CARMINA WOOD
DESIGN

ENGINEER'S REPORT

for

Multi-Family Development

0, 46-84 S Linden Street
Town of Amherst, Erie County, New York

Prepared for

South Linden, LLC

493 Kennedy Road
Cheektowaga, NY 14227

Prepared by

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September 2025

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Section 1 - Location & Description

This project is a development of a 2.4 acre site located of the vacant land on South Linden Street in the Town of Amherst. Construction will consist of two multi-family buildings totaling 28 units, with detached garage buildings, associated utility, lighting and landscaping improvements. Currently the site is undeveloped consisting of mostly wooded areas. The proposed site development area to be disturbed for this project is approximately 2.25 acres when construction is completed.

Section 2 - Water Service

Water service for the multi-family buildings will be tapped off the existing 8" ECWA water main on the north side of Wehrle Drive. The service will be a 6" Class 52 DI combined water service, then split into a 6" fire service and a 4" domestic service at the ROW line. Both services will continue into a proposed insulated enclosure and have a meter and RPZ. Proper heat and lighting will be provided in the enclosure, drainage due to testing or failure of the RPZ will be to the exterior grade. The owner will be responsible for keeping the drainage ports clear of snow and debris. Water inside the multi-family buildings will be used for typical domestic uses.

The multi-family buildings are to be sprinklered, interior fire protection system to be designed by others. One private hydrant will be installed on site to ensure fire hose coverage not exceeding 600'.

Domestic Summary:	
Peak Operating Demand:	10.89 gpm
Water Main:	8" on Wehrle Drive
Static Pressure:	52 psi (ECWA)
Friction Loss:	0.0 psi
Loss through meter/RPZ:	13.0 psi
Elevation Loss:	0.0 psi
Pressure after RPZ:	39.0 psi

Repairs to all devices will be made during off hours, dual backflow preventers are not required. The site is not located in a 100-year flood plain. Disinfection of the water service following installation will be continuous feed, according to AWWA C-651, latest revision.

Section 3 - Sanitary Sewer Service

The proposed multi-family buildings will each have a 6" SDR-35 PVC sanitary lateral at 1.0% minimum slope. These laterals will connect and ultimately connect to the nearest public sanitary sewer manhole on McIntire Road.

Design Parameters

1-bedroom townhouse:	110 gal/day/units x 12 units = 1,320 gpd
2-bedroom townhouse:	220 gal/day/units x12 units = 2,640 gpd
3-bedroom townhouse:	330 gal/day/units x 4 units = 1,320 gpd

3,960 gpd * 4.33 = 17,163 gpd *use peaking factor of 4.33

The hydraulic loading rate is per "Design Standards for Intermediate Sized Wastewater Treatment Systems" 2014, NYSDEC.

Section 4 - Storm Sewer Service

The existing site currently sheet drains north to the existing ditches on site which ultimately discharge to McIntire Road.

Stormwater runoff collected onsite as a result of the proposed development will be routed through the proposed storm sewer system consisting of a bioretention area and dry detention system connected by a series of catch basins, yard drains and smooth interior HDPE pipe. The bioretention area on site is designed to provide 100% of the required runoff reduction volume (RRv). The soils in the vicinity of the bioretention area are mainly USDA hydrologic group 'D' and therefore the system will be installed with underdrains per NYSDEC requirements. The bioretention area will consist of 6" perforated HDPE underdrains in 8" of drainage gravel, followed by filter fabric and then finally 18" minimum of planting soil. Overflow yard drains will be installed to allow 6" maximum ponding for RRv treatment. Stormwater detention is required per NYSDEC standards and specifications. The dry detention field was designed to allow for stormwater to be temporarily stored and discharged at a controlled rate. A 4" orifice and 10" outlet control pipe along will be provided as the outlet control device for the dry detention basin. Discharge from the outlet pipe will flow through a proposed water quality treatment unit prior to outleting to the existing Town of Amherst storm sewer system on McIntire Road.

Runoff reduction volume (RRv), water quality volume (WQv) and stormwater volume attenuation for the site is designed in accordance with Chapter 4 of the NYSDEC Stormwater design manual. The bioretention area is provided as a "green infrastructure" practice to provide runoff reduction to meet the Chapter 4 requirements for the currently undeveloped areas. A Water Quality Treatment unit is proposed to satisfy the remaining NYSDEC water quality volume (WQv) treatment requirements. Runoff from the site was looked at as a whole for the calculation of volume attenuation requirements. The existing site has a pre-development total of 0.05 acres of impervious cover. The amount of impervious cover post-development is 1.05 acres. The proposed dry detention basin is designed to accommodate the 1-year through 100-year storm events controlling the offsite runoff rate to less than the existing runoff rates, as well as the below stated Town stormwater runoff requirements.

Town of Amherst Requirement:
The Town of Amherst requires that the 25-year proposed storm event be attenuated with detention and that the outlet flowrate be restricted to the 10-year existing storm event. This volume of 9,332 cf is accommodated in the dry detention basin at elevation 678.44. At this elevation, the outlet discharge will be restricted to 0.65 cfs, which is less than the existing 10-year peak runoff outflow of 1.44 cfs of the overall site.

Dry Detention Basin Summary:
Top of pond = 679.00
Bottom of pond = 675.90
100-year storm storage volume = 13,554 cf @ 678.97

Water Quality Summary:
WQv req'd = 3,479 cf (0.080 ac-ft)
RRv min. req'd = 179 cf (0.004 ac-ft)
RRv provided - bioretention area = 576 cf (0.013 ac-ft)
WQv provided – Treatment unit = 2,903 cf (0.067 ac-ft)
Total RRv + WQv provided = 576 cf + 2,903 cf = 3,479 cf (0.080 ac-ft)

Bioretention: 100% of minimum post-development Runoff Reduction volume (RRv)
Area: 600 sf
Bottom Elevation: 680.30

Detention: Comparison of the existing 1-year vs. the proposed 1-year runoff
Comparison of the existing 10-year vs. the proposed 10-year runoff
Comparison of the existing 10-year vs. the proposed 25-year runoff
Comparison of the existing 100-year vs. the proposed 100-year runoff

Runoff Summary:

Event	Ex. Runoff (cfs)	Pro. Runoff (cfs)*	Result (cfs)
1-year	0.43	0.41	-0.02
10-year	1.44	0.58	-0.86
25-year	2.08	0.65	-1.43
100-year	3.46	1.81	-1.65

* Proposed runoff flowrate is the rate controlled by the 10" outlet pipe from the dry detention basin which ultimately discharges to the existing Town of Amherst storm sewer as shown Appendix B of this report.

Appendix A

Sanitary Sewer and Water Demand Calculations

CARMINA WOOD DESIGN
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BUFFALO, NEW YORK, 14203
(716) 842-3165
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Project No.: 23-4154 Date: 9/22/2025
Project Name: Multi-Family Development
Project Address: S Linden Street Amherst, NY
Subject: Sanitary Sewer & Water Demand Calcs
Sheet: 1 of 2

Sanitary Sewage Demand Calculations:

110	gal/d/unit	x	12 units	=	1,320	gpd	*use 110 gallons per unit per day (1-bdrm)
220	gal/d/unit	x	12 units	=	2,640	gpd	*use 220 gallons per unit per day (2-bdrm)
330	gal/d/unit	x	4 units	=	1,320	gpd	*use 330 gallons per unit per day (3-bdrm)

Total Site Sanitary Demand: = 3,960 gpd

Find Peak Sanitary Demand:

Peaking Factor based on Population:

Total demand: 3,960 gpd / 100 gpcd = 40 per capita

Population (P) = 40 people

Peaking Factor : $(18 + \sqrt{P}) / (4 + \sqrt{P})$ where P is in thousands

Peaking Factor = 4.33

Peak Sanitary Demand = 3,960 x 4.33 = 17,163 gpd
= 0.017 MGD
= 0.027 cfs

Required Infiltration and Inflow Mitigation:

Peak Sanitary Flow = 17,163 gpd = 11.92 gpm

4:1 offset flow per NYSDEC requirements = 11.92 x 4 = 47.68 gpm req'd

Mitigation Credit = $250 / gpm

Mitigation Agreement Amount = $11,918.86

CARMINA WOOD DESIGN
80 SILO CITY ROW, SUITE 100
BUFFALO, NEW YORK, 14203
(716) 842-3165
FAX (716) 842-0263

Project No.: 25-4154 Date: 9/22/2025
Project Name: Multi-Family Development
Project Address: S Linden Street Amherst, NY
Subject: Sanitary Sewer & Water Demand Calcs
Sheet: 2 of 2

Water Demand Calculations (domestic):

Proposed Multi-Family

3,960 gpd x 1.1 = 4,356 gpd *use 110% of sewage demand

*use 1.8 peaking factor and assume a 12 hour day

4,356 gpm x 1day/12hr x 1hr/60min = 6.05 gpm

6.05 gpm x 3.0 = 10.89 gpm Q_{peak} *use peaking factor 3 per ECDOH standards

Headlosses:

Q_{peak} = 10.89 gpm
Pipe = 6 inch Ductile Iron C = 140
Length = 100 LF (approx. distance from tap to RPZ in hot box)

$$H_L = \frac{10.44\ L\ Q^{1.85}}{C^{1.85}\ D^{4.866}} = \frac{10.44(100)(10.89)^{1.85}}{(140)^{1.85}\ (6)^{4.866}} = 0.00 \text{ ft} = 0.00 \text{ psi}$$

Δ elev = 0 ft = 0.00 psi
Loss through meter = 1 psi
Loss through RPZ = 12 psi
Total Losses = 13.0 psi
Static Pressure = 52 psi (per ECWA)
Residual Pressure Following RPZ = 52 - 13.0 = 39.0 psi (available after rpz & meter)

Residual Pressure 30" above 2nd Floor
Δ elev = 11 ft = 4.76 psi
Residual Pressure 30" above 2nd Floor = 34.2 psi

Water Demand Calculations (fire):

Proposed Multi-Family

Q = 1,000 gpd

Headlosses:

Q_{peak} = 1000 gpm
Pipe = 6 inch PVC C = 140
Length = 135 LF (approx. distance from RPZ to farthest hydrant)

$$H_L = \frac{10.44\ L\ Q^{1.85}}{C^{1.85}\ D^{4.866}} = \frac{10.44(135)(1000)^{1.85}}{(140)^{1.85}\ (6)^{4.866}} = 8.75 \text{ ft} = 3.79 \text{ psi}$$

Δ elev = -3 ft = -1.30 psi

Static Pressure after RPZ = 52.0 psi (per ECWA)
Residual Pressure at hydrant = 52 - 2.5 = 49.5 psi

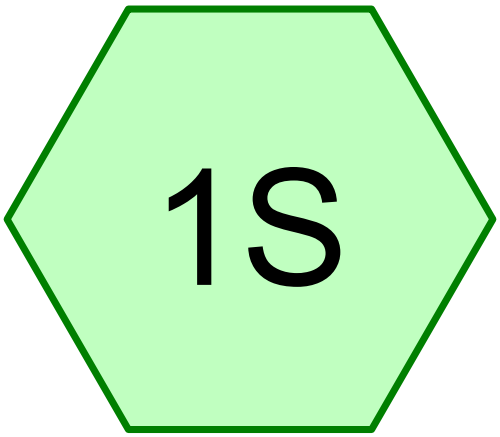
Appendix B

Storm Sewer System Drainage Calculations

Existing Runoff

Events for Subcatchment 1S: Existing

Event	Rainfall (inches)	Runoff (cfs)	Volume (cubic-feet)	Depth (inches)
1-Year	1.87	0.43	3,905	0.45
2-Year	2.20	0.66	5,605	0.64
5-Year	2.69	1.05	8,426	0.97
10-Year	3.14	1.44	11,254	1.29
25-Year	3.84	2.08	15,981	1.83
50-Year	4.48	2.71	20,558	2.36
100-Year	**5.23**	**3.46**	**26,142**	**3.00**



Existing

Subcat Reach Pond Link

Routing Diagram for 23-4154 existing
Prepared by Carmina Wood Design, Printed 9/25/2025

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	Type II 24-hr		Default	24.00	1	1.87	2
2	10-Year	Type II 24-hr		Default	24.00	1	3.14	2
3	100-Year	Type II 24-hr		Default	24.00	1	5.23	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
104,544	79	Woods, Fair, HSG D (1S)
104,544	**79**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
0	HSG C	
104,544	HSG D	1S
0	Other	
104,544		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Subcatchment Numbers
0	0	0	104,544	0	104,544	Woods, Fair	1S
0	**0**	**0**	**104,544**	**0**	**104,544**	**TOTAL AREA**	

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Runoff Area=2.400 ac 0.00% Impervious Runoff Depth=0.45"
Flow Length=185' Slope=0.0200 '/' Tc=69.2 min CN=79 Runoff=0.43 cfs 3,905 cf

