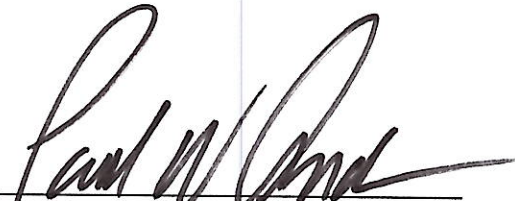




Drainage Report
South Avenue Redevelopment
Plainfield , NJ
Block 623, Lots 1& 2

July 26, 2022
November 11, 2022
February 26, 2023

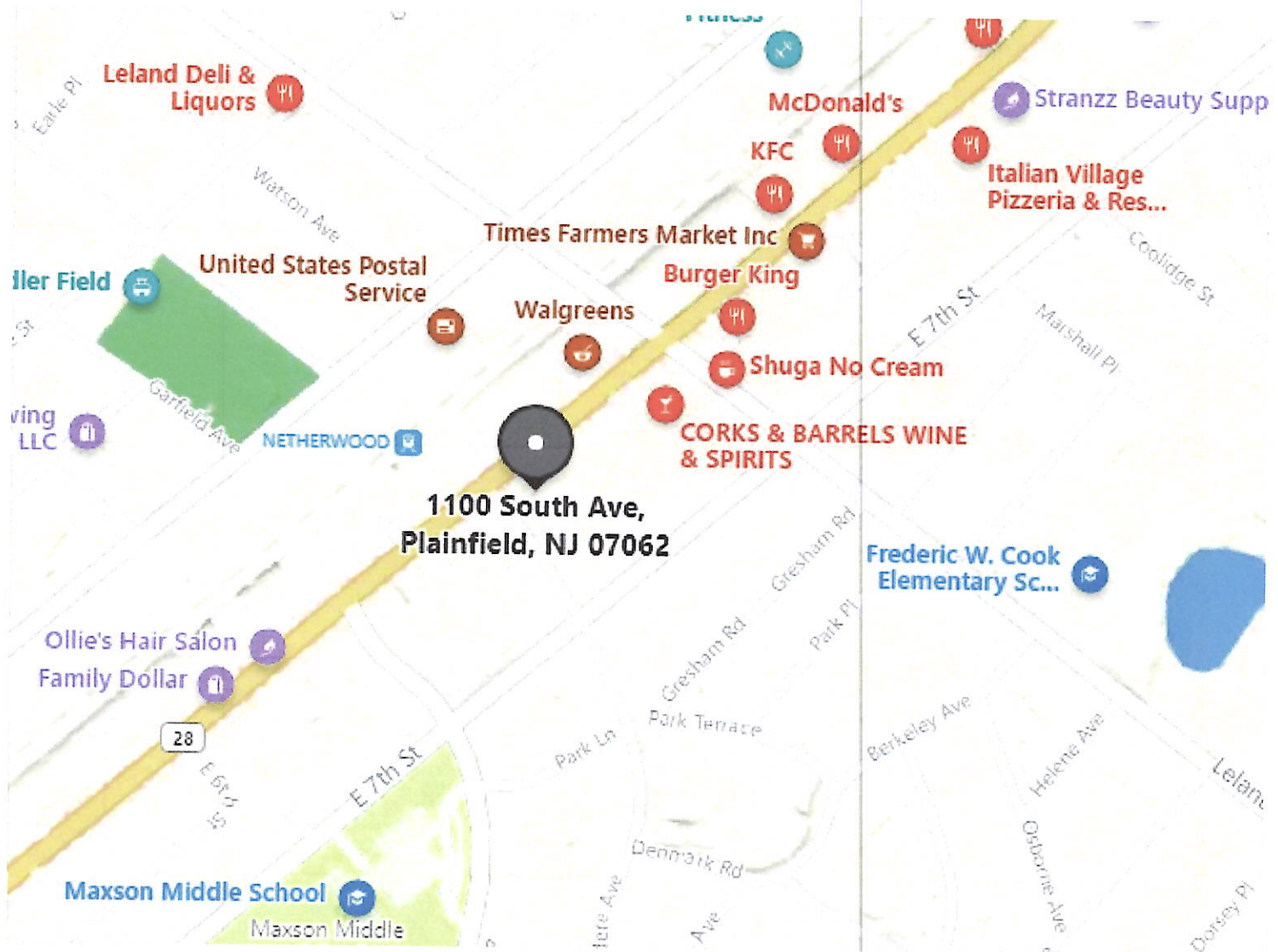


Paul W. Anderson PE PP CME
NJ PE Lic. No. 33410

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Hydrocad calculations



Introduction

The applicant is proposing to redevelop the property at 1100-1114 South Avenue in Plainfield NJ with a multi-story residential building over commercial space. Because of the amount of disturbance required for the project, it is classified as a major project and the state stormwater statute's reduced discharge rates and water quality will apply. The groundwater recharge element of the regulations is encumbered by the presents of onsite contamination from previous use. Because there may be some remaining contamination after the LSRP's closure plan we are we are not proposing any groundwater recharge.

The proposed design will capture roof runoff and discharge it to a stormwater detention pipe under the floor of the underbuilding garage. Stormwater that falls onto the parking lot outside the building line will be collected in drainage inlets and routed through a storm filter system. Storm Filter is approved by NJDEP for 80% removal of contaminants meeting the water quality element of the standards.

The calculations utilize Hydrocad, version 9.10, NJDEP approved intensity curves, and the SCS TR-20 methodology to calculate the pre-and post-development runoff volumes. The system meeting the rate of discharge requirements and the water quality element.

Methodology

The drainage for the property is calculated for the existing and proposed conditions. Discharge rates for the existing conditions under the 2, 10 and 100-year storm events are calculated with The Hydrocad drainage program and the SCS TR-20 method. Hydrographs for the proposed conditions for areas detained and un-detained are developed. Allowable discharge rates for the detention system are calculated and the proposed hydrograph is routed through a proposed detention systems until the desired discharge rate is achieved for each storm.

