55%, Lag= 11.1 min
Primary = 5.55 cfs @ 12.26 hrs, Volume= 0.438 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 13.21' @ 12.26 hrs Surf.Area= 7,429 sf Storage= 21,669 cf

Plug-Flow detention time= 196.7 min calculated for 0.438 af (48% of inflow)
Center-of-Mass det. time= 101.6 min (844.6 - 743.0)

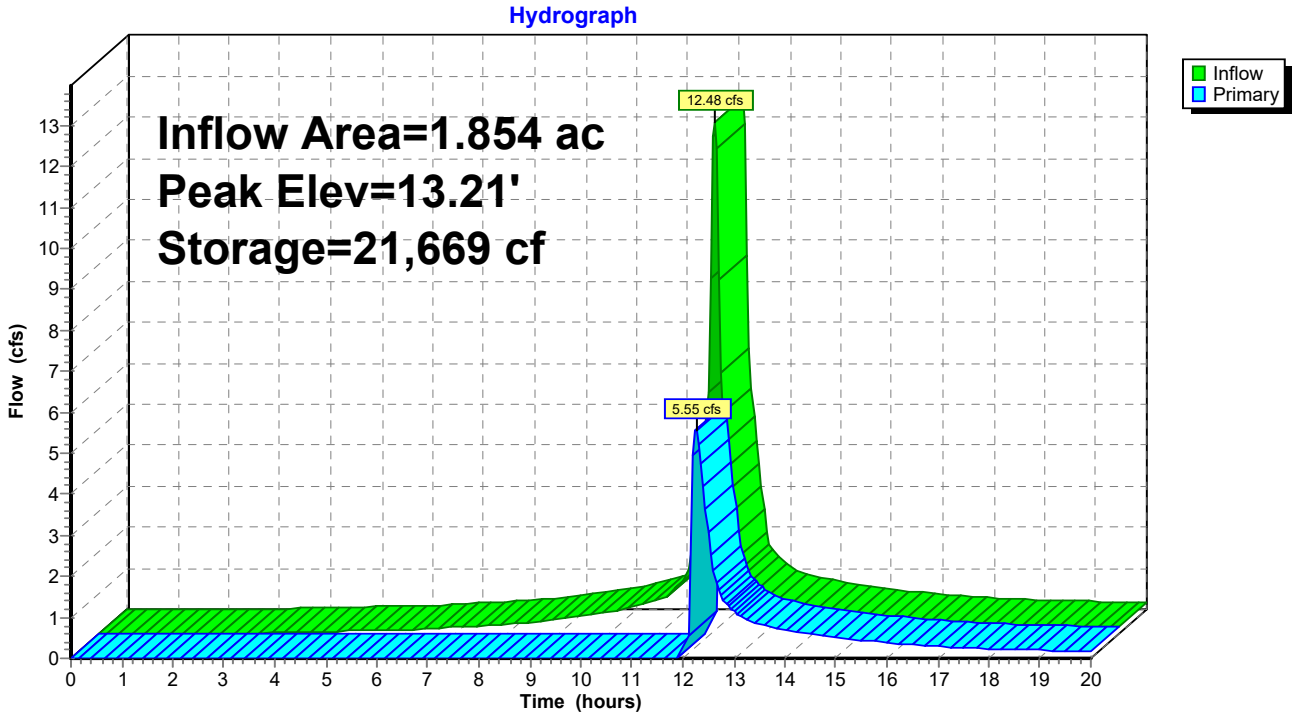
Volume	Invert	Avail.Storage	Storage Description
#1	6.00'	28,176 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
6.00	540	0	0
8.00	1,482	2,022	2,022
10.00	2,580	4,062	6,084
12.00	5,330	7,910	13,994
13.00	7,017	6,174	20,168
14.00	9,000	8,009	28,176

Device	Routing	Invert	Outlet Devices
#1	Primary	13.00'	**20.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=5.48 cfs @ 12.26 hrs HW=13.21' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 5.48 cfs @ 1.33 fps)

Pond 1P: prop swale



Summary for Pond 2P: Pipe Storage

Inflow Area = 0.574 ac, 63.97% Impervious, Inflow Depth > 5.52" for 100-Year event
Inflow = 3.73 cfs @ 12.07 hrs, Volume= 0.264 af
Outflow = 1.37 cfs @ 12.32 hrs, Volume= 0.246 af, Atten= 63%, Lag= 14.7 min
Primary = 1.37 cfs @ 12.32 hrs, Volume= 0.246 af

