

Routing Diagram for Haverhill Proposed Model 160620
 Prepared by Weston & Sampson, Printed 6/21/2016
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Haverhill Proposed Model 160620

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
158,407	61	>75% Grass cover, Good, HSG B (1aS, 1bS, 2aS, 2bS, 4aS, 5S, 6S, 7aS, 8S)
115,723	48	Brush, Good, HSG B (1aS, 2aS, 2bS, 3S, 5S, 7aS, 8S)
2,759	98	Patio & Sidewalk (2bS)
1,443	98	Patio & Sidewalks (8S)
17,494	98	Paved Area (6S)
39,987	98	Paved Areas (4aS)
8,705	98	Paved driveway & Sidewalk (1bS)
9,382	98	Paved driveways & Roofs (1aS)
28,704	98	Paved driveways and Roofs (2aS)
26,563	98	Roofs, HSG B (4bS, 7bS)
19,716	98	Water Surface, 0% imp, HSG B (4aS, 7aS)
3,279	98	Water Surface, HSG B (1bS, 6S)
36,672	98	Wetland (1aS, 2aS, 3S)
132,784	55	Woods, Good, HSG B (1aS, 2aS, 2bS, 3S, 5S, 7aS)
601,618	69	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
456,472	HSG B	1aS, 1bS, 2aS, 2bS, 3S, 4aS, 4bS, 5S, 6S, 7aS, 7bS, 8S
0	HSG C	
0	HSG D	
145,146	Other	1aS, 1bS, 2aS, 2bS, 3S, 4aS, 6S, 8S
601,618		TOTAL AREA

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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
0	158,407	0	0	0	158,407	>75% Grass cover, Good
0	115,723	0	0	0	115,723	Brush, Good
0	0	0	0	2,759	2,759	Patio & Sidewalk
0	0	0	0	1,443	1,443	Patio & Sidewalks
0	0	0	0	17,494	17,494	Paved Area
0	0	0	0	39,987	39,987	Paved Areas
0	0	0	0	8,705	8,705	Paved driveway & Sidewalk
0	0	0	0	9,382	9,382	Paved driveways & Roofs
0	0	0	0	28,704	28,704	Paved driveways and Roofs
0	26,563	0	0	0	26,563	Roofs
0	3,279	0	0	0	3,279	Water Surface
0	19,716	0	0	0	19,716	Water Surface, 0% imp
0	0	0	0	36,672	36,672	Wetland
0	132,784	0	0	0	132,784	Woods, Good
0	456,472	0	0	145,146	601,618	TOTAL AREA

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	4aS	0.00	0.00	490.0	0.0369	0.013	12.0	0.0	0.0
2	4bS	0.00	0.00	300.0	0.0050	0.013	12.0	0.0	0.0
3	7bS	0.00	0.00	236.0	0.0050	0.013	12.0	0.0	0.0

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Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1aS: In/Into IW C	Runoff Area=120,475 sf 28.08% Impervious Runoff Depth>0.68" Flow Length=809' Tc=18.6 min CN=68 Runoff=1.27 cfs 6,778 cf
Subcatchment 1bS: Driveway	Runoff Area=13,258 sf 74.33% Impervious Runoff Depth>1.99" Flow Length=262' Tc=1.6 min CN=89 Runoff=0.79 cfs 2,199 cf
Subcatchment 2aS: In/Into IW A	Runoff Area=142,302 sf 26.58% Impervious Runoff Depth>0.68" Flow Length=935' Tc=13.9 min CN=68 Runoff=1.67 cfs 8,018 cf
Subcatchment 2bS: Into Swale	Runoff Area=34,927 sf 7.90% Impervious Runoff Depth>0.30" Flow Length=214' Tc=16.8 min CN=58 Runoff=0.11 cfs 887 cf
Subcatchment 3S: In/Into IW D	Runoff Area=46,370 sf 6.69% Impervious Runoff Depth>0.27" Flow Length=443' Tc=20.1 min CN=57 Runoff=0.11 cfs 1,061 cf
Subcatchment 4aS: Eastern	Runoff Area=68,048 sf 58.76% Impervious Runoff Depth>1.99" Flow Length=843' Tc=8.7 min CN=89 Runoff=3.29 cfs 11,272 cf
Subcatchment 4bS: Eastern Building	Runoff Area=13,477 sf 100.00% Impervious Runoff Depth>2.87" Flow Length=300' Slope=0.0050 '/' Tc=1.6 min CN=98 Runoff=1.04 cfs 3,221 cf
Subcatchment 5S: Outside Resources Areas	Runoff Area=29,198 sf 0.00% Impervious Runoff Depth>0.17" Flow Length=379' Tc=14.9 min CN=53 Runoff=0.03 cfs 417 cf
Subcatchment 6S: Parking Lot	Runoff Area=28,826 sf 68.07% Impervious Runoff Depth>1.75" Flow Length=274' Tc=6.4 min CN=86 Runoff=1.32 cfs 4,196 cf
Subcatchment 7aS: Western site	Runoff Area=49,439 sf 0.00% Impervious Runoff Depth>0.40" Flow Length=345' Tc=15.8 min CN=61 Runoff=0.24 cfs 1,654 cf
Subcatchment 7bS: Western Building	Runoff Area=13,086 sf 100.00% Impervious Runoff Depth>2.87" Flow Length=236' Slope=0.0050 '/' Tc=1.2 min CN=98 Runoff=1.01 cfs 3,127 cf
Subcatchment 8S: In/Into BVW B	Runoff Area=42,212 sf 3.42% Impervious Runoff Depth>0.15" Flow Length=363' Tc=6.7 min CN=52 Runoff=0.04 cfs 526 cf
Reach 1R: Grassed Swale	Avg. Flow Depth=0.21' Max Vel=2.48 fps Inflow=3.25 cfs 19,590 cf n=0.033 L=265.0' S=0.0415 '/' Capacity=92.94 cfs Outflow=3.23 cfs 19,555 cf
Pond 1P: Isolated Wetland C	Peak Elev=120.24' Inflow=1.55 cfs 8,497 cf Outflow=1.55 cfs 8,497 cf
Pond 2P: Isolated Wetland A	Peak Elev=129.16' Inflow=1.67 cfs 8,018 cf Outflow=1.67 cfs 8,018 cf
Pond 3P: Isolated Wetland D	Peak Elev=112.03' Inflow=0.11 cfs 1,061 cf Outflow=0.11 cfs 1,061 cf

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Pond 4P: BVW B	Inflow=3.24 cfs 20,081 cf Primary=3.24 cfs 20,081 cf
Pond 5P: Basin 1	Peak Elev=104.32' Storage=8,187 cf Inflow=3.82 cfs 14,492 cf Discarded=0.16 cfs 8,680 cf Primary=0.00 cfs 0 cf Outflow=0.16 cfs 8,680 cf
Pond 6P: Basin 2	Peak Elev=103.54' Storage=1,991 cf Inflow=1.02 cfs 5,843 cf Discarded=0.11 cfs 5,630 cf Primary=0.00 cfs 0 cf Outflow=0.11 cfs 5,630 cf
Pond 7P: Sediment Forebay	Peak Elev=106.89' Inflow=3.29 cfs 11,272 cf Outflow=3.29 cfs 11,272 cf
Pond BA 1: Bioretention Area A	Peak Elev=134.34' Storage=552 cf Inflow=0.79 cfs 2,199 cf Outflow=0.76 cfs 1,719 cf
Pond BA 2: Bioretention Area B	Peak Elev=125.51' Storage=2,119 cf Inflow=1.32 cfs 4,196 cf Outflow=0.35 cfs 2,188 cf
Pond POI 1: Northern Site	Inflow=3.25 cfs 20,497 cf Primary=3.25 cfs 20,497 cf

Total Runoff Area = 601,618 sf Runoff Volume = 43,354 cf Average Runoff Depth = 0.86"
70.91% Pervious = 426,630 sf 29.09% Impervious = 174,988 sf

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Summary for Subcatchment 1aS: In/Into IW C

Runoff = 1.27 cfs @ 12.30 hrs, Volume= 6,778 cf, Depth> 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
9,382	98	Paved driveways & Roofs
10,413	55	Woods, Good, HSG B
46,780	61	>75% Grass cover, Good, HSG B
29,453	48	Brush, Good, HSG B
24,447	98	Wetland
120,475	68	Weighted Average
86,646		71.92% Pervious Area
33,829		28.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	90	0.0528	0.25		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
2.4	10	0.0500	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.21"
1.0	63	0.0476	1.09		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.9	174	0.0488	1.55		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	55	0.0273	0.99		Shallow Concentrated Flow, Heavy Brush Kv= 6.0 fps
6.3	417	0.0336	1.10		Shallow Concentrated Flow, Heavy Brush Kv= 6.0 fps
18.6	809				Total

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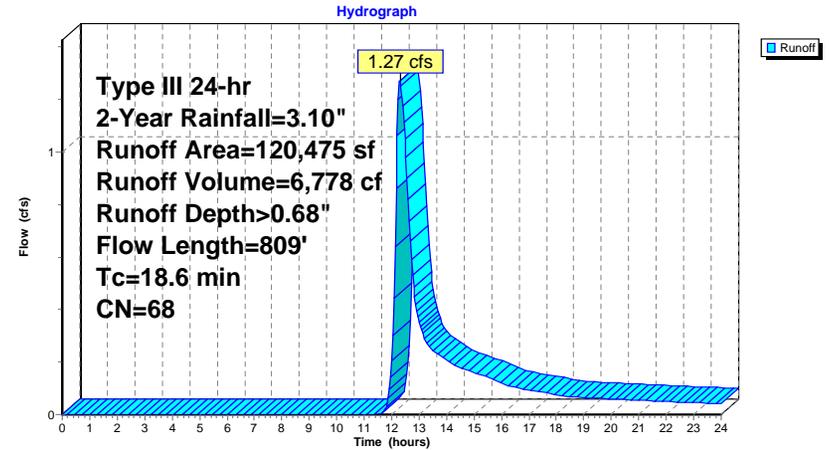
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Type III 24-hr 2-Year Rainfall=3.10"

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Subcatchment 1aS: In/Into IW C



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Summary for Subcatchment 1bS: Driveway

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

Runoff = 0.79 cfs @ 12.03 hrs, Volume= 2,199 cf, Depth> 1.99"

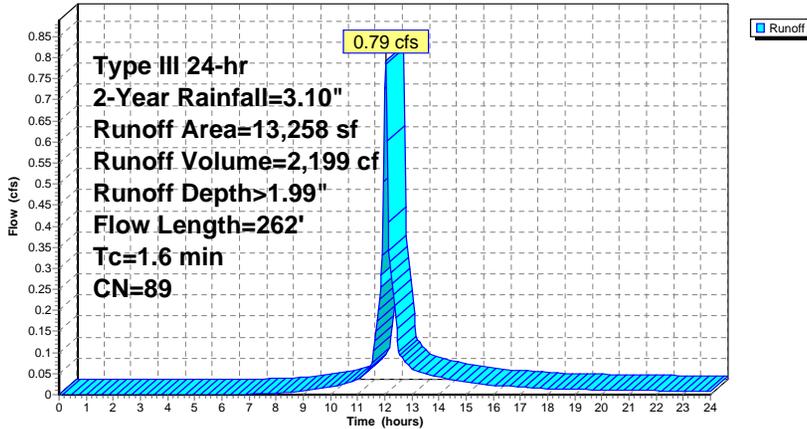
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
8,705	98	Paved driveway & Sidewalk
3,403	61	>75% Grass cover, Good, HSG B
1,150	98	Water Surface, HSG B
13,258	89	Weighted Average
3,403		25.67% Pervious Area
9,855		74.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0350	1.72		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
0.6	162	0.0482	4.46		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.6	262	Total			

Subcatchment 1bS: Driveway

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.10"

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Summary for Subcatchment 2aS: In/Into IW A

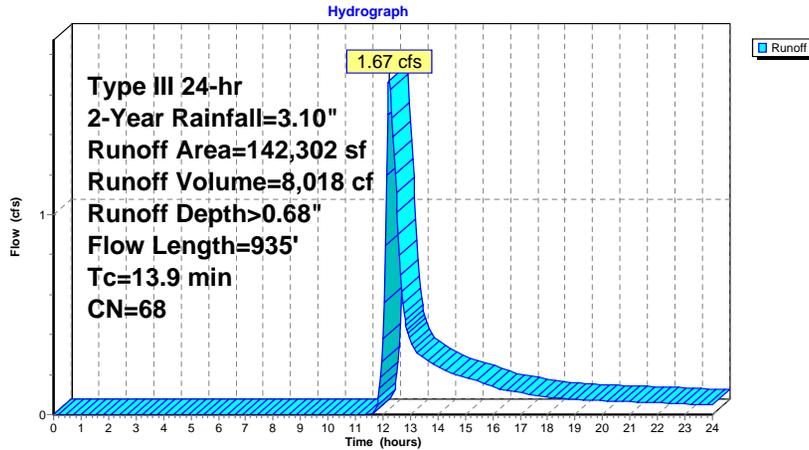
Runoff = 1.67 cfs @ 12.22 hrs, Volume= 8,018 cf, Depth> 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
9,125	98	Wetland
768	48	Brush, Good, HSG B
59,412	55	Woods, Good, HSG B
28,704	98	Paved driveways and Roofs
44,293	61	>75% Grass cover, Good, HSG B
142,302	68	Weighted Average
104,473		73.42% Pervious Area
37,829		26.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
0.8	164	0.0300	3.52		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.1	101	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
3.3	239	0.0593	1.22		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
7.5	331	0.0219	0.74		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.9	935	Total			

Subcatchment 2aS: In/Into IW A



Summary for Subcatchment 2bS: Into Swale

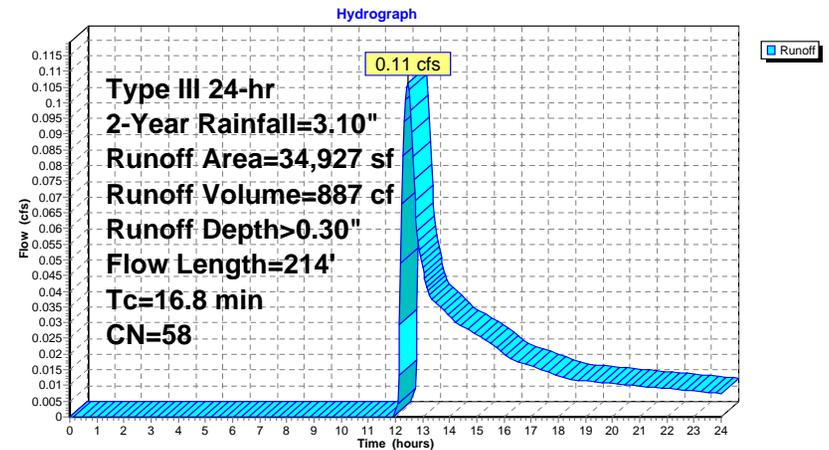
Runoff = 0.11 cfs @ 12.45 hrs, Volume= 887 cf, Depth> 0.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
2,759	98	Patio & Sidewalk
745	55	Woods, Good, HSG B
16,214	48	Brush, Good, HSG B
15,209	61	>75% Grass cover, Good, HSG B
34,927	58	Weighted Average
32,168		92.10% Pervious Area
2,759		7.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	100	0.0450	0.11		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.21"
1.0	114	0.0746	1.91		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
16.8	214	Total			

Subcatchment 2bS: Into Swale



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Summary for Subcatchment 3S: In/Into IW D

Runoff = 0.11 cfs @ 12.52 hrs, Volume= 1,061 cf, Depth> 0.27"

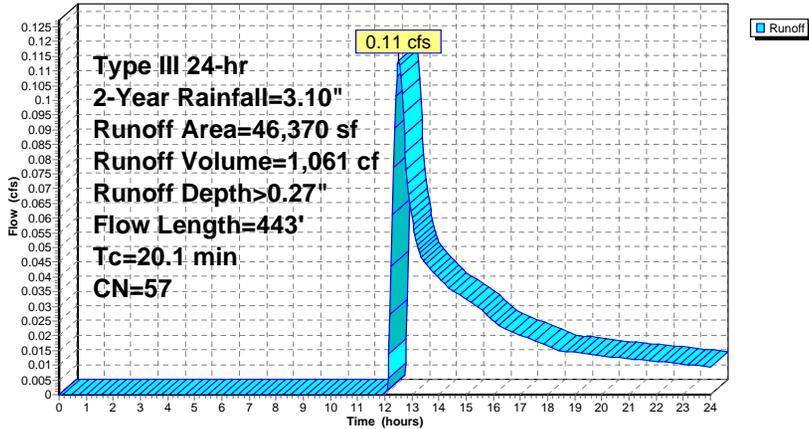
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
3,100	98	Wetland
36,667	55	Woods, Good, HSG B
6,603	48	Brush, Good, HSG B
46,370	57	Weighted Average
43,270		93.31% Pervious Area
3,100		6.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0511	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.21"
4.0	272	0.0511	1.13		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.4	71	0.0141	0.83		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
20.1	443	Total			

Subcatchment 3S: In/Into IW D

Hydrograph



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Summary for Subcatchment 4aS: Eastern Driveway/Back Parking Area

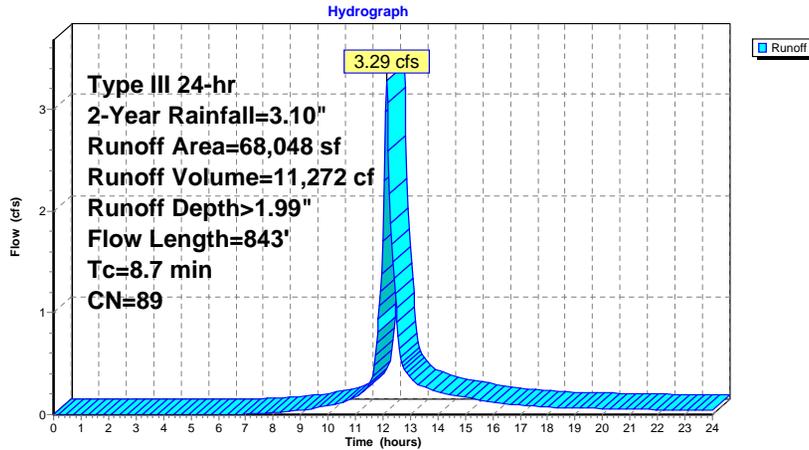
Runoff = 3.29 cfs @ 12.12 hrs, Volume= 11,272 cf, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
17,315	61	>75% Grass cover, Good, HSG B
39,987	98	Paved Areas
10,746	98	Water Surface, 0% imp, HSG B
68,048	89	Weighted Average
28,061		41.24% Pervious Area
39,987		58.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	42	0.0119	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
0.7	58	0.0302	1.46		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
1.1	253	0.0342	3.75		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.9	490	0.0369	8.71	6.84	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
8.7	843	Total			

Subcatchment 4aS: Eastern Driveway/Back Parking Area



Summary for Subcatchment 4bS: Eastern Building

[49] Hint: $T_c < 2dt$ may require smaller dt

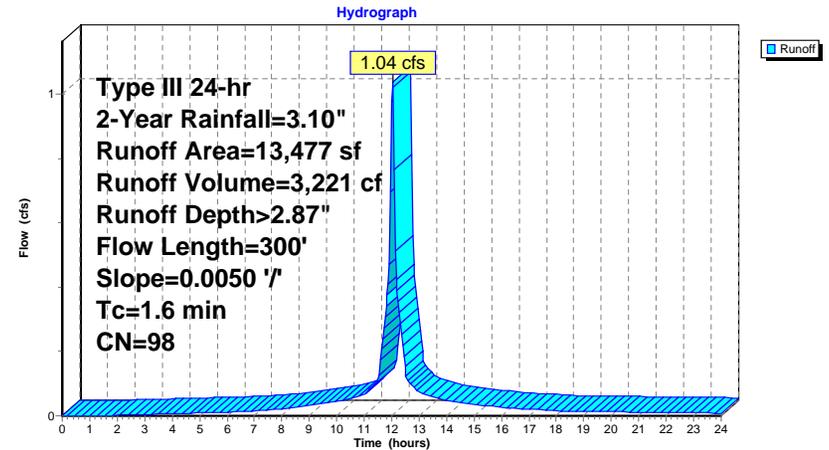
Runoff = 1.04 cfs @ 12.03 hrs, Volume= 3,221 cf, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt=0.04$ hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
13,477	98	Roofs, HSG B
13,477		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	300	0.0050	3.21	2.52	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior

Subcatchment 4bS: Eastern Building



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Summary for Subcatchment 5S: Outside Resources Areas

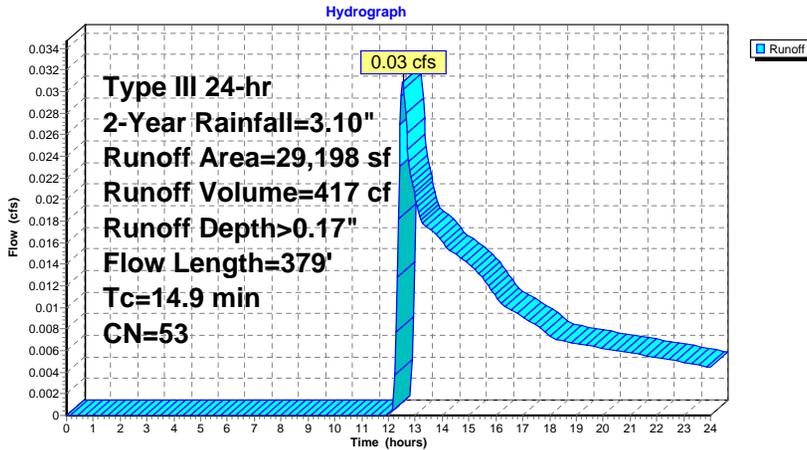
Runoff = 0.03 cfs @ 12.54 hrs, Volume= 417 cf, Depth> 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
9,482	55	Woods, Good, HSG B
6,631	61	>75% Grass cover, Good, HSG B
13,085	48	Brush, Good, HSG B
29,198	53	Weighted Average
29,198		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	61	0.0787	0.27		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
7.9	39	0.0385	0.08		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.21"
2.9	253	0.0435	1.46		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
0.3	26	0.0769	1.39		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
14.9	379	Total			

Subcatchment 5S: Outside Resources Areas



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Summary for Subcatchment 6S: Parking Lot

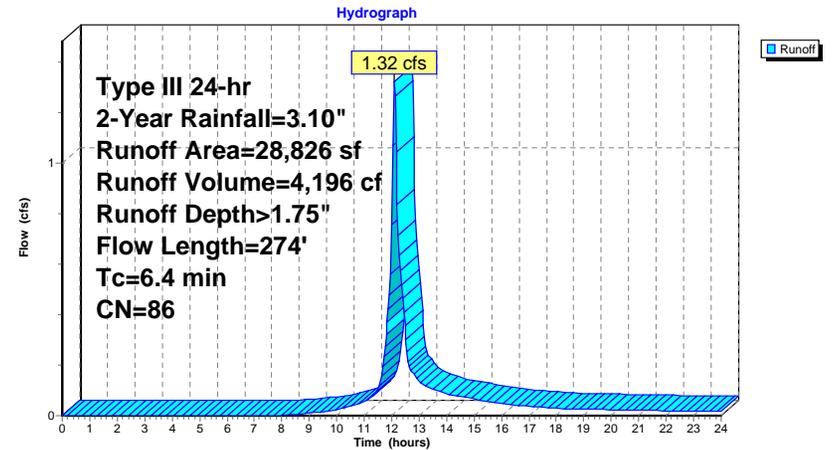
Runoff = 1.32 cfs @ 12.09 hrs, Volume= 4,196 cf, Depth> 1.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
17,494	98	Paved Area
9,203	61	>75% Grass cover, Good, HSG B
2,129	98	Water Surface, HSG B
28,826	86	Weighted Average
9,203		31.93% Pervious Area
19,623		68.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	64	0.0400	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
0.4	36	0.0400	1.48		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
0.8	174	0.0347	3.78		Shallow Concentrated Flow, Paved Kv= 20.3 fps
6.4	274	Total			

Subcatchment 6S: Parking Lot



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Summary for Subcatchment 7aS: Western site

Runoff = 0.24 cfs @ 12.34 hrs, Volume= 1,654 cf, Depth> 0.40"

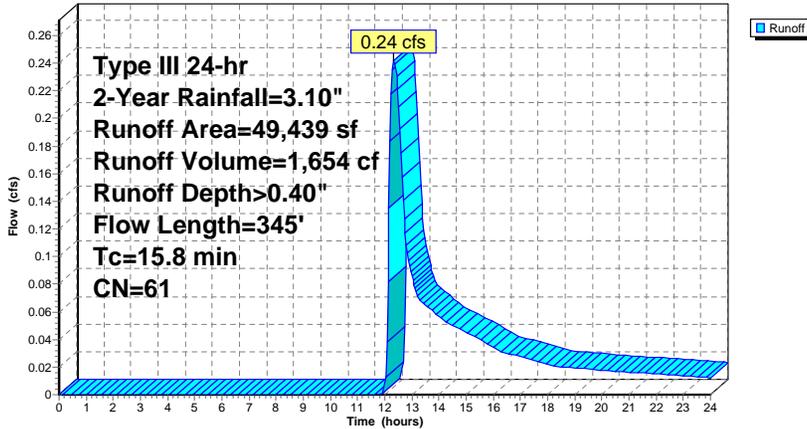
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
6,531	61	>75% Grass cover, Good, HSG B
16,065	55	Woods, Good, HSG B
17,873	48	Brush, Good, HSG B
8,970	98	Water Surface, 0% imp, HSG B
49,439	61	Weighted Average
49,439		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0700	0.13		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.21"
1.6	105	0.0238	1.08		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
1.0	140	0.0250	2.37		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
15.8	345				Total

