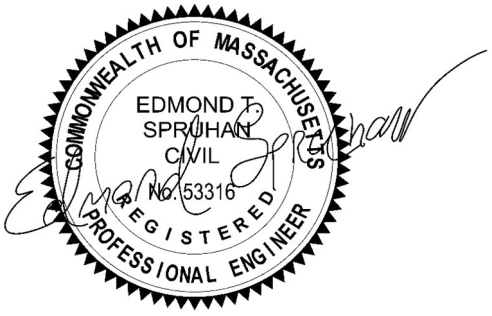
SPRUHAN ENGINEERING, P.C.

STORMWATER REPORT

1092-1094 CHESTNUT ST, NEWTON, MA



Prepared By: Spruhan Engineering, P.C.
February 2, 2021

Contents

1.0 Introduction

Spruhan Engineering, P.C. has prepared this Storm water Report for the proposed development located at 1092-1094 Chestnut St, Newton, Massachusetts.

The proposed development consists of an addition to the existing dwelling and the construction of a new dwelling on the rear of the lot, paved driveway, permeable pavers walkways and landscaped area. The purpose of this report is to demonstrate that the proposed conditions do not create any increased flowrate or runoff from the site. This is achieved by the installation of two drainage systems.

2.0 Existing Conditions

The existing property is located at, 1092-1094 Chestnut St, Newton, Massachusetts. The site is bounded by residential dwellings on the sides and rear. The property is located in Chestnut St between Eliot St and Pennsylvania Ave. The existing house roof area is 1,469 S.F., the existing paved driveway and walkway area is 1,255 S.F, the existing imperious area is 206.7 S.F. and the existing landscaped area on the lot is 17,360 S.F.

2.1 Existing Topography and Drainage Infrastructure.

In general, the property slopes from East (rear) to West (front) ranging between approximately 8.5%. As there is no drainage system currently installed, all storm water scours across the surface at grade.

3.1 Project Description

The development consists of an addition to the existing dwelling and a new dwelling at the rear of the lot, a paved driveway, permeable pavers walkways and landscaped areas. The total, existing and proposed roof will have an area of 4,898 S.F, the paved driveway will have an area of 3,025 S.F., the permeable pavers walkways will have an area of 708 S.F., the unconnected impervious will have an area of 933 S.F. and the remaining landscaped portion will have a footprint of 10,667 S.F.

3.2 Storm Water Runoff

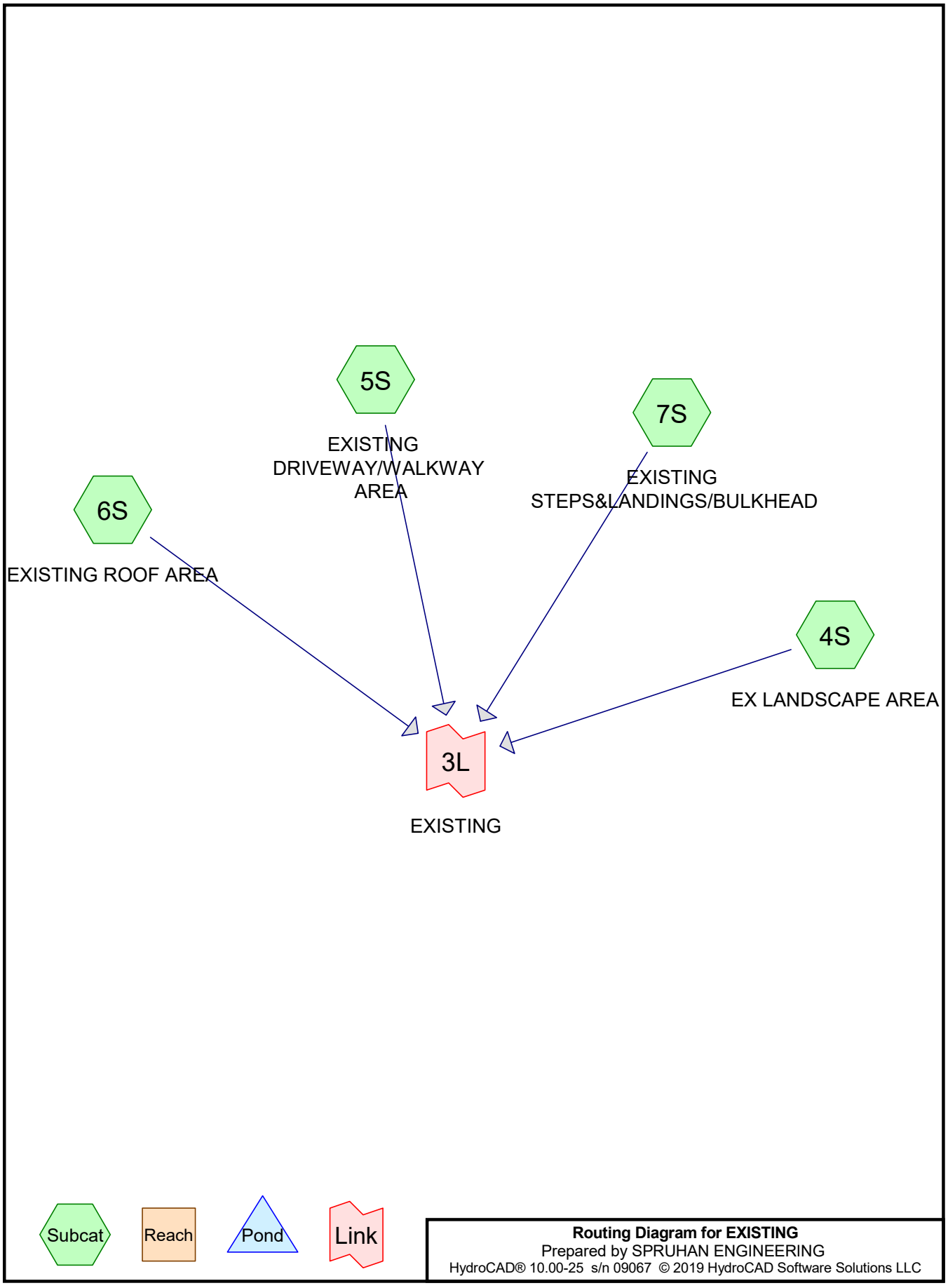
HydroCAD was used to model the site for the existing and proposed conditions for the 2-year, 10-year, 25-year, and 100-year type III storm events based on Atlas-14 Rain information for Middlesex County Central Area. HydroCAD calculations can be seen in Appendix A. The following table shows a summary of the existing and proposed conditions on the site as they relate to flowrate and volume of storm water runoff for each of the storm events.

3.3 Infiltration system

Two infiltration system were proposed to control the runoff rate from the post construction site. This systems consists of 3/4" – 1 1/2" drain gravel. They are 22 'x 35'x 2'and 30' x 37' x 2'.

	Summary Table			
	Runoff Flow Rate		Volume of Runoff	
	EXISTING	PROPOSED	EXISTING	PROPOSED
2 Year Storm	0.22 cfs	0.09 cfs	908 cf	446 cf
10 Year Storm	0.42 cfs	0.20 cfs	1,852 cf	997 cf
25 Year Storm	0.64 cfs	0.33 cfs	2,508 cf	1,387 cf
100 Year Storm	1.76 cfs	1.19 cfs	5,880 cf	3,900 cf

Appendix A – HydroCAD Calculations



Routing Diagram for EXISTING
Prepared by SPRUHAN ENGINEERING
HydroCAD® 10.00-25 s/n 09067 © 2019 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
17,360	49	50-75% Grass cover, Fair, HSG A (4S)
1,255	98	Paved parking, HSG A (5S)
1,469	98	Roofs, HSG A (6S)
207	98	Unconnected pavement, HSG A (7S)
20,291	**56**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
20,291	HSG A	4S, 5S, 6S, 7S
0	HSG B	
0	HSG C	
0	HSG D	
0	Other	
20,291		**TOTAL AREA**

Summary for Subcatchment 4S: EX LANDSCAPE AREA

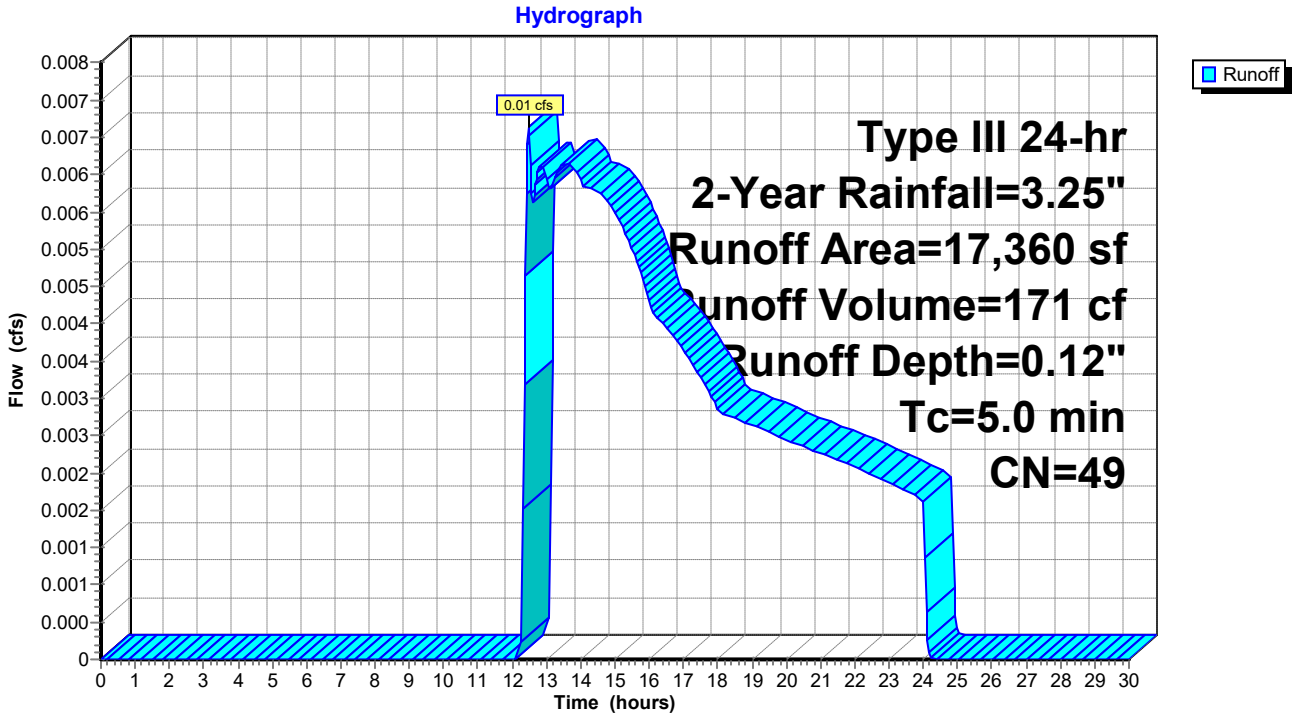
Runoff = 0.01 cfs @ 12.48 hrs, Volume= 171 cf, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.25"

Area (sf)	CN	Description
17,360	49	50-75% Grass cover, Fair, HSG A
17,360		100.00% Pervious Area

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

Subcatchment 4S: EX LANDSCAPE AREA



Summary for Subcatchment 5S: EXISTING DRIVEWAY/WALKWAY AREA

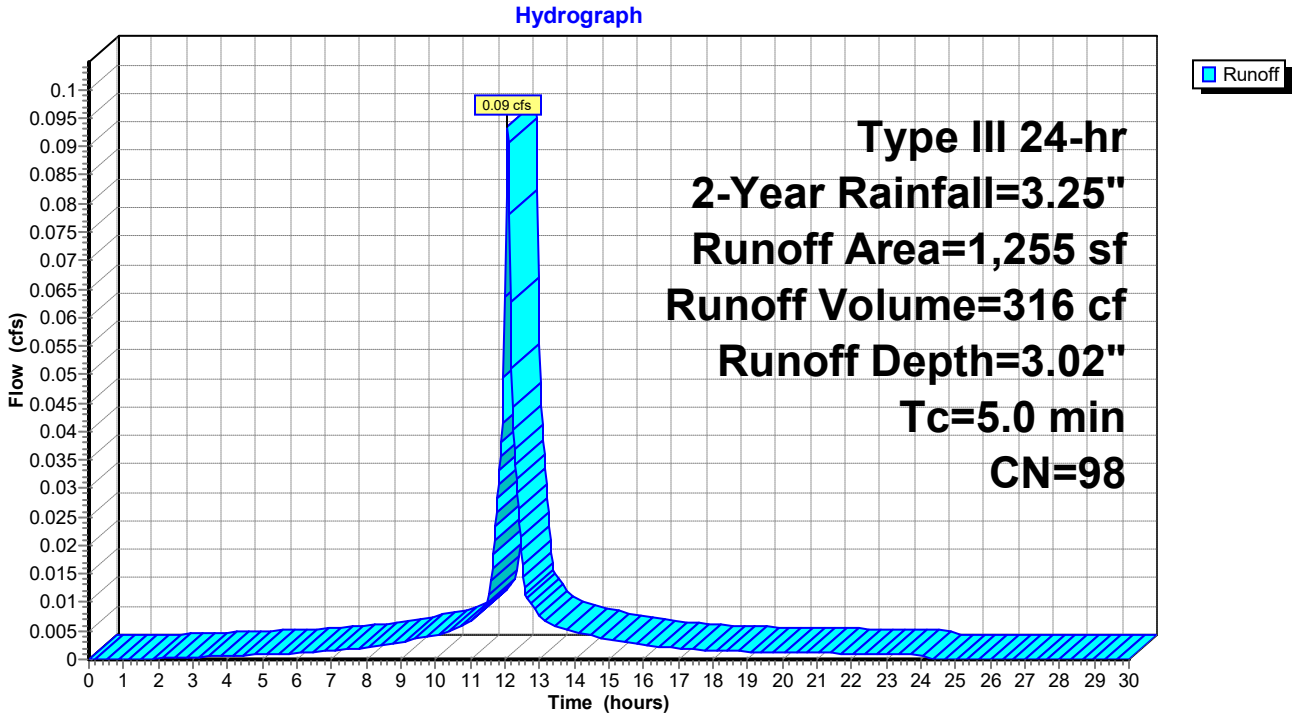
Runoff = 0.09 cfs @ 12.07 hrs, Volume= 316 cf, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.25"

Area (sf)	CN	Description
1,255	98	Paved parking, HSG A
1,255		100.00% Impervious Area

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

Subcatchment 5S: EXISTING DRIVEWAY/WALKWAY AREA



Summary for Subcatchment 6S: EXISTING ROOF AREA

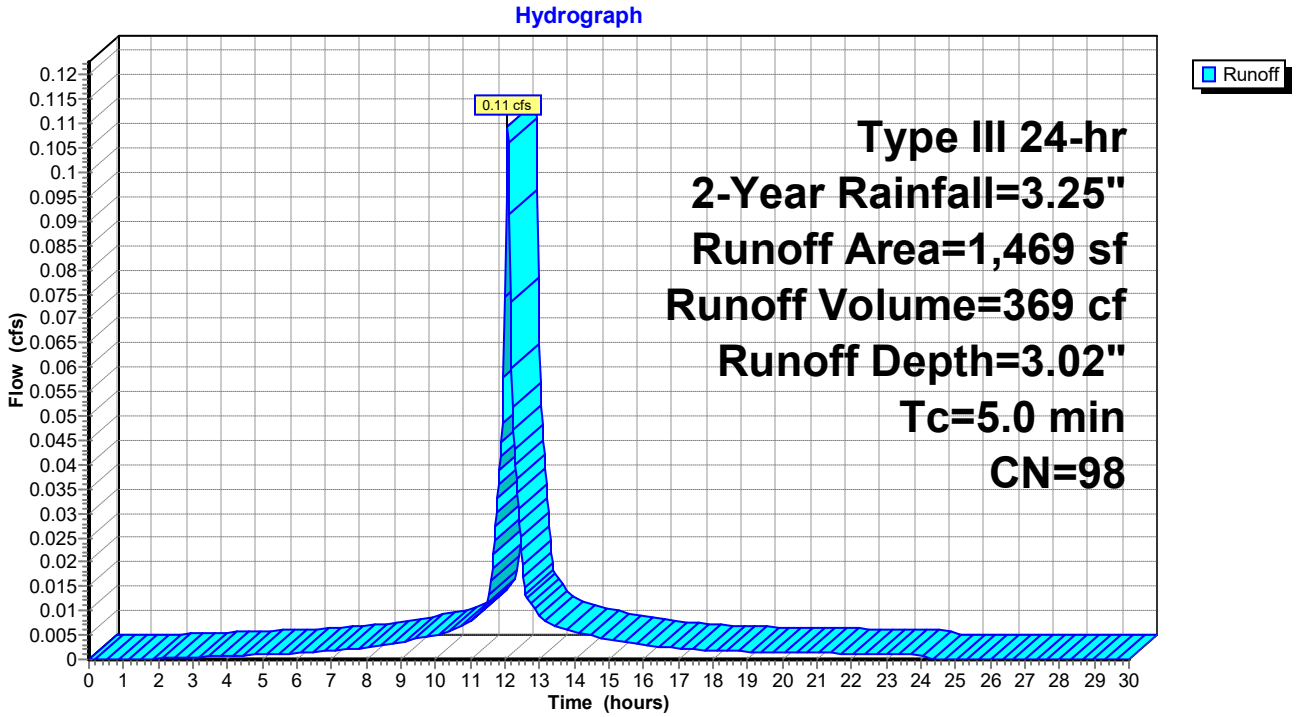
Runoff = 0.11 cfs @ 12.07 hrs, Volume= 369 cf, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.25"

Area (sf)	CN	Description
1,469	98	Roofs, HSG A
1,469		100.00% Impervious Area

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

Subcatchment 6S: EXISTING ROOF AREA



Summary for Subcatchment 7S: EXISTING STEPS&LANDINGS/BULKHEAD

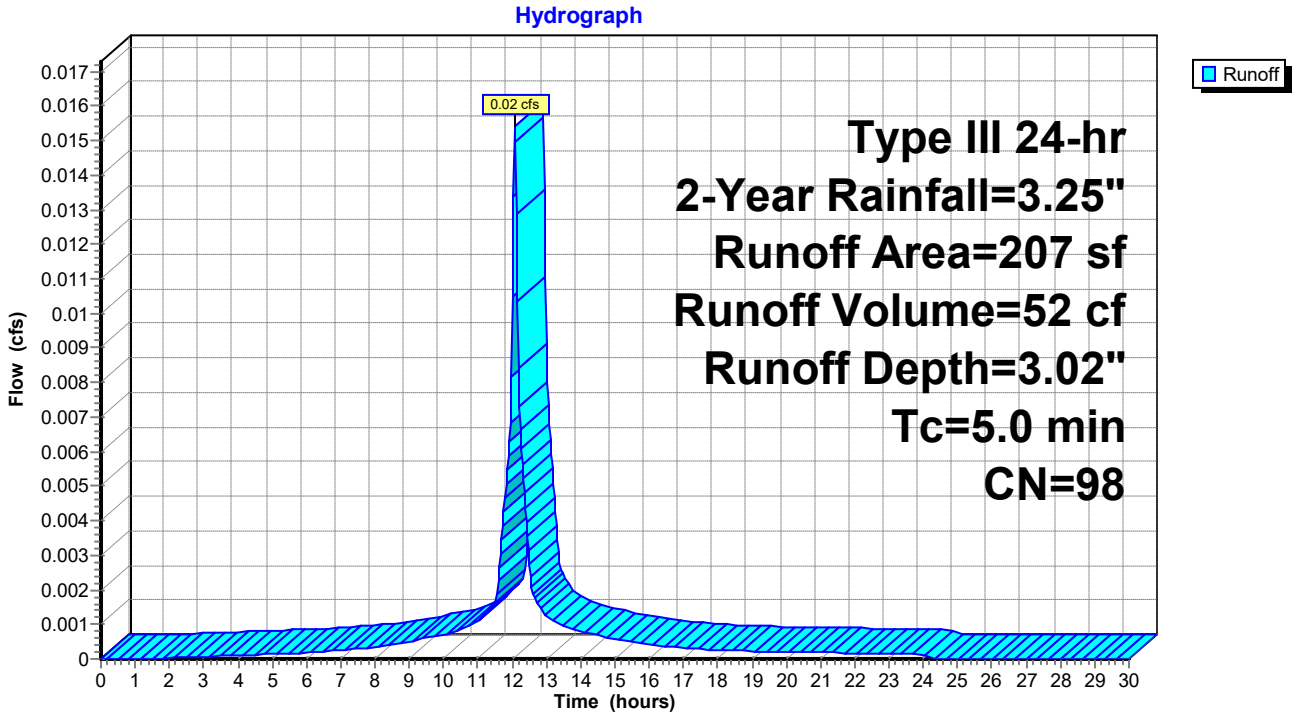
Runoff = 0.02 cfs @ 12.07 hrs, Volume= 52 cf, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.25"

Area (sf)	CN	Description
207	98	Unconnected pavement, HSG A
207		100.00% Impervious Area
207		100.00% Unconnected

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

Subcatchment 7S: EXISTING STEPS&LANDINGS/BULKHEAD

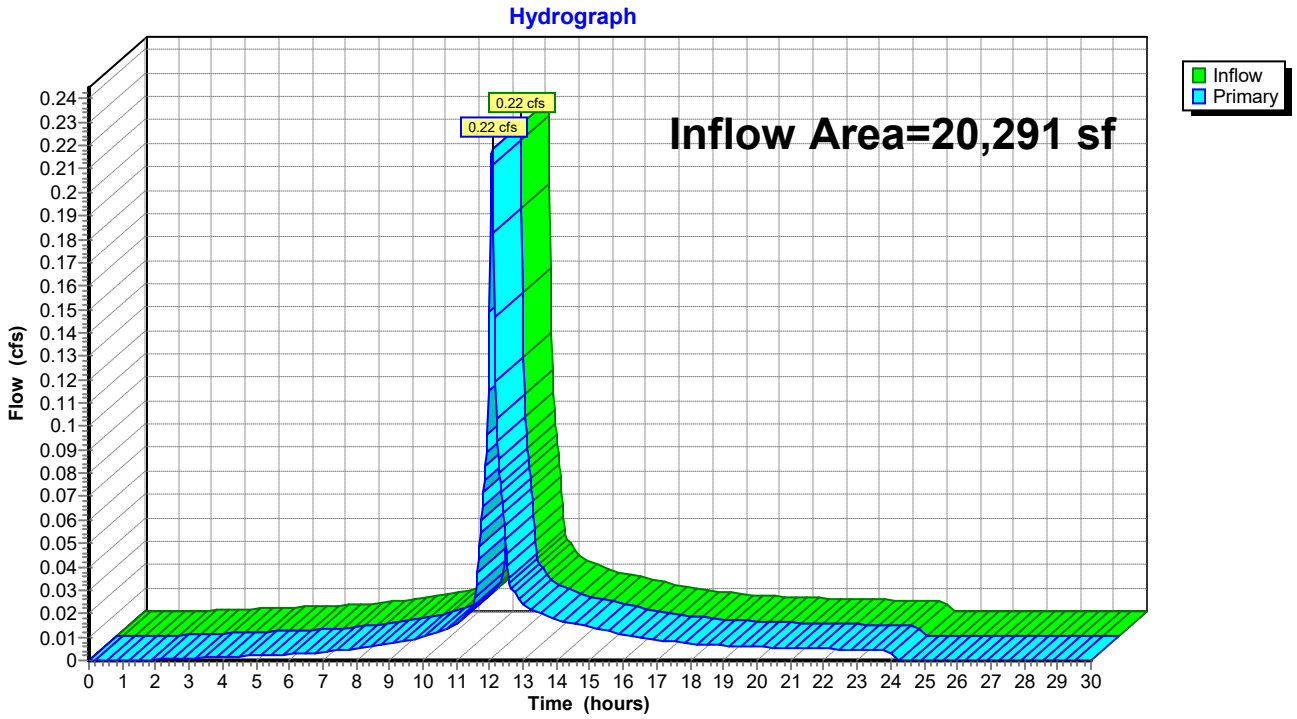


Summary for Link 3L: EXISTING

Inflow Area = 20,291 sf, 14.44% Impervious, Inflow Depth = 0.54" for 2-Year event
Inflow = 0.22 cfs @ 12.07 hrs, Volume= 908 cf
Primary = 0.22 cfs @ 12.07 hrs, Volume= 908 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Link 3L: EXISTING



Summary for Subcatchment 4S: EX LANDSCAPE AREA

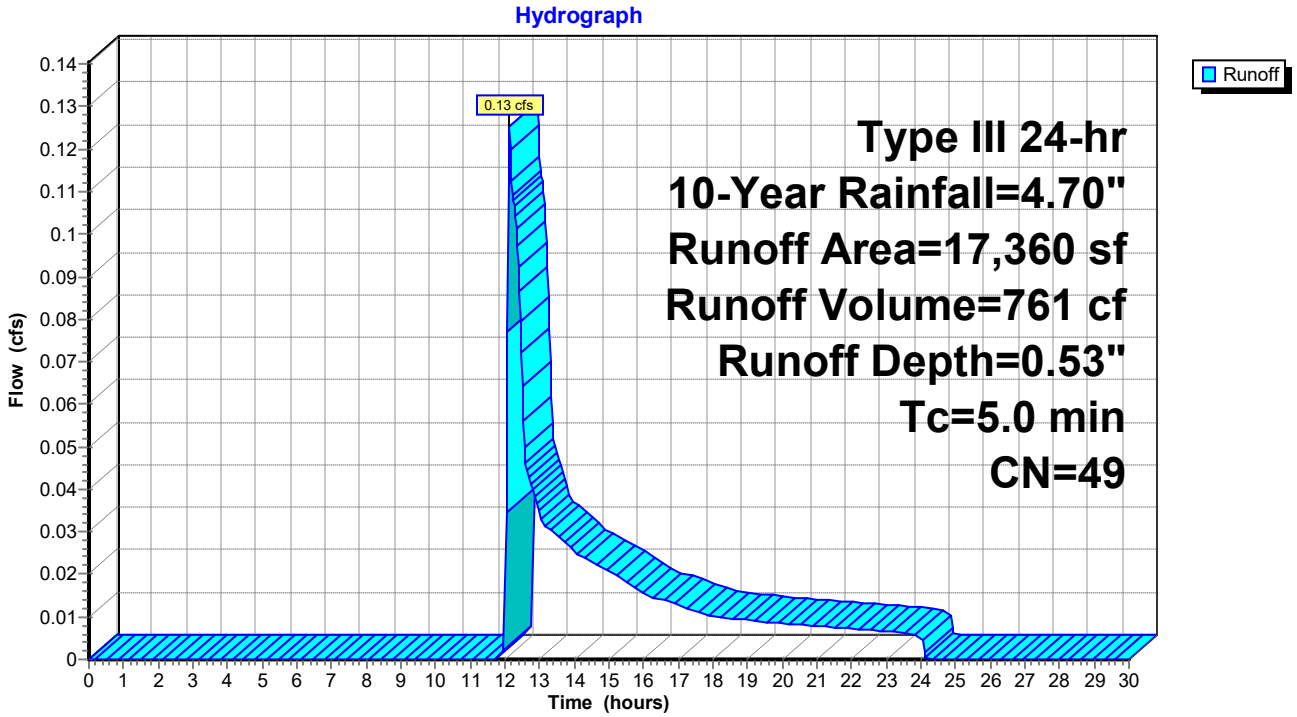
Runoff = 0.13 cfs @ 12.13 hrs, Volume= 761 cf, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
17,360	49	50-75% Grass cover, Fair, HSG A
17,360		100.00% Pervious Area

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

Subcatchment 4S: EX LANDSCAPE AREA



Summary for Subcatchment 5S: EXISTING DRIVEWAY/WALKWAY AREA

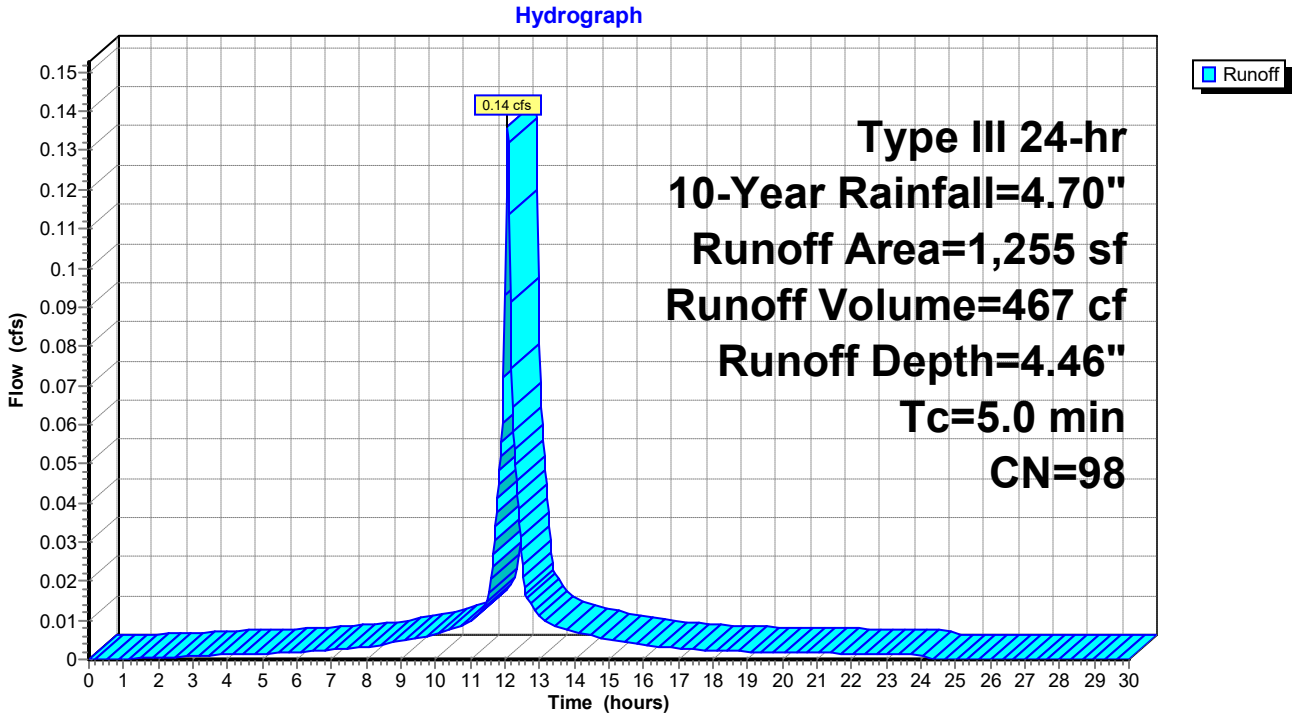
Runoff = 0.14 cfs @ 12.07 hrs, Volume= 467 cf, Depth= 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
1,255	98	Paved parking, HSG A
1,255		100.00% Impervious Area

