Trail Blazers Practice Facility Building Addition
Summary of the stormwater management approach to address the applicable code sections from the Pre-App notes
July 22, 2021
Prepared by Kim Shera, P.E. Vega Civil Engineering

Stormwater plans and calculations were prepared in accordance with TDC 74.630 and 74.650 and CWS Design and Construction Standards Chapter 4. Stormwater from the proposed 1360 SF building addition is managed for water quantity via a flow through stormwater planter with flow control orifice. Roof drains from the proposed addition will discharge to the proposed 50 SF raised planter located directly north of the existing stormwater planter constructed in 2015. The stormwater facility will meet the peak flow matching design criteria for hydromodification based on the design criteria in Section 4.08.06 of CWS Standards for the 25-year event. The 2-year, 5-year, and 10-year post construction discharge rate from the planter slightly (0.002 to 0.006 cfs) exceed the predevelopment discharge rate due to the small basin area and minimum orifice size required by CWS standards.

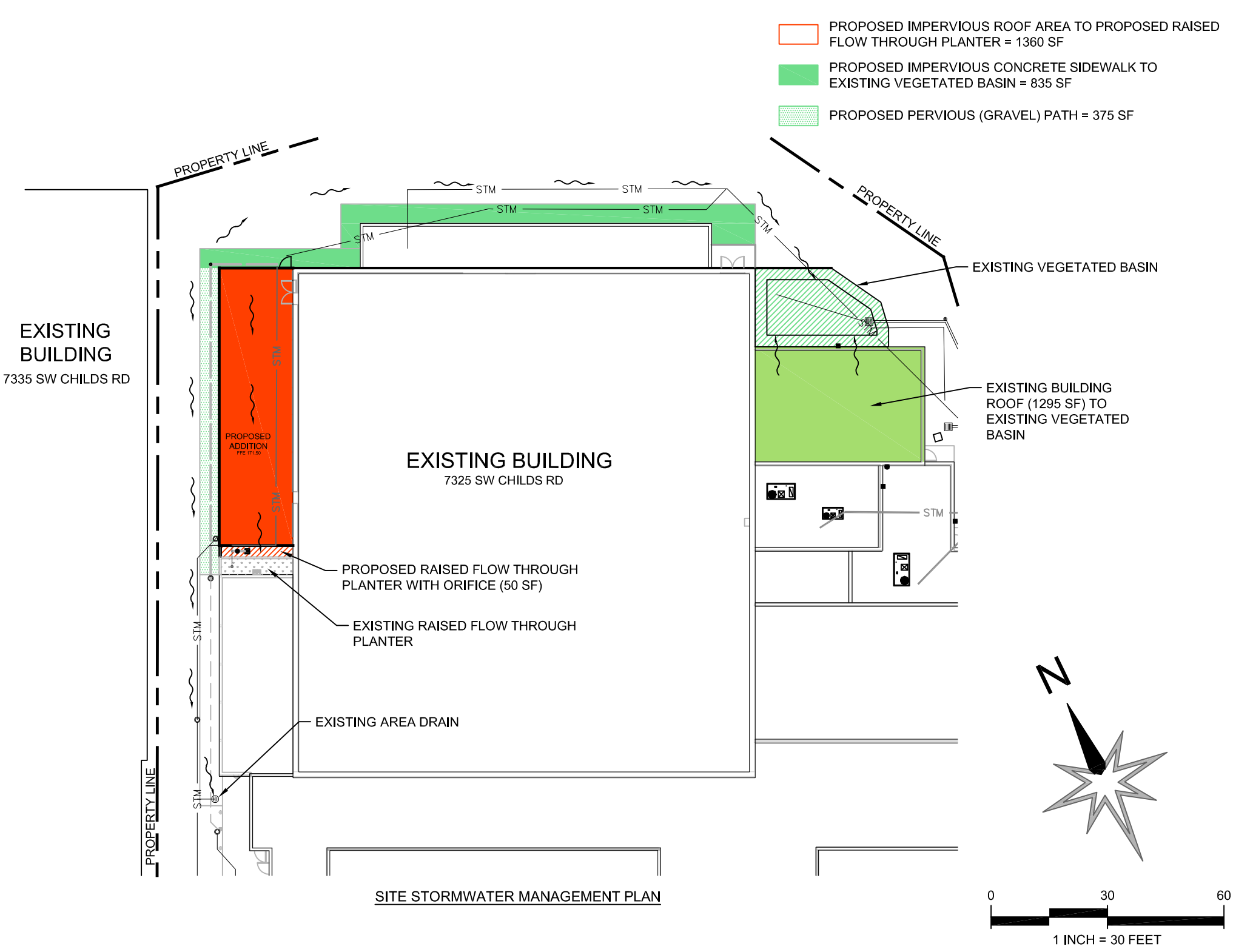
HydroCAD calculations are provided for the 50 SF planter and a 163 SF planter (12% sizing factor) to show that the larger planter size does not provide a significant decrease in the post-developed peak discharge rate for the planter. The peak discharge rates from the larger planter still exceed the predevelopment discharge rates for the 2-year and 5-year storm events by 0.002 to 0.004 cfs. The 10-year event discharge rate from the larger planter is 0.002 cfs less than the 50 SF planter discharge rate and meets the pre-developed rate. See attached summary of peak runoff rates. In order to provide the larger planter, it would require impacts to the existing vegetation and trees to the west of the proposed addition.

The proposed path (375 SF) on the west side of the addition is located below the elevation of the raised stormwater facility and the facility could not be constructed at grade due to the shallow site storm system. This portion of sidewalk will be constructed with pervious material.

The proposed sidewalk (835 SF) on the north side of the existing building will be conveyed in a shallow conveyance ditch to the existing vegetated basin at the northeast corner of the site that was constructed in 2013. The shallow conveyance ditch will provide an opportunity for infiltration prior to discharge to the existing facility. The existing vegetated basin is 350 SF with a 6” water storage depth and is currently providing stormwater management for 1295 SF of roof area. The sizing factor for the existing stormwater facility with the additional sidewalk area (1210 SF) is 13.9% which exceeds the 12% requirement. The existing facility is lined due to the proximity to the building.

In accordance with TMC 3-5-350 and 3-5-360 and CWS Design and Construction Standards Chapter 4, the proposed and existing stormwater facilities are designed to remove 65 percent of the phosphorous from the runoff of a storm event totaling 0.36 inches of precipitation falling in four hours with an average return period of 96 hours from 100 percent of the newly constructed impervious surfaces.

Detention is provided for the new roof area by the proposed stormwater planter. Detention is provided for the concrete sidewalk within the existing vegetated facility based on a 12% sizing factor. The project is able to meet the requirements of the Bridgeport Area Stormwater Master Plan of a maximum allowable release rate of 0.9 cfs/acre for the 25-year storm. The total 25-year peak discharge for the proposed building and sidewalk is 0.039 cfs which is less than the allowable rate of 0.045 cfs for the new impervious area.



SITE STORMWATER MANAGEMENT PLAN

Table 1 – Drainage Basin and Facility Summary

Drainage Basin	Impervious Area Type	Area (sf)	Ownership (private/public)	Facility Type	Facility Size
1	Roof	1,360	Private	Raised Flow Through Planter	50 SF
2	Concrete Sidewalk	835	Private	Existing Vegetated Basin	350 SF

Storm Event	Pre-Developed Runoff Rate for Roof Area (CN=75)	Post-Developed Peak Runoff Rate to Planter (CN=98)	**Post-Developed Peak Discharge from 50 SF Planter**	Post-Developed Peak Discharge from 163 SF Planter
2-year, 24-hour	0.003 cfs	0.018 cfs	**0.009 cfs***	0.007 cfs
5-year, 24-hour	0.006 cfs	0.023 cfs	**0.009 cfs***	0.008 cfs
10-year, 24-hour	0.008 cfs	0.025 cfs	**0.010 cfs***	0.008 cfs
25-year, 24-hour	0.011 cfs	0.029 cfs	**0.010 cfs**	0.008 cfs

* Post-developed runoff rate is higher than pre-developed runoff rate due to small basin area and ½" minimum orifice.

Summary for Subcatchment 3S: Predeveloped

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

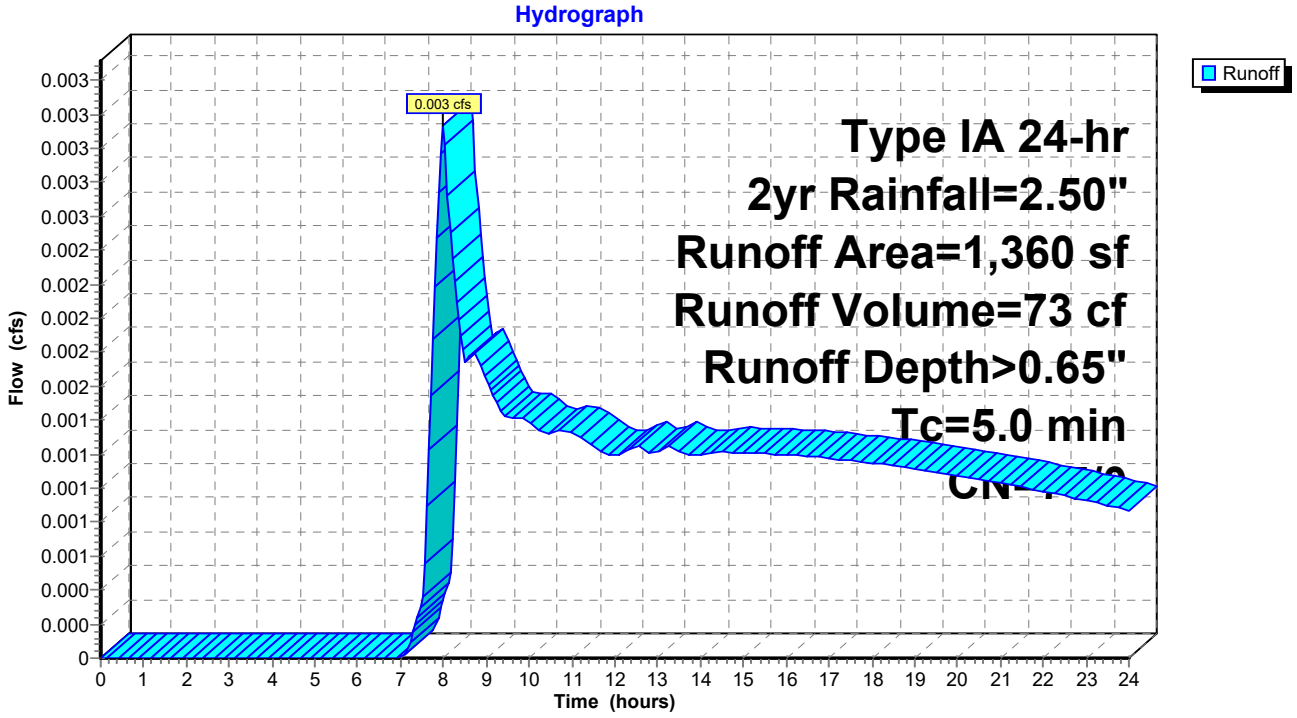
Runoff = 0.003 cfs @ 8.01 hrs, Volume= 73 cf, Depth> 0.65"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2yr Rainfall=2.50"

