150 BUTLERTOWN ROAD SUBDIVISION APPLICATION

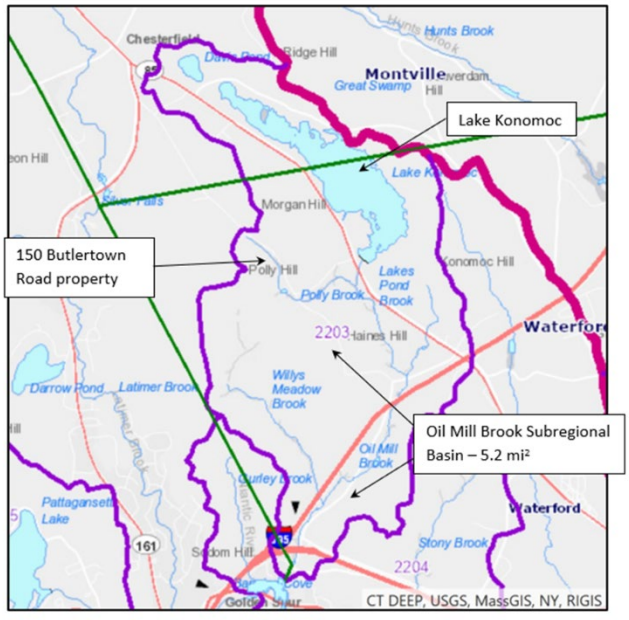
STORM WATER MANAGEMENT REPORT

March 11, 2025

The 150 Butlertown Road Subdivision project involves an existing 33.52 acre parcel – Parcel Map/Lot 37-1278 – located on the southwestern side of Butlertown Road in the northwest section of Waterford, Connecticut. The parcel is proposed to be partially developed as a subdivision under the Town of Waterford Zoning and Subdivision Regulations taking the existing lot and creating a new building lot (Lot A) 5.67 acres in area. The remainder of the parcel will remain as it is presently with woodlands, wetlands and the existing single-family residential structure – 150 Butlertown Road. As part of the Final Subdivision Plan Application requirements listed in Section 25.6 of the Waterford Zoning Regulations and Section 5.5 of the Waterford Subdivision Regulations, this Storm Water Management Report establishes the means for mitigating the increase in storm water runoff and provides treatment capacity consistent with the Connecticut Storm Water Management Plan and other pertinent regulations and best management practices.

The 150 Butlertown Road Subdivision parcel is located within the Oil Mill Brook subregional drainage basin which drains directly to the Niantic River, Niantic Bay and Long Island Sound. The delineation of the subregional basin is shown in Figure 1. The total area of the subregional basin is 5.2 mi^2; The 150 Butlertown Road Subdivision parcel accounts for 33.52 acres of the basin. Excluding the Open Space area of the 150 Butlertown Road Subdivision the development impacts 5.67 acres of the Oil Mill Brook basin; approximately 0.17% of the total basin. The basin consists primarily of residential lots of varying size, roadways (including Interstates 395 and 95), agricultural land, a racetrack, limited commercial and municipal uses, open space and woodlands.

Figure 1: 150 Butlertown Road Subdivision Drainage Basin



The 150 Butlertown Road Subdivision parcel and the development area consists of one primary drainage area. The wetlands (Poly Brook) at the eastern end of the parcel drain directly to Oil Mill Brook downstream of Lake Konomoc. Currently, the 150 Butlertown Road parcel is primarily woodlands and wetlands with only 1.40 acres in the central portion developed with a single-family home. The proposed subdivision would consist of the development of another single-family residential lot on the western side of the wetlands impacting a 5.52 acre drainage basin. These conditions, along with the land survey data from the subdivision site plan set were used to develop a HydroCAD model representing the existing conditions and project storm water runoff flows for various storm events using the USDA Natural Resources Conservation Service (NRCS) TR-20 method. The results of the model are summarized in Figure 2. The full HydroCAD report is attached for reference as Attachment A.

Figure 2: Storm Water Runoff Flow Rates – Existing Conditions

Summary of Storm Water Runoff Flow Rates (ft^3/s)	
150 Butlertown Road Subdivision	
Existing Conditions	
Source: HydroCAD	
Storm Event	**Total**
1 year Storm	0.07
2 year Storm	0.21
10 year Storm	0.78
25 year Storm	1.11
100 year Storm	1.89

The 150 Butlertown Road parcel was then modeled under the land use conditions proposed within the developed area as depicted in the Final Subdivision Application package and site plan set, again, using HydroCAD and the TR-20 methodology.

The proposed development consists of adding one single-unit residential building lot (Lot A), 5.67 acres in size, with an extended gravel driveway that connects with the existing driveway for 150 Butlertown Road and utilizes the existing wetland crossing/bridge. Three small detention basins (#1A, #1B and #1C) are proposed flanking the proposed Lot A driveway to intercept runoff from the up-gradient woodland area and the proposed development for treatment and peak runoff flow mitigation. Each basin is sized and configured per the site plan set and includes a catch basin overflow and discharge pipe to the down-gradient woodland area. Discharges are further protected with riprap aprons for energy dissipation. Two cross-culverts are proposed to convey runoff through the driveway discharging to detention basins #1B and #1C. Total stormwater detention or storage volume is 26,748 ft^3 – Detention Basin #1A – 13,488 ft^3; Detention Basin #1B – 7,140 ft^3; and Detention Basin #1C – 6,120 ft^3. Each of the drainage basin areas for each detention basin under proposed conditions is delineated on the Erosion & Sediment Control and Storm Water Management Plan sheet within the Final Subdivision Application site plan set. A

summary of the storm water runoff flow rates under the proposed developed condition is presented in Figure 3.

Figure 3: Storm Water Runoff Flow Rates – Proposed Conditions

Summary of Storm Water Runoff Flow Rates (ft^3/s)								
150 Butlertown Road Subdivision								
Proposed Conditions								
Source: HydroCAD								
	Drainage Basin #1A		Drainage Basin #1B		Drainage Basin #1C		Totals	
Storm Event	Runoff	Detention Basin Discharge	Runoff	Detention Basin Discharge	Runoff	Detention Basin Discharge	Runoff	Detention Basin Discharges
1 year Storm	0.08	0.00	0.05	0.00	0.04	0.00	0.17	0.00
2 year Storm	0.18	0.00	0.11	0.00	0.10	0.00	0.39	0.00
10 year Storm	0.52	0.00	0.31	0.00	0.32	0.11	1.15	0.11
25 year Storm	0.70	0.12	0.42	0.09	0.45	0.29	1.57	0.50
100 year Storm	1.11	0.68	0.66	0.44	0.74	0.71	2.51	1.83

The storm water runoff flow rates under the proposed conditions represent a zero net increase compared to existing conditions. A comparison of the existing and proposed storm water runoff flow rates for all storms is presented in Figure 4. Attachment B provides all the HydroCAD data reports for the proposed conditions model. The increase in storm water runoff flow rates due to the introduction of impervious surfaces and lawn/landscaped areas within the developed portion of the parcel are mitigated by the detention basin storage and treatment capacity.

Figure 4: Storm Water Runoff Flow Rates Comparison

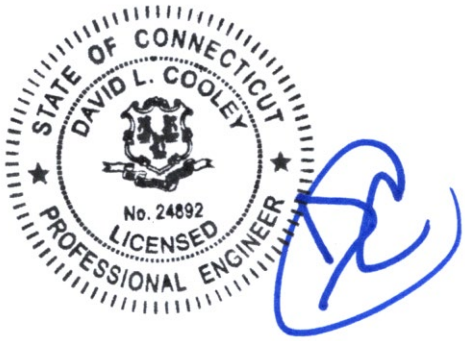
Storm Water Runoff Flow Rates Comparison			
150 Butlertown Road Subdivision			
Existing vs. Proposed Conditions			
Source: HydroCAD			
Storm Event	Existing Condtions	Proposed Conditions	Percent Change
1 year Storm	0.07	0.00	-100.00
2 year Storm	0.21	0.00	-100.00
10 year Storm	0.78	0.11	-85.90
25 year Storm	1.11	0.50	-54.95
100 year Storm	1.89	1.83	-3.17

From a storm water treatment perspective, the Water Quality Volume was calculated for the 150 Butlertown Road Subdivision under proposed conditions and included as part of the Erosion & Sediment Control and Storm Water Management Plan sheet and the Final Subdivision Application package. The Water Quality Volume was calculated per the 2024 Connecticut Stormwater Quality Manual for the development area and determined to be a total of 3,118 ft^3. The proposed stormwater detention basin

provides 26,748 ft^3 of treatment capacity exceeding and effectively treating the calculated Water Quality Volume. The three stormwater detention basins are designed to accept and direct the stormwater flows from the developed area and Lot A and under extreme storm events discharge their overflow to the down-gradient woodlands at flow rates less than existing conditions. Peak flows will be treated, mitigated and delayed eliminating any adverse impact to the greater watershed, wetland area and watercourses downstream.

In conclusion, the impact of the 150 Butlertown Road Subdivision demonstrates a zero net increase in storm water flow rates while introducing storm water treatment with the implementation of strategically placed stormwater detention basins. Further, the detention basins are designed to target the impervious surfaces introduced with the proposed subdivision and provide direct flow mitigation and water treatment. These actions will mitigate the potential adverse impacts of the proposed subdivision on the remainder of the parcel dedicated to open space, the wetland and watercourses downstream of the development and all neighboring properties.

Respectfully submitted,



David L. Cooley, P.E.
DLC Engineering Services, LLC

Attachments

Attachment A – HydroCAD Report – Existing Conditions
Attachment B – HydroCAD Report – Proposed Conditions

ATTACHMENT A

HydroCAD Report – Existing Conditions

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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	Type III 24-hr		Default	24.00	1	2.70	2
2	2-yr	Type III 24-hr		Default	24.00	1	3.40	2
3	10-yr	Type III 24-hr		Default	24.00	1	5.00	2
4	25-yr	Type III 24-hr		Default	24.00	1	5.70	2
5	100-yr	Type III 24-hr		Default	24.00	1	7.10	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.524	55	Woods, Good, HSG B (1S)
5.524	**55**	**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	5.524	0.000	0.000	0.000	5.524	Woods, Good	1S
0.000	**5.524**	**0.000**	**0.000**	**0.000**	**5.524**	**TOTAL AREA**	

Summary for Subcatchment 1S: Drainage Area #1

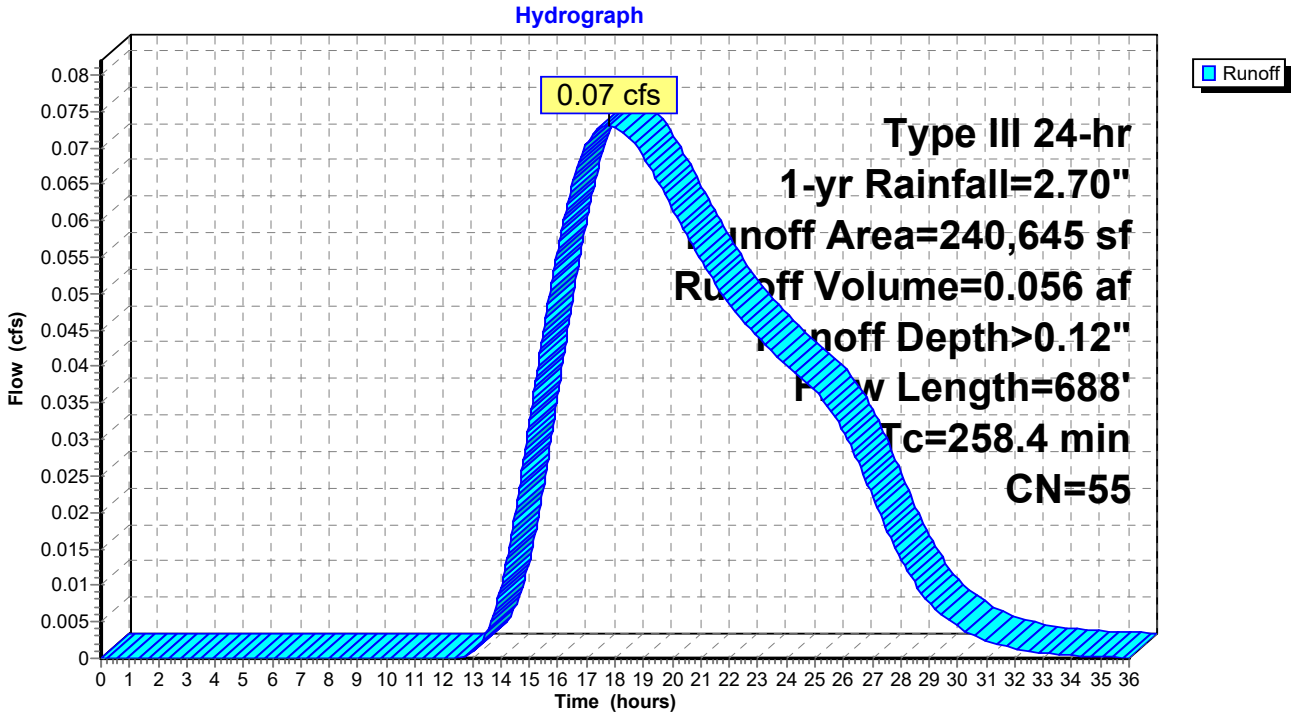
Runoff = 0.07 cfs @ 17.80 hrs, Volume= 0.056 af, Depth> 0.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-yr Rainfall=2.70"

Area (sf)	CN	Description
240,645	55	Woods, Good, HSG B
240,645		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
253.4	100	0.0400	0.01		**Sheet Flow, Sheet Flow** Woods: Dense underbrush n= 0.800 P2= 0.04"
5.0	588	0.1563	1.98		**Shallow Concentrated Flow, Shallow Conc Flow** Woodland Kv= 5.0 fps
258.4	688	Total			

Subcatchment 1S: Drainage Area #1



Summary for Subcatchment 1S: Drainage Area #1

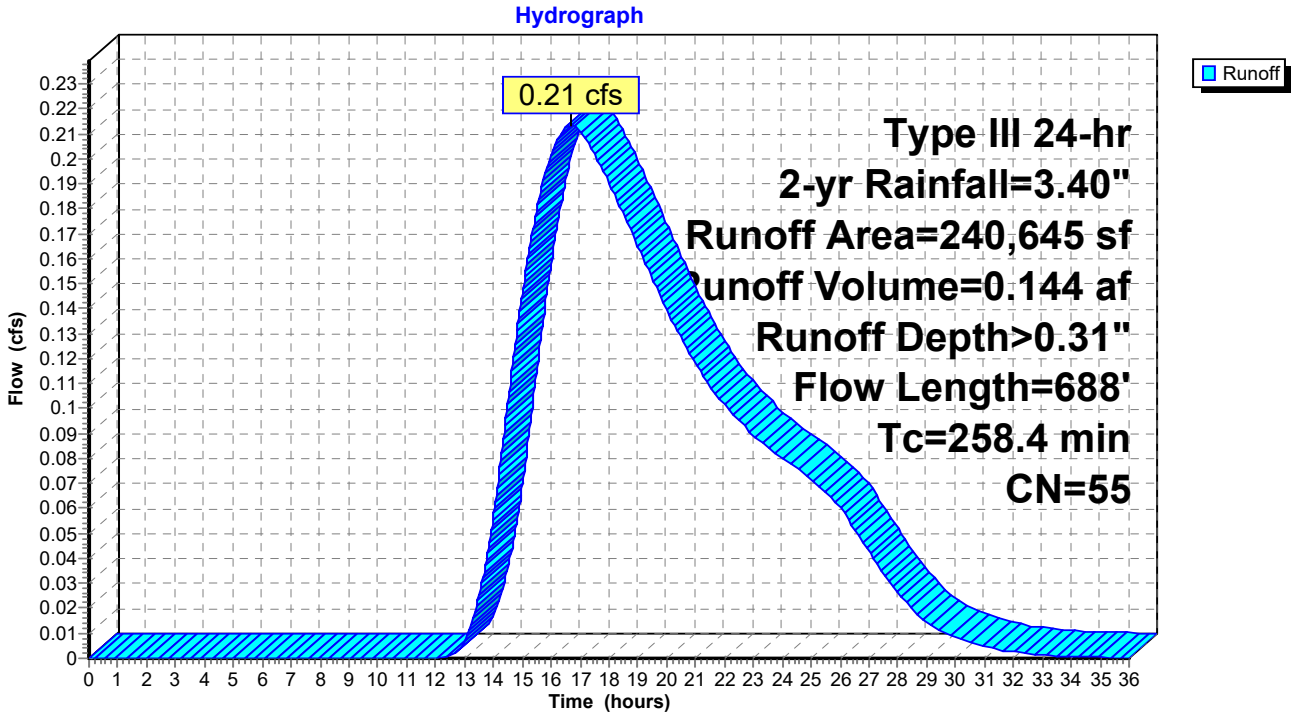
Runoff = 0.21 cfs @ 16.66 hrs, Volume= 0.144 af, Depth> 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.40"

Area (sf)	CN	Description
240,645	55	Woods, Good, HSG B
240,645		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
253.4	100	0.0400	0.01		**Sheet Flow, Sheet Flow** Woods: Dense underbrush n= 0.800 P2= 0.04"
5.0	588	0.1563	1.98		**Shallow Concentrated Flow, Shallow Conc Flow** Woodland Kv= 5.0 fps
258.4	688	Total			

Subcatchment 1S: Drainage Area #1



Summary for Subcatchment 1S: Drainage Area #1

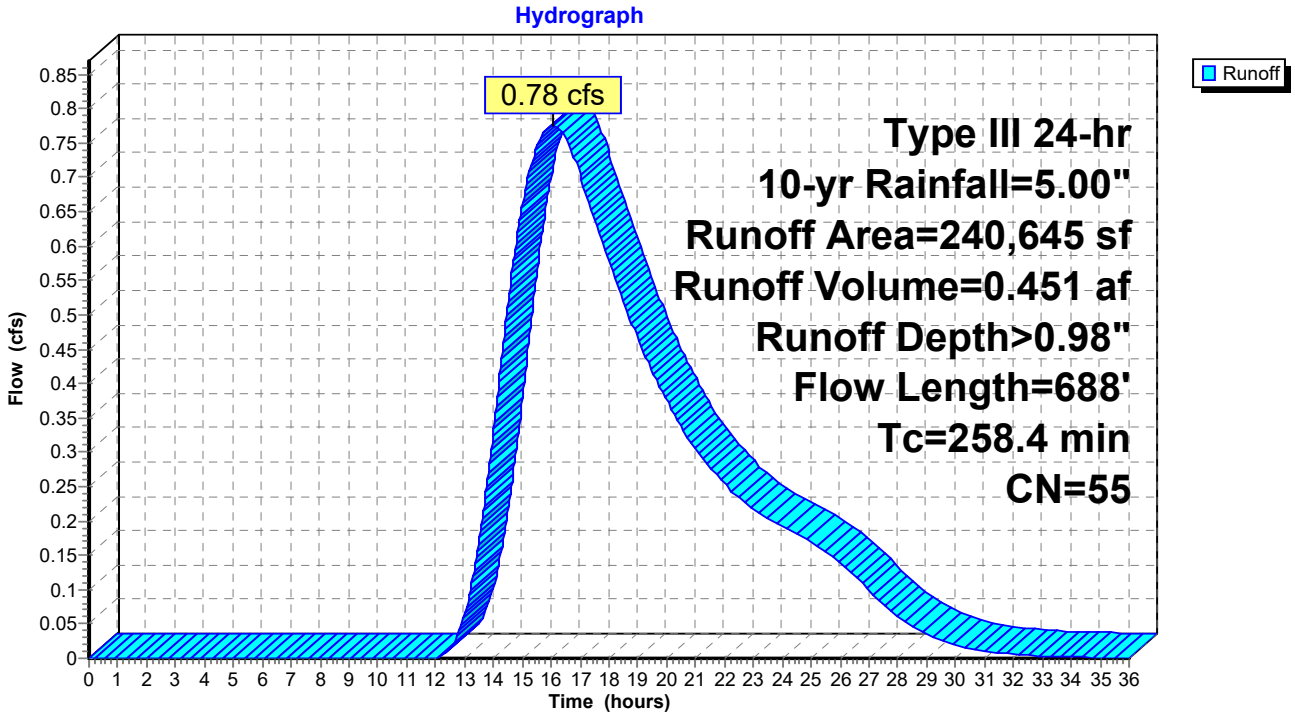
Runoff = 0.78 cfs @ 16.08 hrs, Volume= 0.451 af, Depth> 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=5.00"

Area (sf)	CN	Description
240,645	55	Woods, Good, HSG B
240,645		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
253.4	100	0.0400	0.01		**Sheet Flow, Sheet Flow** Woods: Dense underbrush n= 0.800 P2= 0.04"
5.0	588	0.1563	1.98		**Shallow Concentrated Flow, Shallow Conc Flow** Woodland Kv= 5.0 fps
258.4	688	Total			

Subcatchment 1S: Drainage Area #1



Summary for Subcatchment 1S: Drainage Area #1

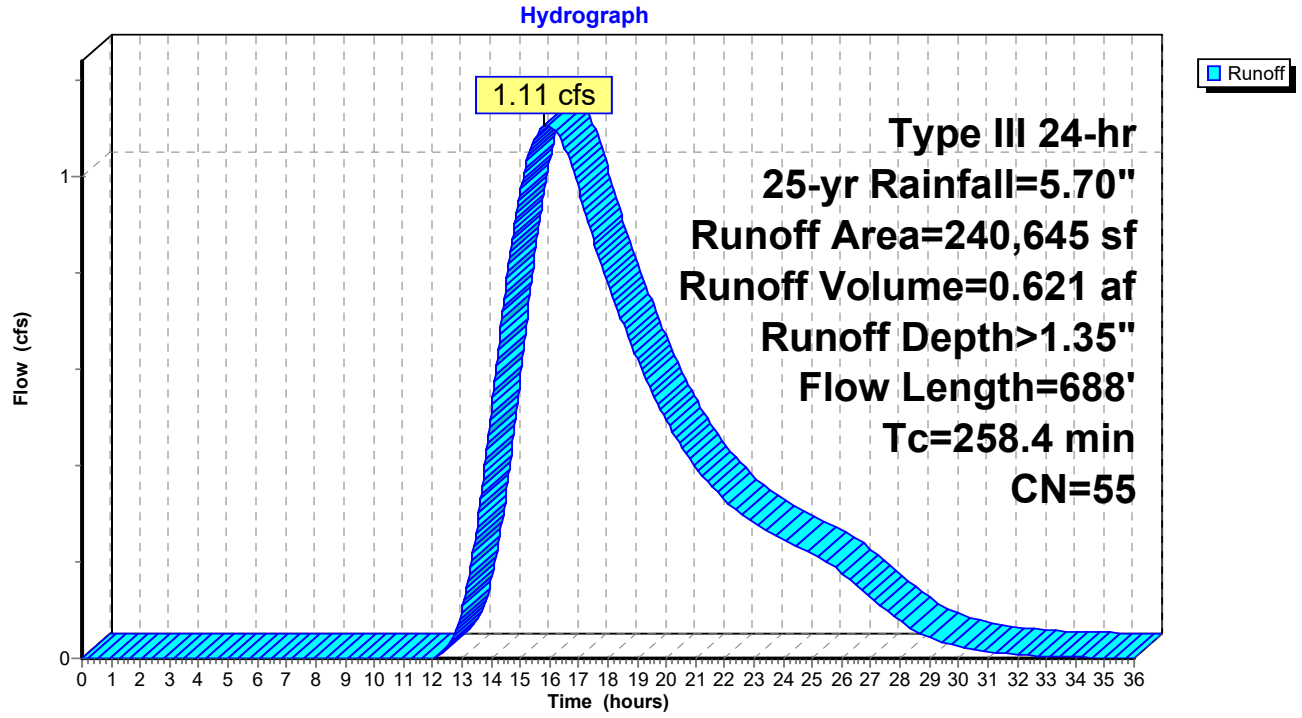
Runoff = 1.11 cfs @ 15.80 hrs, Volume= 0.621 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=5.70"