Total Runoff Area = 104,544 sf Runoff Volume = 3,905 cf Average Runoff Depth = 0.45"
100.00% Pervious = 104,544 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 1S: Existing

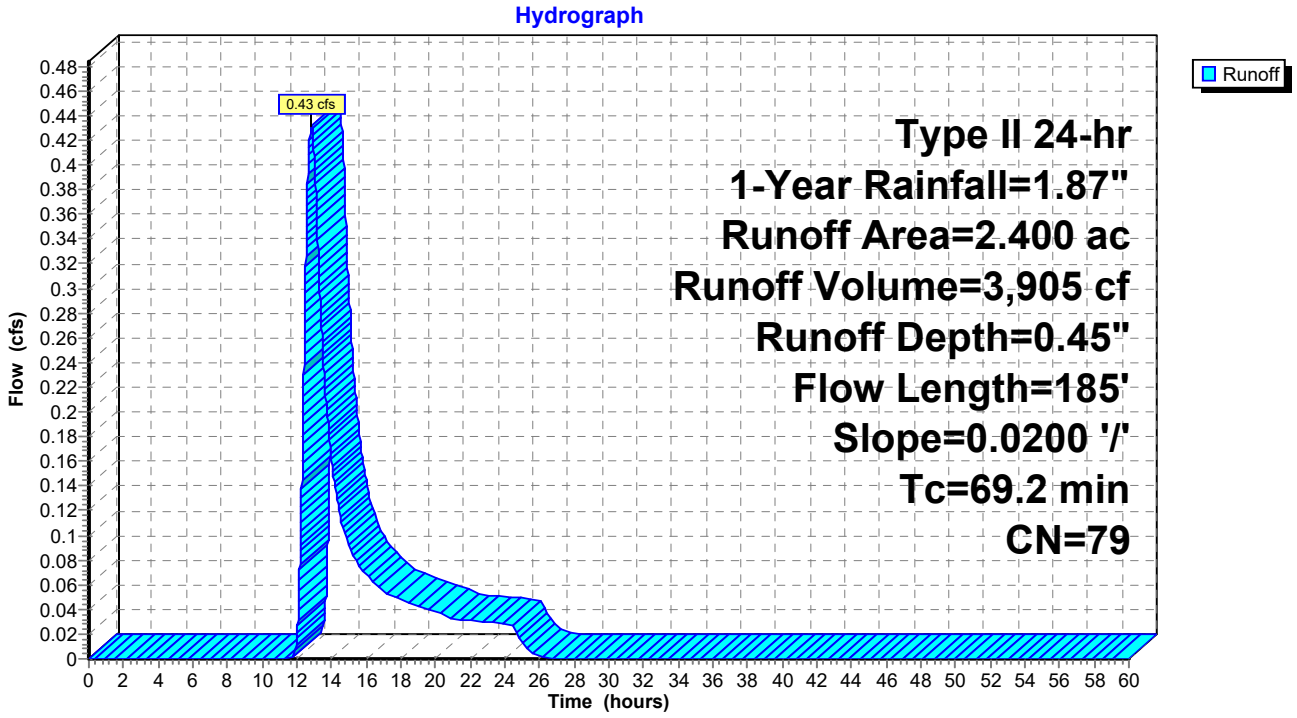
Runoff = 0.43 cfs @ 12.84 hrs, Volume= 3,905 cf, Depth= 0.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-Year Rainfall=1.87"

Area (ac)	CN	Description
2.400	79	Woods, Fair, HSG D
2.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
69.2	185	0.0200	0.04		**Sheet Flow, woods** Woods: Dense underbrush n= 0.800 P2= 2.50"

Subcatchment 1S: Existing



Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Runoff Area=2.400 ac 0.00% Impervious Runoff Depth=1.29"
Flow Length=185' Slope=0.0200 '/' Tc=69.2 min CN=79 Runoff=1.44 cfs 11,254 cf

Total Runoff Area = 104,544 sf Runoff Volume = 11,254 cf Average Runoff Depth = 1.29"
100.00% Pervious = 104,544 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 1S: Existing

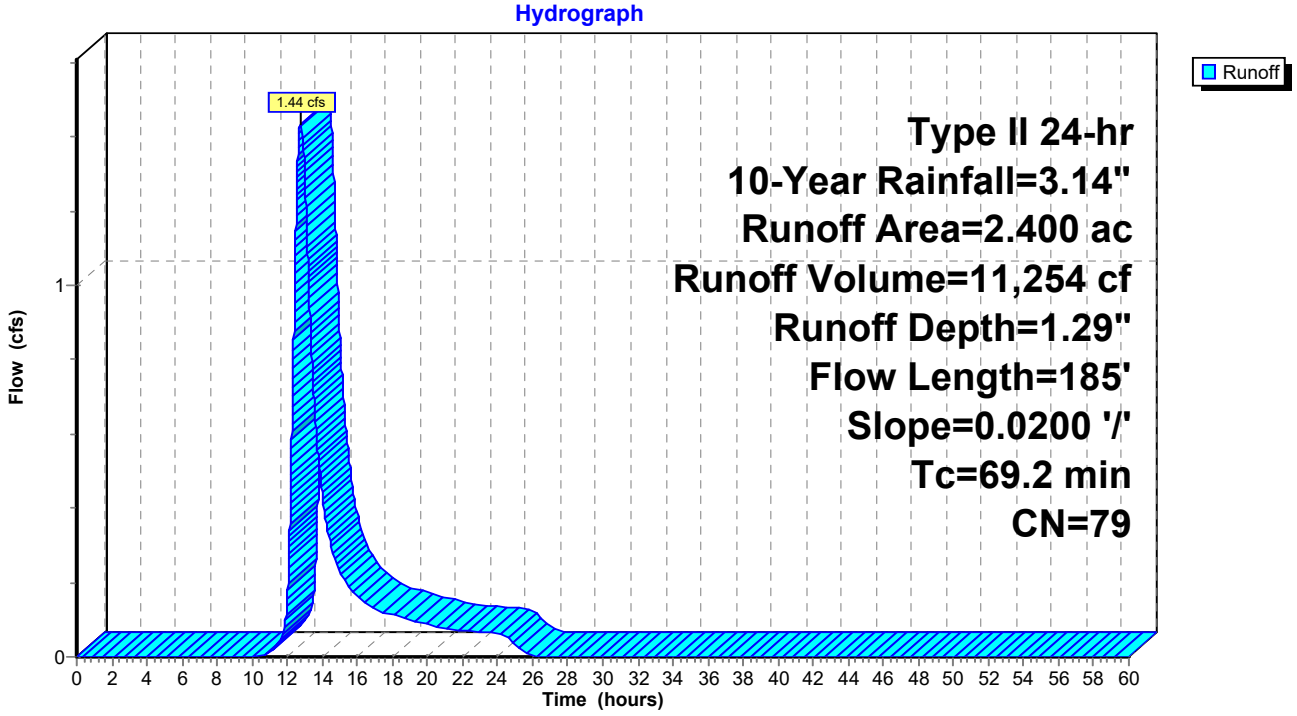
Runoff = 1.44 cfs @ 12.77 hrs, Volume= 11,254 cf, Depth= 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=3.14"

Area (ac)	CN	Description
2.400	79	Woods, Fair, HSG D
2.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
69.2	185	0.0200	0.04		**Sheet Flow, woods** Woods: Dense underbrush n= 0.800 P2= 2.50"

Subcatchment 1S: Existing



Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Existing Runoff Area=2.400 ac 0.00% Impervious Runoff Depth=3.00"
Flow Length=185' Slope=0.0200 '/' Tc=69.2 min CN=79 Runoff=3.46 cfs 26,142 cf

Total Runoff Area = 104,544 sf Runoff Volume = 26,142 cf Average Runoff Depth = 3.00"
100.00% Pervious = 104,544 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 1S: Existing

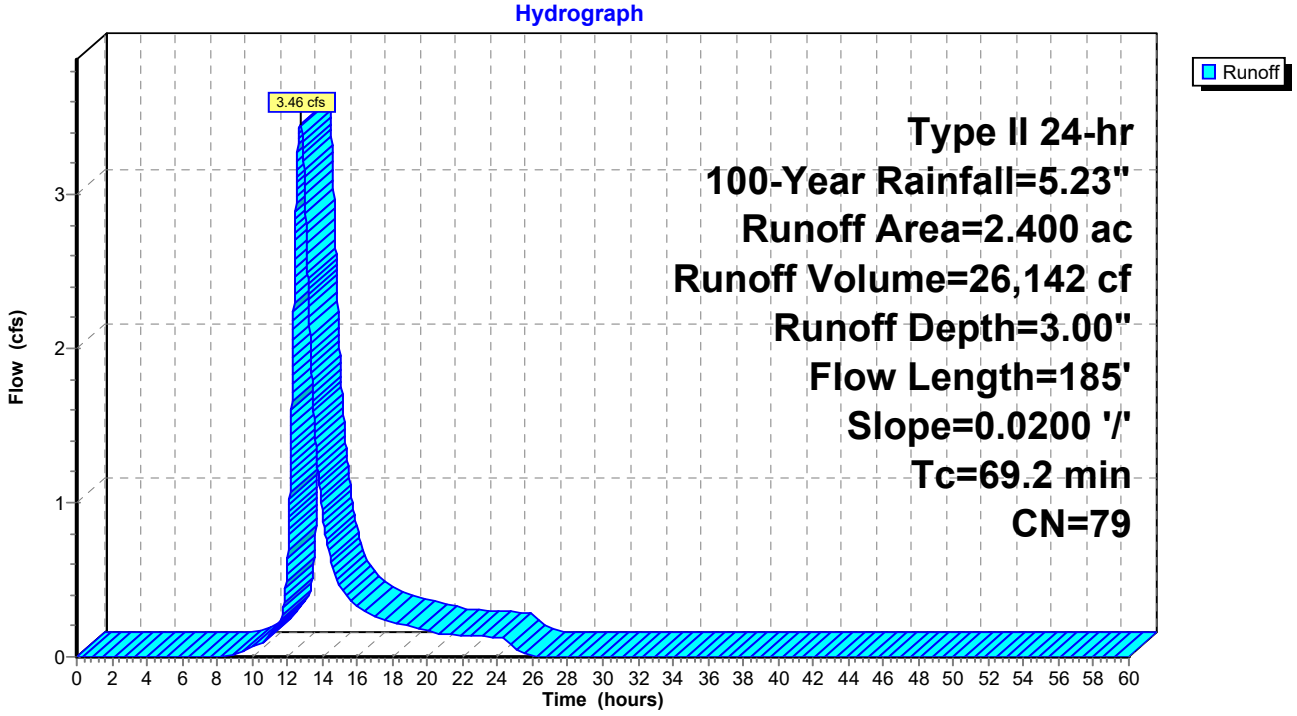
Runoff = 3.46 cfs @ 12.76 hrs, Volume= 26,142 cf, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=5.23"

Area (ac)	CN	Description
2.400	79	Woods, Fair, HSG D
2.400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
69.2	185	0.0200	0.04		**Sheet Flow, woods** Woods: Dense underbrush n= 0.800 P2= 2.50"

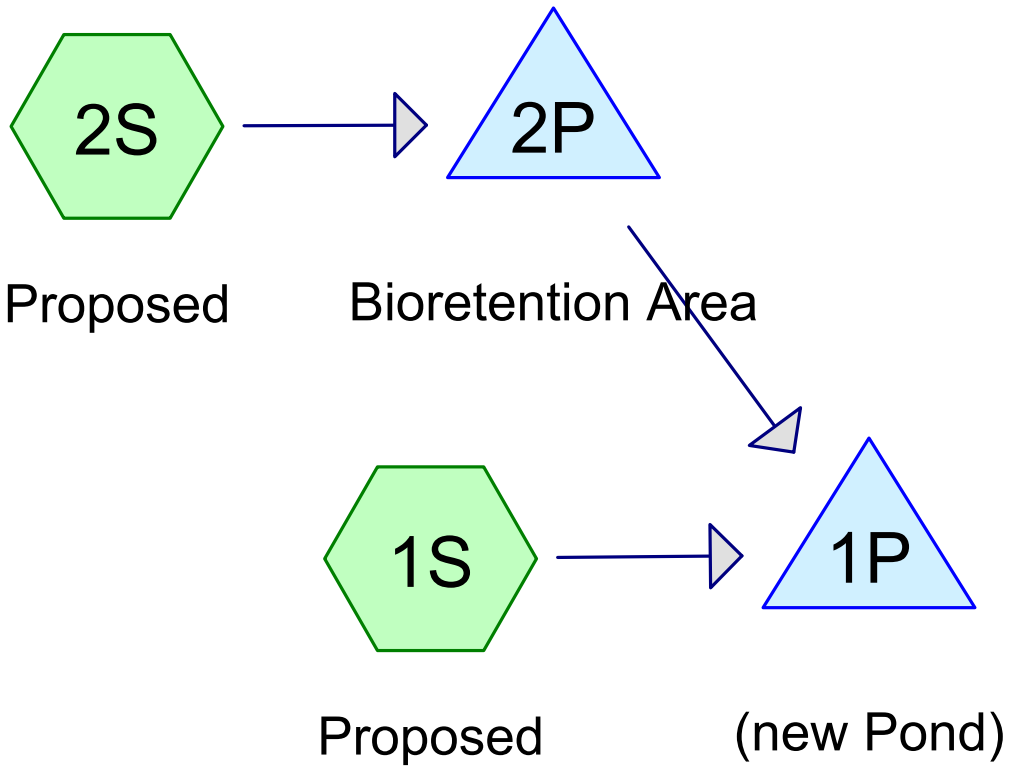
Subcatchment 1S: Existing



Proposed Runoff

Events for Pond 1P: (new Pond)