The porous pavement system does provide some discharge rate attenuation however it is not modeled in our analysis.

Summary

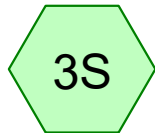
The result of the stormwater design for the project is shown in the table below and detailed hydrographs and routings are included in back of this report.

Storm	Existing (cfs)	Un-detained	Permitted Discharge From detention	Detention Discharge	Total Discharge
2	2.09 cfs	.13 cfs	0.92 cfs	.90 cfs	1.03 cfs
10	3.69 cfs	.42 cfs	2.16 cfs	2.15cfs	2.57 cfs
100	6.21 cfs	.76 cfs	4.20 cfs	3.44 cfs	4.20 cfs

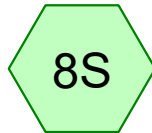
The routing of the runoff to thru the detention pipe reduces the discharge rate in accordance with Plainfield's and state standards so no detrimental impact to the capacity of the city storm sewer system is anticipated.



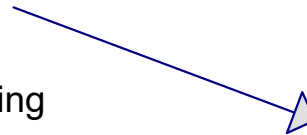
existing conditions



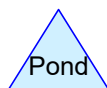
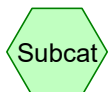
proposed overland



roof & parking



detention tank



Routing Diagram for 1110 South Ave Drainage rev 2

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1100 South Ave

Type III 24-hr 2-Year Rainfall=3.31"

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Time span=0.00-42.00 hrs, dt=0.06 hrs, 701 points

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: existing conditions Runoff Area=38,698 sf 68.91% Impervious Runoff Depth=2.56"
Flow Length=105' Slope=0.0380 '/' Tc=10.0 min CN=79/98 Runoff=2.09 cfs 0.190 af

Subcatchment 3S: proposed overland Runoff Area=4,994 sf 4.51% Impervious Runoff Depth=1.20"
Tc=10.0 min CN=74/98 Runoff=0.13 cfs 0.011 af

Subcatchment 8S: roof & parking Runoff Area=33,703 sf 100.00% Impervious Runoff Depth=3.08"
Tc=10.0 min CN=0/98 Runoff=2.15 cfs 0.198 af

Pond 9P: detention tank Peak Elev=121.58' Storage=1,873 cf Inflow=2.15 cfs 0.198 af
Outflow=0.90 cfs 0.198 af