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

Subcatchment 5S: EXISTING DRIVEWAY/WALKWAY AREA



Summary for Subcatchment 6S: EXISTING ROOF AREA

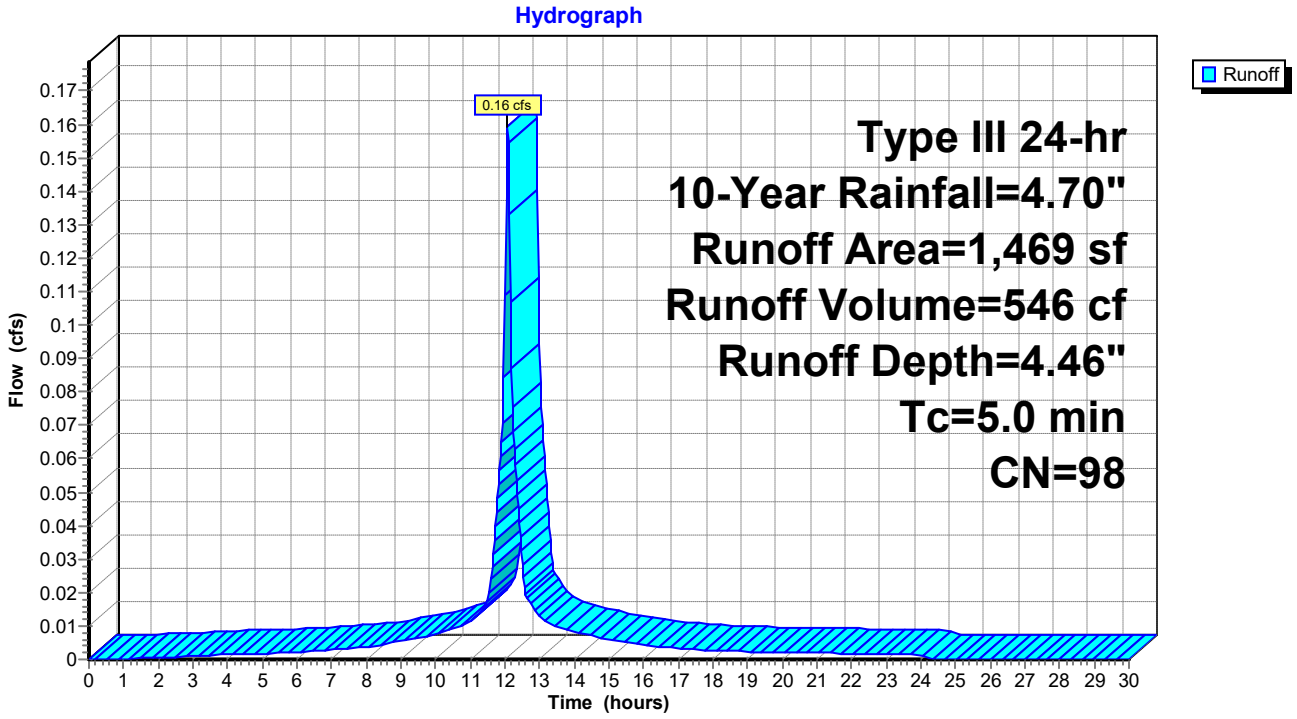
Runoff = 0.16 cfs @ 12.07 hrs, Volume= 546 cf, Depth= 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
1,469	98	Roofs, HSG A
1,469		100.00% Impervious Area

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

Subcatchment 6S: EXISTING ROOF AREA



Summary for Subcatchment 7S: EXISTING STEPS&LANDINGS/BULKHEAD

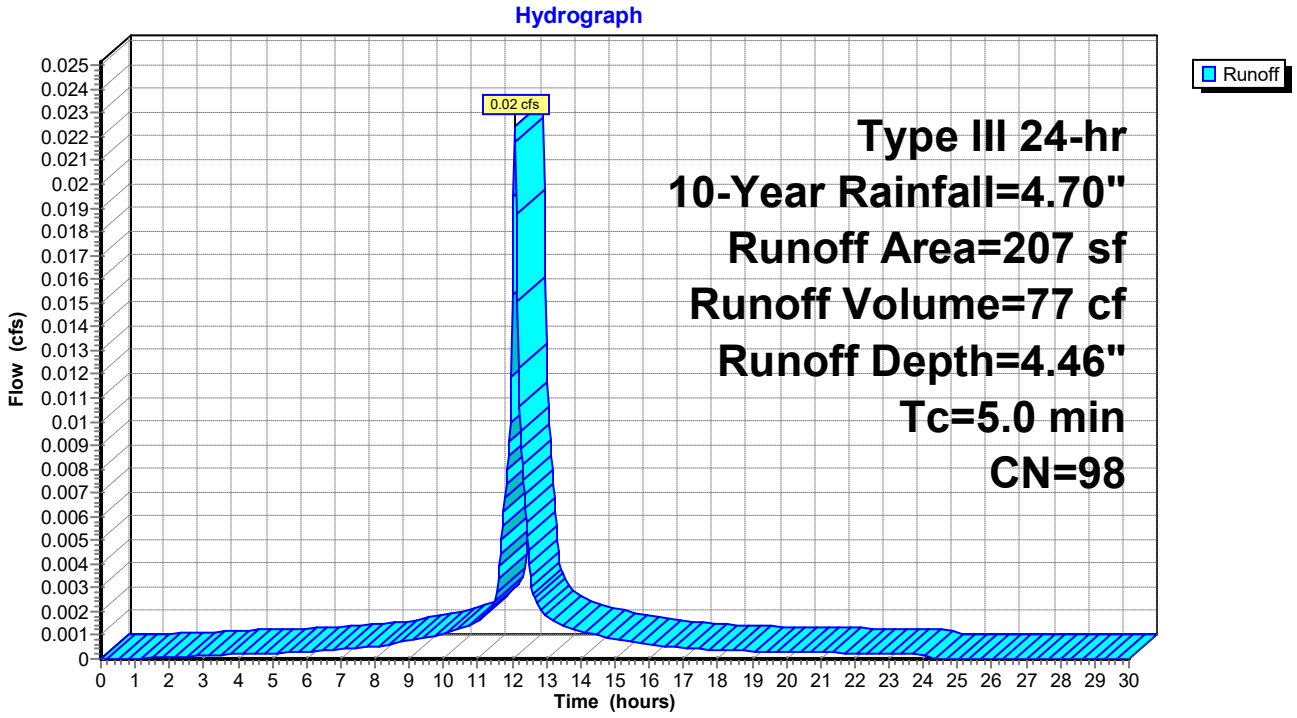
Runoff = 0.02 cfs @ 12.07 hrs, Volume= 77 cf, Depth= 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
207	98	Unconnected pavement, HSG A
207		100.00% Impervious Area
207		100.00% Unconnected

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

Subcatchment 7S: EXISTING STEPS&LANDINGS/BULKHEAD

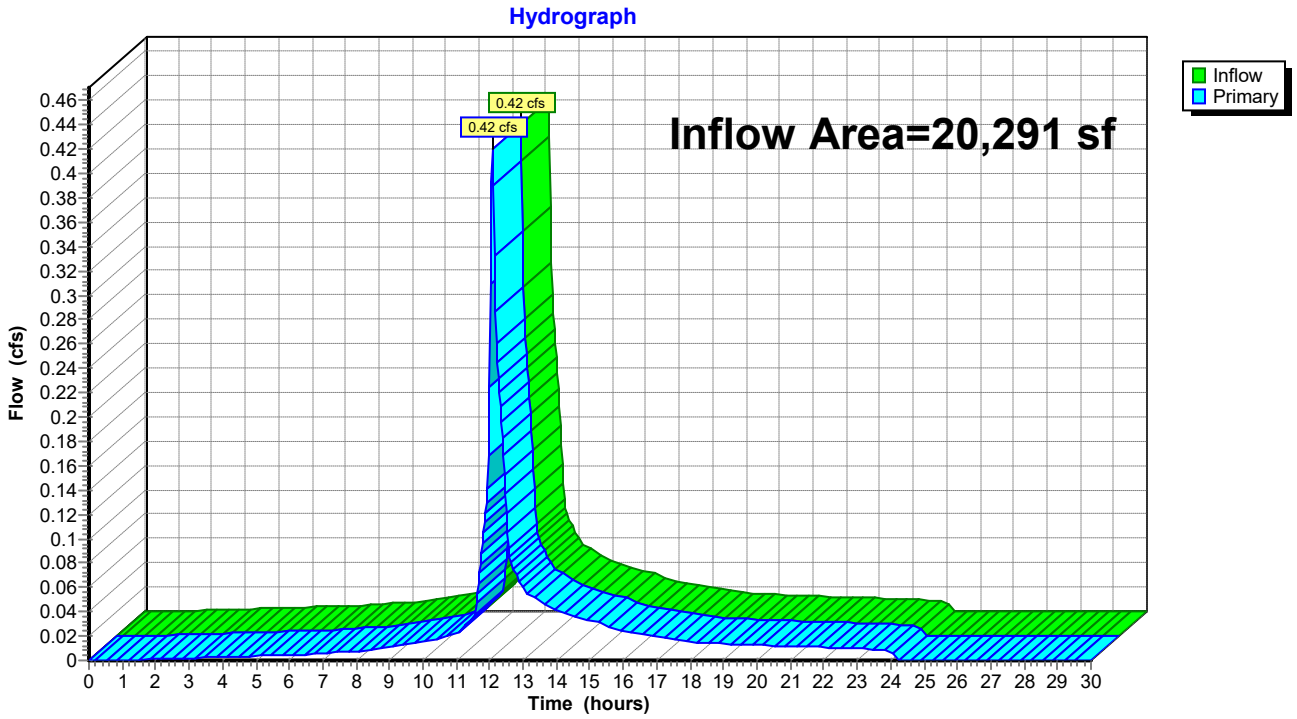


Summary for Link 3L: EXISTING

Inflow Area = 20,291 sf, 14.44% Impervious, Inflow Depth = 1.10" for 10-Year event
Inflow = 0.42 cfs @ 12.09 hrs, Volume= 1,852 cf
Primary = 0.42 cfs @ 12.09 hrs, Volume= 1,852 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Link 3L: EXISTING



Summary for Subcatchment 4S: EX LANDSCAPE AREA

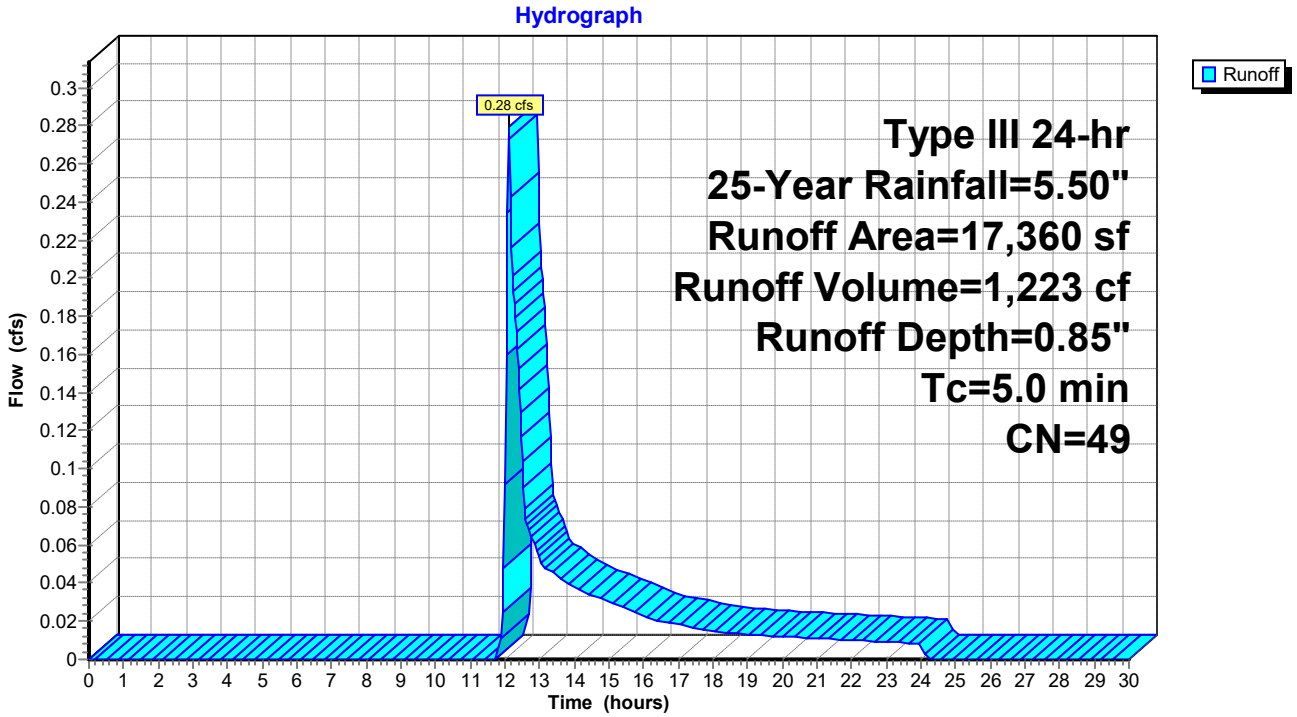
Runoff = 0.28 cfs @ 12.10 hrs, Volume= 1,223 cf, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
17,360	49	50-75% Grass cover, Fair, HSG A
17,360		100.00% Pervious Area

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

Subcatchment 4S: EX LANDSCAPE AREA



Summary for Subcatchment 5S: EXISTING DRIVEWAY/WALKWAY AREA

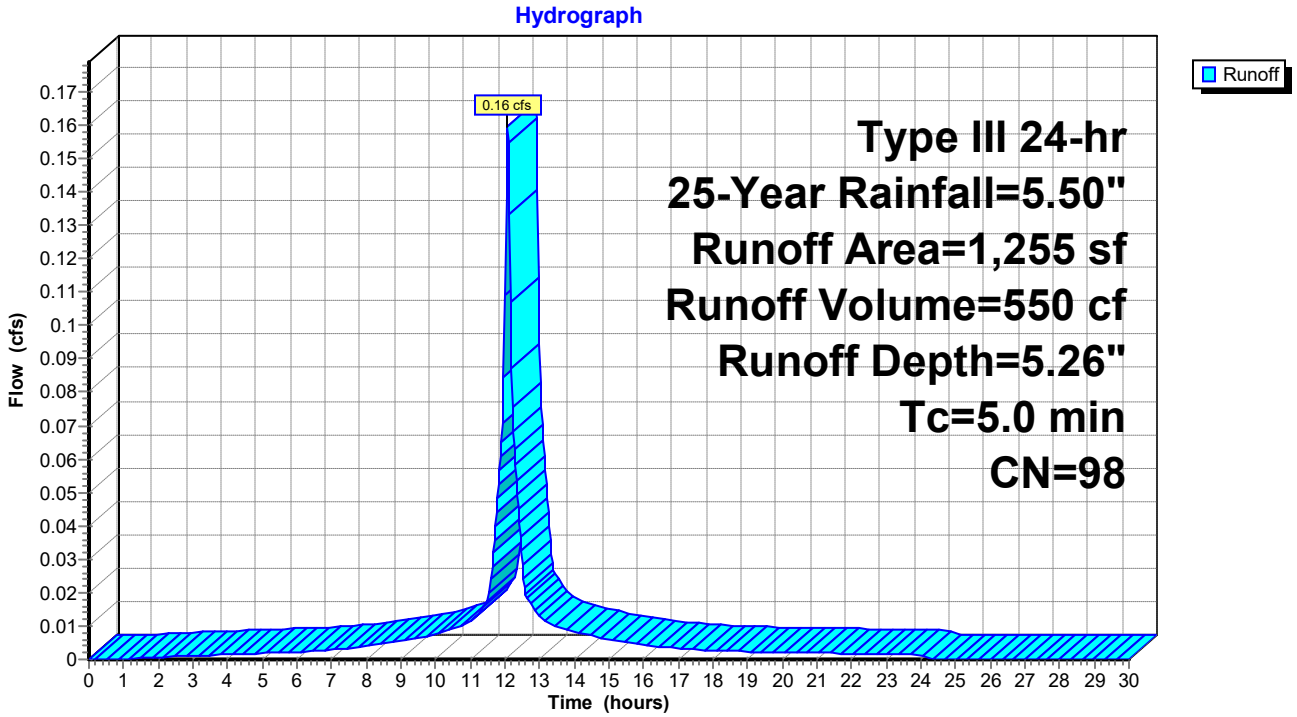
Runoff = 0.16 cfs @ 12.07 hrs, Volume= 550 cf, Depth= 5.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
1,255	98	Paved parking, HSG A
1,255		100.00% Impervious Area

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

Subcatchment 5S: EXISTING DRIVEWAY/WALKWAY AREA



Summary for Subcatchment 6S: EXISTING ROOF AREA

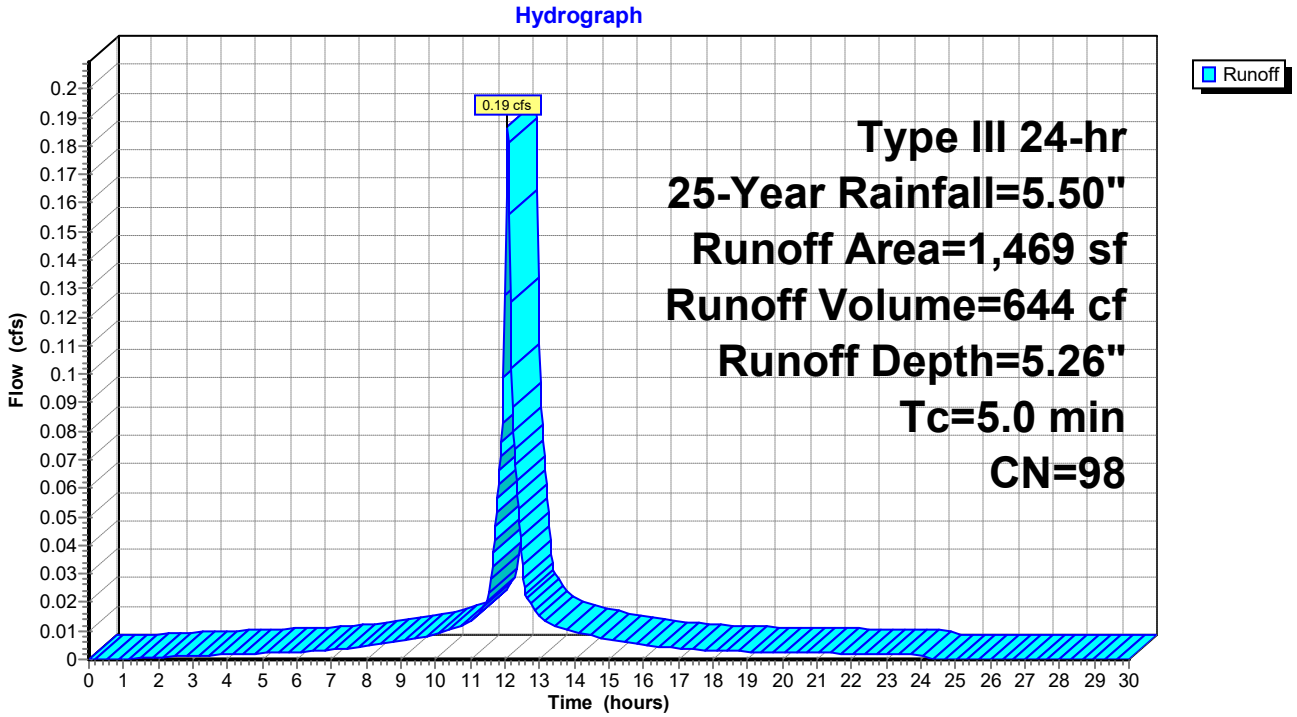
Runoff = 0.19 cfs @ 12.07 hrs, Volume= 644 cf, Depth= 5.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
1,469	98	Roofs, HSG A
1,469		100.00% Impervious Area

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

Subcatchment 6S: EXISTING ROOF AREA



Summary for Subcatchment 7S: EXISTING STEPS&LANDINGS/BULKHEAD

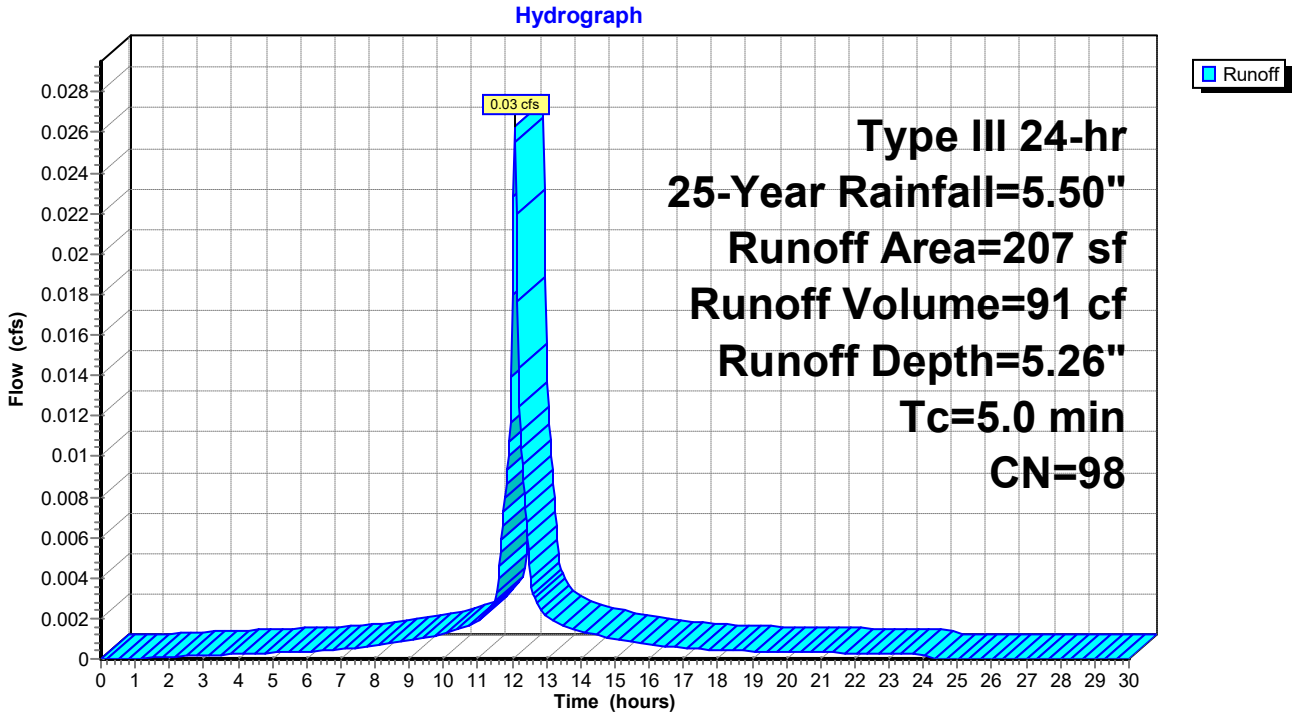
Runoff = 0.03 cfs @ 12.07 hrs, Volume= 91 cf, Depth= 5.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
207	98	Unconnected pavement, HSG A
207		100.00% Impervious Area
207		100.00% Unconnected

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

Subcatchment 7S: EXISTING STEPS&LANDINGS/BULKHEAD

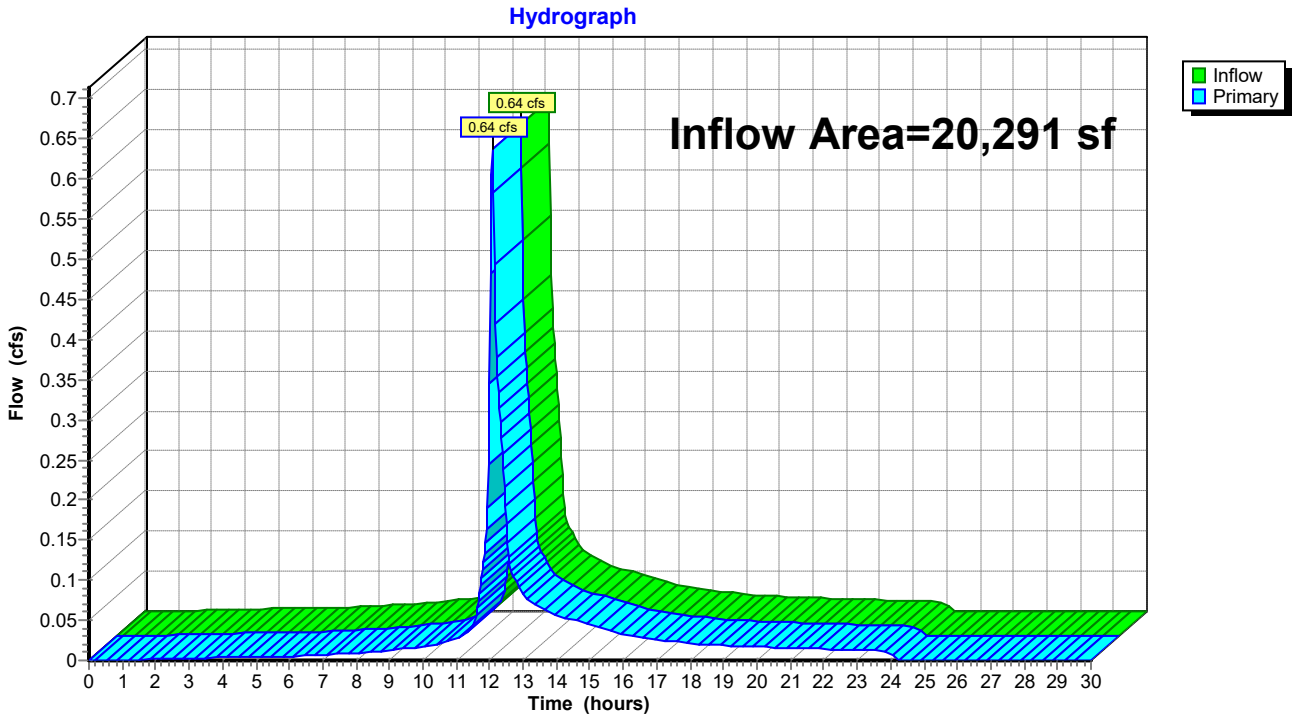


Summary for Link 3L: EXISTING

Inflow Area = 20,291 sf, 14.44% Impervious, Inflow Depth = 1.48" for 25-Year event
Inflow = 0.64 cfs @ 12.09 hrs, Volume= 2,508 cf
Primary = 0.64 cfs @ 12.09 hrs, Volume= 2,508 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Link 3L: EXISTING



Summary for Subcatchment 4S: EX LANDSCAPE AREA

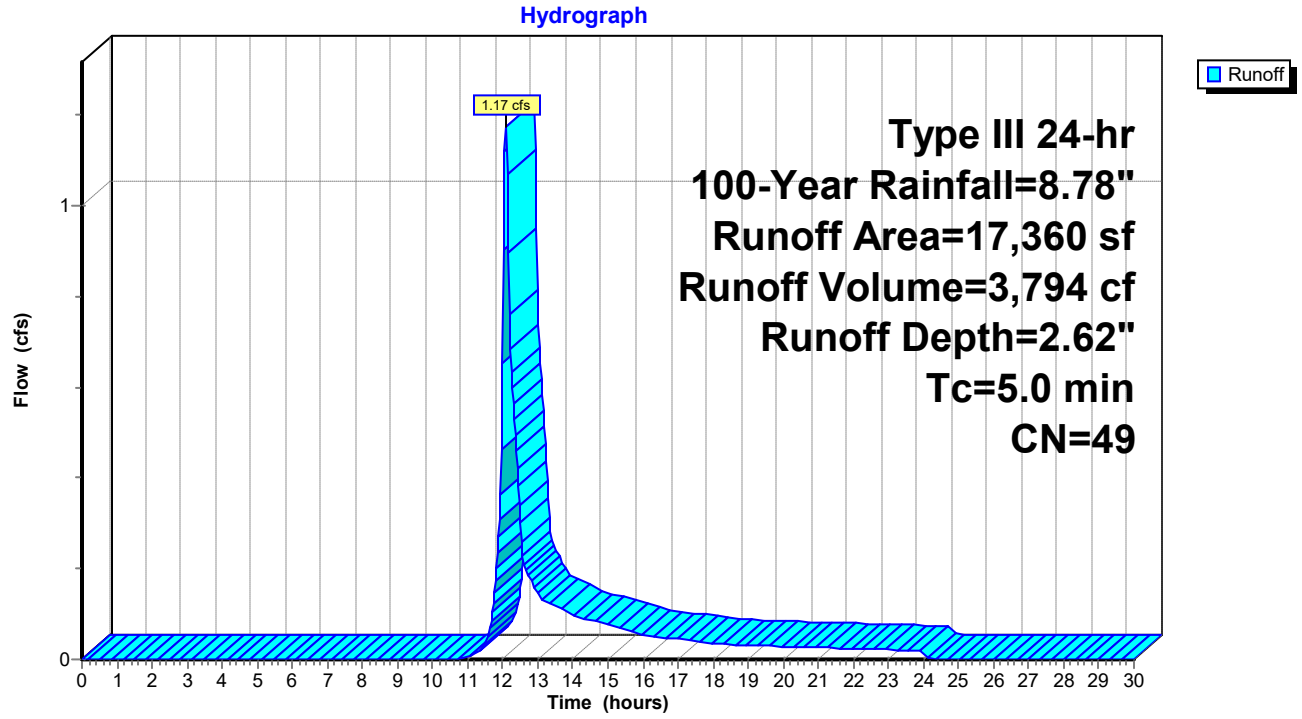
Runoff = 1.17 cfs @ 12.08 hrs, Volume= 3,794 cf, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.78"