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-Year	0.87	0.41	677.02	1,773
2-Year	1.16	0.47	677.31	2,771
5-Year	1.60	0.54	677.69	4,513
10-Year	2.02	0.58	678.00	6,306
25-Year	2.69	0.65	678.44	9,332
50-Year	3.31	0.70	678.82	12,282
100-Year	**4.04**	**1.81**	**678.97**	**13,554**



Subcat Reach Pond Link

Routing Diagram for 23-4154 proposed
Prepared by Carmina Wood Design, Printed 9/25/2025

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-Year	Type II 24-hr		Default	24.00	1	1.87	2
2	10-Year	Type II 24-hr		Default	24.00	1	3.14	2
3	25-Year	Type II 24-hr		Default	24.00	1	3.84	2
4	100-Year	Type II 24-hr		Default	24.00	1	5.23	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
50,094	80	>75% Grass cover, Good, HSG D (1S, 2S)
23,958	98	Paved parking, HSG D (1S, 2S)
21,780	98	Roofs, HSG D (1S)
8,712	79	Woods, Fair, HSG D (1S, 2S)
104,544	**88**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
0	HSG C	
104,544	HSG D	1S, 2S
0	Other	
104,544		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Su Nu
0	0	0	50,094	0	50,094	>75% Grass cover, Good	
0	0	0	23,958	0	23,958	Paved parking	
0	0	0	21,780	0	21,780	Roofs	
0	0	0	8,712	0	8,712	Woods, Fair	
0	**0**	**0**	**104,544**	**0**	**104,544**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	1P	675.90	675.60	30.0	0.0100	0.013	0.0	10.0	0.0
2	2P	678.30	678.11	61.0	0.0031	0.013	0.0	6.0	0.0

Time span=0.00-60.00 hrs, dt=0.05 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Proposed Runoff Area=2.000 ac 40.00% Impervious Runoff Depth=0.81"
Flow Length=200' Slope=0.0100 '/' Tc=79.9 min CN=87 Runoff=0.67 cfs 5,846 cf

Subcatchment2S: Proposed Runoff Area=0.400 ac 62.50% Impervious Runoff Depth=1.05"
Flow Length=250' Slope=0.0200 '/' Tc=67.4 min CN=91 Runoff=0.21 cfs 1,526 cf

Pond 1P: (new Pond) Peak Elev=677.02' Storage=1,773 cf Inflow=0.87 cfs 7,372 cf
Outflow=0.41 cfs 7,372 cf

Pond 2P: Bioretention Area Peak Elev=681.39' Storage=286 cf Inflow=0.21 cfs 1,526 cf
Outflow=0.20 cfs 1,526 cf

Total Runoff Area = 104,544 sf Runoff Volume = 7,372 cf Average Runoff Depth = 0.85"
56.25% Pervious = 58,806 sf 43.75% Impervious = 45,738 sf

Summary for Subcatchment 1S: Proposed

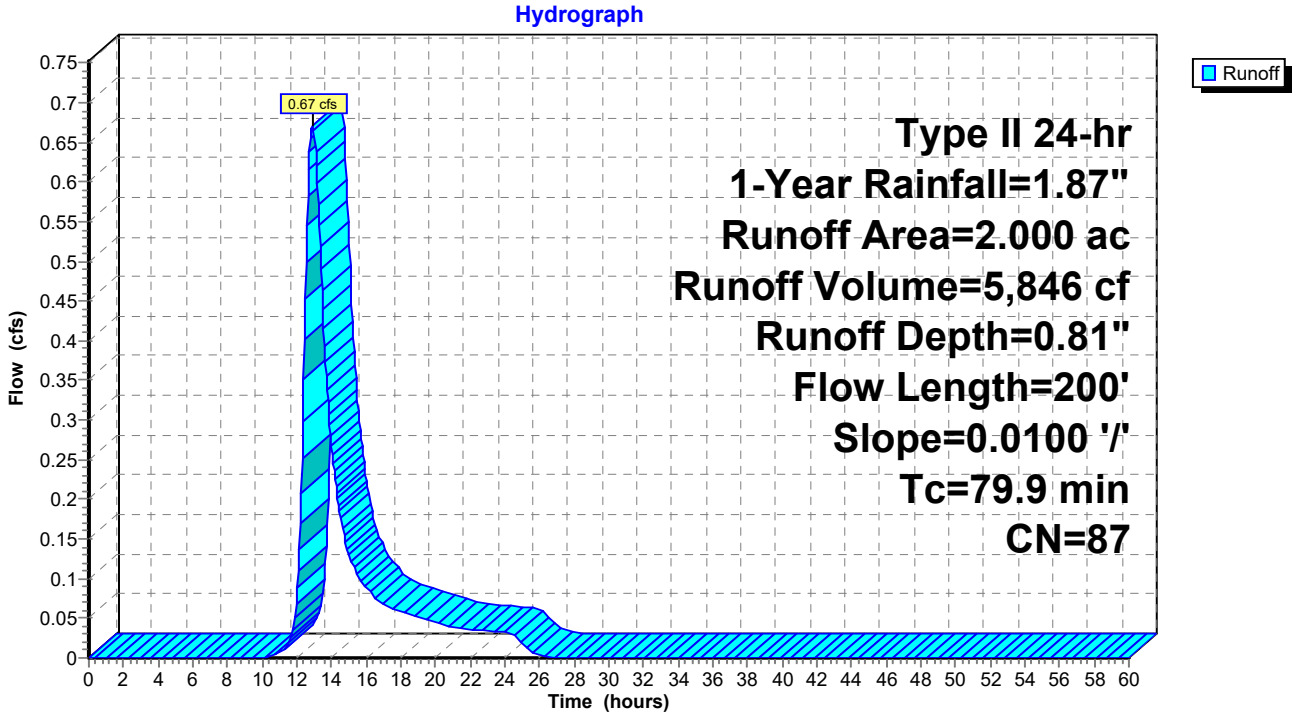
Runoff = 0.67 cfs @ 12.91 hrs, Volume= 5,846 cf, Depth= 0.81"
Routed to Pond 1P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year Rainfall=1.87"

Area (ac)	CN	Description
0.150	79	Woods, Fair, HSG D
0.500	98	Roofs, HSG D
0.300	98	Paved parking, HSG D
1.050	80	>75% Grass cover, Good, HSG D
2.000	87	Weighted Average
1.200		60.00% Pervious Area
0.800		40.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
68.9	130	0.0100	0.03		**Sheet Flow, woods** Woods: Dense underbrush n= 0.800 P2= 2.50"
11.0	70	0.0100	0.11		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 2.50"
79.9	200	Total			

Subcatchment 1S: Proposed



Summary for Subcatchment 2S: Proposed

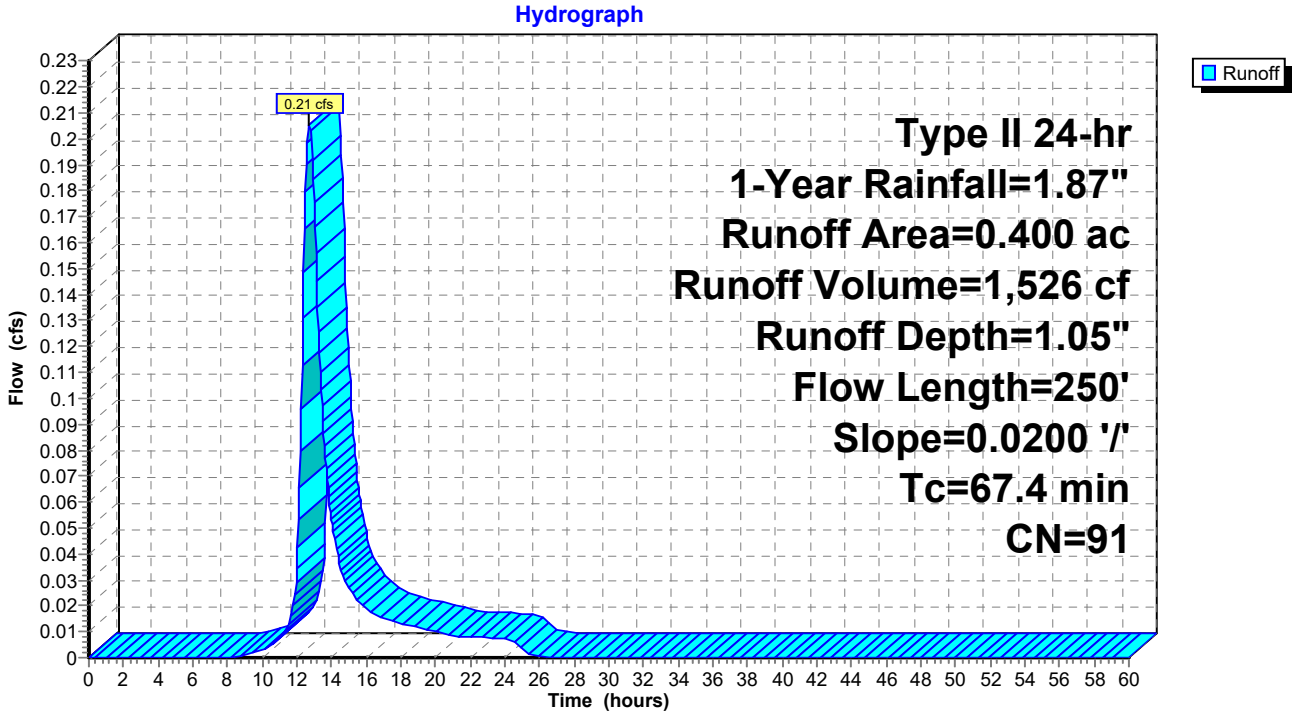
Runoff = 0.21 cfs @ 12.72 hrs, Volume= 1,526 cf, Depth= 1.05"
Routed to Pond 2P : Bioretention Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year Rainfall=1.87"

Area (ac)	CN	Description
0.050	79	Woods, Fair, HSG D
0.100	80	>75% Grass cover, Good, HSG D
0.250	98	Paved parking, HSG D
0.400	91	Weighted Average
0.150		37.50% Pervious Area
0.250		62.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	110	0.0200	0.15		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 2.50"
55.4	140	0.0200	0.04		**Sheet Flow, woods** Woods: Dense underbrush n= 0.800 P2= 2.50"
67.4	250	Total			

Subcatchment 2S: Proposed



Summary for Pond 1P: (new Pond)

[44] Hint: Outlet device #2 is below defined storage

Inflow Area = 104,544 sf, 43.75% Impervious, Inflow Depth = 0.85" for 1-Year event
Inflow = 0.87 cfs @ 12.88 hrs, Volume= 7,372 cf
Outflow = 0.41 cfs @ 13.76 hrs, Volume= 7,372 cf, Atten= 53%, Lag= 52.9 min
Primary = 0.41 cfs @ 13.76 hrs, Volume= 7,372 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 677.02' @ 13.76 hrs Surf.Area= 2,901 sf Storage= 1,773 cf

Plug-Flow detention time= 40.5 min calculated for 7,366 cf (100% of inflow)
Center-of-Mass det. time= 40.4 min (988.3 - 947.9)