Total Runoff Area = 1.777 ac Runoff Volume = 0.400 af Average Runoff Depth = 2.70"
21.71% Pervious = 0.386 ac 78.29% Impervious = 1.391 ac

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Summary for Subcatchment 1S: existing conditions

Runoff = 2.09 cfs @ 12.14 hrs, Volume= 0.190 af, Depth= 2.56"

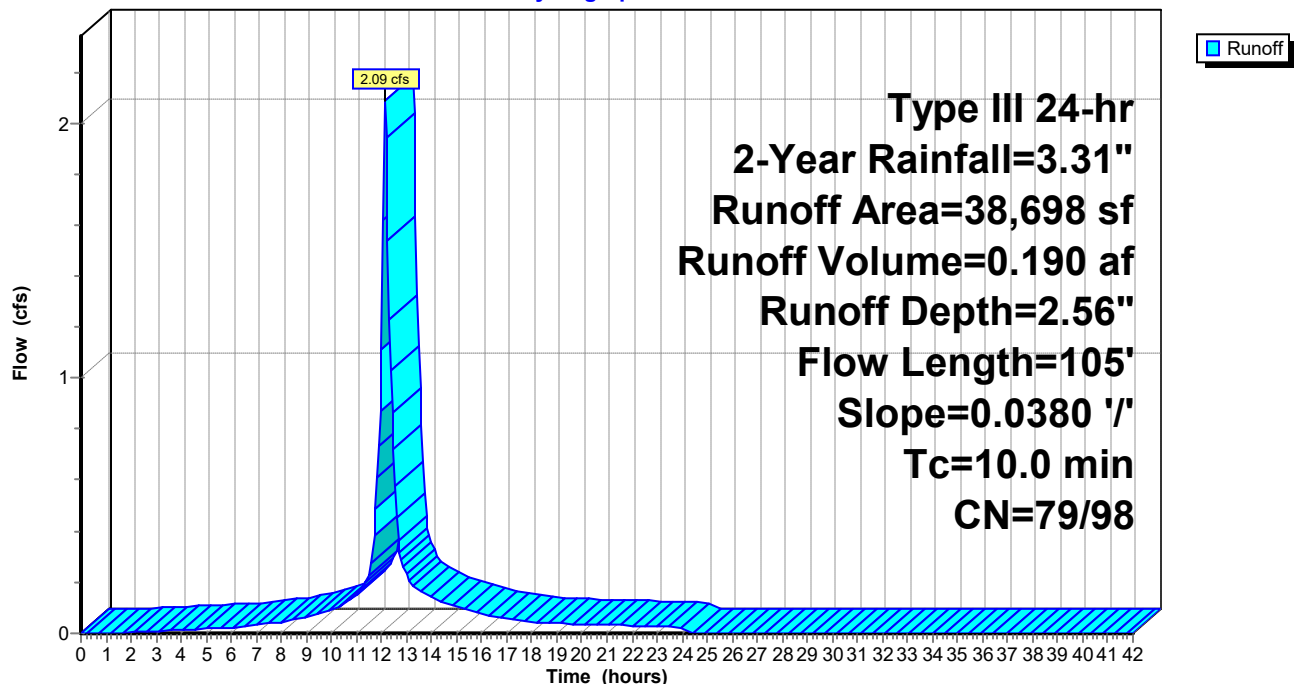
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-42.00 hrs, dt= 0.06 hrs
Type III 24-hr 2-Year Rainfall=3.31"

Area (sf)	CN	Description
26,667	98	Paved parking, HSG C
12,031	79	50-75% Grass cover, Fair, HSG C
38,698	92	Weighted Average
12,031	79	31.09% Pervious Area
26,667	98	68.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	105	0.0380	0.21		Sheet Flow, grass
					Grass: Short n= 0.150 P2= 2.80"
8.4	105	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 1S: existing conditions

Hydrograph



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Hydrograph for Subcatchment 1S: existing conditions