Area (sf)	CN	Description
240,645	55	Woods, Good, HSG B
240,645		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
253.4	100	0.0400	0.01		**Sheet Flow, Sheet Flow** Woods: Dense underbrush n= 0.800 P2= 0.04"
5.0	588	0.1563	1.98		**Shallow Concentrated Flow, Shallow Conc Flow** Woodland Kv= 5.0 fps
258.4	688	Total			

Subcatchment 1S: Drainage Area #1



Summary for Subcatchment 1S: Drainage Area #1

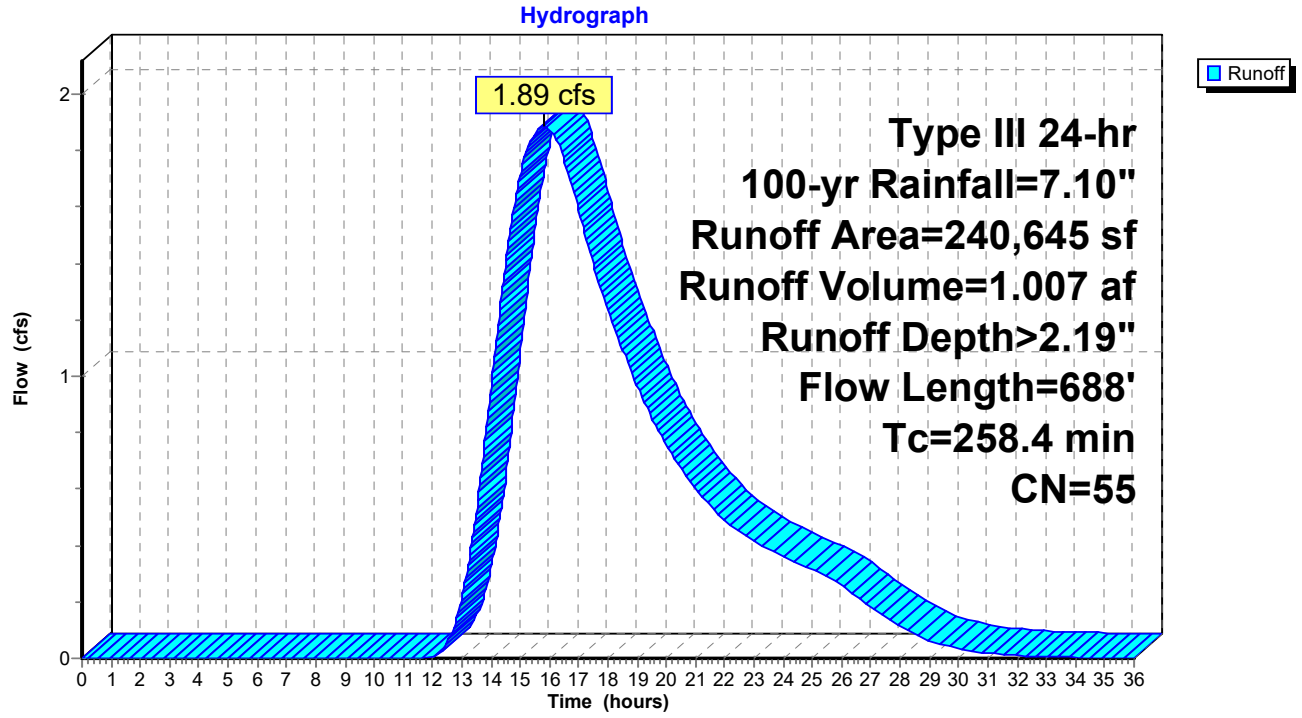
Runoff = 1.89 cfs @ 15.79 hrs, Volume= 1.007 af, Depth> 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=7.10"

Area (sf)	CN	Description
240,645	55	Woods, Good, HSG B
240,645		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
253.4	100	0.0400	0.01		**Sheet Flow, Sheet Flow** Woods: Dense underbrush n= 0.800 P2= 0.04"
5.0	588	0.1563	1.98		**Shallow Concentrated Flow, Shallow Conc Flow** Woodland Kv= 5.0 fps
258.4	688	Total			

Subcatchment 1S: Drainage Area #1



ATTACHMENT B

HydroCAD Report – Proposed Conditions

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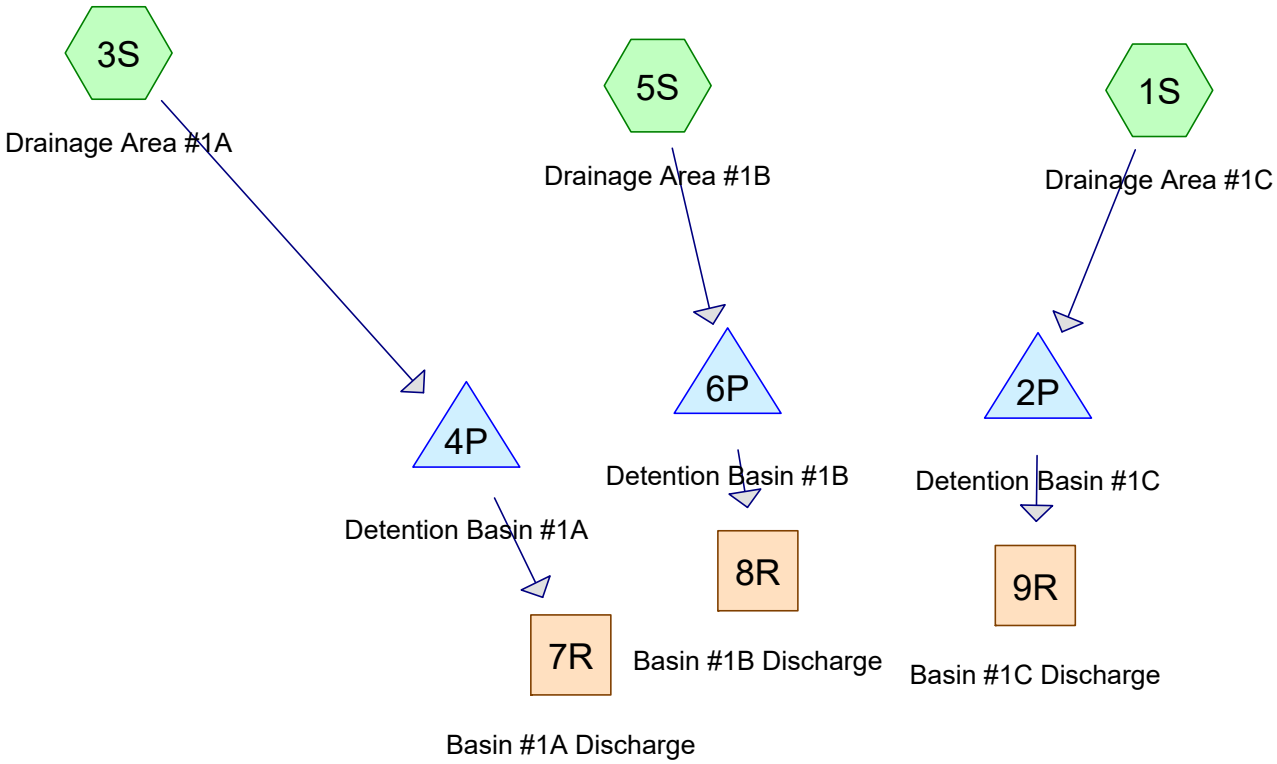


Subcat Reach Pond Link

Routing Diagram for Butlertown Road.Proposed Conditions.11.23.2024
Prepared by DLC Engineering Services, LLC, Printed 12/19/2024

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	Type III 24-hr		Default	24.00	1	2.70	2
2	2-yr	Type III 24-hr		Default	24.00	1	3.40	2
3	10-yr	Type III 24-hr		Default	24.00	1	5.00	2
4	25-yr	Type III 24-hr		Default	24.00	1	5.70	2
5	100-yr	Type III 24-hr		Default	24.00	1	7.10	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.184	61	>75% Grass cover, Good, HSG B (1S, 3S, 5S)
0.444	96	Gravel surface, HSG B (1S, 3S, 5S)
0.056	98	Unconnected roofs, HSG B (3S)
3.808	55	Woods, Good, HSG B (1S, 3S, 5S)
5.492	**60**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
5.492	HSG B	1S, 3S, 5S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
5.492		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	1.184	0.000	0.000	0.000	1.184	>75% Grass cover, Good	1S, 3S, 5S
0.000	0.444	0.000	0.000	0.000	0.444	Gravel surface	1S, 3S, 5S
0.000	0.056	0.000	0.000	0.000	0.056	Unconnected roofs	3S
0.000	3.808	0.000	0.000	0.000	3.808	Woods, Good	1S, 3S, 5S
0.000	**5.492**	**0.000**	**0.000**	**0.000**	**5.492**	**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)	Node Name
1	1S	0.00	0.00	25.0	0.0800	0.020	0.0	24.0	0.0	
2	7R	356.00	355.00	111.0	0.0090	0.020	0.0	18.0	0.0	
3	8R	320.00	319.00	28.0	0.0357	0.020	0.0	18.0	0.0	
4	9R	302.00	301.00	27.0	0.0370	0.020	0.0	18.0	0.0	

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area #1C Runoff Area=84,877 sf 0.00% Impervious Runoff Depth=0.16"
Flow Length=621' Tc=257.8 min CN=57 Runoff=0.04 cfs 0.026 af

Subcatchment 3S: Drainage Area #1A Runoff Area=99,965 sf 2.45% Impervious Runoff Depth=0.26"
Flow Length=424' Tc=234.9 min CN=61 Runoff=0.08 cfs 0.049 af

Subcatchment 5S: Drainage Area #1B Runoff Area=54,385 sf 0.00% Impervious Runoff Depth=0.29"
Flow Length=509' Tc=219.2 min CN=62 Runoff=0.05 cfs 0.030 af

Reach 7R: Basin #1A Discharge Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
18.0" Round Pipe n=0.020 L=111.0' S=0.0090 '/' Capacity=6.48 cfs Outflow=0.00 cfs 0.000 af

Reach 8R: Basin #1B Discharge Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
18.0" Round Pipe n=0.020 L=28.0' S=0.0357 '/' Capacity=12.90 cfs Outflow=0.00 cfs 0.000 af

Reach 9R: Basin #1C Discharge Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
18.0" Round Pipe n=0.020 L=27.0' S=0.0370 '/' Capacity=13.14 cfs Outflow=0.00 cfs 0.000 af

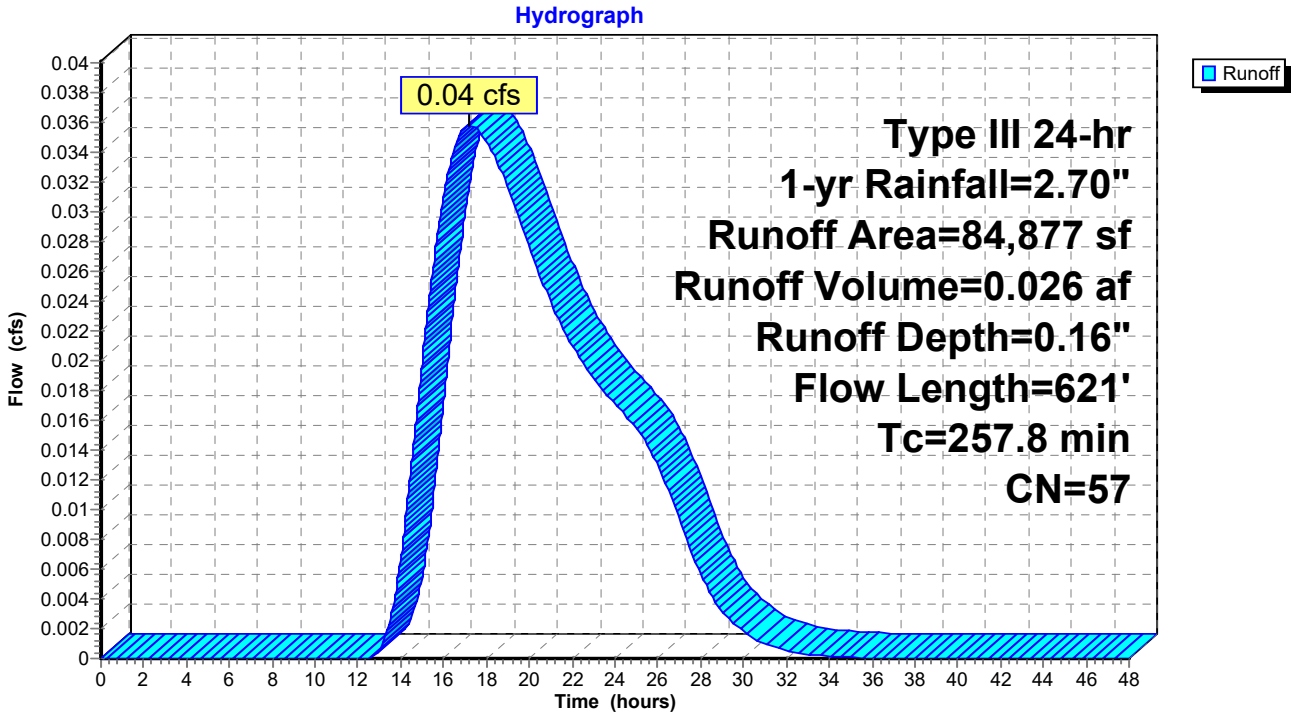
Pond 2P: Detention Basin #1C Peak Elev=307.55' Storage=1,149 cf Inflow=0.04 cfs 0.026 af
Outflow=0.00 cfs 0.000 af

Pond 4P: Detention Basin #1A Peak Elev=361.25' Storage=2,153 cf Inflow=0.08 cfs 0.049 af
Outflow=0.00 cfs 0.000 af

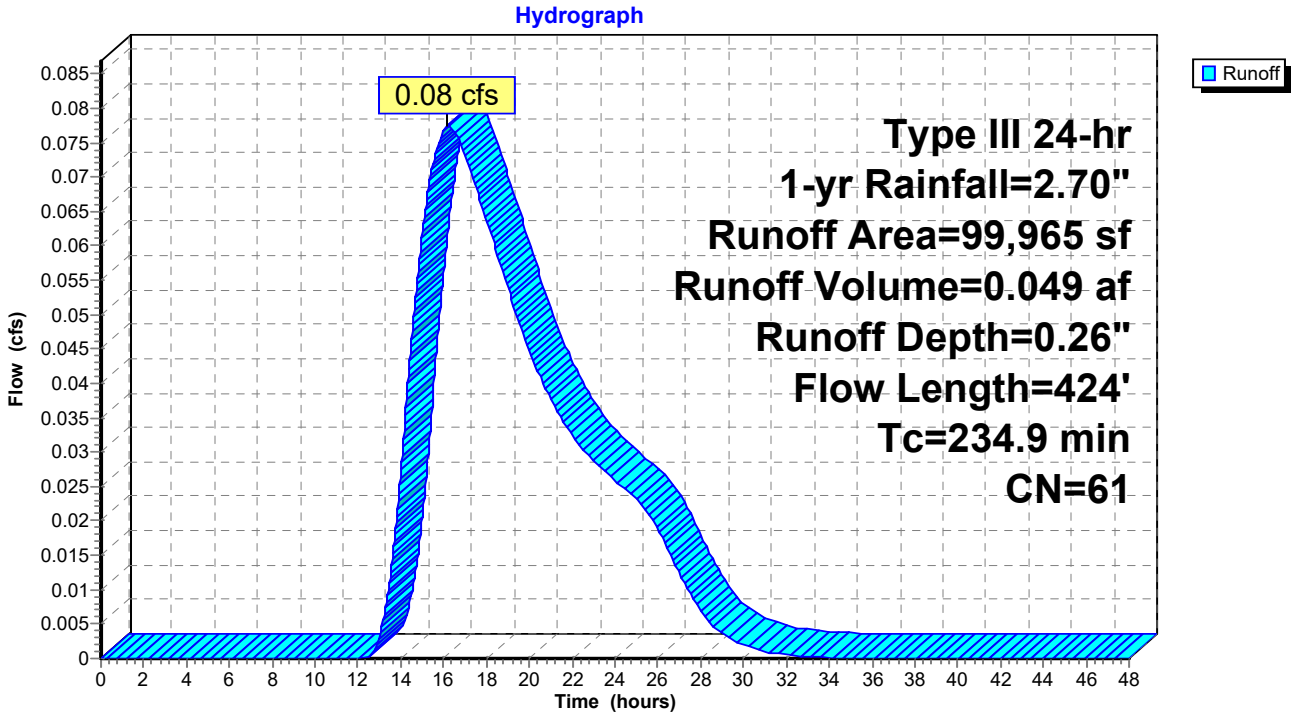
Pond 6P: Detention Basin #1B Peak Elev=325.46' Storage=1,295 cf Inflow=0.05 cfs 0.030 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 5.492 ac Runoff Volume = 0.106 af Average Runoff Depth = 0.23"
98.98% Pervious = 5.436 ac 1.02% Impervious = 0.056 ac