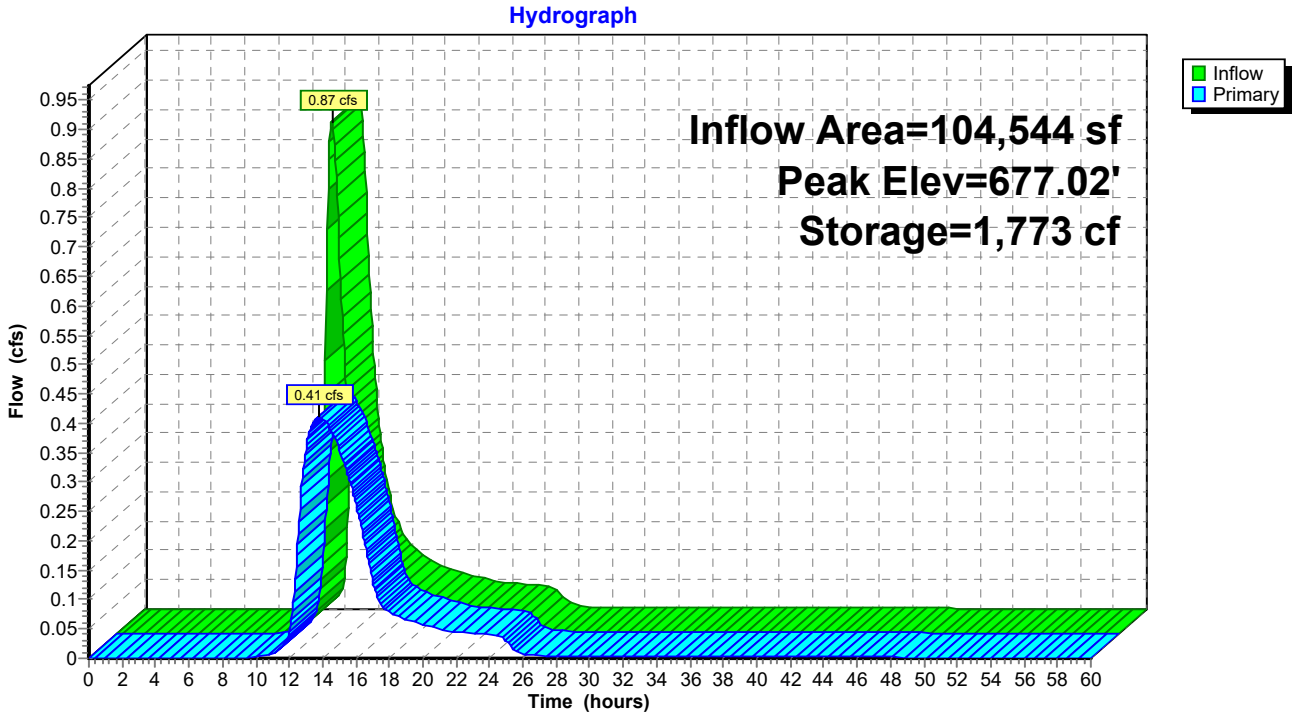
Volume	Invert	Avail.Storage	Storage Description
#1	676.00'	13,810 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
676.00	600	0	0
677.00	2,830	1,715	1,715
678.00	6,340	4,585	6,300
679.00	8,680	7,510	13,810

Device	Routing	Invert	Outlet Devices
#1	Primary	675.90'	**10.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.90' / 675.60' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#2	Device 1	675.90'	**4.0" Vert. 4" orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	678.85'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.41 cfs @ 13.76 hrs HW=677.02' (Free Discharge)
└─**1=Culvert** (Passes 0.41 cfs of 2.04 cfs potential flow)
  ├─**2=4" orifice** (Orifice Controls 0.41 cfs @ 4.70 fps)
  └─**3=Grate** (Controls 0.00 cfs)

Pond 1P: (new Pond)



Summary for Pond 2P: Bioretention Area

Inflow Area = 17,424 sf, 62.50% Impervious, Inflow Depth = 1.05" for 1-Year event
Inflow = 0.21 cfs @ 12.72 hrs, Volume= 1,526 cf
Outflow = 0.20 cfs @ 12.81 hrs, Volume= 1,526 cf, Atten= 1%, Lag= 5.4 min
Primary = 0.20 cfs @ 12.81 hrs, Volume= 1,526 cf
Routed to Pond 1P : (new Pond)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 681.39' @ 12.81 hrs Surf.Area= 666 sf Storage= 286 cf

Plug-Flow detention time= 217.1 min calculated for 1,524 cf (100% of inflow)
Center-of-Mass det. time= 218.1 min (1,096.1 - 878.1)

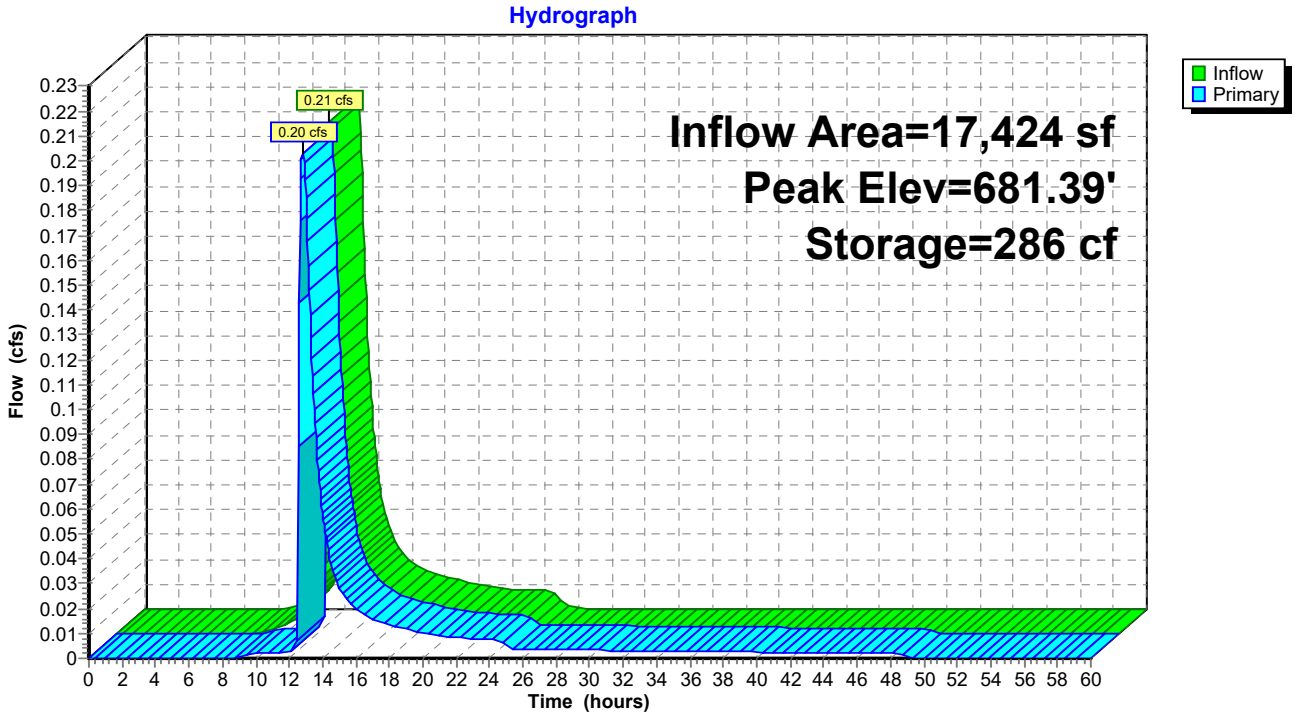
Volume	Invert	Avail.Storage	Storage Description
#1	680.80'	614 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
680.80	305	0	0
681.30	600	226	226
681.80	950	388	614

Device	Routing	Invert	Outlet Devices
#1	Primary	678.30'	**6.0" Round 6" pipe** L= 61.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 678.30' / 678.11' S= 0.0031 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	681.30'	**8.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	680.80'	**0.250 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 670.00'

Primary OutFlow Max=0.20 cfs @ 12.81 hrs HW=681.39' (Free Discharge)
└**1=6" pipe** (Passes 0.20 cfs of 1.05 cfs potential flow)
└**2=Grate** (Weir Controls 0.20 cfs @ 1.00 fps)
└**3=Exfiltration** (Controls 0.00 cfs)

Pond 2P: Bioretention Area



Time span=0.00-60.00 hrs, dt=0.05 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Proposed Runoff Area=2.000 ac 40.00% Impervious Runoff Depth=1.86"
Flow Length=200' Slope=0.0100 '/' Tc=79.9 min CN=87 Runoff=1.61 cfs 13,517 cf

Subcatchment2S: Proposed Runoff Area=0.400 ac 62.50% Impervious Runoff Depth=2.20"
Flow Length=250' Slope=0.0200 '/' Tc=67.4 min CN=91 Runoff=0.43 cfs 3,197 cf

Pond 1P: (new Pond) Peak Elev=678.00' Storage=6,306 cf Inflow=2.02 cfs 16,715 cf
Outflow=0.58 cfs 16,715 cf

Pond 2P: Bioretention Area Peak Elev=681.46' Storage=329 cf Inflow=0.43 cfs 3,197 cf
Outflow=0.43 cfs 3,197 cf

Total Runoff Area = 104,544 sf Runoff Volume = 16,715 cf Average Runoff Depth = 1.92"
56.25% Pervious = 58,806 sf 43.75% Impervious = 45,738 sf

Summary for Subcatchment 1S: Proposed

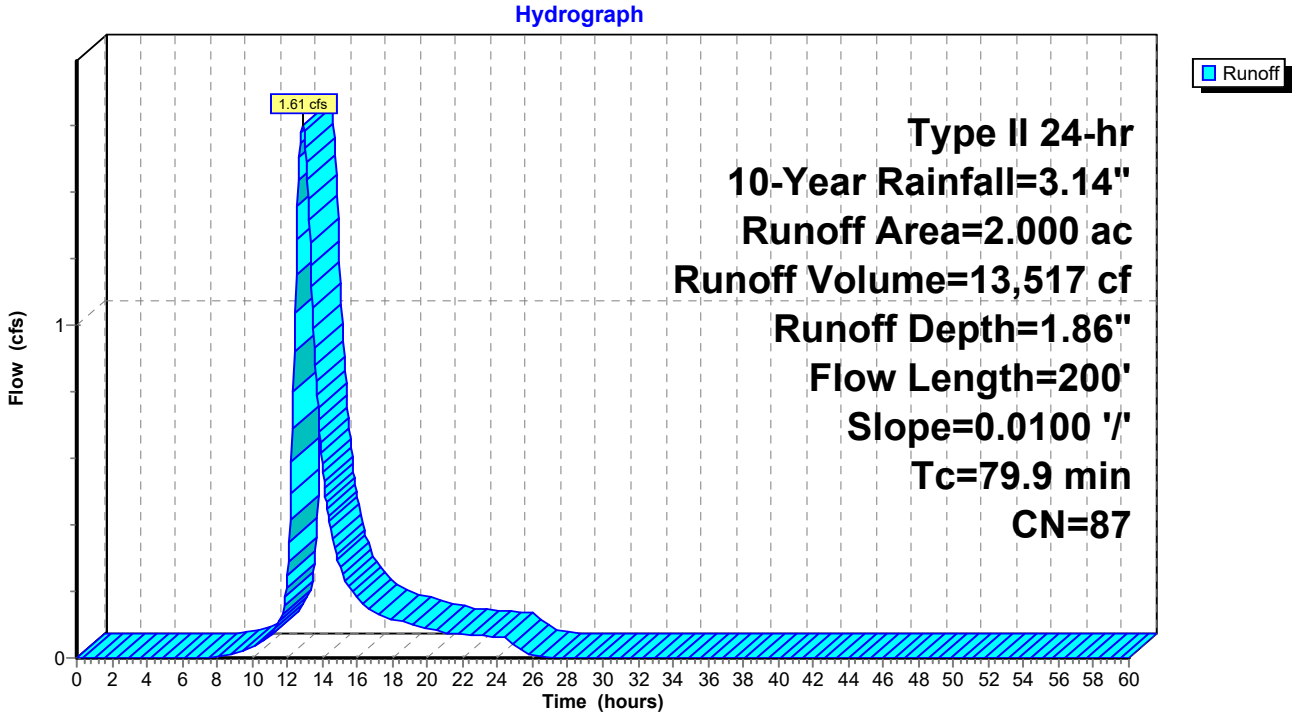
Runoff = 1.61 cfs @ 12.88 hrs, Volume= 13,517 cf, Depth= 1.86"
Routed to Pond 1P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.150	79	Woods, Fair, HSG D
0.500	98	Roofs, HSG D
0.300	98	Paved parking, HSG D
1.050	80	>75% Grass cover, Good, HSG D
2.000	87	Weighted Average
1.200		60.00% Pervious Area
0.800		40.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
68.9	130	0.0100	0.03		**Sheet Flow, woods** Woods: Dense underbrush n= 0.800 P2= 2.50"
11.0	70	0.0100	0.11		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 2.50"
79.9	200	Total			