Area (sf)	CN	Description
17,360	49	50-75% Grass cover, Fair, HSG A
17,360		100.00% Pervious Area

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

Subcatchment 4S: EX LANDSCAPE AREA



Summary for Subcatchment 5S: EXISTING DRIVEWAY/WALKWAY AREA

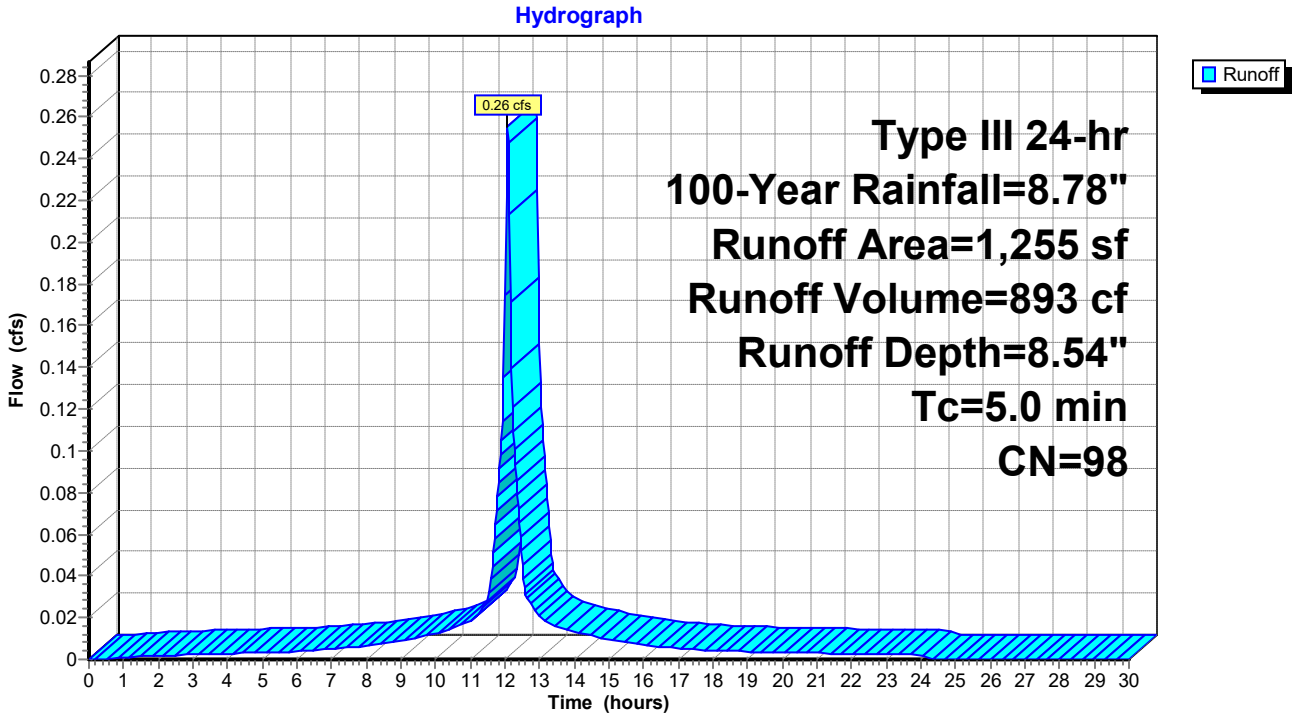
Runoff = 0.26 cfs @ 12.07 hrs, Volume= 893 cf, Depth= 8.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.78"

Area (sf)	CN	Description
1,255	98	Paved parking, HSG A
1,255		100.00% Impervious Area

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

Subcatchment 5S: EXISTING DRIVEWAY/WALKWAY AREA



Summary for Subcatchment 6S: EXISTING ROOF AREA

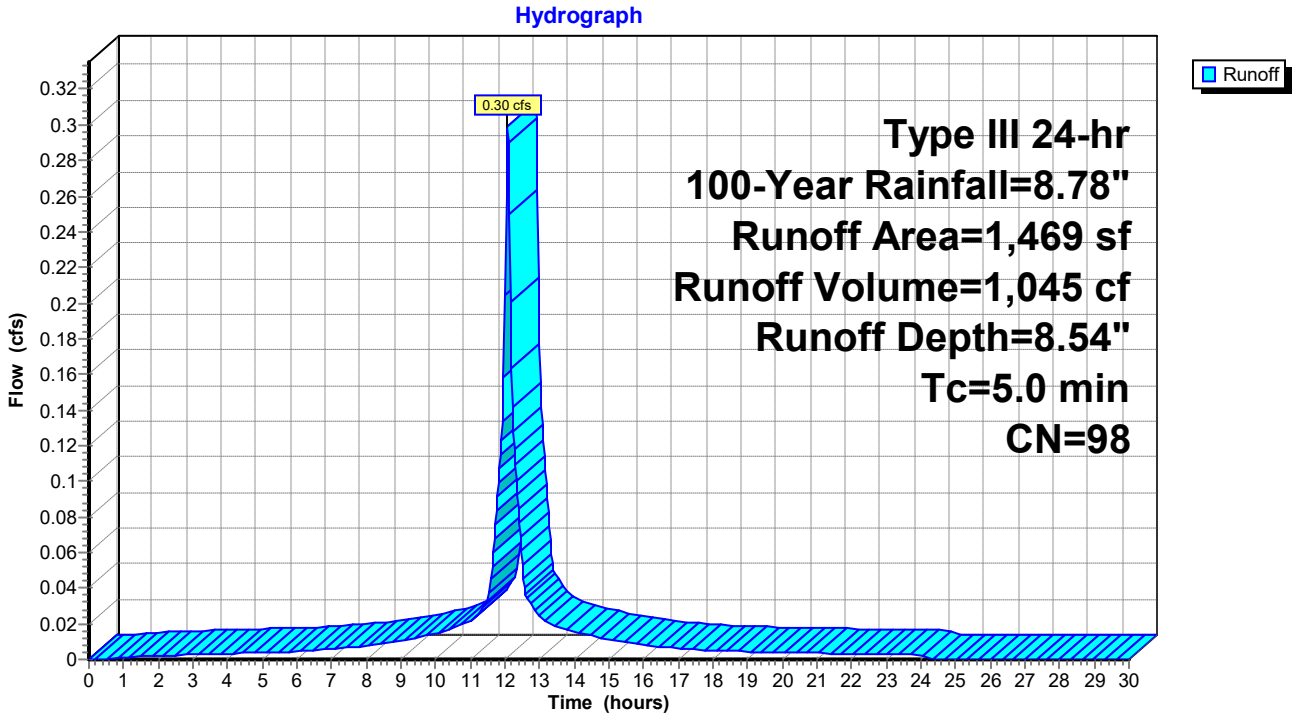
Runoff = 0.30 cfs @ 12.07 hrs, Volume= 1,045 cf, Depth= 8.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.78"

Area (sf)	CN	Description
1,469	98	Roofs, HSG A
1,469		100.00% Impervious Area

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

Subcatchment 6S: EXISTING ROOF AREA



Summary for Subcatchment 7S: EXISTING STEPS&LANDINGS/BULKHEAD

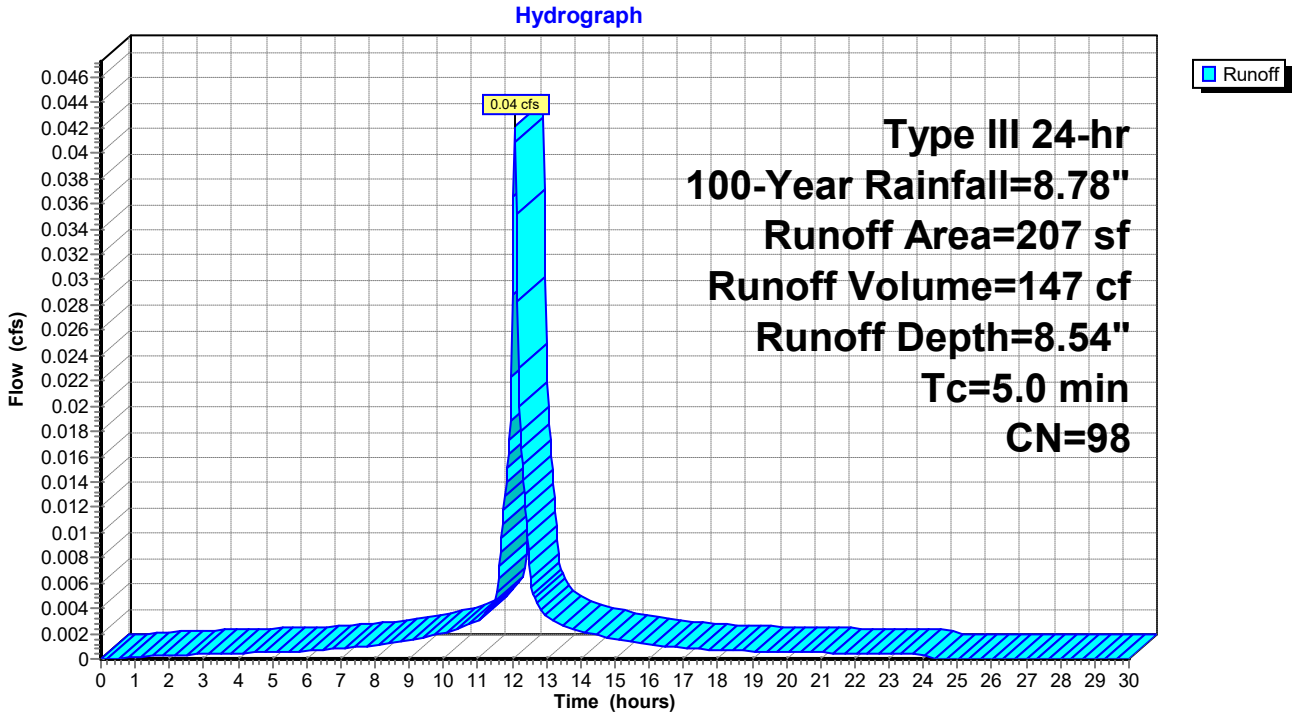
Runoff = 0.04 cfs @ 12.07 hrs, Volume= 147 cf, Depth= 8.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.78"

Area (sf)	CN	Description
207	98	Unconnected pavement, HSG A
207		100.00% Impervious Area
207		100.00% Unconnected

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

Subcatchment 7S: EXISTING STEPS&LANDINGS/BULKHEAD

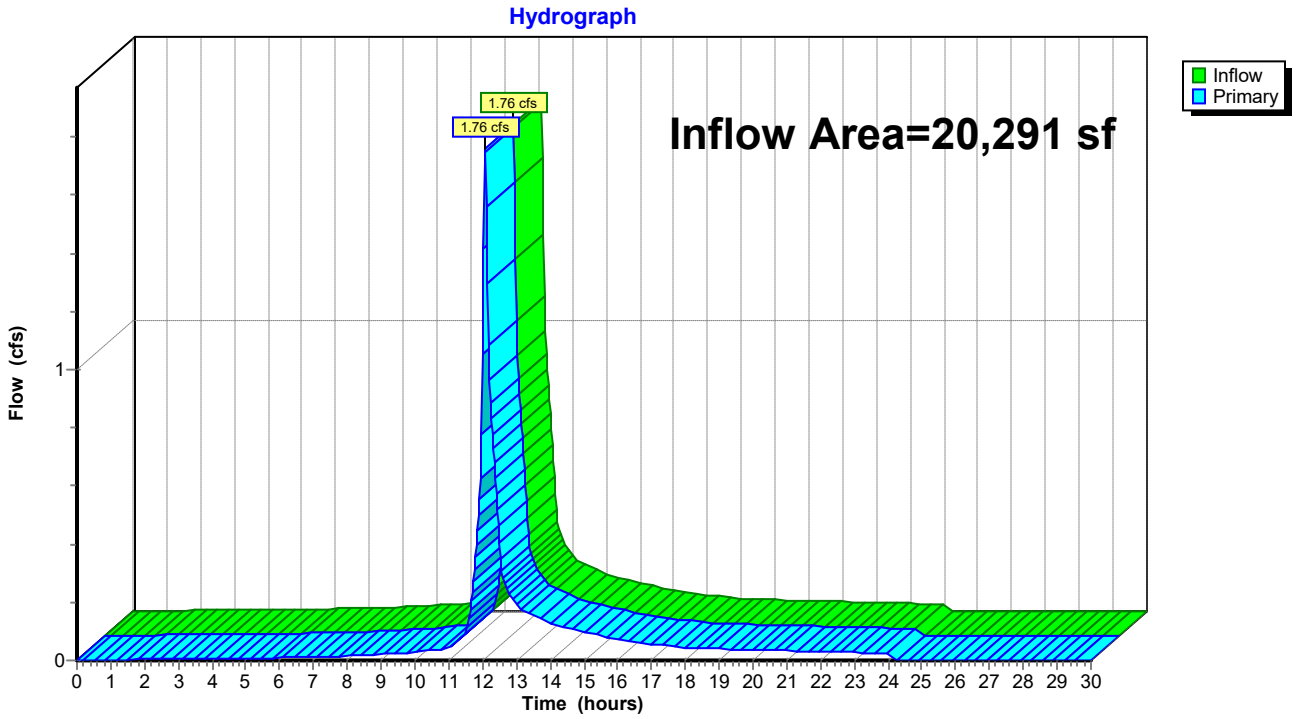


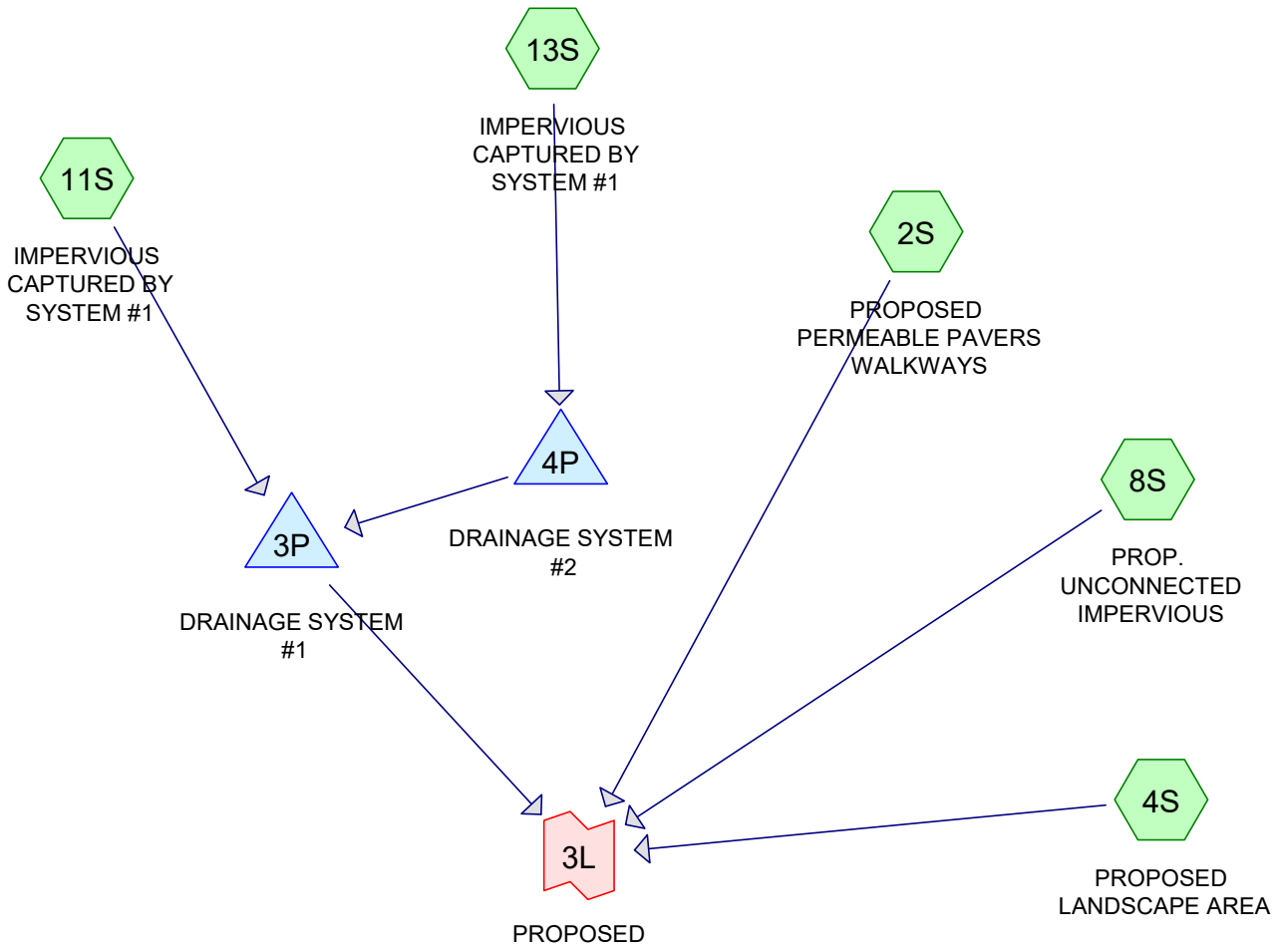
Summary for Link 3L: EXISTING

Inflow Area = 20,291 sf, 14.44% Impervious, Inflow Depth = 3.48" for 100-Year event
Inflow = 1.76 cfs @ 12.08 hrs, Volume= 5,880 cf
Primary = 1.76 cfs @ 12.08 hrs, Volume= 5,880 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.03 hrs

Link 3L: EXISTING





Subcat Reach Pond Link

Routing Diagram for PROPOSED
Prepared by SPRUHAN ENGINEERING
HydroCAD® 10.00-25 s/n 09067 © 2019 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
10,667	49	50-75% Grass cover, Fair, HSG A (4S)
1,984	98	Driveway portion #1 (11S)
1,101	98	Driveway portion #2 (13S)
1,599	98	Front building (11S)
708	85	Permeable Pavers (2S)
1,010	98	Portion of front building (13S)
2,289	98	Rear building (13S)
933	98	Unconnected pavement, HSG A (8S)
20,291	**72**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
11,600	HSG A	4S, 8S
0	HSG B	
0	HSG C	
0	HSG D	
8,691	Other	2S, 11S, 13S
20,291		**TOTAL AREA**

Summary for Subcatchment 2S: PROPOSED PERMEABLE PAVERS WALKWAYS

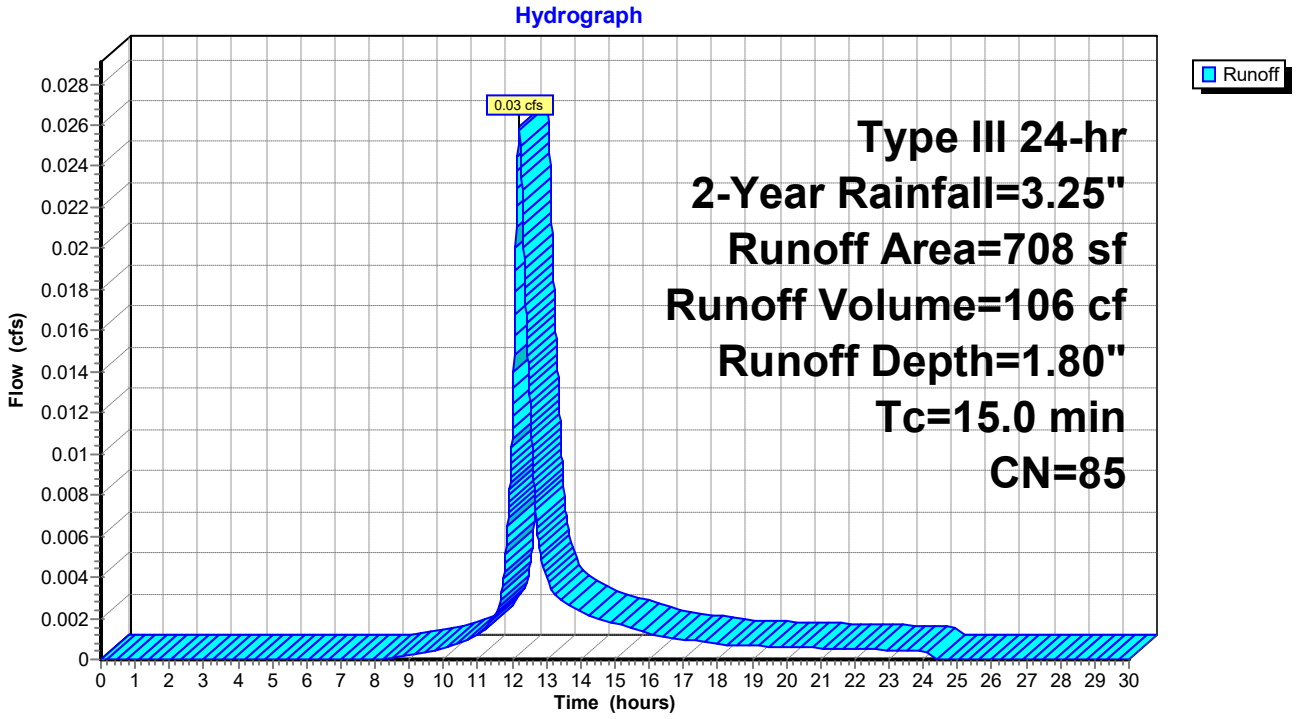
Runoff = 0.03 cfs @ 12.21 hrs, Volume= 106 cf, Depth= 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.25"

	Area (sf)	CN	Description
*	708	85	Permeable Pavers
	708		100.00% Pervious Area

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

Subcatchment 2S: PROPOSED PERMEABLE PAVERS WALKWAYS



Summary for Subcatchment 4S: PROPOSED LANDSCAPE AREA

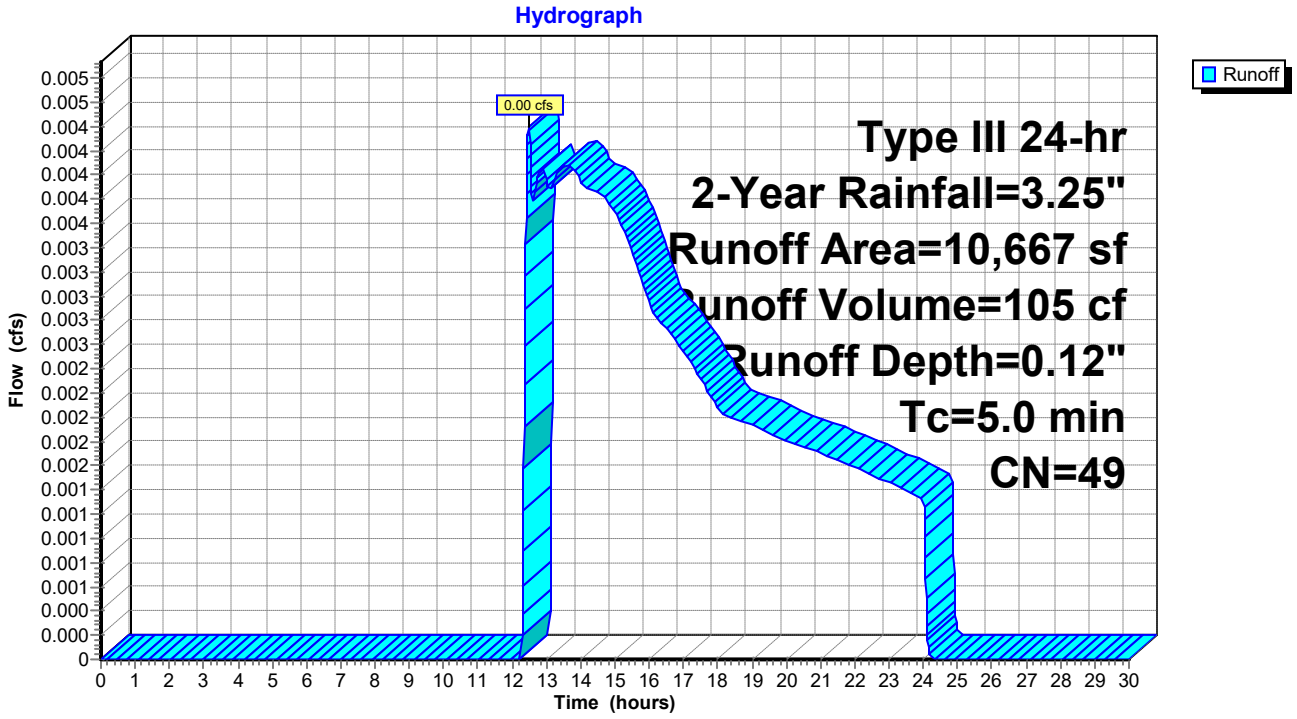
Runoff = 0.00 cfs @ 12.48 hrs, Volume= 105 cf, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.25"

Area (sf)	CN	Description
10,667	49	50-75% Grass cover, Fair, HSG A
10,667		100.00% Pervious Area

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

Subcatchment 4S: PROPOSED LANDSCAPE AREA



Summary for Subcatchment 8S: PROP. UNCONNECTED IMPERVIOUS

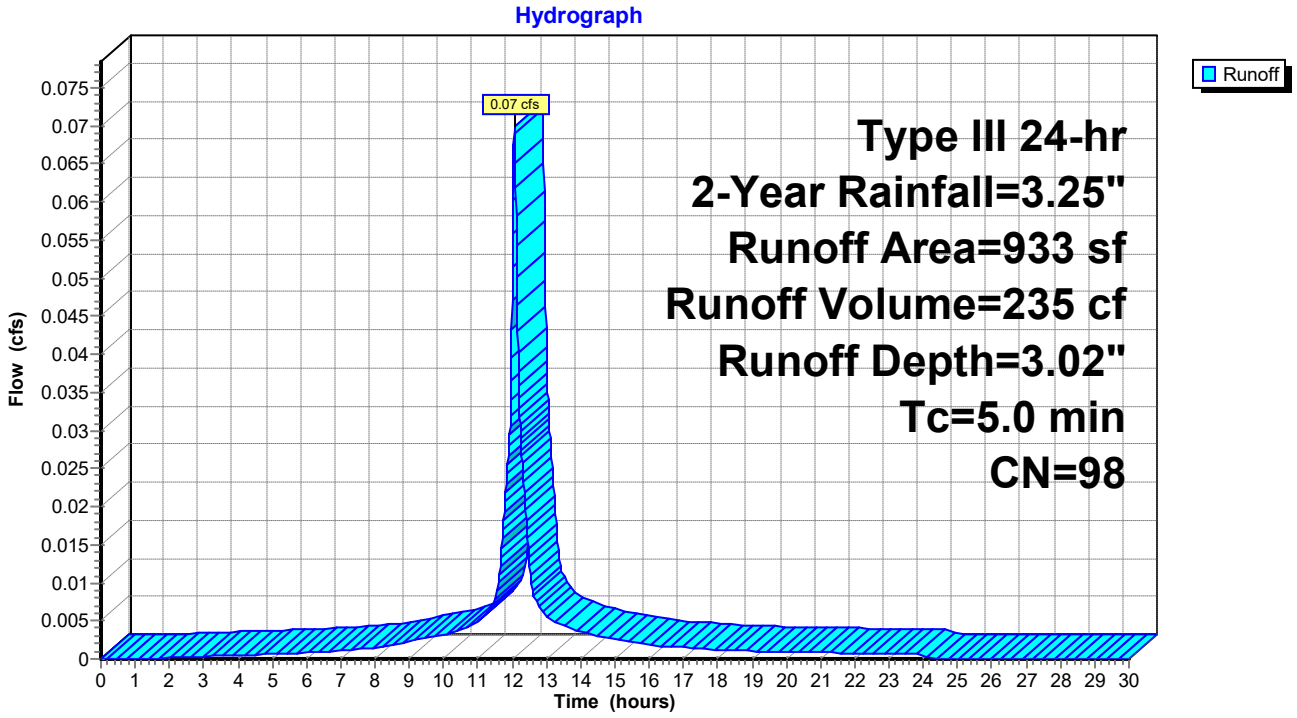
Runoff = 0.07 cfs @ 12.07 hrs, Volume= 235 cf, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.25"

Area (sf)	CN	Description
933	98	Unconnected pavement, HSG A
933		100.00% Impervious Area
933		100.00% Unconnected

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

Subcatchment 8S: PROP. UNCONNECTED IMPERVIOUS



Summary for Subcatchment 11S: IMPERVIOUS CAPTURED BY SYSTEM #1

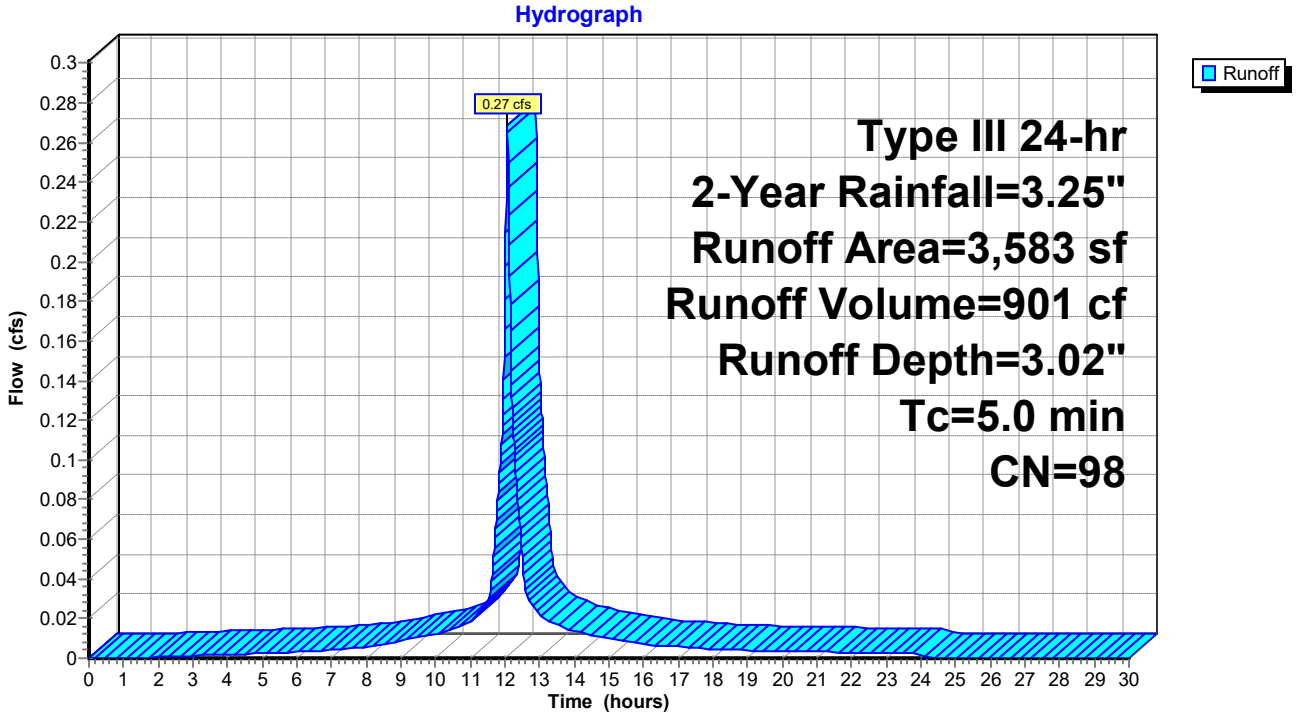
Runoff = 0.27 cfs @ 12.07 hrs, Volume= 901 cf, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.25"