	Area (sf)	CN	Description
*	1,360	75	new building
	1,360		100.00% Pervious Area

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

Subcatchment 3S: Predeveloped



Summary for Subcatchment 6S: Post Building

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

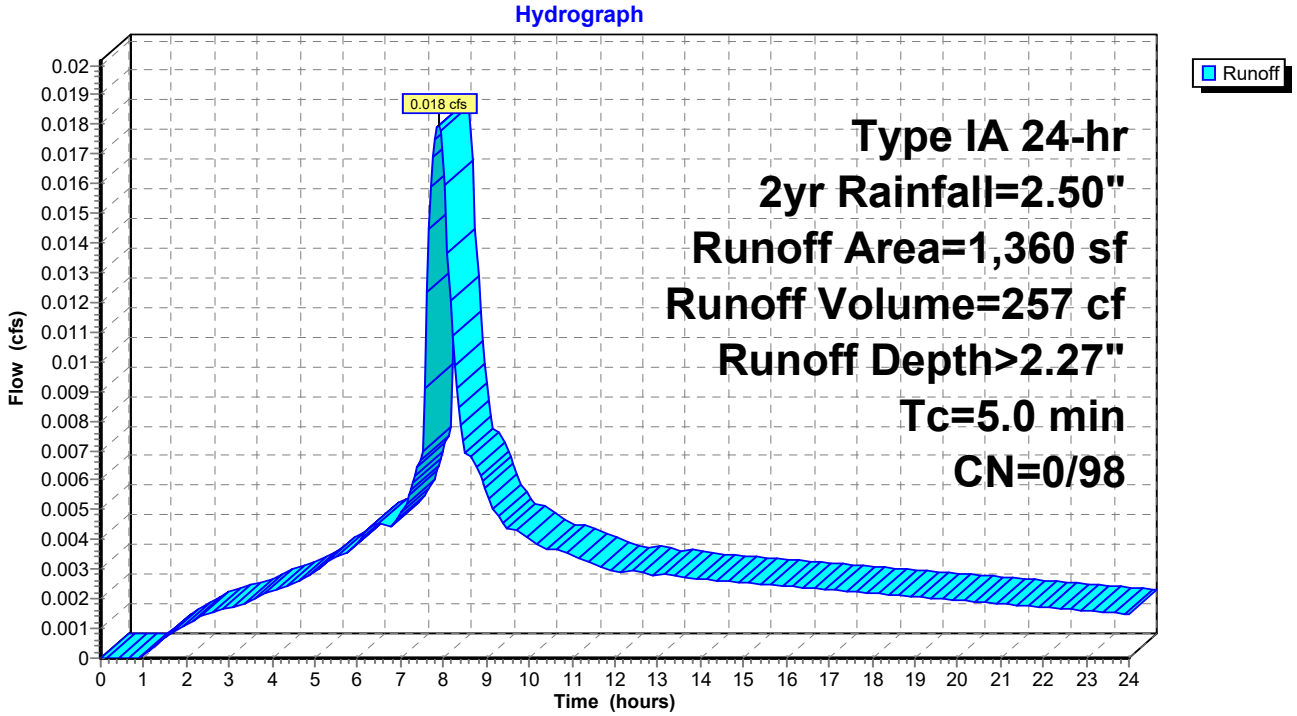
Runoff = 0.018 cfs @ 7.90 hrs, Volume= 257 cf, Depth> 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2yr Rainfall=2.50"

	Area (sf)	CN	Description
*	1,360	98	
	1,360		100.00% Impervious Area

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

Subcatchment 6S: Post Building



Summary for Pond 6P: Flow Through Planter

Inflow Area = 1,360 sf,100.00% Impervious, Inflow Depth > 2.27" for 2yr event
Inflow = 0.018 cfs @ 7.90 hrs, Volume= 257 cf
Outflow = 0.007 cfs @ 8.66 hrs, Volume= 206 cf, Atten= 62%, Lag= 45.5 min
Primary = 0.007 cfs @ 8.66 hrs, Volume= 206 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 173.32' @ 8.66 hrs Surf.Area= 163 sf Storage= 84 cf

Plug-Flow detention time= 266.7 min calculated for 206 cf (80% of inflow)
Center-of-Mass det. time= 136.5 min (809.0 - 672.5)

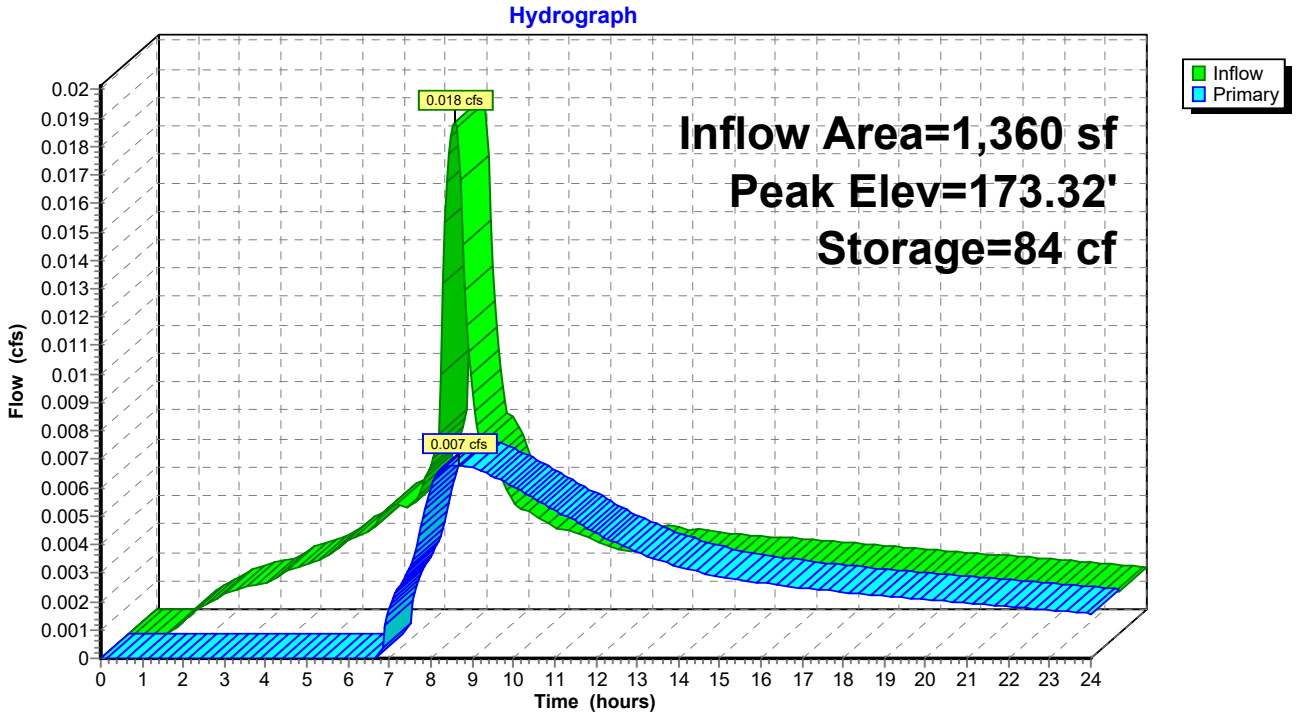
Volume	Invert	Avail.Storage	Storage Description
#1	171.25'	261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
171.25	163	0.0	0	0
172.25	163	30.0	49	49
173.75	163	20.0	49	98
174.75	163	100.0	163	261

Device	Routing	Invert	Outlet Devices		
#1	Primary	172.25'	**0.5" Horiz. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads
#2	Primary	174.58'	**4.0" Horiz. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads

Primary OutFlow Max=0.007 cfs @ 8.66 hrs HW=173.32' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.007 cfs @ 4.97 fps)
└**2=Orifice/Grate** (Controls 0.000 cfs)

Pond 6P: Flow Through Planter



Summary for Subcatchment 3S: Predeveloped

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

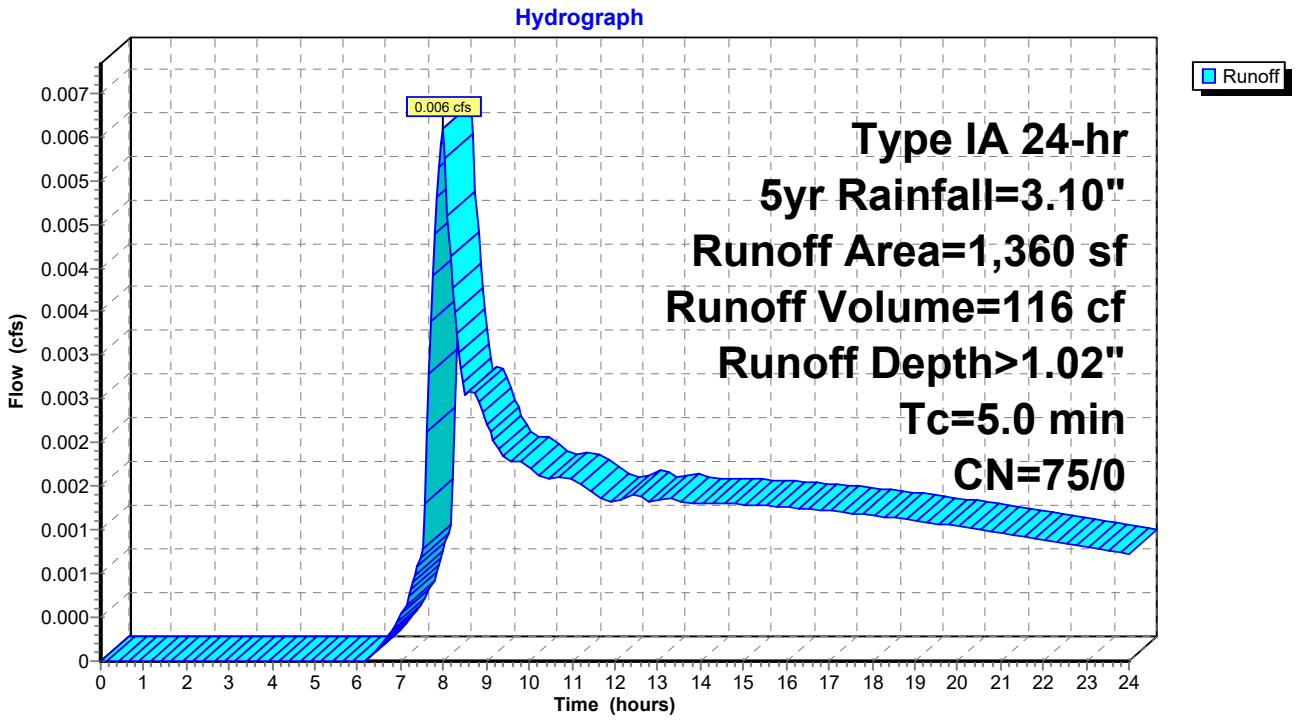
Runoff = 0.006 cfs @ 7.99 hrs, Volume= 116 cf, Depth> 1.02"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5yr Rainfall=3.10"