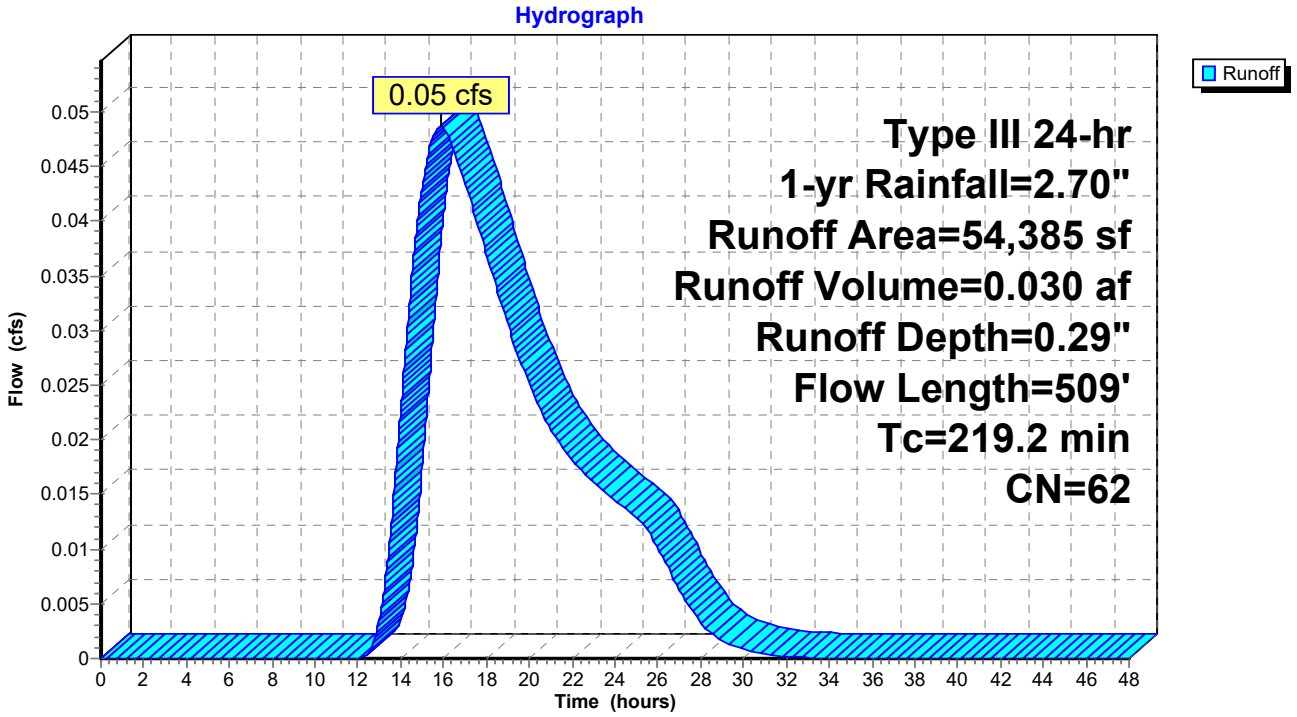
Subcatchment 1S: Drainage Area #1C



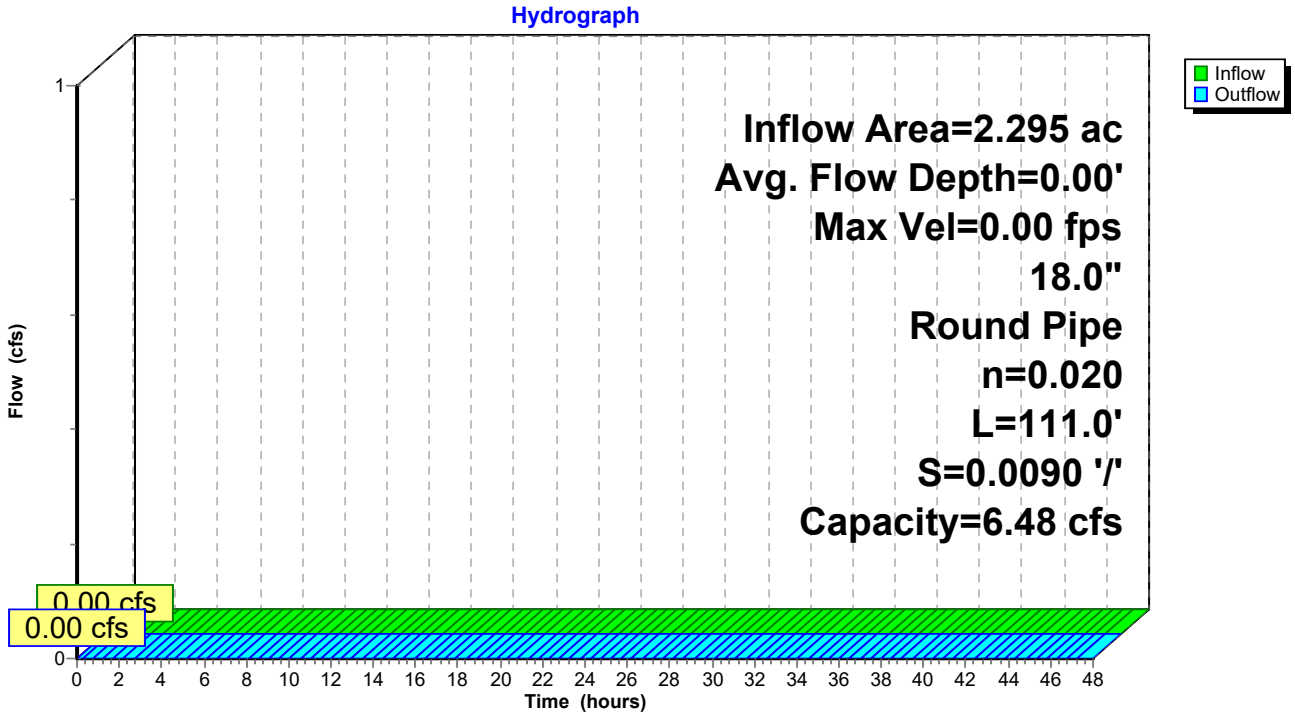
Subcatchment 3S: Drainage Area #1A



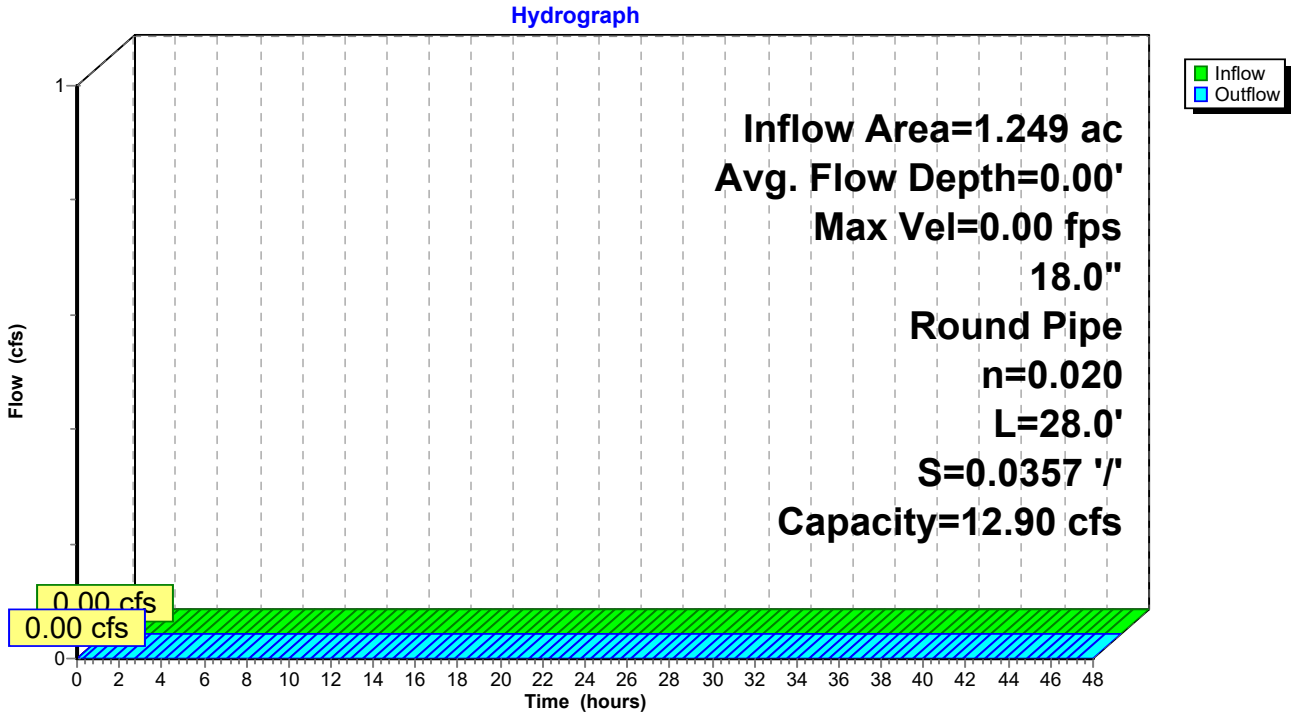
Subcatchment 5S: Drainage Area #1B



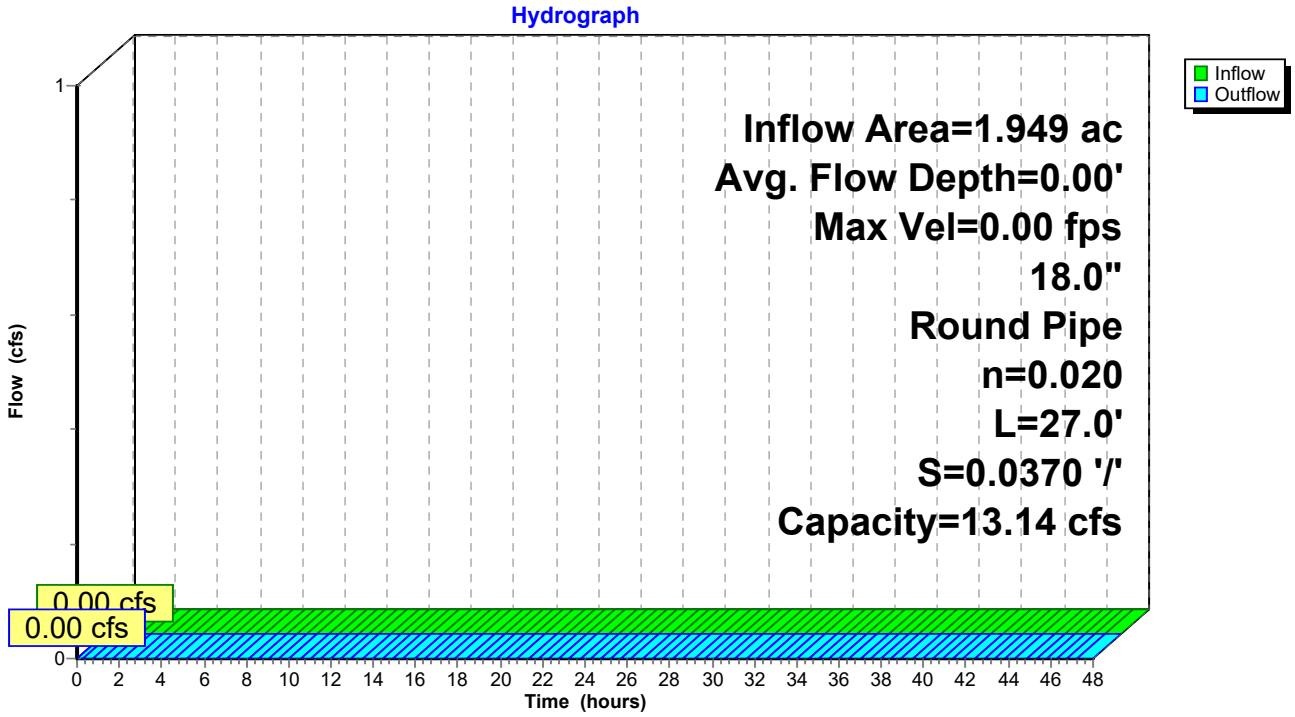
Reach 7R: Basin #1A Discharge



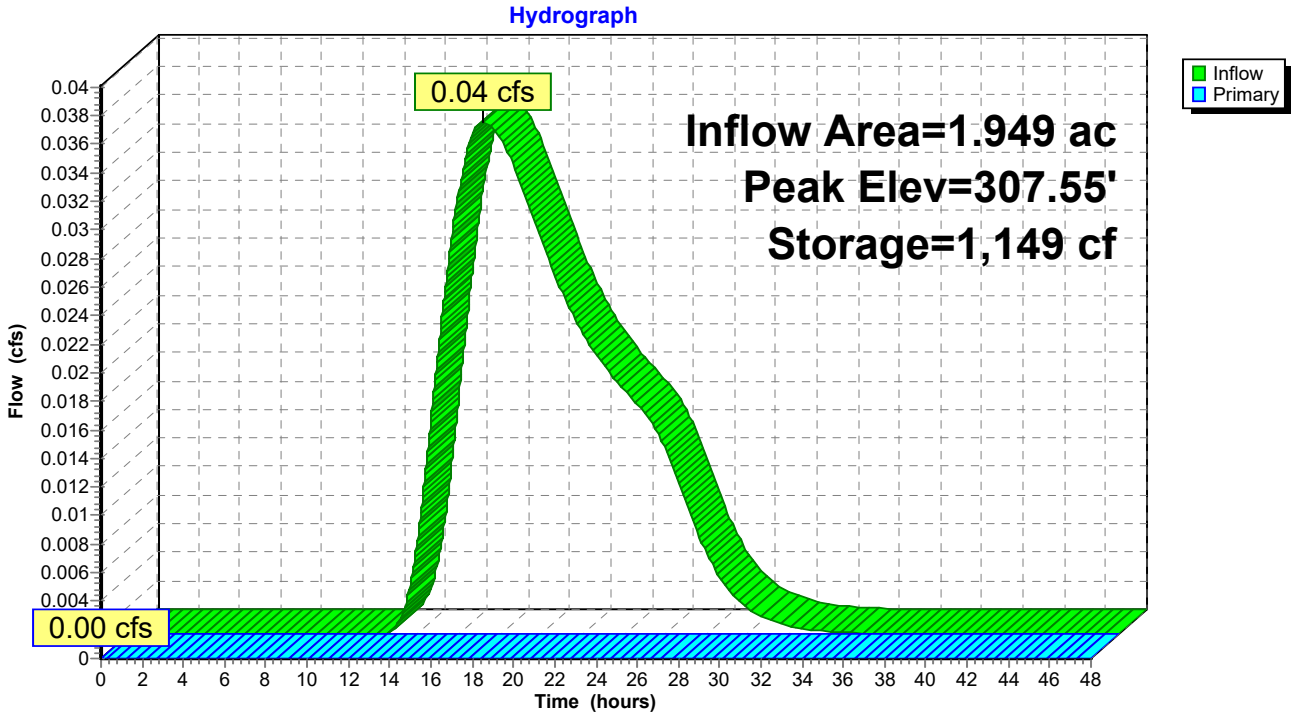
Reach 8R: Basin #1B Discharge



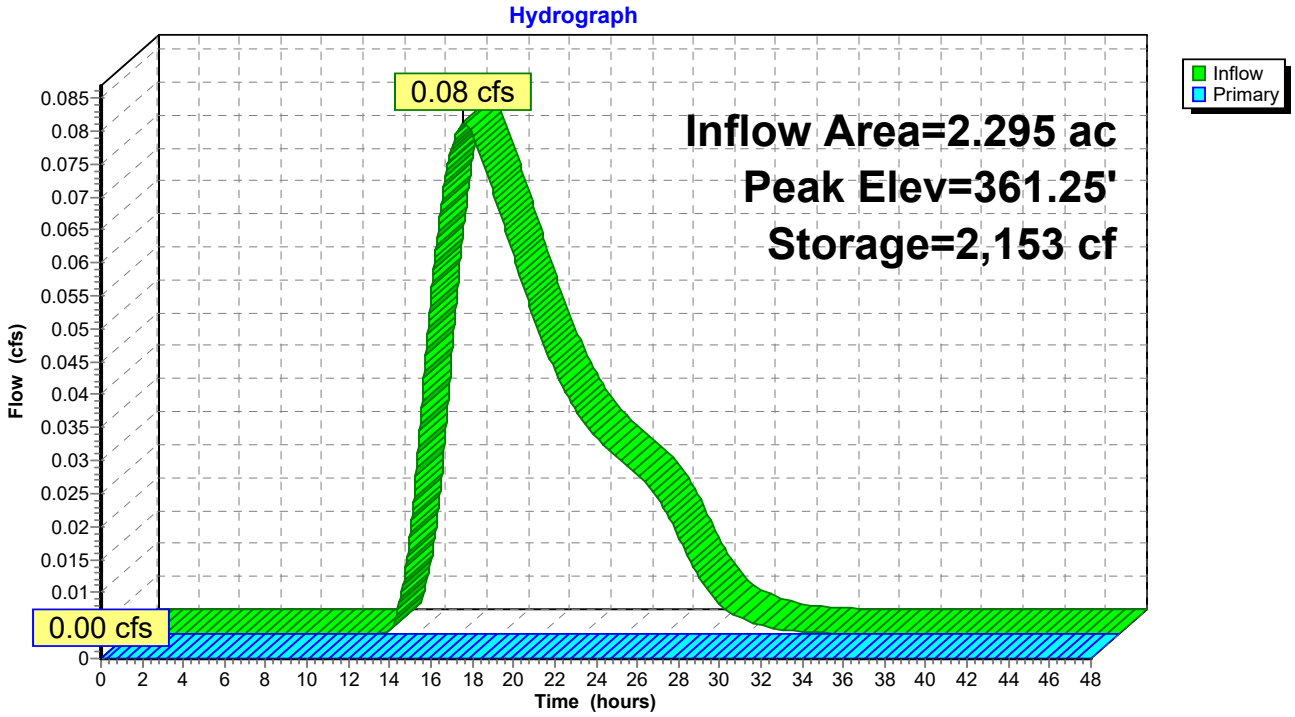
Reach 9R: Basin #1C Discharge



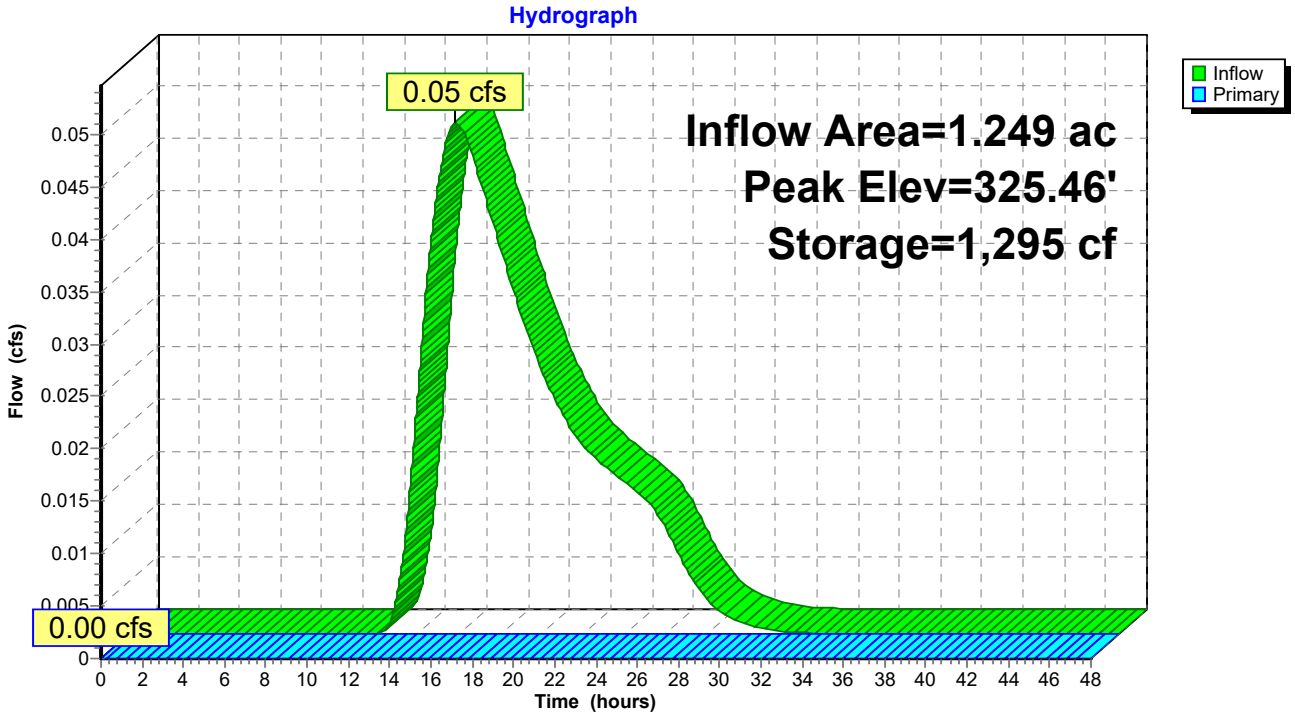
Pond 2P: Detention Basin #1C



Pond 4P: Detention Basin #1A



Pond 6P: Detention Basin #1B



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area #1C Runoff Area=84,877 sf 0.00% Impervious Runoff Depth=0.38"
Flow Length=621' Tc=257.8 min CN=57 Runoff=0.10 cfs 0.062 af

Subcatchment 3S: Drainage Area #1A Runoff Area=99,965 sf 2.45% Impervious Runoff Depth=0.53"
Flow Length=424' Tc=234.9 min CN=61 Runoff=0.18 cfs 0.101 af

Subcatchment 5S: Drainage Area #1B Runoff Area=54,385 sf 0.00% Impervious Runoff Depth=0.57"
Flow Length=509' Tc=219.2 min CN=62 Runoff=0.11 cfs 0.059 af

Reach 7R: Basin #1A Discharge Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
18.0" Round Pipe n=0.020 L=111.0' S=0.0090 '/' Capacity=6.48 cfs Outflow=0.00 cfs 0.000 af

Reach 8R: Basin #1B Discharge Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
18.0" Round Pipe n=0.020 L=28.0' S=0.0357 '/' Capacity=12.90 cfs Outflow=0.00 cfs 0.000 af

Reach 9R: Basin #1C Discharge Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
18.0" Round Pipe n=0.020 L=27.0' S=0.0370 '/' Capacity=13.14 cfs Outflow=0.00 cfs 0.000 af

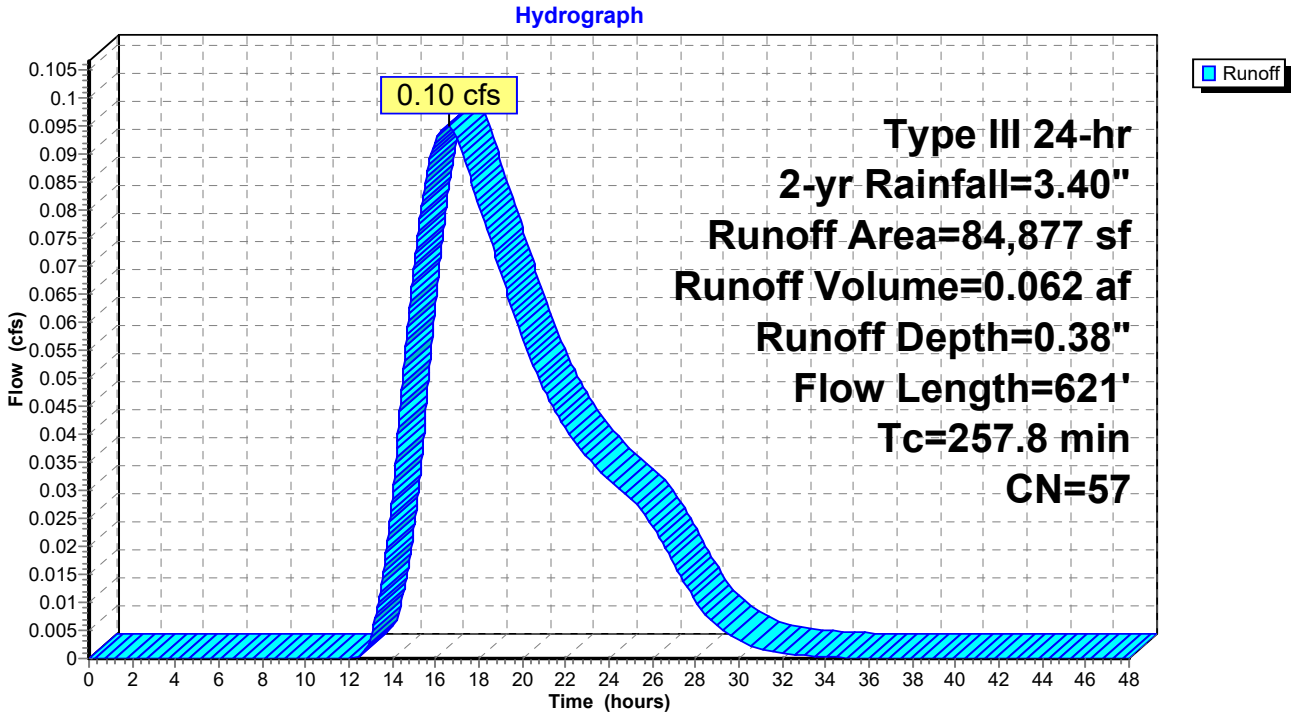
Pond 2P: Detention Basin #1C Peak Elev=309.19' Storage=2,681 cf Inflow=0.10 cfs 0.062 af
Outflow=0.00 cfs 0.000 af

Pond 4P: Detention Basin #1A Peak Elev=362.38' Storage=4,402 cf Inflow=0.18 cfs 0.101 af
Outflow=0.00 cfs 0.000 af