Subcatchment 1S: Proposed



Summary for Subcatchment 2S: Proposed

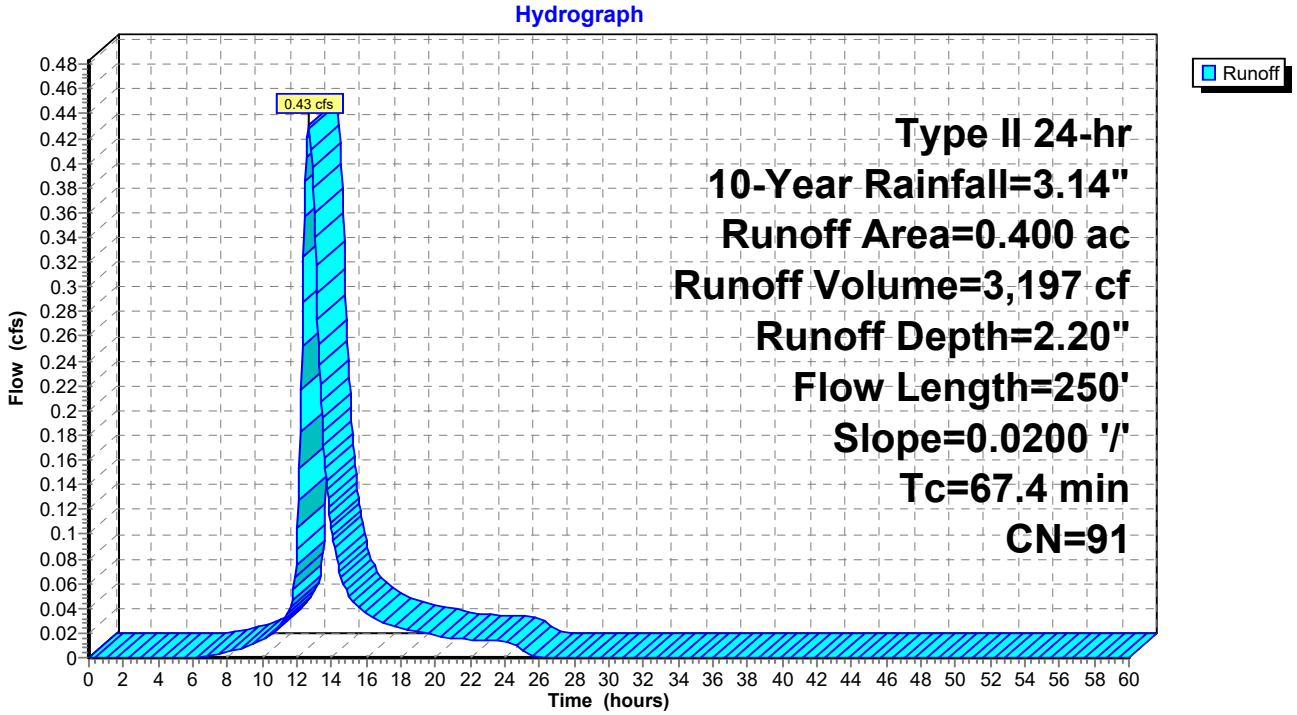
Runoff = 0.43 cfs @ 12.69 hrs, Volume= 3,197 cf, Depth= 2.20"
Routed to Pond 2P : Bioretention Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=3.14"

Area (ac)	CN	Description
0.050	79	Woods, Fair, HSG D
0.100	80	>75% Grass cover, Good, HSG D
0.250	98	Paved parking, HSG D
0.400	91	Weighted Average
0.150		37.50% Pervious Area
0.250		62.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	110	0.0200	0.15		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 2.50"
55.4	140	0.0200	0.04		**Sheet Flow, woods** Woods: Dense underbrush n= 0.800 P2= 2.50"
67.4	250	Total			

Subcatchment 2S: Proposed



Summary for Pond 1P: (new Pond)

[44] Hint: Outlet device #2 is below defined storage

Inflow Area = 104,544 sf, 43.75% Impervious, Inflow Depth = 1.92" for 10-Year event
Inflow = 2.02 cfs @ 12.85 hrs, Volume= 16,715 cf
Outflow = 0.58 cfs @ 14.19 hrs, Volume= 16,715 cf, Atten= 71%, Lag= 80.4 min
Primary = 0.58 cfs @ 14.19 hrs, Volume= 16,715 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 678.00' @ 14.19 hrs Surf.Area= 6,342 sf Storage= 6,306 cf

Plug-Flow detention time= 105.4 min calculated for 16,715 cf (100% of inflow)
Center-of-Mass det. time= 105.4 min (1,007.0 - 901.6)

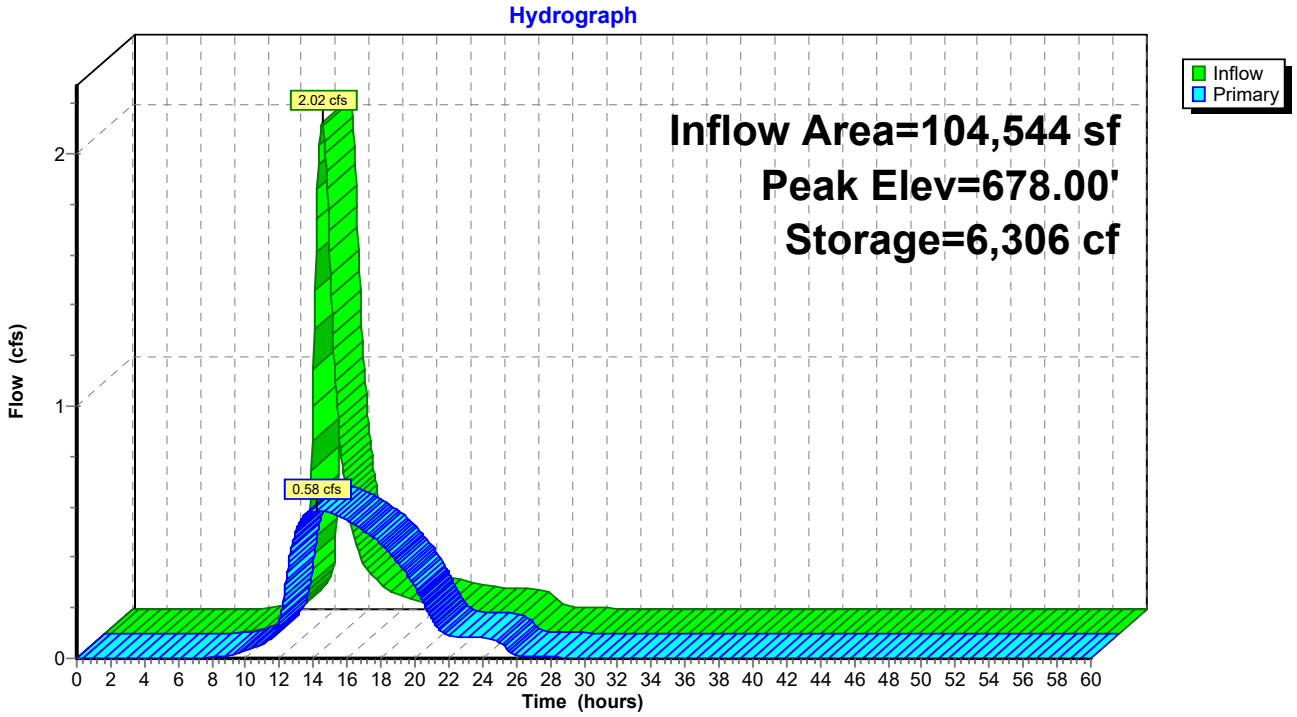
Volume	Invert	Avail.Storage	Storage Description
#1	676.00'	13,810 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
676.00	600	0	0
677.00	2,830	1,715	1,715
678.00	6,340	4,585	6,300
679.00	8,680	7,510	13,810

Device	Routing	Invert	Outlet Devices
#1	Primary	675.90'	**10.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.90' / 675.60' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#2	Device 1	675.90'	**4.0" Vert. 4" orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	678.85'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.58 cfs @ 14.19 hrs HW=678.00' (Free Discharge)
└**1=Culvert** (Passes 0.58 cfs of 3.33 cfs potential flow)
  ├**2=4" orifice** (Orifice Controls 0.58 cfs @ 6.70 fps)
  └**3=Grate** (Controls 0.00 cfs)

Pond 1P: (new Pond)



Summary for Pond 2P: Bioretention Area

Inflow Area = 17,424 sf, 62.50% Impervious, Inflow Depth = 2.20" for 10-Year event
Inflow = 0.43 cfs @ 12.69 hrs, Volume= 3,197 cf
Outflow = 0.43 cfs @ 12.75 hrs, Volume= 3,197 cf, Atten= 1%, Lag= 3.5 min
Primary = 0.43 cfs @ 12.75 hrs, Volume= 3,197 cf
Routed to Pond 1P : (new Pond)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 681.46' @ 12.75 hrs Surf.Area= 710 sf Storage= 329 cf

Plug-Flow detention time= 112.9 min calculated for 3,195 cf (100% of inflow)
Center-of-Mass det. time= 114.0 min (971.0 - 857.0)

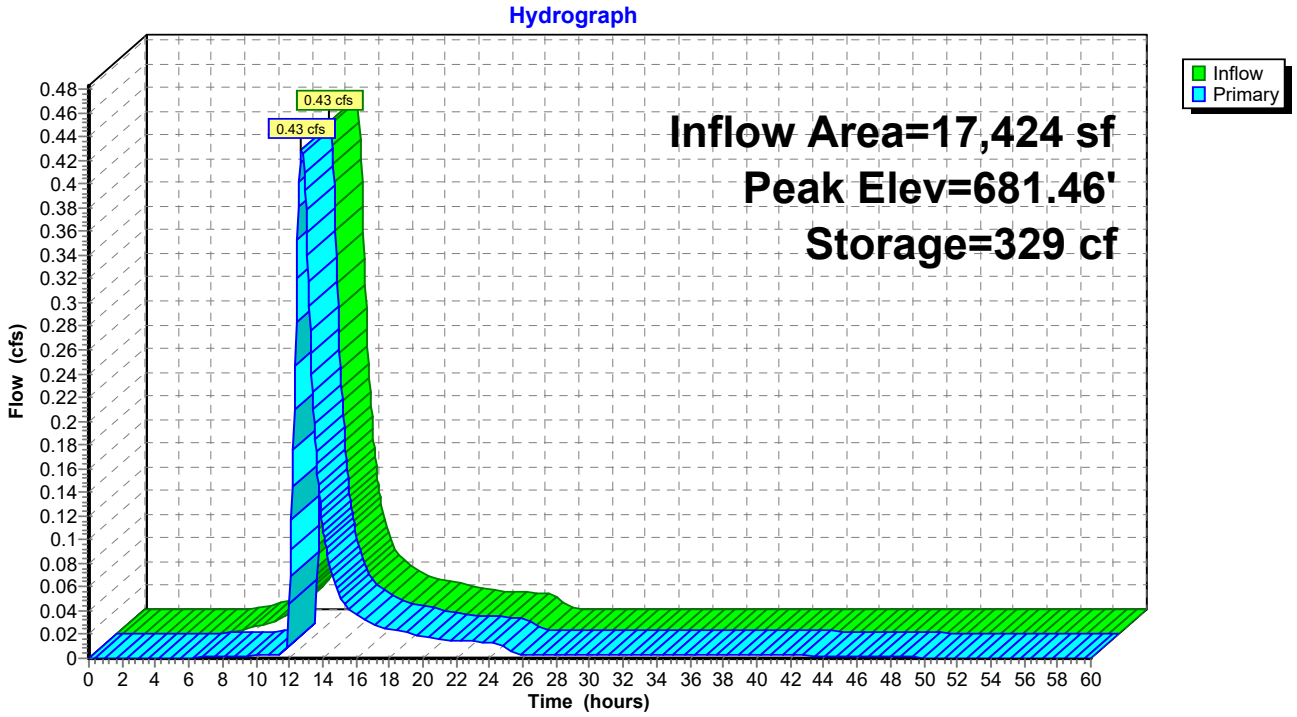
Volume	Invert	Avail.Storage	Storage Description
#1	680.80'	614 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
680.80	305	0	0
681.30	600	226	226
681.80	950	388	614

Device	Routing	Invert	Outlet Devices
#1	Primary	678.30'	**6.0" Round 6" pipe** L= 61.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 678.30' / 678.11' S= 0.0031 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	681.30'	**8.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	680.80'	**0.250 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 670.00'

Primary OutFlow Max=0.43 cfs @ 12.75 hrs HW=681.46' (Free Discharge)
└**1=6" pipe** (Passes 0.43 cfs of 1.06 cfs potential flow)
└**2=Grate** (Weir Controls 0.42 cfs @ 1.29 fps)
└**3=Exfiltration** (Controls 0.00 cfs)

Pond 2P: Bioretention Area



Time span=0.00-60.00 hrs, dt=0.05 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Proposed Runoff Area=2.000 ac 40.00% Impervious Runoff Depth=2.49"
Flow Length=200' Slope=0.0100 '/' Tc=79.9 min CN=87 Runoff=2.15 cfs 18,080 cf