	Area (sf)	CN	Description
*	1,360	75	new building
	1,360		100.00% Pervious Area

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

Subcatchment 3S: Predeveloped



Summary for Subcatchment 6S: Post Building

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

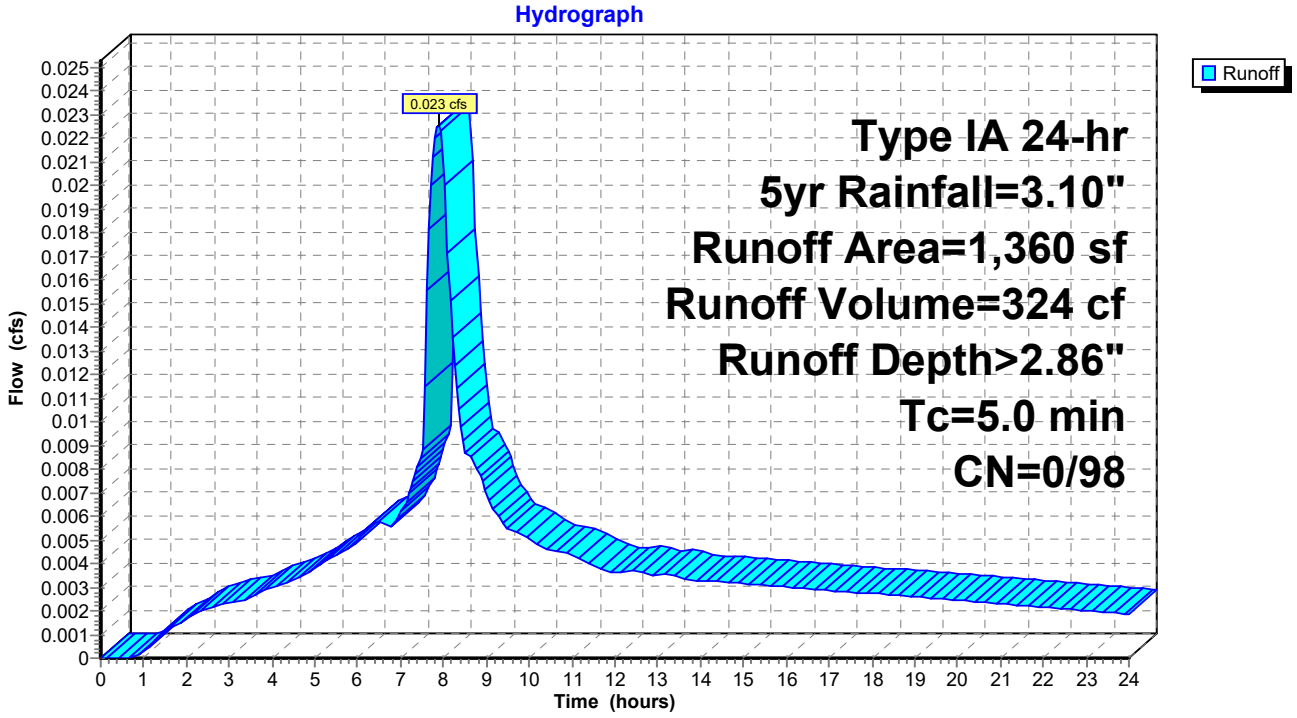
Runoff = 0.023 cfs @ 7.90 hrs, Volume= 324 cf, Depth> 2.86"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5yr Rainfall=3.10"

	Area (sf)	CN	Description
*	1,360	98	
	1,360		100.00% Impervious Area

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

Subcatchment 6S: Post Building



Summary for Pond 6P: Flow Through Planter

Inflow Area = 1,360 sf,100.00% Impervious, Inflow Depth > 2.86" for 5yr event
Inflow = 0.023 cfs @ 7.90 hrs, Volume= 324 cf
Outflow = 0.008 cfs @ 8.77 hrs, Volume= 273 cf, Atten= 64%, Lag= 52.1 min
Primary = 0.008 cfs @ 8.77 hrs, Volume= 273 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 173.76' @ 8.77 hrs Surf.Area= 163 sf Storage= 99 cf

Plug-Flow detention time= 240.2 min calculated for 273 cf (84% of inflow)
Center-of-Mass det. time= 131.2 min (797.1 - 666.0)

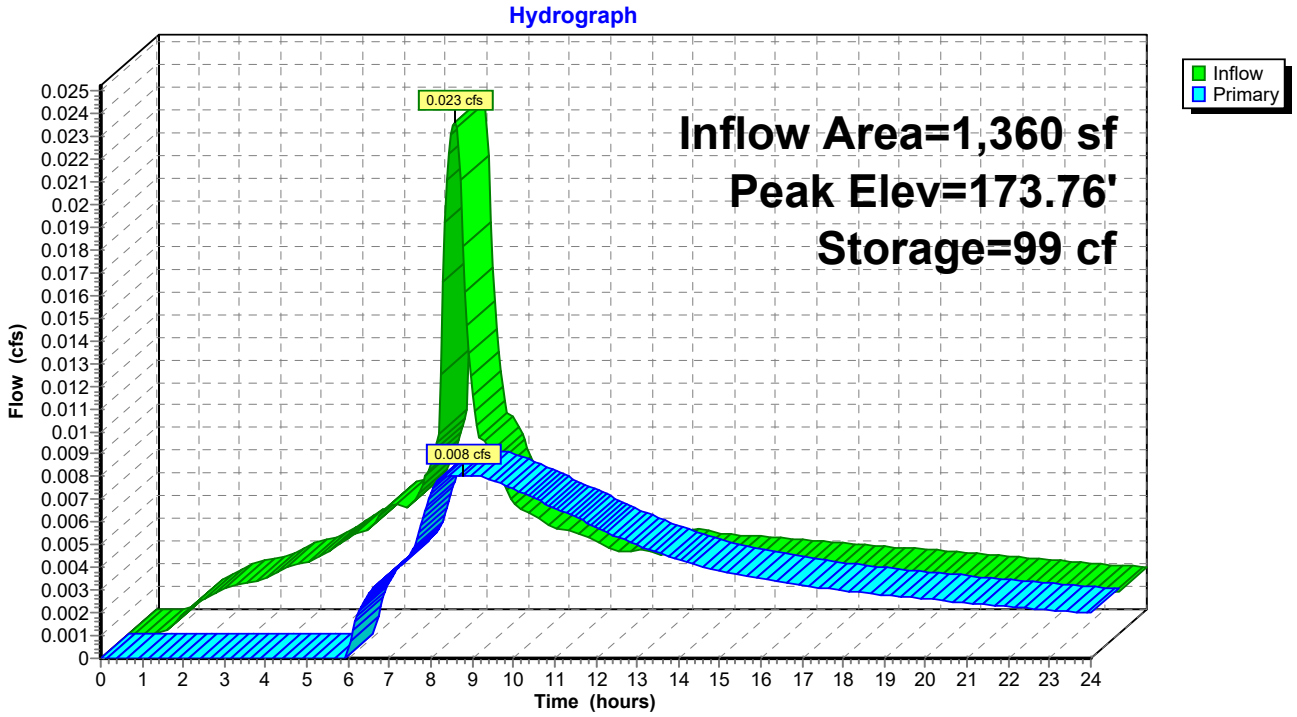
Volume	Invert	Avail.Storage	Storage Description
#1	171.25'	261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
171.25	163	0.0	0	0
172.25	163	30.0	49	49
173.75	163	20.0	49	98
174.75	163	100.0	163	261

Device	Routing	Invert	Outlet Devices		
#1	Primary	172.25'	**0.5" Horiz. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads
#2	Primary	174.58'	**4.0" Horiz. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads

Primary OutFlow Max=0.008 cfs @ 8.77 hrs HW=173.76' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.008 cfs @ 5.91 fps)
└**2=Orifice/Grate** (Controls 0.000 cfs)

Pond 6P: Flow Through Planter



Summary for Subcatchment 3S: Predeveloped

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

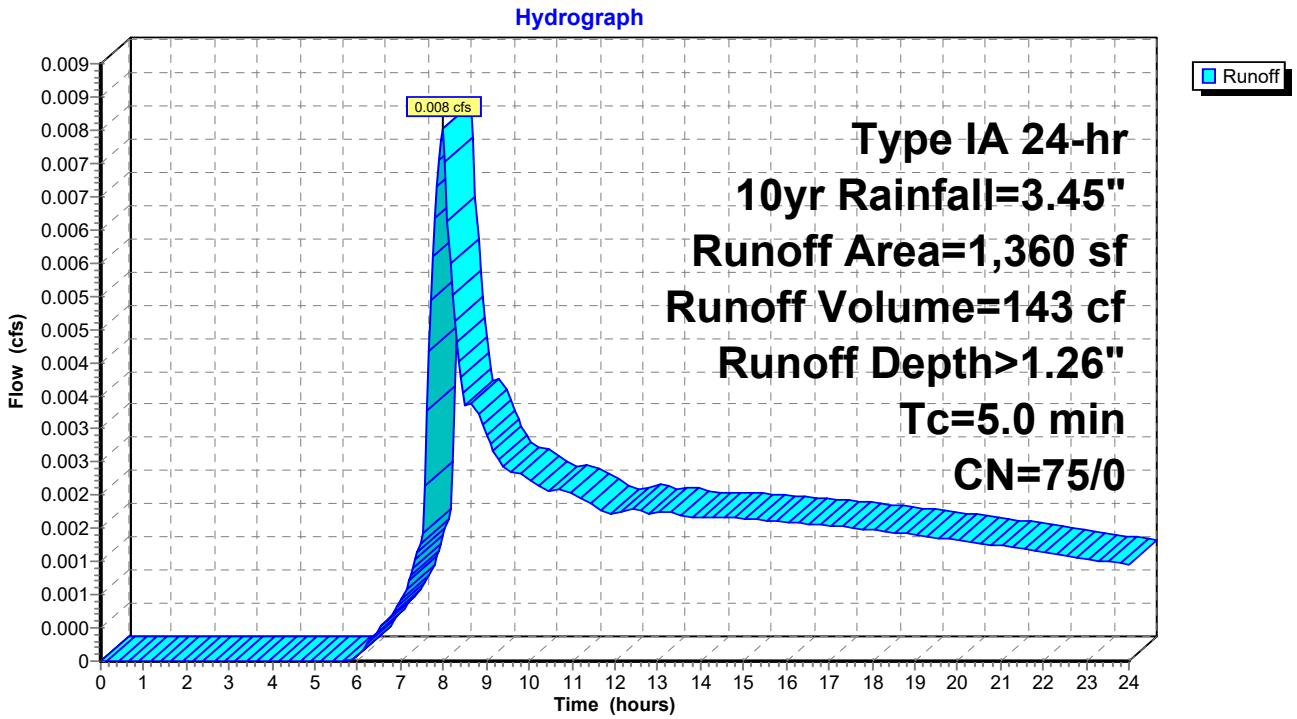
Runoff = 0.008 cfs @ 7.99 hrs, Volume= 143 cf, Depth> 1.26"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10yr Rainfall=3.45"

	Area (sf)	CN	Description
*	1,360	75	new building
	1,360		100.00% Pervious Area

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

Subcatchment 3S: Predeveloped



Summary for Subcatchment 6S: Post Building

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

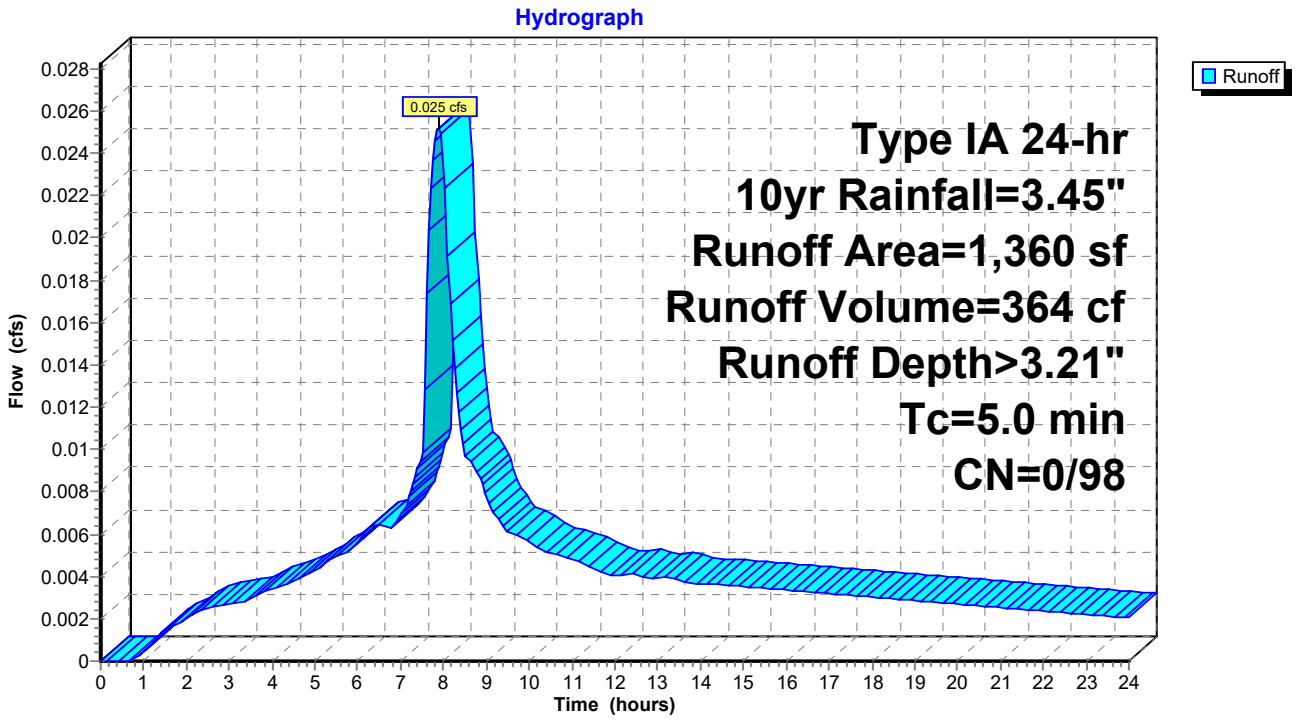
Runoff = 0.025 cfs @ 7.90 hrs, Volume= 364 cf, Depth> 3.21"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10yr Rainfall=3.45"