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.04	0.00	0.00	0.00
2.40	0.08	0.00	0.01	0.01
3.60	0.13	0.00	0.02	0.01
4.80	0.18	0.00	0.06	0.02
6.00	0.24	0.00	0.10	0.02
7.20	0.31	0.00	0.16	0.04
8.40	0.41	0.00	0.24	0.05
9.60	0.56	0.00	0.38	0.08
10.80	0.78	0.02	0.58	0.13
12.00	1.65	0.33	1.43	1.11
13.20	2.53	0.86	2.30	0.19
14.40	2.75	1.01	2.52	0.12
15.60	2.90	1.11	2.66	0.09
16.80	3.00	1.19	2.76	0.06
18.00	3.07	1.24	2.84	0.05
19.20	3.13	1.29	2.90	0.04
20.40	3.18	1.33	2.95	0.03
21.60	3.23	1.36	3.00	0.03
22.80	3.27	1.39	3.04	0.03
24.00	3.31	1.42	3.08	0.02
25.20	3.31	1.42	3.08	0.00
26.40	3.31	1.42	3.08	0.00
27.60	3.31	1.42	3.08	0.00
28.80	3.31	1.42	3.08	0.00
30.00	3.31	1.42	3.08	0.00
31.20	3.31	1.42	3.08	0.00
32.40	3.31	1.42	3.08	0.00
33.60	3.31	1.42	3.08	0.00
34.80	3.31	1.42	3.08	0.00
36.00	3.31	1.42	3.08	0.00
37.20	3.31	1.42	3.08	0.00
38.40	3.31	1.42	3.08	0.00
39.60	3.31	1.42	3.08	0.00
40.80	3.31	1.42	3.08	0.00
42.00	3.31	1.42	3.08	0.00

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Summary for Subcatchment 3S: proposed overland

Runoff = 0.13 cfs @ 12.15 hrs, Volume= 0.011 af, Depth= 1.20"

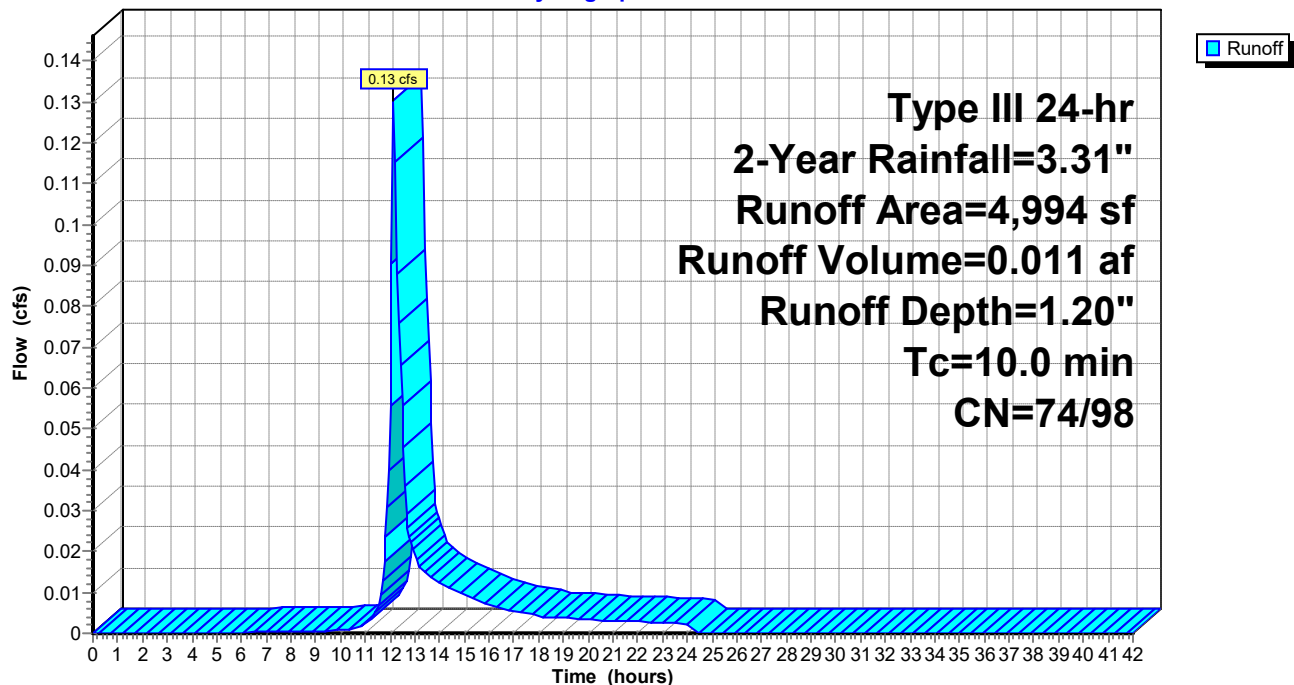
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-42.00 hrs, dt= 0.06 hrs
Type III 24-hr 2-Year Rainfall=3.31"