Subcatchment 7aS: Western site

Hydrograph



Haverhill Proposed Model 160620

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Type III 24-hr 2-Year Rainfall=3.10"

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Summary for Subcatchment 7bS: Western Building

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

Runoff = 1.01 cfs @ 12.02 hrs, Volume= 3,127 cf, Depth> 2.87"

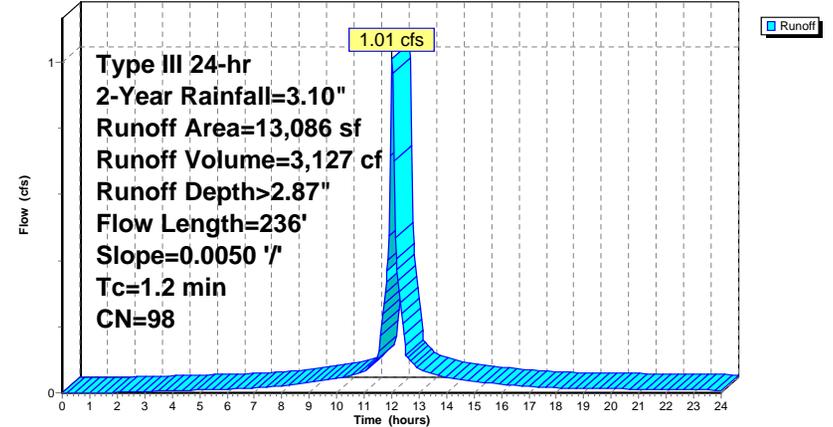
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
13,086	98	Roofs, HSG B
13,086		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	236	0.0050	3.21	2.52	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior

Subcatchment 7bS: Western Building

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.10"

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Summary for Subcatchment 8S: In/Into BVW B

Runoff = 0.04 cfs @ 12.45 hrs, Volume= 526 cf, Depth> 0.15"

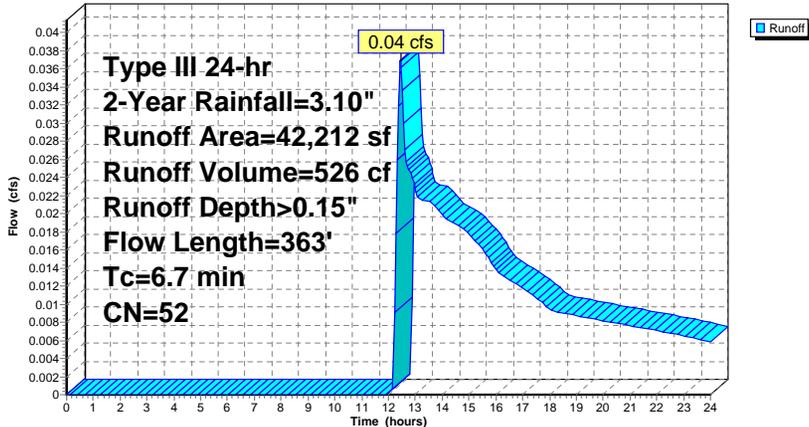
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
1,443	98	Patio & Sidewalks
9,042	61	>75% Grass cover, Good, HSG B
31,727	48	Brush, Good, HSG B
42,212	52	Weighted Average
40,769		96.58% Pervious Area
1,443		3.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	52	0.0100	0.92		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
2.9	48	0.0937	0.27		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
2.9	263	0.0456	1.49		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
6.7	363	Total			

Subcatchment 8S: In/Into BVW B

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.10"

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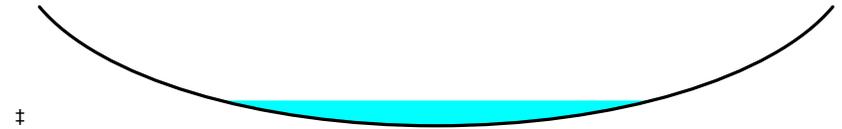
Summary for Reach 1R: Grassed Swale

Inflow Area = 339,788 sf, 30.58% Impervious, Inflow Depth > 0.69" for 2-Year event
Inflow = 3.25 cfs @ 12.25 hrs, Volume= 19,590 cf
Outflow = 3.23 cfs @ 12.28 hrs, Volume= 19,555 cf, Atten= 1%, Lag= 1.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
Max. Velocity= 2.48 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 1.22 fps, Avg. Travel Time= 3.6 min

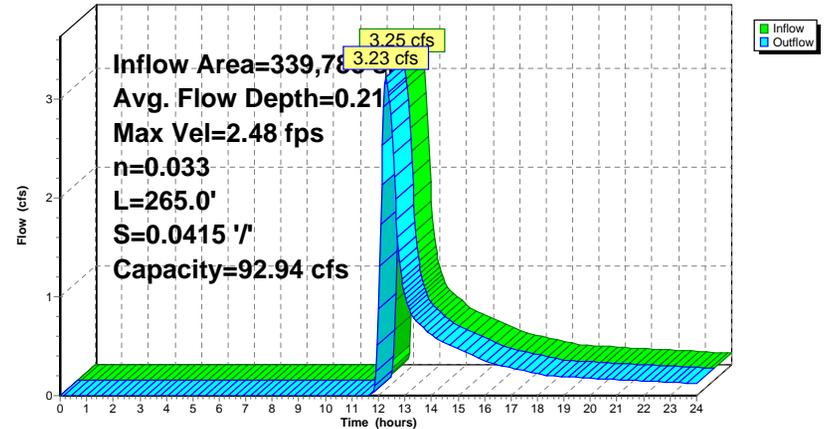
Peak Storage= 344 cf @ 12.28 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 92.94 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.033 Earth, grassed & winding
Length= 265.0' Slope= 0.0415 '/
Inlet Invert= 120.00', Outlet Invert= 109.00'



Reach 1R: Grassed Swale

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.10"

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Summary for Pond 1P: Isolated Wetland C

[57] Hint: Peaked at 120.24' (Flood elevation advised)

Inflow Area = 133,733 sf, 32.67% Impervious, Inflow Depth > 0.76" for 2-Year event
 Inflow = 1.55 cfs @ 12.29 hrs, Volume= 8,497 cf
 Outflow = 1.55 cfs @ 12.29 hrs, Volume= 8,497 cf, Atten= 0%, Lag= 0.0 min
 Primary = 1.55 cfs @ 12.29 hrs, Volume= 8,497 cf

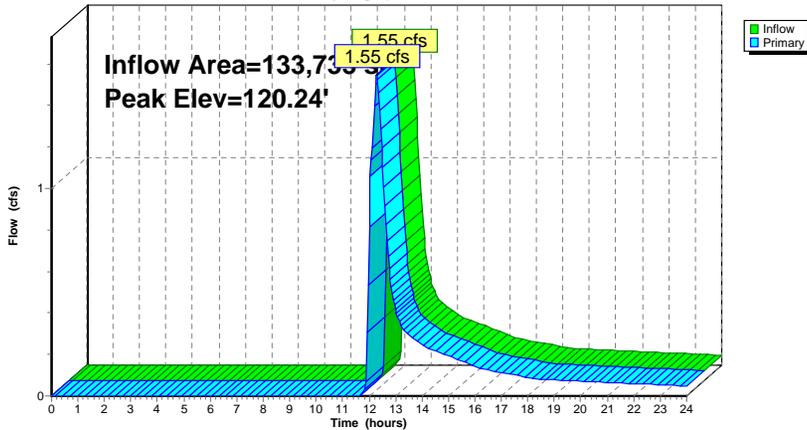
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 120.24' @ 12.28 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	10.0' long x 57.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.54 cfs @ 12.29 hrs HW=120.24' TW=120.21' (Dynamic Tailwater)
 1=Broad-Crested Rectangular Weir (Weir Controls 1.54 cfs @ 0.65 fps)

Pond 1P: Isolated Wetland C

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.10"

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Summary for Pond 2P: Isolated Wetland A

[57] Hint: Peaked at 129.16' (Flood elevation advised)

Inflow Area = 142,302 sf, 26.58% Impervious, Inflow Depth > 0.68" for 2-Year event
 Inflow = 1.67 cfs @ 12.22 hrs, Volume= 8,018 cf
 Outflow = 1.67 cfs @ 12.22 hrs, Volume= 8,018 cf, Atten= 0%, Lag= 0.0 min
 Primary = 1.67 cfs @ 12.22 hrs, Volume= 8,018 cf

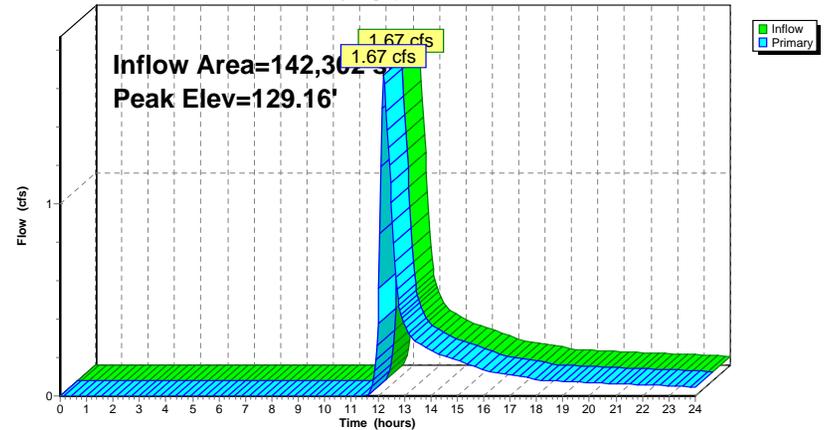
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 129.16' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	10.0' long x 214.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.66 cfs @ 12.22 hrs HW=129.16' TW=120.21' (Dynamic Tailwater)
 1=Broad-Crested Rectangular Weir (Weir Controls 1.66 cfs @ 1.06 fps)

Pond 2P: Isolated Wetland A

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.10"

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Summary for Pond 3P: Isolated Wetland D

[57] Hint: Peaked at 112.03' (Flood elevation advised)

Inflow Area = 46,370 sf, 6.69% Impervious, Inflow Depth > 0.27" for 2-Year event
 Inflow = 0.11 cfs @ 12.52 hrs, Volume= 1,061 cf
 Outflow = 0.11 cfs @ 12.52 hrs, Volume= 1,061 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.11 cfs @ 12.52 hrs, Volume= 1,061 cf

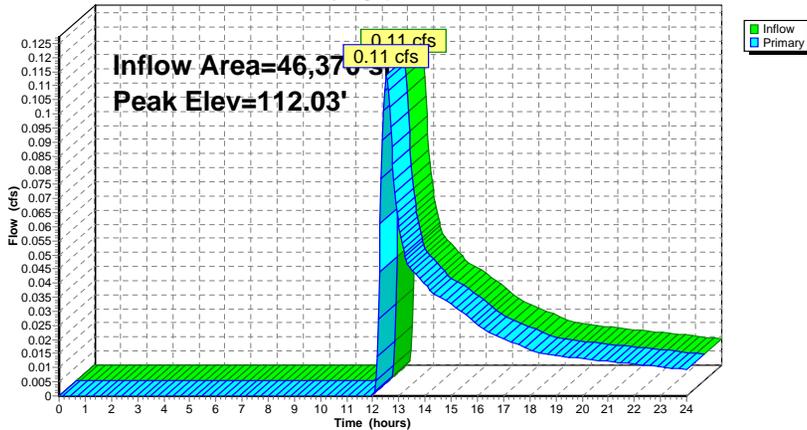
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 112.03' @ 12.52 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	112.00'	10.0' long x 203.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.11 cfs @ 12.52 hrs HW=112.03' TW=103.41' (Dynamic Tailwater)
 #1=Broad-Crested Rectangular Weir (Weir Controls 0.11 cfs @ 0.43 fps)

Pond 3P: Isolated Wetland D

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.10"

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Summary for Pond 4P: BVW B

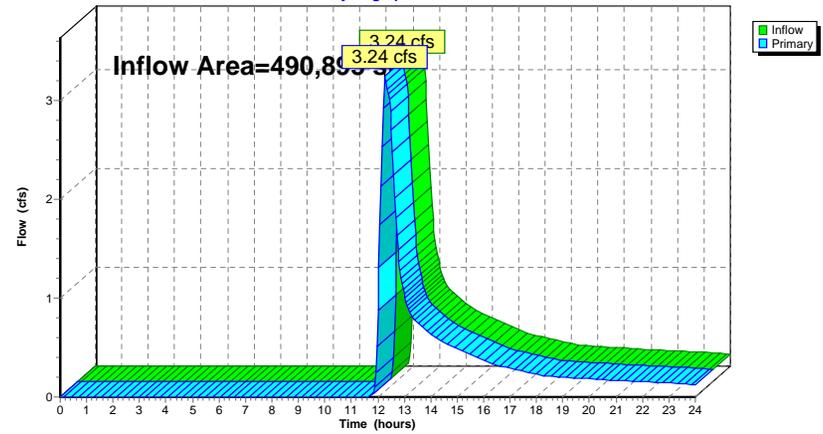
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 490,895 sf, 24.76% Impervious, Inflow Depth > 0.49" for 2-Year event
 Inflow = 3.24 cfs @ 12.28 hrs, Volume= 20,081 cf
 Primary = 3.24 cfs @ 12.28 hrs, Volume= 20,081 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3

Pond 4P: BVW B

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.10"

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Summary for Pond 5P: Basin 1

Inflow Area = 81,525 sf, 65.58% Impervious, Inflow Depth > 2.13" for 2-Year event
 Inflow = 3.82 cfs @ 12.11 hrs, Volume= 14,492 cf
 Outflow = 0.16 cfs @ 15.69 hrs, Volume= 8,680 cf, Atten= 96%, Lag= 215.3 min
 Discarded = 0.16 cfs @ 15.69 hrs, Volume= 8,680 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 104.32' @ 15.69 hrs Surf.Area= 6,919 sf Storage= 8,187 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 178.2 min (978.6 - 800.4)

Volume	Invert	Avail.Storage	Storage Description	
#1	103.00'	31,798 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
103.00	5,534	0	0	5,534
104.00	6,579	6,049	6,049	6,615
105.00	7,680	7,122	13,171	7,756
106.00	9,412	8,531	21,703	9,518
107.00	10,794	10,095	31,798	10,945

Device	Routing	Invert	Outlet Devices
#1	Primary	105.65'	10.0' long x 141.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	103.00'	1.020 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.16 cfs @ 15.69 hrs HW=104.32' (Free Discharge)
 ↳2=Exfiltration (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=103.00' TW=0.00' (Dynamic Tailwater)
 ↳1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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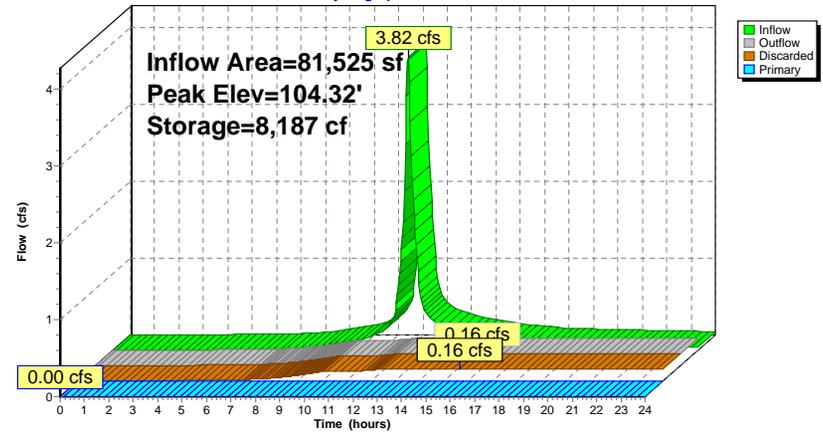
Type III 24-hr 2-Year Rainfall=3.10"

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Pond 5P: Basin 1

Hydrograph



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Summary for Pond 6P: Basin 2

Inflow Area = 108,895 sf, 14.86% Impervious, Inflow Depth > 0.64" for 2-Year event
 Inflow = 1.02 cfs @ 12.02 hrs, Volume= 5,843 cf
 Outflow = 0.11 cfs @ 15.05 hrs, Volume= 5,630 cf, Atten= 89%, Lag= 182.1 min
 Discarded = 0.11 cfs @ 15.05 hrs, Volume= 5,630 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 103.54' @ 15.05 hrs Surf.Area= 4,728 sf Storage= 1,991 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 152.5 min (990.5 - 838.0)

Volume	Invert	Avail.Storage	Storage Description	
#1	103.10'	25,458 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
103.10	4,240	0	0	4,240
104.00	5,256	4,265	4,265	5,279
105.00	6,432	5,834	10,099	6,486
106.00	7,675	7,044	17,143	7,764
107.00	8,970	8,314	25,458	9,099

Device	Routing	Invert	Outlet Devices
#1	Discarded	103.10'	1.020 in/hr Exfiltration over Surface area
#2	Primary	105.80'	10.0' long x 75.0' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60			
Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63			

Discarded OutFlow Max=0.11 cfs @ 15.05 hrs HW=103.54' (Free Discharge)
 ↳1=Exfiltration (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=103.10' TW=0.00' (Dynamic Tailwater)
 ↳2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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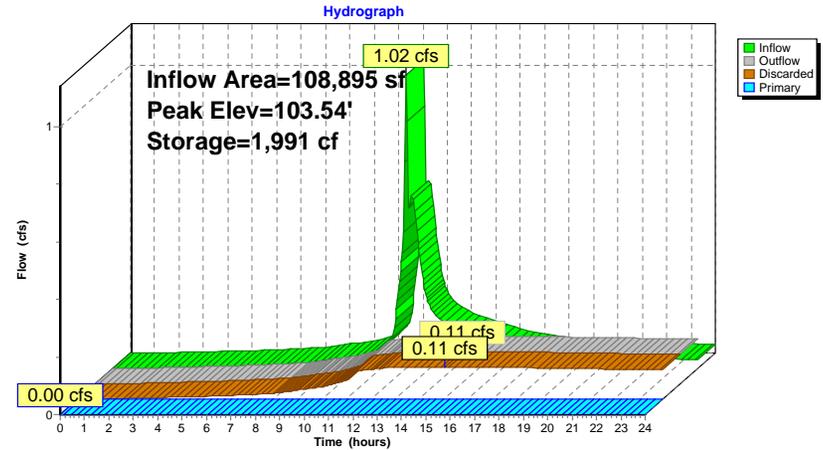
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Type III 24-hr 2-Year Rainfall=3.10"

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Pond 6P: Basin 2



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Type III 24-hr 2-Year Rainfall=3.10"

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Summary for Pond 7P: Sediment Forebay

[57] Hint: Peaked at 106.89' (Flood elevation advised)

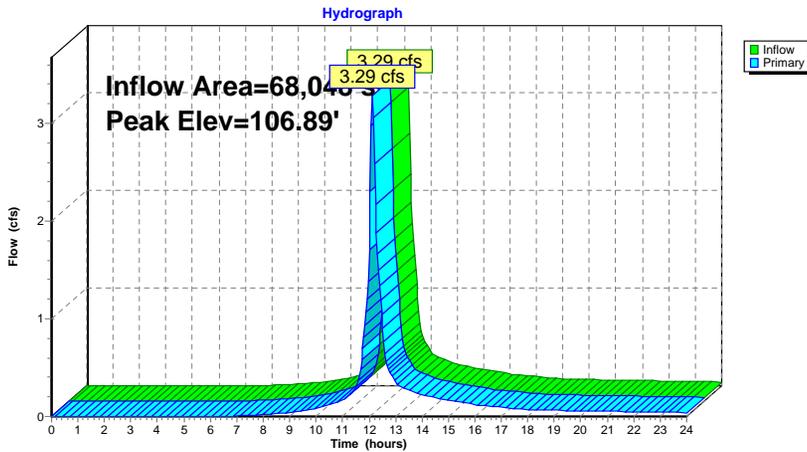
Inflow Area = 68,048 sf, 58.76% Impervious, Inflow Depth > 1.99" for 2-Year event
 Inflow = 3.29 cfs @ 12.12 hrs, Volume= 11,272 cf
 Outflow = 3.29 cfs @ 12.12 hrs, Volume= 11,272 cf, Atten= 0%, Lag= 0.0 min
 Primary = 3.29 cfs @ 12.12 hrs, Volume= 11,272 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 106.89' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	106.50'	5.3' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=3.27 cfs @ 12.12 hrs HW=106.89' TW=103.63' (Dynamic Tailwater)
 ↳1=Broad-Crested Rectangular Weir (Weir Controls 3.27 cfs @ 1.58 fps)

Pond 7P: Sediment Forebay



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Type III 24-hr 2-Year Rainfall=3.10"

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Summary for Pond BA 1: Bioretention Area A

Inflow Area = 13,258 sf, 74.33% Impervious, Inflow Depth > 1.99" for 2-Year event
 Inflow = 0.79 cfs @ 12.03 hrs, Volume= 2,199 cf
 Outflow = 0.76 cfs @ 12.05 hrs, Volume= 1,719 cf, Atten= 4%, Lag= 1.1 min
 Primary = 0.76 cfs @ 12.05 hrs, Volume= 1,719 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 134.34' @ 12.05 hrs Surf.Area= 835 sf Storage= 552 cf

Plug-Flow detention time= 124.0 min calculated for 1,719 cf (78% of inflow)
 Center-of-Mass det. time= 43.9 min (852.1 - 808.2)

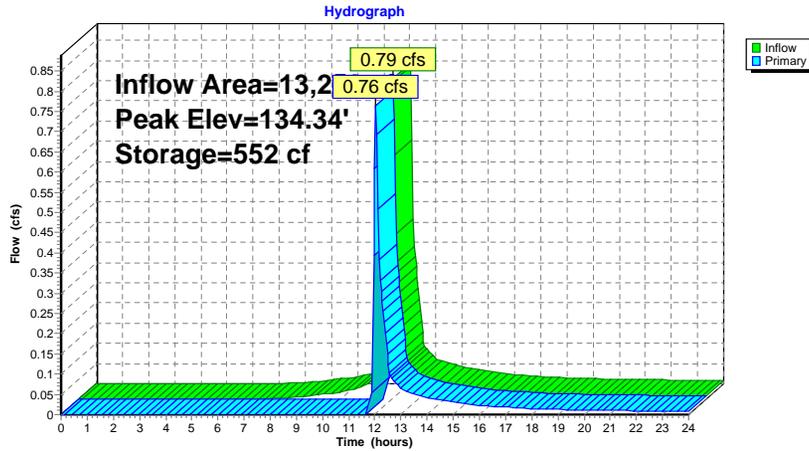
Volume	Invert	Avail.Storage	Storage Description
#1	133.50'	1,201 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
133.50	481	0	0	481
134.00	690	291	291	694
135.00	1,150	910	1,201	1,167

Device	Routing	Invert	Outlet Devices
#1	Primary	134.25'	10.0' long x 43.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.75 cfs @ 12.05 hrs HW=134.34' TW=120.17' (Dynamic Tailwater)
 ↳1=Broad-Crested Rectangular Weir (Weir Controls 0.75 cfs @ 0.81 fps)

Pond BA 1: Bioretention Area A



Summary for Pond BA 2: Bioretention Area B

Inflow Area = 28,826 sf, 68.07% Impervious, Inflow Depth > 1.75" for 2-Year event
 Inflow = 1.32 cfs @ 12.09 hrs, Volume= 4,196 cf
 Outflow = 0.35 cfs @ 12.49 hrs, Volume= 2,188 cf, Atten= 73%, Lag= 23.6 min
 Primary = 0.35 cfs @ 12.49 hrs, Volume= 2,188 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 125.51' @ 12.49 hrs Surf.Area= 2,001 sf Storage= 2,119 cf

Plug-Flow detention time= 225.2 min calculated for 2,188 cf (52% of inflow)
 Center-of-Mass det. time= 112.1 min (935.7 - 823.7)

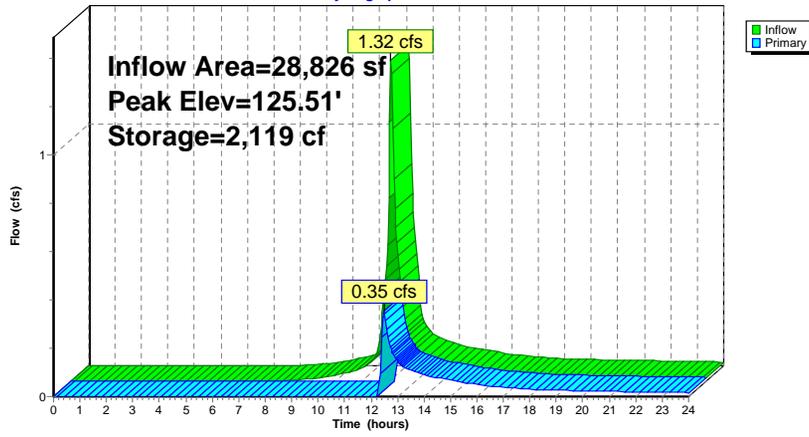
Volume	Invert	Avail.Storage	Storage Description	
#1	124.00'	3,205 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
124.00	898	0	0	898
125.00	1,548	1,208	1,208	1,560
126.00	2,482	1,997	3,205	2,507

Device	Routing	Invert	Outlet Devices
#1	Primary	125.45'	8.0' long x 75.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.35 cfs @ 12.49 hrs HW=125.51' TW=120.20' (Dynamic Tailwater)
 ↳=Broad-Crested Rectangular Weir (Weir Controls 0.35 cfs @ 0.68 fps)