	Area (sf)	CN	Description
*	1,360	98	
	1,360		100.00% Impervious Area

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

Subcatchment 6S: Post Building



Summary for Pond 6P: Flow Through Planter

Inflow Area = 1,360 sf,100.00% Impervious, Inflow Depth > 3.21" for 10yr event
Inflow = 0.025 cfs @ 7.90 hrs, Volume= 364 cf
Outflow = 0.008 cfs @ 8.92 hrs, Volume= 311 cf, Atten= 67%, Lag= 61.3 min
Primary = 0.008 cfs @ 8.92 hrs, Volume= 311 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 173.82' @ 8.92 hrs Surf.Area= 163 sf Storage= 110 cf

Plug-Flow detention time= 232.6 min calculated for 311 cf (86% of inflow)
Center-of-Mass det. time= 132.5 min (795.6 - 663.1)

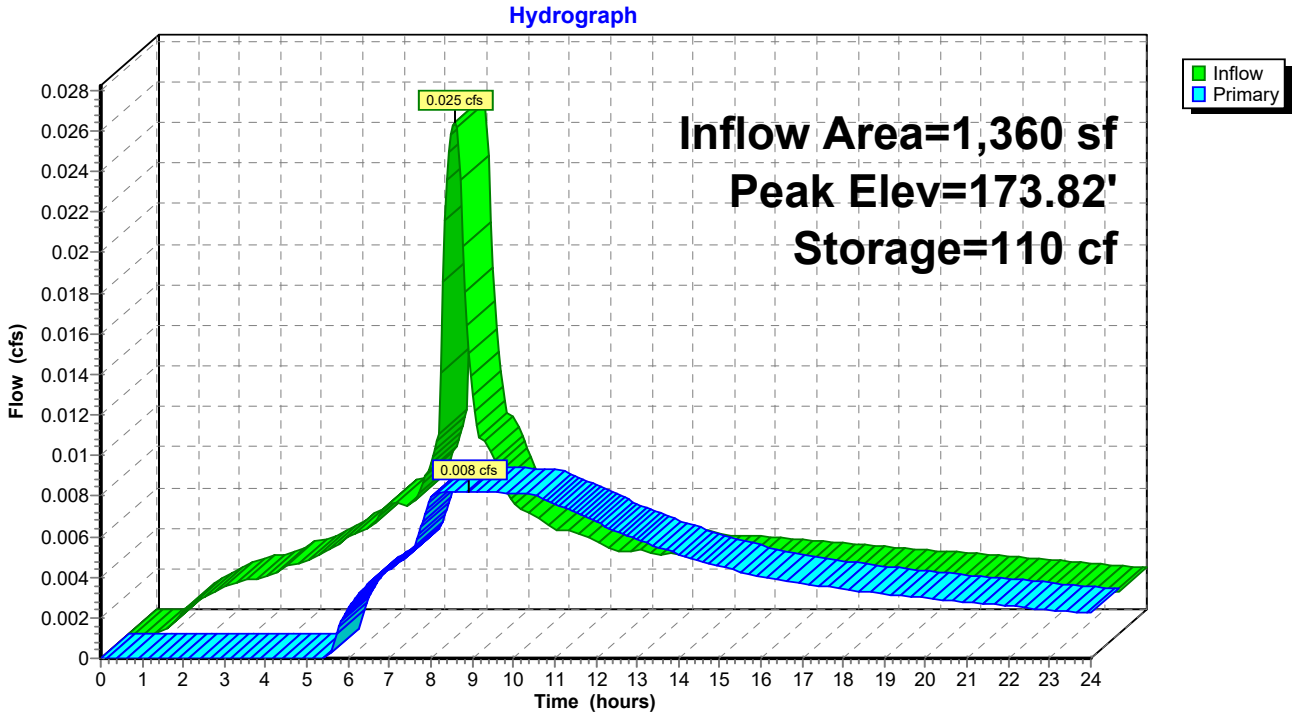
Volume	Invert	Avail.Storage	Storage Description
#1	171.25'	261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
171.25	163	0.0	0	0
172.25	163	30.0	49	49
173.75	163	20.0	49	98
174.75	163	100.0	163	261

Device	Routing	Invert	Outlet Devices		
#1	Primary	172.25'	**0.5" Horiz. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads
#2	Primary	174.58'	**4.0" Horiz. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads

Primary OutFlow Max=0.008 cfs @ 8.92 hrs HW=173.82' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.008 cfs @ 6.04 fps)
└**2=Orifice/Grate** (Controls 0.000 cfs)

Pond 6P: Flow Through Planter



Summary for Subcatchment 3S: Predeveloped

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

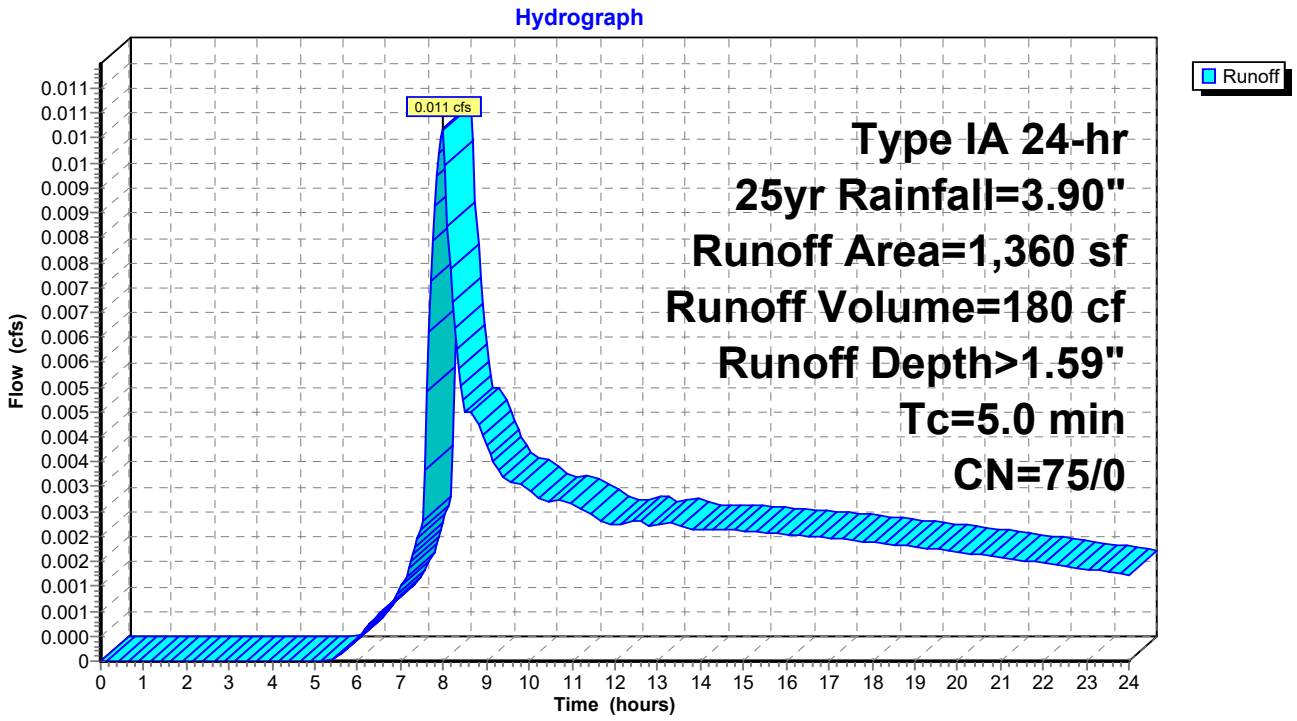
Runoff = 0.011 cfs @ 7.98 hrs, Volume= 180 cf, Depth> 1.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25yr Rainfall=3.90"

	Area (sf)	CN	Description
*	1,360	75	new building
	1,360		100.00% Pervious Area

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

Subcatchment 3S: Predeveloped



Summary for Subcatchment 6S: Post Building

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

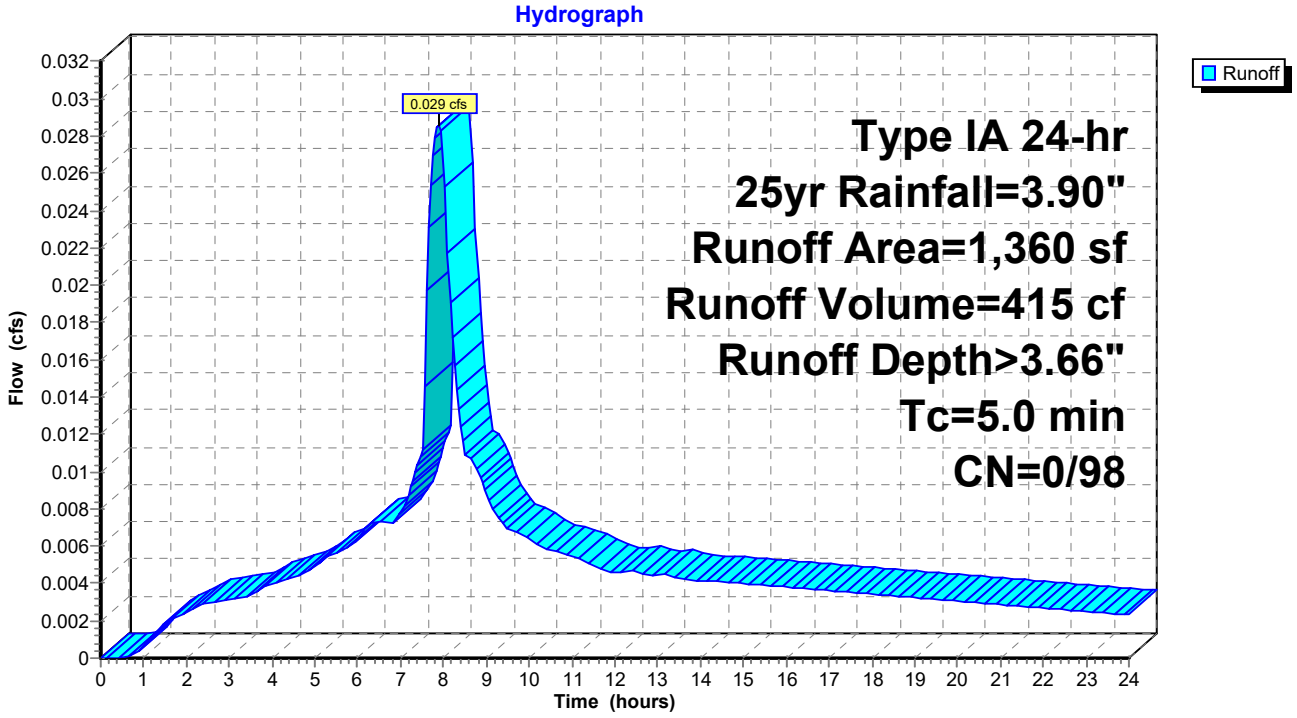
Runoff = 0.029 cfs @ 7.90 hrs, Volume= 415 cf, Depth> 3.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25yr Rainfall=3.90"