Area (sf)	CN	Description
225	98	Paved parking, HSG C
4,769	74	>75% Grass cover, Good, HSG C
4,994	75	Weighted Average
4,769	74	95.49% Pervious Area
225	98	4.51% Impervious Area

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

Subcatchment 3S: proposed overland

Hydrograph



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Type III 24-hr 2-Year Rainfall=3.31"

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Hydrograph for Subcatchment 3S: proposed overland

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.04	0.00	0.00	0.00
2.40	0.08	0.00	0.01	0.00
3.60	0.13	0.00	0.02	0.00
4.80	0.18	0.00	0.06	0.00
6.00	0.24	0.00	0.10	0.00
7.20	0.31	0.00	0.16	0.00
8.40	0.41	0.00	0.24	0.00
9.60	0.56	0.00	0.38	0.00
10.80	0.78	0.00	0.58	0.00
12.00	1.65	0.20	1.43	0.06
13.20	2.53	0.62	2.30	0.02
14.40	2.75	0.75	2.52	0.01
15.60	2.90	0.84	2.66	0.01
16.80	3.00	0.91	2.76	0.01
18.00	3.07	0.95	2.84	0.00
19.20	3.13	0.99	2.90	0.00
20.40	3.18	1.03	2.95	0.00
21.60	3.23	1.06	3.00	0.00
22.80	3.27	1.09	3.04	0.00
24.00	3.31	1.11	3.08	0.00
25.20	3.31	1.11	3.08	0.00
26.40	3.31	1.11	3.08	0.00
27.60	3.31	1.11	3.08	0.00
28.80	3.31	1.11	3.08	0.00
30.00	3.31	1.11	3.08	0.00
31.20	3.31	1.11	3.08	0.00
32.40	3.31	1.11	3.08	0.00
33.60	3.31	1.11	3.08	0.00
34.80	3.31	1.11	3.08	0.00
36.00	3.31	1.11	3.08	0.00
37.20	3.31	1.11	3.08	0.00
38.40	3.31	1.11	3.08	0.00
39.60	3.31	1.11	3.08	0.00
40.80	3.31	1.11	3.08	0.00
42.00	3.31	1.11	3.08	0.00

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Summary for Subcatchment 8S: roof & parking

Runoff = 2.15 cfs @ 12.13 hrs, Volume= 0.198 af, Depth= 3.08"