Pond BA 2: Bioretention Area B

Hydrograph



Summary for Pond POI 1: Northern Site

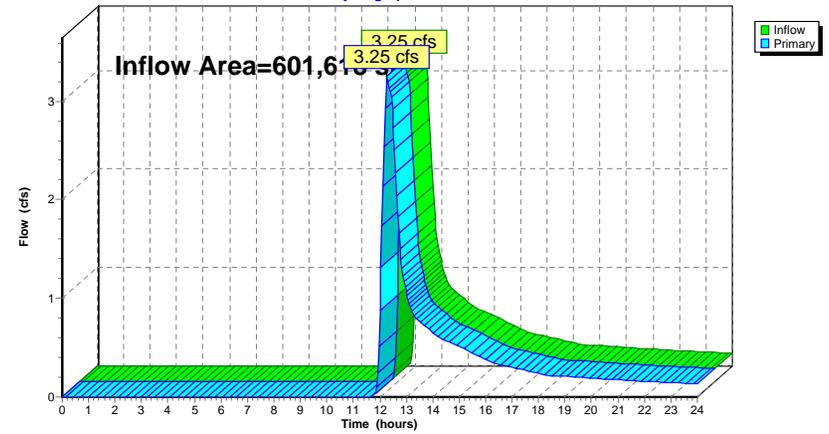
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 601,618 sf, 29.09% Impervious, Inflow Depth > 0.41" for 2-Year event
 Inflow = 3.25 cfs @ 12.28 hrs, Volume= 20,497 cf
 Primary = 3.25 cfs @ 12.28 hrs, Volume= 20,497 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3

Pond POI 1: Northern Site

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1aS: In/Into IW C	Runoff Area=120,475 sf 28.08% Impervious Runoff Depth>1.53" Flow Length=809' Tc=18.6 min CN=68 Runoff=3.27 cfs 15,314 cf
Subcatchment 1bS: Driveway	Runoff Area=13,258 sf 74.33% Impervious Runoff Depth>3.29" Flow Length=262' Tc=1.6 min CN=89 Runoff=1.29 cfs 3,640 cf
Subcatchment 2aS: In/Into IW A	Runoff Area=142,302 sf 26.58% Impervious Runoff Depth>1.53" Flow Length=935' Tc=13.9 min CN=68 Runoff=4.33 cfs 18,112 cf
Subcatchment 2bS: Into Swale	Runoff Area=34,927 sf 7.90% Impervious Runoff Depth>0.90" Flow Length=214' Tc=16.8 min CN=58 Runoff=0.49 cfs 2,620 cf
Subcatchment 3S: In/Into IW D	Runoff Area=46,370 sf 6.69% Impervious Runoff Depth>0.84" Flow Length=443' Tc=20.1 min CN=57 Runoff=0.56 cfs 3,260 cf
Subcatchment 4aS: Eastern	Runoff Area=68,048 sf 58.76% Impervious Runoff Depth>3.29" Flow Length=843' Tc=8.7 min CN=89 Runoff=5.35 cfs 18,662 cf
Subcatchment 4bS: Eastern Building	Runoff Area=13,477 sf 100.00% Impervious Runoff Depth>4.26" Flow Length=300' Slope=0.0050 '/' Tc=1.6 min CN=98 Runoff=1.52 cfs 4,789 cf
Subcatchment 5S: Outside Resources Areas	Runoff Area=29,198 sf 0.00% Impervious Runoff Depth>0.64" Flow Length=379' Tc=14.9 min CN=53 Runoff=0.25 cfs 1,552 cf
Subcatchment 6S: Parking Lot	Runoff Area=28,826 sf 68.07% Impervious Runoff Depth>3.00" Flow Length=274' Tc=6.4 min CN=86 Runoff=2.26 cfs 7,208 cf
Subcatchment 7aS: Western site	Runoff Area=49,439 sf 0.00% Impervious Runoff Depth>1.07" Flow Length=345' Tc=15.8 min CN=61 Runoff=0.92 cfs 4,426 cf
Subcatchment 7bS: Western Building	Runoff Area=13,086 sf 100.00% Impervious Runoff Depth>4.26" Flow Length=236' Slope=0.0050 '/' Tc=1.2 min CN=98 Runoff=1.48 cfs 4,650 cf
Subcatchment 8S: In/Into BVW B	Runoff Area=42,212 sf 3.42% Impervious Runoff Depth>0.59" Flow Length=363' Tc=6.7 min CN=52 Runoff=0.39 cfs 2,080 cf
Reach 1R: Grassed Swale	Avg. Flow Depth=0.36' Max Vel=3.50 fps Inflow=9.95 cfs 44,400 cf n=0.033 L=265.0' S=0.0415 '/' Capacity=92.94 cfs Outflow=9.90 cfs 44,347 cf
Pond 1P: Isolated Wetland C	Peak Elev=120.41' Inflow=3.72 cfs 18,474 cf Outflow=3.72 cfs 18,474 cf
Pond 2P: Isolated Wetland A	Peak Elev=129.30' Inflow=4.33 cfs 18,112 cf Outflow=4.33 cfs 18,112 cf
Pond 3P: Isolated Wetland D	Peak Elev=112.08' Inflow=0.56 cfs 3,260 cf Outflow=0.56 cfs 3,260 cf

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Type III 24-hr 10-Year Rainfall=4.50"

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Pond 4P: BVW B	Inflow=10.23 cfs 46,427 cf Primary=10.23 cfs 46,427 cf
Pond 5P: Basin 1	Peak Elev=105.23' Storage=14,981 cf Inflow=6.13 cfs 23,451 cf Discarded=0.19 cfs 10,497 cf Primary=0.00 cfs 0 cf Outflow=0.19 cfs 10,497 cf
Pond 6P: Basin 2	Peak Elev=104.41' Storage=6,500 cf Inflow=1.89 cfs 12,337 cf Discarded=0.14 cfs 7,047 cf Primary=0.00 cfs 0 cf Outflow=0.14 cfs 7,047 cf
Pond 7P: Sediment Forebay	Peak Elev=107.03' Inflow=5.35 cfs 18,662 cf Outflow=5.35 cfs 18,662 cf
Pond BA 1: Bioretention Area A	Peak Elev=134.38' Storage=583 cf Inflow=1.29 cfs 3,640 cf Outflow=1.25 cfs 3,159 cf
Pond BA 2: Bioretention Area B	Peak Elev=125.65' Storage=2,395 cf Inflow=2.26 cfs 7,208 cf Outflow=1.89 cfs 5,195 cf
Pond POI 1: Northern Site	Inflow=10.46 cfs 47,979 cf Primary=10.46 cfs 47,979 cf

Total Runoff Area = 601,618 sf Runoff Volume = 86,313 cf Average Runoff Depth = 1.72"
70.91% Pervious = 426,630 sf 29.09% Impervious = 174,988 sf

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Type III 24-hr 10-Year Rainfall=4.50"

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Summary for Subcatchment 1aS: In/Into IW C

Runoff = 3.27 cfs @ 12.28 hrs, Volume= 15,314 cf, Depth > 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
* 9,382	98	Paved driveways & Roofs
10,413	55	Woods, Good, HSG B
46,780	61	>75% Grass cover, Good, HSG B
29,453	48	Brush, Good, HSG B
* 24,447	98	Wetland
120,475	68	Weighted Average
86,646		71.92% Pervious Area
33,829		28.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	90	0.0528	0.25		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
2.4	10	0.0500	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.21"
1.0	63	0.0476	1.09		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.9	174	0.0488	1.55		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	55	0.0273	0.99		Shallow Concentrated Flow, Heavy Brush Kv= 6.0 fps
6.3	417	0.0336	1.10		Shallow Concentrated Flow, Heavy Brush Kv= 6.0 fps
18.6	809	Total			

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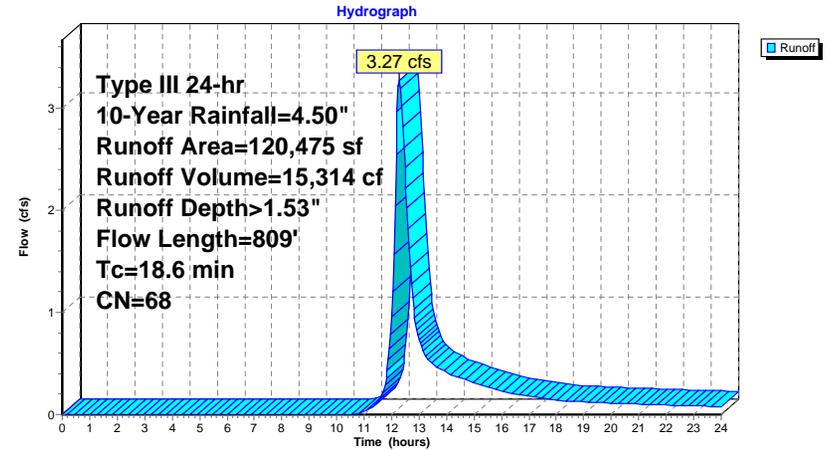
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Type III 24-hr 10-Year Rainfall=4.50"

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Subcatchment 1aS: In/Into IW C



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Summary for Subcatchment 1bS: Driveway

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

Runoff = 1.29 cfs @ 12.03 hrs, Volume= 3,640 cf, Depth> 3.29"

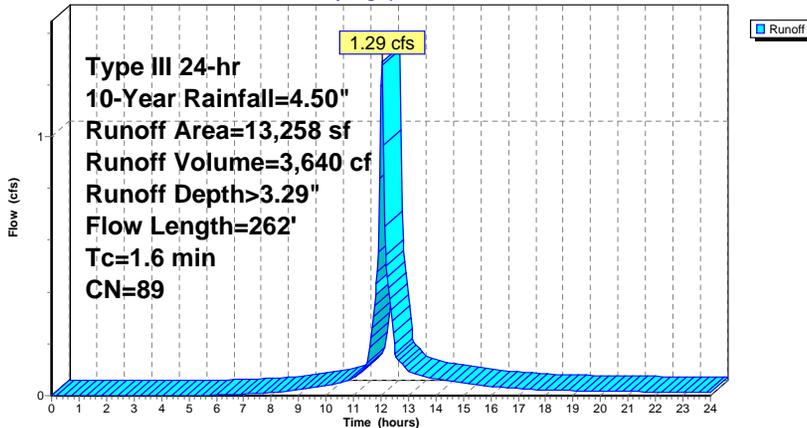
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
8,705	98	Paved driveway & Sidewalk
3,403	61	>75% Grass cover, Good, HSG B
1,150	98	Water Surface, HSG B
13,258	89	Weighted Average
3,403		25.67% Pervious Area
9,855		74.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0350	1.72		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
0.6	162	0.0482	4.46		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.6	262	Total			

Subcatchment 1bS: Driveway

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Summary for Subcatchment 2aS: In/Into IW A

Runoff = 4.33 cfs @ 12.21 hrs, Volume= 18,112 cf, Depth> 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
9,125	98	Wetland
768	48	Brush, Good, HSG B
59,412	55	Woods, Good, HSG B
28,704	98	Paved driveways and Roofs
44,293	61	>75% Grass cover, Good, HSG B
142,302	68	Weighted Average
104,473		73.42% Pervious Area
37,829		26.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
0.8	164	0.0300	3.52		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.1	101	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
3.3	239	0.0593	1.22		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
7.5	331	0.0219	0.74		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.9	935	Total			

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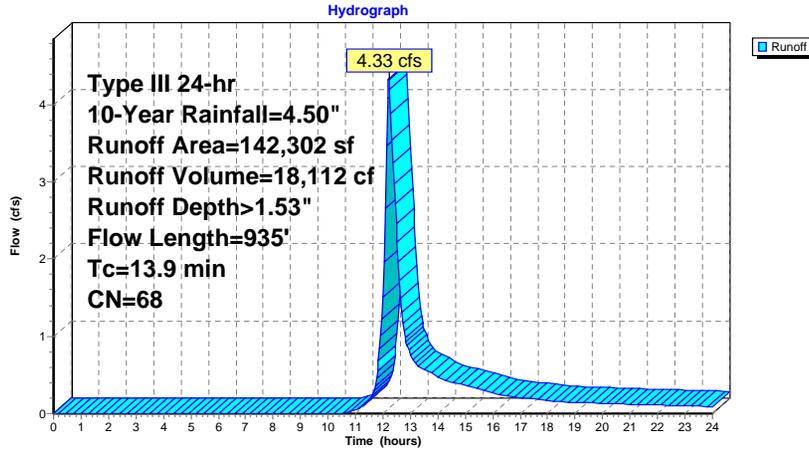
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Subcatchment 2aS: In/Into IW A



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Summary for Subcatchment 2bS: Into Swale

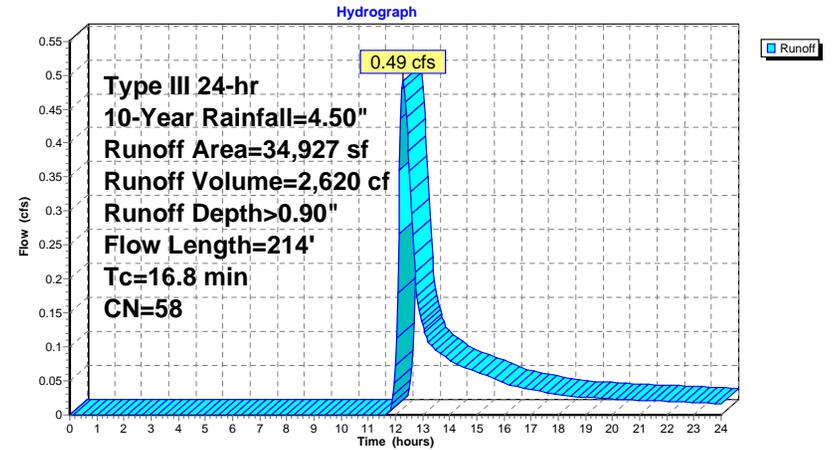
Runoff = 0.49 cfs @ 12.28 hrs, Volume= 2,620 cf, Depth> 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
2,759	98	Patio & Sidewalk
745	55	Woods, Good, HSG B
16,214	48	Brush, Good, HSG B
15,209	61	>75% Grass cover, Good, HSG B
34,927	58	Weighted Average
32,168		92.10% Pervious Area
2,759		7.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	100	0.0450	0.11		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.21"
1.0	114	0.0746	1.91		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
16.8	214	Total			

Subcatchment 2bS: Into Swale



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Type III 24-hr 10-Year Rainfall=4.50"

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Summary for Subcatchment 3S: In/Into IW D

Runoff = 0.56 cfs @ 12.35 hrs, Volume= 3,260 cf, Depth> 0.84"

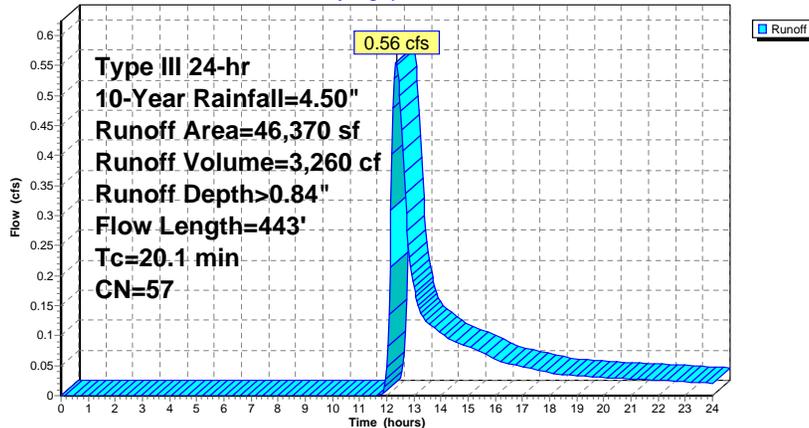
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
3,100	98	Wetland
36,667	55	Woods, Good, HSG B
6,603	48	Brush, Good, HSG B
46,370	57	Weighted Average
43,270		93.31% Pervious Area
3,100		6.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0511	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.21"
4.0	272	0.0511	1.13		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.4	71	0.0141	0.83		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
20.1	443				Total

Subcatchment 3S: In/Into IW D

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Summary for Subcatchment 4aS: Eastern Driveway/Back Parking Area

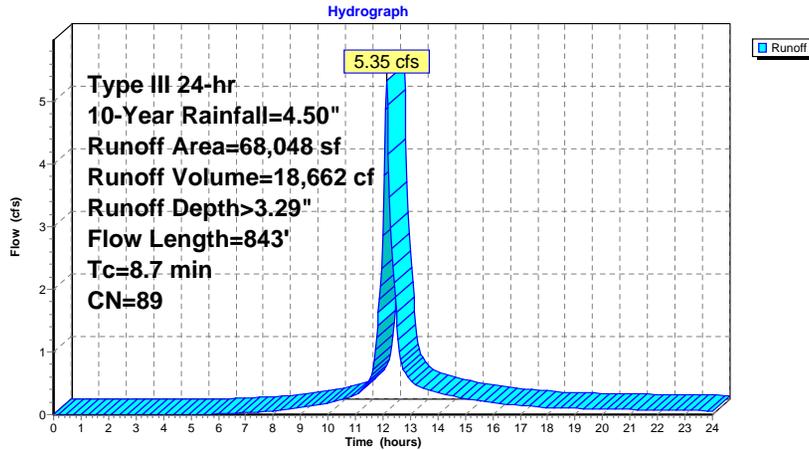
Runoff = 5.35 cfs @ 12.12 hrs, Volume= 18,662 cf, Depth> 3.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
17,315	61	>75% Grass cover, Good, HSG B
39,987	98	Paved Areas
10,746	98	Water Surface, 0% imp, HSG B
68,048	89	Weighted Average
28,061		41.24% Pervious Area
39,987		58.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	42	0.0119	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
0.7	58	0.0302	1.46		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
1.1	253	0.0342	3.75		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.9	490	0.0369	8.71	6.84	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
8.7	843				Total

Subcatchment 4aS: Eastern Driveway/Back Parking Area



Summary for Subcatchment 4bS: Eastern Building

[49] Hint: $T_c < 2dt$ may require smaller dt

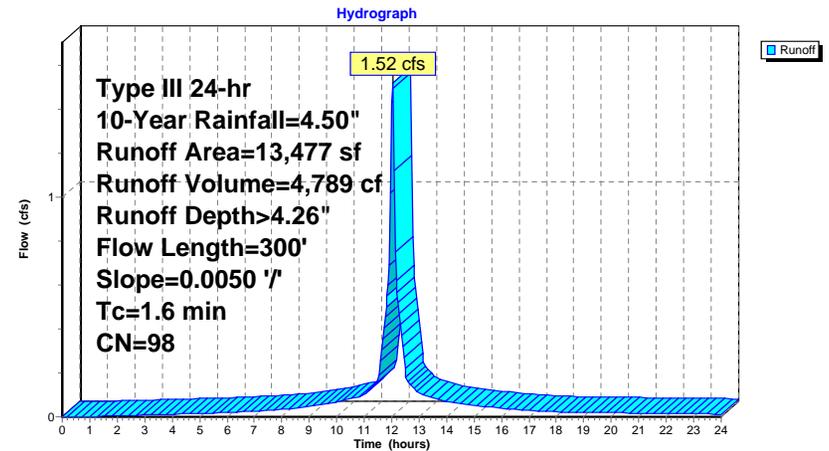
Runoff = 1.52 cfs @ 12.03 hrs, Volume= 4,789 cf, Depth> 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, $dt= 0.04$ hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
13,477	98	Roofs, HSG B
13,477		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	300	0.0050	3.21	2.52	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior

Subcatchment 4bS: Eastern Building



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Type III 24-hr 10-Year Rainfall=4.50"

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Summary for Subcatchment 5S: Outside Resources Areas

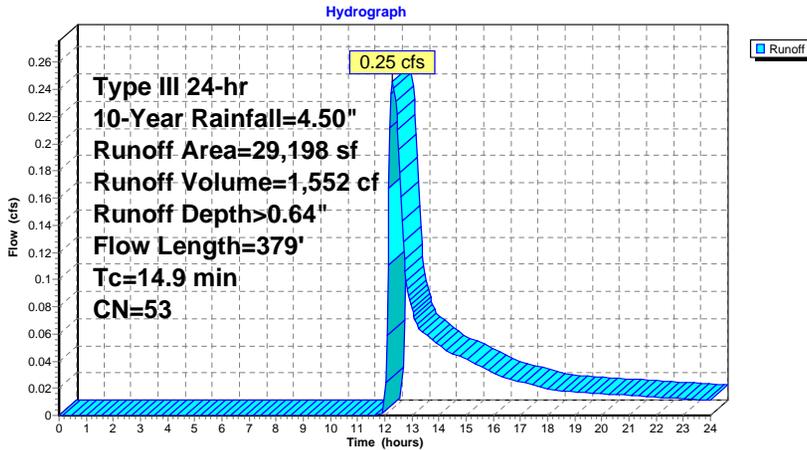
Runoff = 0.25 cfs @ 12.29 hrs, Volume= 1,552 cf, Depth> 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
9,482	55	Woods, Good, HSG B
6,631	61	>75% Grass cover, Good, HSG B
13,085	48	Brush, Good, HSG B
29,198	53	Weighted Average
29,198		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	61	0.0787	0.27		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
7.9	39	0.0385	0.08		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.21"
2.9	253	0.0435	1.46		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
0.3	26	0.0769	1.39		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
14.9	379	Total			

Subcatchment 5S: Outside Resources Areas



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Type III 24-hr 10-Year Rainfall=4.50"

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Summary for Subcatchment 6S: Parking Lot

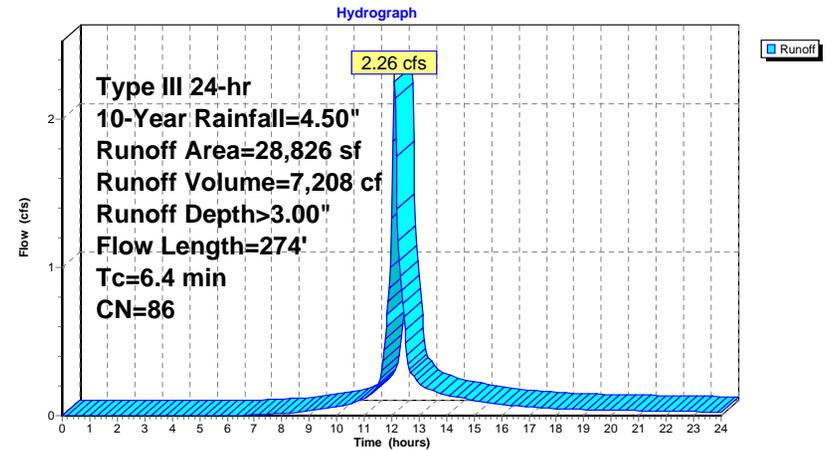
Runoff = 2.26 cfs @ 12.09 hrs, Volume= 7,208 cf, Depth> 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
17,494	98	Paved Area
9,203	61	>75% Grass cover, Good, HSG B
2,129	98	Water Surface, HSG B
28,826	86	Weighted Average
9,203		31.93% Pervious Area
19,623		68.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	64	0.0400	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
0.4	36	0.0400	1.48		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
0.8	174	0.0347	3.78		Shallow Concentrated Flow, Paved Kv= 20.3 fps
6.4	274	Total			

Subcatchment 6S: Parking Lot



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Summary for Subcatchment 7aS: Western site

Runoff = 0.92 cfs @ 12.25 hrs, Volume= 4,426 cf, Depth> 1.07"

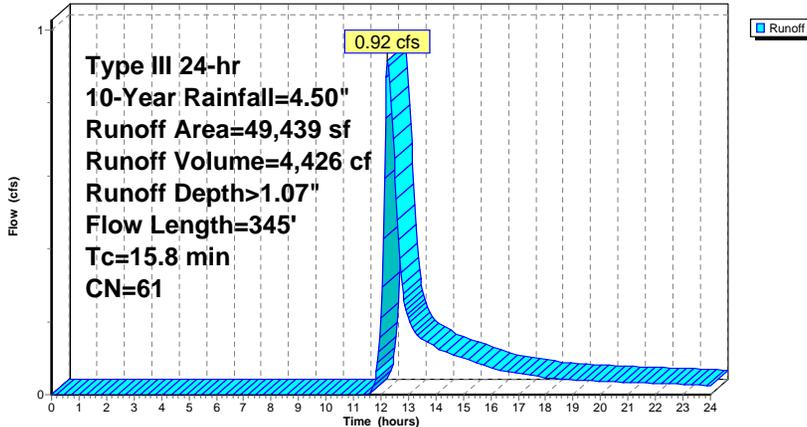
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
6,531	61	>75% Grass cover, Good, HSG B
16,065	55	Woods, Good, HSG B
17,873	48	Brush, Good, HSG B
8,970	98	Water Surface, 0% imp, HSG B
49,439	61	Weighted Average
49,439		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0700	0.13		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.21"
1.6	105	0.0238	1.08		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
1.0	140	0.0250	2.37		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
15.8	345				Total

Subcatchment 7aS: Western site

Hydrograph



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Summary for Subcatchment 7bS: Western Building

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

Runoff = 1.48 cfs @ 12.02 hrs, Volume= 4,650 cf, Depth> 4.26"