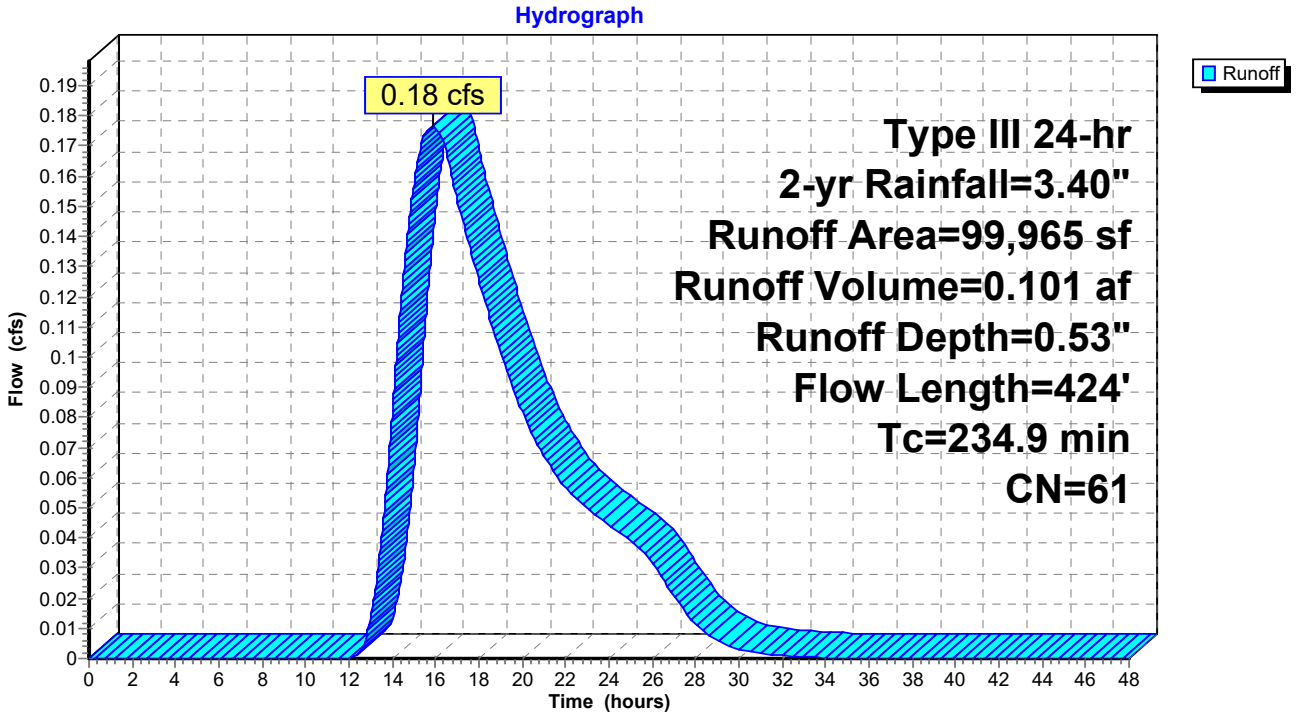
Pond 6P: Detention Basin #1B Peak Elev=326.68' Storage=2,580 cf Inflow=0.11 cfs 0.059 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 5.492 ac Runoff Volume = 0.222 af Average Runoff Depth = 0.48"
98.98% Pervious = 5.436 ac 1.02% Impervious = 0.056 ac

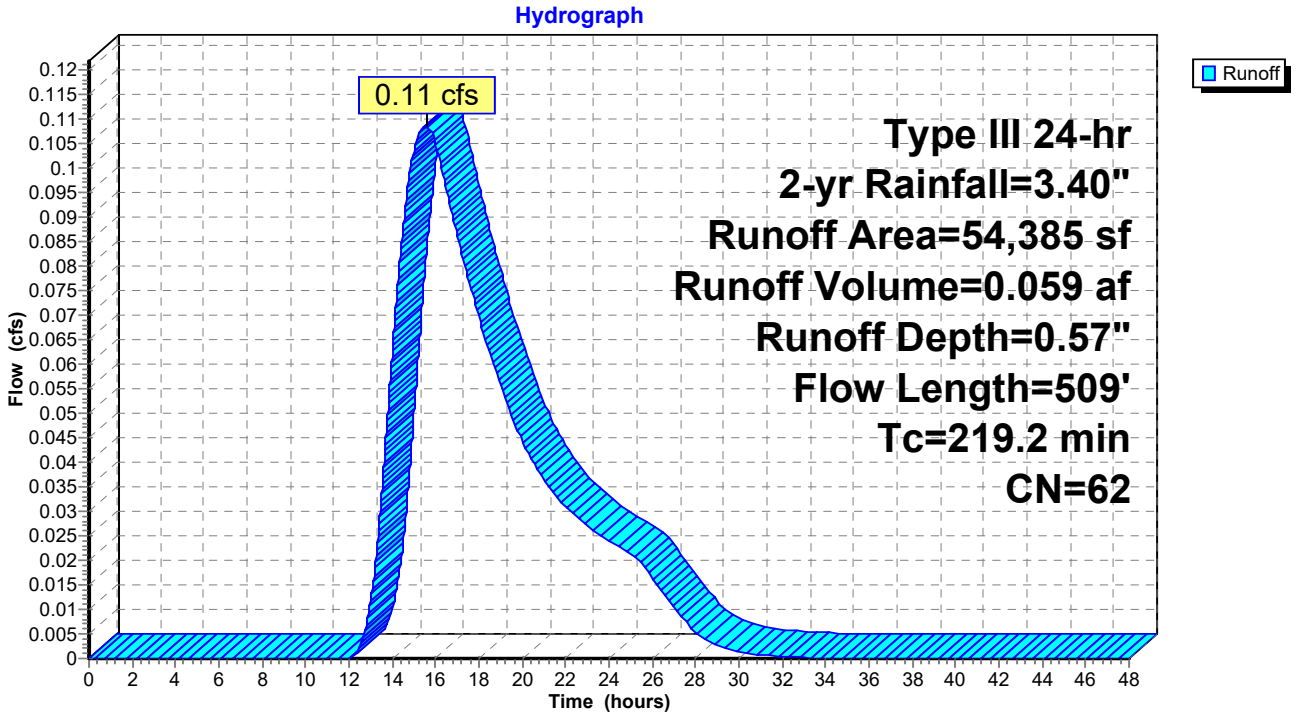
Subcatchment 1S: Drainage Area #1C



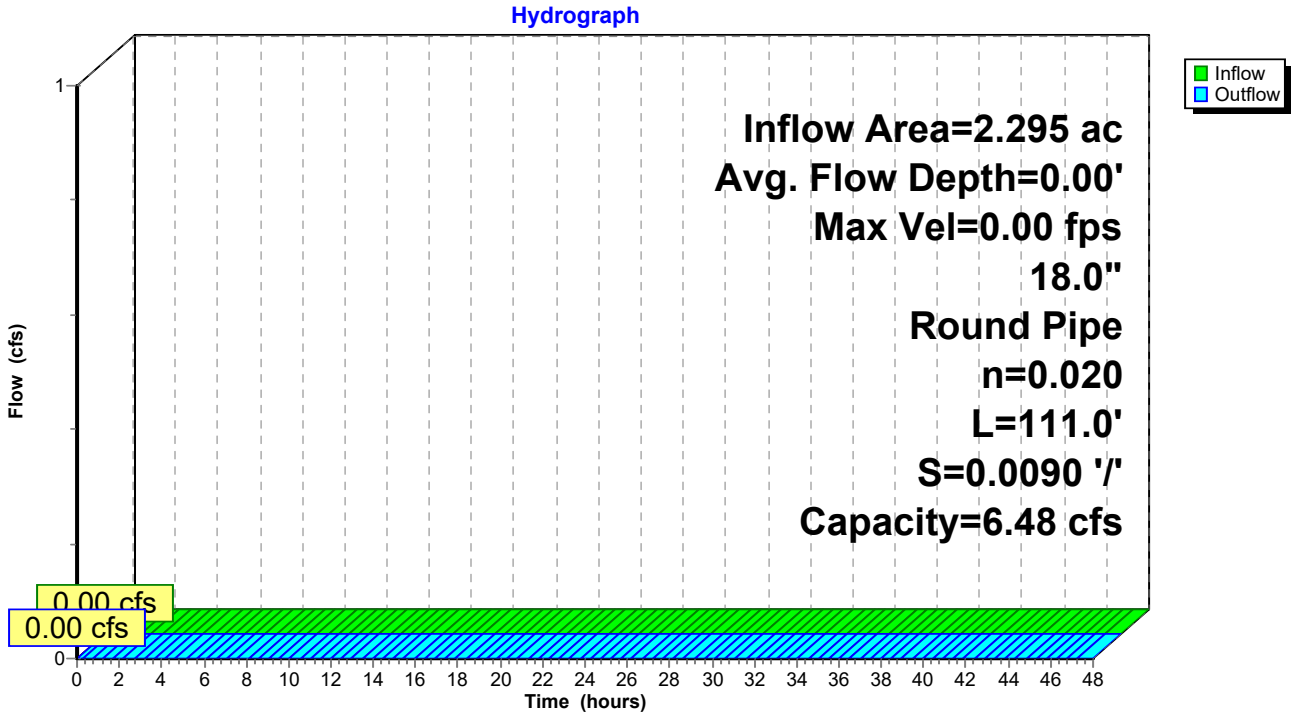
Subcatchment 3S: Drainage Area #1A



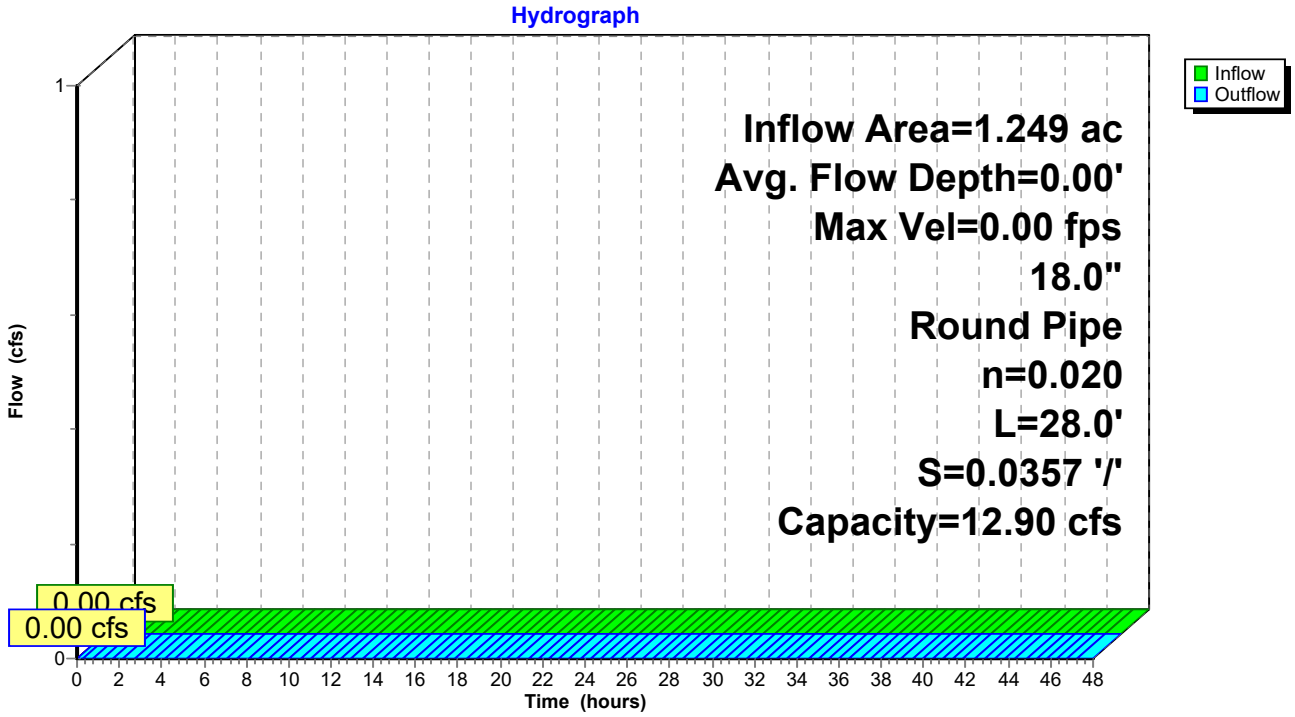
Subcatchment 5S: Drainage Area #1B



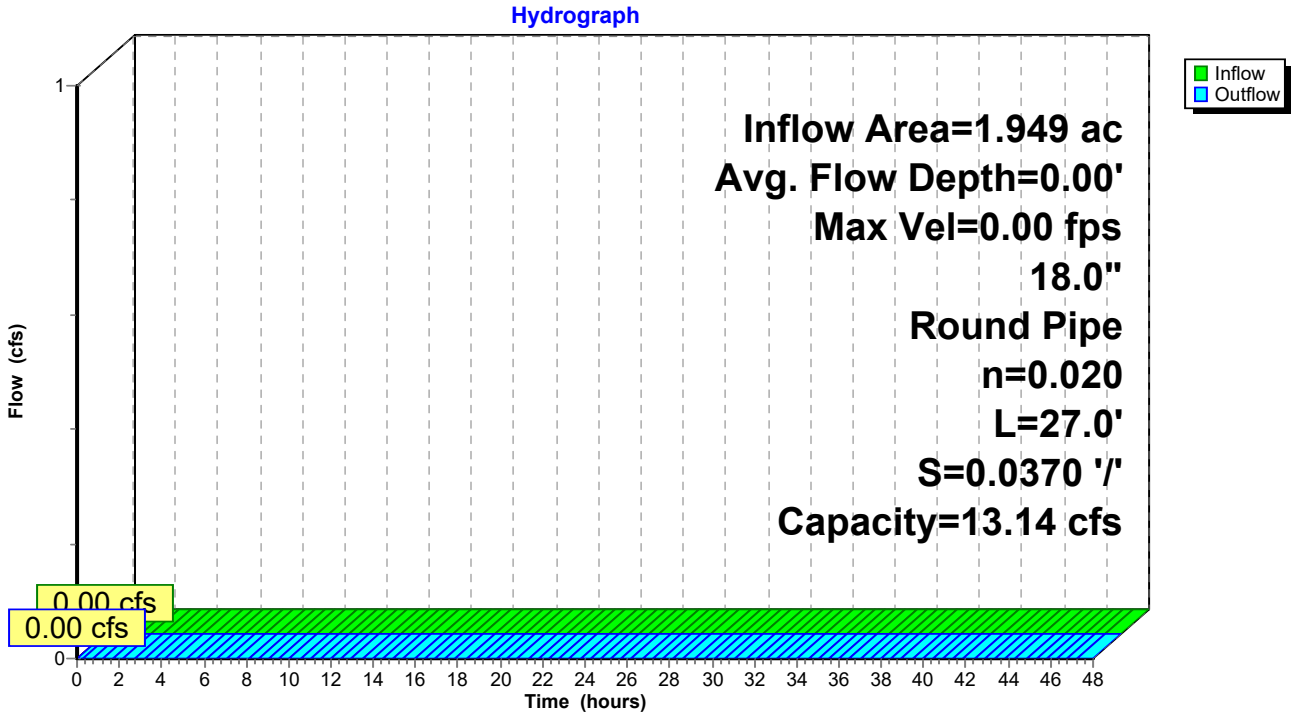
Reach 7R: Basin #1A Discharge



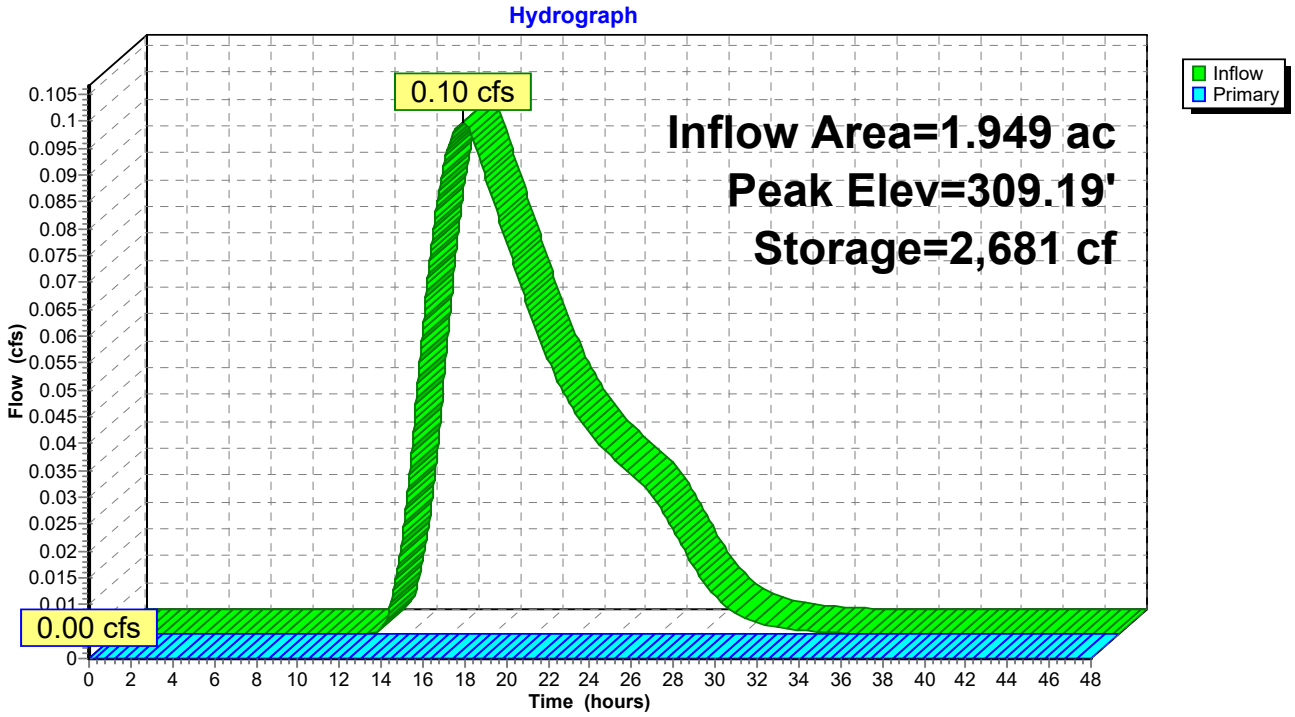
Reach 8R: Basin #1B Discharge



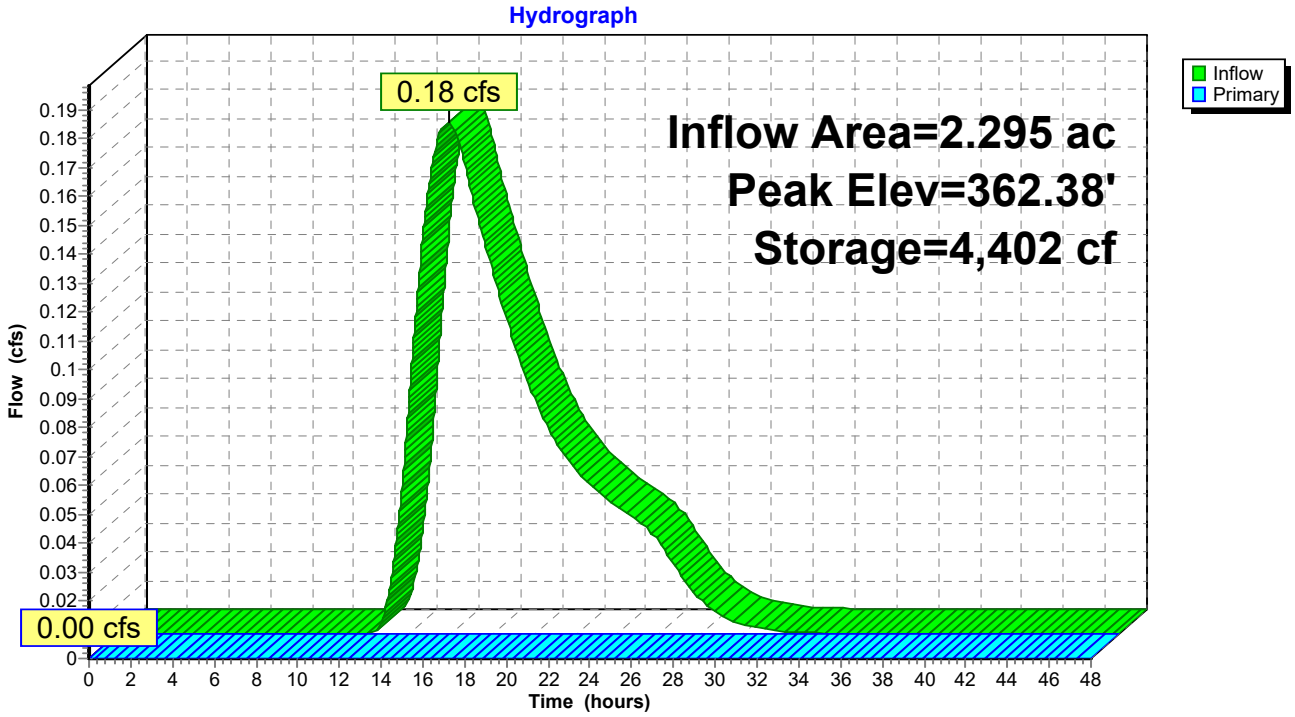
Reach 9R: Basin #1C Discharge



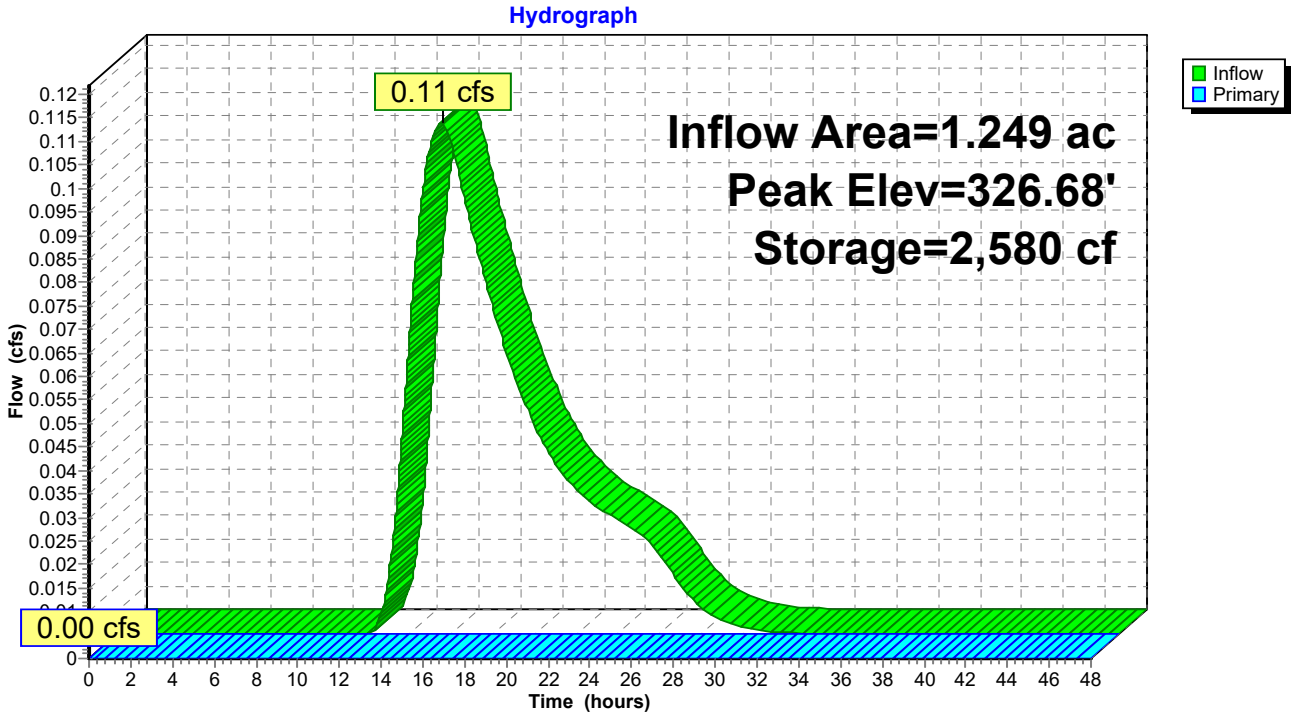
Pond 2P: Detention Basin #1C



Pond 4P: Detention Basin #1A



Pond 6P: Detention Basin #1B



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area #1C Runoff Area=84,877 sf 0.00% Impervious Runoff Depth=1.10"
Flow Length=621' Tc=257.8 min CN=57 Runoff=0.32 cfs 0.179 af