Subcatchment2S: Proposed Runoff Area=0.400 ac 62.50% Impervious Runoff Depth=2.86"
Flow Length=250' Slope=0.0200 '/' Tc=67.4 min CN=91 Runoff=0.56 cfs 4,159 cf

Pond 1P: (new Pond) Peak Elev=678.44' Storage=9,332 cf Inflow=2.69 cfs 22,239 cf
Outflow=0.65 cfs 22,239 cf

Pond 2P: Bioretention Area Peak Elev=681.49' Storage=350 cf Inflow=0.56 cfs 4,159 cf
Outflow=0.56 cfs 4,159 cf

Total Runoff Area = 104,544 sf Runoff Volume = 22,239 cf Average Runoff Depth = 2.55"
56.25% Pervious = 58,806 sf 43.75% Impervious = 45,738 sf

Summary for Subcatchment 1S: Proposed

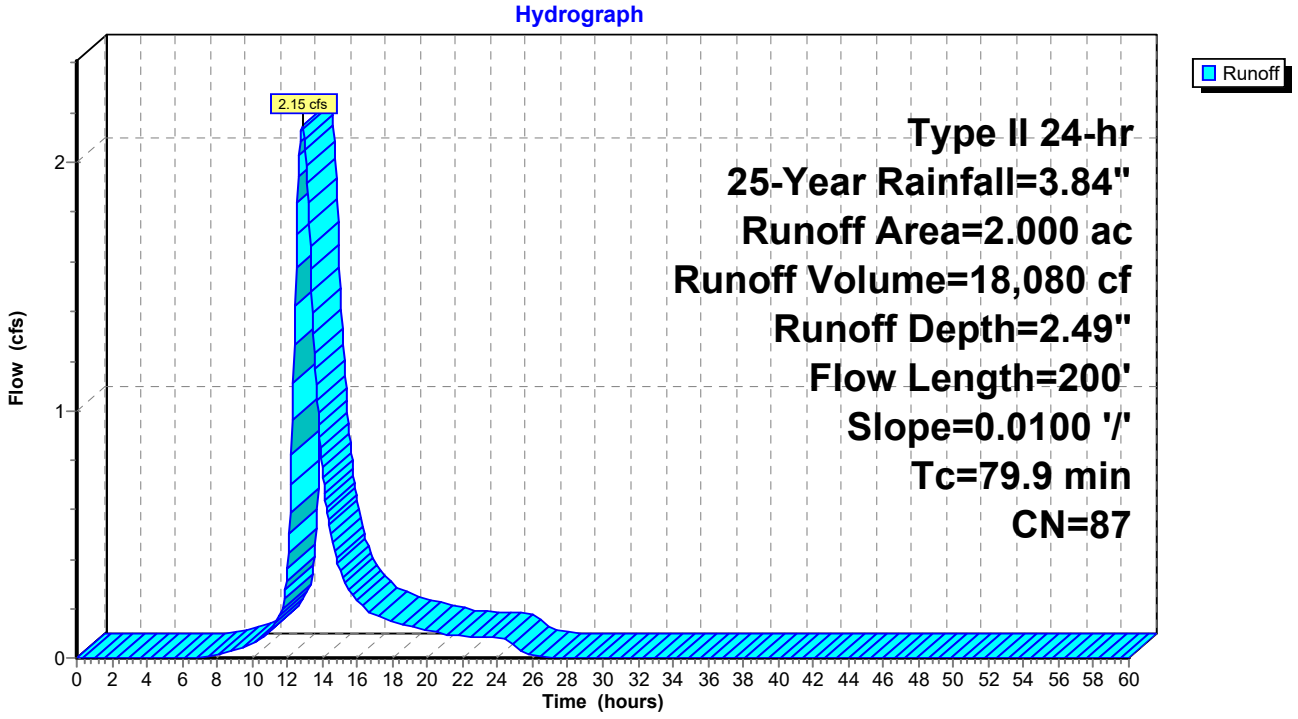
Runoff = 2.15 cfs @ 12.87 hrs, Volume= 18,080 cf, Depth= 2.49"
Routed to Pond 1P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-Year Rainfall=3.84"

Area (ac)	CN	Description
0.150	79	Woods, Fair, HSG D
0.500	98	Roofs, HSG D
0.300	98	Paved parking, HSG D
1.050	80	>75% Grass cover, Good, HSG D
2.000	87	Weighted Average
1.200		60.00% Pervious Area
0.800		40.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
68.9	130	0.0100	0.03		**Sheet Flow, woods** Woods: Dense underbrush n= 0.800 P2= 2.50"
11.0	70	0.0100	0.11		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 2.50"
79.9	200	Total			

Subcatchment 1S: Proposed



Summary for Subcatchment 2S: Proposed

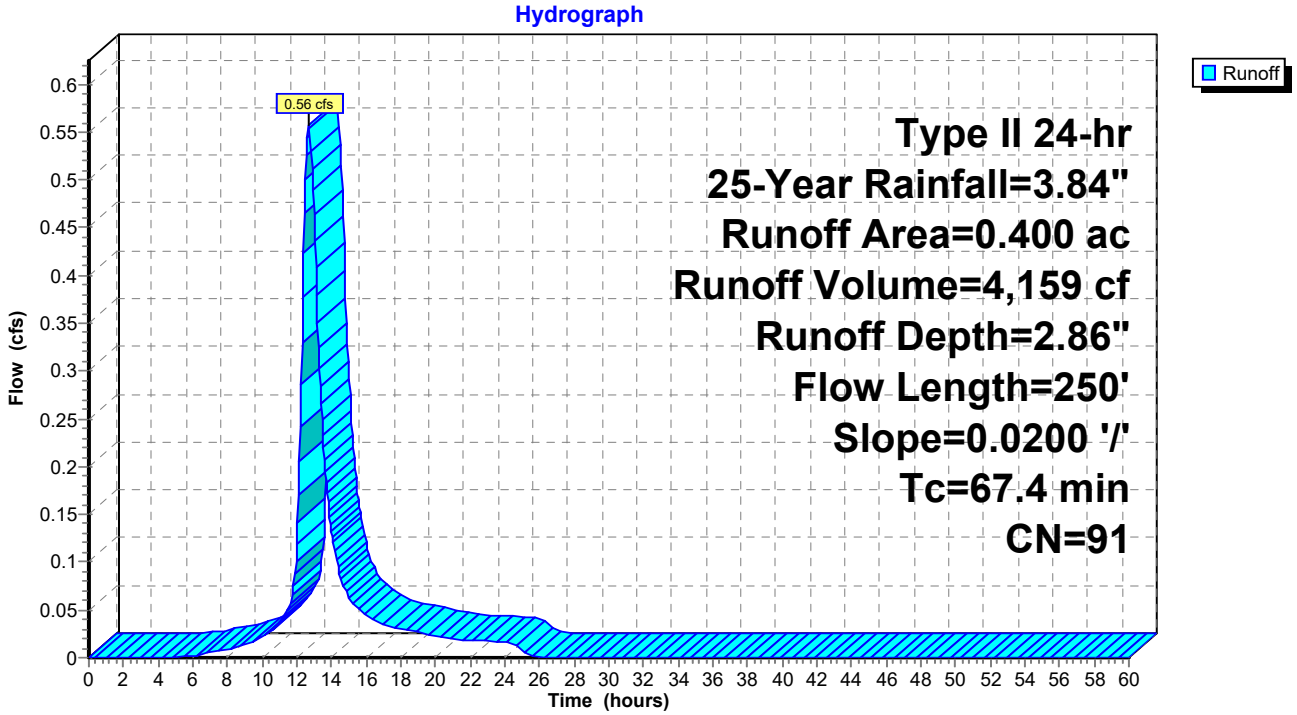
Runoff = 0.56 cfs @ 12.69 hrs, Volume= 4,159 cf, Depth= 2.86"
Routed to Pond 2P : Bioretention Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-Year Rainfall=3.84"

Area (ac)	CN	Description
0.050	79	Woods, Fair, HSG D
0.100	80	>75% Grass cover, Good, HSG D
0.250	98	Paved parking, HSG D
0.400	91	Weighted Average
0.150		37.50% Pervious Area
0.250		62.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	110	0.0200	0.15		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 2.50"
55.4	140	0.0200	0.04		**Sheet Flow, woods** Woods: Dense underbrush n= 0.800 P2= 2.50"
67.4	250	Total			

Subcatchment 2S: Proposed



Summary for Pond 1P: (new Pond)

[44] Hint: Outlet device #2 is below defined storage
[79] Warning: Submerged Pond 2P Primary device # 1 INLET by 0.14'

Inflow Area = 104,544 sf, 43.75% Impervious, Inflow Depth = 2.55" for 25-Year event
Inflow = 2.69 cfs @ 12.85 hrs, Volume= 22,239 cf
Outflow = 0.65 cfs @ 14.38 hrs, Volume= 22,239 cf, Atten= 76%, Lag= 91.7 min
Primary = 0.65 cfs @ 14.38 hrs, Volume= 22,239 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 678.44' @ 14.38 hrs Surf.Area= 7,375 sf Storage= 9,332 cf

Plug-Flow detention time= 144.0 min calculated for 22,220 cf (100% of inflow)
Center-of-Mass det. time= 143.9 min (1,032.9 - 889.0)

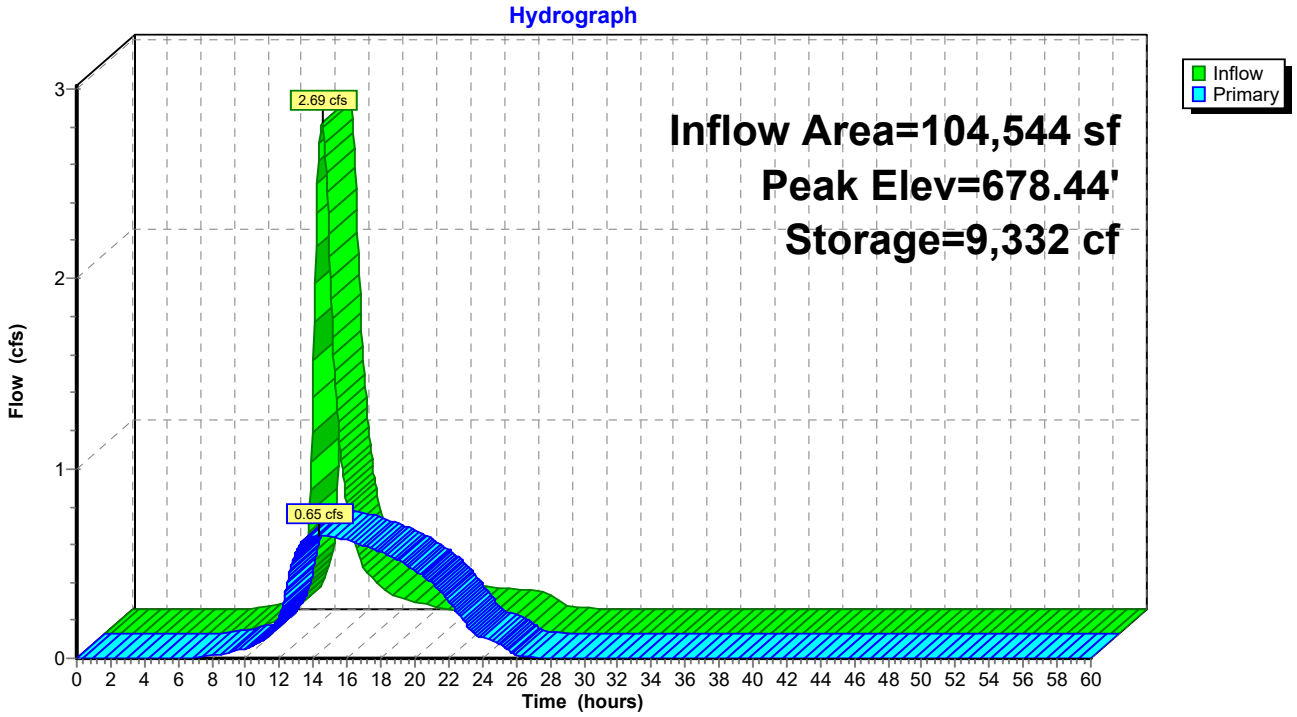
Volume	Invert	Avail.Storage	Storage Description
#1	676.00'	13,810 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
676.00	600	0	0
677.00	2,830	1,715	1,715
678.00	6,340	4,585	6,300
679.00	8,680	7,510	13,810