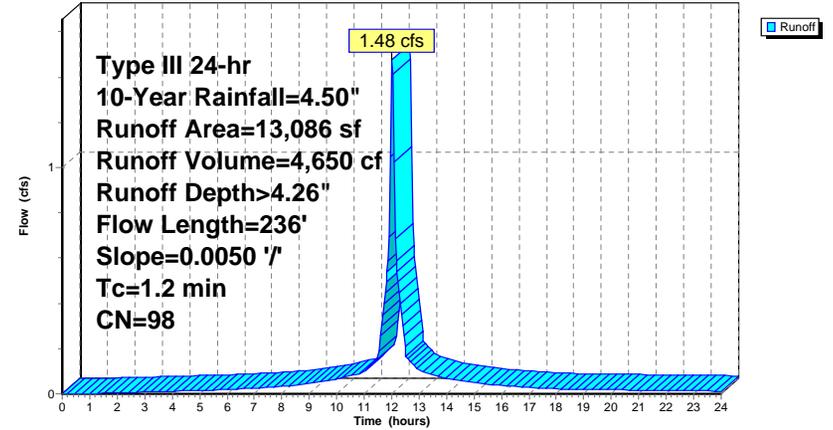
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
13,086	98	Roofs, HSG B
13,086		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	236	0.0050	3.21	2.52	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior

Subcatchment 7bS: Western Building

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Summary for Subcatchment 8S: In/Into BVW B

Runoff = 0.39 cfs @ 12.14 hrs, Volume= 2,080 cf, Depth> 0.59"

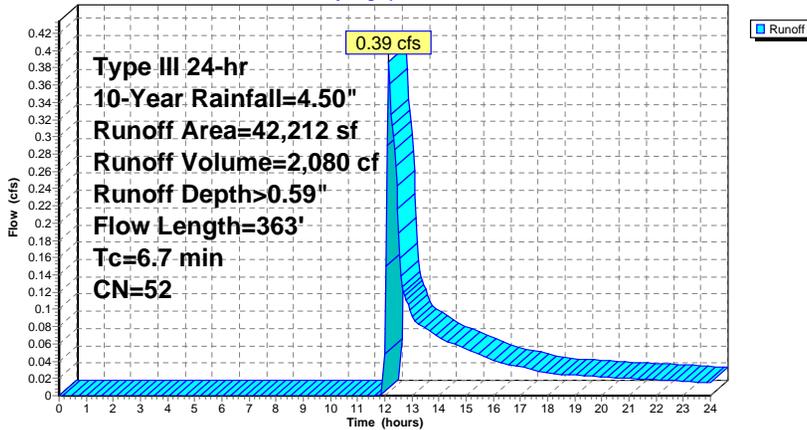
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
1,443	98	Patio & Sidewalks
9,042	61	>75% Grass cover, Good, HSG B
31,727	48	Brush, Good, HSG B
42,212	52	Weighted Average
40,769		96.58% Pervious Area
1,443		3.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	52	0.0100	0.92		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
2.9	48	0.0937	0.27		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
2.9	263	0.0456	1.49		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
6.7	363	Total			

Subcatchment 8S: In/Into BVW B

Hydrograph



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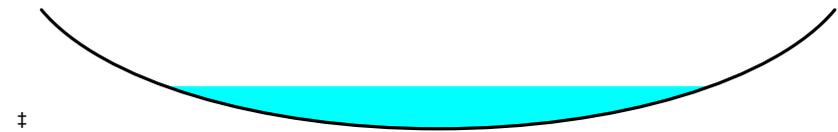
Summary for Reach 1R: Grassed Swale

Inflow Area = 339,788 sf, 30.58% Impervious, Inflow Depth > 1.57" for 10-Year event
 Inflow = 9.95 cfs @ 12.21 hrs, Volume= 44,400 cf
 Outflow = 9.90 cfs @ 12.23 hrs, Volume= 44,347 cf, Atten= 1%, Lag= 1.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Max. Velocity= 3.50 fps, Min. Travel Time= 1.3 min
 Avg. Velocity = 1.46 fps, Avg. Travel Time= 3.0 min

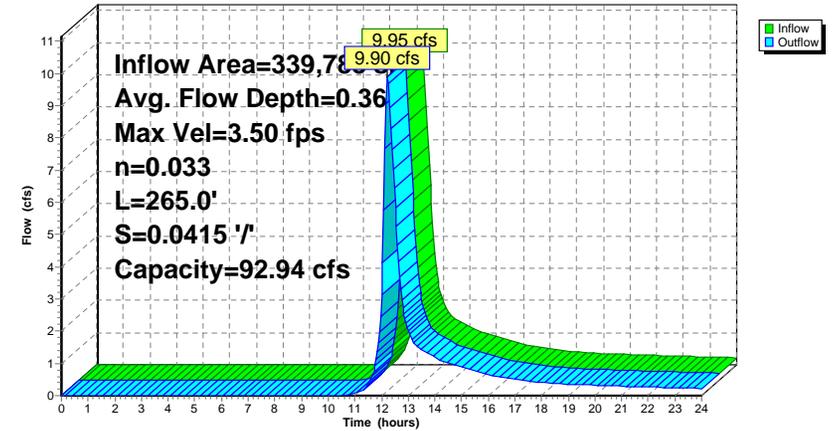
Peak Storage= 748 cf @ 12.23 hrs
 Average Depth at Peak Storage= 0.36'
 Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 92.94 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.033 Earth, grassed & winding
 Length= 265.0' Slope= 0.0415 '/
 Inlet Invert= 120.00', Outlet Invert= 109.00'



Reach 1R: Grassed Swale

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Summary for Pond 1P: Isolated Wetland C

[57] Hint: Peaked at 120.41' (Flood elevation advised)

Inflow Area = 133,733 sf, 32.67% Impervious, Inflow Depth > 1.66" for 10-Year event
 Inflow = 3.72 cfs @ 12.27 hrs, Volume= 18,474 cf
 Outflow = 3.72 cfs @ 12.27 hrs, Volume= 18,474 cf, Atten= 0%, Lag= 0.0 min
 Primary = 3.72 cfs @ 12.27 hrs, Volume= 18,474 cf

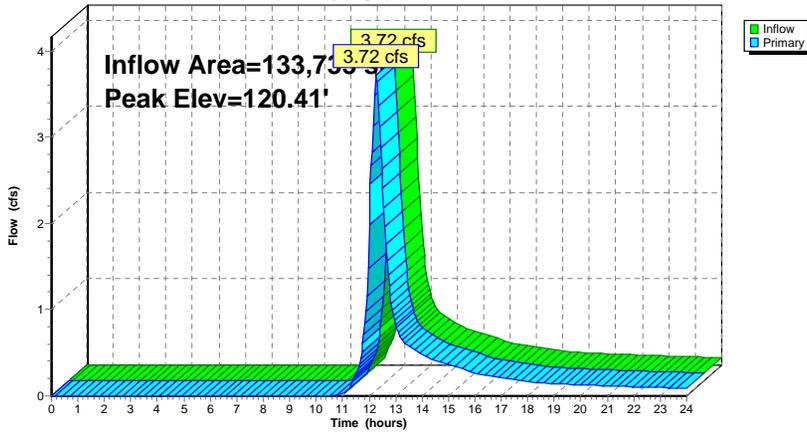
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 120.41' @ 12.25 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	10.0' long x 57.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=3.70 cfs @ 12.27 hrs HW=120.41' TW=120.35' (Dynamic Tailwater)
 1=Broad-Crested Rectangular Weir (Weir Controls 3.70 cfs @ 0.91 fps)

Pond 1P: Isolated Wetland C

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Summary for Pond 2P: Isolated Wetland A

[57] Hint: Peaked at 129.30' (Flood elevation advised)

Inflow Area = 142,302 sf, 26.58% Impervious, Inflow Depth > 1.53" for 10-Year event
 Inflow = 4.33 cfs @ 12.21 hrs, Volume= 18,112 cf
 Outflow = 4.33 cfs @ 12.21 hrs, Volume= 18,112 cf, Atten= 0%, Lag= 0.0 min
 Primary = 4.33 cfs @ 12.21 hrs, Volume= 18,112 cf

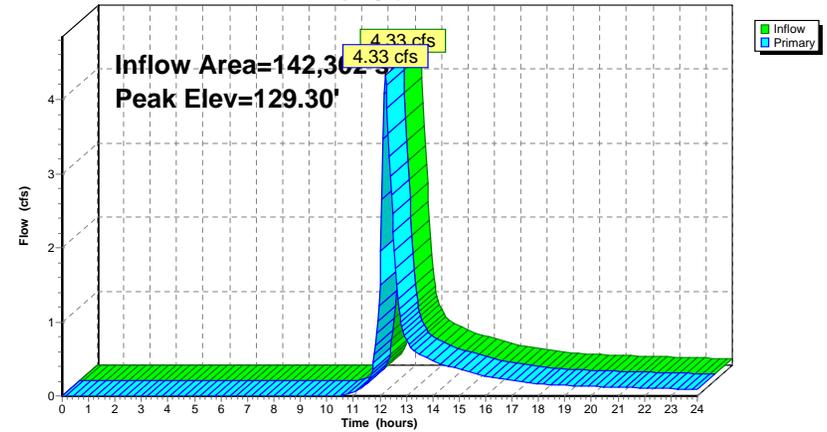
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 129.30' @ 12.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	10.0' long x 214.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4.30 cfs @ 12.21 hrs HW=129.29' TW=120.35' (Dynamic Tailwater)
 1=Broad-Crested Rectangular Weir (Weir Controls 4.30 cfs @ 1.46 fps)

Pond 2P: Isolated Wetland A

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Summary for Pond 3P: Isolated Wetland D

[57] Hint: Peaked at 112.08' (Flood elevation advised)

Inflow Area = 46,370 sf, 6.69% Impervious, Inflow Depth > 0.84" for 10-Year event
 Inflow = 0.56 cfs @ 12.35 hrs, Volume= 3,260 cf
 Outflow = 0.56 cfs @ 12.35 hrs, Volume= 3,260 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.56 cfs @ 12.35 hrs, Volume= 3,260 cf

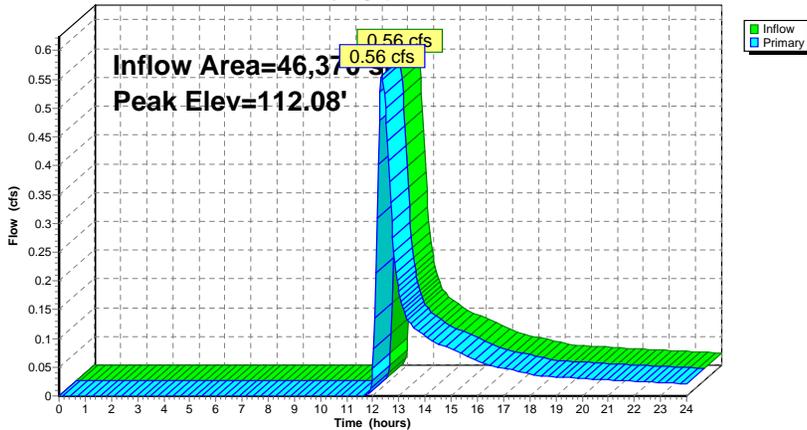
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 112.08' @ 12.35 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	112.00'	10.0' long x 203.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.56 cfs @ 12.35 hrs HW=112.08' TW=103.73' (Dynamic Tailwater)
 1=Broad-Crested Rectangular Weir (Weir Controls 0.56 cfs @ 0.74 fps)

Pond 3P: Isolated Wetland D

Hydrograph



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Type III 24-hr 10-Year Rainfall=4.50"

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Summary for Pond 4P: BVW B

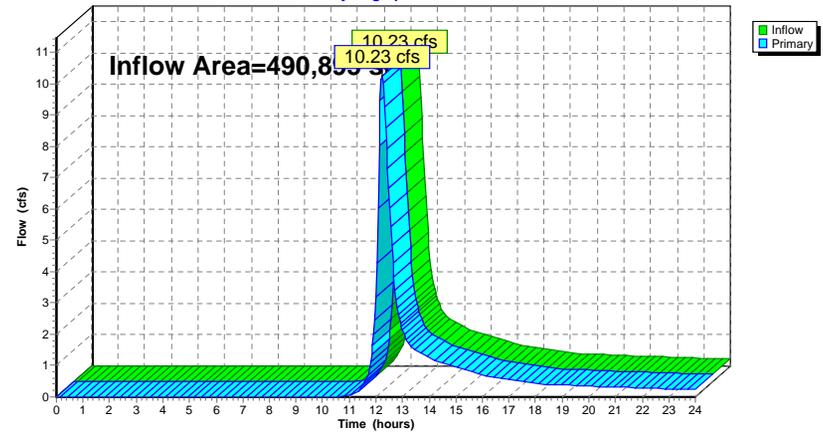
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 490,895 sf, 24.76% Impervious, Inflow Depth > 1.13" for 10-Year event
 Inflow = 10.23 cfs @ 12.23 hrs, Volume= 46,427 cf
 Primary = 10.23 cfs @ 12.23 hrs, Volume= 46,427 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3

Pond 4P: BVW B

Hydrograph



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Summary for Pond 5P: Basin 1

Inflow Area = 81,525 sf, 65.58% Impervious, Inflow Depth > 3.45" for 10-Year event
 Inflow = 6.13 cfs @ 12.11 hrs, Volume= 23,451 cf
 Outflow = 0.19 cfs @ 16.59 hrs, Volume= 10,497 cf, Atten= 97%, Lag= 269.2 min
 Discarded = 0.19 cfs @ 16.59 hrs, Volume= 10,497 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 105.23' @ 16.59 hrs Surf.Area= 8,063 sf Storage= 14,981 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 167.1 min (955.9 - 788.8)

Volume	Invert	Avail.Storage	Storage Description	
#1	103.00'	31,798 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
103.00	5,534	0	0	5,534
104.00	6,579	6,049	6,049	6,615
105.00	7,680	7,122	13,171	7,756
106.00	9,412	8,531	21,703	9,518
107.00	10,794	10,095	31,798	10,945

Device	Routing	Invert	Outlet Devices
#1	Primary	105.65'	10.0' long x 141.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	103.00'	1.020 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.19 cfs @ 16.59 hrs HW=105.23' (Free Discharge)
 ↳2=Exfiltration (Exfiltration Controls 0.19 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=103.00' TW=0.00' (Dynamic Tailwater)
 ↳1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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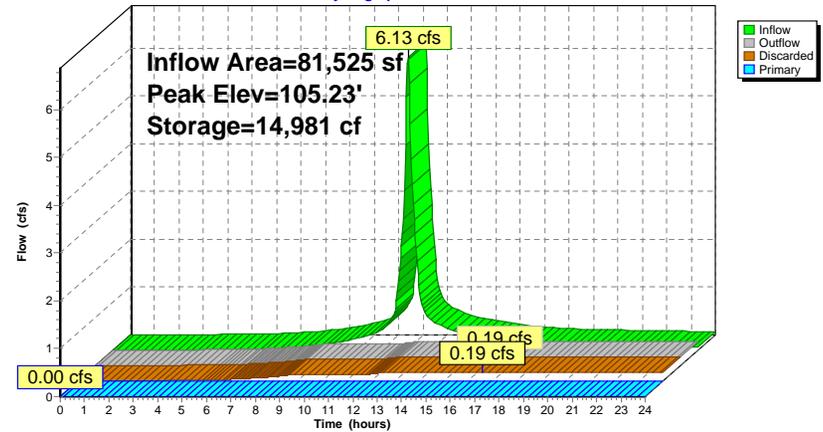
Type III 24-hr 10-Year Rainfall=4.50"

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Pond 5P: Basin 1

Hydrograph



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Summary for Pond 6P: Basin 2

Inflow Area = 108,895 sf, 14.86% Impervious, Inflow Depth > 1.36" for 10-Year event
 Inflow = 1.89 cfs @ 12.25 hrs, Volume= 12,337 cf
 Outflow = 0.14 cfs @ 17.02 hrs, Volume= 7,047 cf, Atten= 93%, Lag= 286.2 min
 Discarded = 0.14 cfs @ 17.02 hrs, Volume= 7,047 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 104.41' @ 17.02 hrs Surf.Area= 5,721 sf Storage= 6,500 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 142.3 min (980.5 - 838.2)

Volume	Invert	Avail.Storage	Storage Description	
#1	103.10'	25,458 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
103.10	4,240	0	0	4,240
104.00	5,256	4,265	4,265	5,279
105.00	6,432	5,834	10,099	6,486
106.00	7,675	7,044	17,143	7,764
107.00	8,970	8,314	25,458	9,099

Device	Routing	Invert	Outlet Devices
#1	Discarded	103.10'	1.020 in/hr Exfiltration over Surface area
#2	Primary	105.80'	10.0' long x 75.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.14 cfs @ 17.02 hrs HW=104.41' (Free Discharge)
 ↳1=Exfiltration (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=103.10' TW=0.00' (Dynamic Tailwater)
 ↳2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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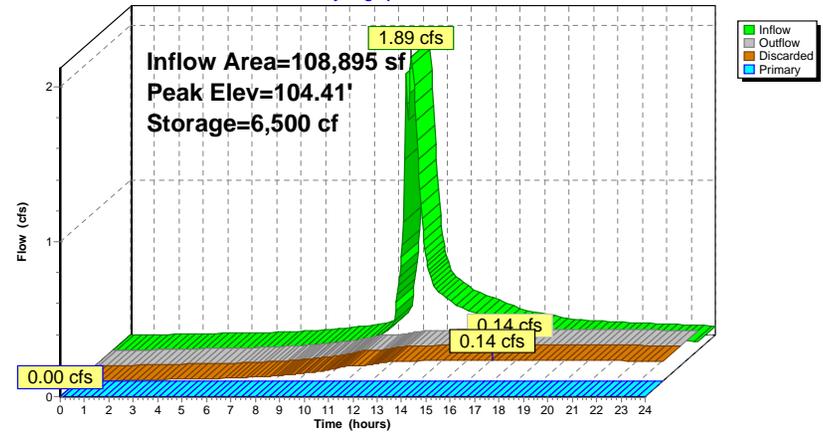
Type III 24-hr 10-Year Rainfall=4.50"

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Pond 6P: Basin 2

Hydrograph



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Summary for Pond 7P: Sediment Forebay

[57] Hint: Peaked at 107.03' (Flood elevation advised)

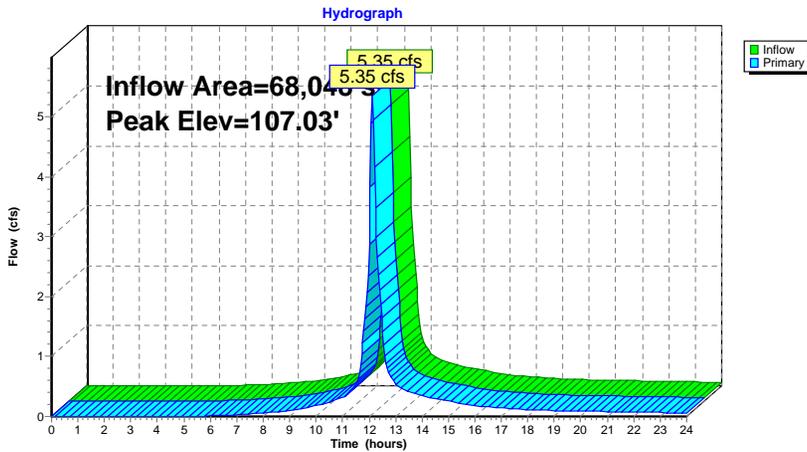
Inflow Area = 68,048 sf, 58.76% Impervious, Inflow Depth > 3.29" for 10-Year event
 Inflow = 5.35 cfs @ 12.12 hrs, Volume= 18,662 cf
 Outflow = 5.35 cfs @ 12.12 hrs, Volume= 18,662 cf, Atten= 0%, Lag= 0.0 min
 Primary = 5.35 cfs @ 12.12 hrs, Volume= 18,662 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 107.03' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	106.50'	5.3' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=5.33 cfs @ 12.12 hrs HW=107.03' TW=104.14' (Dynamic Tailwater)
 ↳1=Broad-Crested Rectangular Weir (Weir Controls 5.33 cfs @ 1.91 fps)

Pond 7P: Sediment Forebay



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Type III 24-hr 10-Year Rainfall=4.50"

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Summary for Pond BA 1: Bioretention Area A

Inflow Area = 13,258 sf, 74.33% Impervious, Inflow Depth > 3.29" for 10-Year event
 Inflow = 1.29 cfs @ 12.03 hrs, Volume= 3,640 cf
 Outflow = 1.25 cfs @ 12.04 hrs, Volume= 3,159 cf, Atten= 3%, Lag= 1.0 min
 Primary = 1.25 cfs @ 12.04 hrs, Volume= 3,159 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 134.38' @ 12.04 hrs Surf.Area= 851 sf Storage= 583 cf

Plug-Flow detention time= 91.1 min calculated for 3,154 cf (87% of inflow)
 Center-of-Mass det. time= 33.1 min (827.1 - 794.0)

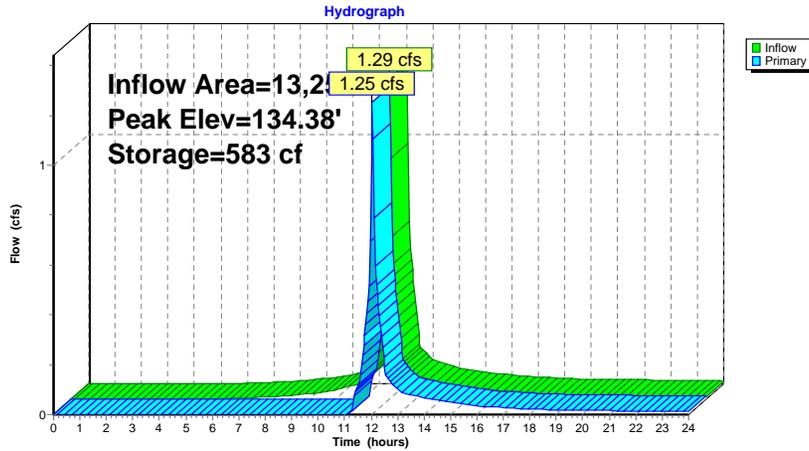
Volume	Invert	Avail.Storage	Storage Description
#1	133.50'	1,201 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
133.50	481	0	0	481
134.00	690	291	291	694
135.00	1,150	910	1,201	1,167

Device	Routing	Invert	Outlet Devices
#1	Primary	134.25'	10.0' long x 43.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.23 cfs @ 12.04 hrs HW=134.38' TW=120.29' (Dynamic Tailwater)
 ↳1=Broad-Crested Rectangular Weir (Weir Controls 1.23 cfs @ 0.96 fps)

Pond BA 1: Bioretention Area A



Summary for Pond BA 2: Bioretention Area B

Inflow Area = 28,826 sf, 68.07% Impervious, Inflow Depth > 3.00" for 10-Year event
 Inflow = 2.26 cfs @ 12.09 hrs, Volume= 7,208 cf
 Outflow = 1.89 cfs @ 12.15 hrs, Volume= 5,195 cf, Atten= 16%, Lag= 3.7 min
 Primary = 1.89 cfs @ 12.15 hrs, Volume= 5,195 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 125.65' @ 12.15 hrs Surf.Area= 2,128 sf Storage= 2,395 cf

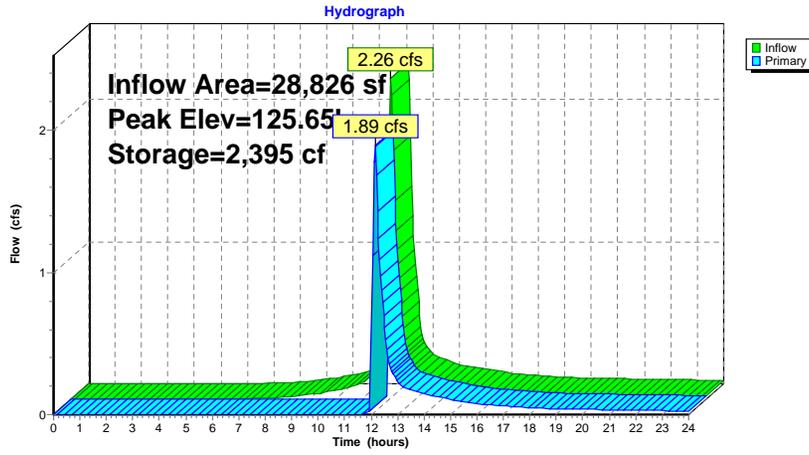
Plug-Flow detention time= 147.8 min calculated for 5,195 cf (72% of inflow)
 Center-of-Mass det. time= 57.9 min (866.2 - 808.3)

Volume #1	Invert	Avail.Storage	Storage Description	
#1	124.00'	3,205 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
124.00	898	0	0	898
125.00	1,548	1,208	1,208	1,560
126.00	2,482	1,997	3,205	2,507

Device #1	Routing	Invert	Outlet Devices
#1	Primary	125.45'	8.0' long x 75.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.87 cfs @ 12.15 hrs HW=125.65' TW=120.34' (Dynamic Tailwater)
 ↳=Broad-Crested Rectangular Weir (Weir Controls 1.87 cfs @ 1.19 fps)

Pond BA 2: Bioretention Area B



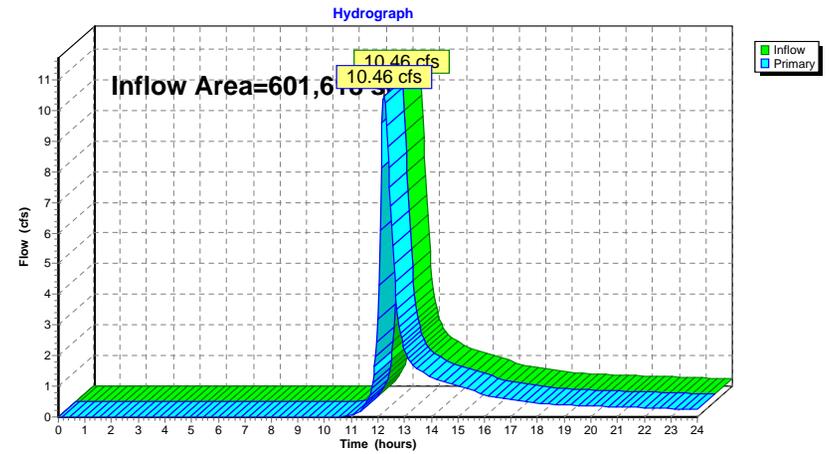
Summary for Pond POI 1: Northern Site

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

Inflow Area = 601,618 sf, 29.09% Impervious, Inflow Depth > 0.96" for 10-Year event
 Inflow = 10.46 cfs @ 12.23 hrs, Volume= 47,979 cf
 Primary = 10.46 cfs @ 12.23 hrs, Volume= 47,979 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3