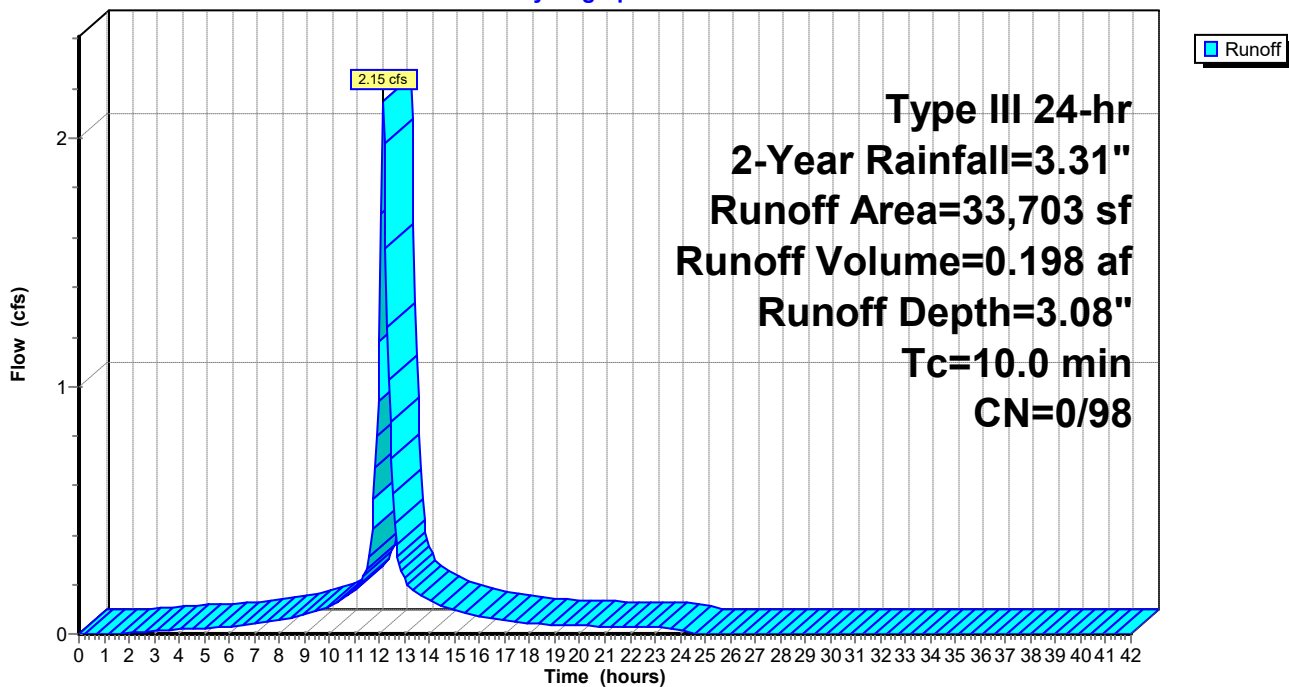
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-42.00 hrs, dt= 0.06 hrs
Type III 24-hr 2-Year Rainfall=3.31"

Area (sf)	CN	Description
33,703	98	Roofs, HSG C
33,703	98	100.00% Impervious Area

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

Subcatchment 8S: roof & parking

Hydrograph



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Hydrograph for Subcatchment 8S: roof & parking

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.04	0.00	0.00	0.00
2.40	0.08	0.00	0.01	0.01
3.60	0.13	0.00	0.02	0.02
4.80	0.18	0.00	0.06	0.02
6.00	0.24	0.00	0.10	0.03
7.20	0.31	0.00	0.16	0.04
8.40	0.41	0.00	0.24	0.06
9.60	0.56	0.00	0.38	0.10
10.80	0.78	0.00	0.58	0.16
12.00	1.65	0.00	1.43	1.18
13.20	2.53	0.00	2.30	0.19
14.40	2.75	0.00	2.52	0.12
15.60	2.90	0.00	2.66	0.08
16.80	3.00	0.00	2.76	0.06
18.00	3.07	0.00	2.84	0.04
19.20	3.13	0.00	2.90	0.04
20.40	3.18	0.00	2.95	0.03
21.60	3.23	0.00	3.00	0.03
22.80	3.27	0.00	3.04	0.03
24.00	3.31	0.00	3.08	0.02
25.20	3.31	0.00	3.08	0.00
26.40	3.31	0.00	3.08	0.00
27.60	3.31	0.00	3.08	0.00
28.80	3.31	0.00	3.08	0.00
30.00	3.31	0.00	3.08	0.00
31.20	3.31	0.00	3.08	0.00
32.40	3.31	0.00	3.08	0.00
33.60	3.31	0.00	3.08	0.00
34.80	3.31	0.00	3.08	0.00
36.00	3.31	0.00	3.08	0.00
37.20	3.31	0.00	3.08	0.00
38.40	3.31	0.00	3.08	0.00
39.60	3.31	0.00	3.08	0.00
40.80	3.31	0.00	3.08	0.00
42.00	3.31	0.00	3.08	0.00

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Summary for Pond 9P: detention tank

Inflow Area = 0.774 ac, 100.00% Impervious, Inflow Depth = 3.08" for 2-Year event
Inflow = 2.15 cfs @ 12.13 hrs, Volume= 0.198 af
Outflow = 0.90 cfs @ 12.41 hrs, Volume= 0.198 af, Atten= 58%, Lag= 16.3 min
Primary = 0.90 cfs @ 12.41 hrs, Volume= 0.198 af

Routing by Stor-Ind method, Time Span= 0.00-42.00 hrs, dt= 0.06 hrs
Peak Elev= 121.58' @ 12.41 hrs Surf.Area= 900 sf Storage= 1,873 cf