	Area (sf)	CN	Description
*	1,599	98	Front building
*	1,984	98	Driveway portion #1
	3,583	98	Weighted Average
	3,583		100.00% Impervious Area

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

Subcatchment 11S: IMPERVIOUS CAPTURED BY SYSTEM #1



Summary for Subcatchment 13S: IMPERVIOUS CAPTURED BY SYSTEM #1

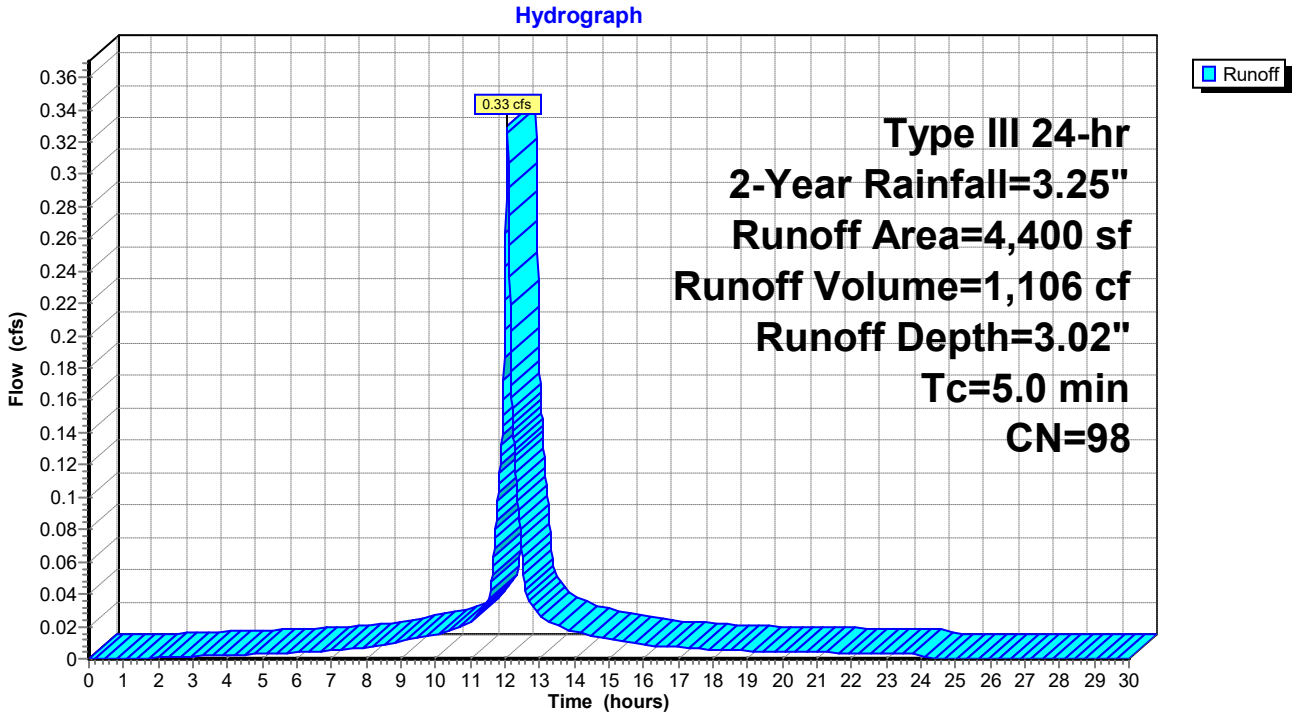
Runoff = 0.33 cfs @ 12.07 hrs, Volume= 1,106 cf, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.25"

	Area (sf)	CN	Description
*	2,289	98	Rear building
*	1,010	98	Portion of front building
*	1,101	98	Driveway portion #2
	4,400	98	Weighted Average
	4,400		100.00% Impervious Area

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

Subcatchment 13S: IMPERVIOUS CAPTURED BY SYSTEM #1



Summary for Pond 3P: DRAINAGE SYSTEM #1

Inflow Area = 7,983 sf,100.00% Impervious, Inflow Depth = 1.35" for 2-Year event
Inflow = 0.27 cfs @ 12.07 hrs, Volume= 901 cf
Outflow = 0.07 cfs @ 12.43 hrs, Volume= 901 cf, Atten= 76%, Lag= 21.9 min
Discarded = 0.07 cfs @ 12.43 hrs, Volume= 901 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 109.98' @ 12.43 hrs Surf.Area= 1,110 sf Storage= 186 cf

Plug-Flow detention time= 15.9 min calculated for 901 cf (100% of inflow)
Center-of-Mass det. time= 15.9 min (771.0 - 755.1)

Volume	Invert	Avail.Storage	Storage Description
#1	109.50'	971 cf	**30.00'W x 37.00'L x 2.50'H Prismatoid** 2,775 cf Overall x 35.0% Voids
#2	112.00'	15 cf	**Ponding** Listed below -Impervious
		986 cf	Total Available Storage

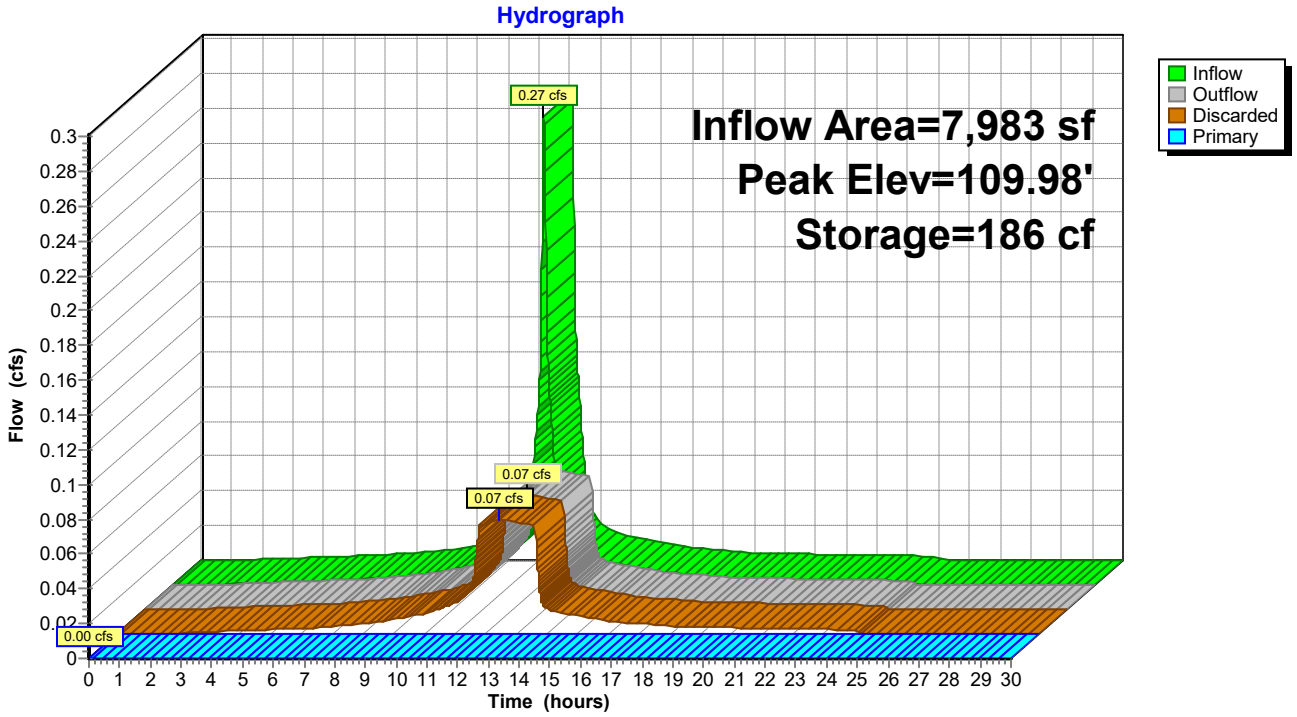
Elevation (feet)	Cum.Store (cubic-feet)
112.00	0
113.50	5
113.70	15

Device	Routing	Invert	Outlet Devices
#1	Discarded	109.50'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	111.90'	**6.0" Horiz. Overflow** C= 0.600 Limited to weir flow at low heads

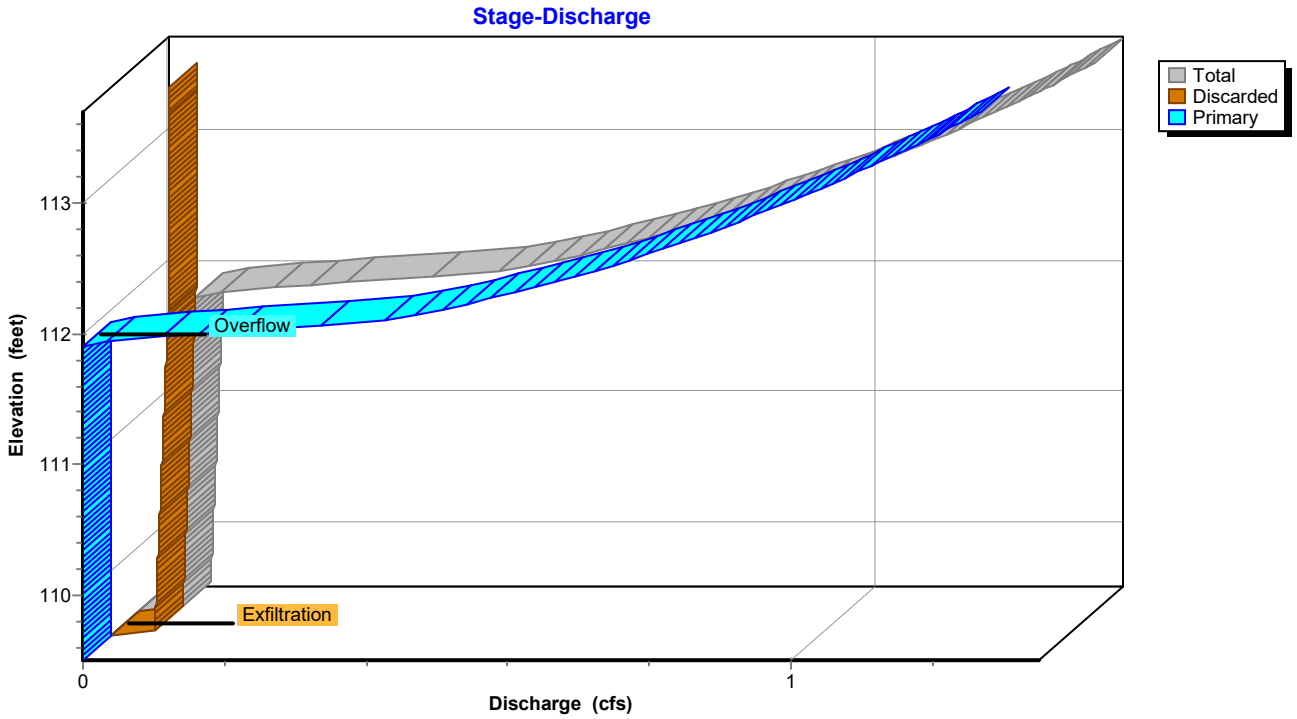
Discarded OutFlow Max=0.07 cfs @ 12.43 hrs HW=109.98' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=109.50' (Free Discharge)
↑—**2=Overflow** (Controls 0.00 cfs)

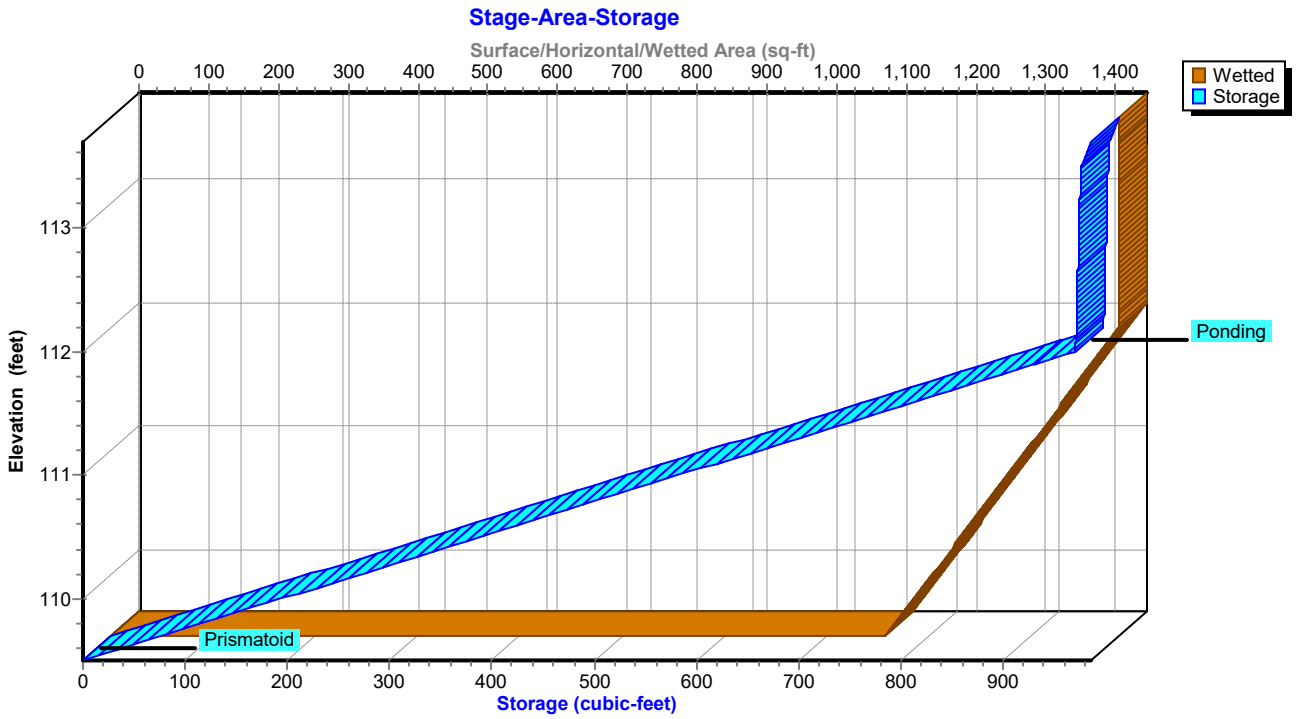
Pond 3P: DRAINAGE SYSTEM #1



Pond 3P: DRAINAGE SYSTEM #1



Pond 3P: DRAINAGE SYSTEM #1



Summary for Pond 4P: DRAINAGE SYSTEM #2

Inflow Area = 4,400 sf,100.00% Impervious, Inflow Depth = 3.02" for 2-Year event
Inflow = 0.33 cfs @ 12.07 hrs, Volume= 1,106 cf
Outflow = 0.05 cfs @ 12.54 hrs, Volume= 1,106 cf, Atten= 85%, Lag= 28.2 min
Discarded = 0.05 cfs @ 12.54 hrs, Volume= 1,106 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 113.97' @ 12.54 hrs Surf.Area= 770 sf Storage= 316 cf

Plug-Flow detention time= 39.2 min calculated for 1,106 cf (100% of inflow)
Center-of-Mass det. time= 39.1 min (794.3 - 755.1)

Volume	Invert	Avail.Storage	Storage Description
#1	112.80'	674 cf	**22.00'W x 35.00'L x 2.50'H Prismatoid** 1,925 cf Overall x 35.0% Voids
#2	115.30'	15 cf	**Ponding** Listed below -Impervious
		689 cf	Total Available Storage

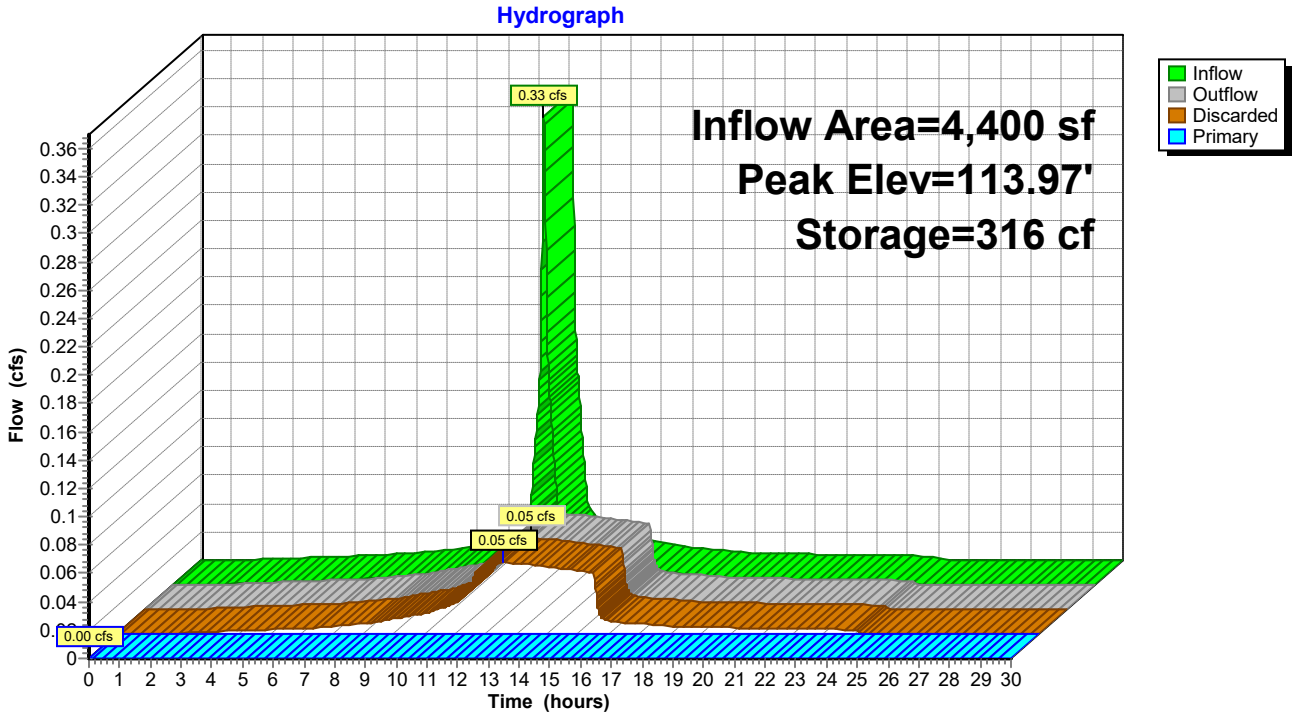
Elevation (feet)	Cum.Store (cubic-feet)
115.30	0
116.80	5
117.00	15

Device	Routing	Invert	Outlet Devices
#1	Discarded	112.80'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	115.20'	**6.0" Horiz. Overflow** C= 0.600 Limited to weir flow at low heads

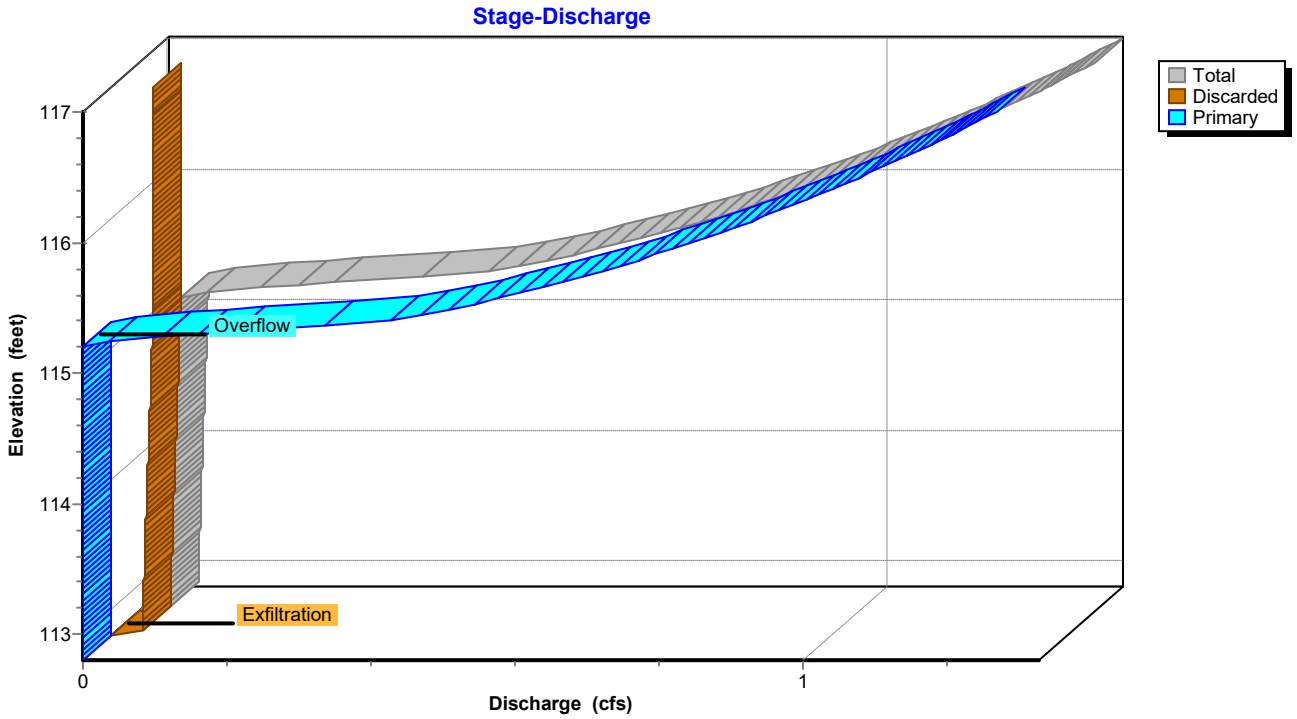
Discarded OutFlow Max=0.05 cfs @ 12.54 hrs HW=113.97' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=112.80' (Free Discharge)
↑—**2=Overflow** (Controls 0.00 cfs)

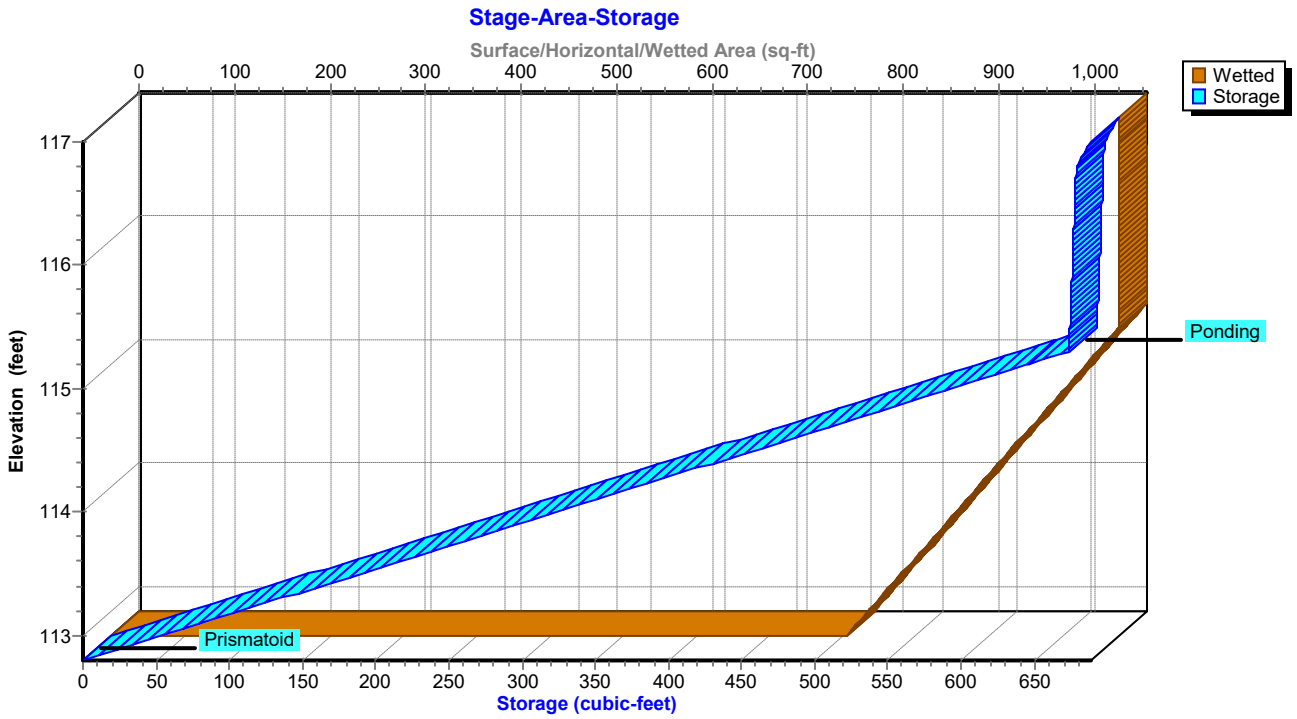
Pond 4P: DRAINAGE SYSTEM #2



Pond 4P: DRAINAGE SYSTEM #2



Pond 4P: DRAINAGE SYSTEM #2

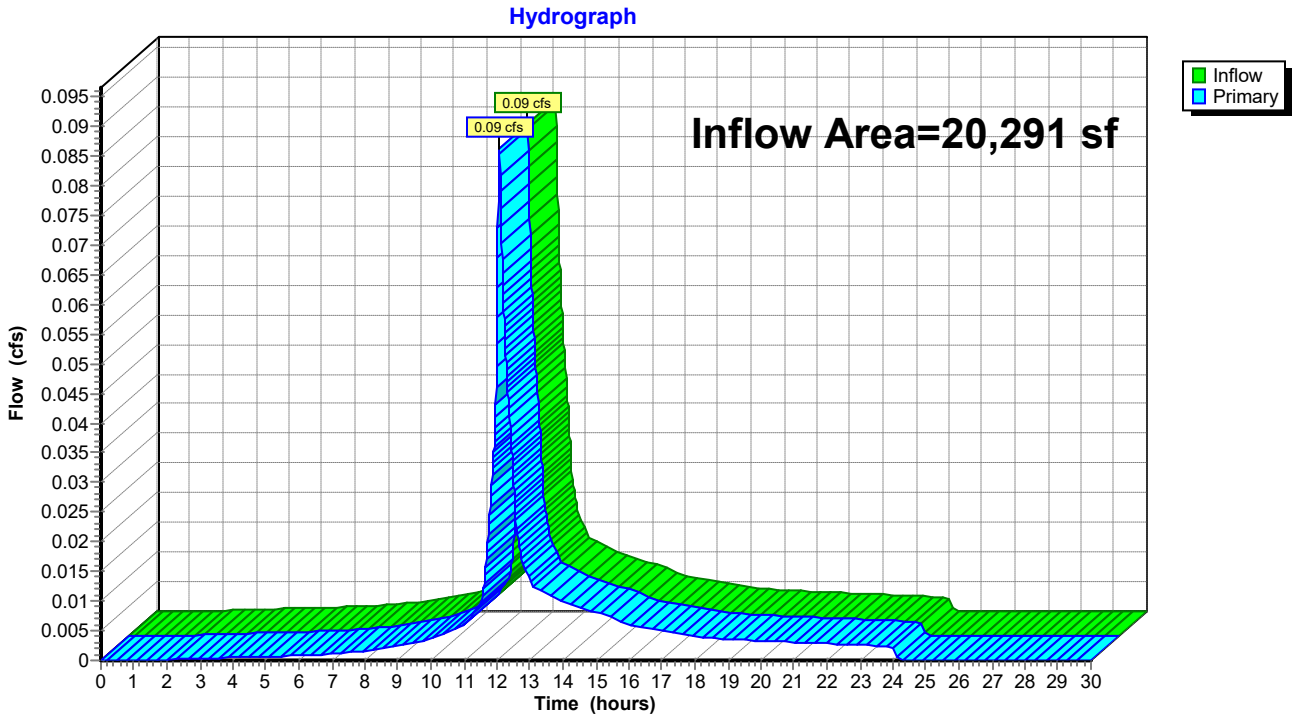


Summary for Link 3L: PROPOSED

Inflow Area = 20,291 sf, 43.94% Impervious, Inflow Depth = 0.26" for 2-Year event
Inflow = 0.09 cfs @ 12.08 hrs, Volume= 446 cf
Primary = 0.09 cfs @ 12.08 hrs, Volume= 446 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 3L: PROPOSED