Pond POI 1: Northern Site



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Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1aS: In/Into IW C	Runoff Area=120,475 sf 28.08% Impervious Runoff Depth>2.16" Flow Length=809' Tc=18.6 min CN=68 Runoff=4.75 cfs 21,686 cf
Subcatchment 1bS: Driveway	Runoff Area=13,258 sf 74.33% Impervious Runoff Depth>4.16" Flow Length=262' Tc=1.6 min CN=89 Runoff=1.60 cfs 4,591 cf
Subcatchment 2aS: In/Into IW A	Runoff Area=142,302 sf 26.58% Impervious Runoff Depth>2.16" Flow Length=935' Tc=13.9 min CN=68 Runoff=6.29 cfs 25,645 cf
Subcatchment 2bS: Into Swale	Runoff Area=34,927 sf 7.90% Impervious Runoff Depth>1.39" Flow Length=214' Tc=16.8 min CN=58 Runoff=0.84 cfs 4,042 cf
Subcatchment 3S: In/Into IW D	Runoff Area=46,370 sf 6.69% Impervious Runoff Depth>1.32" Flow Length=443' Tc=20.1 min CN=57 Runoff=0.97 cfs 5,087 cf
Subcatchment 4aS: Eastern	Runoff Area=68,048 sf 58.76% Impervious Runoff Depth>4.15" Flow Length=843' Tc=8.7 min CN=89 Runoff=6.67 cfs 23,538 cf
Subcatchment 4bS: Eastern Building	Runoff Area=13,477 sf 100.00% Impervious Runoff Depth>5.16" Flow Length=300' Slope=0.0050 '/' Tc=1.6 min CN=98 Runoff=1.83 cfs 5,798 cf
Subcatchment 5S: Outside Resources Areas	Runoff Area=29,198 sf 0.00% Impervious Runoff Depth>1.05" Flow Length=379' Tc=14.9 min CN=53 Runoff=0.49 cfs 2,549 cf
Subcatchment 6S: Parking Lot	Runoff Area=28,826 sf 68.07% Impervious Runoff Depth>3.84" Flow Length=274' Tc=6.4 min CN=86 Runoff=2.86 cfs 9,221 cf
Subcatchment 7aS: Western site	Runoff Area=49,439 sf 0.00% Impervious Runoff Depth>1.61" Flow Length=345' Tc=15.8 min CN=61 Runoff=1.47 cfs 6,628 cf
Subcatchment 7bS: Western Building	Runoff Area=13,086 sf 100.00% Impervious Runoff Depth>5.16" Flow Length=236' Slope=0.0050 '/' Tc=1.2 min CN=98 Runoff=1.78 cfs 5,630 cf
Subcatchment 8S: In/Into BVW B	Runoff Area=42,212 sf 3.42% Impervious Runoff Depth>0.99" Flow Length=363' Tc=6.7 min CN=52 Runoff=0.83 cfs 3,469 cf
Reach 1R: Grassed Swale	Avg. Flow Depth=0.42' Max Vel=3.91 fps Inflow=14.25 cfs 62,688 cf n=0.033 L=265.0' S=0.0415 '/' Capacity=92.94 cfs Outflow=14.22 cfs 62,625 cf
Pond 1P: Isolated Wetland C	Peak Elev=120.50' Inflow=5.32 cfs 25,796 cf Outflow=5.32 cfs 25,796 cf
Pond 2P: Isolated Wetland A	Peak Elev=129.38' Inflow=6.29 cfs 25,645 cf Outflow=6.29 cfs 25,645 cf
Pond 3P: Isolated Wetland D	Peak Elev=112.11' Inflow=0.97 cfs 5,087 cf Outflow=0.97 cfs 5,087 cf

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Type III 24-hr 25-Year Rainfall=5.40"

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Pond 4P: BVW B	Inflow=14.85 cfs 66,093 cf Primary=14.85 cfs 66,093 cf
Pond 5P: Basin 1	Peak Elev=105.68' Storage=18,808 cf Inflow=7.62 cfs 29,336 cf Discarded=0.21 cfs 11,665 cf Primary=0.16 cfs 992 cf Outflow=0.37 cfs 12,656 cf
Pond 6P: Basin 2	Peak Elev=105.03' Storage=10,320 cf Inflow=2.95 cfs 17,345 cf Discarded=0.15 cfs 8,008 cf Primary=0.00 cfs 0 cf Outflow=0.15 cfs 8,008 cf
Pond 7P: Sediment Forebay	Peak Elev=107.10' Inflow=6.67 cfs 23,538 cf Outflow=6.67 cfs 23,538 cf
Pond BA 1: Bioretention Area A	Peak Elev=134.40' Storage=601 cf Inflow=1.60 cfs 4,591 cf Outflow=1.57 cfs 4,110 cf
Pond BA 2: Bioretention Area B	Peak Elev=125.70' Storage=2,500 cf Inflow=2.86 cfs 9,221 cf Outflow=2.64 cfs 7,205 cf
Pond POI 1: Northern Site	Inflow=15.33 cfs 69,634 cf Primary=15.33 cfs 69,634 cf

Total Runoff Area = 601,618 sf Runoff Volume = 117,883 cf Average Runoff Depth = 2.35"
70.91% Pervious = 426,630 sf 29.09% Impervious = 174,988 sf

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Type III 24-hr 25-Year Rainfall=5.40"

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Summary for Subcatchment 1aS: In/Into IW C

Runoff = 4.75 cfs @ 12.27 hrs, Volume= 21,686 cf, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
9,382	98	Paved driveways & Roofs
10,413	55	Woods, Good, HSG B
46,780	61	>75% Grass cover, Good, HSG B
29,453	48	Brush, Good, HSG B
24,447	98	Wetland
120,475	68	Weighted Average
86,646		71.92% Pervious Area
33,829		28.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	90	0.0528	0.25		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
2.4	10	0.0500	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.21"
1.0	63	0.0476	1.09		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.9	174	0.0488	1.55		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	55	0.0273	0.99		Shallow Concentrated Flow, Heavy Brush Kv= 6.0 fps
6.3	417	0.0336	1.10		Shallow Concentrated Flow, Heavy Brush Kv= 6.0 fps
18.6	809	Total			

Haverhill Proposed Model 160620

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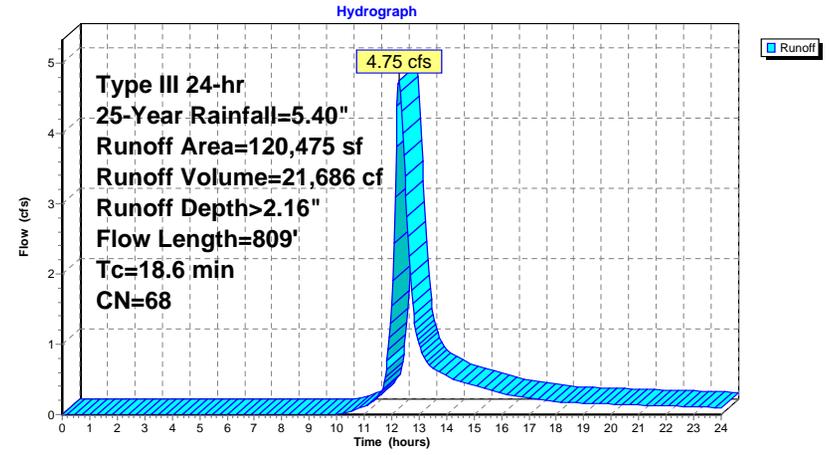
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Type III 24-hr 25-Year Rainfall=5.40"

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Subcatchment 1aS: In/Into IW C



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Type III 24-hr 25-Year Rainfall=5.40"

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Summary for Subcatchment 1bS: Driveway

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

Runoff = 1.60 cfs @ 12.03 hrs, Volume= 4,591 cf, Depth> 4.16"

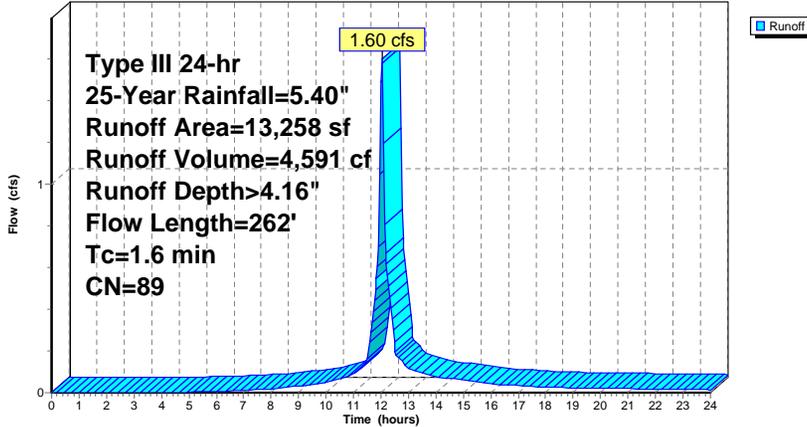
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
* 8,705	98	Paved driveway & Sidewalk
3,403	61	>75% Grass cover, Good, HSG B
1,150	98	Water Surface, HSG B
13,258	89	Weighted Average
3,403		25.67% Pervious Area
9,855		74.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0350	1.72		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
0.6	162	0.0482	4.46		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.6	262	Total			

Subcatchment 1bS: Driveway

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.40"

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Summary for Subcatchment 2aS: In/Into IW A

Runoff = 6.29 cfs @ 12.20 hrs, Volume= 25,645 cf, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
* 9,125	98	Wetland
768	48	Brush, Good, HSG B
59,412	55	Woods, Good, HSG B
* 28,704	98	Paved driveways and Roofs
44,293	61	>75% Grass cover, Good, HSG B
142,302	68	Weighted Average
104,473		73.42% Pervious Area
37,829		26.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
0.8	164	0.0300	3.52		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.1	101	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
3.3	239	0.0593	1.22		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
7.5	331	0.0219	0.74		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.9	935	Total			

Haverhill Proposed Model 160620

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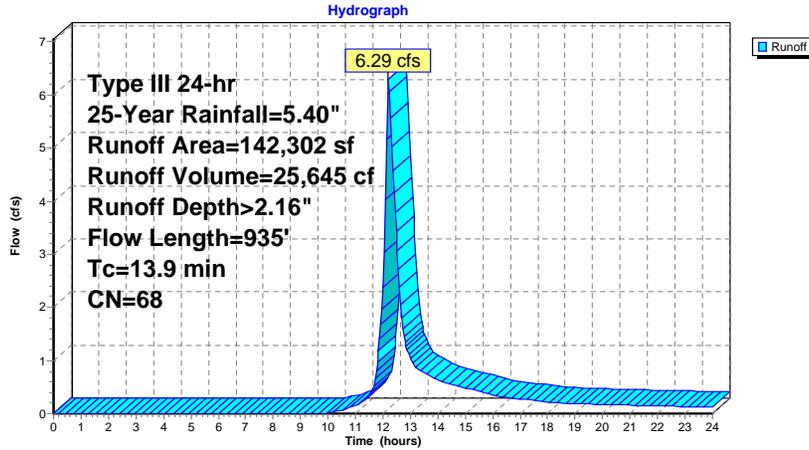
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Type III 24-hr 25-Year Rainfall=5.40"

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Subcatchment 2aS: In/Into IW A



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Type III 24-hr 25-Year Rainfall=5.40"

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Summary for Subcatchment 2bS: Into Swale

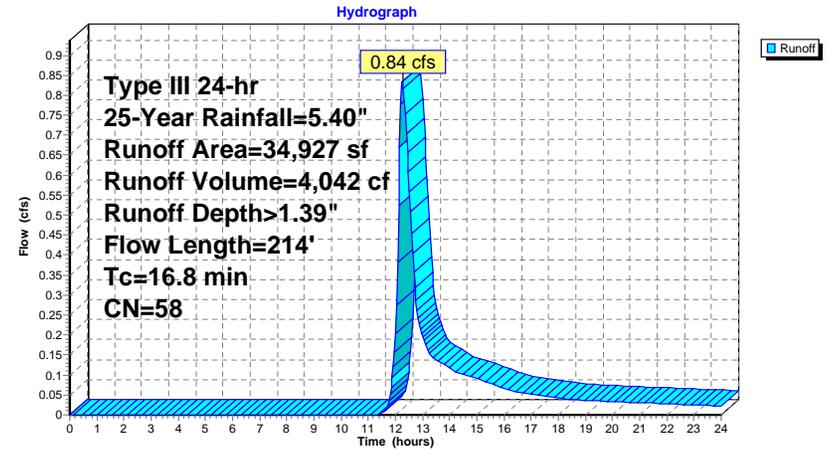
Runoff = 0.84 cfs @ 12.26 hrs, Volume= 4,042 cf, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
2,759	98	Patio & Sidewalk
745	55	Woods, Good, HSG B
16,214	48	Brush, Good, HSG B
15,209	61	>75% Grass cover, Good, HSG B
34,927	58	Weighted Average
32,168		92.10% Pervious Area
2,759		7.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	100	0.0450	0.11		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.21"
1.0	114	0.0746	1.91		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
16.8	214				Total

Subcatchment 2bS: Into Swale



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Type III 24-hr 25-Year Rainfall=5.40"

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Summary for Subcatchment 3S: In/Into IW D

Runoff = 0.97 cfs @ 12.32 hrs, Volume= 5,087 cf, Depth > 1.32"

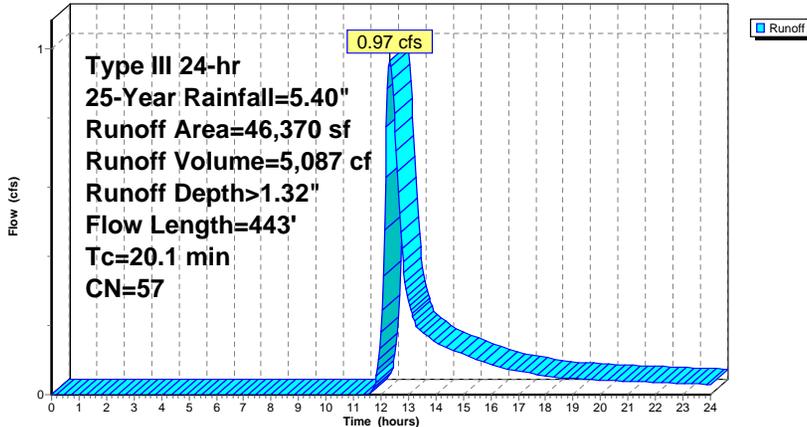
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
3,100	98	Wetland
36,667	55	Woods, Good, HSG B
6,603	48	Brush, Good, HSG B
46,370	57	Weighted Average
43,270		93.31% Pervious Area
3,100		6.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0511	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.21"
4.0	272	0.0511	1.13		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.4	71	0.0141	0.83		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
20.1	443	Total			

Subcatchment 3S: In/Into IW D

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.40"

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Summary for Subcatchment 4aS: Eastern Driveway/Back Parking Area

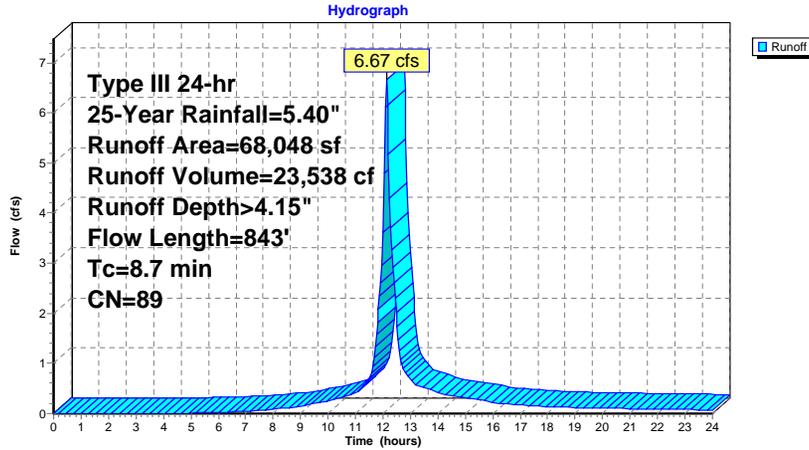
Runoff = 6.67 cfs @ 12.12 hrs, Volume= 23,538 cf, Depth > 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
17,315	61	>75% Grass cover, Good, HSG B
39,987	98	Paved Areas
10,746	98	Water Surface, 0% imp, HSG B
68,048	89	Weighted Average
28,061		41.24% Pervious Area
39,987		58.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	42	0.0119	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
0.7	58	0.0302	1.46		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
1.1	253	0.0342	3.75		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.9	490	0.0369	8.71	6.84	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
8.7	843	Total			

Subcatchment 4aS: Eastern Driveway/Back Parking Area



Summary for Subcatchment 4bS: Eastern Building

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

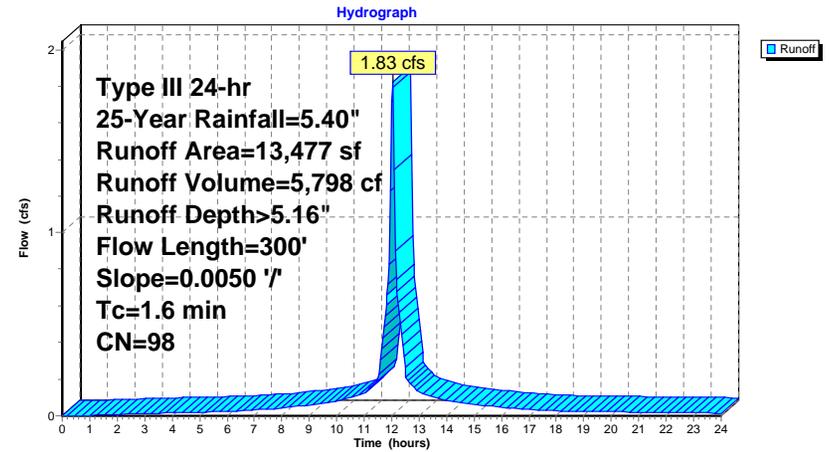
Runoff = 1.83 cfs @ 12.03 hrs, Volume= 5,798 cf, Depth> 5.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
13,477	98	Roofs, HSG B
13,477		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	300	0.0050	3.21	2.52	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior

Subcatchment 4bS: Eastern Building



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Type III 24-hr 25-Year Rainfall=5.40"

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Summary for Subcatchment 5S: Outside Resources Areas

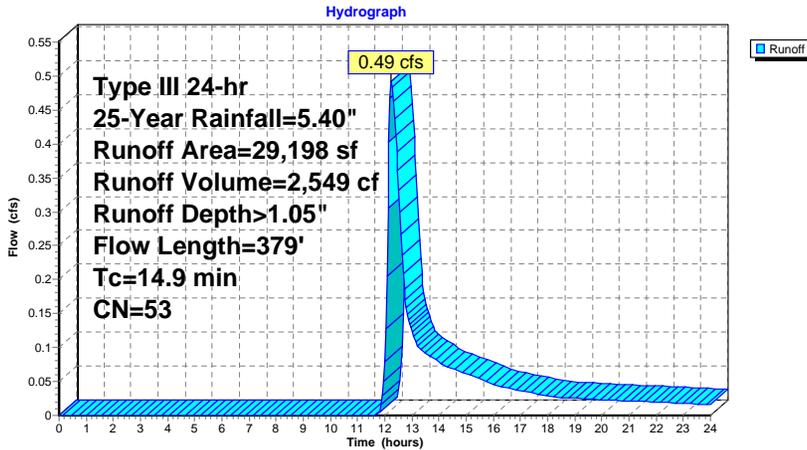
Runoff = 0.49 cfs @ 12.25 hrs, Volume= 2,549 cf, Depth> 1.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
9,482	55	Woods, Good, HSG B
6,631	61	>75% Grass cover, Good, HSG B
13,085	48	Brush, Good, HSG B
29,198	53	Weighted Average
29,198		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	61	0.0787	0.27		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
7.9	39	0.0385	0.08		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.21"
2.9	253	0.0435	1.46		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
0.3	26	0.0769	1.39		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
14.9	379				Total

Subcatchment 5S: Outside Resources Areas



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Summary for Subcatchment 6S: Parking Lot

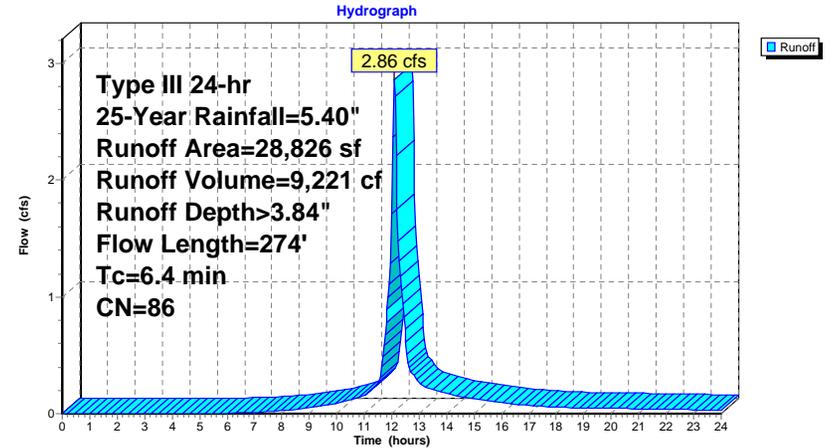
Runoff = 2.86 cfs @ 12.09 hrs, Volume= 9,221 cf, Depth> 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
17,494	98	Paved Area
9,203	61	>75% Grass cover, Good, HSG B
2,129	98	Water Surface, HSG B
28,826	86	Weighted Average
9,203		31.93% Pervious Area
19,623		68.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	64	0.0400	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
0.4	36	0.0400	1.48		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
0.8	174	0.0347	3.78		Shallow Concentrated Flow, Paved Kv= 20.3 fps
6.4	274				Total

Subcatchment 6S: Parking Lot



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Type III 24-hr 25-Year Rainfall=5.40"

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Summary for Subcatchment 7aS: Western site

Runoff = 1.47 cfs @ 12.24 hrs, Volume= 6,628 cf, Depth> 1.61"

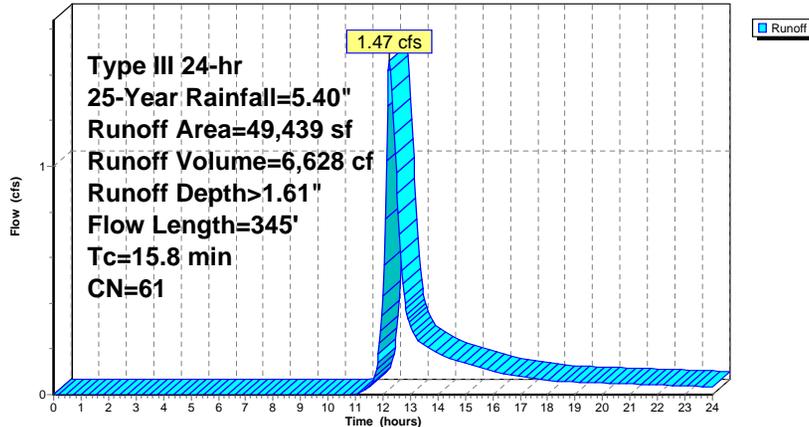
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
6,531	61	>75% Grass cover, Good, HSG B
16,065	55	Woods, Good, HSG B
17,873	48	Brush, Good, HSG B
8,970	98	Water Surface, 0% imp, HSG B
49,439	61	Weighted Average
49,439		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0700	0.13		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.21"
1.6	105	0.0238	1.08		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
1.0	140	0.0250	2.37		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
15.8	345				Total

Subcatchment 7aS: Western site

Hydrograph



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Summary for Subcatchment 7bS: Western Building

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

Runoff = 1.78 cfs @ 12.02 hrs, Volume= 5,630 cf, Depth> 5.16"

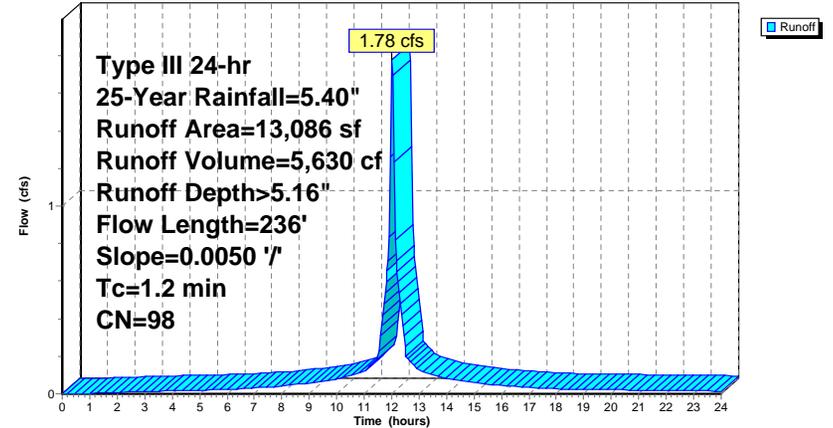
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
13,086	98	Roofs, HSG B
13,086		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	236	0.0050	3.21	2.52	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior

Subcatchment 7bS: Western Building

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.40"

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Summary for Subcatchment 8S: In/Into BVW B

Runoff = 0.83 cfs @ 12.12 hrs, Volume= 3,469 cf, Depth> 0.99"

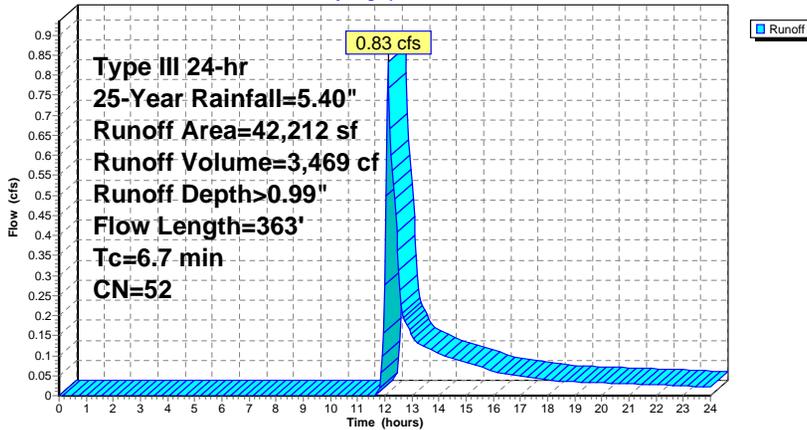
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-Year Rainfall=5.40"

Area (sf)	CN	Description
1,443	98	Patio & Sidewalks
9,042	61	>75% Grass cover, Good, HSG B
31,727	48	Brush, Good, HSG B
42,212	52	Weighted Average
40,769		96.58% Pervious Area
1,443		3.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	52	0.0100	0.92		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
2.9	48	0.0937	0.27		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
2.9	263	0.0456	1.49		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
6.7	363	Total			

Subcatchment 8S: In/Into BVW B

Hydrograph



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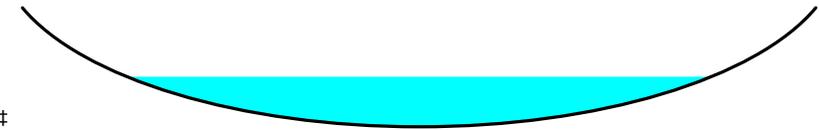
Summary for Reach 1R: Grassed Swale

Inflow Area = 339,788 sf, 30.58% Impervious, Inflow Depth > 2.21" for 25-Year event
Inflow = 14.25 cfs @ 12.21 hrs, Volume= 62,688 cf
Outflow = 14.22 cfs @ 12.22 hrs, Volume= 62,625 cf, Atten= 0%, Lag= 0.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
Max. Velocity= 3.91 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.58 fps, Avg. Travel Time= 2.8 min

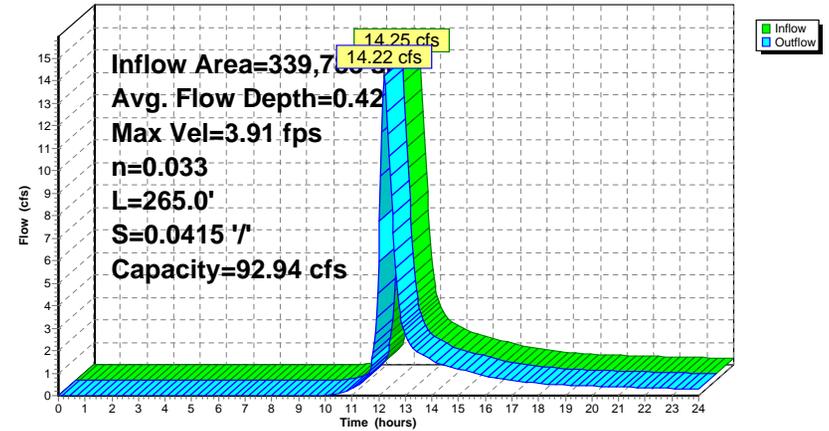
Peak Storage= 961 cf @ 12.22 hrs
Average Depth at Peak Storage= 0.42'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 92.94 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.033 Earth, grassed & winding
Length= 265.0' Slope= 0.0415 '/
Inlet Invert= 120.00', Outlet Invert= 109.00'



Reach 1R: Grassed Swale

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.40"

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Summary for Pond 1P: Isolated Wetland C

[57] Hint: Peaked at 120.50' (Flood elevation advised)

Inflow Area = 133,733 sf, 32.67% Impervious, Inflow Depth > 2.31" for 25-Year event
 Inflow = 5.32 cfs @ 12.26 hrs, Volume= 25,796 cf
 Outflow = 5.32 cfs @ 12.26 hrs, Volume= 25,796 cf, Atten= 0%, Lag= 0.0 min
 Primary = 5.32 cfs @ 12.26 hrs, Volume= 25,796 cf

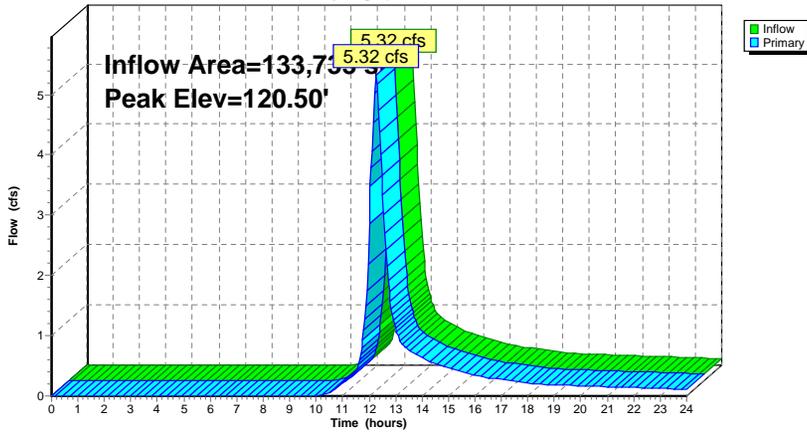
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 120.50' @ 12.24 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	10.0' long x 57.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=5.29 cfs @ 12.26 hrs HW=120.49' TW=120.41' (Dynamic Tailwater)
 1=Broad-Crested Rectangular Weir (Weir Controls 5.29 cfs @ 1.07 fps)

Pond 1P: Isolated Wetland C

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.40"

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Summary for Pond 2P: Isolated Wetland A

[57] Hint: Peaked at 129.38' (Flood elevation advised)

Inflow Area = 142,302 sf, 26.58% Impervious, Inflow Depth > 2.16" for 25-Year event
 Inflow = 6.29 cfs @ 12.20 hrs, Volume= 25,645 cf
 Outflow = 6.29 cfs @ 12.20 hrs, Volume= 25,645 cf, Atten= 0%, Lag= 0.0 min
 Primary = 6.29 cfs @ 12.20 hrs, Volume= 25,645 cf

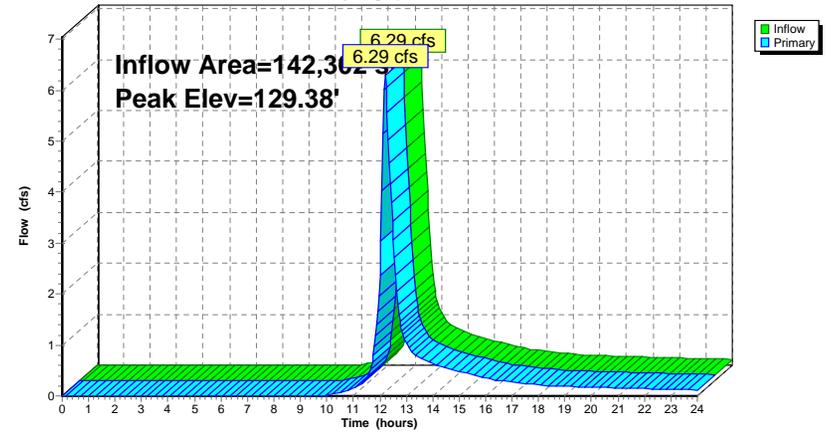
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 129.38' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	10.0' long x 214.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=6.28 cfs @ 12.20 hrs HW=129.38' TW=120.42' (Dynamic Tailwater)
 1=Broad-Crested Rectangular Weir (Weir Controls 6.28 cfs @ 1.66 fps)

Pond 2P: Isolated Wetland A

Hydrograph



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Summary for Pond 3P: Isolated Wetland D

[57] Hint: Peaked at 112.11' (Flood elevation advised)

Inflow Area = 46,370 sf, 6.69% Impervious, Inflow Depth > 1.32" for 25-Year event
 Inflow = 0.97 cfs @ 12.32 hrs, Volume= 5,087 cf
 Outflow = 0.97 cfs @ 12.32 hrs, Volume= 5,087 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.97 cfs @ 12.32 hrs, Volume= 5,087 cf

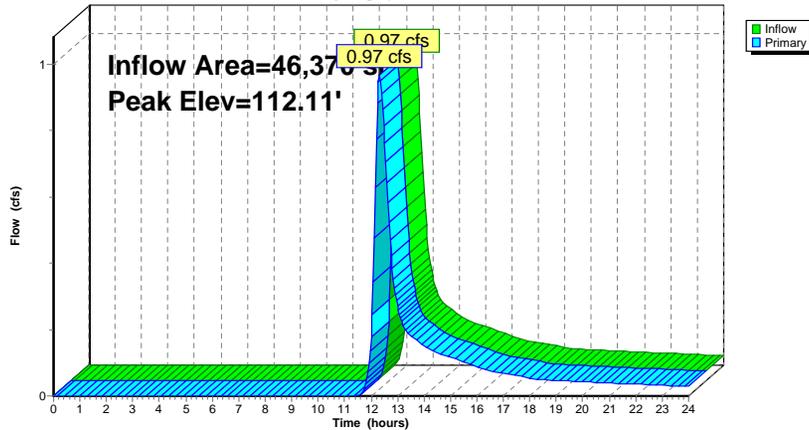
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 112.11' @ 12.32 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	112.00'	10.0' long x 203.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.97 cfs @ 12.32 hrs HW=112.11' TW=104.00' (Dynamic Tailwater)
 1=Broad-Crested Rectangular Weir (Weir Controls 0.97 cfs @ 0.89 fps)

Pond 3P: Isolated Wetland D

Hydrograph



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Summary for Pond 4P: BVW B

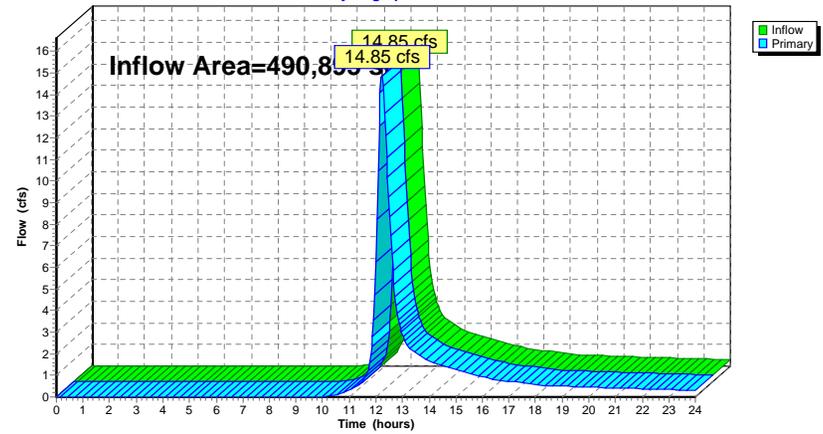
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 490,895 sf, 24.76% Impervious, Inflow Depth > 1.62" for 25-Year event
 Inflow = 14.85 cfs @ 12.22 hrs, Volume= 66,093 cf
 Primary = 14.85 cfs @ 12.22 hrs, Volume= 66,093 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3

Pond 4P: BVW B

Hydrograph



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Summary for Pond 5P: Basin 1

Inflow Area = 81,525 sf, 65.58% Impervious, Inflow Depth > 4.32" for 25-Year event
 Inflow = 7.62 cfs @ 12.11 hrs, Volume= 29,336 cf
 Outflow = 0.37 cfs @ 15.10 hrs, Volume= 12,656 cf, Atten= 95%, Lag= 179.6 min
 Discarded = 0.21 cfs @ 15.10 hrs, Volume= 11,665 cf
 Primary = 0.16 cfs @ 15.10 hrs, Volume= 992 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 105.68' @ 15.10 hrs Surf.Area= 8,844 sf Storage= 18,808 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 162.0 min (945.4 - 783.4)

Volume	Invert	Avail.Storage	Storage Description	
#1	103.00'	31,798 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
103.00	5,534	0	0	5,534
104.00	6,579	6,049	6,049	6,615
105.00	7,680	7,122	13,171	7,756
106.00	9,412	8,531	21,703	9,518
107.00	10,794	10,095	31,798	10,945

Device	Routing	Invert	Outlet Devices
#1	Primary	105.65'	10.0' long x 141.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	103.00'	1.020 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.21 cfs @ 15.10 hrs HW=105.68' (Free Discharge)
 ↳2=Exfiltration (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=0.16 cfs @ 15.10 hrs HW=105.68' TW=0.00' (Dynamic Tailwater)
 ↳1=Broad-Crested Rectangular Weir (Weir Controls 0.16 cfs @ 0.49 fps)

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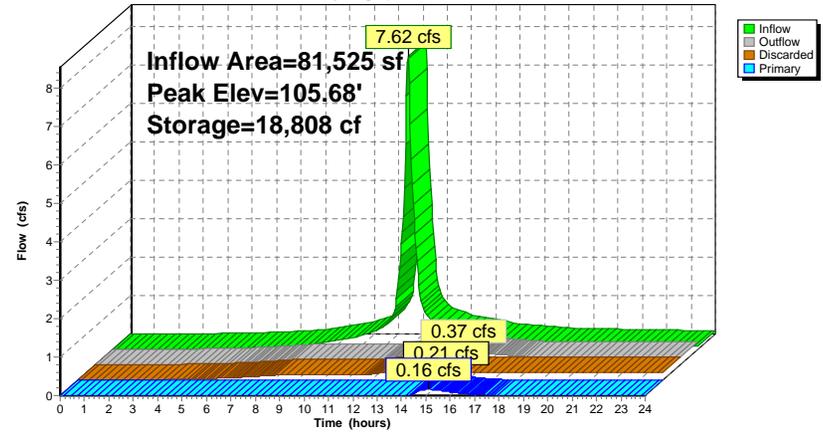
Type III 24-hr 25-Year Rainfall=5.40"

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Pond 5P: Basin 1

Hydrograph



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Summary for Pond 6P: Basin 2

Inflow Area = 108,895 sf, 14.86% Impervious, Inflow Depth > 1.91" for 25-Year event
 Inflow = 2.95 cfs @ 12.25 hrs, Volume= 17,345 cf
 Outflow = 0.15 cfs @ 17.78 hrs, Volume= 8,008 cf, Atten= 95%, Lag= 332.2 min
 Discarded = 0.15 cfs @ 17.78 hrs, Volume= 8,008 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 105.03' @ 17.78 hrs Surf.Area= 6,473 sf Storage= 10,320 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 141.9 min (977.3 - 835.5)

Volume	Invert	Avail.Storage	Storage Description	
#1	103.10'	25,458 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
103.10	4,240	0	0	4,240
104.00	5,256	4,265	4,265	5,279
105.00	6,432	5,834	10,099	6,486
106.00	7,675	7,044	17,143	7,764
107.00	8,970	8,314	25,458	9,099

Device	Routing	Invert	Outlet Devices
#1	Discarded	103.10'	1.020 in/hr Exfiltration over Surface area
#2	Primary	105.80'	10.0' long x 75.0' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60			
Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63			

Discarded OutFlow Max=0.15 cfs @ 17.78 hrs HW=105.03' (Free Discharge)
 ↳1=Exfiltration (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=103.10' TW=0.00' (Dynamic Tailwater)
 ↳2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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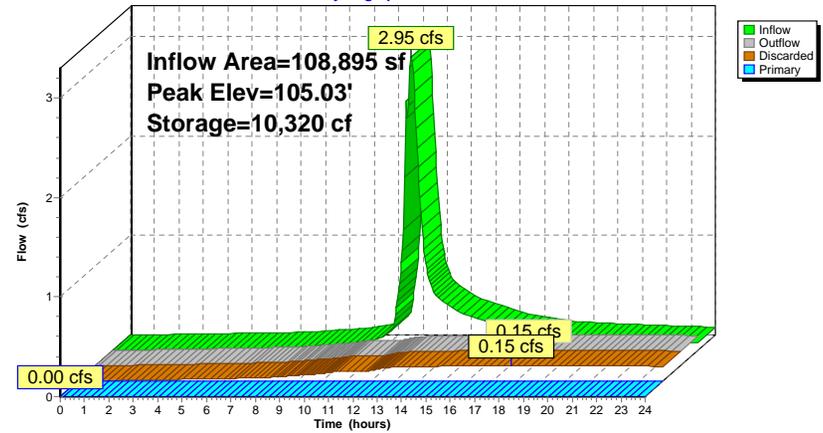
Type III 24-hr 25-Year Rainfall=5.40"

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Pond 6P: Basin 2

Hydrograph



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Summary for Pond 7P: Sediment Forebay

[57] Hint: Peaked at 107.10' (Flood elevation advised)

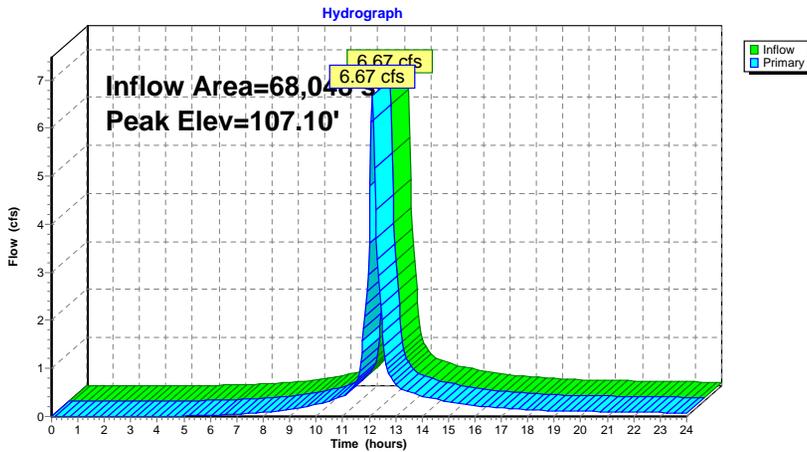
Inflow Area = 68,048 sf, 58.76% Impervious, Inflow Depth > 4.15" for 25-Year event
 Inflow = 6.67 cfs @ 12.12 hrs, Volume= 23,538 cf
 Outflow = 6.67 cfs @ 12.12 hrs, Volume= 23,538 cf, Atten= 0%, Lag= 0.0 min
 Primary = 6.67 cfs @ 12.12 hrs, Volume= 23,538 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 107.10' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	106.50'	5.3' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=6.66 cfs @ 12.12 hrs HW=107.10' TW=104.48' (Dynamic Tailwater)
 ↳1=Broad-Crested Rectangular Weir (Weir Controls 6.66 cfs @ 2.09 fps)

Pond 7P: Sediment Forebay



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Summary for Pond BA 1: Bioretention Area A

Inflow Area = 13,258 sf, 74.33% Impervious, Inflow Depth > 4.16" for 25-Year event
 Inflow = 1.60 cfs @ 12.03 hrs, Volume= 4,591 cf
 Outflow = 1.57 cfs @ 12.04 hrs, Volume= 4,110 cf, Atten= 2%, Lag= 0.9 min
 Primary = 1.57 cfs @ 12.04 hrs, Volume= 4,110 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 134.40' @ 12.04 hrs Surf.Area= 860 sf Storage= 601 cf

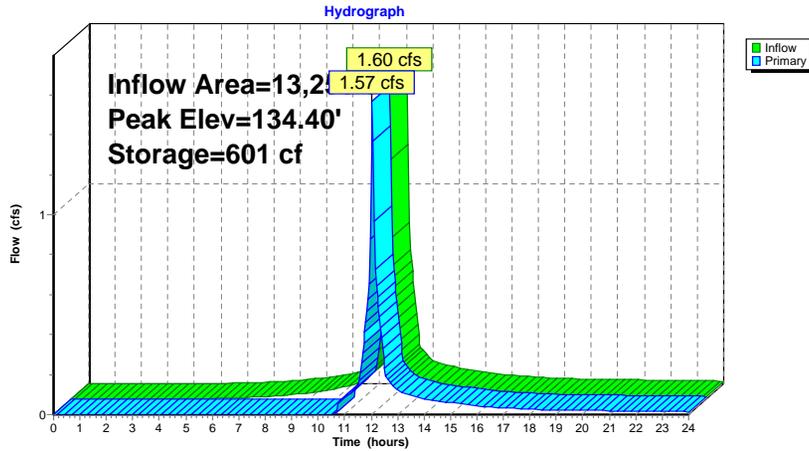
Plug-Flow detention time= 79.4 min calculated for 4,103 cf (89% of inflow)
 Center-of-Mass det. time= 29.9 min (817.5 - 787.6)

Volume	Invert	Avail.Storage	Storage Description	
#1	133.50'	1,201 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
133.50	481	0	0	481
134.00	690	291	291	694
135.00	1,150	910	1,201	1,167

Device	Routing	Invert	Outlet Devices
#1	Primary	134.25'	10.0' long x 43.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.55 cfs @ 12.04 hrs HW=134.40' TW=120.38' (Dynamic Tailwater)
 ↳1=Broad-Crested Rectangular Weir (Weir Controls 1.55 cfs @ 1.04 fps)

Pond BA 1: Bioretention Area A



Summary for Pond BA 2: Bioretention Area B

Inflow Area = 28,826 sf, 68.07% Impervious, Inflow Depth > 3.84" for 25-Year event
 Inflow = 2.86 cfs @ 12.09 hrs, Volume= 9,221 cf
 Outflow = 2.64 cfs @ 12.13 hrs, Volume= 7,205 cf, Atten= 8%, Lag= 2.3 min
 Primary = 2.64 cfs @ 12.13 hrs, Volume= 7,205 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 125.70' @ 12.13 hrs Surf.Area= 2,176 sf Storage= 2,500 cf

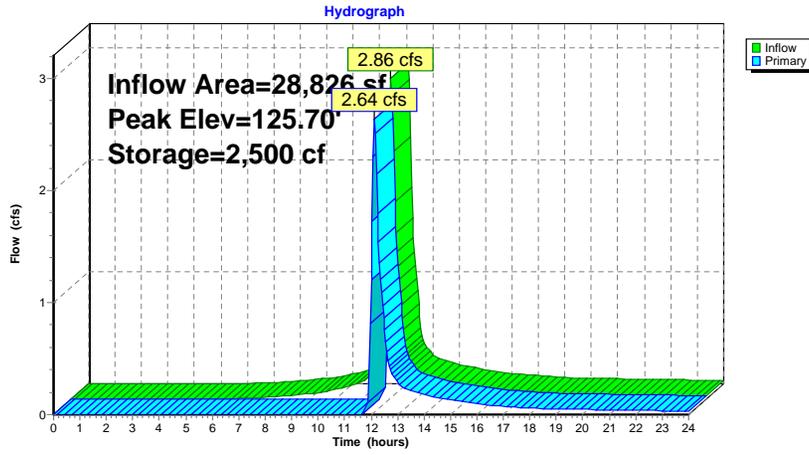
Plug-Flow detention time= 126.4 min calculated for 7,193 cf (78% of inflow)
 Center-of-Mass det. time= 48.3 min (849.6 - 801.3)

Volume #1	Invert	Avail.Storage	Storage Description	
	124.00'	3,205 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
124.00	898	0	0	898
125.00	1,548	1,208	1,208	1,560
126.00	2,482	1,997	3,205	2,507

Device	Routing	Invert	Outlet Devices
#1	Primary	125.45'	8.0' long x 75.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.60 cfs @ 12.13 hrs HW=125.69' TW=120.39' (Dynamic Tailwater)
 ↳=Broad-Crested Rectangular Weir (Weir Controls 2.60 cfs @ 1.33 fps)

Pond BA 2: Bioretention Area B



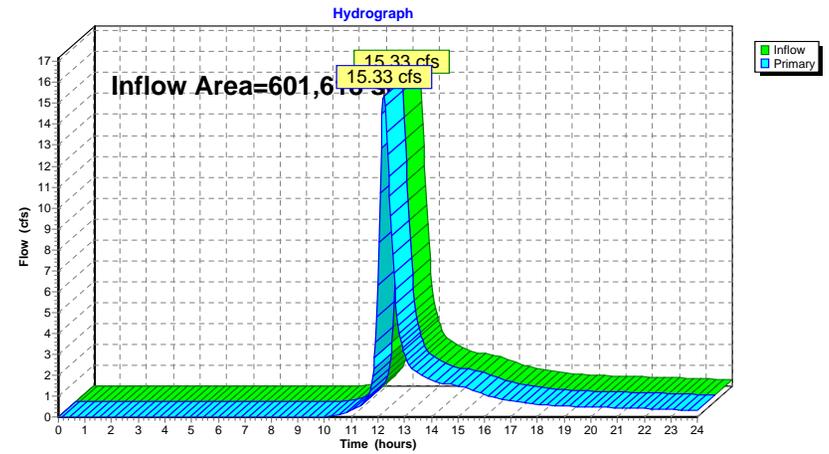
Summary for Pond POI 1: Northern Site

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

Inflow Area = 601,618 sf, 29.09% Impervious, Inflow Depth > 1.39" for 25-Year event
 Inflow = 15.33 cfs @ 12.22 hrs, Volume= 69,634 cf
 Primary = 15.33 cfs @ 12.22 hrs, Volume= 69,634 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3