	Area (sf)	CN	Description
*	1,360	98	
	1,360		100.00% Impervious Area

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

Subcatchment 6S: Post Building



Summary for Pond 6P: Flow Through Planter

Inflow Area = 1,360 sf,100.00% Impervious, Inflow Depth > 3.66" for 25yr event
Inflow = 0.029 cfs @ 7.90 hrs, Volume= 415 cf
Outflow = 0.008 cfs @ 9.07 hrs, Volume= 361 cf, Atten= 70%, Lag= 70.6 min
Primary = 0.008 cfs @ 9.07 hrs, Volume= 361 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 173.92' @ 9.07 hrs Surf.Area= 163 sf Storage= 125 cf

Plug-Flow detention time= 229.2 min calculated for 361 cf (87% of inflow)
Center-of-Mass det. time= 138.2 min (798.2 - 660.0)

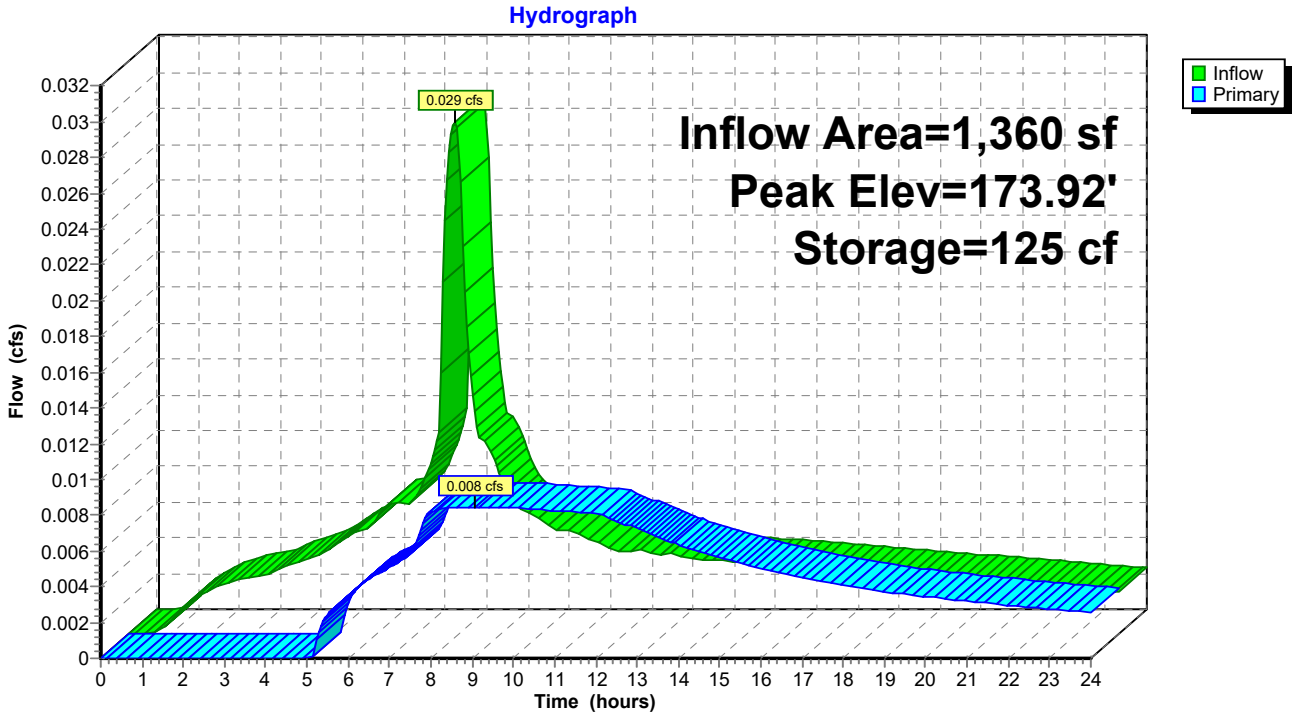
Volume	Invert	Avail.Storage	Storage Description
#1	171.25'	261 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
171.25	163	0.0	0	0
172.25	163	30.0	49	49
173.75	163	20.0	49	98
174.75	163	100.0	163	261

Device	Routing	Invert	Outlet Devices		
#1	Primary	172.25'	**0.5" Horiz. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads
#2	Primary	174.58'	**4.0" Horiz. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads

Primary OutFlow Max=0.008 cfs @ 9.07 hrs HW=173.92' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.008 cfs @ 6.21 fps)
└**2=Orifice/Grate** (Controls 0.000 cfs)

Pond 6P: Flow Through Planter



Summary for Subcatchment 3S: Predeveloped

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

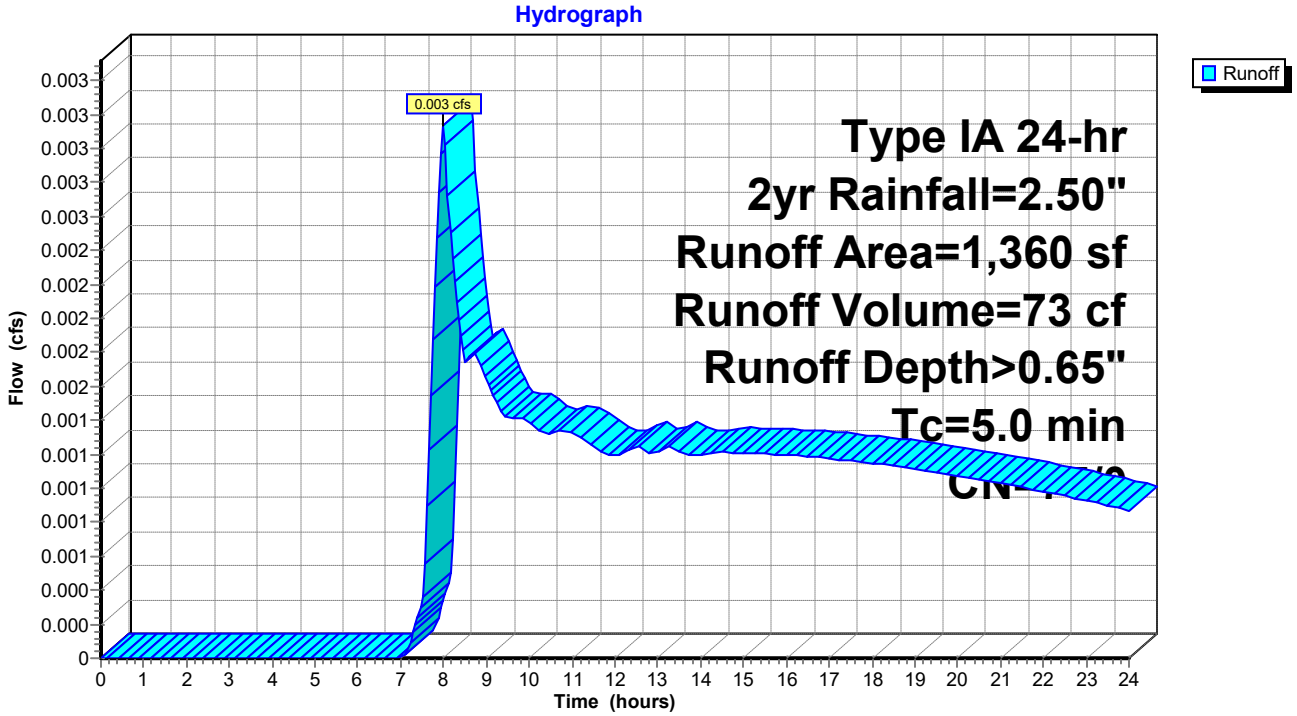
Runoff = 0.003 cfs @ 8.01 hrs, Volume= 73 cf, Depth> 0.65"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2yr Rainfall=2.50"

	Area (sf)	CN	Description
*	1,360	75	new building
	1,360		100.00% Pervious Area

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

Subcatchment 3S: Predeveloped



Summary for Subcatchment 6S: Post Building

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

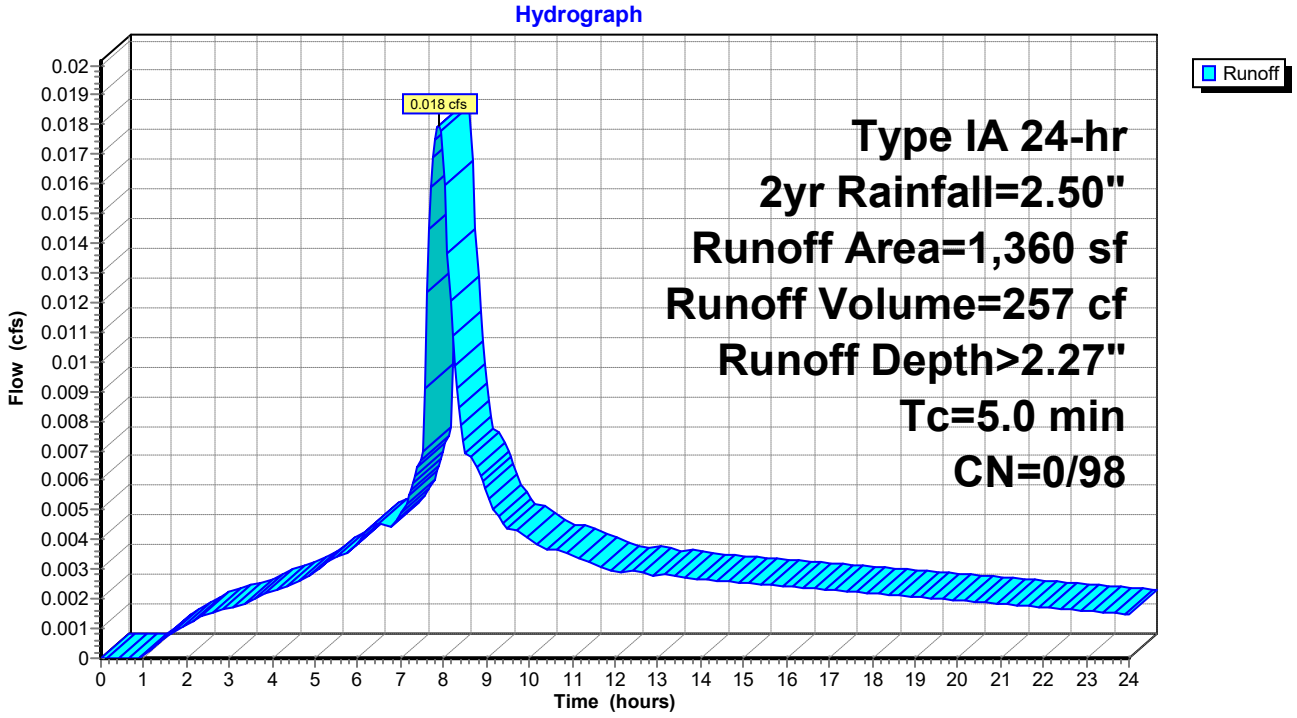
Runoff = 0.018 cfs @ 7.90 hrs, Volume= 257 cf, Depth> 2.27"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2yr Rainfall=2.50"