Subcatchment 3S: Drainage Area #1A Runoff Area=99,965 sf 2.45% Impervious Runoff Depth=1.37"
Flow Length=424' Tc=234.9 min CN=61 Runoff=0.52 cfs 0.262 af

Subcatchment 5S: Drainage Area #1B Runoff Area=54,385 sf 0.00% Impervious Runoff Depth=1.44"
Flow Length=509' Tc=219.2 min CN=62 Runoff=0.31 cfs 0.150 af

Reach 7R: Basin #1A Discharge Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
18.0" Round Pipe n=0.020 L=111.0' S=0.0090 '/' Capacity=6.48 cfs Outflow=0.00 cfs 0.000 af

Reach 8R: Basin #1B Discharge Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
18.0" Round Pipe n=0.020 L=28.0' S=0.0357 '/' Capacity=12.90 cfs Outflow=0.00 cfs 0.000 af

Reach 9R: Basin #1C Discharge Avg. Flow Depth=0.10' Max Vel=2.26 fps Inflow=0.11 cfs 0.039 af
18.0" Round Pipe n=0.020 L=27.0' S=0.0370 '/' Capacity=13.14 cfs Outflow=0.11 cfs 0.039 af

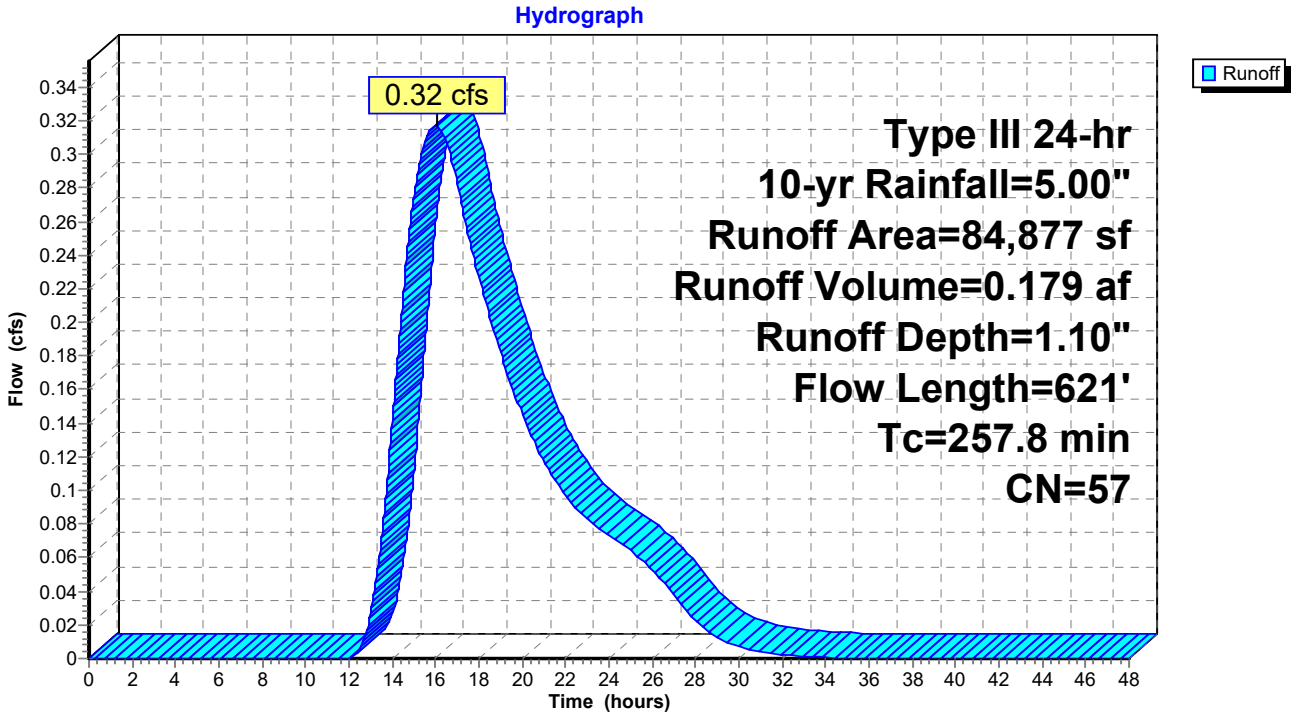
Pond 2P: Detention Basin #1C Peak Elev=312.00' Storage=6,120 cf Inflow=0.32 cfs 0.179 af
Outflow=0.11 cfs 0.039 af

Pond 4P: Detention Basin #1A Peak Elev=365.27' Storage=11,405 cf Inflow=0.52 cfs 0.262 af
Outflow=0.00 cfs 0.000 af

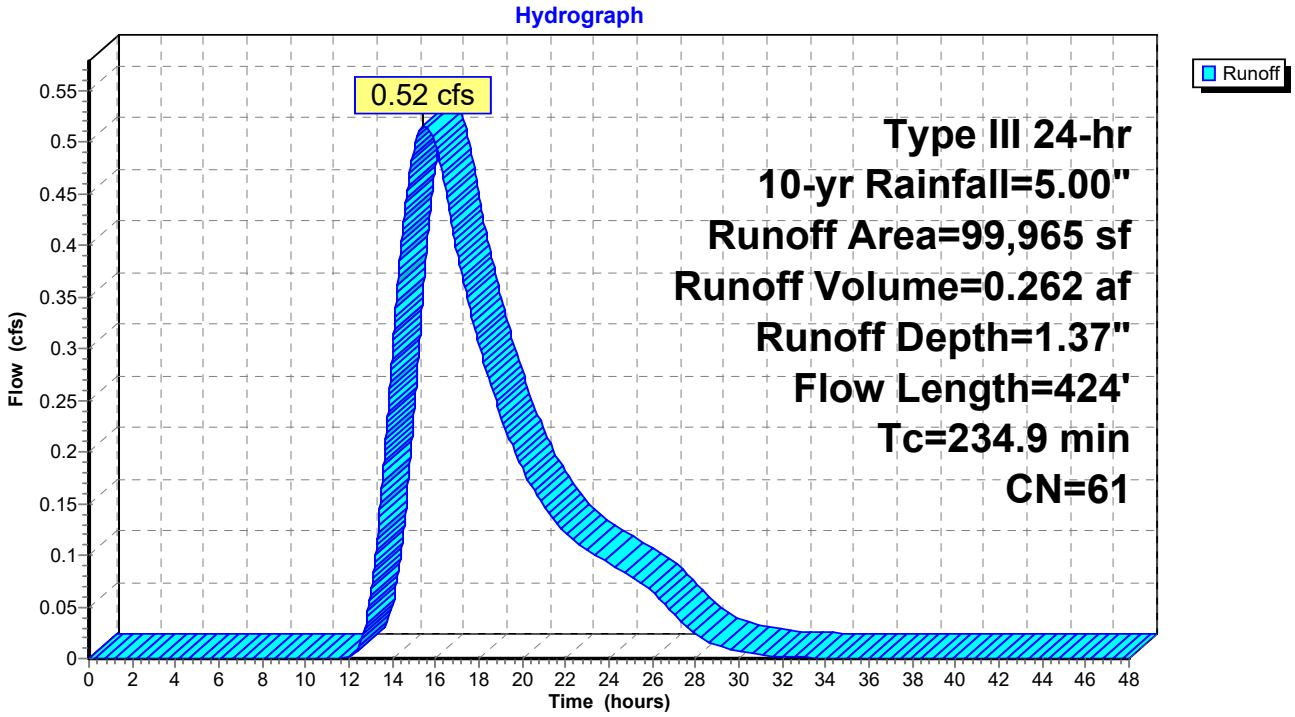
Pond 6P: Detention Basin #1B Peak Elev=329.61' Storage=6,519 cf Inflow=0.31 cfs 0.150 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 5.492 ac Runoff Volume = 0.591 af Average Runoff Depth = 1.29"
98.98% Pervious = 5.436 ac 1.02% Impervious = 0.056 ac