Summary for Subcatchment 2S: PROPOSED PERMEABLE PAVERS WALKWAYS

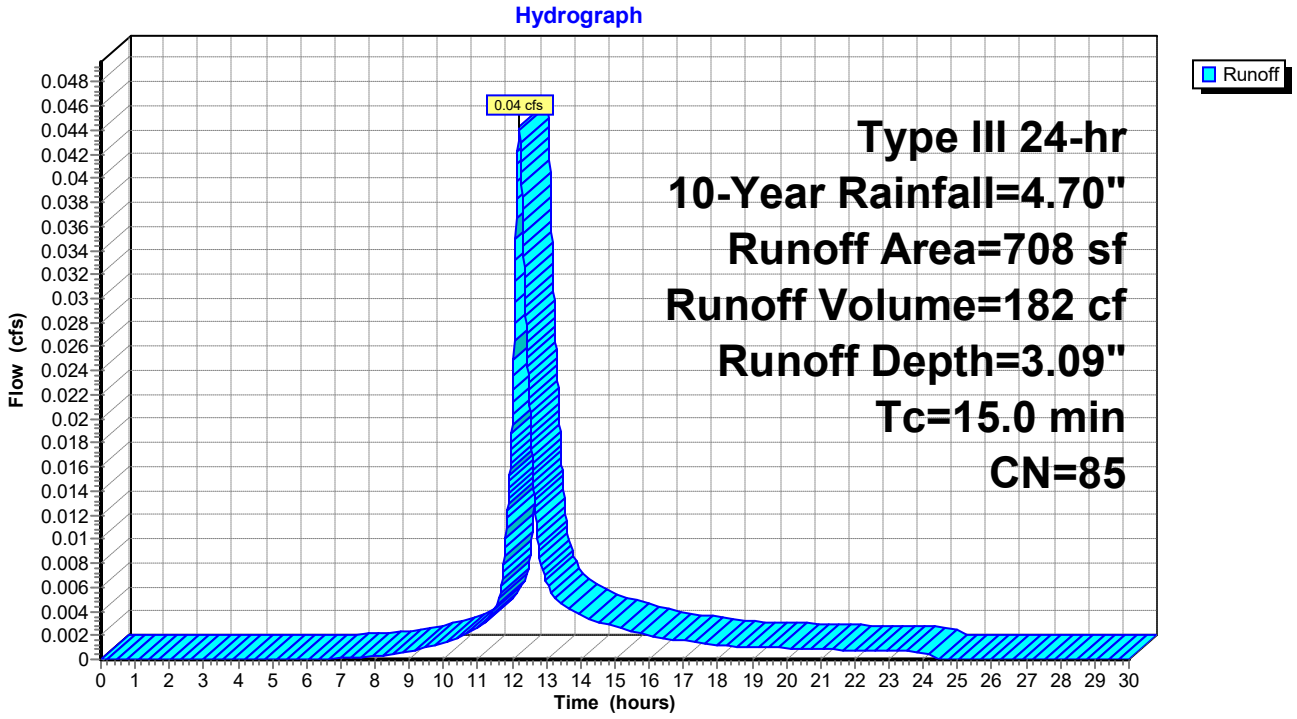
Runoff = 0.04 cfs @ 12.20 hrs, Volume= 182 cf, Depth= 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.70"

	Area (sf)	CN	Description
*	708	85	Permeable Pavers
	708		100.00% Pervious Area

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

Subcatchment 2S: PROPOSED PERMEABLE PAVERS WALKWAYS



Summary for Subcatchment 4S: PROPOSED LANDSCAPE AREA

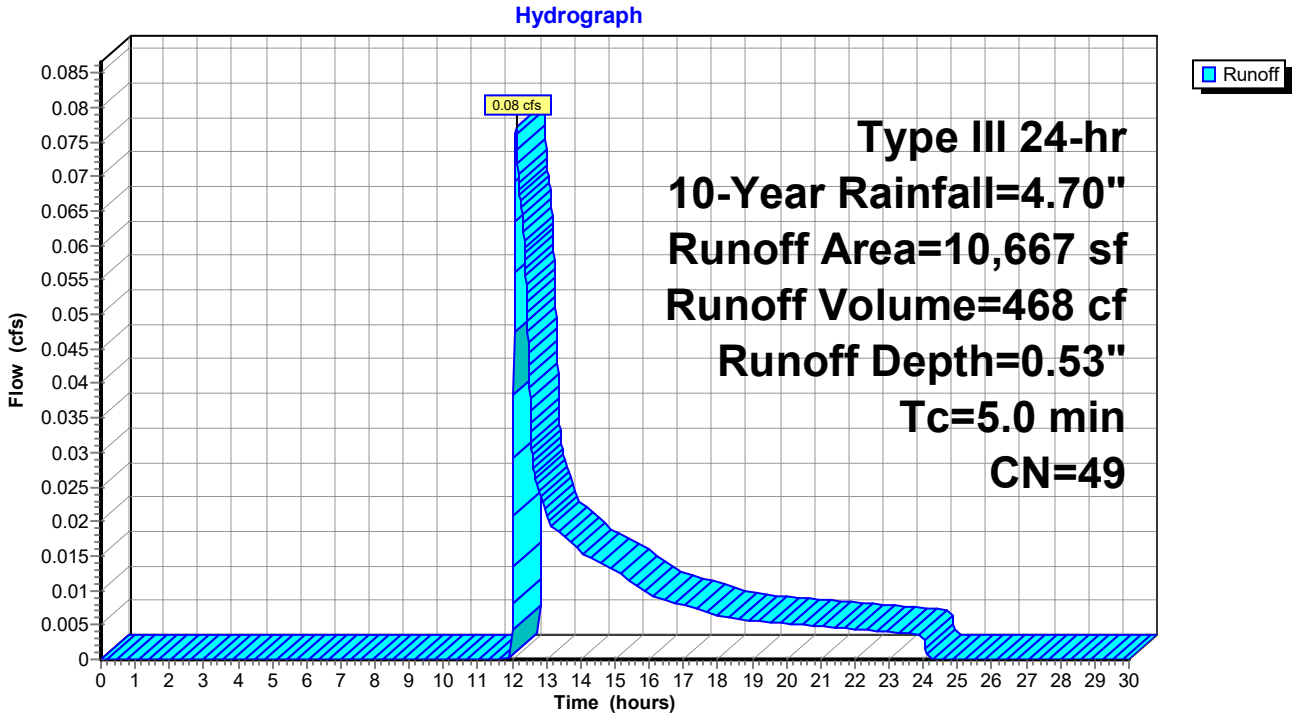
Runoff = 0.08 cfs @ 12.12 hrs, Volume= 468 cf, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
10,667	49	50-75% Grass cover, Fair, HSG A
10,667		100.00% Pervious Area

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

Subcatchment 4S: PROPOSED LANDSCAPE AREA



Summary for Subcatchment 8S: PROP. UNCONNECTED IMPERVIOUS

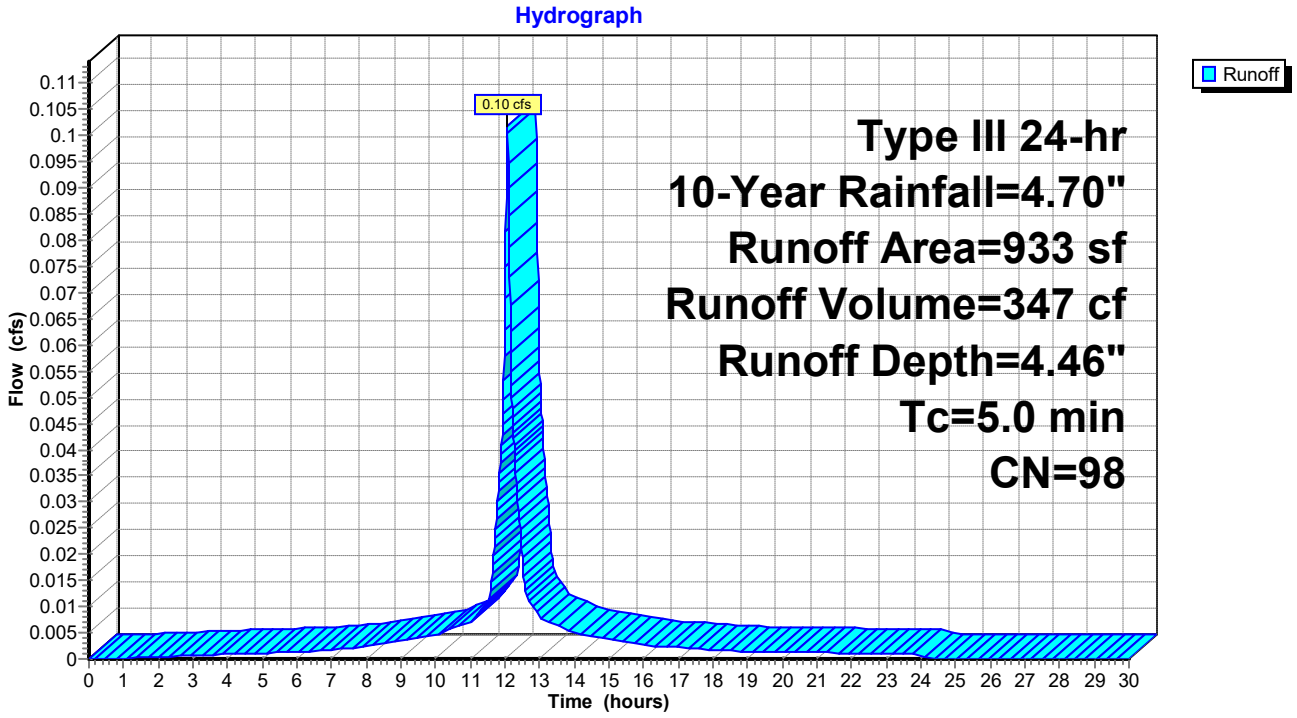
Runoff = 0.10 cfs @ 12.07 hrs, Volume= 347 cf, Depth= 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (sf)	CN	Description
933	98	Unconnected pavement, HSG A
933		100.00% Impervious Area
933		100.00% Unconnected

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

Subcatchment 8S: PROP. UNCONNECTED IMPERVIOUS



Summary for Subcatchment 11S: IMPERVIOUS CAPTURED BY SYSTEM #1

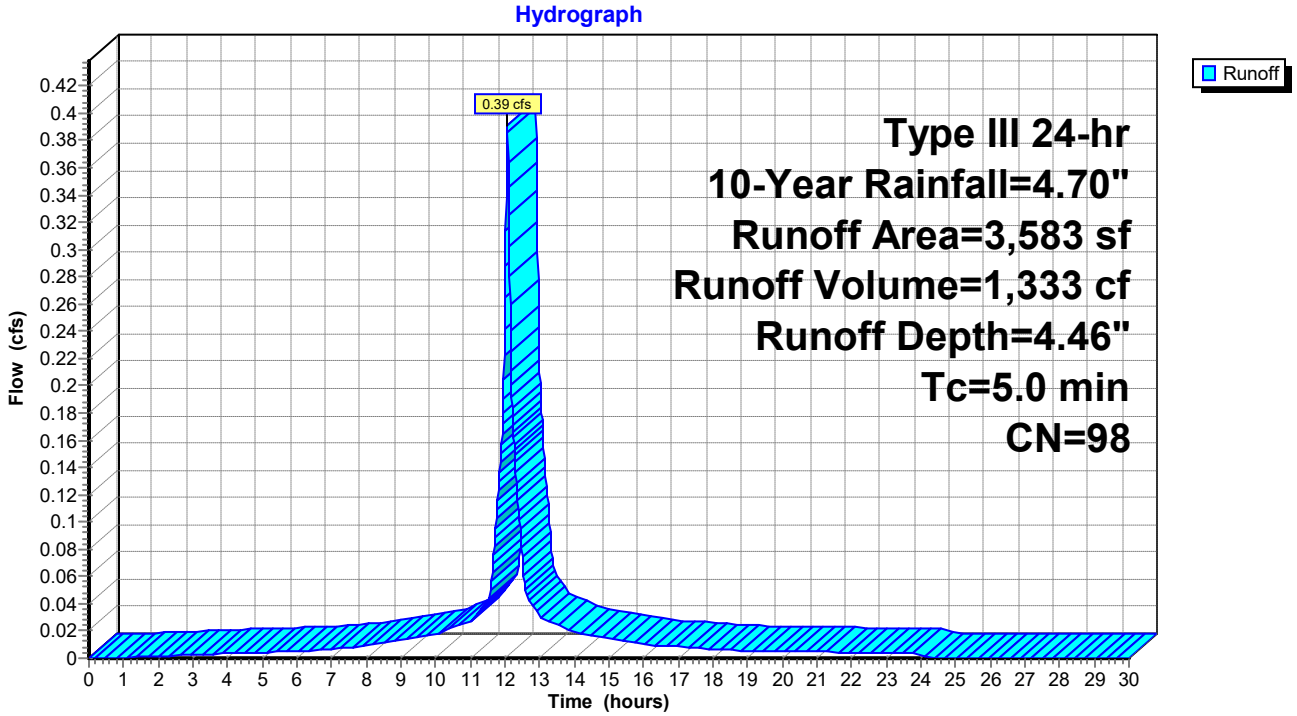
Runoff = 0.39 cfs @ 12.07 hrs, Volume= 1,333 cf, Depth= 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.70"

	Area (sf)	CN	Description
*	1,599	98	Front building
*	1,984	98	Driveway portion #1
	3,583	98	Weighted Average
	3,583		100.00% Impervious Area

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

Subcatchment 11S: IMPERVIOUS CAPTURED BY SYSTEM #1



Summary for Subcatchment 13S: IMPERVIOUS CAPTURED BY SYSTEM #1

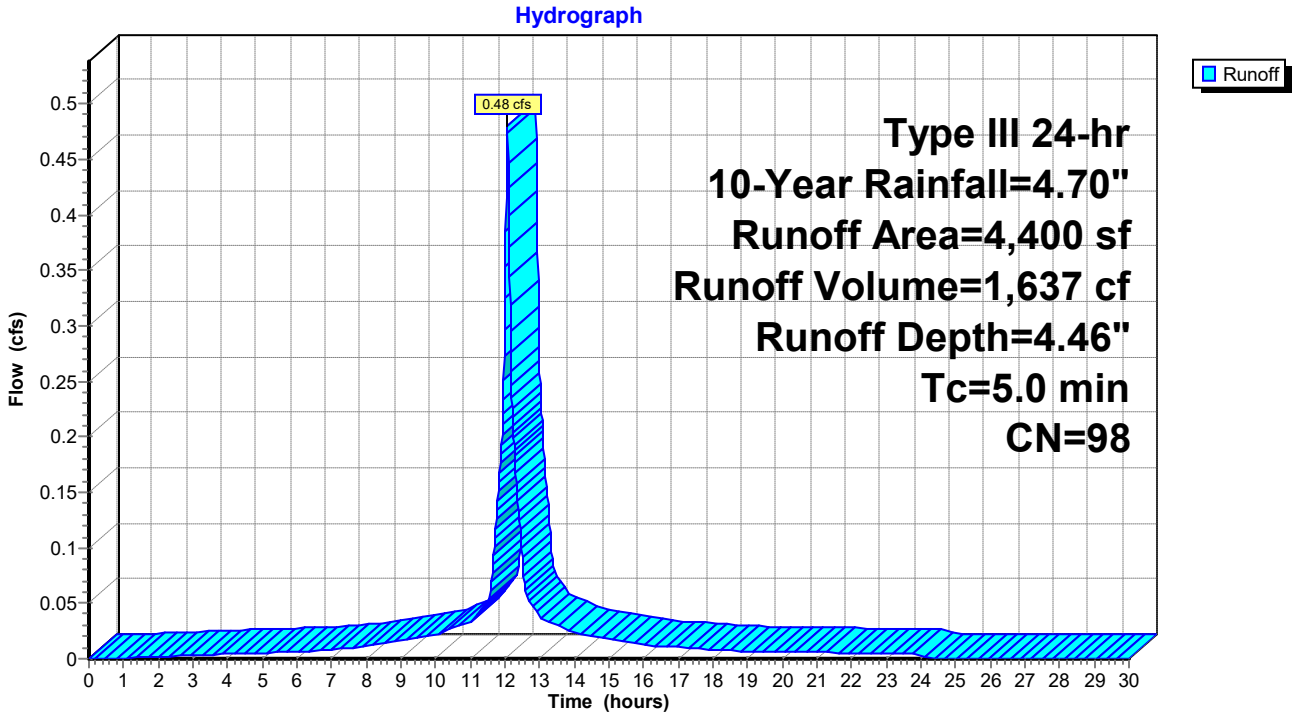
Runoff = 0.48 cfs @ 12.07 hrs, Volume= 1,637 cf, Depth= 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.70"

	Area (sf)	CN	Description
*	2,289	98	Rear building
*	1,010	98	Portion of front building
*	1,101	98	Driveway portion #2
	4,400	98	Weighted Average
	4,400		100.00% Impervious Area

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

Subcatchment 13S: IMPERVIOUS CAPTURED BY SYSTEM #1



Summary for Pond 3P: DRAINAGE SYSTEM #1

Inflow Area = 7,983 sf,100.00% Impervious, Inflow Depth = 2.00" for 10-Year event
Inflow = 0.39 cfs @ 12.07 hrs, Volume= 1,333 cf
Outflow = 0.07 cfs @ 12.51 hrs, Volume= 1,333 cf, Atten= 82%, Lag= 26.5 min
Discarded = 0.07 cfs @ 12.51 hrs, Volume= 1,333 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 110.39' @ 12.51 hrs Surf.Area= 1,110 sf Storage= 344 cf

Plug-Flow detention time= 29.2 min calculated for 1,332 cf (100% of inflow)
Center-of-Mass det. time= 29.2 min (777.3 - 748.1)

Volume	Invert	Avail.Storage	Storage Description
#1	109.50'	971 cf	**30.00'W x 37.00'L x 2.50'H Prismatoid** 2,775 cf Overall x 35.0% Voids
#2	112.00'	15 cf	**Ponding** Listed below -Impervious
		986 cf	Total Available Storage

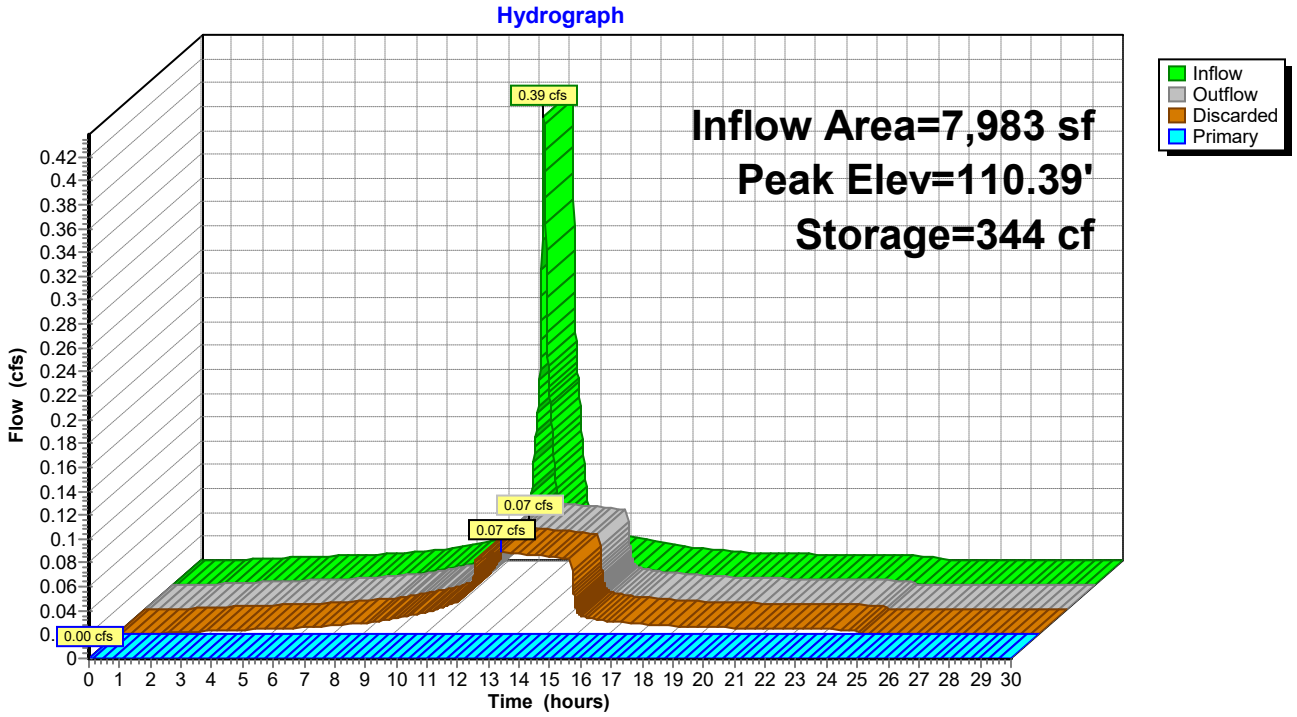
Elevation (feet)	Cum.Store (cubic-feet)
112.00	0
113.50	5
113.70	15

Device	Routing	Invert	Outlet Devices
#1	Discarded	109.50'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	111.90'	**6.0" Horiz. Overflow** C= 0.600 Limited to weir flow at low heads

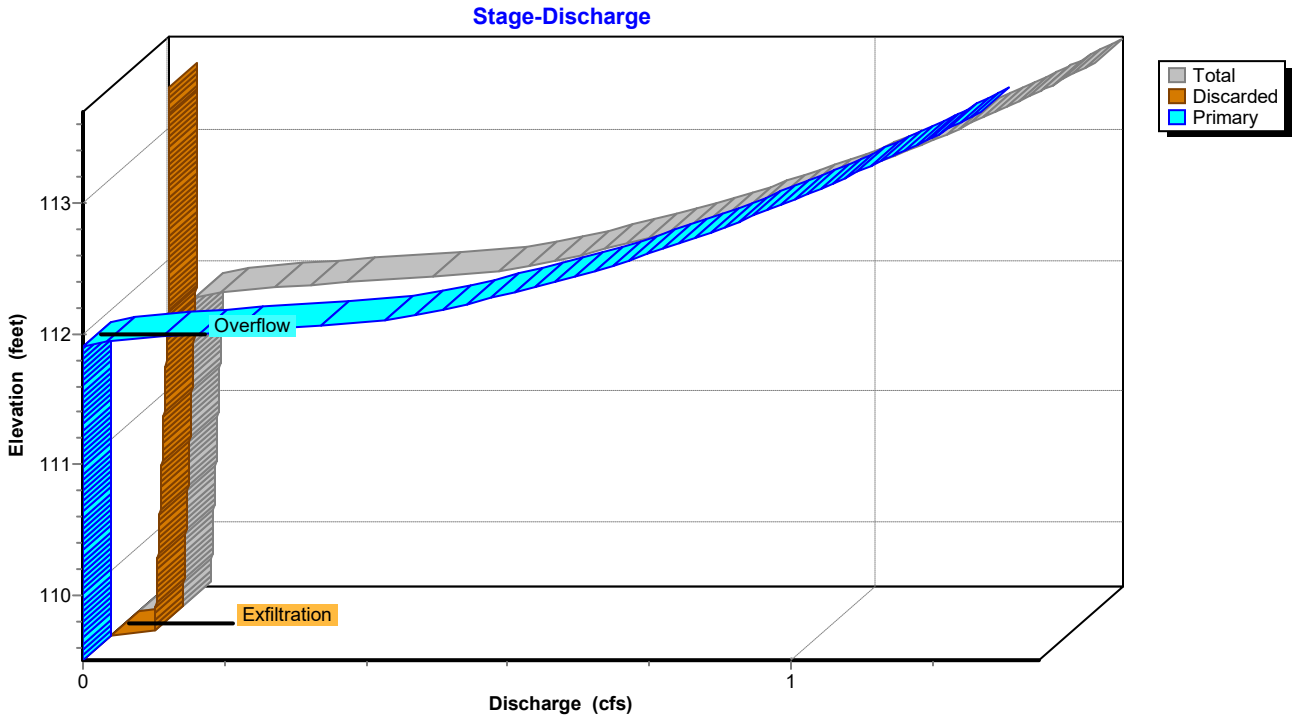
Discarded OutFlow Max=0.07 cfs @ 12.51 hrs HW=110.39' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=109.50' (Free Discharge)
↑—**2=Overflow** (Controls 0.00 cfs)

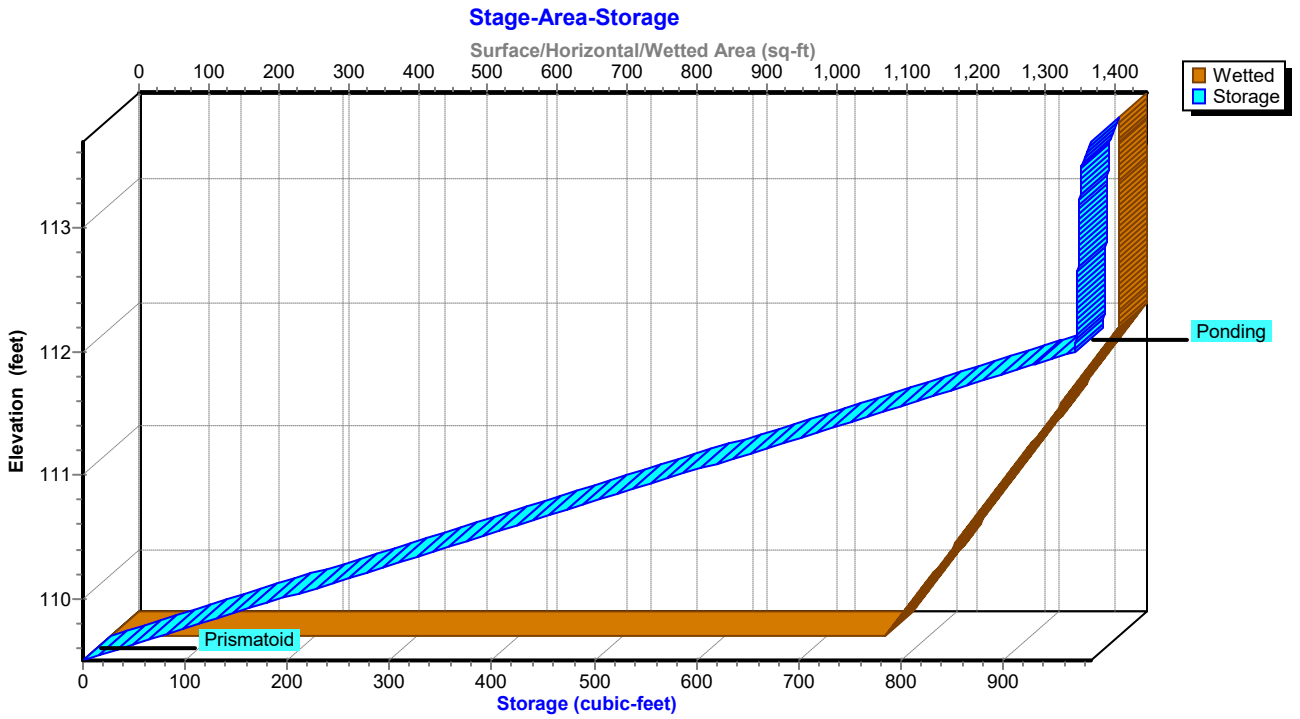
Pond 3P: DRAINAGE SYSTEM #1



Pond 3P: DRAINAGE SYSTEM #1



Pond 3P: DRAINAGE SYSTEM #1



Summary for Pond 4P: DRAINAGE SYSTEM #2

Inflow Area = 4,400 sf,100.00% Impervious, Inflow Depth = 4.46" for 10-Year event
Inflow = 0.48 cfs @ 12.07 hrs, Volume= 1,637 cf
Outflow = 0.06 cfs @ 12.63 hrs, Volume= 1,637 cf, Atten= 88%, Lag= 33.7 min
Discarded = 0.06 cfs @ 12.63 hrs, Volume= 1,637 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 114.77' @ 12.63 hrs Surf.Area= 770 sf Storage= 530 cf

Plug-Flow detention time= 66.6 min calculated for 1,637 cf (100% of inflow)
Center-of-Mass det. time= 66.6 min (814.7 - 748.1)

Volume	Invert	Avail.Storage	Storage Description
#1	112.80'	674 cf	**22.00'W x 35.00'L x 2.50'H Prismatoid** 1,925 cf Overall x 35.0% Voids
#2	115.30'	15 cf	**Ponding** Listed below -Impervious
		689 cf	Total Available Storage

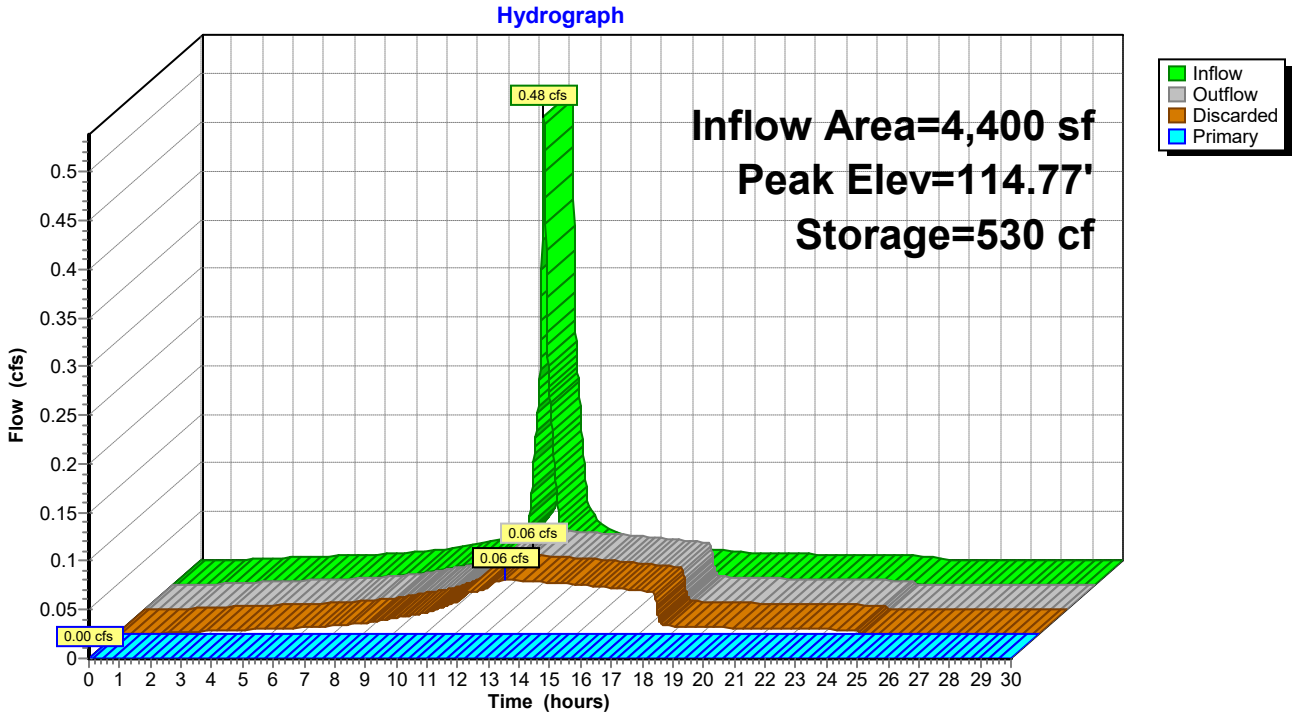
Elevation (feet)	Cum.Store (cubic-feet)
115.30	0
116.80	5
117.00	15