Device	Routing	Invert	Outlet Devices
#1	Primary	675.90'	**10.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.90' / 675.60' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#2	Device 1	675.90'	**4.0" Vert. 4" orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	678.85'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.65 cfs @ 14.38 hrs HW=678.44' (Free Discharge)
└**1=Culvert** (Passes 0.65 cfs of 3.77 cfs potential flow)
  ├**2=4" orifice** (Orifice Controls 0.65 cfs @ 7.42 fps)
  └**3=Grate** (Controls 0.00 cfs)

Pond 1P: (new Pond)



Summary for Pond 2P: Bioretention Area

Inflow Area = 17,424 sf, 62.50% Impervious, Inflow Depth = 2.86" for 25-Year event
Inflow = 0.56 cfs @ 12.69 hrs, Volume= 4,159 cf
Outflow = 0.56 cfs @ 12.74 hrs, Volume= 4,159 cf, Atten= 0%, Lag= 3.4 min
Primary = 0.56 cfs @ 12.74 hrs, Volume= 4,159 cf
Routed to Pond 1P : (new Pond)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 681.49' @ 12.74 hrs Surf.Area= 730 sf Storage= 350 cf

Plug-Flow detention time= 90.9 min calculated for 4,156 cf (100% of inflow)
Center-of-Mass det. time= 92.0 min (941.6 - 849.6)

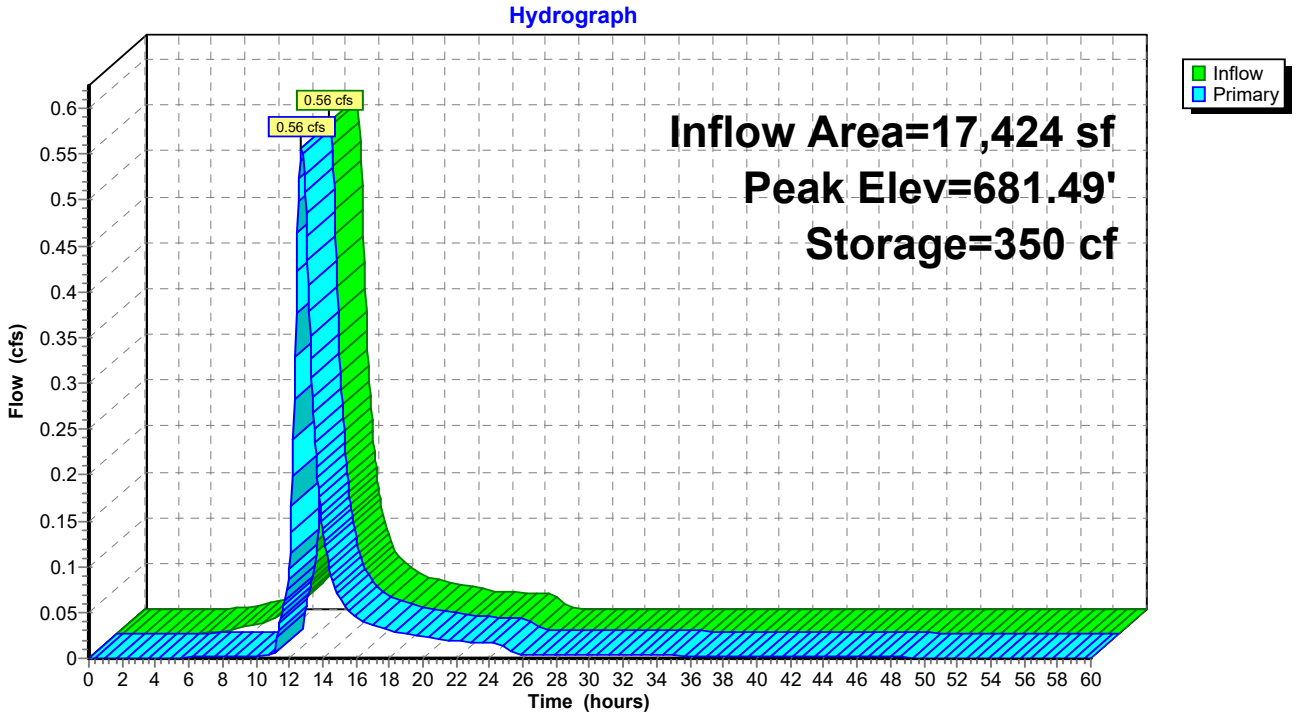
Volume	Invert	Avail.Storage	Storage Description
#1	680.80'	614 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
680.80	305	0	0
681.30	600	226	226
681.80	950	388	614

Device	Routing	Invert	Outlet Devices
#1	Primary	678.30'	**6.0" Round 6" pipe** L= 61.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 678.30' / 678.11' S= 0.0031 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	681.30'	**8.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	680.80'	**0.250 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 670.00'

Primary OutFlow Max=0.55 cfs @ 12.74 hrs HW=681.49' (Free Discharge)
└**1=6" pipe** (Passes 0.55 cfs of 1.06 cfs potential flow)
└**2=Grate** (Weir Controls 0.55 cfs @ 1.41 fps)
└**3=Exfiltration** (Controls 0.00 cfs)

Pond 2P: Bioretention Area



Time span=0.00-60.00 hrs, dt=0.05 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: Proposed Runoff Area=2.000 ac 40.00% Impervious Runoff Depth=3.78"
Flow Length=200' Slope=0.0100 '/' Tc=79.9 min CN=87 Runoff=3.26 cfs 27,475 cf

Subcatchment2S: Proposed Runoff Area=0.400 ac 62.50% Impervious Runoff Depth=4.21"
Flow Length=250' Slope=0.0200 '/' Tc=67.4 min CN=91 Runoff=0.81 cfs 6,107 cf

Pond 1P: (new Pond) Peak Elev=678.97' Storage=13,554 cf Inflow=4.04 cfs 33,581 cf
Outflow=1.81 cfs 33,581 cf

Pond 2P: Bioretention Area Peak Elev=681.54' Storage=390 cf Inflow=0.81 cfs 6,107 cf
Outflow=0.81 cfs 6,107 cf

Total Runoff Area = 104,544 sf Runoff Volume = 33,581 cf Average Runoff Depth = 3.85"
56.25% Pervious = 58,806 sf 43.75% Impervious = 45,738 sf

Summary for Subcatchment 1S: Proposed

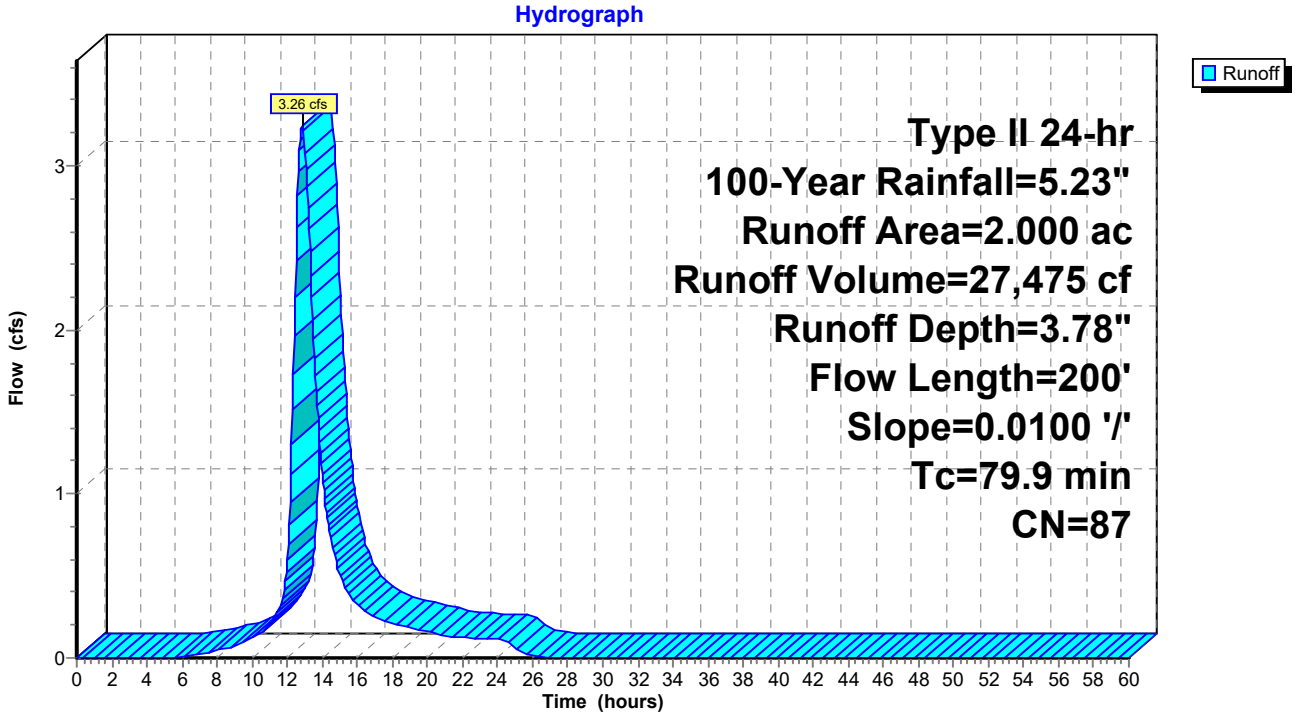
Runoff = 3.26 cfs @ 12.86 hrs, Volume= 27,475 cf, Depth= 3.78"
Routed to Pond 1P : (new Pond)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=5.23"

Area (ac)	CN	Description
0.150	79	Woods, Fair, HSG D
0.500	98	Roofs, HSG D
0.300	98	Paved parking, HSG D
1.050	80	>75% Grass cover, Good, HSG D
2.000	87	Weighted Average
1.200		60.00% Pervious Area
0.800		40.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
68.9	130	0.0100	0.03		**Sheet Flow, woods** Woods: Dense underbrush n= 0.800 P2= 2.50"
11.0	70	0.0100	0.11		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 2.50"
79.9	200	Total			

Subcatchment 1S: Proposed



Summary for Subcatchment 2S: Proposed

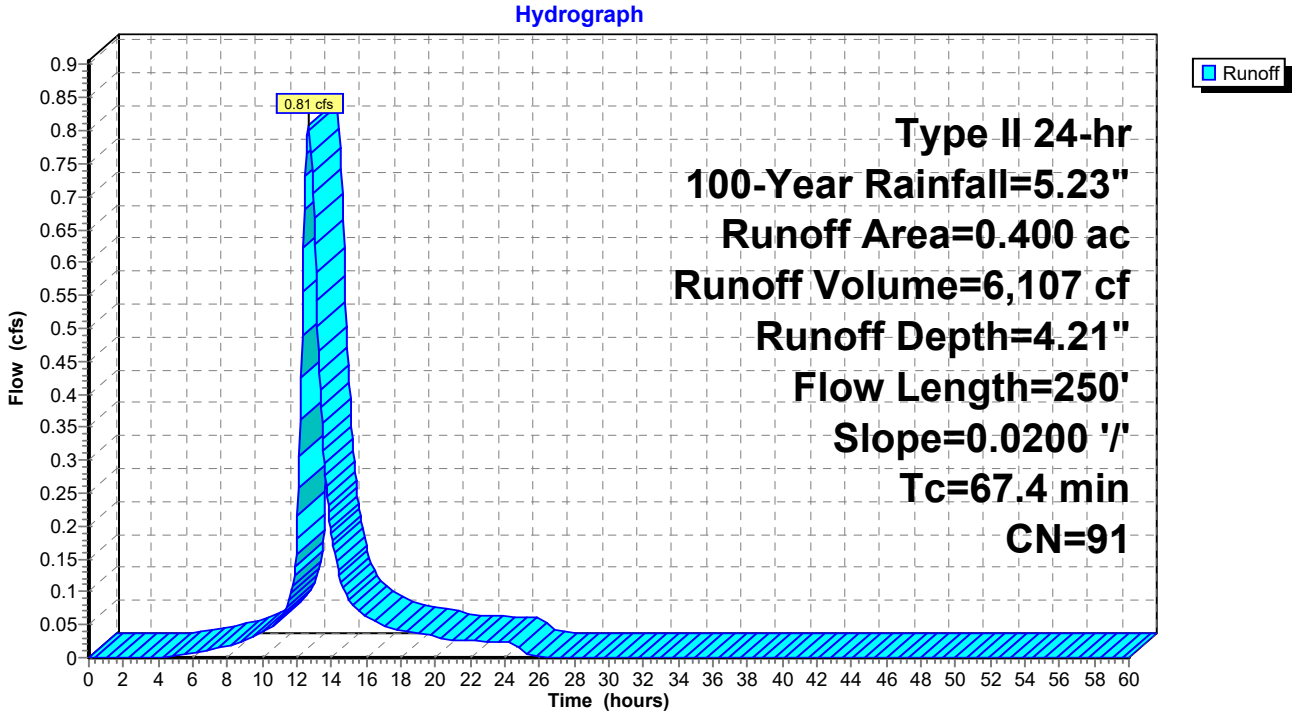
Runoff = 0.81 cfs @ 12.68 hrs, Volume= 6,107 cf, Depth= 4.21"
Routed to Pond 2P : Bioretention Area