Routing by Stor-Ind method, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 19.85' @ 12.32 hrs Surf.Area= 1,615 sf Storage= 3,312 cf

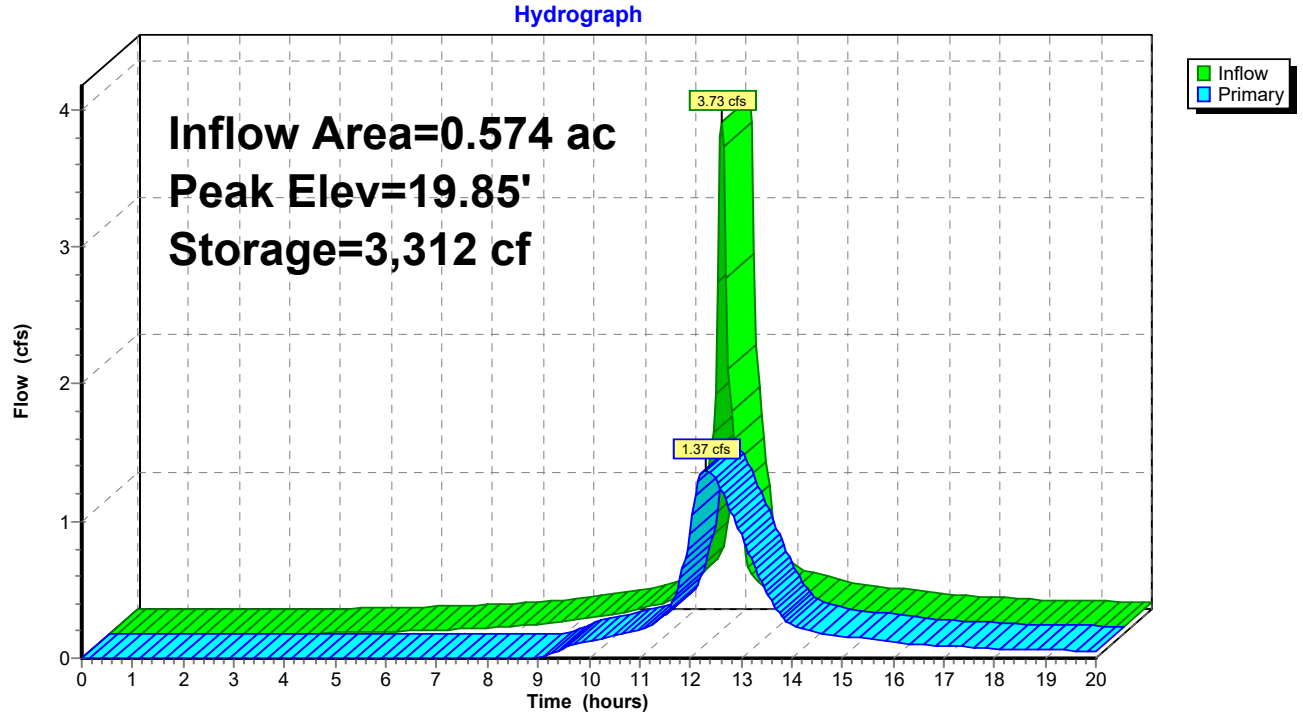
Plug-Flow detention time= 62.6 min calculated for 0.246 af (93% of inflow)
Center-of-Mass det. time= 38.7 min (790.0 - 751.3)

Volume	Invert	Avail.Storage	Storage Description
#1	17.50'	2,283 cf	**36.0" Round Pipe Storage** Inside #2 L= 323.0'
#2	16.50'	2,317 cf	**5.00'W x 323.00'L x 5.00'H Prismatoid** 8,075 cf Overall - 2,283 cf Embedded = 5,792 cf x 40.0% Voids
		4,600 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	17.50'	**6.0" Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=1.37 cfs @ 12.32 hrs HW=19.84' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 1.37 cfs @ 6.97 fps)

Pond 2P: Pipe Storage



Summary for Link 1L: (new Link)

Inflow Area = 0.574 ac, 63.97% Impervious, Inflow Depth > 5.52" for 100-Year event
Inflow = 3.73 cfs @ 12.07 hrs, Volume= 0.264 af
Primary = 3.73 cfs @ 12.07 hrs, Volume= 0.264 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-20.00 hrs, dt= 0.05 hrs

Link 1L: (new Link)