Device	Routing	Invert	Outlet Devices
#1	Discarded	112.80'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	115.20'	**6.0" Horiz. Overflow** C= 0.600 Limited to weir flow at low heads

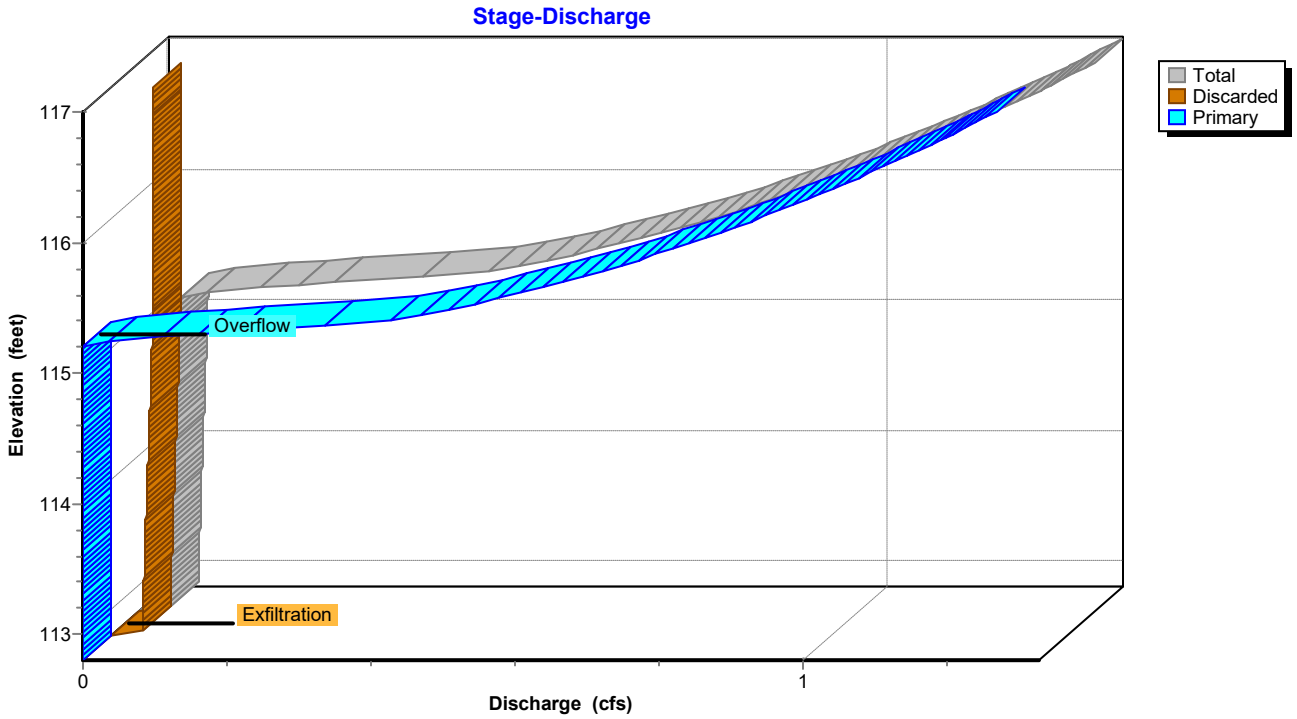
Discarded OutFlow Max=0.06 cfs @ 12.63 hrs HW=114.77' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=112.80' (Free Discharge)
↑—**2=Overflow** (Controls 0.00 cfs)

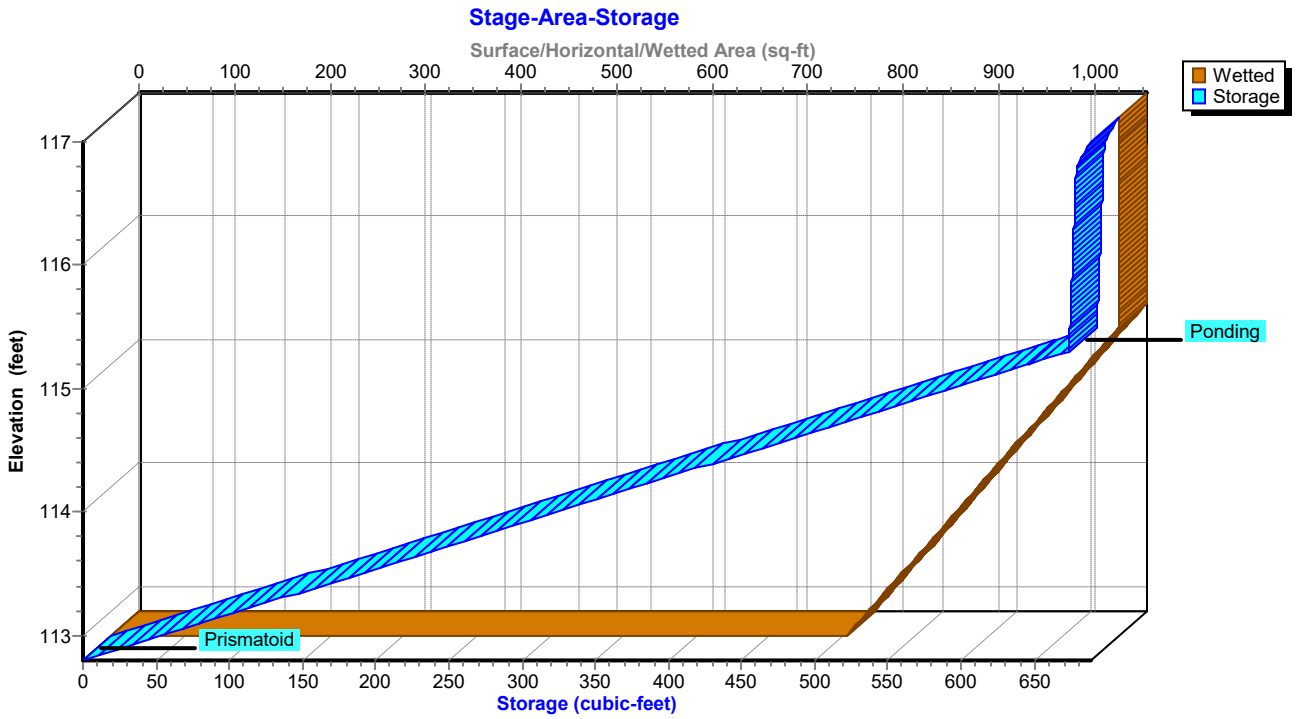
Pond 4P: DRAINAGE SYSTEM #2



Pond 4P: DRAINAGE SYSTEM #2



Pond 4P: DRAINAGE SYSTEM #2

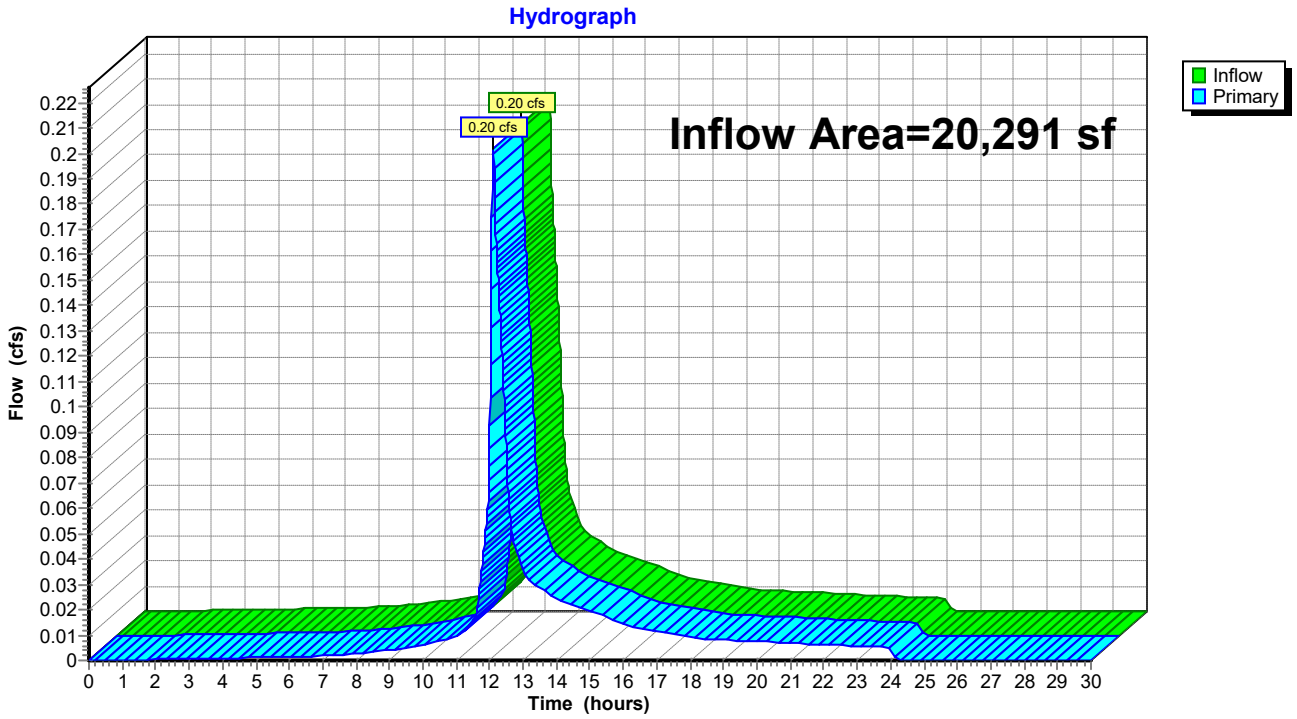


Summary for Link 3L: PROPOSED

Inflow Area = 20,291 sf, 43.94% Impervious, Inflow Depth = 0.59" for 10-Year event
Inflow = 0.20 cfs @ 12.10 hrs, Volume= 997 cf
Primary = 0.20 cfs @ 12.10 hrs, Volume= 997 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 3L: PROPOSED



Summary for Subcatchment 2S: PROPOSED PERMEABLE PAVERS WALKWAYS

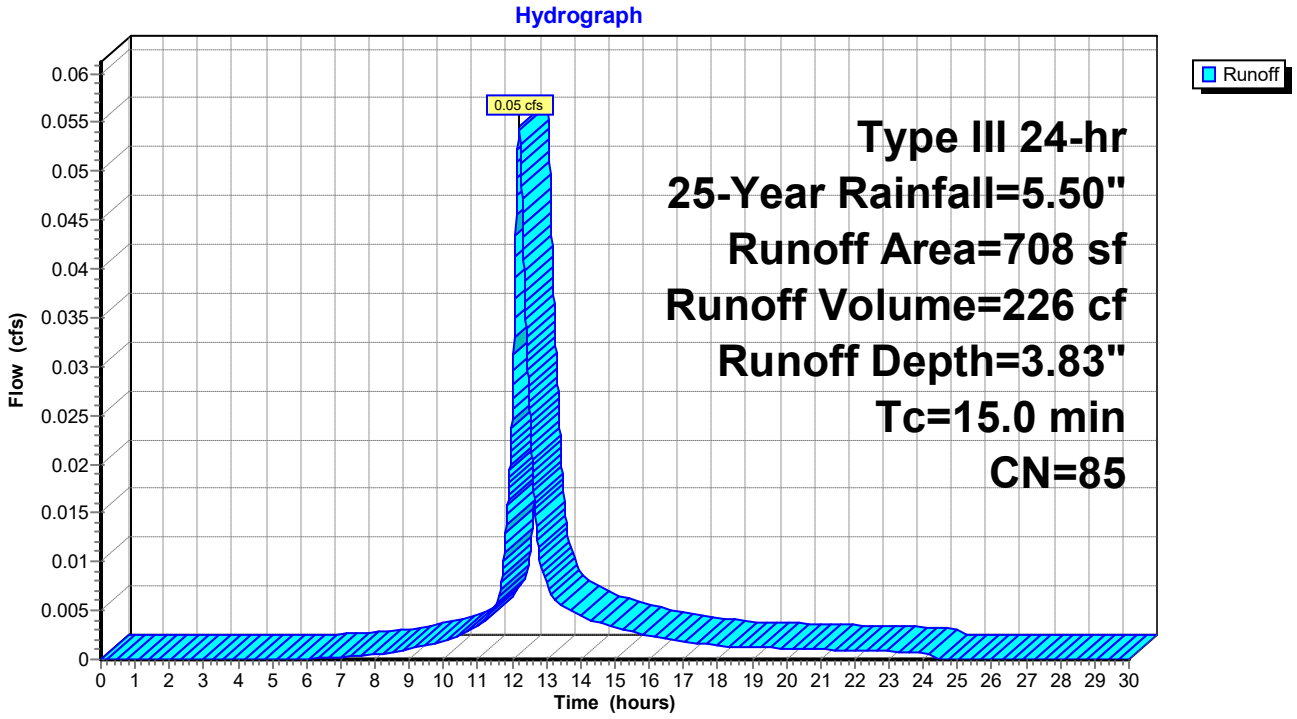
Runoff = 0.05 cfs @ 12.20 hrs, Volume= 226 cf, Depth= 3.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.50"

	Area (sf)	CN	Description
*	708	85	Permeable Pavers
	708		100.00% Pervious Area

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

Subcatchment 2S: PROPOSED PERMEABLE PAVERS WALKWAYS



Summary for Subcatchment 4S: PROPOSED LANDSCAPE AREA

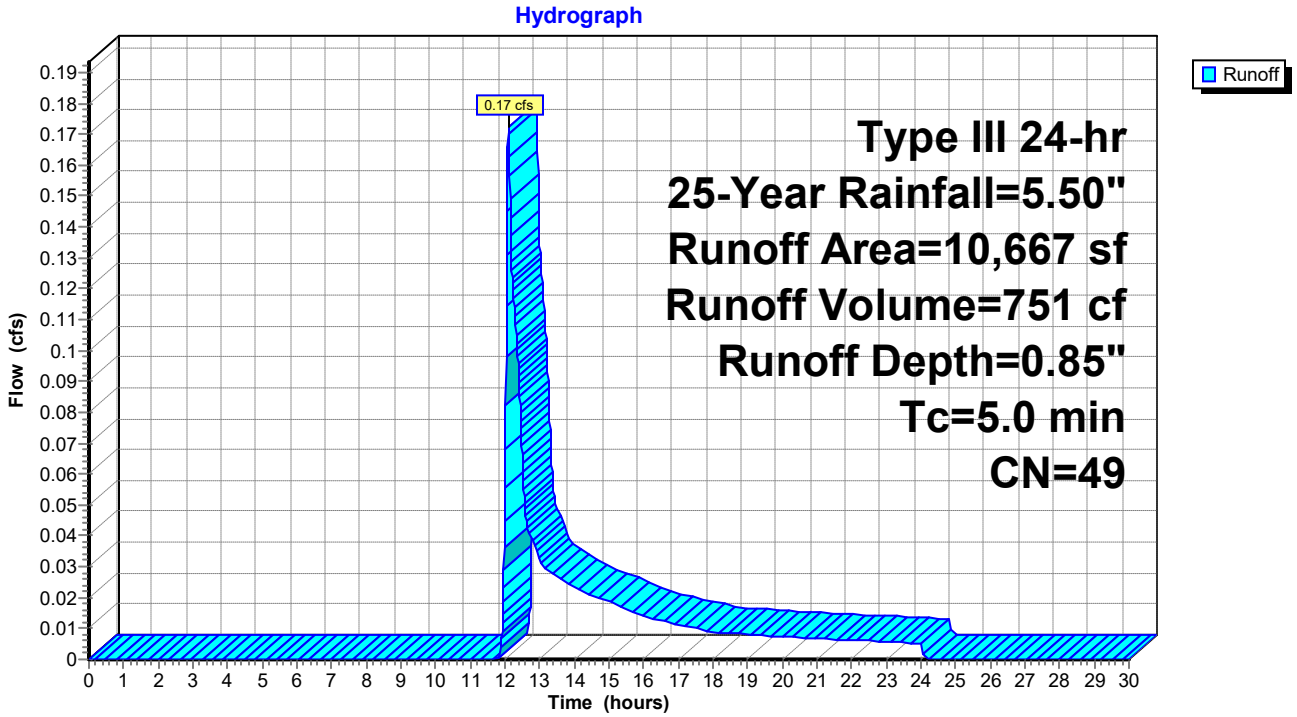
Runoff = 0.17 cfs @ 12.10 hrs, Volume= 751 cf, Depth= 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
10,667	49	50-75% Grass cover, Fair, HSG A
10,667		100.00% Pervious Area

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

Subcatchment 4S: PROPOSED LANDSCAPE AREA



Summary for Subcatchment 8S: PROP. UNCONNECTED IMPERVIOUS

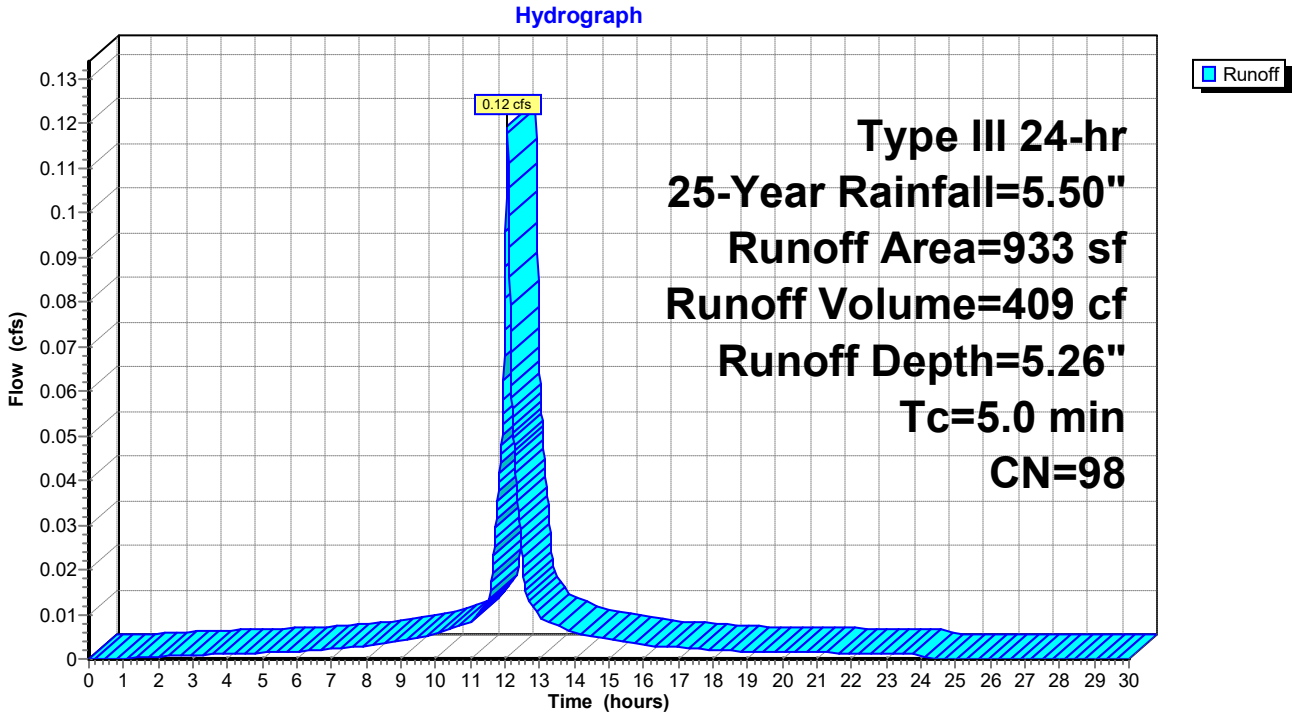
Runoff = 0.12 cfs @ 12.07 hrs, Volume= 409 cf, Depth= 5.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.50"

Area (sf)	CN	Description
933	98	Unconnected pavement, HSG A
933		100.00% Impervious Area
933		100.00% Unconnected

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

Subcatchment 8S: PROP. UNCONNECTED IMPERVIOUS



Summary for Subcatchment 11S: IMPERVIOUS CAPTURED BY SYSTEM #1

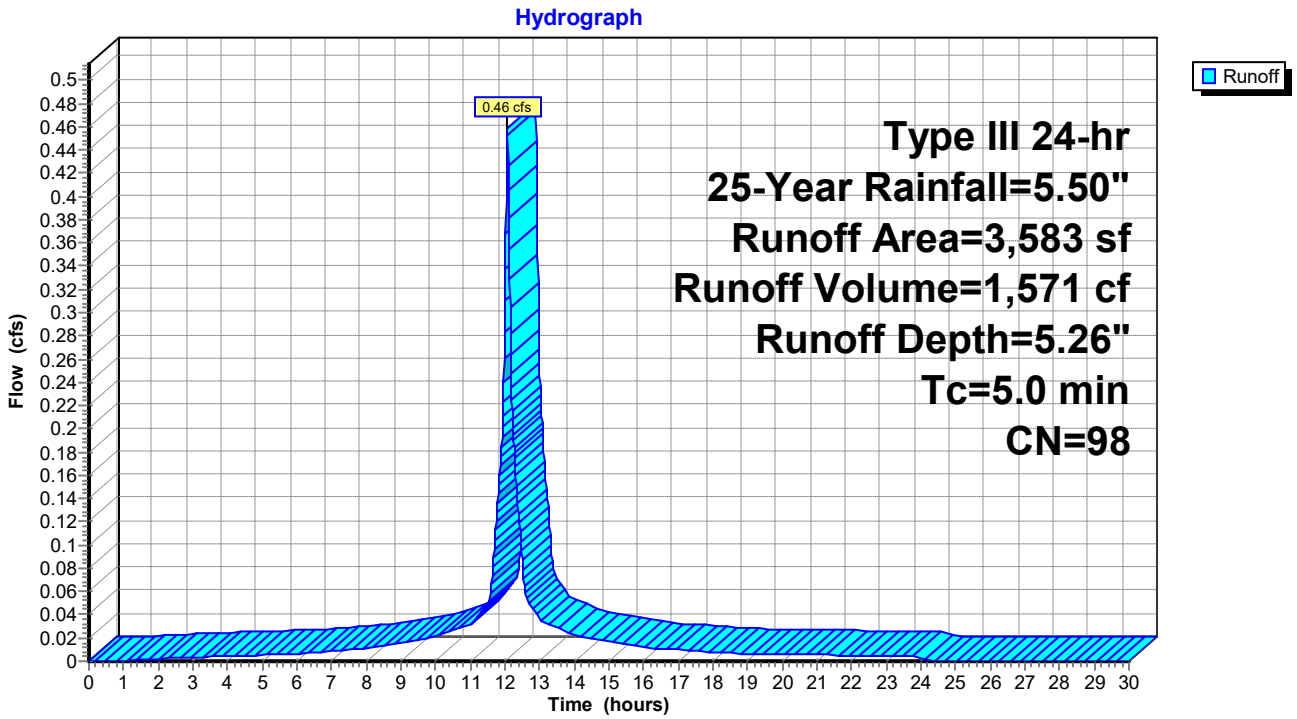
Runoff = 0.46 cfs @ 12.07 hrs, Volume= 1,571 cf, Depth= 5.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.50"

	Area (sf)	CN	Description
*	1,599	98	Front building
*	1,984	98	Driveway portion #1
	3,583	98	Weighted Average
	3,583		100.00% Impervious Area

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

Subcatchment 11S: IMPERVIOUS CAPTURED BY SYSTEM #1



Summary for Subcatchment 13S: IMPERVIOUS CAPTURED BY SYSTEM #1

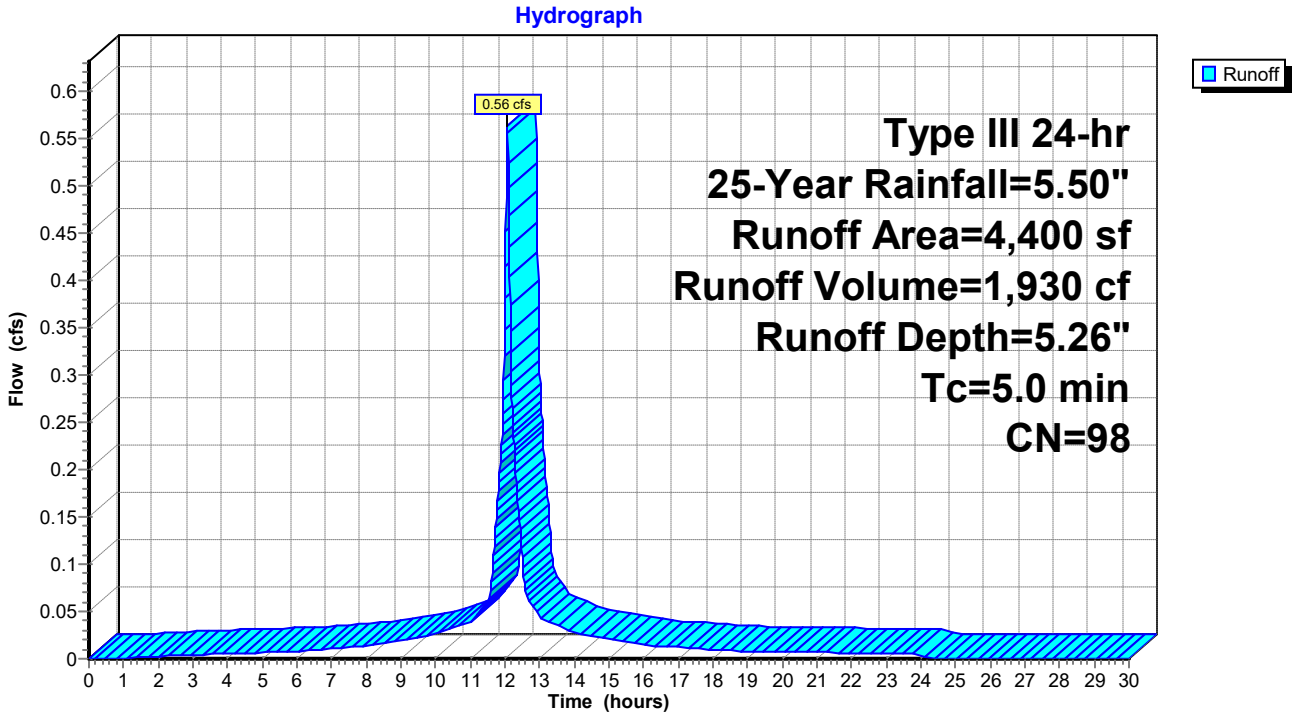
Runoff = 0.56 cfs @ 12.07 hrs, Volume= 1,930 cf, Depth= 5.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-Year Rainfall=5.50"

	Area (sf)	CN	Description
*	2,289	98	Rear building
*	1,010	98	Portion of front building
*	1,101	98	Driveway portion #2
	4,400	98	Weighted Average
	4,400		100.00% Impervious Area

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

Subcatchment 13S: IMPERVIOUS CAPTURED BY SYSTEM #1



Summary for Pond 3P: DRAINAGE SYSTEM #1

Inflow Area = 7,983 sf,100.00% Impervious, Inflow Depth = 2.38" for 25-Year event
Inflow = 0.46 cfs @ 12.07 hrs, Volume= 1,581 cf
Outflow = 0.07 cfs @ 12.60 hrs, Volume= 1,581 cf, Atten= 85%, Lag= 31.6 min
Discarded = 0.07 cfs @ 12.60 hrs, Volume= 1,581 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 110.63' @ 12.60 hrs Surf.Area= 1,110 sf Storage= 438 cf

Plug-Flow detention time= 38.2 min calculated for 1,580 cf (100% of inflow)
Center-of-Mass det. time= 38.2 min (783.8 - 745.6)

Volume	Invert	Avail.Storage	Storage Description
#1	109.50'	971 cf	**30.00'W x 37.00'L x 2.50'H Prismatoid** 2,775 cf Overall x 35.0% Voids
#2	112.00'	15 cf	**Ponding** Listed below -Impervious
		986 cf	Total Available Storage

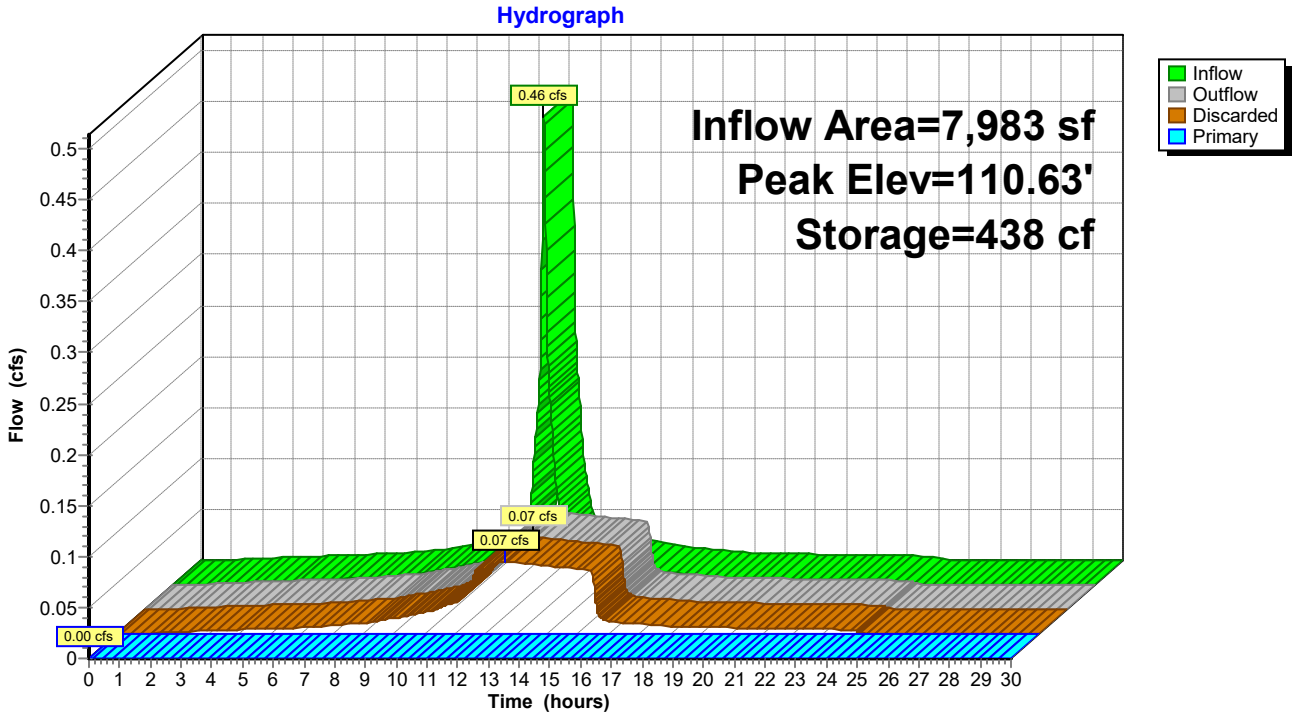
Elevation (feet)	Cum.Store (cubic-feet)
112.00	0
113.50	5
113.70	15