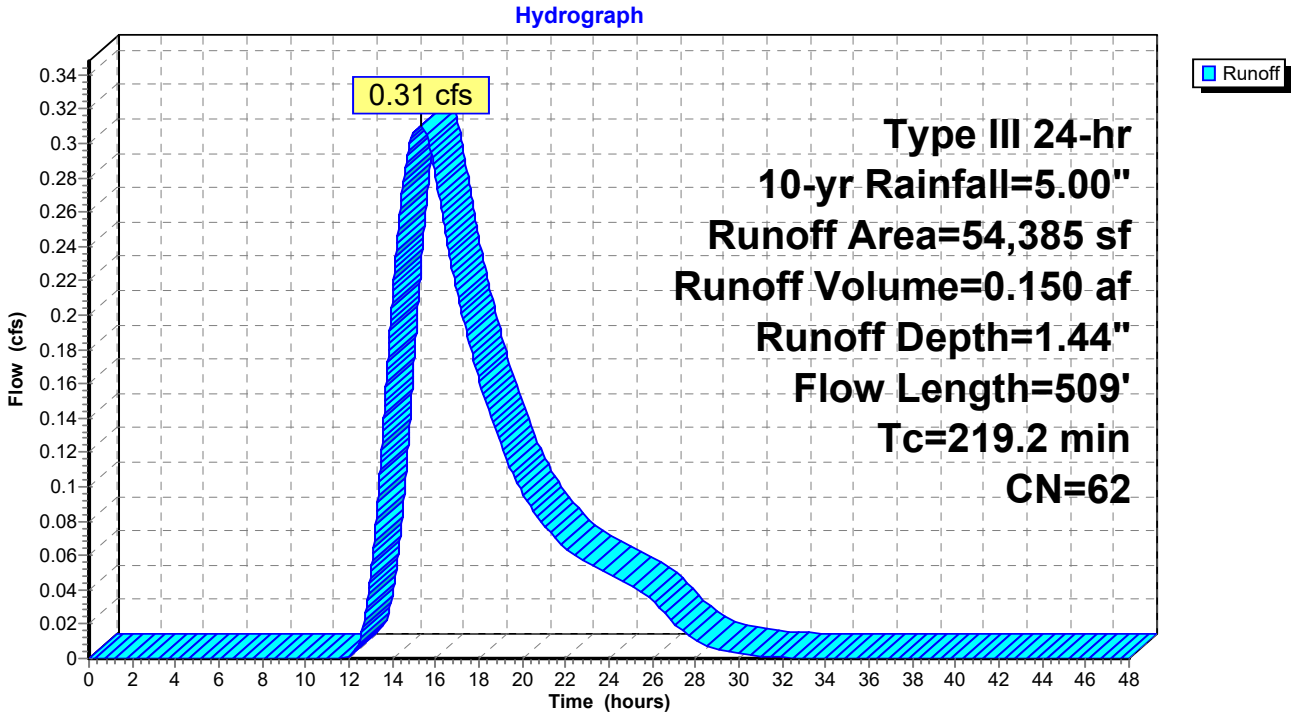
Subcatchment 1S: Drainage Area #1C



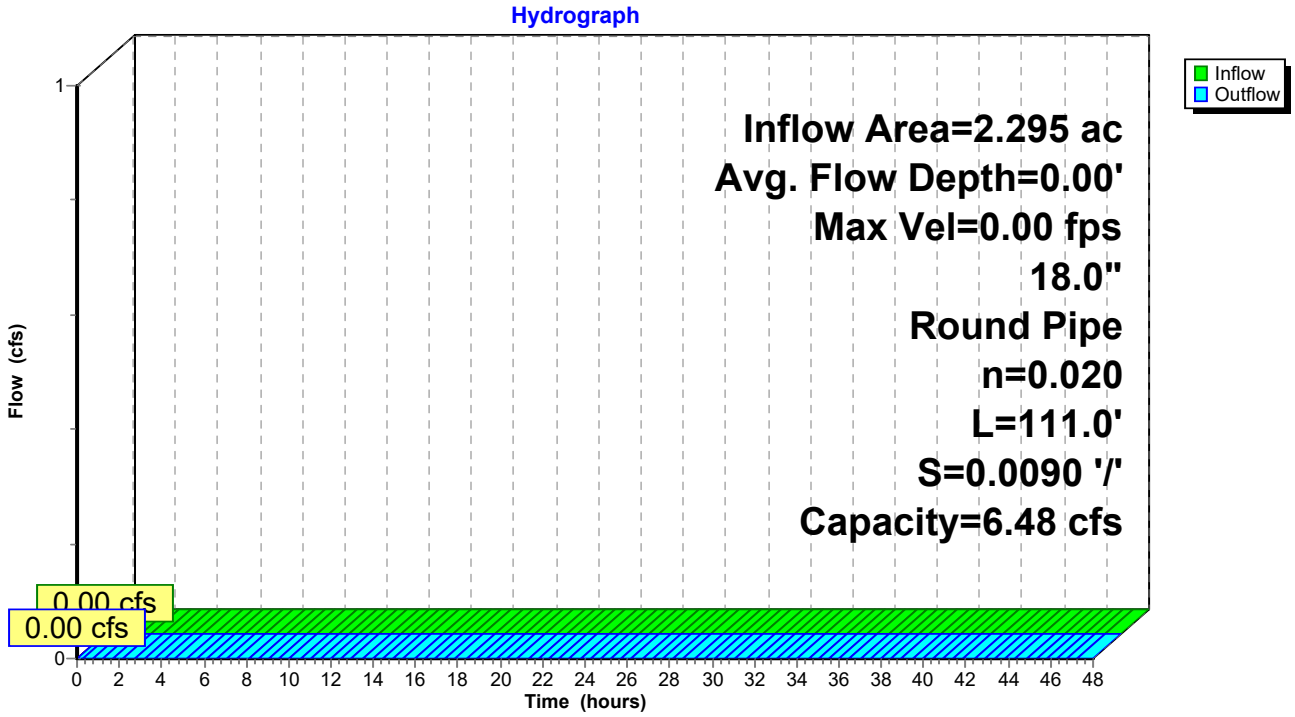
Subcatchment 3S: Drainage Area #1A



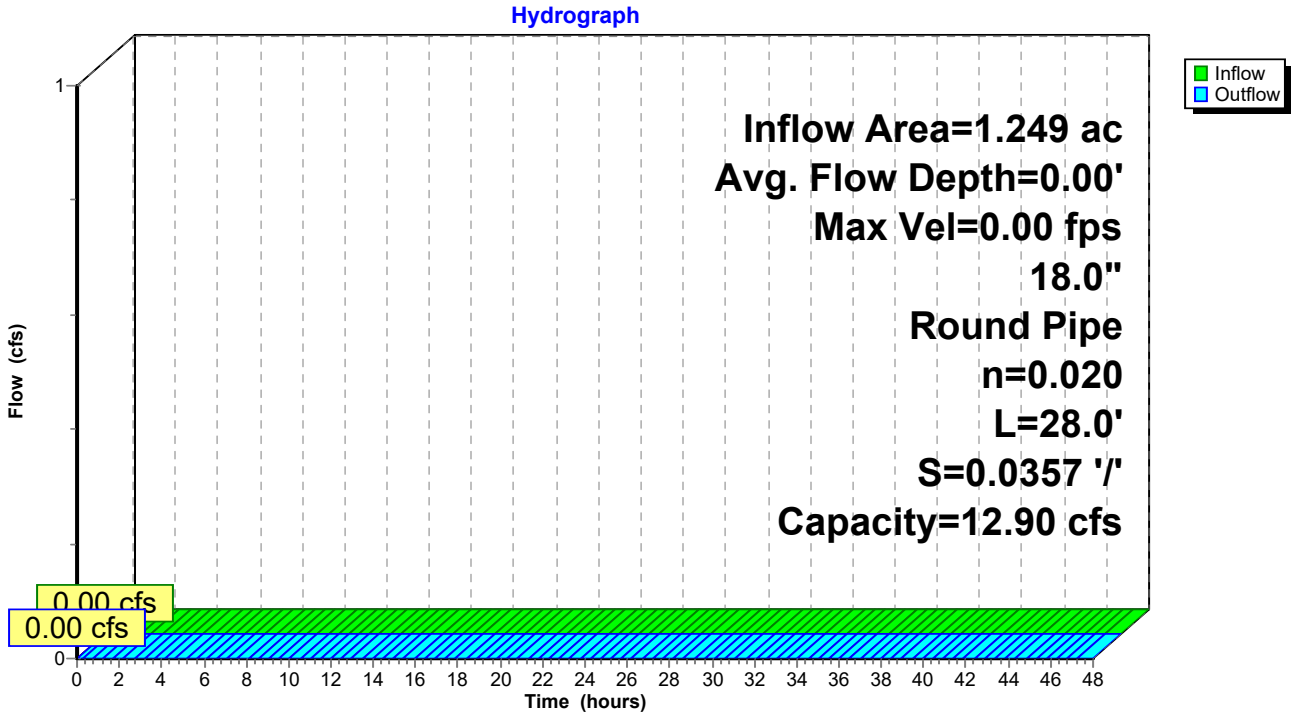
Subcatchment 5S: Drainage Area #1B



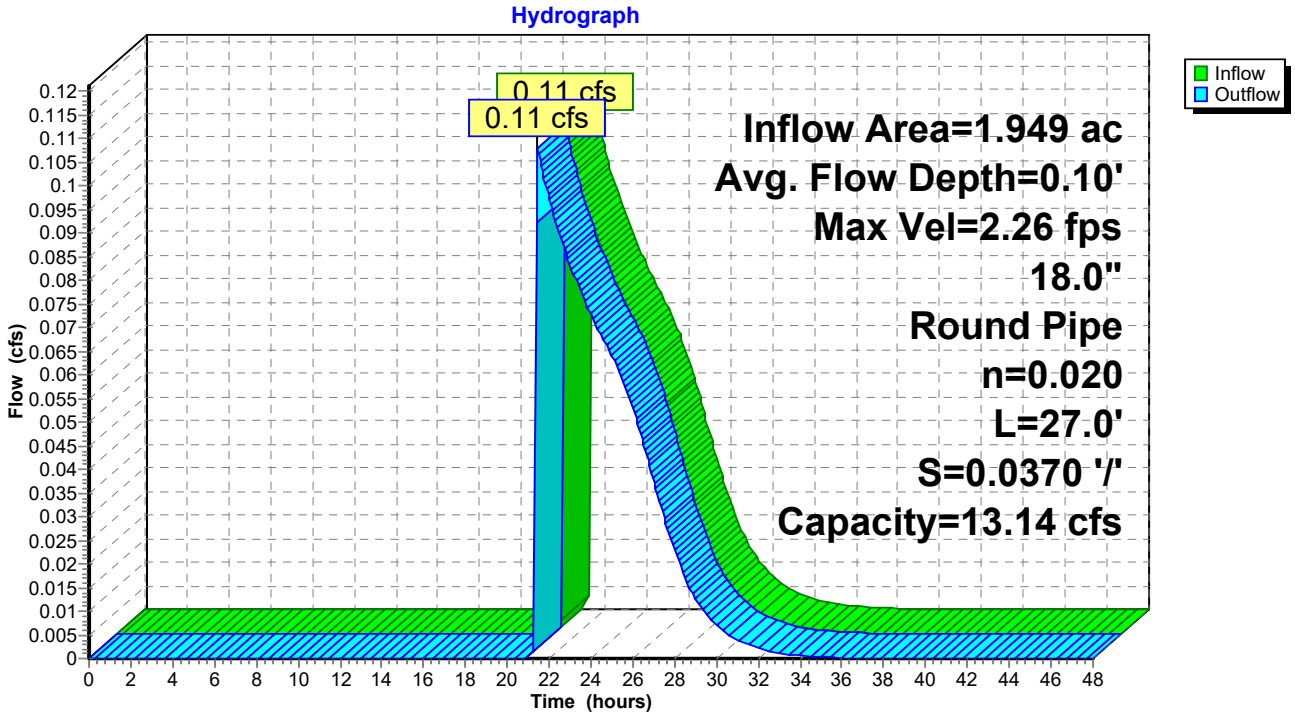
Reach 7R: Basin #1A Discharge



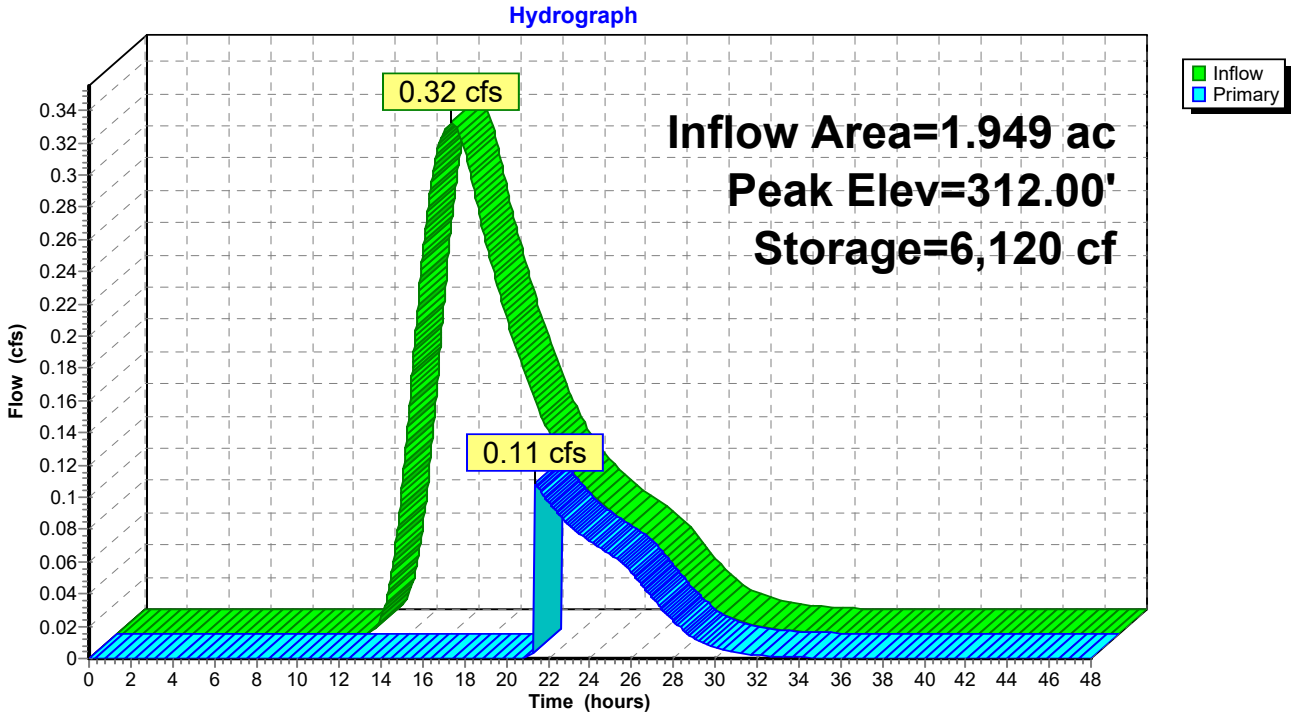
Reach 8R: Basin #1B Discharge



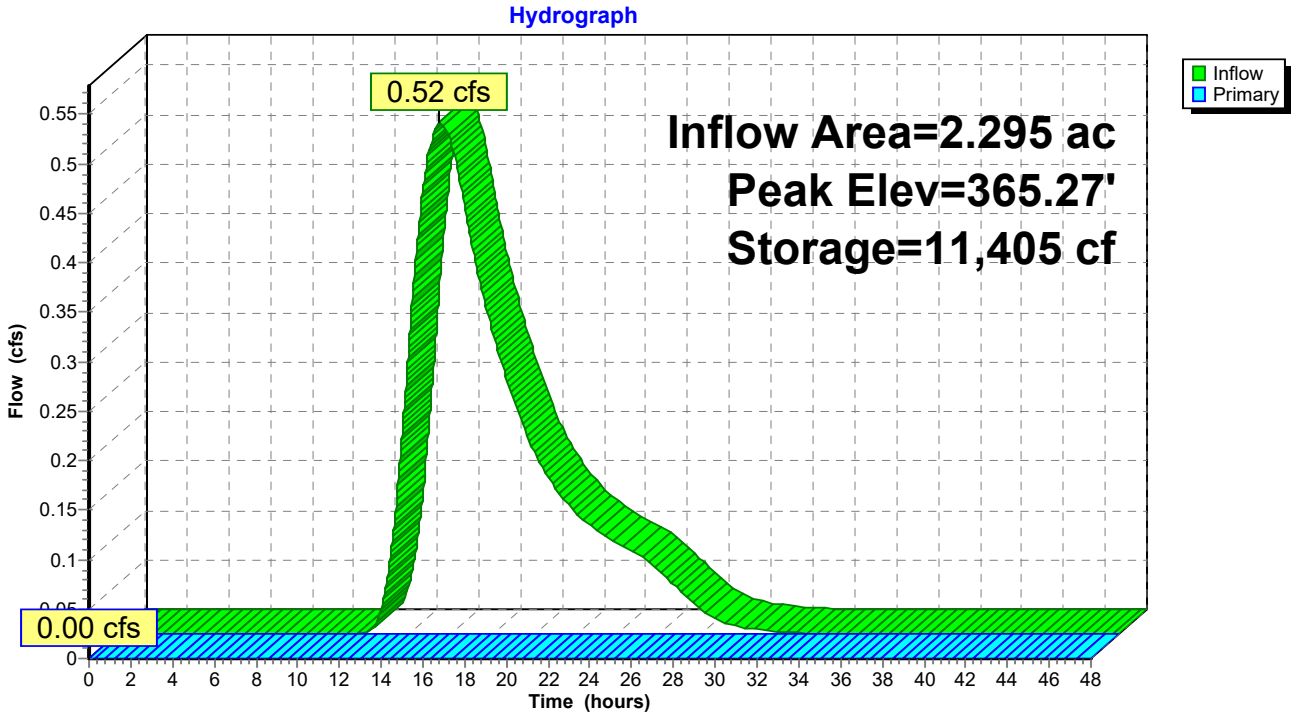
Reach 9R: Basin #1C Discharge



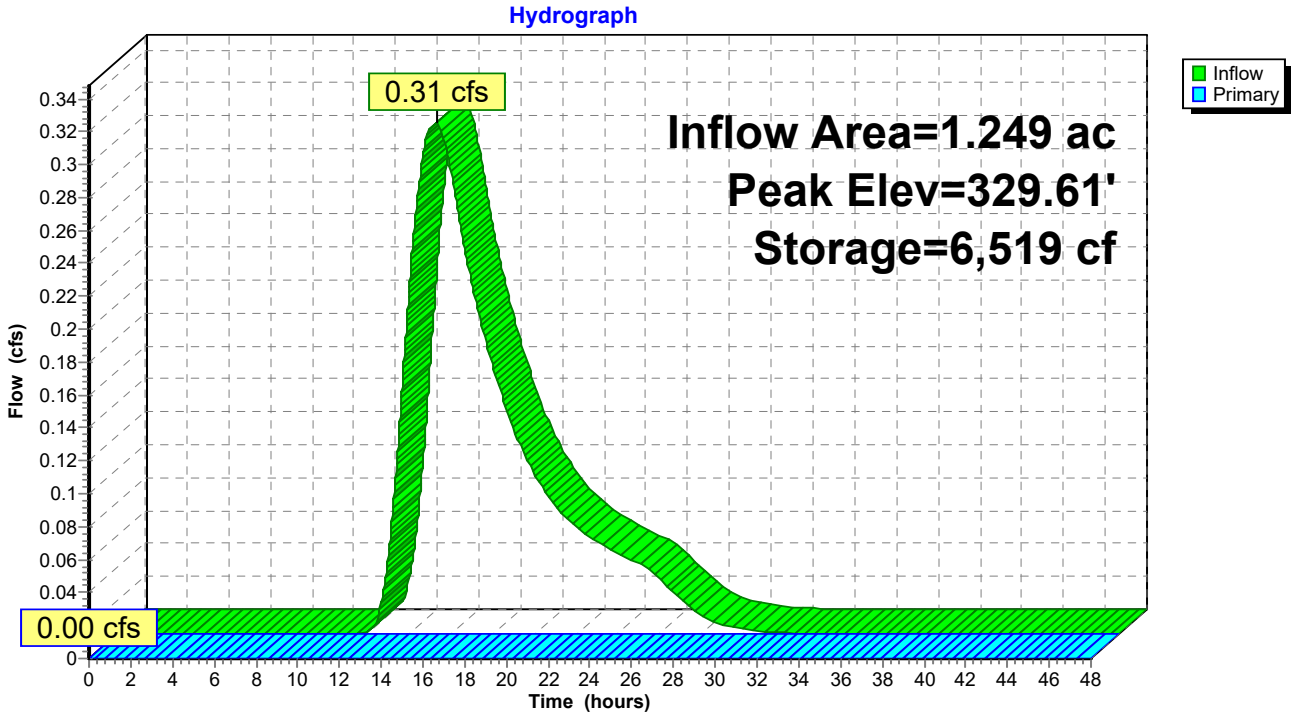
Pond 2P: Detention Basin #1C



Pond 4P: Detention Basin #1A



Pond 6P: Detention Basin #1B



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area #1C Runoff Area=84,877 sf 0.00% Impervious Runoff Depth=1.50"
Flow Length=621' Tc=257.8 min CN=57 Runoff=0.45 cfs 0.243 af

Subcatchment 3S: Drainage Area #1A Runoff Area=99,965 sf 2.45% Impervious Runoff Depth=1.81"
Flow Length=424' Tc=234.9 min CN=61 Runoff=0.70 cfs 0.346 af

Subcatchment 5S: Drainage Area #1B Runoff Area=54,385 sf 0.00% Impervious Runoff Depth=1.89"
Flow Length=509' Tc=219.2 min CN=62 Runoff=0.42 cfs 0.196 af

Reach 7R: Basin #1A Discharge Avg. Flow Depth=0.14' Max Vel=1.43 fps Inflow=0.13 cfs 0.036 af
18.0" Round Pipe n=0.020 L=111.0' S=0.0090 '/' Capacity=6.48 cfs Outflow=0.12 cfs 0.036 af

Reach 8R: Basin #1B Discharge Avg. Flow Depth=0.09' Max Vel=2.13 fps Inflow=0.09 cfs 0.033 af
18.0" Round Pipe n=0.020 L=28.0' S=0.0357 '/' Capacity=12.90 cfs Outflow=0.09 cfs 0.033 af

Reach 9R: Basin #1C Discharge Avg. Flow Depth=0.15' Max Vel=3.02 fps Inflow=0.29 cfs 0.103 af
18.0" Round Pipe n=0.020 L=27.0' S=0.0370 '/' Capacity=13.14 cfs Outflow=0.29 cfs 0.103 af

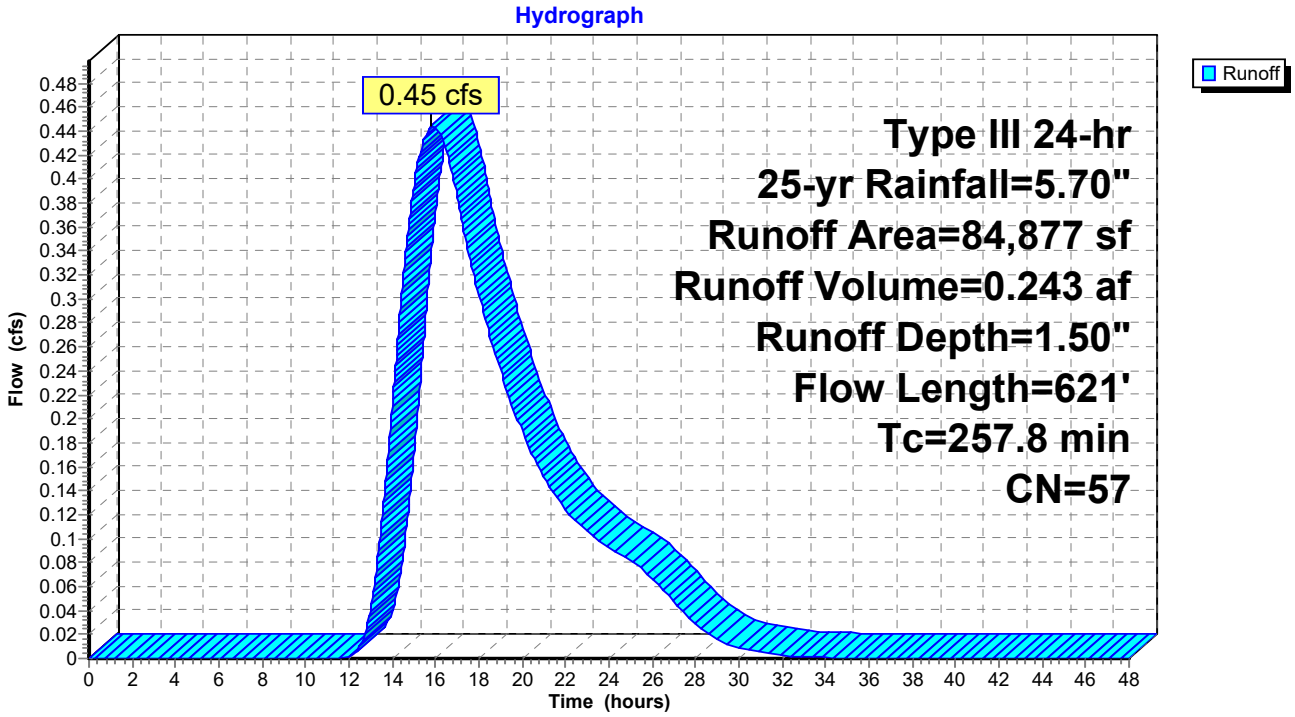
Pond 2P: Detention Basin #1C Peak Elev=312.00' Storage=6,120 cf Inflow=0.45 cfs 0.243 af
Outflow=0.29 cfs 0.103 af

Pond 4P: Detention Basin #1A Peak Elev=366.00' Storage=13,488 cf Inflow=0.70 cfs 0.346 af
Outflow=0.13 cfs 0.036 af

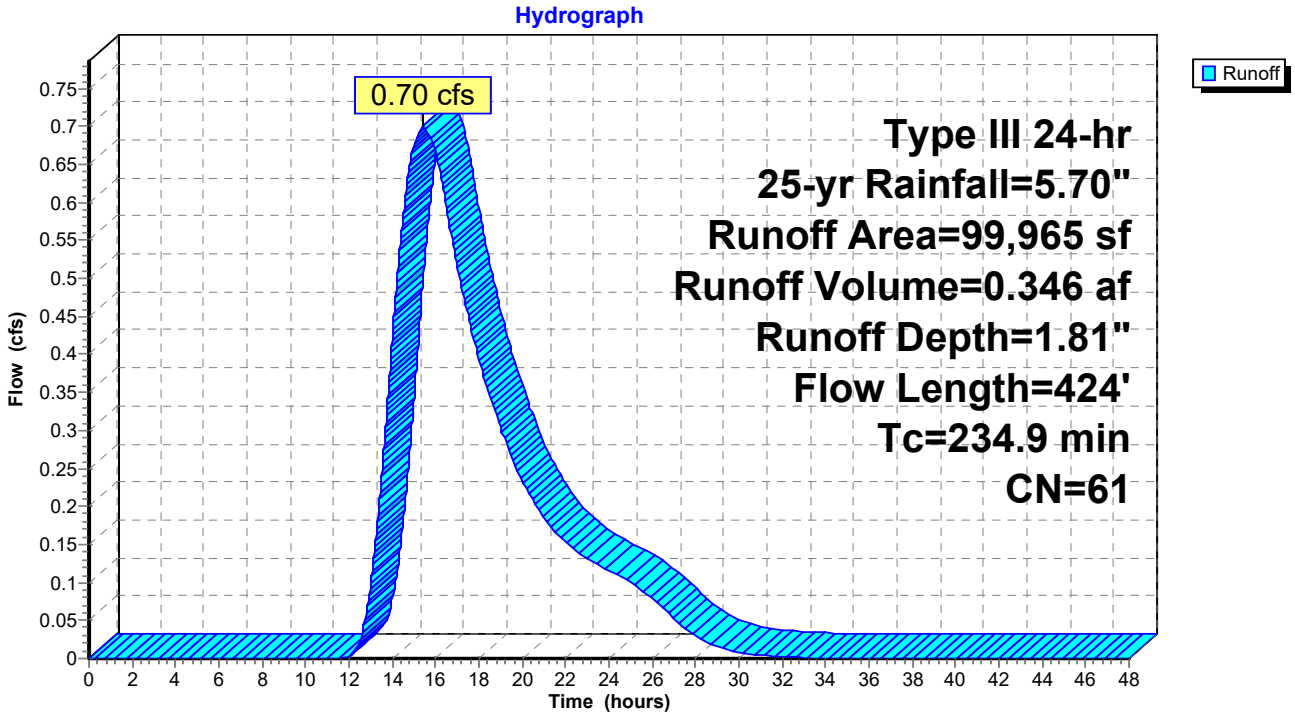
Pond 6P: Detention Basin #1B Peak Elev=330.00' Storage=7,140 cf Inflow=0.42 cfs 0.196 af
Outflow=0.09 cfs 0.033 af

Total Runoff Area = 5.492 ac Runoff Volume = 0.785 af Average Runoff Depth = 1.72"
98.98% Pervious = 5.436 ac 1.02% Impervious = 0.056 ac