Plug-Flow detention time= 33.1 min calculated for 0.198 af (100% of inflow)
Center-of-Mass det. time= 32.7 min (792.1 - 759.4)

Volume	Invert	Avail.Storage	Storage Description
#1	119.50'	4,050 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
119.50	900	0	0
124.00	900	4,050	4,050

Device	Routing	Invert	Outlet Devices
#1	Primary	119.50'	5.0" Vert. Orifice/Grate C= 0.600
#2	Primary	121.60'	15.0" W x 3.0" H Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.90 cfs @ 12.41 hrs HW=121.58' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.90 cfs @ 6.58 fps)

2=Orifice/Grate (Controls 0.00 cfs)

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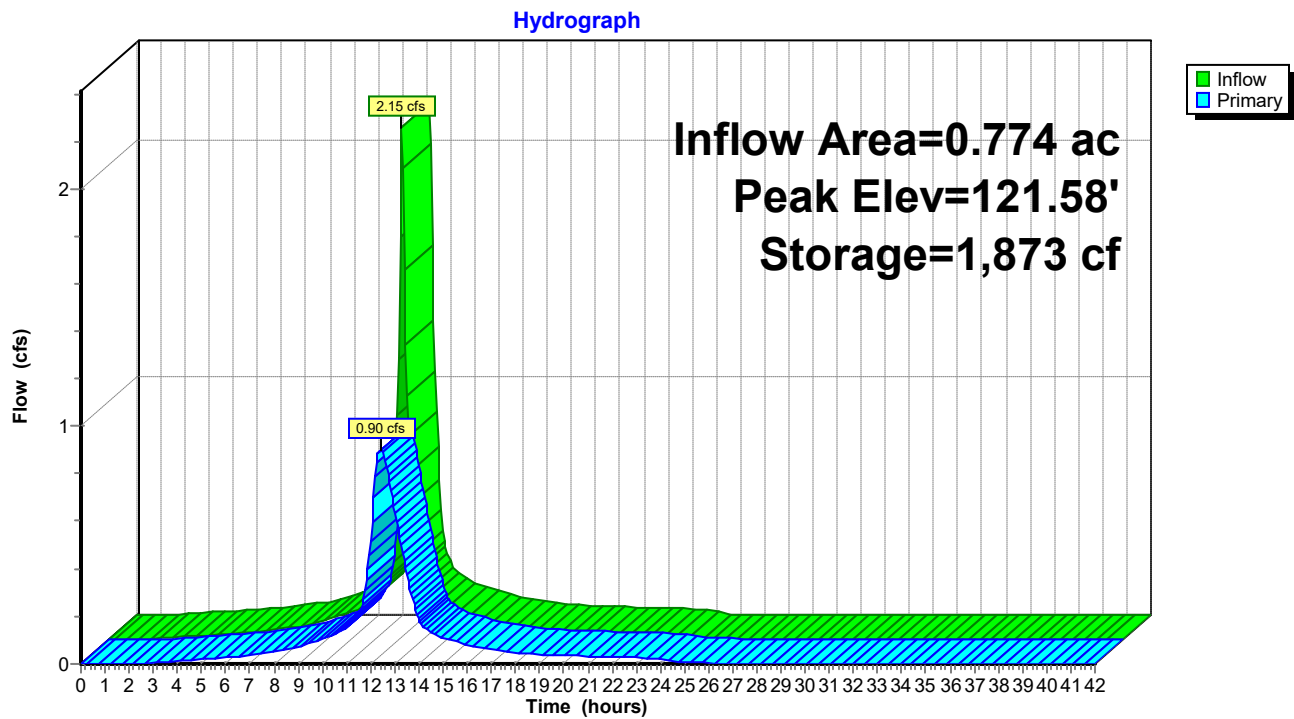
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Pond 9P: detention tank



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Hydrograph for Pond 9P: detention tank