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=5.23"

Area (ac)	CN	Description
0.050	79	Woods, Fair, HSG D
0.100	80	>75% Grass cover, Good, HSG D
0.250	98	Paved parking, HSG D
0.400	91	Weighted Average
0.150		37.50% Pervious Area
0.250		62.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	110	0.0200	0.15		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 2.50"
55.4	140	0.0200	0.04		**Sheet Flow, woods** Woods: Dense underbrush n= 0.800 P2= 2.50"
67.4	250	Total			

Subcatchment 2S: Proposed



Summary for Pond 1P: (new Pond)

[44] Hint: Outlet device #2 is below defined storage
[79] Warning: Submerged Pond 2P Primary device # 1 INLET by 0.67'

Inflow Area = 104,544 sf, 43.75% Impervious, Inflow Depth = 3.85" for 100-Year event
Inflow = 4.04 cfs @ 12.84 hrs, Volume= 33,581 cf
Outflow = 1.81 cfs @ 13.71 hrs, Volume= 33,581 cf, Atten= 55%, Lag= 52.1 min
Primary = 1.81 cfs @ 13.71 hrs, Volume= 33,581 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 678.97' @ 13.71 hrs Surf.Area= 8,611 sf Storage= 13,554 cf

Plug-Flow detention time= 171.2 min calculated for 33,553 cf (100% of inflow)
Center-of-Mass det. time= 171.1 min (1,043.7 - 872.6)

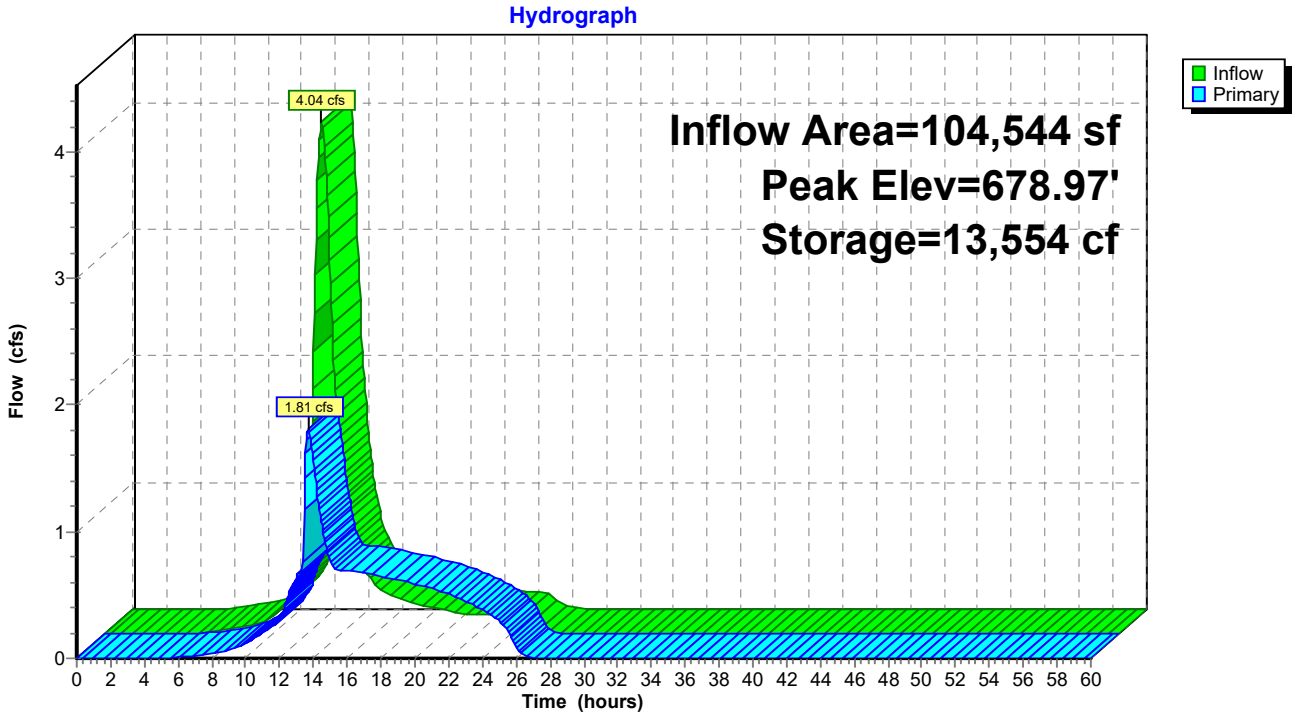
Volume	Invert	Avail.Storage	Storage Description
#1	676.00'	13,810 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
676.00	600	0	0
677.00	2,830	1,715	1,715
678.00	6,340	4,585	6,300
679.00	8,680	7,510	13,810

Device	Routing	Invert	Outlet Devices
#1	Primary	675.90'	**10.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.90' / 675.60' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#2	Device 1	675.90'	**4.0" Vert. 4" orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	678.85'	**24.0" x 24.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.81 cfs @ 13.71 hrs HW=678.97' (Free Discharge)
└**1=Culvert** (Passes 1.81 cfs of 4.24 cfs potential flow)
  ├**2=4" orifice** (Orifice Controls 0.72 cfs @ 8.20 fps)
  └**3=Grate** (Weir Controls 1.09 cfs @ 1.13 fps)

Pond 1P: (new Pond)



Summary for Pond 2P: Bioretention Area

Inflow Area = 17,424 sf, 62.50% Impervious, Inflow Depth = 4.21" for 100-Year event
Inflow = 0.81 cfs @ 12.68 hrs, Volume= 6,107 cf
Outflow = 0.81 cfs @ 12.73 hrs, Volume= 6,107 cf, Atten= 0%, Lag= 3.2 min
Primary = 0.81 cfs @ 12.73 hrs, Volume= 6,107 cf
Routed to Pond 1P : (new Pond)

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 681.54' @ 12.73 hrs Surf.Area= 767 sf Storage= 390 cf

Plug-Flow detention time= 66.6 min calculated for 6,101 cf (100% of inflow)
Center-of-Mass det. time= 67.7 min (906.8 - 839.0)

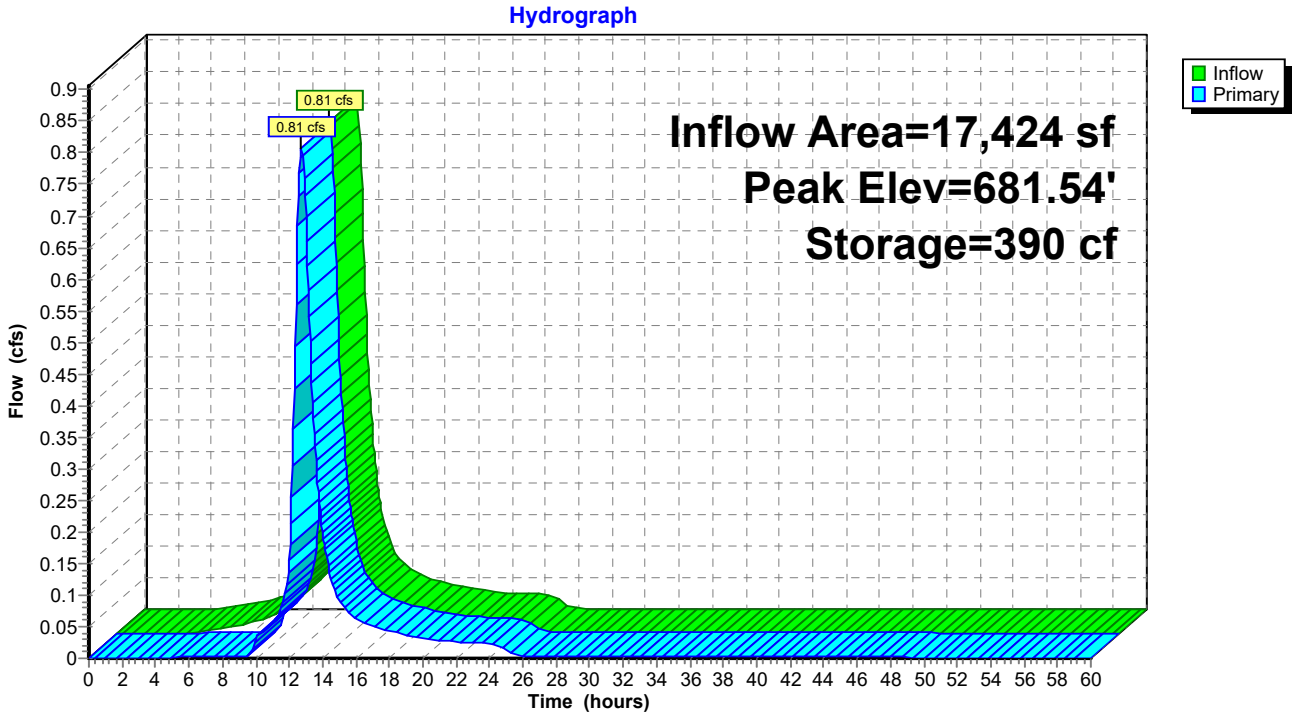
Volume	Invert	Avail.Storage	Storage Description
#1	680.80'	614 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
680.80	305	0	0
681.30	600	226	226
681.80	950	388	614

Device	Routing	Invert	Outlet Devices
#1	Primary	678.30'	**6.0" Round 6" pipe** L= 61.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 678.30' / 678.11' S= 0.0031 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	681.30'	**8.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	680.80'	**0.250 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 670.00'

Primary OutFlow Max=0.80 cfs @ 12.73 hrs HW=681.54' (Free Discharge)
└**1=6" pipe** (Passes 0.80 cfs of 1.07 cfs potential flow)
  └**2=Grate** (Weir Controls 0.80 cfs @ 1.60 fps)
  └**3=Exfiltration** (Controls 0.00 cfs)

Pond 2P: Bioretention Area



Green Infrastructure & Water Quality Calculations

Step 2 - Calculate Water Quality Volume

Is this project subject to Section 4.3 of the NYS Design Manual for Enhanced Phosphorus Removal?	No
What is the nature of this construction project?	

Design Point:	1		
P=	0.90	inches	*Enter 90% Rainfall Event as P*

Calculate Required WQv

Drainage Area Number	Contributing Area (Acres)	Impervious Area (Acres)	Percent Impervious %	Rv	WQv (cf)	SMP Description
1	0.40	0.25	63	0.61	800	
2	2.00	0.80	40	0.41	2,679	
3						
4						
5						
6						
7						
8						
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27						
28						
29						
30						
Total	2.40	1.05	44	0.44	**3479**	**Required WQv**

Step 4 - Calcuate Minimum RRv Required

Enter the Soils Data for the site		
Hydrologic Soil Group	Acres	S
A		55%
B		40%
C		30%
D	0.25	20%
Total Area	0.25	

Calculate the Minimum RRv		
S =	**0.20**	
Impervious =	0.25	*acres*
Precipitation	0.90	*inches*
Rv	0.95	
Minimum RRv	**0.004**	***af***
	174	cf

Filtration Bioretention (F-5)

Design Point:	1

Enter Site Data For Drainage Area to be Treated by Practice							
Drainage Area Number	**Contributing Area** (Acres)	**Impervious Area** (Acres)	**Percent Impervious** %	**Rv**	**WQv** (cf)	**Precipitation** (in)	**Description**
1	0.40	0.25	63	0.61	800	0.90	0

Design Criteria		
Enter underlying soil infiltration rate (based on geotechnical testing, refer to Appendix D)	0	Underdrains required
Is the contributing area to the practice a stormwater hotspot?	No	
Is the practice the first in series for treatment of a Level 1 (Infiltration Restricted) hotspot?	No	
Is contributing area greater than max. contributing area?	No	
Enter depth to seasonal high water table (ft)		
Enter depth to bedrock (ft)		
Is pretreatment provided, in conformance with Section 6.4.3.1	Yes	
Enter average height of ponding (ft)	0.5	
Enter depth of surface layer (inches)	3	
Enter depth of filter media (ft)	2.5	
Enter depth of drainage layer (inches)	12	
Enter slope of maintenance access (%)	1.5	
Enter width of maintenance access (ft)	24	

Sizing Criteria				
		Value	Units	Notes
Permeability Flow Rate	k	1	ft/day	
Filter Time	tf	2	days	
Required Filter Area	Af	333	sf	
Enter Provided Filter Area	Af	600	sf	
Recalculated Water Quality Volume (based on provided filter area)	WQv calc	1440	cf	

Calculate Runoff Reduction			
RRv Provided	**576**	***cf***	
WQv Treated	224	cf	This is the portion of the WQv that is not reduced in the practice.