	Area (sf)	CN	Description
*	1,360	98	
	1,360		100.00% Impervious Area

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

Subcatchment 6S: Post Building



Summary for Pond 6P: Flow Through Planter

Inflow Area = 1,360 sf,100.00% Impervious, Inflow Depth > 2.27" for 2yr event
Inflow = 0.018 cfs @ 7.90 hrs, Volume= 257 cf
Outflow = 0.009 cfs @ 8.34 hrs, Volume= 241 cf, Atten= 52%, Lag= 26.3 min
Primary = 0.009 cfs @ 8.34 hrs, Volume= 241 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 173.96' @ 8.34 hrs Surf.Area= 50 sf Storage= 40 cf

Plug-Flow detention time= 93.1 min calculated for 241 cf (94% of inflow)
Center-of-Mass det. time= 49.1 min (721.5 - 672.5)

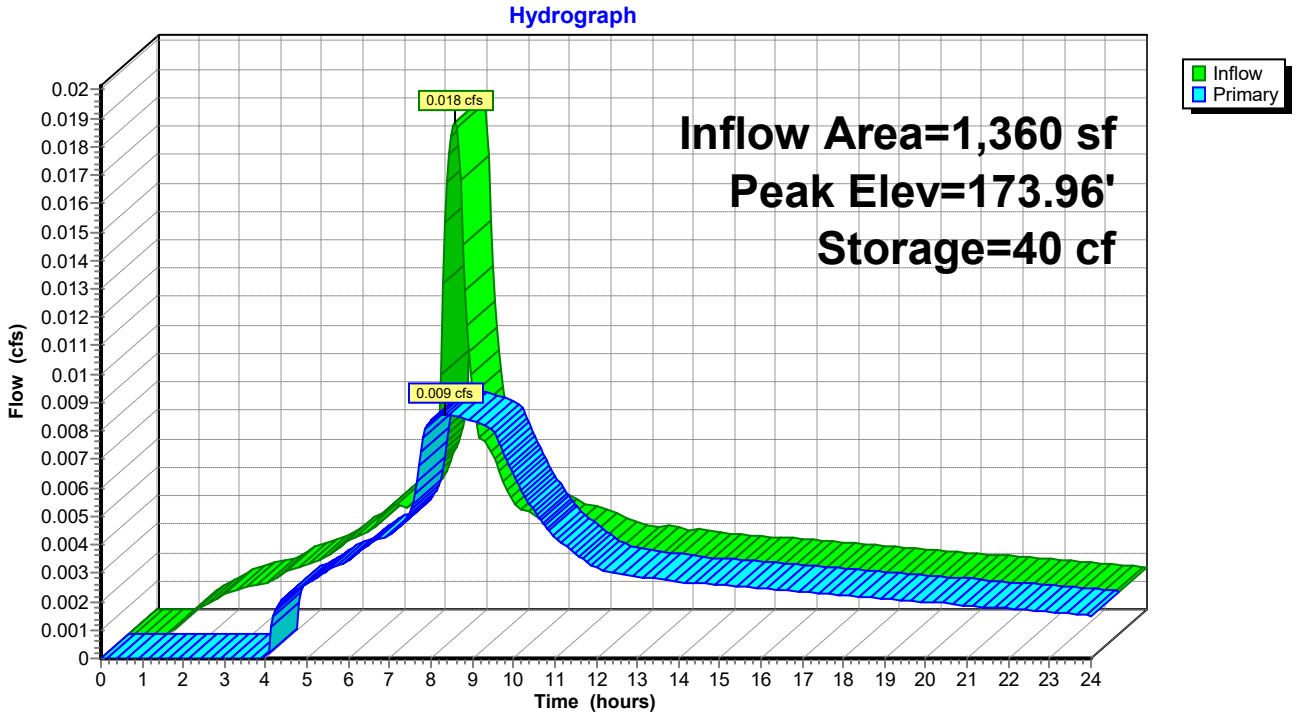
Volume	Invert	Avail.Storage	Storage Description
#1	171.25'	80 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
171.25	50	0.0	0	0
172.25	50	30.0	15	15
173.75	50	20.0	15	30
174.75	50	100.0	50	80

Device	Routing	Invert	Outlet Devices		
#1	Primary	172.25'	**0.5" Horiz. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads
#2	Primary	174.58'	**4.0" Horiz. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads

Primary OutFlow Max=0.009 cfs @ 8.34 hrs HW=173.96' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.009 cfs @ 6.30 fps)
└**2=Orifice/Grate** (Controls 0.000 cfs)

Pond 6P: Flow Through Planter



Summary for Subcatchment 3S: Predeveloped

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

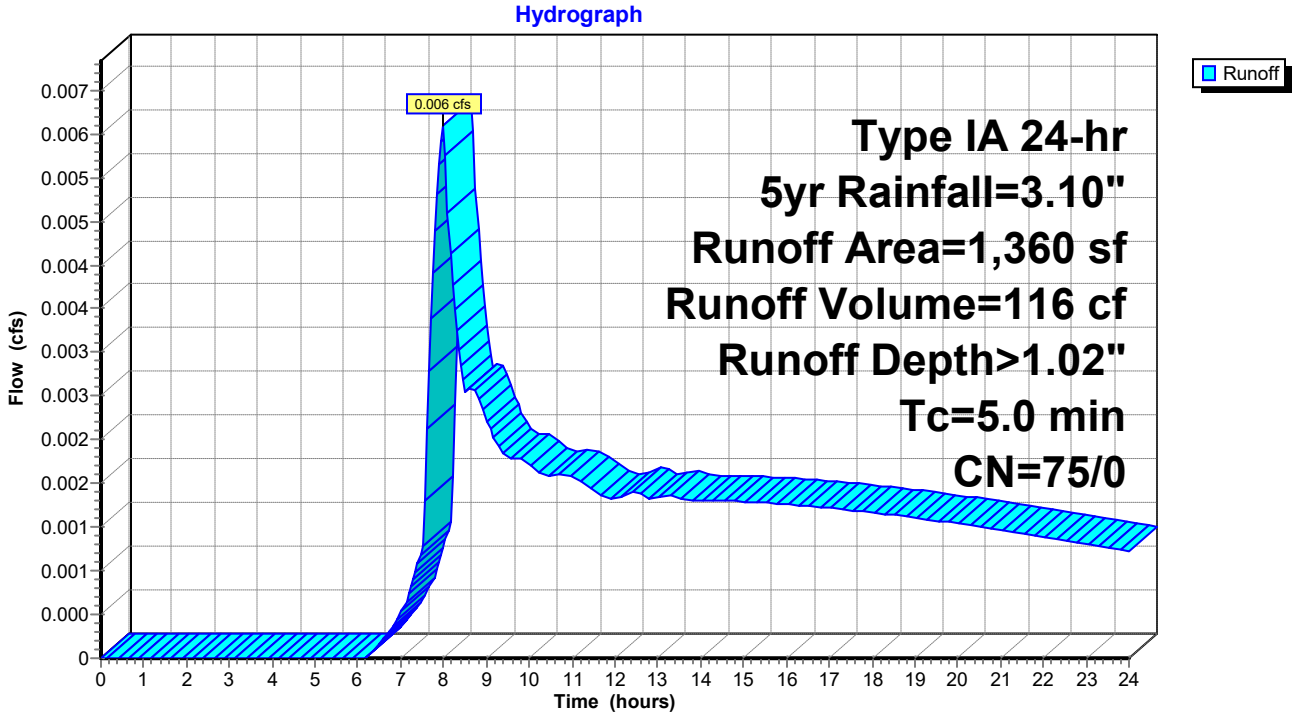
Runoff = 0.006 cfs @ 7.99 hrs, Volume= 116 cf, Depth> 1.02"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5yr Rainfall=3.10"

	Area (sf)	CN	Description
*	1,360	75	new building
	1,360		100.00% Pervious Area

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

Subcatchment 3S: Predeveloped



Summary for Subcatchment 6S: Post Building

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

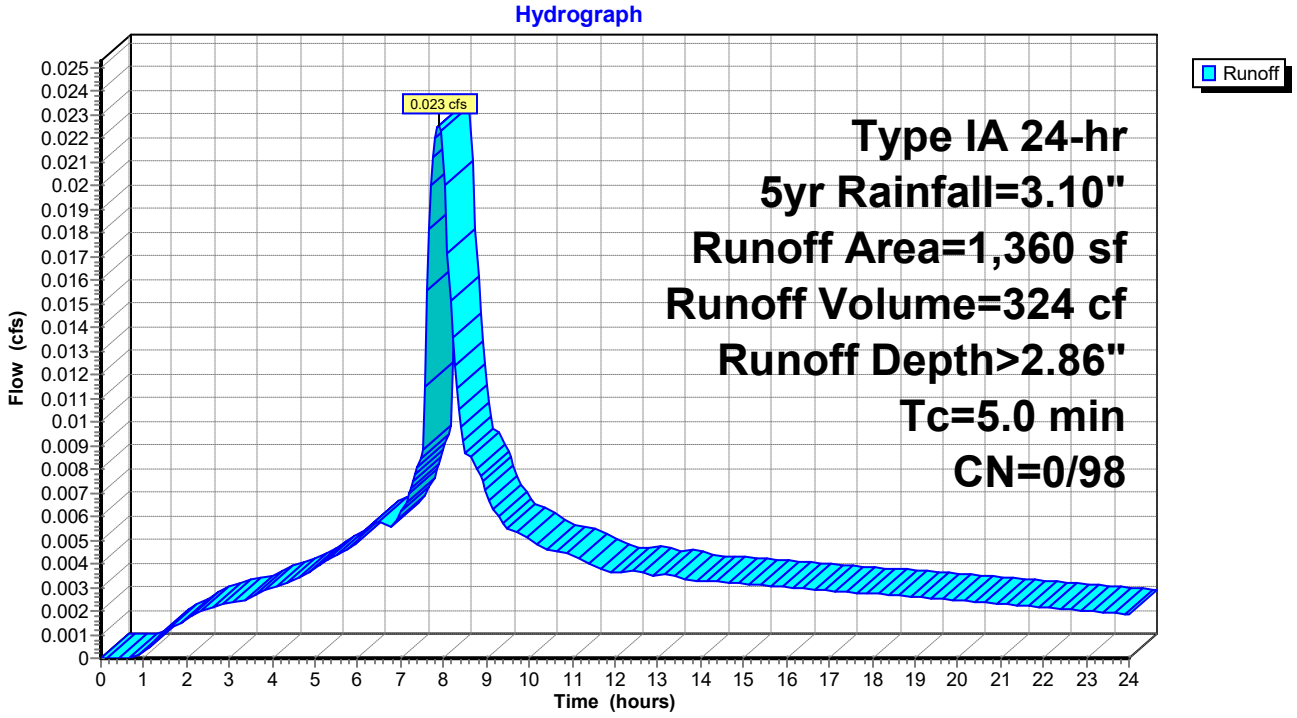
Runoff = 0.023 cfs @ 7.90 hrs, Volume= 324 cf, Depth> 2.86"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5yr Rainfall=3.10"