Device	Routing	Invert	Outlet Devices
#1	Discarded	109.50'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	111.90'	**6.0" Horiz. Overflow** C= 0.600 Limited to weir flow at low heads

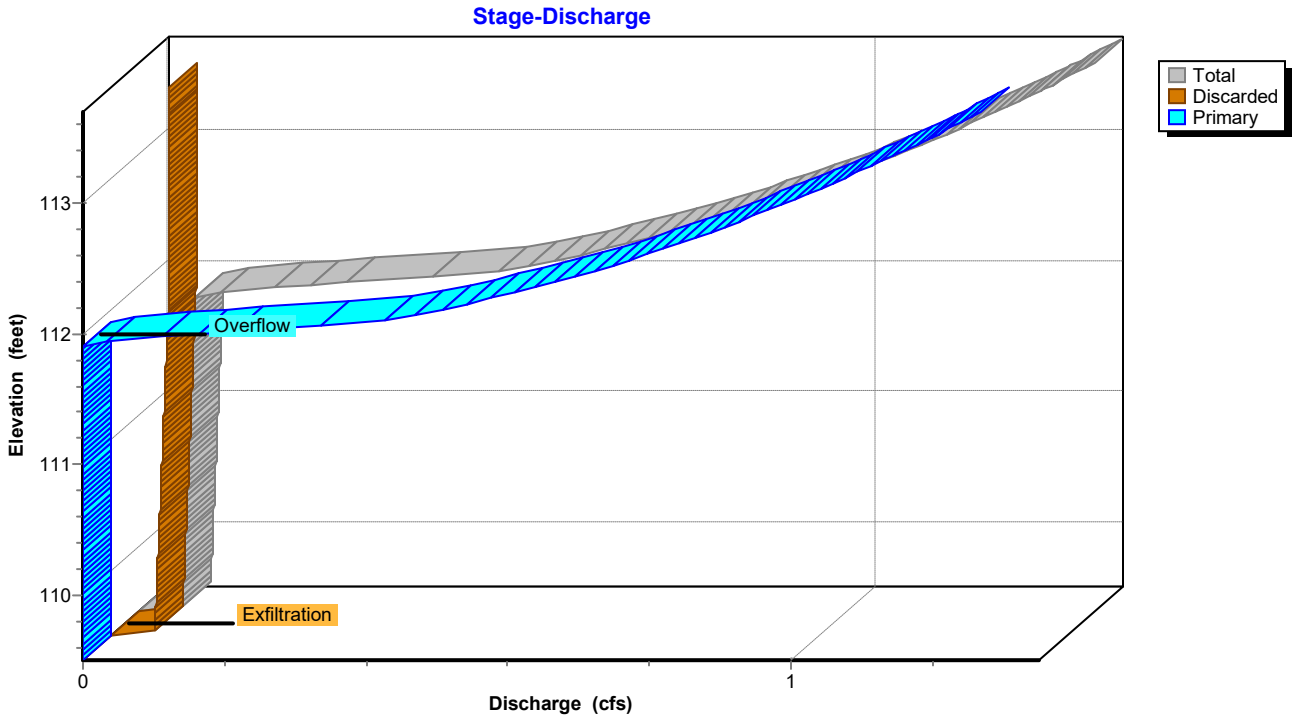
Discarded OutFlow Max=0.07 cfs @ 12.60 hrs HW=110.63' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=109.50' (Free Discharge)
↑—**2=Overflow** (Controls 0.00 cfs)

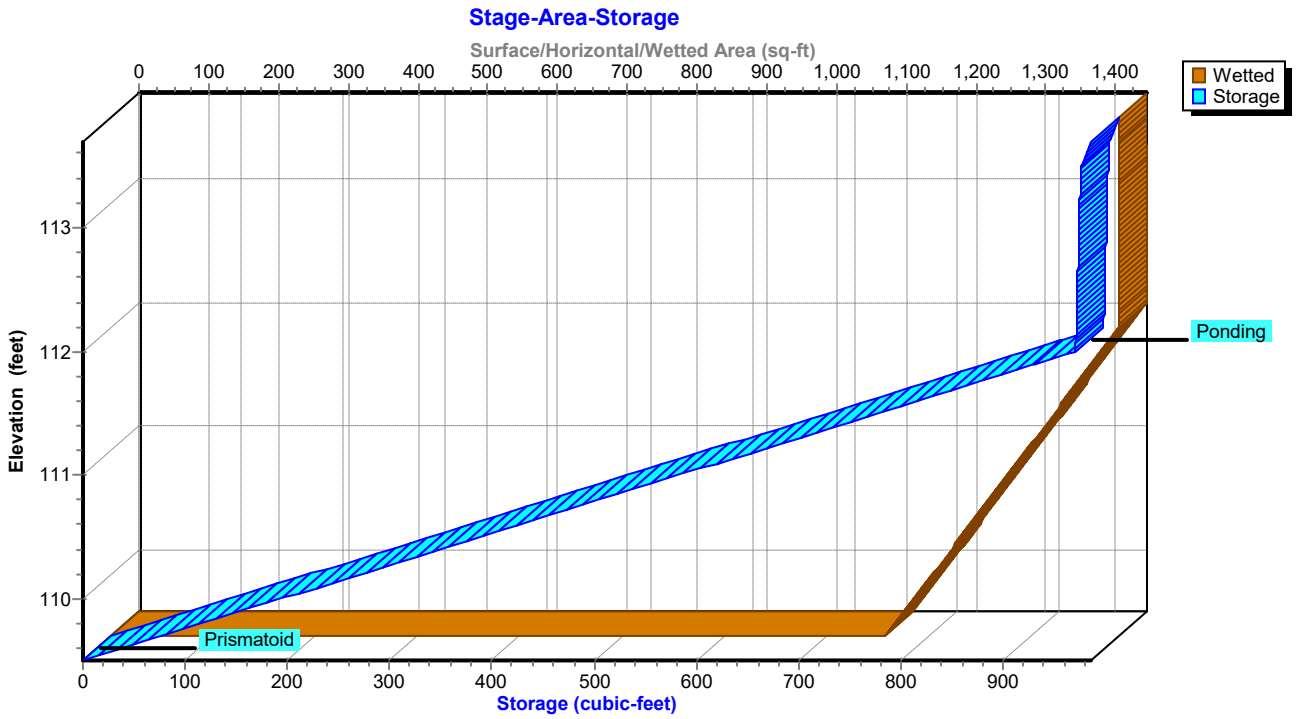
Pond 3P: DRAINAGE SYSTEM #1



Pond 3P: DRAINAGE SYSTEM #1



Pond 3P: DRAINAGE SYSTEM #1



Summary for Pond 4P: DRAINAGE SYSTEM #2

Inflow Area = 4,400 sf,100.00% Impervious, Inflow Depth = 5.26" for 25-Year event
Inflow = 0.56 cfs @ 12.07 hrs, Volume= 1,930 cf
Outflow = 0.07 cfs @ 12.58 hrs, Volume= 1,930 cf, Atten= 87%, Lag= 30.3 min
Discarded = 0.06 cfs @ 12.58 hrs, Volume= 1,920 cf
Primary = 0.01 cfs @ 12.58 hrs, Volume= 9 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 115.22' @ 12.58 hrs Surf.Area= 770 sf Storage= 651 cf

Plug-Flow detention time= 80.9 min calculated for 1,930 cf (100% of inflow)
Center-of-Mass det. time= 80.9 min (826.4 - 745.5)

Volume	Invert	Avail.Storage	Storage Description
#1	112.80'	674 cf	**22.00'W x 35.00'L x 2.50'H Prismatoid** 1,925 cf Overall x 35.0% Voids
#2	115.30'	15 cf	**Ponding** Listed below -Impervious
		689 cf	Total Available Storage

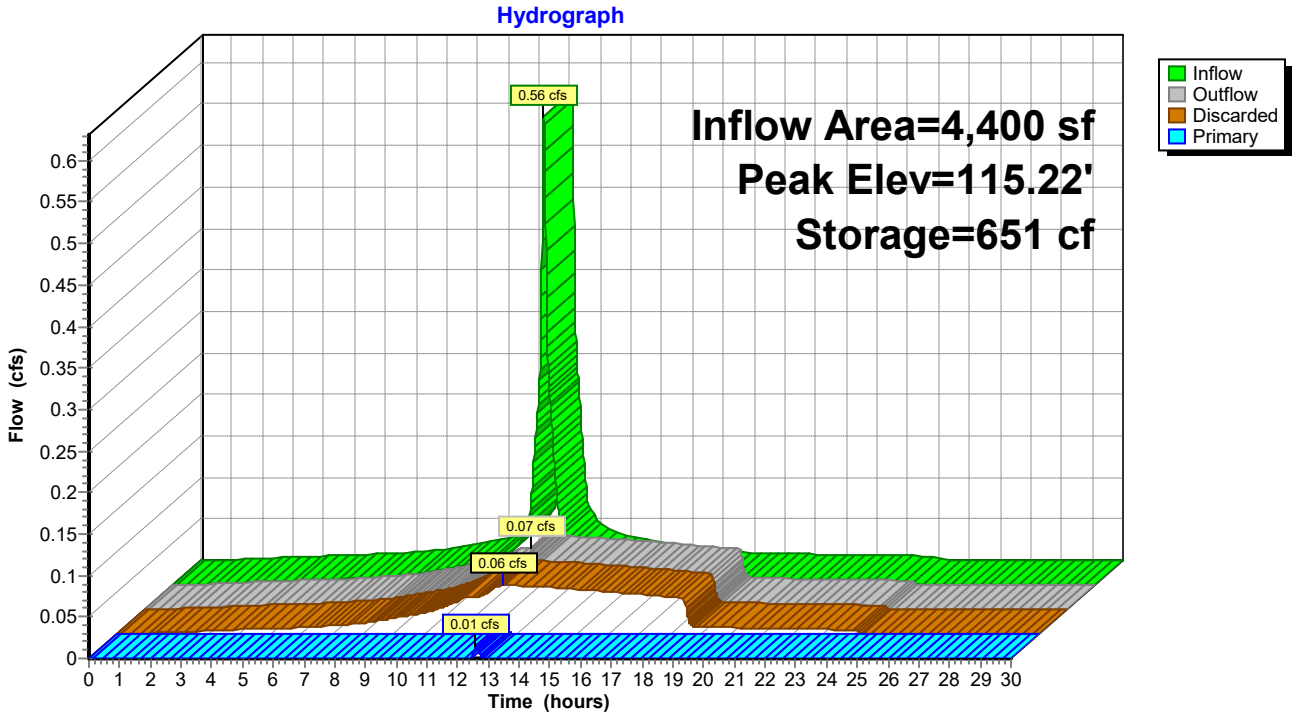
Elevation (feet)	Cum.Store (cubic-feet)
115.30	0
116.80	5
117.00	15

Device	Routing	Invert	Outlet Devices
#1	Discarded	112.80'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	115.20'	**6.0" Horiz. Overflow** C= 0.600 Limited to weir flow at low heads

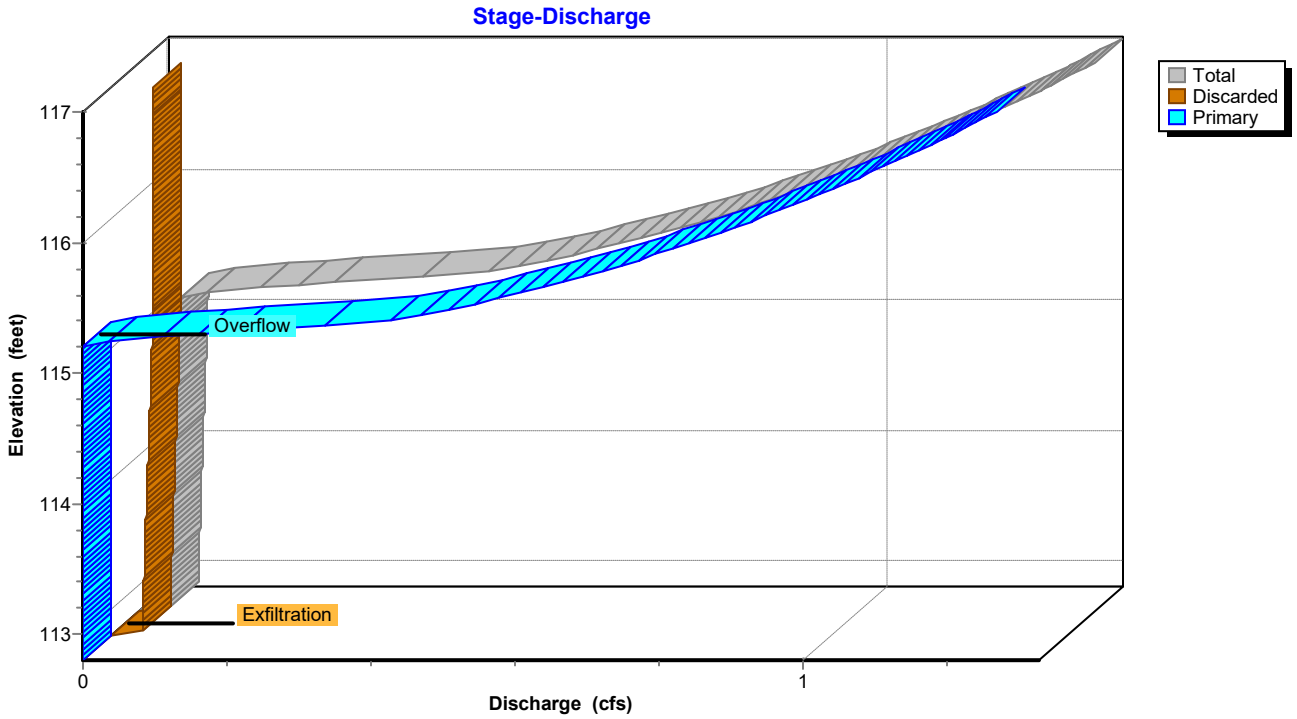
Discarded OutFlow Max=0.06 cfs @ 12.58 hrs HW=115.22' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.01 cfs @ 12.58 hrs HW=115.22' (Free Discharge)
↑—**2=Overflow** (Weir Controls 0.01 cfs @ 0.40 fps)

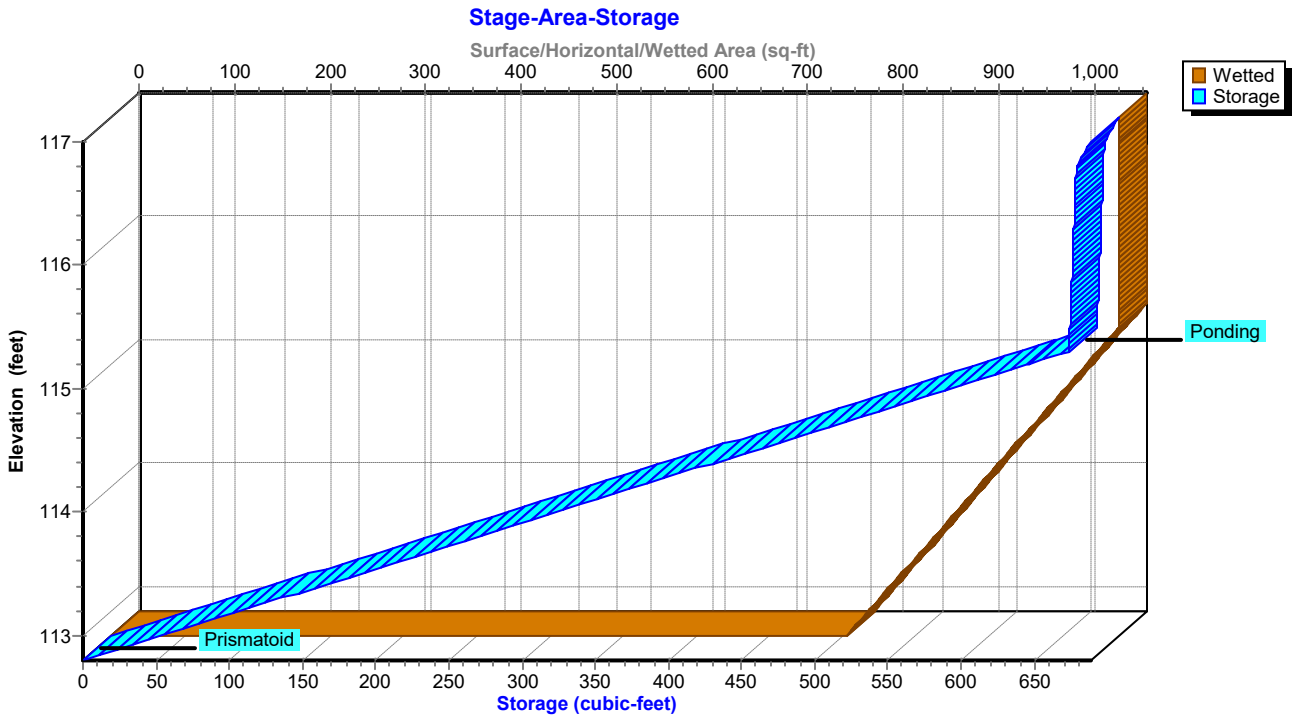
Pond 4P: DRAINAGE SYSTEM #2



Pond 4P: DRAINAGE SYSTEM #2



Pond 4P: DRAINAGE SYSTEM #2

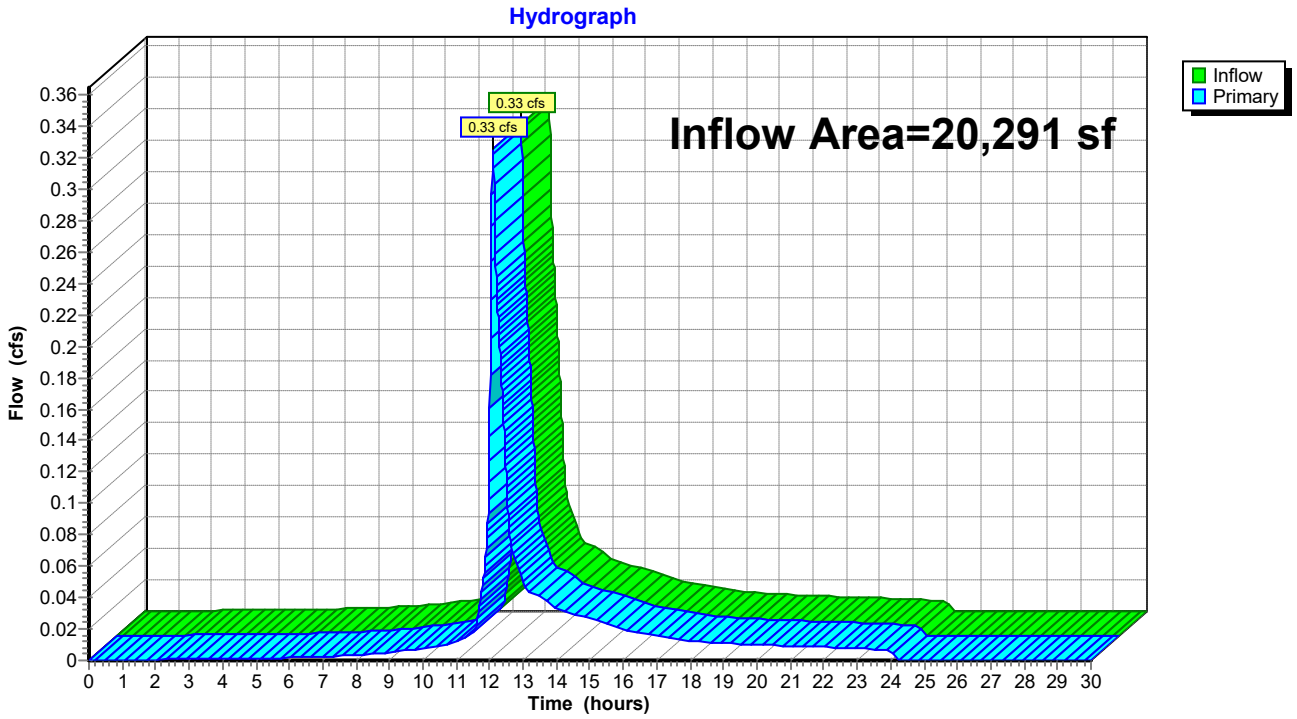


Summary for Link 3L: PROPOSED

Inflow Area = 20,291 sf, 43.94% Impervious, Inflow Depth = 0.82" for 25-Year event
Inflow = 0.33 cfs @ 12.09 hrs, Volume= 1,387 cf
Primary = 0.33 cfs @ 12.09 hrs, Volume= 1,387 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 3L: PROPOSED



Summary for Subcatchment 2S: PROPOSED PERMEABLE PAVERS WALKWAYS

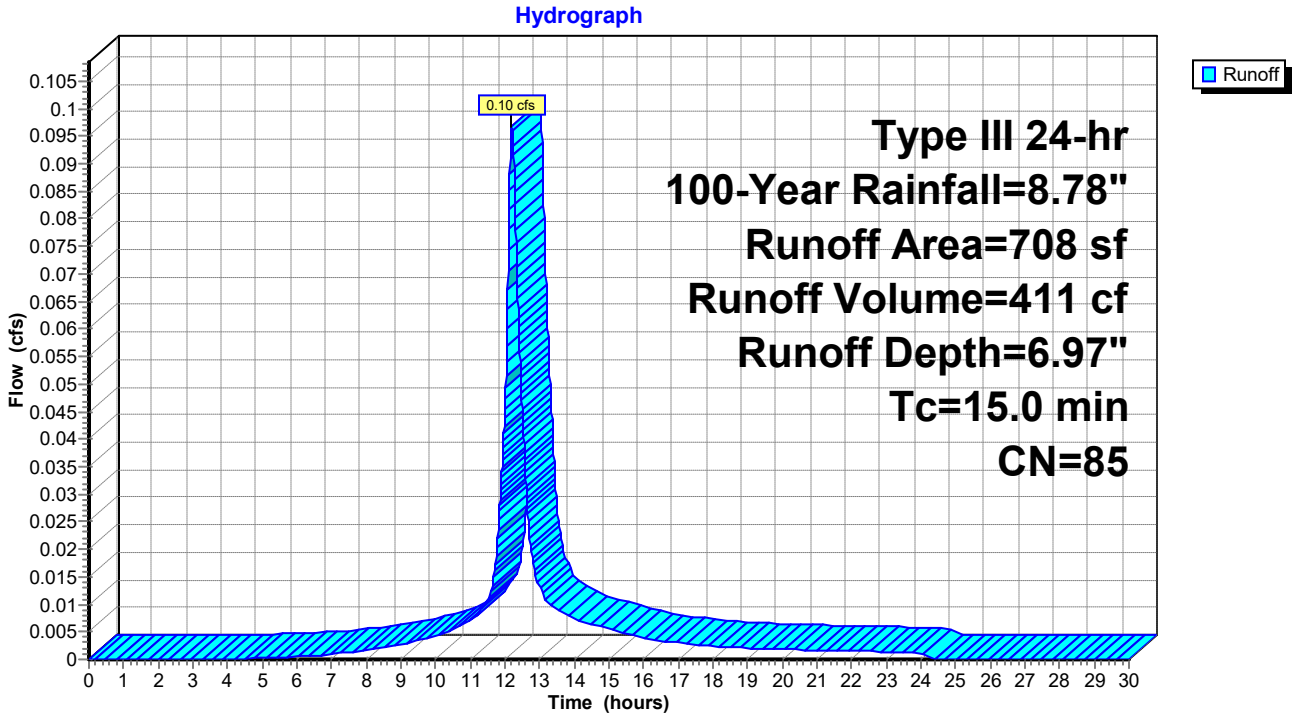
Runoff = 0.10 cfs @ 12.20 hrs, Volume= 411 cf, Depth= 6.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.78"

	Area (sf)	CN	Description
*	708	85	Permeable Pavers
	708		100.00% Pervious Area

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

Subcatchment 2S: PROPOSED PERMEABLE PAVERS WALKWAYS



Summary for Subcatchment 4S: PROPOSED LANDSCAPE AREA

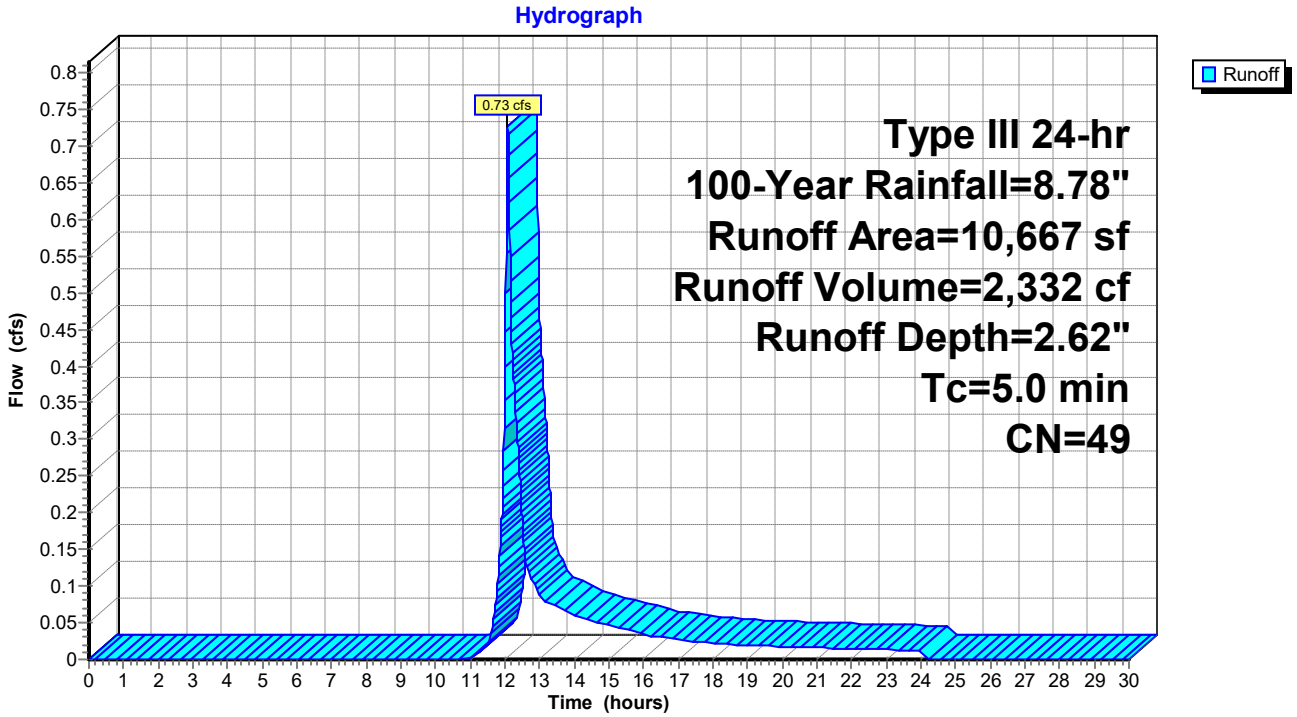
Runoff = 0.73 cfs @ 12.08 hrs, Volume= 2,332 cf, Depth= 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.78"

Area (sf)	CN	Description
10,667	49	50-75% Grass cover, Fair, HSG A
10,667		100.00% Pervious Area

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

Subcatchment 4S: PROPOSED LANDSCAPE AREA



Summary for Subcatchment 8S: PROP. UNCONNECTED IMPERVIOUS

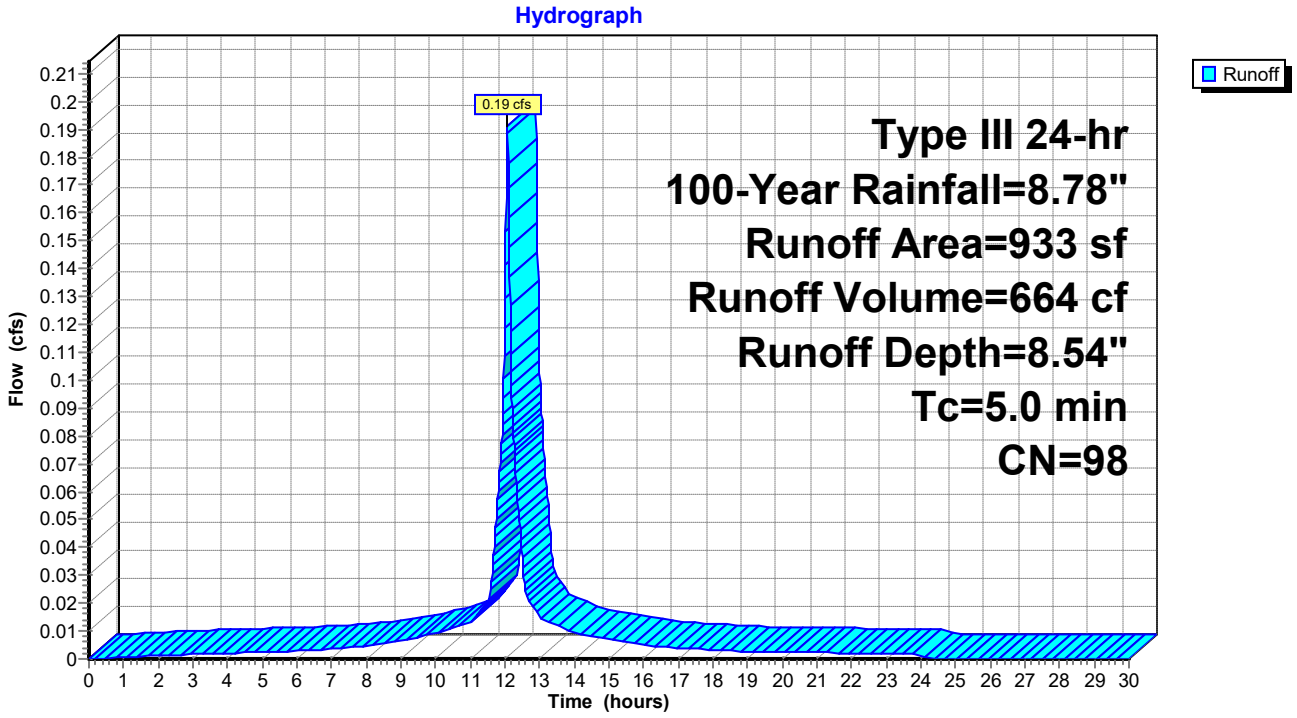
Runoff = 0.19 cfs @ 12.07 hrs, Volume= 664 cf, Depth= 8.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.78"