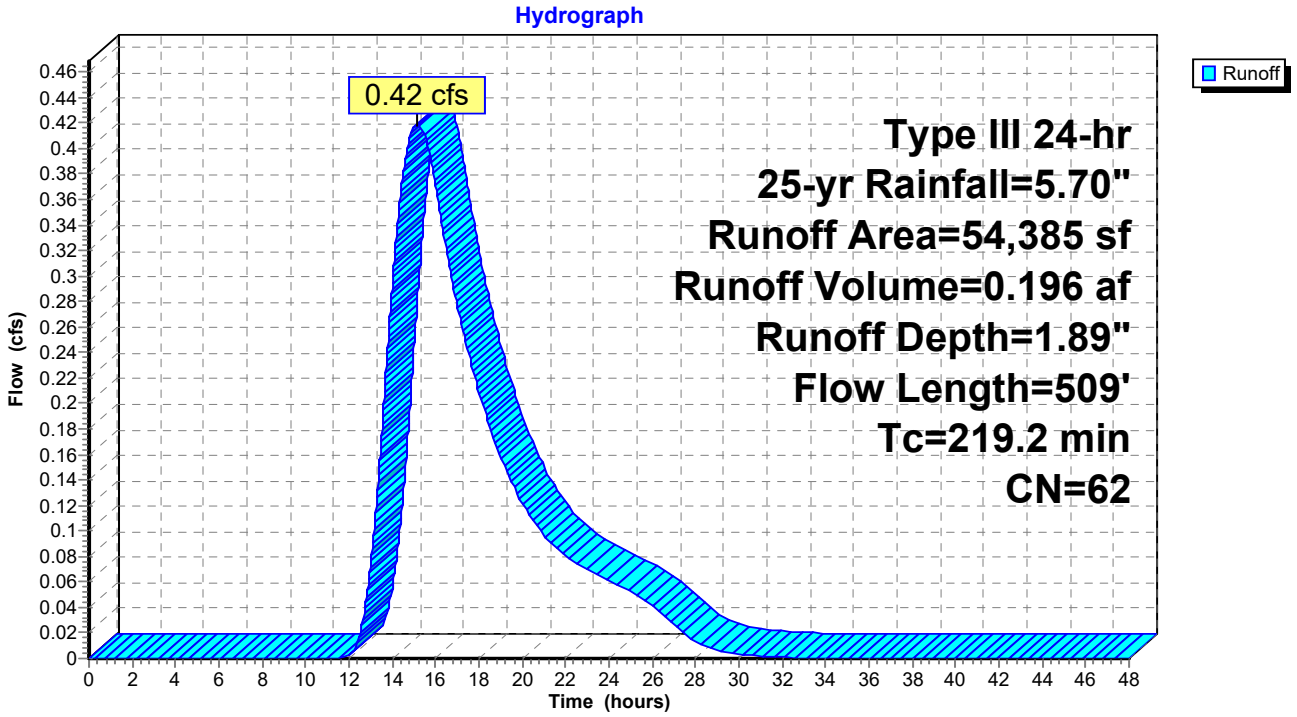
Subcatchment 1S: Drainage Area #1C



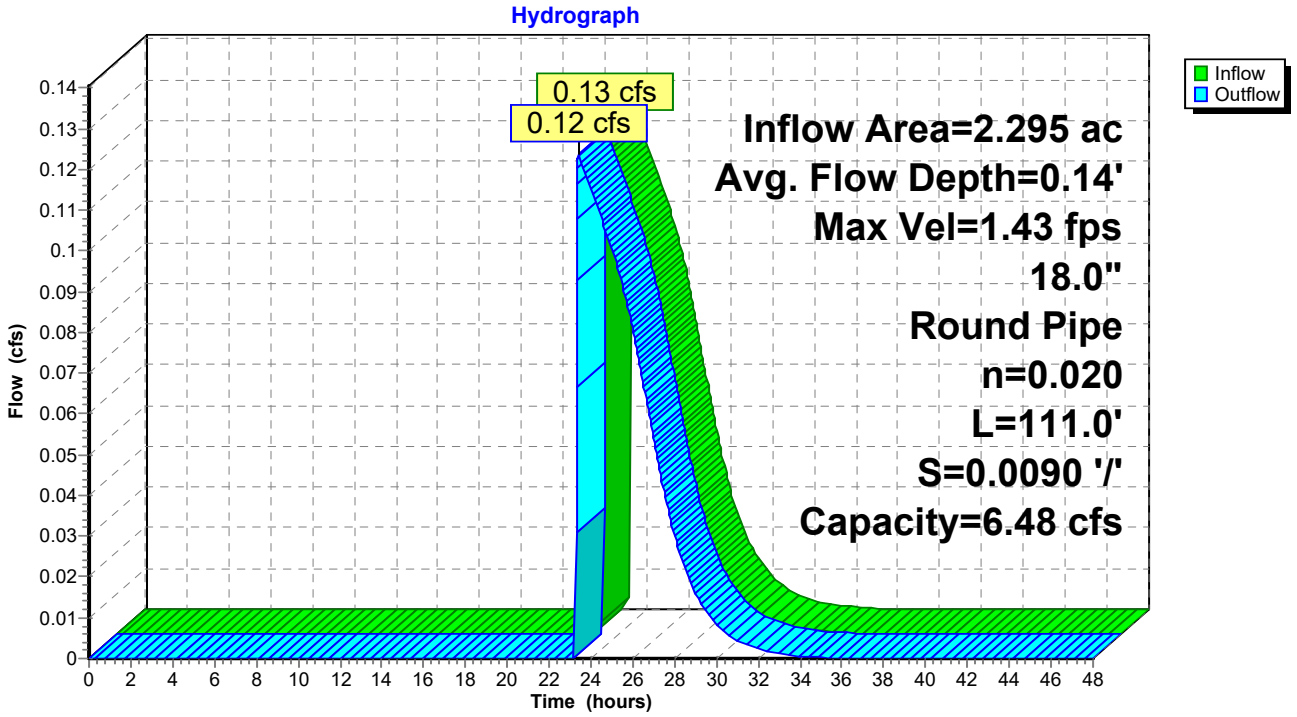
Subcatchment 3S: Drainage Area #1A



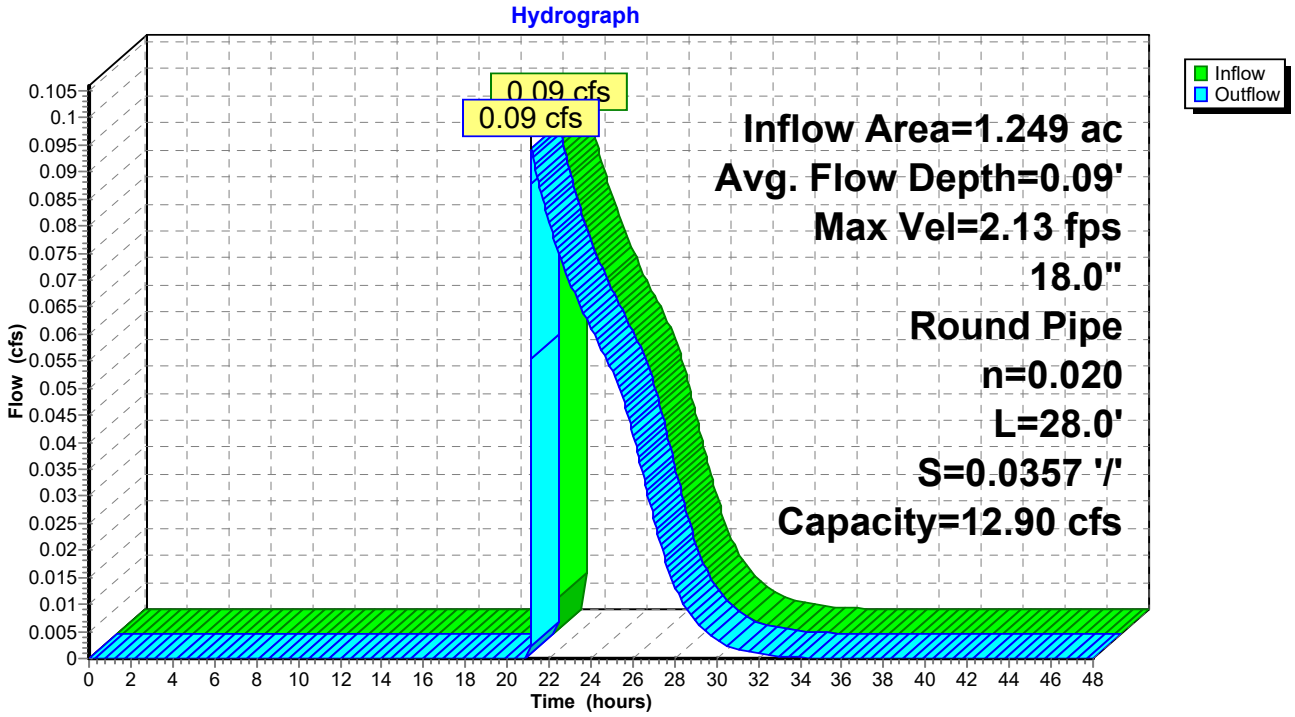
Subcatchment 5S: Drainage Area #1B



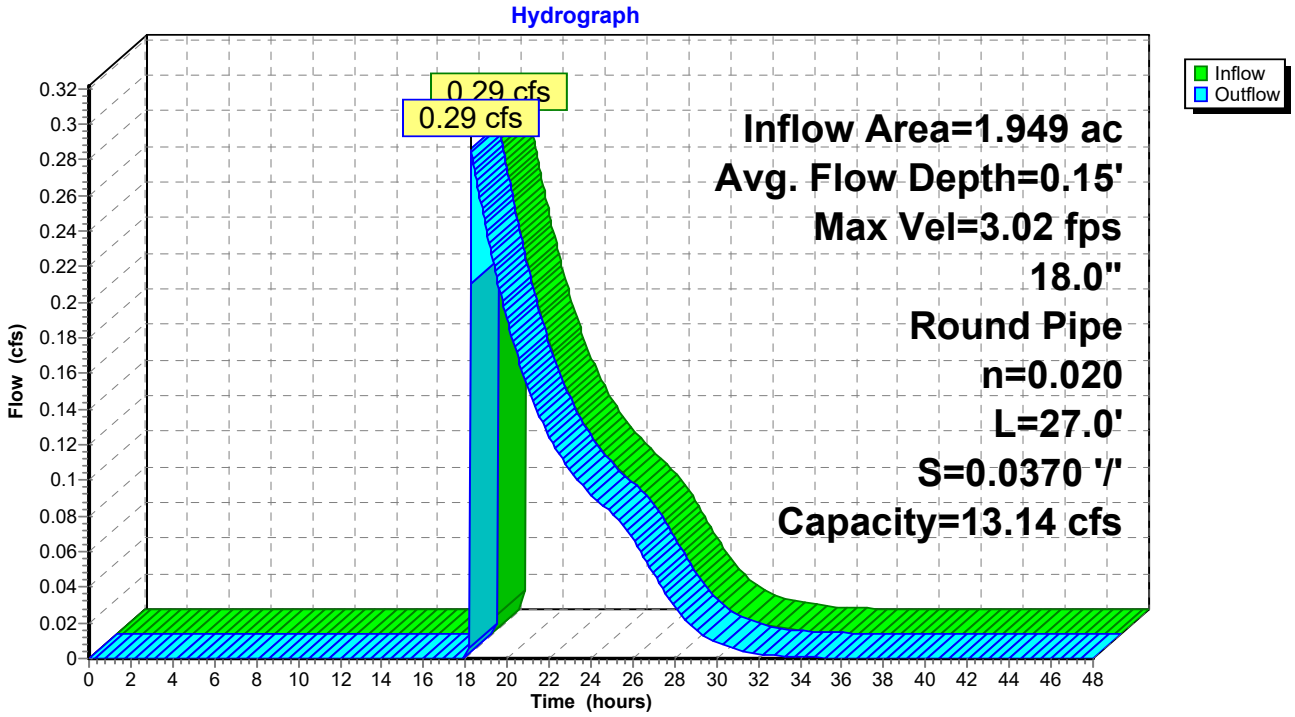
Reach 7R: Basin #1A Discharge



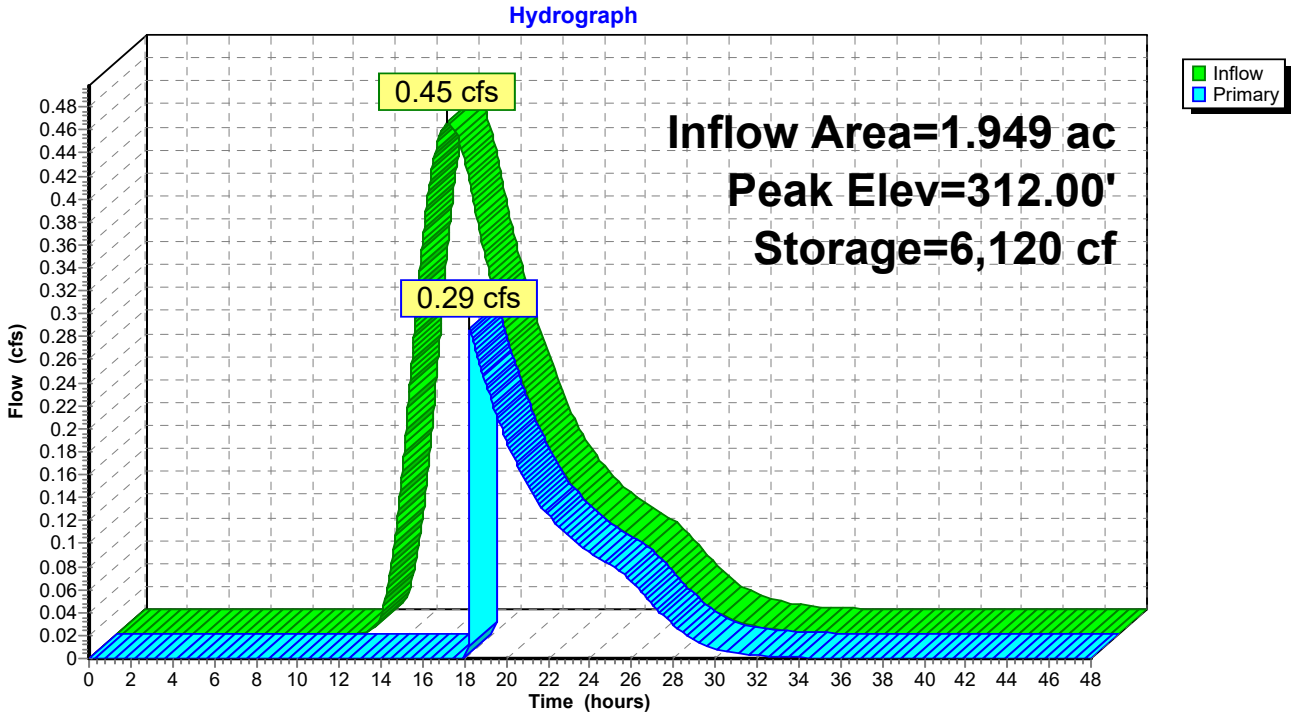
Reach 8R: Basin #1B Discharge



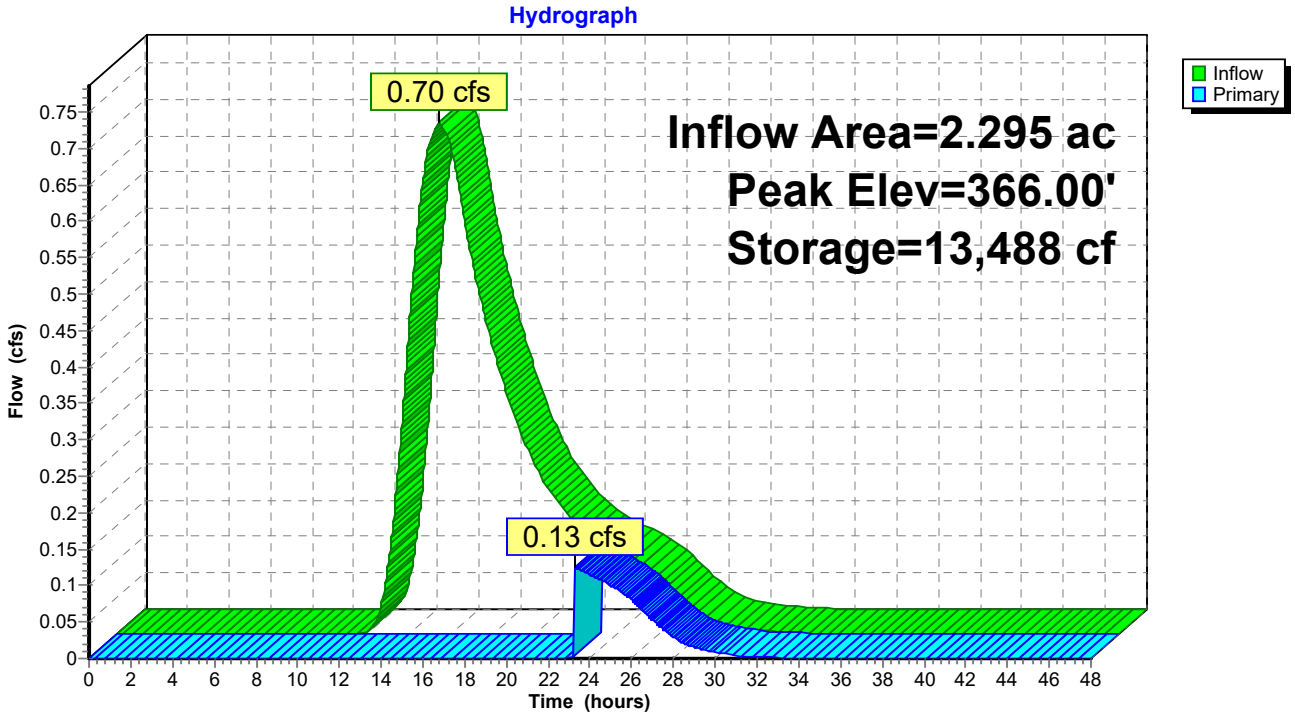
Reach 9R: Basin #1C Discharge



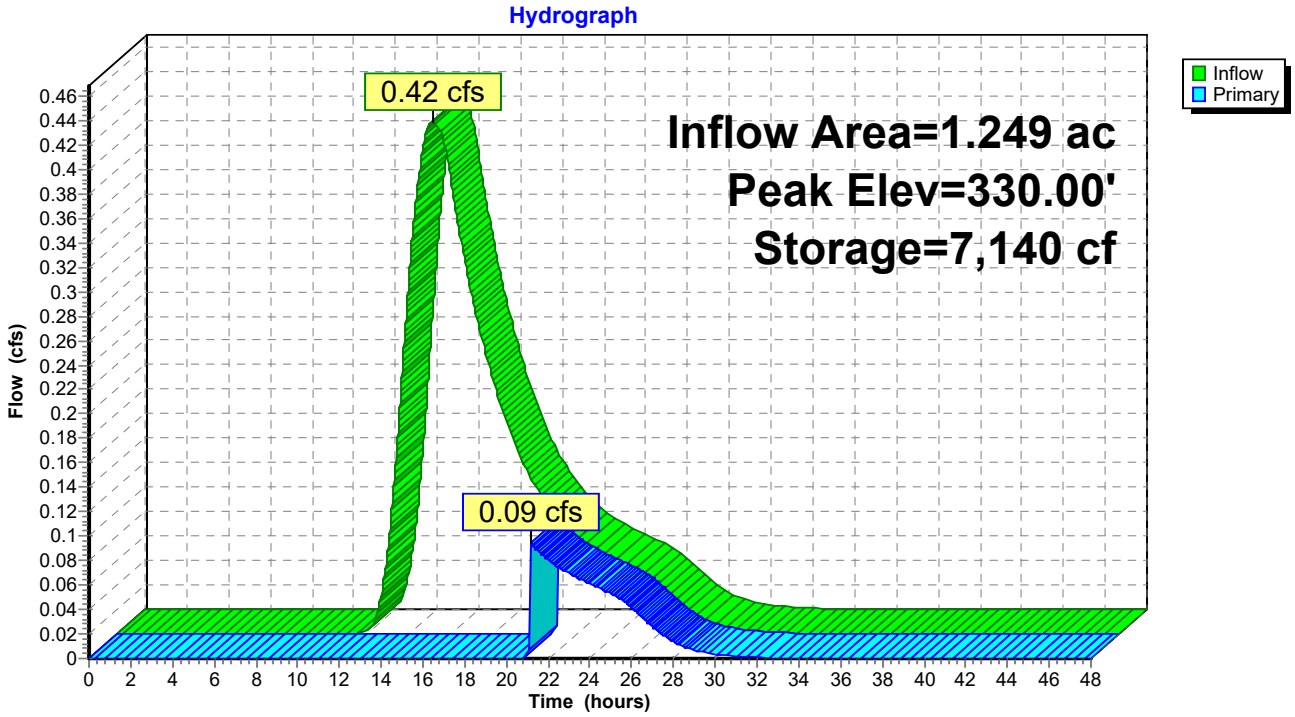
Pond 2P: Detention Basin #1C



Pond 4P: Detention Basin #1A



Pond 6P: Detention Basin #1B



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Drainage Area #1C Runoff Area=84,877 sf 0.00% Impervious Runoff Depth=2.38"
Flow Length=621' Tc=257.8 min CN=57 Runoff=0.74 cfs 0.386 af

Subcatchment 3S: Drainage Area #1A Runoff Area=99,965 sf 2.45% Impervious Runoff Depth=2.77"
Flow Length=424' Tc=234.9 min CN=61 Runoff=1.11 cfs 0.531 af

Subcatchment 5S: Drainage Area #1B Runoff Area=54,385 sf 0.00% Impervious Runoff Depth=2.87"
Flow Length=509' Tc=219.2 min CN=62 Runoff=0.66 cfs 0.299 af

Reach 7R: Basin #1A Discharge Avg. Flow Depth=0.33' Max Vel=2.38 fps Inflow=0.69 cfs 0.221 af
18.0" Round Pipe n=0.020 L=111.0' S=0.0090 '/' Capacity=6.48 cfs Outflow=0.68 cfs 0.221 af

Reach 8R: Basin #1B Discharge Avg. Flow Depth=0.19' Max Vel=3.40 fps Inflow=0.44 cfs 0.135 af
18.0" Round Pipe n=0.020 L=28.0' S=0.0357 '/' Capacity=12.90 cfs Outflow=0.44 cfs 0.135 af

Reach 9R: Basin #1C Discharge Avg. Flow Depth=0.24' Max Vel=3.97 fps Inflow=0.71 cfs 0.246 af
18.0" Round Pipe n=0.020 L=27.0' S=0.0370 '/' Capacity=13.14 cfs Outflow=0.71 cfs 0.246 af

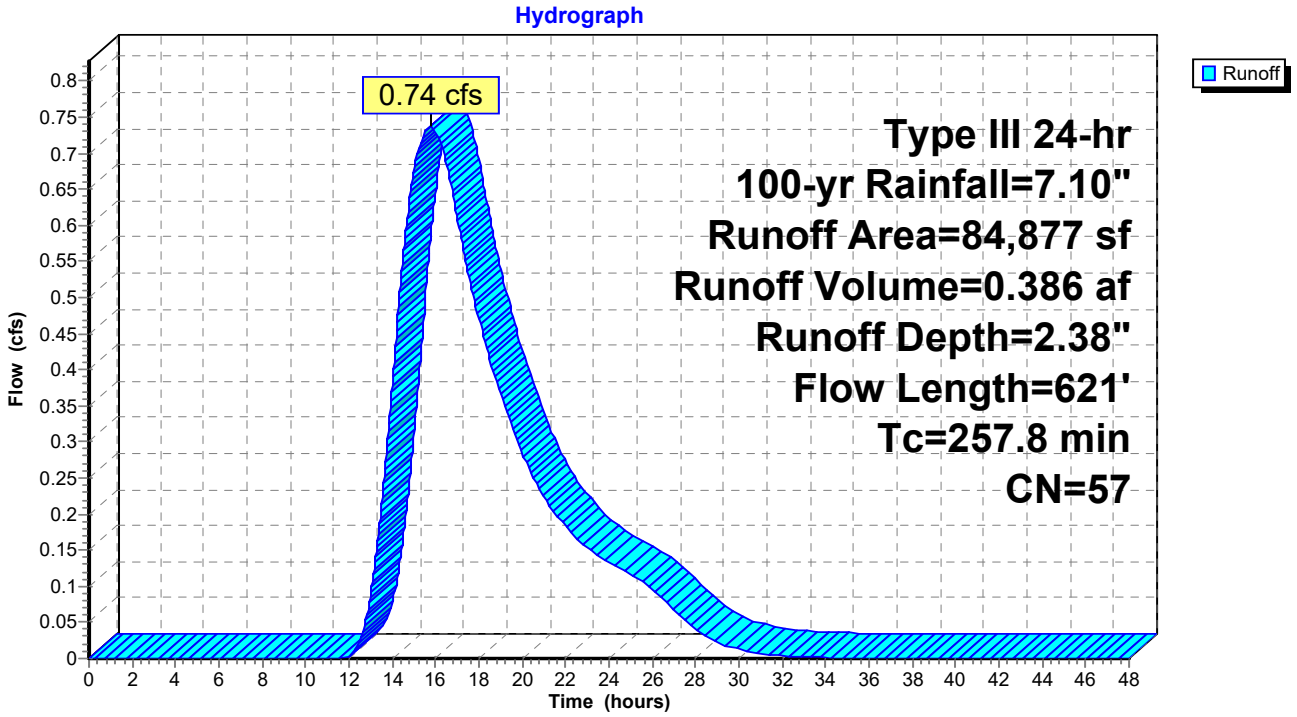
Pond 2P: Detention Basin #1C Peak Elev=312.00' Storage=6,120 cf Inflow=0.74 cfs 0.386 af
Outflow=0.71 cfs 0.246 af

Pond 4P: Detention Basin #1A Peak Elev=366.00' Storage=13,488 cf Inflow=1.11 cfs 0.531 af
Outflow=0.69 cfs 0.221 af

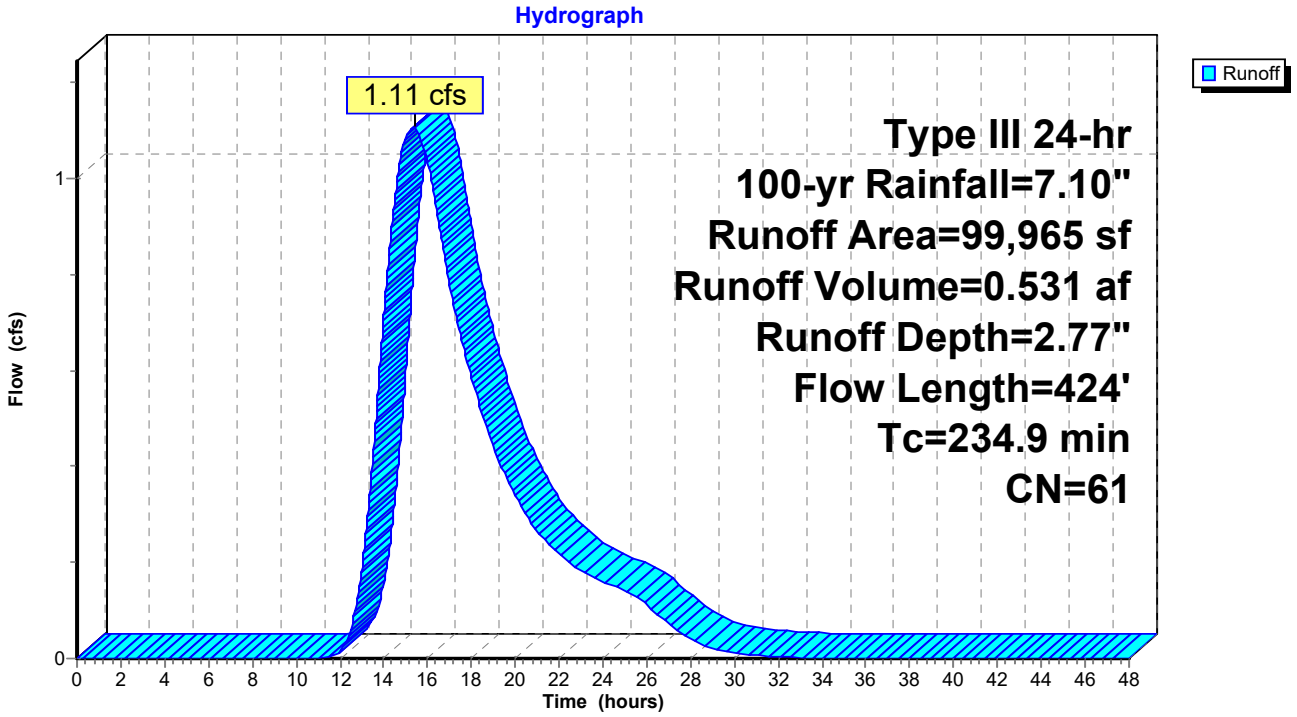
Pond 6P: Detention Basin #1B Peak Elev=330.00' Storage=7,140 cf Inflow=0.66 cfs 0.299 af
Outflow=0.44 cfs 0.135 af

Total Runoff Area = 5.492 ac Runoff Volume = 1.216 af Average Runoff Depth = 2.66"
98.98% Pervious = 5.436 ac 1.02% Impervious = 0.056 ac