	Area (sf)	CN	Description
*	1,360	98	
	1,360		100.00% Impervious Area

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

Subcatchment 6S: Post Building



Summary for Pond 6P: Flow Through Planter

Inflow Area = 1,360 sf,100.00% Impervious, Inflow Depth > 2.86" for 5yr event
Inflow = 0.023 cfs @ 7.90 hrs, Volume= 324 cf
Outflow = 0.009 cfs @ 8.45 hrs, Volume= 309 cf, Atten= 59%, Lag= 33.3 min
Primary = 0.009 cfs @ 8.45 hrs, Volume= 309 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 174.20' @ 8.45 hrs Surf.Area= 50 sf Storage= 53 cf

Plug-Flow detention time= 86.6 min calculated for 309 cf (95% of inflow)
Center-of-Mass det. time= 50.5 min (716.5 - 666.0)

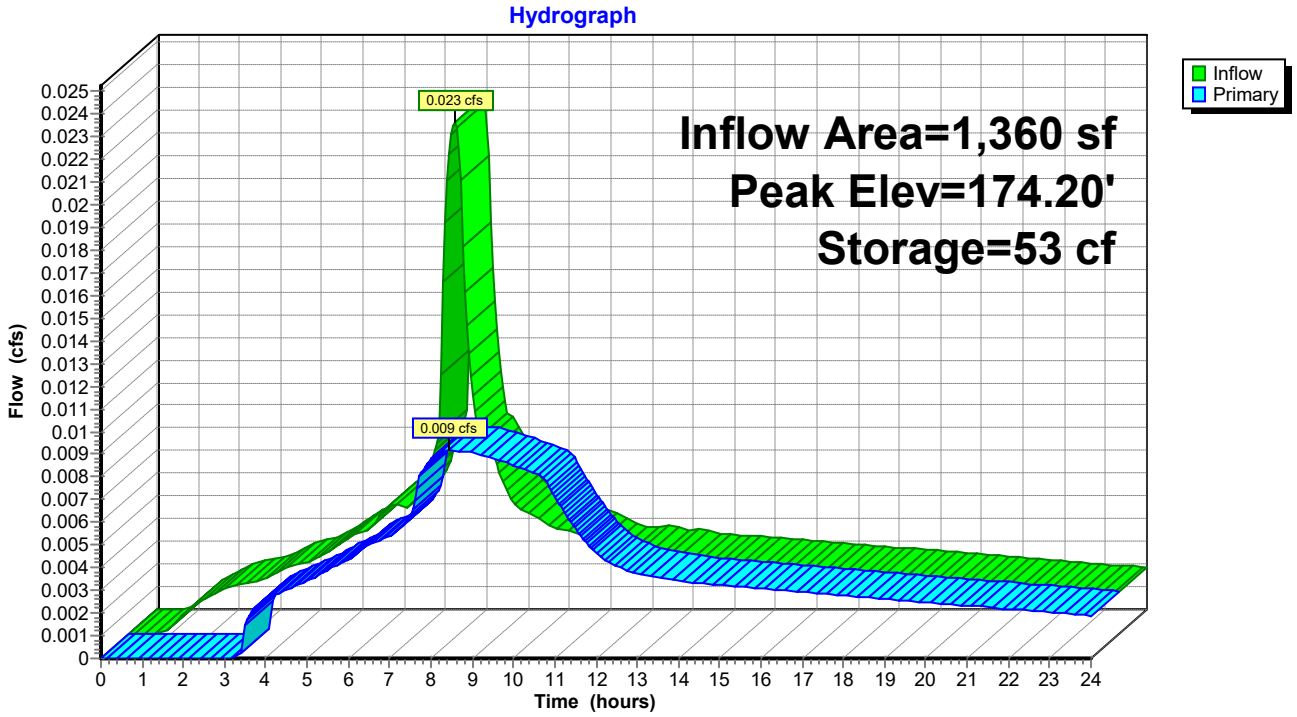
Volume	Invert	Avail.Storage	Storage Description
#1	171.25'	80 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
171.25	50	0.0	0	0
172.25	50	30.0	15	15
173.75	50	20.0	15	30
174.75	50	100.0	50	80

Device	Routing	Invert	Outlet Devices		
#1	Primary	172.25'	**0.5" Horiz. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads
#2	Primary	174.58'	**4.0" Horiz. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads

Primary OutFlow Max=0.009 cfs @ 8.45 hrs HW=174.20' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.009 cfs @ 6.72 fps)
└**2=Orifice/Grate** (Controls 0.000 cfs)

Pond 6P: Flow Through Planter



Summary for Subcatchment 3S: Predeveloped

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

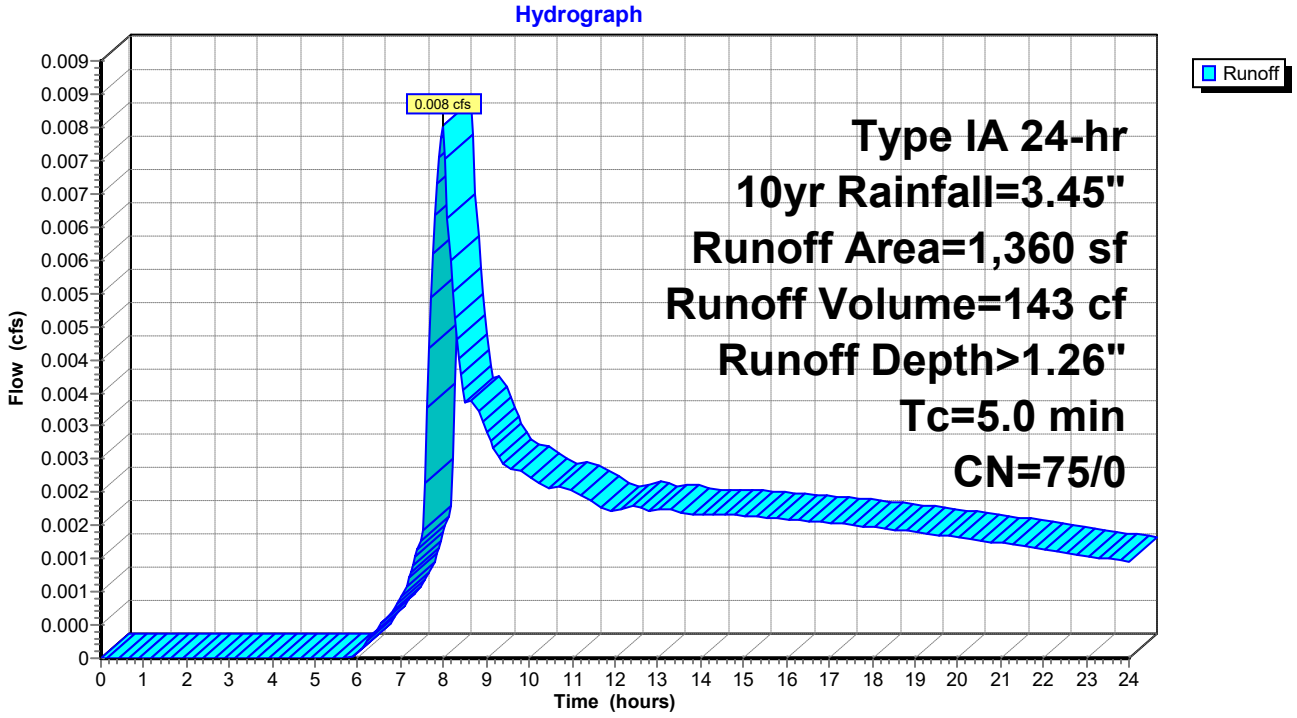
Runoff = 0.008 cfs @ 7.99 hrs, Volume= 143 cf, Depth> 1.26"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10yr Rainfall=3.45"

	Area (sf)	CN	Description
*	1,360	75	new building
	1,360		100.00% Pervious Area

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

Subcatchment 3S: Predeveloped



Summary for Subcatchment 6S: Post Building

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

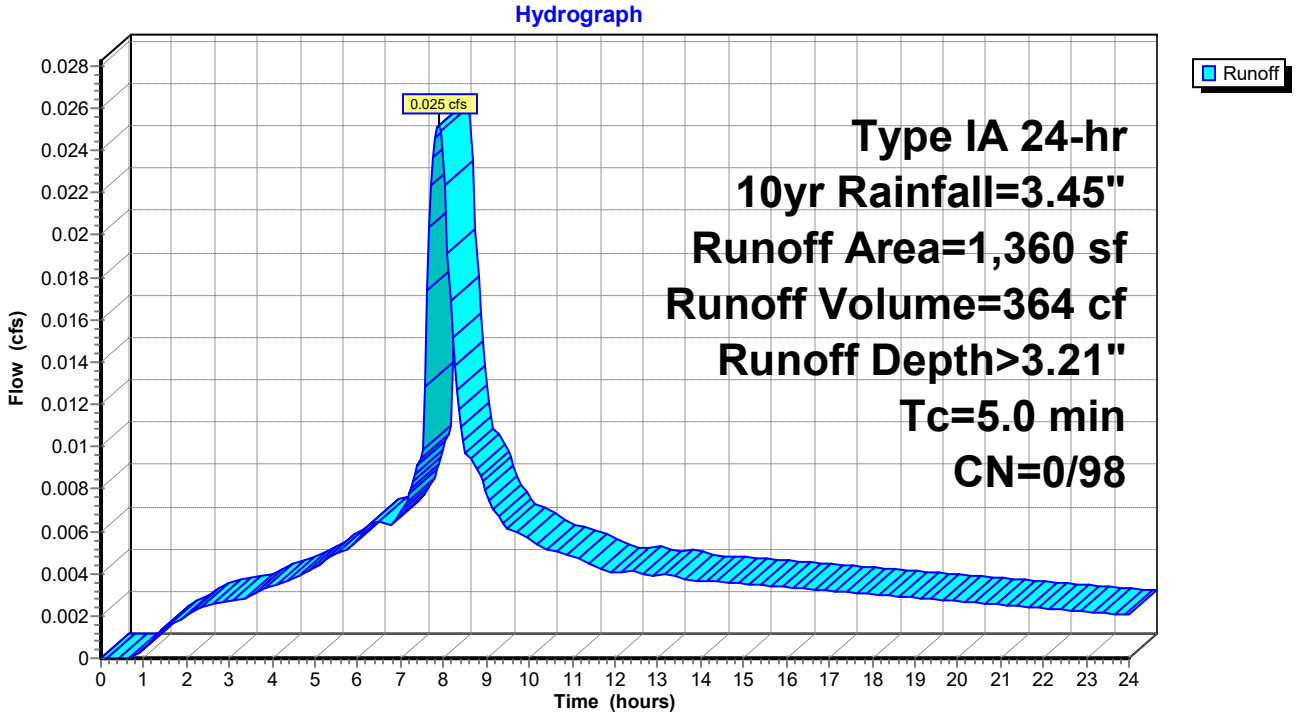
Runoff = 0.025 cfs @ 7.90 hrs, Volume= 364 cf, Depth> 3.21"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10yr Rainfall=3.45"

	Area (sf)	CN	Description
*	1,360	98	
	1,360		100.00% Impervious Area

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

Subcatchment 6S: Post Building



Summary for Pond 6P: Flow Through Planter

Inflow Area = 1,360 sf,100.00% Impervious, Inflow Depth > 3.21" for 10yr event
Inflow = 0.025 cfs @ 7.90 hrs, Volume= 364 cf
Outflow = 0.010 cfs @ 8.63 hrs, Volume= 348 cf, Atten= 62%, Lag= 44.0 min
Primary = 0.010 cfs @ 8.63 hrs, Volume= 348 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 174.35' @ 8.63 hrs Surf.Area= 50 sf Storage= 60 cf

Plug-Flow detention time= 85.6 min calculated for 347 cf (95% of inflow)
Center-of-Mass det. time= 52.8 min (715.9 - 663.1)