Area (sf)	CN	Description
933	98	Unconnected pavement, HSG A
933		100.00% Impervious Area
933		100.00% Unconnected

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

Subcatchment 8S: PROP. UNCONNECTED IMPERVIOUS



Summary for Subcatchment 11S: IMPERVIOUS CAPTURED BY SYSTEM #1

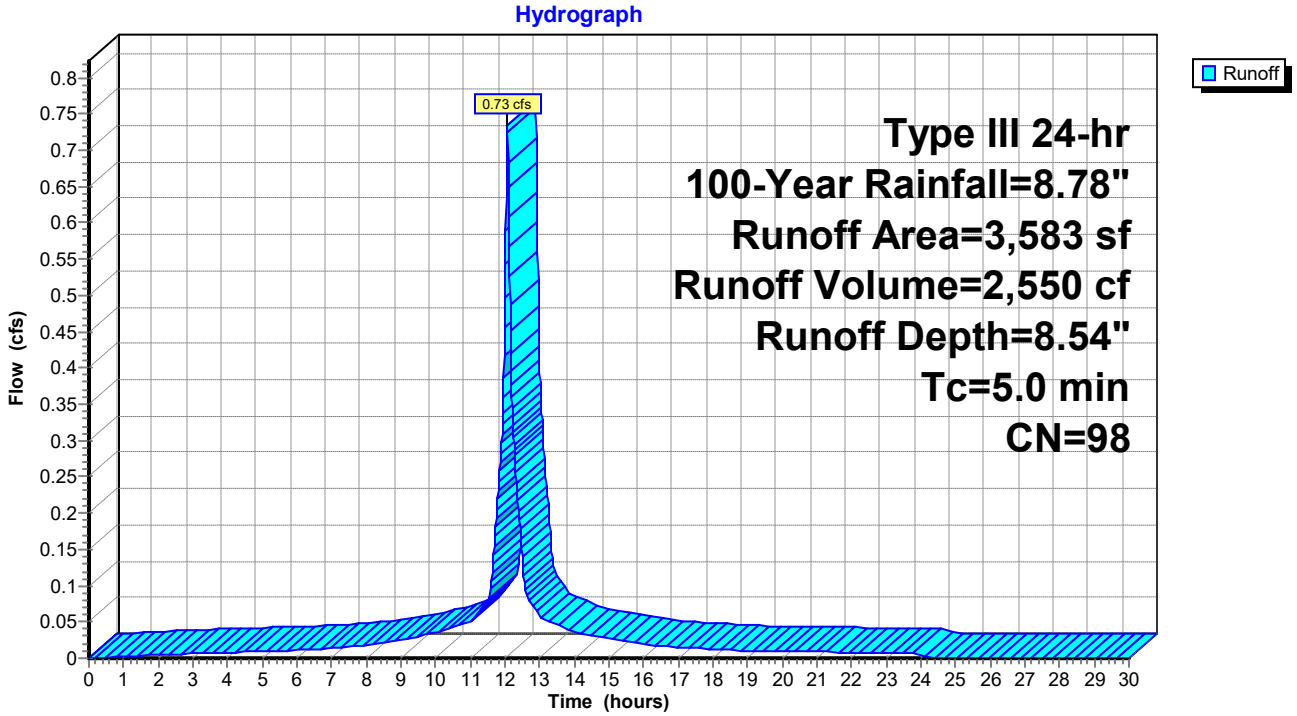
Runoff = 0.73 cfs @ 12.07 hrs, Volume= 2,550 cf, Depth= 8.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.78"

	Area (sf)	CN	Description
*	1,599	98	Front building
*	1,984	98	Driveway portion #1
	3,583	98	Weighted Average
	3,583		100.00% Impervious Area

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

Subcatchment 11S: IMPERVIOUS CAPTURED BY SYSTEM #1



Summary for Subcatchment 13S: IMPERVIOUS CAPTURED BY SYSTEM #1

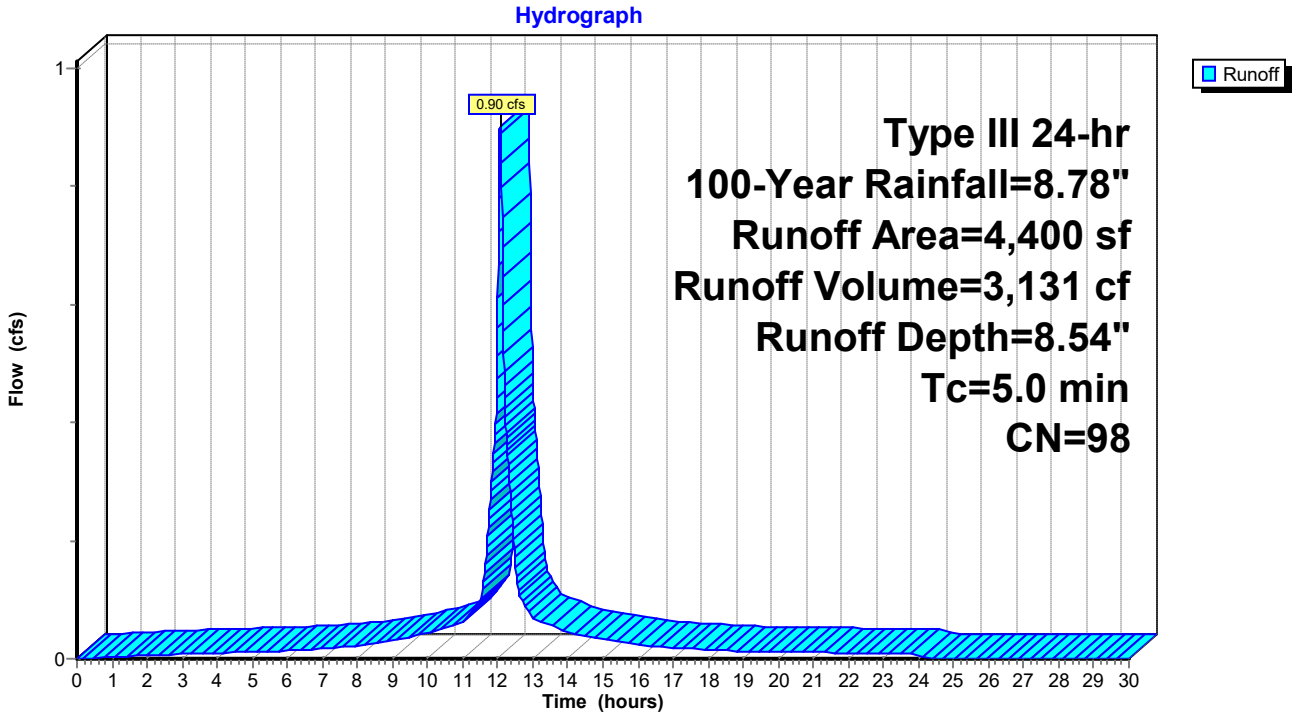
Runoff = 0.90 cfs @ 12.07 hrs, Volume= 3,131 cf, Depth= 8.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year Rainfall=8.78"

	Area (sf)	CN	Description
*	2,289	98	Rear building
*	1,010	98	Portion of front building
*	1,101	98	Driveway portion #2
	4,400	98	Weighted Average
	4,400		100.00% Impervious Area

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

Subcatchment 13S: IMPERVIOUS CAPTURED BY SYSTEM #1



Summary for Pond 3P: DRAINAGE SYSTEM #1

Inflow Area = 7,983 sf,100.00% Impervious, Inflow Depth = 4.78" for 100-Year event
Inflow = 1.55 cfs @ 12.09 hrs, Volume= 3,179 cf
Outflow = 0.70 cfs @ 12.23 hrs, Volume= 3,175 cf, Atten= 55%, Lag= 8.9 min
Discarded = 0.08 cfs @ 12.23 hrs, Volume= 2,682 cf
Primary = 0.62 cfs @ 12.23 hrs, Volume= 493 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 112.29' @ 12.23 hrs Surf.Area= 1,110 sf Storage= 972 cf

Plug-Flow detention time= 74.0 min calculated for 3,175 cf (100% of inflow)
Center-of-Mass det. time= 73.0 min (812.0 - 739.0)

Volume	Invert	Avail.Storage	Storage Description
#1	109.50'	971 cf	**30.00'W x 37.00'L x 2.50'H Prismatoid** 2,775 cf Overall x 35.0% Voids
#2	112.00'	15 cf	**Ponding** Listed below -Impervious
		986 cf	Total Available Storage

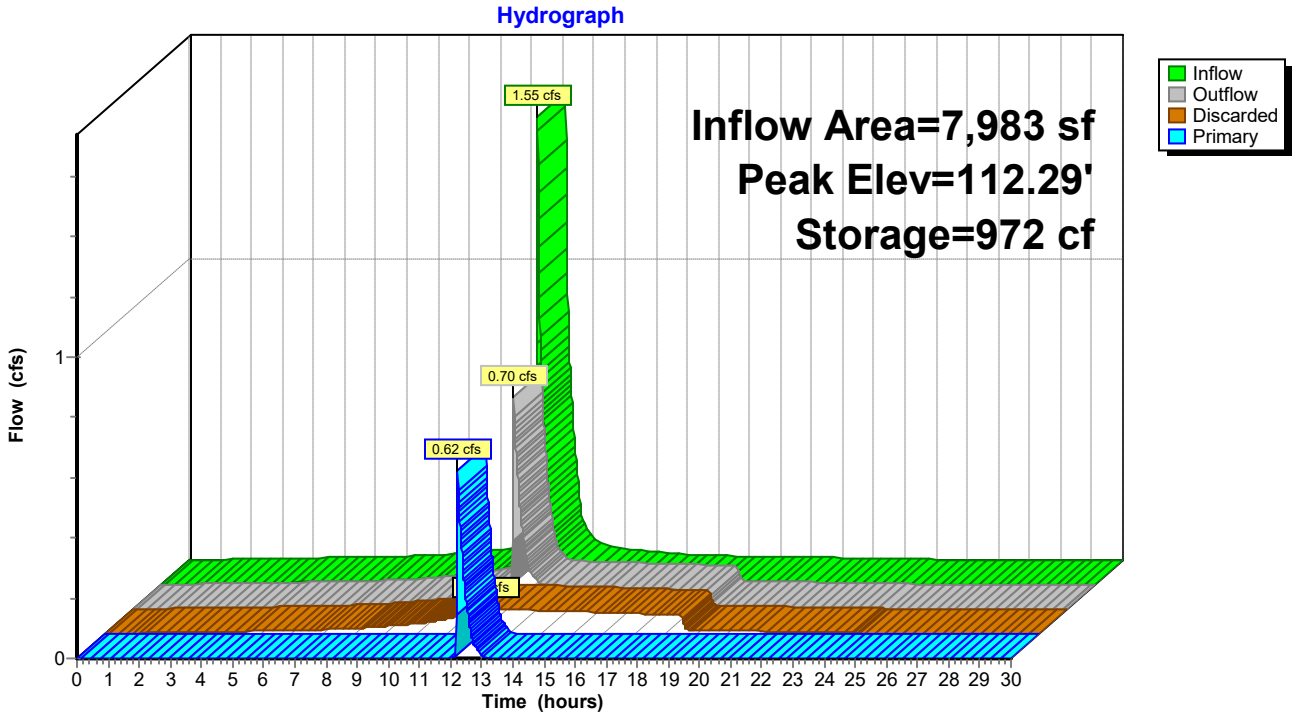
Elevation (feet)	Cum.Store (cubic-feet)
112.00	0
113.50	5
113.70	15

Device	Routing	Invert	Outlet Devices
#1	Discarded	109.50'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	111.90'	**6.0" Horiz. Overflow** C= 0.600 Limited to weir flow at low heads

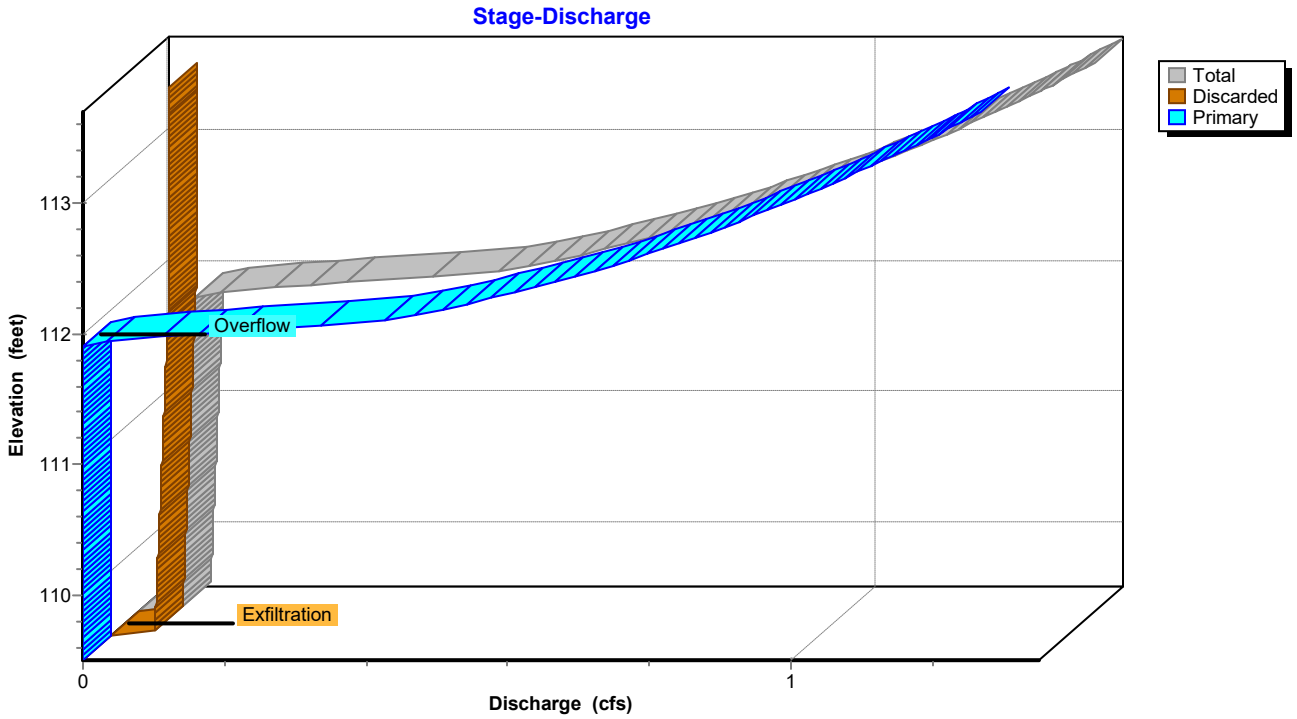
Discarded OutFlow Max=0.08 cfs @ 12.23 hrs HW=112.27' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.57 cfs @ 12.23 hrs HW=112.26' (Free Discharge)
↑—**2=Overflow** (Orifice Controls 0.57 cfs @ 2.88 fps)

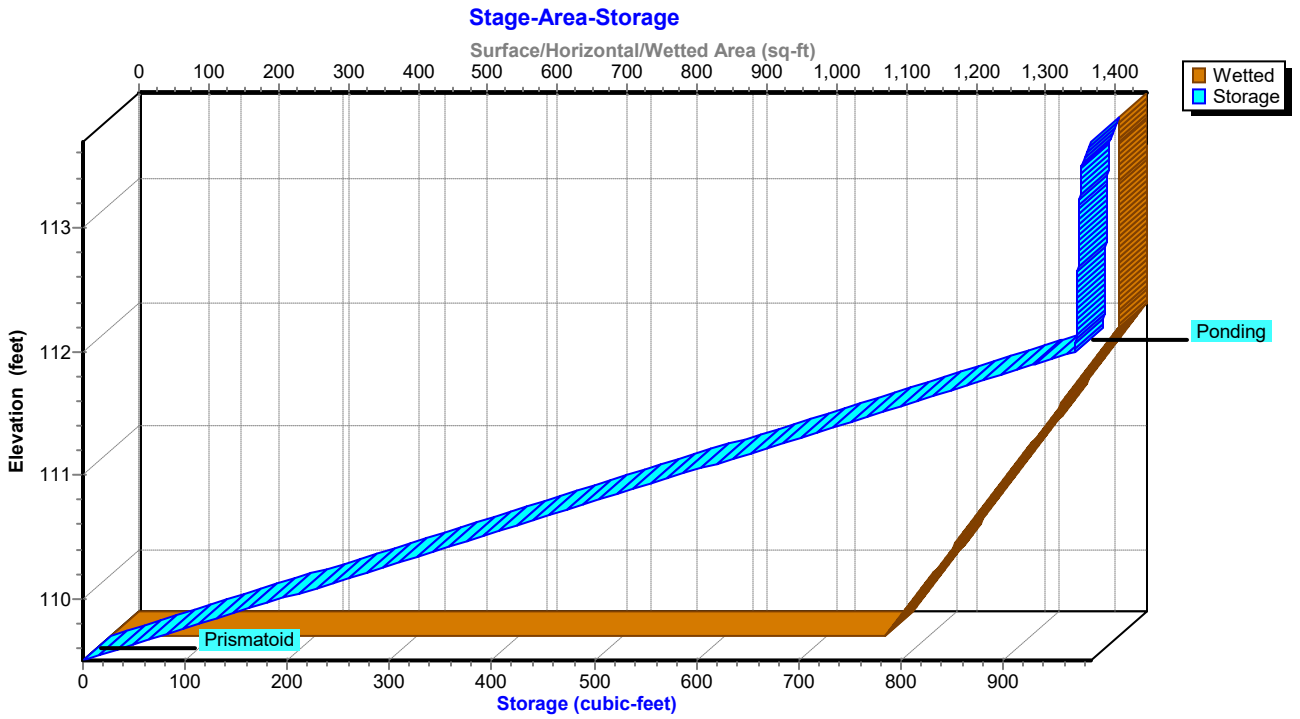
Pond 3P: DRAINAGE SYSTEM #1



Pond 3P: DRAINAGE SYSTEM #1



Pond 3P: DRAINAGE SYSTEM #1



Summary for Pond 4P: DRAINAGE SYSTEM #2

Inflow Area = 4,400 sf,100.00% Impervious, Inflow Depth = 8.54" for 100-Year event
Inflow = 0.90 cfs @ 12.07 hrs, Volume= 3,131 cf
Outflow = 0.89 cfs @ 12.09 hrs, Volume= 3,131 cf, Atten= 1%, Lag= 1.1 min
Discarded = 0.06 cfs @ 12.08 hrs, Volume= 2,502 cf
Primary = 0.83 cfs @ 12.09 hrs, Volume= 629 cf

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 115.98' @ 12.09 hrs Surf.Area= 770 sf Storage= 676 cf

Plug-Flow detention time= 69.4 min calculated for 3,130 cf (100% of inflow)
Center-of-Mass det. time= 69.4 min (808.5 - 739.2)

Volume	Invert	Avail.Storage	Storage Description
#1	112.80'	674 cf	**22.00'W x 35.00'L x 2.50'H Prismatoid** 1,925 cf Overall x 35.0% Voids
#2	115.30'	15 cf	**Ponding** Listed below -Impervious
		689 cf	Total Available Storage

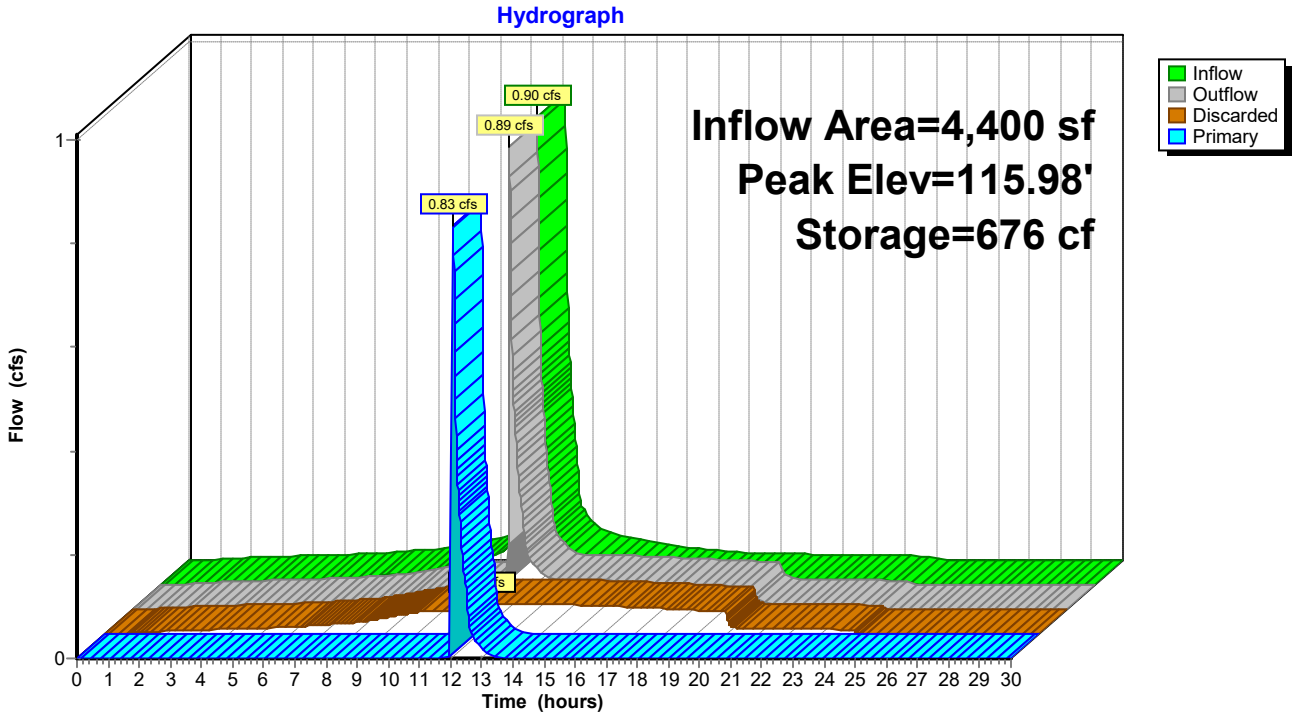
Elevation (feet)	Cum.Store (cubic-feet)
115.30	0
116.80	5
117.00	15

Device	Routing	Invert	Outlet Devices
#1	Discarded	112.80'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	115.20'	**6.0" Horiz. Overflow** C= 0.600 Limited to weir flow at low heads

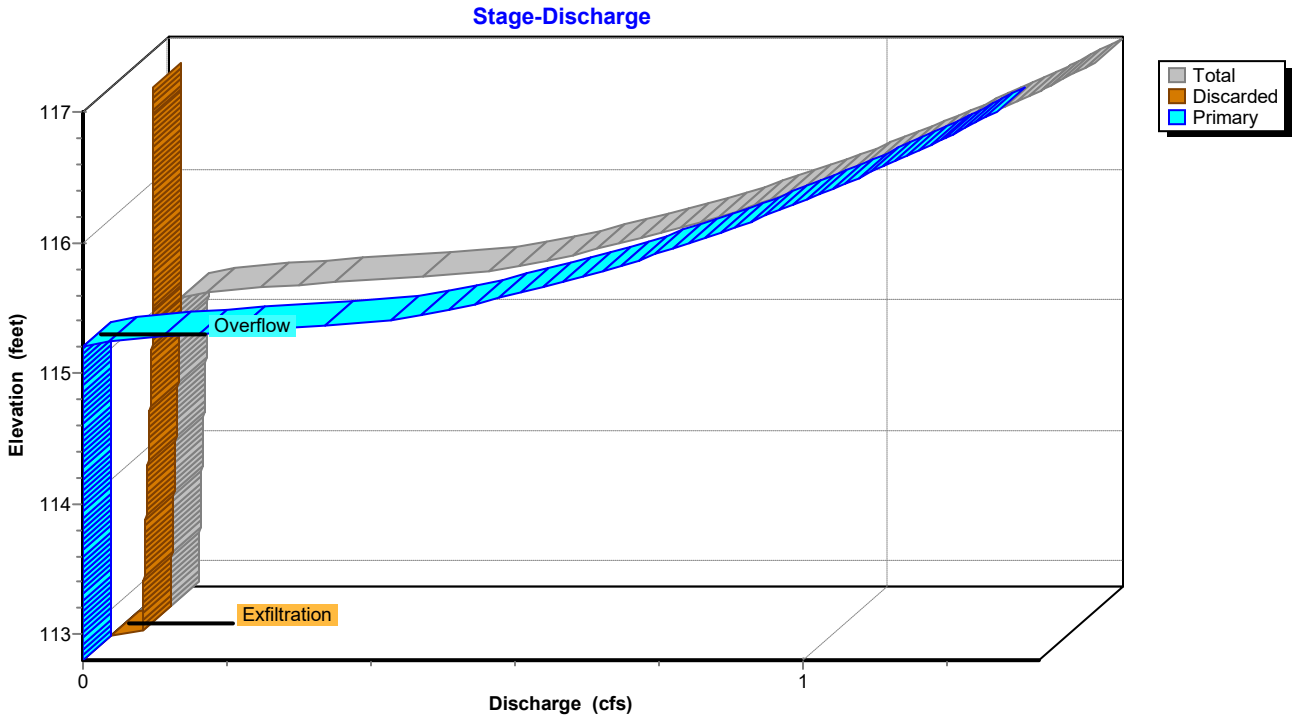
Discarded OutFlow Max=0.06 cfs @ 12.08 hrs HW=115.93' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.83 cfs @ 12.09 hrs HW=115.97' (Free Discharge)
↑—**2=Overflow** (Orifice Controls 0.83 cfs @ 4.22 fps)

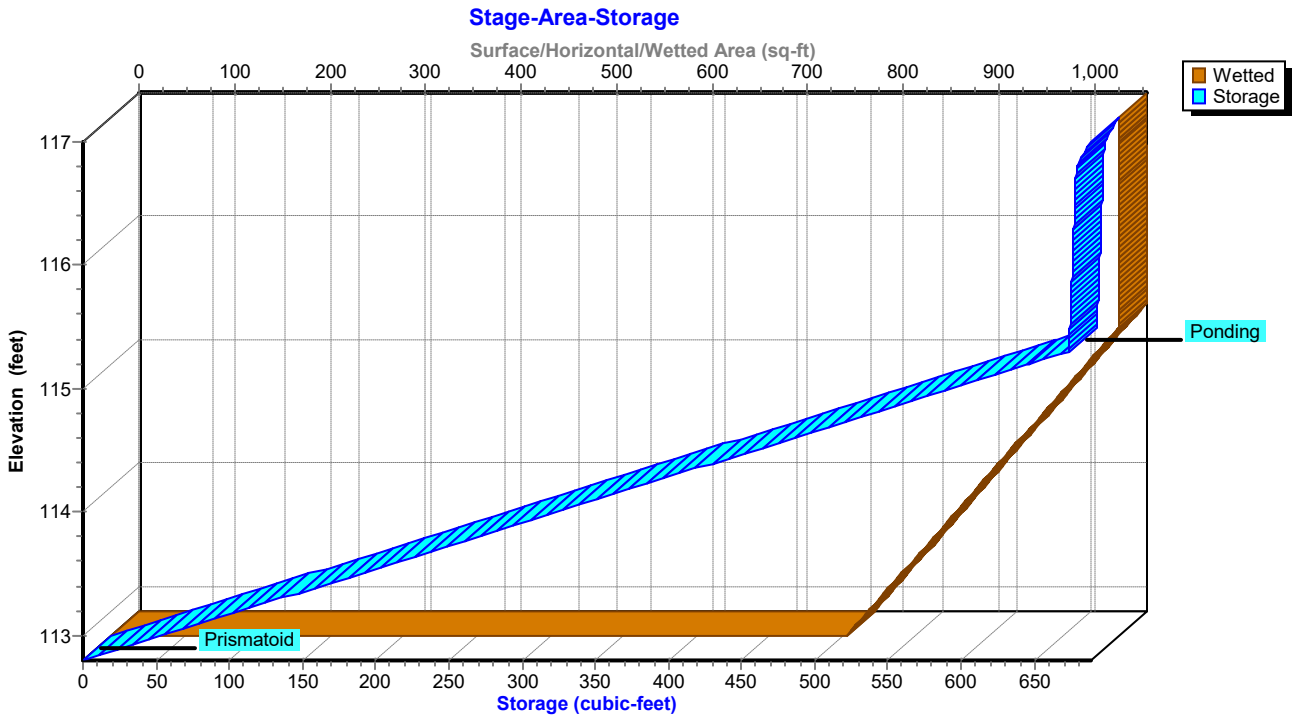
Pond 4P: DRAINAGE SYSTEM #2



Pond 4P: DRAINAGE SYSTEM #2



Pond 4P: DRAINAGE SYSTEM #2



Summary for Link 3L: PROPOSED

Inflow Area = 20,291 sf, 43.94% Impervious, Inflow Depth = 2.31" for 100-Year event
Inflow = 1.19 cfs @ 12.23 hrs, Volume= 3,900 cf
Primary = 1.19 cfs @ 12.23 hrs, Volume= 3,900 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link 3L: PROPOSED