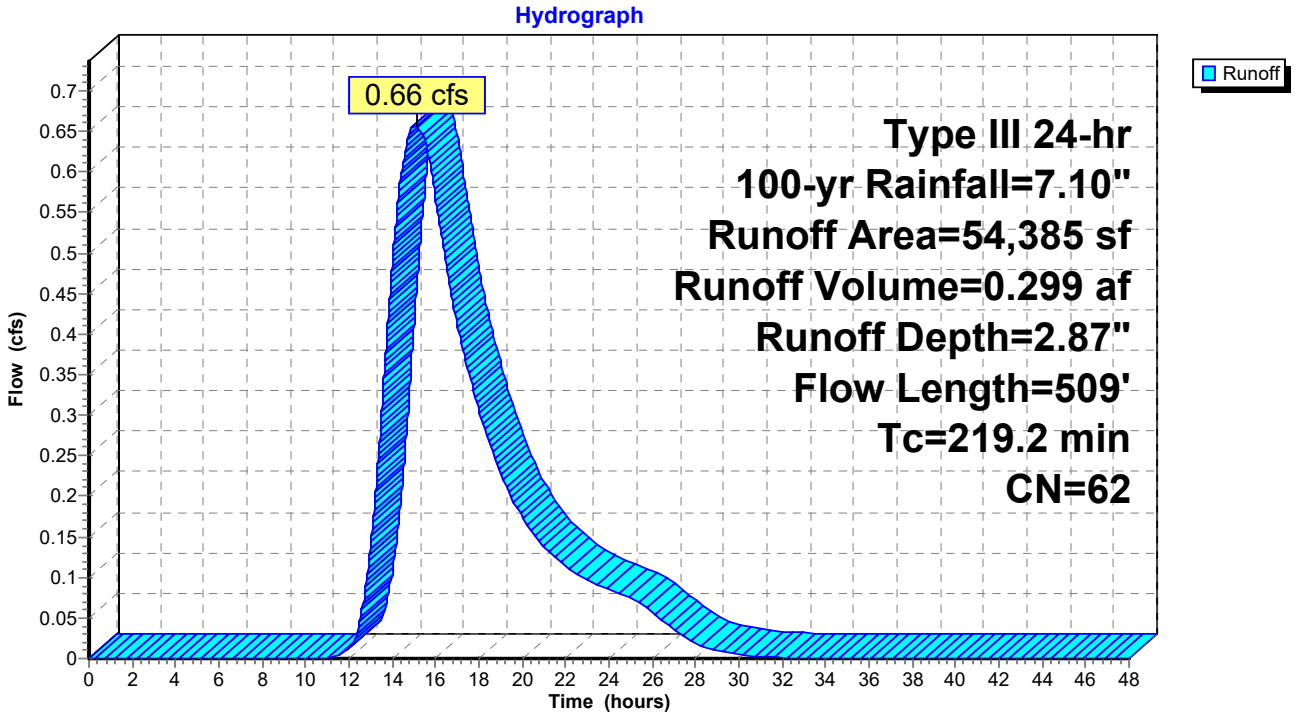
Subcatchment 1S: Drainage Area #1C



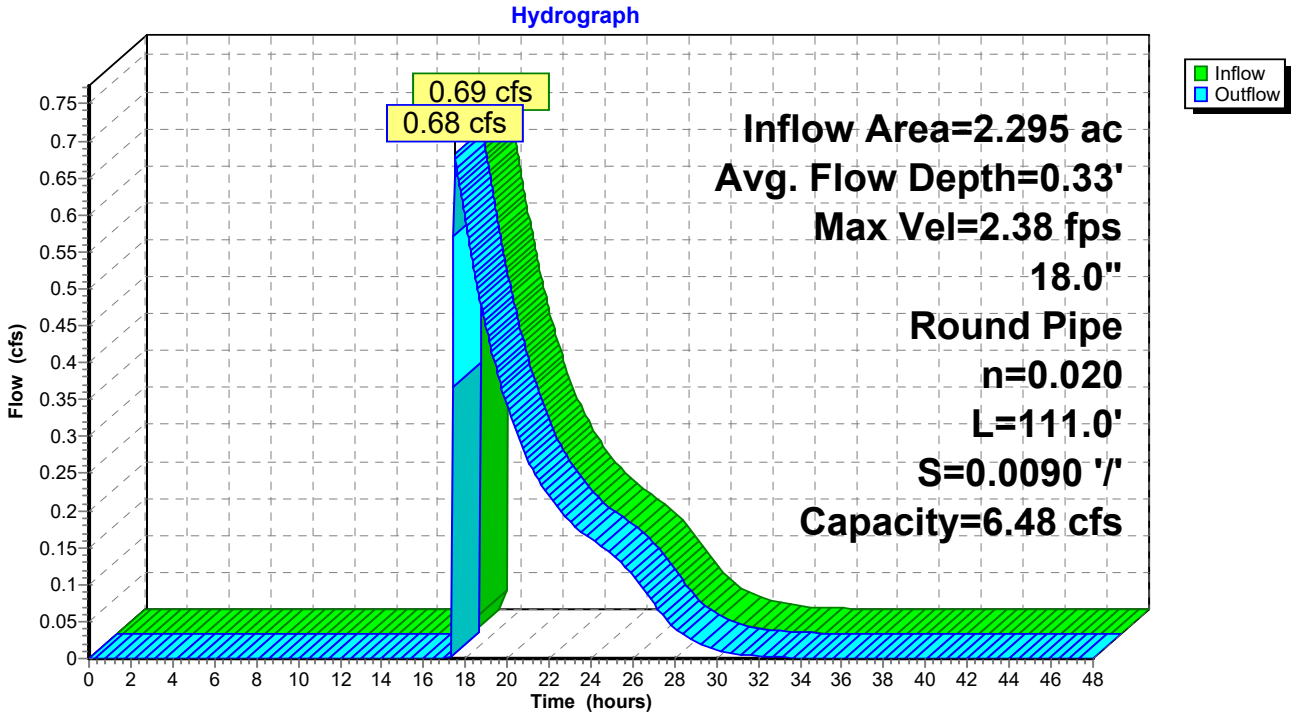
Subcatchment 3S: Drainage Area #1A



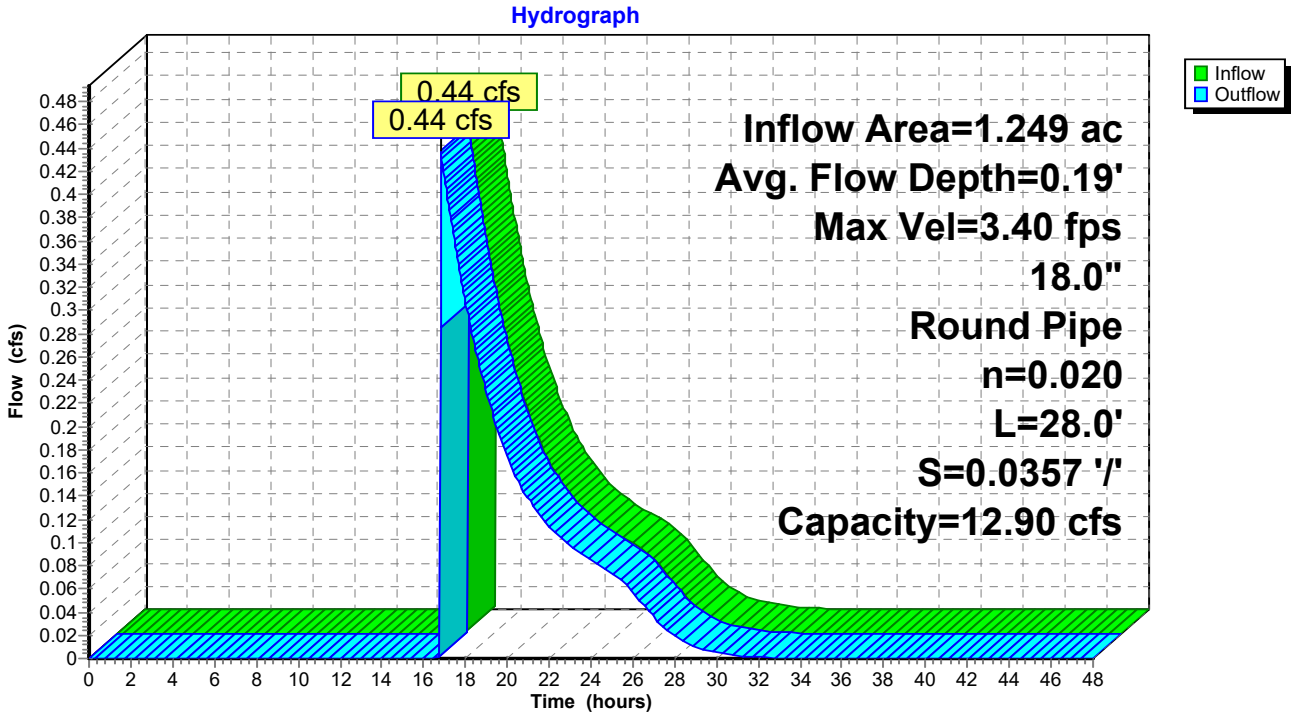
Subcatchment 5S: Drainage Area #1B



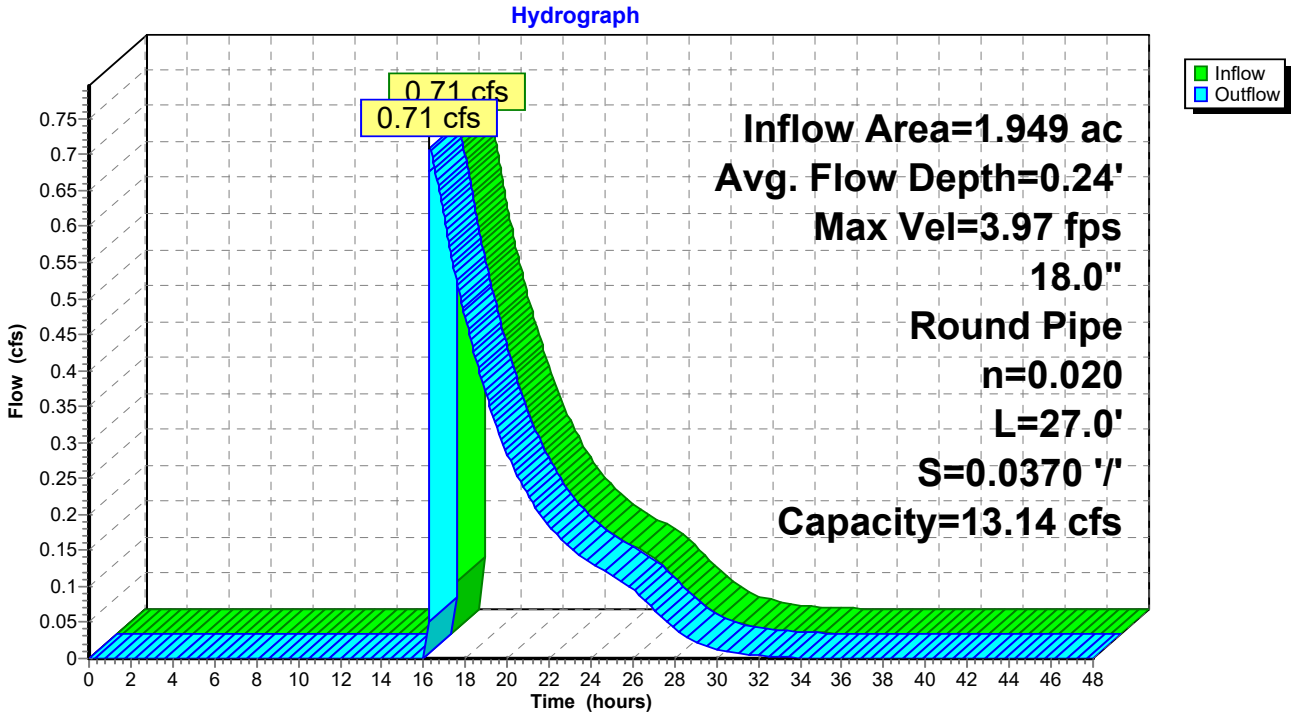
Reach 7R: Basin #1A Discharge



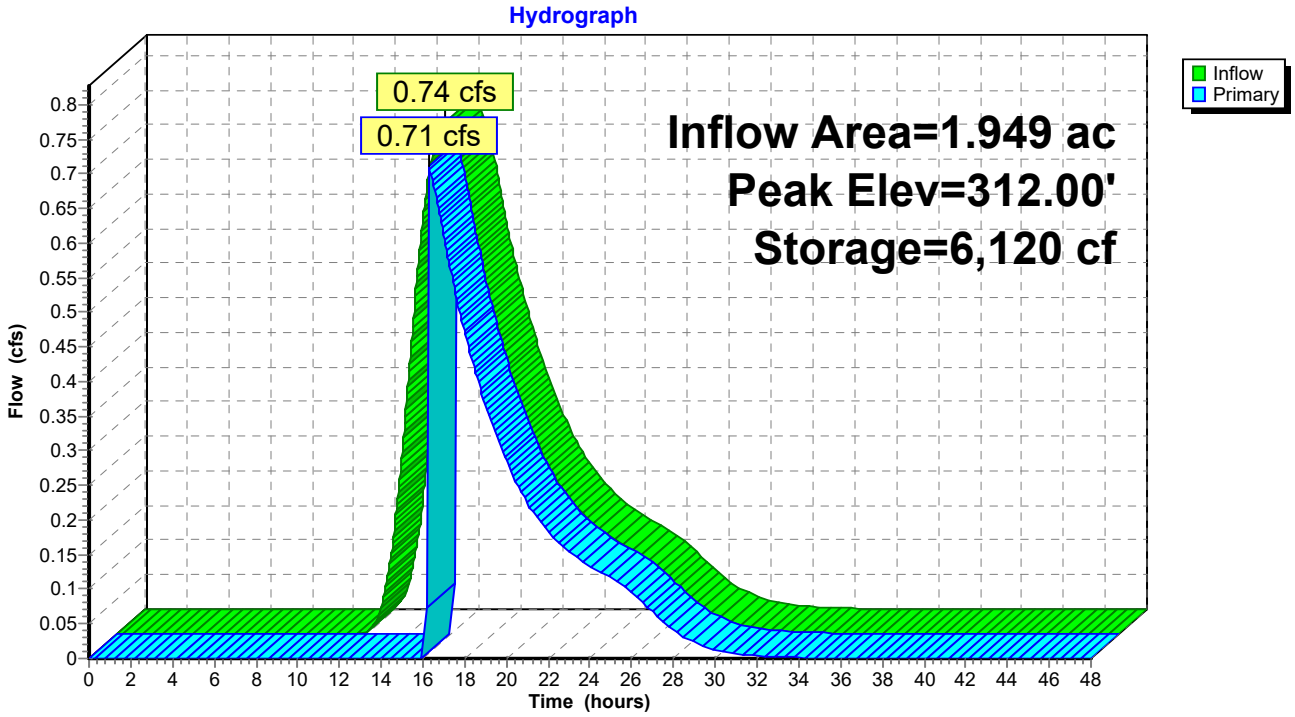
Reach 8R: Basin #1B Discharge



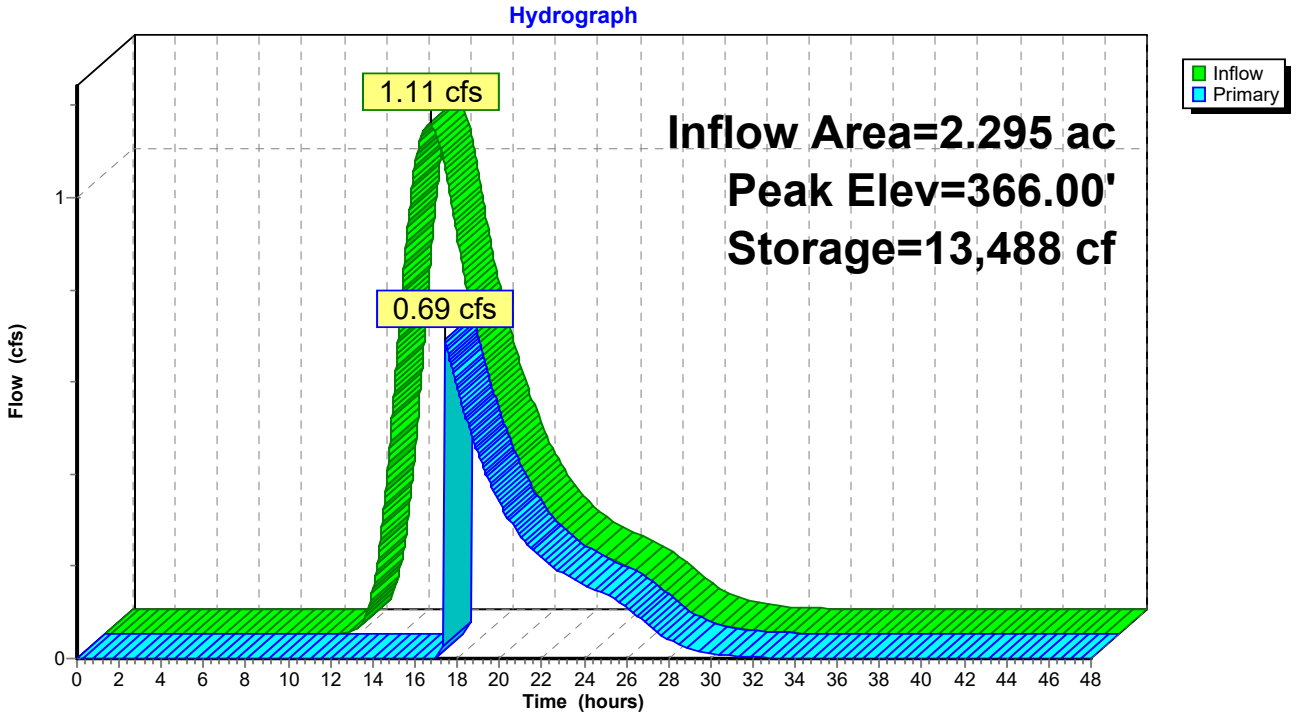
Reach 9R: Basin #1C Discharge



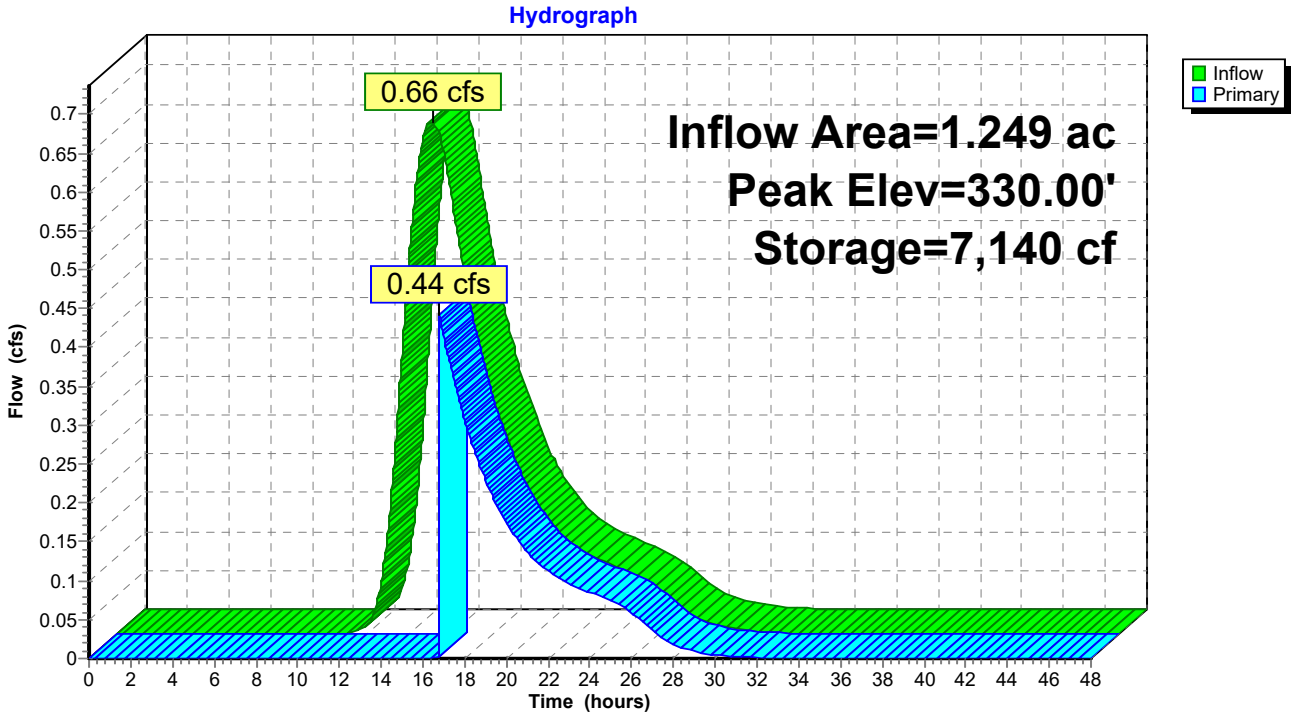
Pond 2P: Detention Basin #1C



Pond 4P: Detention Basin #1A



Pond 6P: Detention Basin #1B



Events for Subcatchment 1S: Drainage Area #1C

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	2.70	0.04	0.026	0.16
2-yr	3.40	0.10	0.062	0.38
10-yr	5.00	0.32	0.179	1.10
25-yr	5.70	0.45	0.243	1.50
100-yr	**7.10**	**0.74**	**0.386**	**2.38**

Events for Subcatchment 3S: Drainage Area #1A

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	2.70	0.08	0.049	0.26
2-yr	3.40	0.18	0.101	0.53
10-yr	5.00	0.52	0.262	1.37
25-yr	5.70	0.70	0.346	1.81
100-yr	**7.10**	**1.11**	**0.531**	**2.77**

Events for Subcatchment 5S: Drainage Area #1B

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
1-yr	2.70	0.05	0.030	0.29
2-yr	3.40	0.11	0.059	0.57
10-yr	5.00	0.31	0.150	1.44
25-yr	5.70	0.42	0.196	1.89
100-yr	**7.10**	**0.66**	**0.299**	**2.87**

Events for Reach 7R: Basin #1A Discharge

Event	Inflow (cfs)	Outflow (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	0.00	0.00	356.00	0
2-yr	0.00	0.00	356.00	0
10-yr	0.00	0.00	356.00	0
25-yr	0.13	0.12	356.14	10
100-yr	**0.69**	**0.68**	**356.33**	**32**

Events for Reach 8R: Basin #1B Discharge

Event	Inflow (cfs)	Outflow (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	0.00	0.00	320.00	0
2-yr	0.00	0.00	320.00	0
10-yr	0.00	0.00	320.00	0
25-yr	0.09	0.09	320.09	1
100-yr	**0.44**	**0.44**	**320.19**	**4**

Events for Reach 9R: Basin #1C Discharge

Event	Inflow (cfs)	Outflow (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	0.00	0.00	302.00	0
2-yr	0.00	0.00	302.00	0
10-yr	0.11	0.11	302.10	1
25-yr	0.29	0.29	302.15	3
100-yr	**0.71**	**0.71**	**302.24**	**5**

Events for Pond 2P: Detention Basin #1C

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	0.04	0.00	307.55	1,149
2-yr	0.10	0.00	309.19	2,681
10-yr	0.32	0.11	**312.00**	**6,120**
25-yr	0.45	0.29	312.00	6,120
100-yr	**0.74**	**0.71**	312.00	6,120

Events for Pond 4P: Detention Basin #1A

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	0.08	0.00	361.25	2,153
2-yr	0.18	0.00	362.38	4,402
10-yr	0.52	0.00	365.27	11,405
25-yr	0.70	0.13	**366.00**	**13,488**
100-yr	**1.11**	**0.69**	366.00	13,488

Events for Pond 6P: Detention Basin #1B

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
1-yr	0.05	0.00	325.46	1,295
2-yr	0.11	0.00	326.68	2,580
10-yr	0.31	0.00	329.61	6,519
25-yr	0.42	0.09	**330.00**	**7,140**
100-yr	**0.66**	**0.44**	330.00	7,140