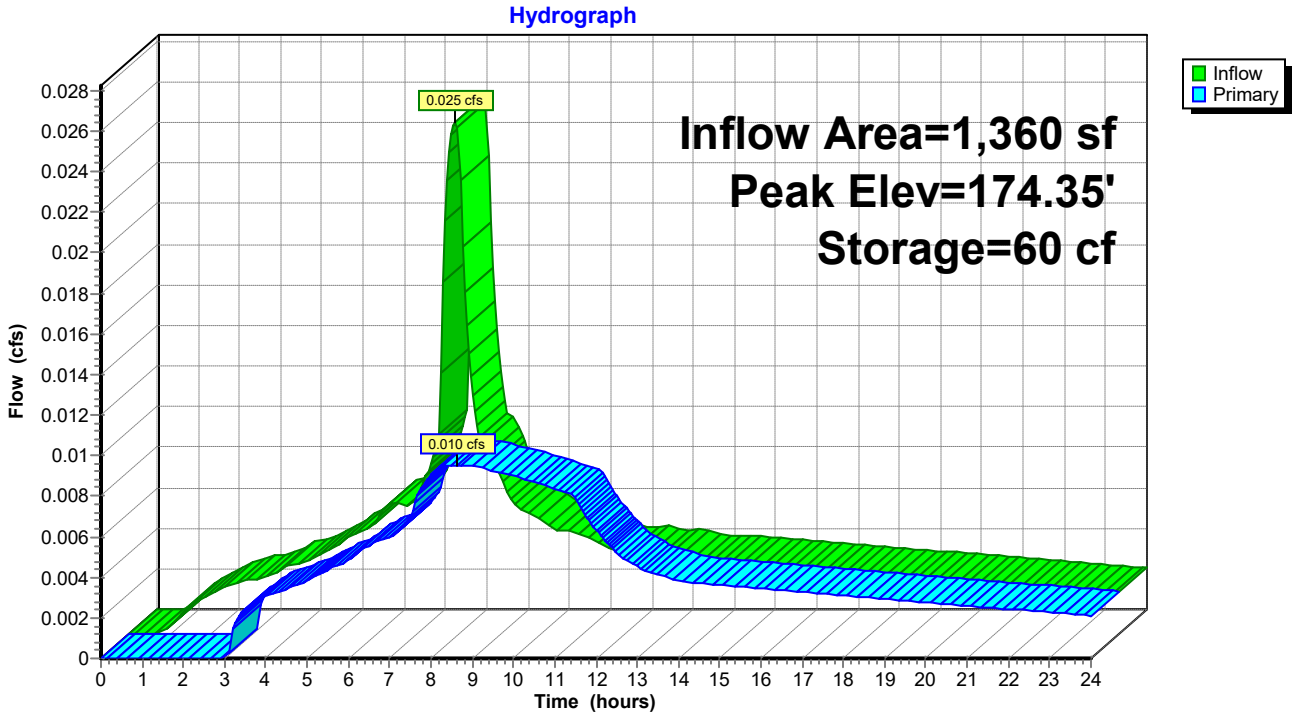
Volume	Invert	Avail.Storage	Storage Description
#1	171.25'	80 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
171.25	50	0.0	0	0
172.25	50	30.0	15	15
173.75	50	20.0	15	30
174.75	50	100.0	50	80

Device	Routing	Invert	Outlet Devices		
#1	Primary	172.25'	**0.5" Horiz. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads
#2	Primary	174.58'	**4.0" Horiz. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads

Primary OutFlow Max=0.010 cfs @ 8.63 hrs HW=174.35' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.010 cfs @ 6.98 fps)
└**2=Orifice/Grate** (Controls 0.000 cfs)

Pond 6P: Flow Through Planter



Summary for Subcatchment 3S: Predeveloped

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

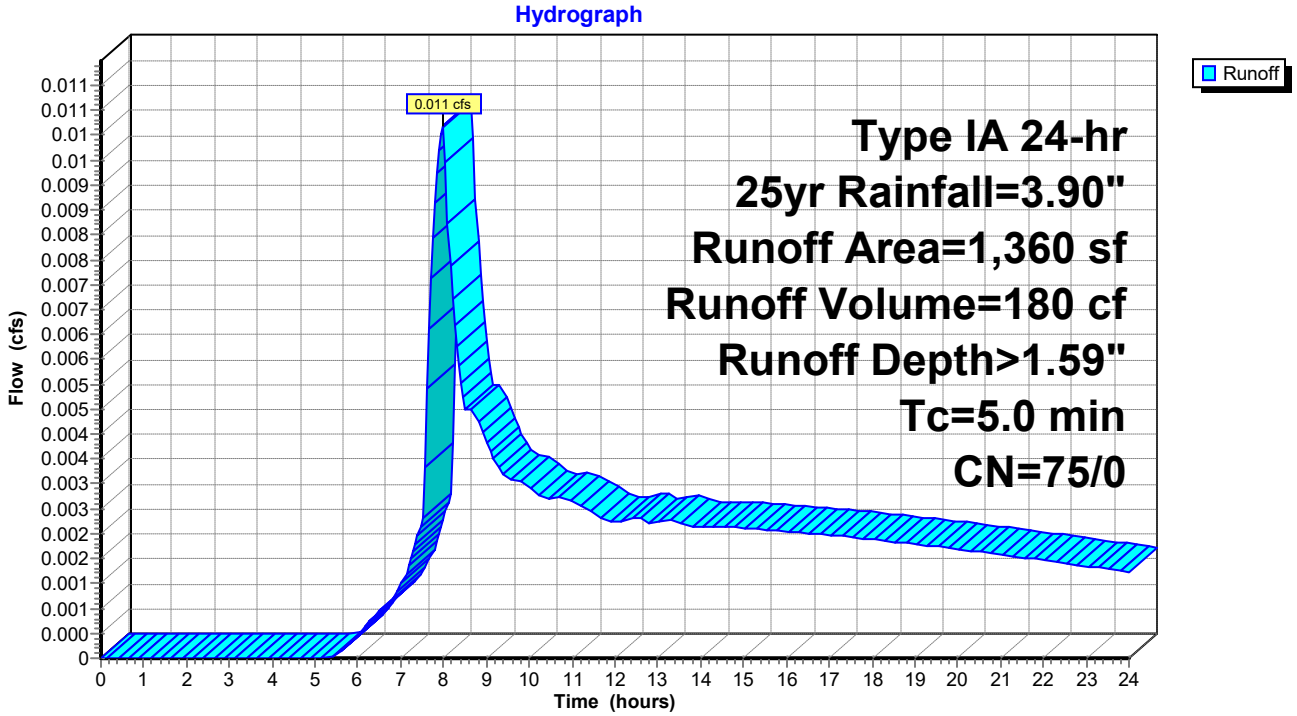
Runoff = 0.011 cfs @ 7.98 hrs, Volume= 180 cf, Depth> 1.59"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25yr Rainfall=3.90"

	Area (sf)	CN	Description
*	1,360	75	new building
	1,360		100.00% Pervious Area

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

Subcatchment 3S: Predeveloped



Summary for Subcatchment 6S: Post Building

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

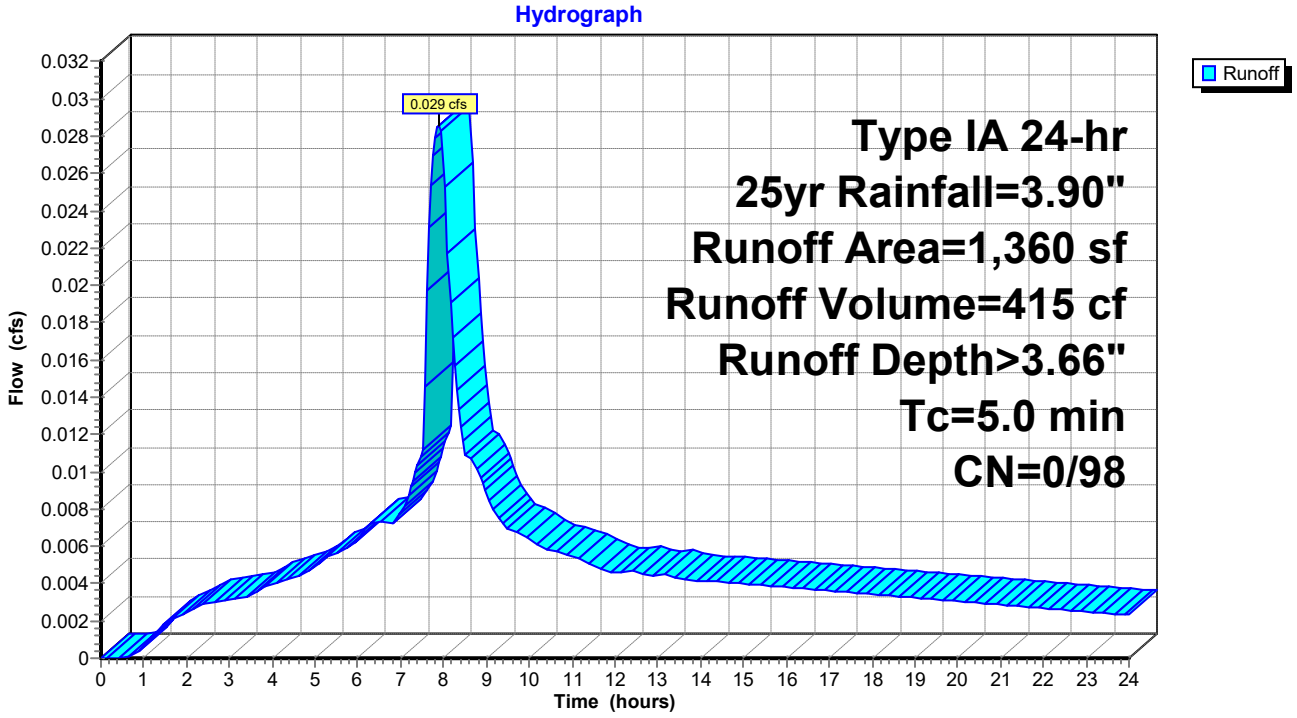
Runoff = 0.029 cfs @ 7.90 hrs, Volume= 415 cf, Depth> 3.66"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25yr Rainfall=3.90"

	Area (sf)	CN	Description
*	1,360	98	
	1,360		100.00% Impervious Area

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

Subcatchment 6S: Post Building



Summary for Pond 6P: Flow Through Planter

Inflow Area = 1,360 sf,100.00% Impervious, Inflow Depth > 3.66" for 25yr event
Inflow = 0.029 cfs @ 7.90 hrs, Volume= 415 cf
Outflow = 0.010 cfs @ 8.80 hrs, Volume= 398 cf, Atten= 65%, Lag= 54.3 min
Primary = 0.010 cfs @ 8.80 hrs, Volume= 398 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 174.57' @ 8.80 hrs Surf.Area= 50 sf Storage= 71 cf

Plug-Flow detention time= 86.6 min calculated for 398 cf (96% of inflow)
Center-of-Mass det. time= 57.0 min (717.0 - 660.0)

Volume	Invert	Avail.Storage	Storage Description
#1	171.25'	80 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
171.25	50	0.0	0	0
172.25	50	30.0	15	15
173.75	50	20.0	15	30
174.75	50	100.0	50	80

Device	Routing	Invert	Outlet Devices		
#1	Primary	172.25'	**0.5" Horiz. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads
#2	Primary	174.58'	**4.0" Horiz. Orifice/Grate**	C= 0.600	Limited to weir flow at low heads

Primary OutFlow Max=0.010 cfs @ 8.80 hrs HW=174.57' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 0.010 cfs @ 7.34 fps)
└**2=Orifice/Grate** (Controls 0.000 cfs)

Pond 6P: Flow Through Planter