Pond POI 1: Northern Site



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Time span=0.00-24.00 hrs, dt=0.04 hrs, 601 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1aS: In/Into IW C	Runoff Area=120,475 sf 28.08% Impervious Runoff Depth>4.29" Flow Length=809' Tc=18.6 min CN=68 Runoff=9.67 cfs 43,037 cf
Subcatchment 1bS: Driveway	Runoff Area=13,258 sf 74.33% Impervious Runoff Depth>6.76" Flow Length=262' Tc=1.6 min CN=89 Runoff=2.54 cfs 7,474 cf
Subcatchment 2aS: In/Into IW A	Runoff Area=142,302 sf 26.58% Impervious Runoff Depth>4.29" Flow Length=935' Tc=13.9 min CN=68 Runoff=12.77 cfs 50,886 cf
Subcatchment 2bS: Into Swale	Runoff Area=34,927 sf 7.90% Impervious Runoff Depth>3.16" Flow Length=214' Tc=16.8 min CN=58 Runoff=2.09 cfs 9,191 cf
Subcatchment 3S: In/Into IW D	Runoff Area=46,370 sf 6.69% Impervious Runoff Depth>3.04" Flow Length=443' Tc=20.1 min CN=57 Runoff=2.48 cfs 11,765 cf
Subcatchment 4aS: Eastern	Runoff Area=68,048 sf 58.76% Impervious Runoff Depth>6.76" Flow Length=843' Tc=8.7 min CN=89 Runoff=10.58 cfs 38,320 cf
Subcatchment 4bS: Eastern Building	Runoff Area=13,477 sf 100.00% Impervious Runoff Depth>7.84" Flow Length=300' Slope=0.0050 '/' Tc=1.6 min CN=98 Runoff=2.74 cfs 8,805 cf
Subcatchment 5S: Outside Resources Areas	Runoff Area=29,198 sf 0.00% Impervious Runoff Depth>2.61" Flow Length=379' Tc=14.9 min CN=53 Runoff=1.46 cfs 6,354 cf
Subcatchment 6S: Parking Lot	Runoff Area=28,826 sf 68.07% Impervious Runoff Depth>6.40" Flow Length=274' Tc=6.4 min CN=86 Runoff=4.66 cfs 15,383 cf
Subcatchment 7aS: Western site	Runoff Area=49,439 sf 0.00% Impervious Runoff Depth>3.49" Flow Length=345' Tc=15.8 min CN=61 Runoff=3.39 cfs 14,394 cf
Subcatchment 7bS: Western Building	Runoff Area=13,086 sf 100.00% Impervious Runoff Depth>7.84" Flow Length=236' Slope=0.0050 '/' Tc=1.2 min CN=98 Runoff=2.67 cfs 8,549 cf
Subcatchment 8S: In/Into BVW B	Runoff Area=42,212 sf 3.42% Impervious Runoff Depth>2.51" Flow Length=363' Tc=6.7 min CN=52 Runoff=2.58 cfs 8,826 cf
Reach 1R: Grassed Swale	Avg. Flow Depth=0.58' Max Vel=4.83 fps Inflow=28.29 cfs 123,465 cf n=0.033 L=265.0' S=0.0415 '/' Capacity=92.94 cfs Outflow=28.25 cfs 123,374 cf
Pond 1P: Isolated Wetland C	Peak Elev=120.73' Inflow=10.55 cfs 50,028 cf Outflow=10.55 cfs 50,028 cf
Pond 2P: Isolated Wetland A	Peak Elev=129.61' Inflow=12.77 cfs 50,886 cf Outflow=12.77 cfs 50,886 cf
Pond 3P: Isolated Wetland D	Peak Elev=112.20' Inflow=2.48 cfs 11,765 cf Outflow=2.48 cfs 11,765 cf

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Pond 4P: BVW B	Inflow=30.03 cfs 141,683 cf Primary=30.03 cfs 141,683 cf
Pond 5P: Basin 1	Peak Elev=105.97' Storage=21,449 cf Inflow=12.01 cfs 47,124 cf Discarded=0.22 cfs 12,821 cf Primary=4.94 cfs 16,383 cf Outflow=5.16 cfs 29,205 cf
Pond 6P: Basin 2	Peak Elev=105.93' Storage=16,596 cf Inflow=6.65 cfs 34,708 cf Discarded=0.18 cfs 9,717 cf Primary=1.23 cfs 9,483 cf Outflow=1.41 cfs 19,200 cf
Pond 7P: Sediment Forebay	Peak Elev=107.32' Inflow=10.58 cfs 38,320 cf Outflow=10.58 cfs 38,320 cf
Pond BA 1: Bioretention Area A	Peak Elev=134.46' Storage=649 cf Inflow=2.54 cfs 7,474 cf Outflow=2.49 cfs 6,991 cf
Pond BA 2: Bioretention Area B	Peak Elev=125.79' Storage=2,718 cf Inflow=4.66 cfs 15,383 cf Outflow=4.37 cfs 13,359 cf
Pond POI 1: Northern Site	Inflow=34.12 cfs 164,420 cf Primary=34.12 cfs 164,420 cf

Total Runoff Area = 601,618 sf Runoff Volume = 222,985 cf Average Runoff Depth = 4.45"
70.91% Pervious = 426,630 sf 29.09% Impervious = 174,988 sf

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Summary for Subcatchment 1aS: In/Into IW C

Runoff = 9.67 cfs @ 12.26 hrs, Volume= 43,037 cf, Depth> 4.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.08"

Area (sf)	CN	Description
* 9,382	98	Paved driveways & Roofs
10,413	55	Woods, Good, HSG B
46,780	61	>75% Grass cover, Good, HSG B
29,453	48	Brush, Good, HSG B
* 24,447	98	Wetland
120,475	68	Weighted Average
86,646		71.92% Pervious Area
33,829		28.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	90	0.0528	0.25		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
2.4	10	0.0500	0.07		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.21"
1.0	63	0.0476	1.09		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.9	174	0.0488	1.55		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	55	0.0273	0.99		Shallow Concentrated Flow, Heavy Brush Kv= 6.0 fps
6.3	417	0.0336	1.10		Shallow Concentrated Flow, Heavy Brush Kv= 6.0 fps
18.6	809	Total			

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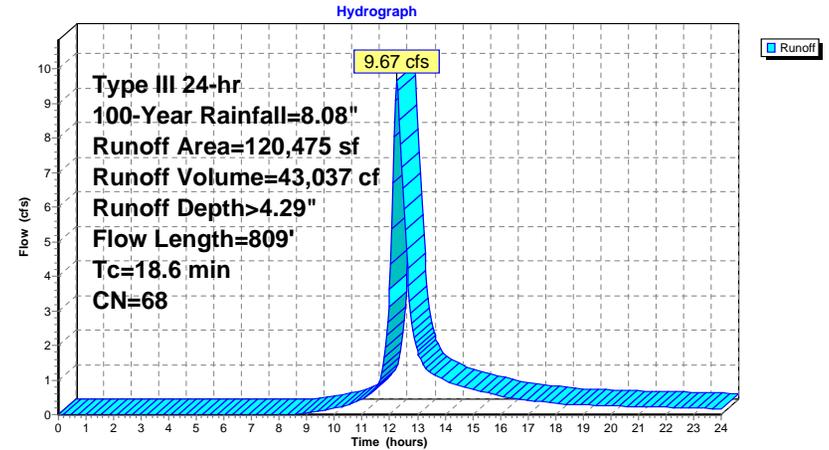
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Subcatchment 1aS: In/Into IW C



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Summary for Subcatchment 1bS: Driveway

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

Runoff = 2.54 cfs @ 12.03 hrs, Volume= 7,474 cf, Depth> 6.76"

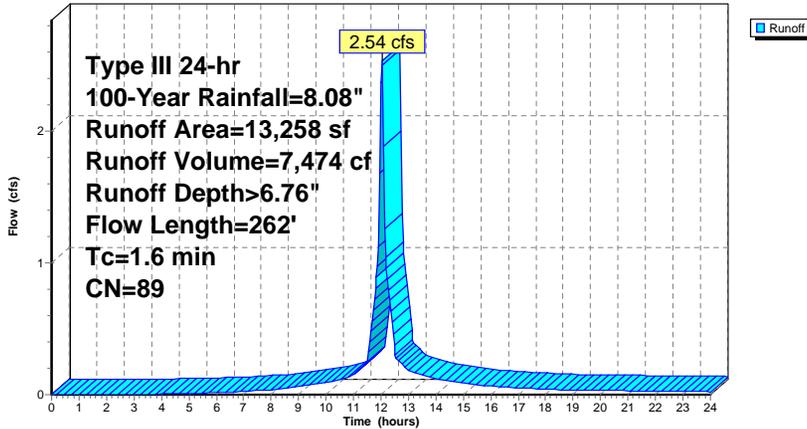
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.08"

Area (sf)	CN	Description
8,705	98	Paved driveway & Sidewalk
3,403	61	>75% Grass cover, Good, HSG B
1,150	98	Water Surface, HSG B
13,258	89	Weighted Average
3,403		25.67% Pervious Area
9,855		74.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0350	1.72		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
0.6	162	0.0482	4.46		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.6	262	Total			

Subcatchment 1bS: Driveway

Hydrograph



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Summary for Subcatchment 2aS: In/Into IW A

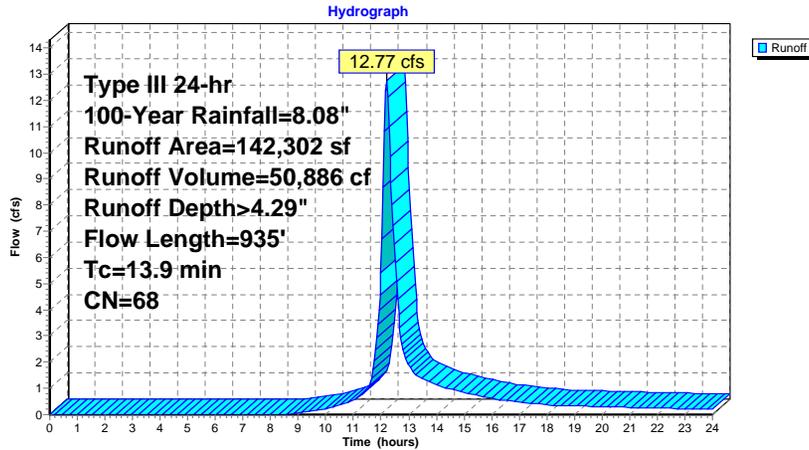
Runoff = 12.77 cfs @ 12.20 hrs, Volume= 50,886 cf, Depth> 4.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.08"

Area (sf)	CN	Description
9,125	98	Wetland
768	48	Brush, Good, HSG B
59,412	55	Woods, Good, HSG B
28,704	98	Paved driveways and Roofs
44,293	61	>75% Grass cover, Good, HSG B
142,302	68	Weighted Average
104,473		73.42% Pervious Area
37,829		26.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	100	0.0200	1.38		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
0.8	164	0.0300	3.52		Shallow Concentrated Flow, Paved Kv= 20.3 fps
1.1	101	0.0500	1.57		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
3.3	239	0.0593	1.22		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
7.5	331	0.0219	0.74		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
13.9	935	Total			

Subcatchment 2aS: In/Into IW A



Summary for Subcatchment 2bS: Into Swale

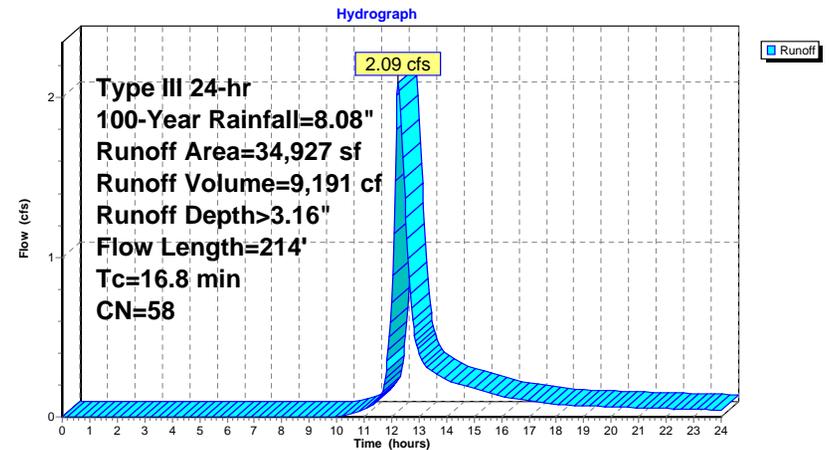
Runoff = 2.09 cfs @ 12.24 hrs, Volume= 9,191 cf, Depth> 3.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.08"

Area (sf)	CN	Description
2,759	98	Patio & Sidewalk
745	55	Woods, Good, HSG B
16,214	48	Brush, Good, HSG B
15,209	61	>75% Grass cover, Good, HSG B
34,927	58	Weighted Average
32,168		92.10% Pervious Area
2,759		7.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.8	100	0.0450	0.11		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.21"
1.0	114	0.0746	1.91		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
16.8	214	Total			

Subcatchment 2bS: Into Swale



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Type III 24-hr 100-Year Rainfall=8.08"

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Summary for Subcatchment 3S: In/Into IW D

Runoff = 2.48 cfs @ 12.29 hrs, Volume= 11,765 cf, Depth> 3.04"

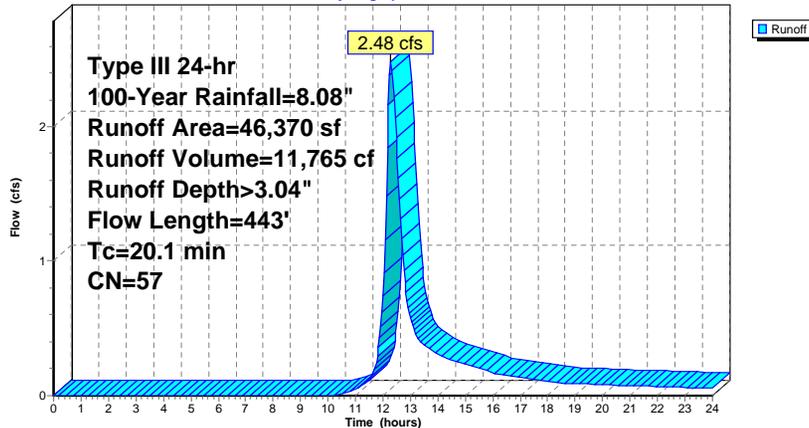
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.08"

Area (sf)	CN	Description
3,100	98	Wetland
36,667	55	Woods, Good, HSG B
6,603	48	Brush, Good, HSG B
46,370	57	Weighted Average
43,270		93.31% Pervious Area
3,100		6.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0511	0.11		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 3.21"
4.0	272	0.0511	1.13		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
1.4	71	0.0141	0.83		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
20.1	443	Total			

Subcatchment 3S: In/Into IW D

Hydrograph



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Type III 24-hr 100-Year Rainfall=8.08"

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Summary for Subcatchment 4aS: Eastern Driveway/Back Parking Area

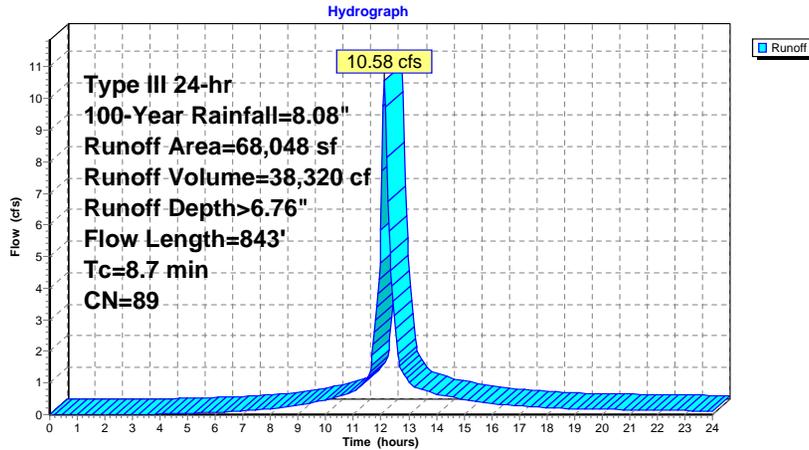
Runoff = 10.58 cfs @ 12.12 hrs, Volume= 38,320 cf, Depth> 6.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.08"

Area (sf)	CN	Description
17,315	61	>75% Grass cover, Good, HSG B
39,987	98	Paved Areas
10,746	98	Water Surface, 0% imp, HSG B
68,048	89	Weighted Average
28,061		41.24% Pervious Area
39,987		58.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	42	0.0119	0.12		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
0.7	58	0.0302	1.46		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
1.1	253	0.0342	3.75		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.9	490	0.0369	8.71	6.84	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
8.7	843	Total			

Subcatchment 4aS: Eastern Driveway/Back Parking Area



Summary for Subcatchment 4bS: Eastern Building

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

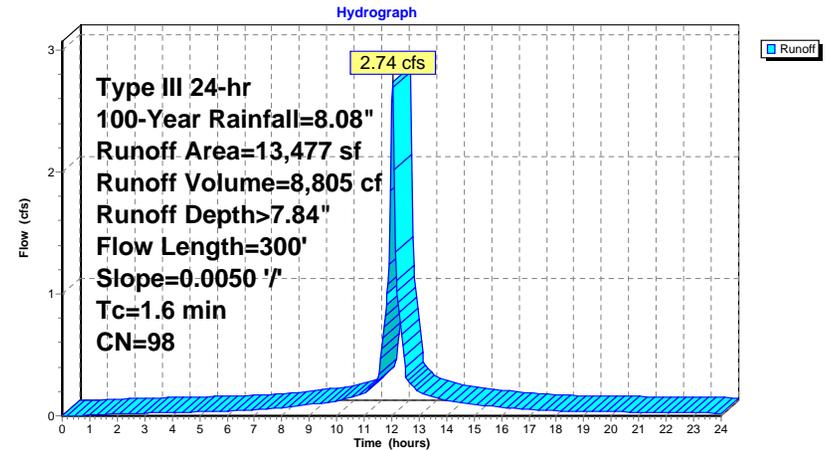
Runoff = 2.74 cfs @ 12.03 hrs, Volume= 8,805 cf, Depth> 7.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.08"

Area (sf)	CN	Description
13,477	98	Roofs, HSG B
13,477		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	300	0.0050	3.21	2.52	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior

Subcatchment 4bS: Eastern Building



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Type III 24-hr 100-Year Rainfall=8.08"

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Summary for Subcatchment 5S: Outside Resources Areas

Runoff = 1.46 cfs @ 12.22 hrs, Volume= 6,354 cf, Depth> 2.61"

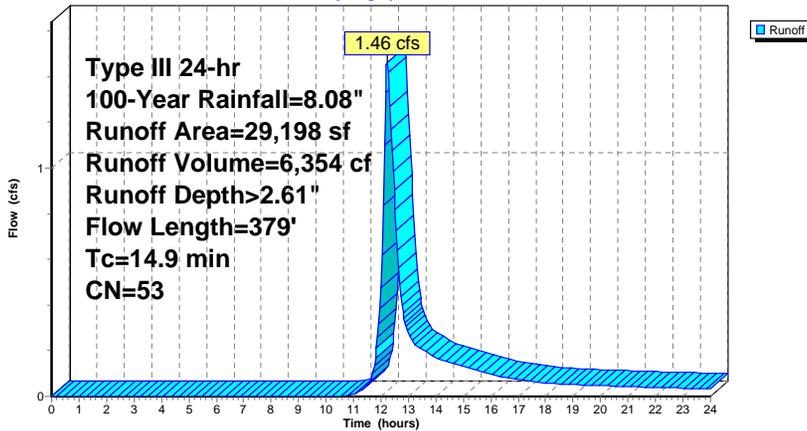
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.08"

Area (sf)	CN	Description
9,482	55	Woods, Good, HSG B
6,631	61	>75% Grass cover, Good, HSG B
13,085	48	Brush, Good, HSG B
29,198	53	Weighted Average
29,198		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	61	0.0787	0.27		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
7.9	39	0.0385	0.08		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.21"
2.9	253	0.0435	1.46		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
0.3	26	0.0769	1.39		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
14.9	379	Total			

Subcatchment 5S: Outside Resources Areas

Hydrograph



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Type III 24-hr 100-Year Rainfall=8.08"

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Summary for Subcatchment 6S: Parking Lot

Runoff = 4.66 cfs @ 12.09 hrs, Volume= 15,383 cf, Depth> 6.40"

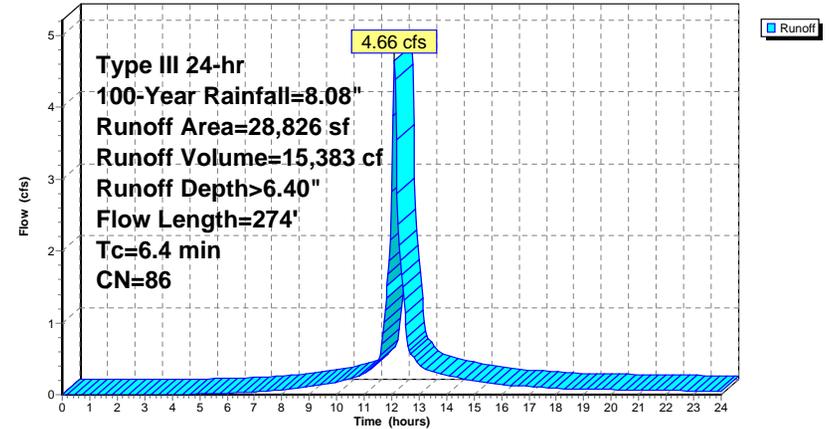
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.08"

Area (sf)	CN	Description
17,494	98	Paved Area
9,203	61	>75% Grass cover, Good, HSG B
2,129	98	Water Surface, HSG B
28,826	86	Weighted Average
9,203		31.93% Pervious Area
19,623		68.07% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	64	0.0400	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
0.4	36	0.0400	1.48		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
0.8	174	0.0347	3.78		Shallow Concentrated Flow, Paved Kv= 20.3 fps
6.4	274	Total			

Subcatchment 6S: Parking Lot

Hydrograph



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Summary for Subcatchment 7aS: Western site

Runoff = 3.39 cfs @ 12.23 hrs, Volume= 14,394 cf, Depth> 3.49"

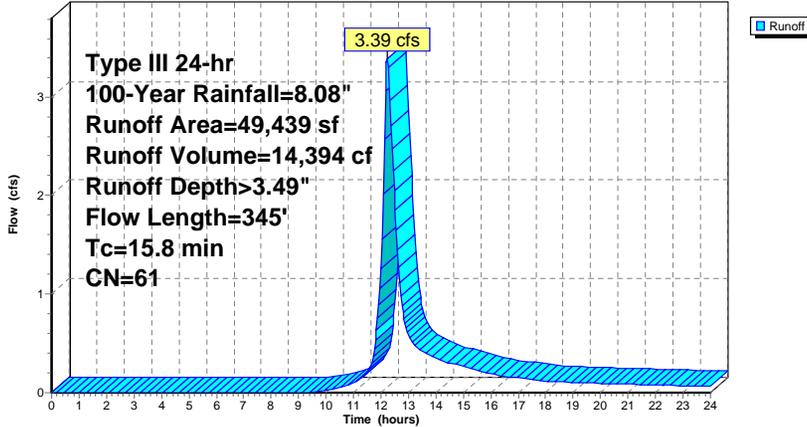
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.08"

Area (sf)	CN	Description
6,531	61	>75% Grass cover, Good, HSG B
16,065	55	Woods, Good, HSG B
17,873	48	Brush, Good, HSG B
8,970	98	Water Surface, 0% imp, HSG B
49,439	61	Weighted Average
49,439		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.2	100	0.0700	0.13		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.21"
1.6	105	0.0238	1.08		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
1.0	140	0.0250	2.37		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
15.8	345				Total

Subcatchment 7aS: Western site

Hydrograph



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Summary for Subcatchment 7bS: Western Building

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

Runoff = 2.67 cfs @ 12.02 hrs, Volume= 8,549 cf, Depth> 7.84"

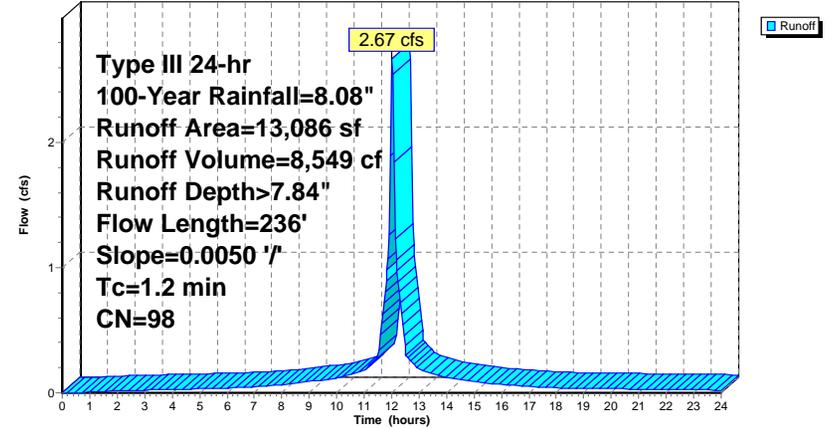
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.08"

Area (sf)	CN	Description
13,086	98	Roofs, HSG B
13,086		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	236	0.0050	3.21	2.52	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior

Subcatchment 7bS: Western Building

Hydrograph



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Summary for Subcatchment 8S: In/Into BVW B

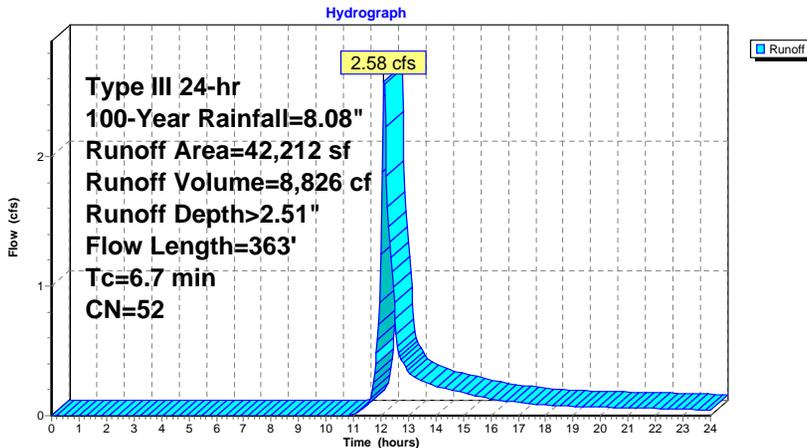
Runoff = 2.58 cfs @ 12.11 hrs, Volume= 8,826 cf, Depth> 2.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-Year Rainfall=8.08"

Area (sf)	CN	Description
1,443	98	Patio & Sidewalks
9,042	61	>75% Grass cover, Good, HSG B
31,727	48	Brush, Good, HSG B
42,212	52	Weighted Average
40,769		96.58% Pervious Area
1,443		3.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	52	0.0100	0.92		Sheet Flow, Smooth surfaces n= 0.011 P2= 3.21"
2.9	48	0.0937	0.27		Sheet Flow, Grass: Short n= 0.150 P2= 3.21"
2.9	263	0.0456	1.49		Shallow Concentrated Flow, Heavy Brush Kv= 7.0 fps
6.7	363	Total			

Subcatchment 8S: In/Into BVW B



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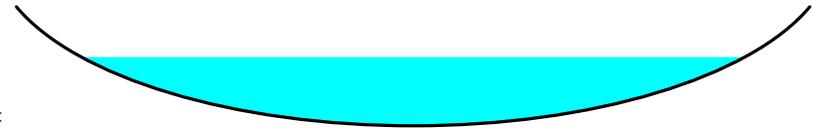
Summary for Reach 1R: Grassed Swale

Inflow Area = 339,788 sf, 30.58% Impervious, Inflow Depth > 4.36" for 100-Year event
Inflow = 28.29 cfs @ 12.20 hrs, Volume= 123,465 cf
Outflow = 28.25 cfs @ 12.21 hrs, Volume= 123,374 cf, Atten= 0%, Lag= 0.6 min

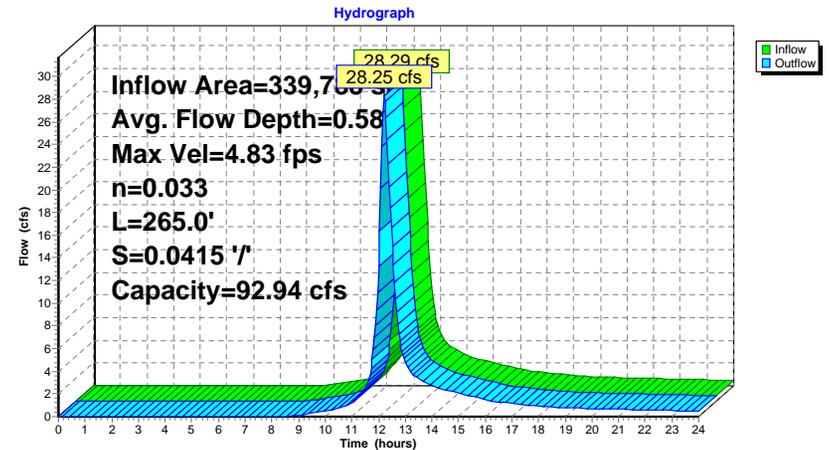
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
Max. Velocity= 4.83 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.85 fps, Avg. Travel Time= 2.4 min

Peak Storage= 1,547 cf @ 12.21 hrs
Average Depth at Peak Storage= 0.58'
Bank-Full Depth= 1.00' Flow Area= 13.3 sf, Capacity= 92.94 cfs

20.00' x 1.00' deep Parabolic Channel, n= 0.033 Earth, grassed & winding
Length= 265.0' Slope= 0.0415 '/
Inlet Invert= 120.00', Outlet Invert= 109.00'



Reach 1R: Grassed Swale



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Summary for Pond 1P: Isolated Wetland C

[57] Hint: Peaked at 120.73' (Flood elevation advised)

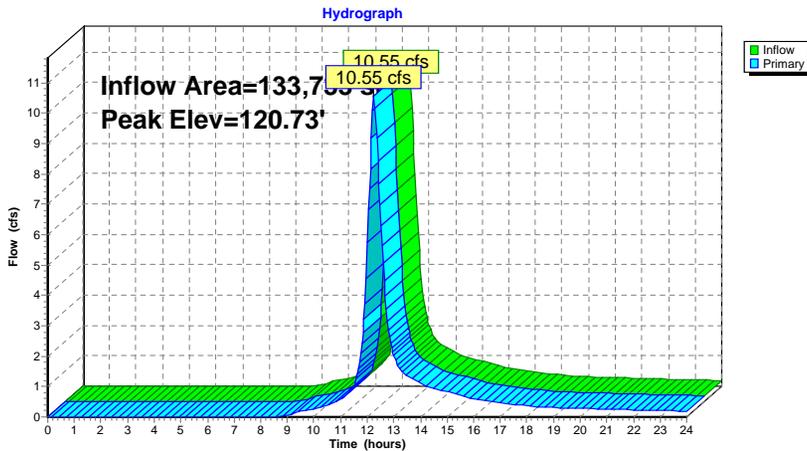
Inflow Area = 133,733 sf, 32.67% Impervious, Inflow Depth > 4.49" for 100-Year event
 Inflow = 10.55 cfs @ 12.25 hrs, Volume= 50,028 cf
 Outflow = 10.55 cfs @ 12.25 hrs, Volume= 50,028 cf, Atten= 0%, Lag= 0.0 min
 Primary = 10.55 cfs @ 12.25 hrs, Volume= 50,028 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 120.73' @ 12.24 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	120.00'	10.0' long x 57.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=10.49 cfs @ 12.25 hrs HW=120.73' TW=120.57' (Dynamic Tailwater)
 1=Broad-Crested Rectangular Weir (Weir Controls 10.49 cfs @ 1.44 fps)

Pond 1P: Isolated Wetland C



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Summary for Pond 2P: Isolated Wetland A

[57] Hint: Peaked at 129.61' (Flood elevation advised)

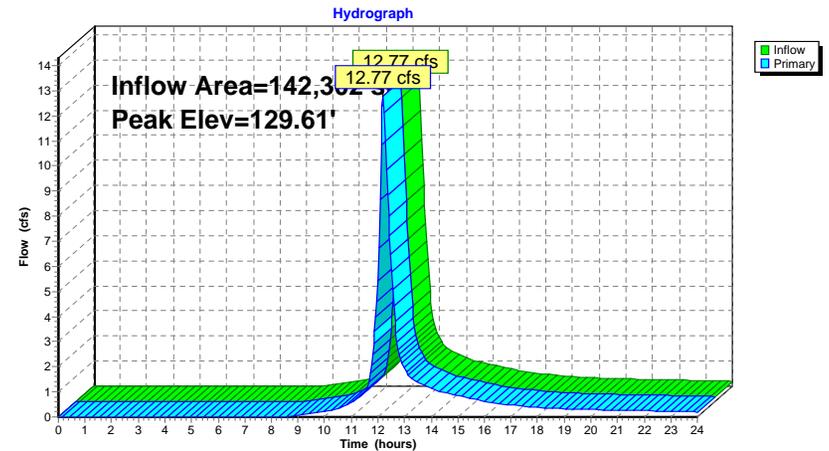
Inflow Area = 142,302 sf, 26.58% Impervious, Inflow Depth > 4.29" for 100-Year event
 Inflow = 12.77 cfs @ 12.20 hrs, Volume= 50,886 cf
 Outflow = 12.77 cfs @ 12.20 hrs, Volume= 50,886 cf, Atten= 0%, Lag= 0.0 min
 Primary = 12.77 cfs @ 12.20 hrs, Volume= 50,886 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 129.61' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	129.00'	10.0' long x 214.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=12.72 cfs @ 12.20 hrs HW=129.61' TW=120.57' (Dynamic Tailwater)
 1=Broad-Crested Rectangular Weir (Weir Controls 12.72 cfs @ 2.10 fps)

Pond 2P: Isolated Wetland A



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Summary for Pond 3P: Isolated Wetland D

[57] Hint: Peaked at 112.20' (Flood elevation advised)

Inflow Area = 46,370 sf, 6.69% Impervious, Inflow Depth > 3.04" for 100-Year event
 Inflow = 2.48 cfs @ 12.29 hrs, Volume= 11,765 cf
 Outflow = 2.48 cfs @ 12.29 hrs, Volume= 11,765 cf, Atten= 0%, Lag= 0.0 min
 Primary = 2.48 cfs @ 12.29 hrs, Volume= 11,765 cf

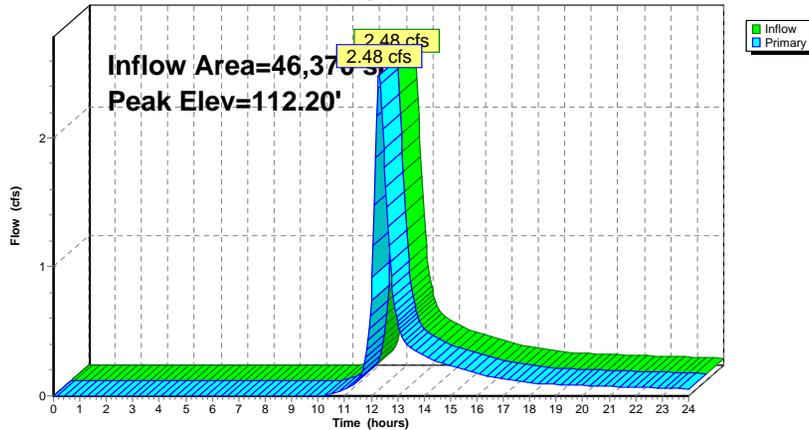
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 112.20' @ 12.29 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	112.00'	10.0' long x 203.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.47 cfs @ 12.29 hrs HW=112.20' TW=104.98' (Dynamic Tailwater)
 #1=Broad-Crested Rectangular Weir (Weir Controls 2.47 cfs @ 1.21 fps)

Pond 3P: Isolated Wetland D

Hydrograph



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Summary for Pond 4P: BVW B

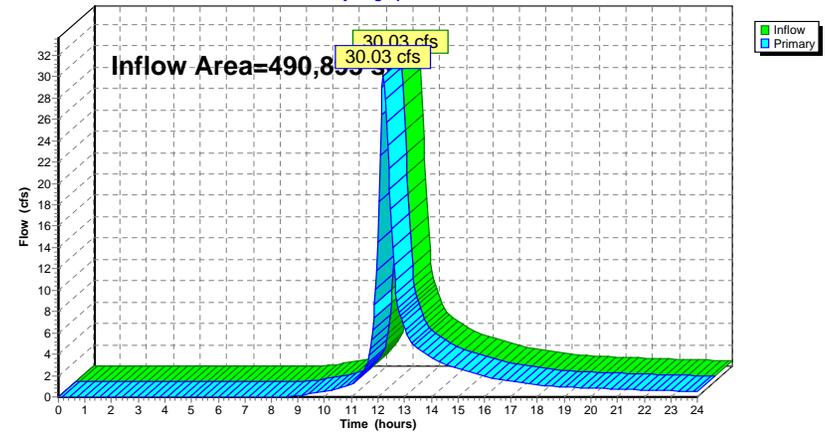
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 490,895 sf, 24.76% Impervious, Inflow Depth > 3.46" for 100-Year event
 Inflow = 30.03 cfs @ 12.21 hrs, Volume= 141,683 cf
 Primary = 30.03 cfs @ 12.21 hrs, Volume= 141,683 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3

Pond 4P: BVW B

Hydrograph



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Summary for Pond 5P: Basin 1

Inflow Area = 81,525 sf, 65.58% Impervious, Inflow Depth > 6.94" for 100-Year event
 Inflow = 12.01 cfs @ 12.11 hrs, Volume= 47,124 cf
 Outflow = 5.16 cfs @ 12.37 hrs, Volume= 29,205 cf, Atten= 57%, Lag= 15.8 min
 Discarded = 0.22 cfs @ 12.37 hrs, Volume= 12,821 cf
 Primary = 4.94 cfs @ 12.37 hrs, Volume= 16,383 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 105.97' @ 12.37 hrs Surf.Area= 9,363 sf Storage= 21,449 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 78.4 min (850.8 - 772.4)

Volume	Invert	Avail.Storage	Storage Description	
#1	103.00'	31,798 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
103.00	5,534	0	0	5,534
104.00	6,579	6,049	6,049	6,615
105.00	7,680	7,122	13,171	7,756
106.00	9,412	8,531	21,703	9,518
107.00	10,794	10,095	31,798	10,945

Device	Routing	Invert	Outlet Devices
#1	Primary	105.65'	10.0' long x 141.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Discarded	103.00'	1.020 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.22 cfs @ 12.37 hrs HW=105.97' (Free Discharge)
 ↳2=Exfiltration (Exfiltration Controls 0.22 cfs)

Primary OutFlow Max=4.92 cfs @ 12.37 hrs HW=105.97' TW=0.00' (Dynamic Tailwater)
 ↳1=Broad-Crested Rectangular Weir (Weir Controls 4.92 cfs @ 1.53 fps)

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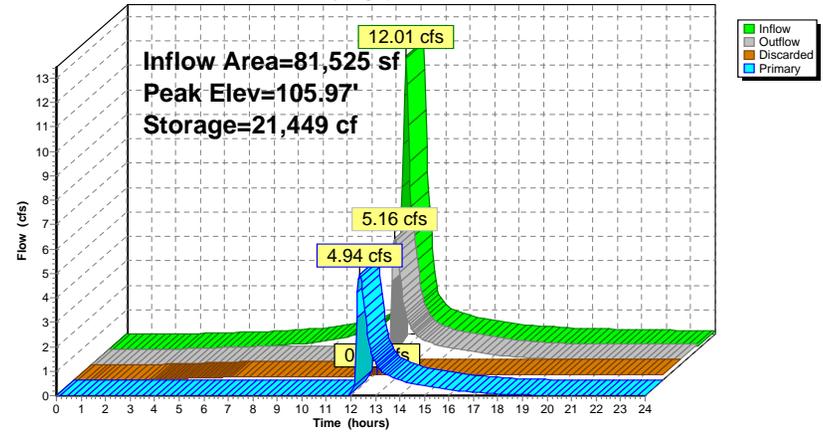
Type III 24-hr 100-Year Rainfall=8.08"

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Pond 5P: Basin 1

Hydrograph



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Summary for Pond 6P: Basin 2

Inflow Area = 108,895 sf, 14.86% Impervious, Inflow Depth > 3.82" for 100-Year event
 Inflow = 6.65 cfs @ 12.24 hrs, Volume= 34,708 cf
 Outflow = 1.41 cfs @ 12.98 hrs, Volume= 19,200 cf, Atten= 79%, Lag= 44.1 min
 Discarded = 0.18 cfs @ 12.98 hrs, Volume= 9,717 cf
 Primary = 1.23 cfs @ 12.98 hrs, Volume= 9,483 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 105.93' @ 12.98 hrs Surf.Area= 7,582 sf Storage= 16,596 cf

Plug-Flow detention time= 214.9 min calculated for 19,168 cf (55% of inflow)
 Center-of-Mass det. time= 93.8 min (920.3 - 826.5)

Volume	Invert	Avail.Storage	Storage Description	
#1	103.10'	25,458 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
103.10	4,240	0	0	4,240
104.00	5,256	4,265	4,265	5,279
105.00	6,432	5,834	10,099	6,486
106.00	7,675	7,044	17,143	7,764
107.00	8,970	8,314	25,458	9,099

Device	Routing	Invert	Outlet Devices
#1	Discarded	103.10'	1.020 in/hr Exfiltration over Surface area
#2	Primary	105.80'	10.0' long x 75.0' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Discarded OutFlow Max=0.18 cfs @ 12.98 hrs HW=105.93' (Free Discharge)

↳ **1=Exfiltration** (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=1.23 cfs @ 12.98 hrs HW=105.93' TW=0.00' (Dynamic Tailwater)

↳ **2=Broad-Crested Rectangular Weir** (Weir Controls 1.23 cfs @ 0.96 fps)

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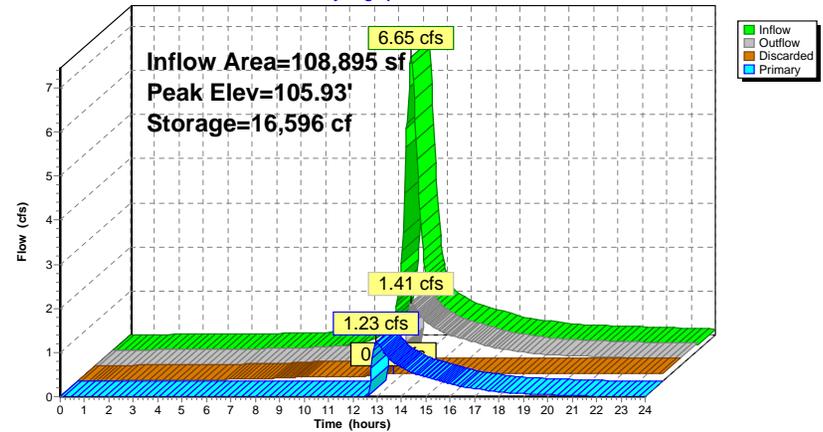
Type III 24-hr 100-Year Rainfall=8.08"

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Pond 6P: Basin 2

Hydrograph



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Summary for Pond 7P: Sediment Forebay

[57] Hint: Peaked at 107.32' (Flood elevation advised)

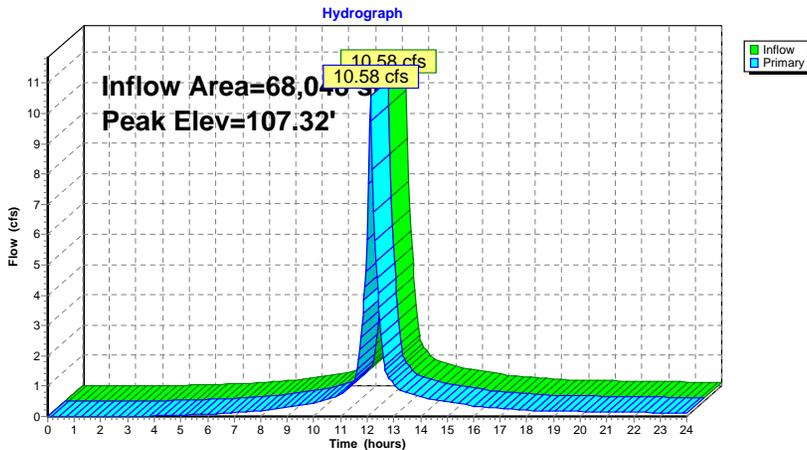
Inflow Area = 68,048 sf, 58.76% Impervious, Inflow Depth > 6.76" for 100-Year event
 Inflow = 10.58 cfs @ 12.12 hrs, Volume= 38,320 cf
 Outflow = 10.58 cfs @ 12.12 hrs, Volume= 38,320 cf, Atten= 0%, Lag= 0.0 min
 Primary = 10.58 cfs @ 12.12 hrs, Volume= 38,320 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 107.32' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	106.50'	5.3' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=10.57 cfs @ 12.12 hrs HW=107.32' TW=105.47' (Dynamic Tailwater)
 ↳1=Broad-Crested Rectangular Weir (Weir Controls 10.57 cfs @ 2.43 fps)

Pond 7P: Sediment Forebay



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Type III 24-hr 100-Year Rainfall=8.08"

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Summary for Pond BA 1: Bioretention Area A

Inflow Area = 13,258 sf, 74.33% Impervious, Inflow Depth > 6.76" for 100-Year event
 Inflow = 2.54 cfs @ 12.03 hrs, Volume= 7,474 cf
 Outflow = 2.49 cfs @ 12.04 hrs, Volume= 6,991 cf, Atten= 2%, Lag= 0.8 min
 Primary = 2.49 cfs @ 12.04 hrs, Volume= 6,991 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 134.46' @ 12.04 hrs Surf.Area= 885 sf Storage= 649 cf

Plug-Flow detention time= 58.4 min calculated for 6,979 cf (93% of inflow)
 Center-of-Mass det. time= 24.0 min (798.7 - 774.6)

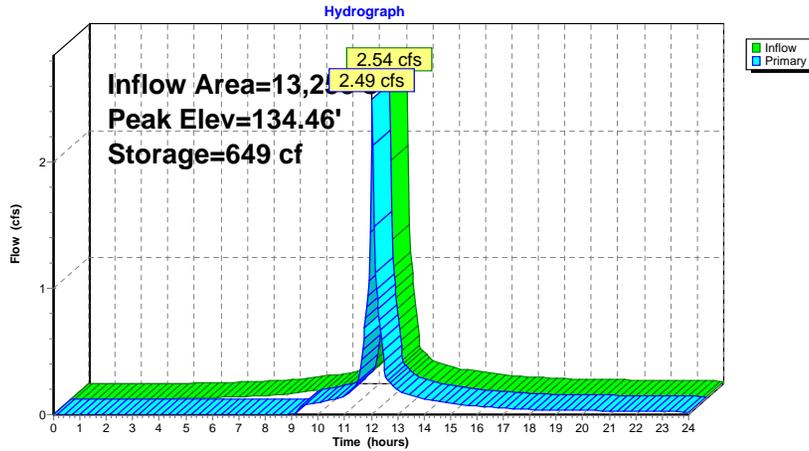
Volume	Invert	Avail.Storage	Storage Description
#1	133.50'	1,201 cf	Custom Stage Data (Conic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
133.50	481	0	0	481
134.00	690	291	291	694
135.00	1,150	910	1,201	1,167

Device	Routing	Invert	Outlet Devices
#1	Primary	134.25'	10.0' long x 43.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.49 cfs @ 12.04 hrs HW=134.46' TW=120.56' (Dynamic Tailwater)
 ↳1=Broad-Crested Rectangular Weir (Weir Controls 2.49 cfs @ 1.21 fps)

Pond BA 1: Bioretention Area A



Summary for Pond BA 2: Bioretention Area B

Inflow Area = 28,826 sf, 68.07% Impervious, Inflow Depth > 6.40" for 100-Year event
 Inflow = 4.66 cfs @ 12.09 hrs, Volume= 15,383 cf
 Outflow = 4.37 cfs @ 12.12 hrs, Volume= 13,359 cf, Atten= 6%, Lag= 2.0 min
 Primary = 4.37 cfs @ 12.12 hrs, Volume= 13,359 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3
 Peak Elev= 125.79' @ 12.12 hrs Surf.Area= 2,273 sf Storage= 2,718 cf

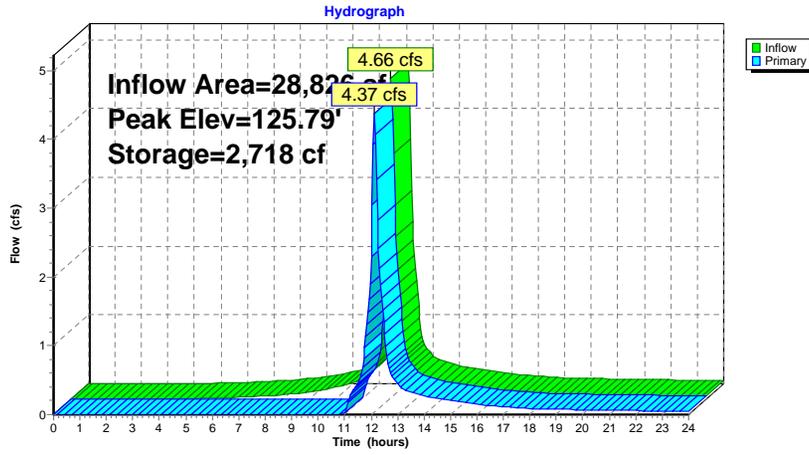
Plug-Flow detention time= 95.3 min calculated for 13,336 cf (87% of inflow)
 Center-of-Mass det. time= 37.9 min (825.2 - 787.3)

Volume	Invert	Avail.Storage	Storage Description	
#1	124.00'	3,205 cf	Custom Stage Data (Conic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
124.00	898	0	0	898
125.00	1,548	1,208	1,208	1,560
126.00	2,482	1,997	3,205	2,507

Device	Routing	Invert	Outlet Devices
#1	Primary	125.45'	8.0' long x 75.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4.33 cfs @ 12.12 hrs HW=125.79' TW=120.54' (Dynamic Tailwater)
 ↳=Broad-Crested Rectangular Weir (Weir Controls 4.33 cfs @ 1.58 fps)

Pond BA 2: Bioretention Area B



Summary for Pond POI 1: Northern Site

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

Inflow Area = 601,618 sf, 29.09% Impervious, Inflow Depth > 3.28" for 100-Year event
Inflow = 34.12 cfs @ 12.24 hrs, Volume= 164,420 cf
Primary = 34.12 cfs @ 12.24 hrs, Volume= 164,420 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.04 hrs / 3

Pond POI 1: Northern Site