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	119.50	0.00
1.20	0.00	0	119.50	0.00
2.40	0.01	11	119.51	0.00
3.60	0.02	43	119.55	0.01
4.80	0.02	70	119.58	0.02
6.00	0.03	88	119.60	0.03
7.20	0.04	107	119.62	0.04
8.40	0.06	133	119.65	0.06
9.60	0.10	172	119.69	0.09
10.80	0.16	222	119.75	0.14
12.00	1.18	743	120.33	0.52
13.20	0.19	777	120.36	0.53
14.40	0.12	217	119.74	0.14
15.60	0.08	172	119.69	0.09
16.80	0.06	140	119.66	0.06
18.00	0.04	121	119.63	0.05
19.20	0.04	108	119.62	0.04
20.40	0.03	100	119.61	0.03
21.60	0.03	94	119.60	0.03
22.80	0.03	89	119.60	0.03
24.00	0.02	83	119.59	0.02
25.20	0.00	39	119.54	0.01
26.40	0.00	21	119.52	0.00
27.60	0.00	11	119.51	0.00
28.80	0.00	6	119.51	0.00
30.00	0.00	3	119.50	0.00
31.20	0.00	2	119.50	0.00
32.40	0.00	1	119.50	0.00
33.60	0.00	1	119.50	0.00
34.80	0.00	0	119.50	0.00
36.00	0.00	0	119.50	0.00
37.20	0.00	0	119.50	0.00
38.40	0.00	0	119.50	0.00
39.60	0.00	0	119.50	0.00
40.80	0.00	0	119.50	0.00
42.00	0.00	0	119.50	0.00

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Type III 24-hr 2-Year Rainfall=3.31"

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Stage-Discharge for Pond 9P: detention tank

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
119.50	0.00	122.05	1.86
119.55	0.01	122.10	1.93
119.60	0.03	122.15	2.00
119.65	0.06	122.20	2.07
119.70	0.10	122.25	2.13
119.75	0.15	122.30	2.20
119.80	0.20	122.35	2.25
119.85	0.25	122.40	2.31
119.90	0.29	122.45	2.37
119.95	0.32	122.50	2.42
120.00	0.35	122.55	2.47
120.05	0.38	122.60	2.52
120.10	0.41	122.65	2.57
120.15	0.44	122.70	2.62
120.20	0.46	122.75	2.67
120.25	0.48	122.80	2.71
120.30	0.51	122.85	2.76
120.35	0.53	122.90	2.80
120.40	0.55	122.95	2.85
120.45	0.57	123.00	2.89
120.50	0.58	123.05	2.93
120.55	0.60	123.10	2.97
120.60	0.62	123.15	3.01
120.65	0.64	123.20	3.05
120.70	0.65	123.25	3.09
120.75	0.67	123.30	3.13
120.80	0.69	123.35	3.17
120.85	0.70	123.40	3.21
120.90	0.72	123.45	3.25
120.95	0.73	123.50	3.28
121.00	0.75	123.55	3.32
121.05	0.76	123.60	3.36
121.10	0.77	123.65	3.39
121.15	0.79	123.70	3.43
121.20	0.80	123.75	3.46
121.25	0.82	123.80	3.50
121.30	0.83	123.85	3.53
121.35	0.84	123.90	3.56
121.40	0.85	123.95	3.60
121.45	0.87	124.00	3.63
121.50	0.88		
121.55	0.89		
121.60	0.90		
121.65	0.96		
121.70	1.05		
121.75	1.17		
121.80	1.31		
121.85	1.46		
121.90	1.59		
121.95	1.69		
122.00	1.78		

1110 South Ave Drainage rev 2

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1100 South Ave
Type III 24-hr 10-Year Rainfall=5.02", AMC=3

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Time span=0.00-42.00 hrs, dt=0.06 hrs, 701 points

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: existing conditions Runoff Area=38,698 sf 68.91% Impervious Runoff Depth=4.62"
Flow Length=105' Slope=0.0380 '/' Tc=10.0 min AMC Adjusted CN=91/99 Runoff=3.69 cfs 0.342 af

Subcatchment 3S: proposed overland Runoff Area=4,994 sf 4.51% Impervious Runoff Depth=3.74"
Tc=10.0 min AMC Adjusted CN=88/99 Runoff=0.42 cfs 0.036 af

Subcatchment 8S: roof & parking Runoff Area=33,703 sf 100.00% Impervious Runoff Depth=4.90"
Tc=10.0 min AMC Adjusted CN=0/99 Runoff=3.30 cfs 0.316 af

Pond 9P: detention tank Peak Elev=122.26' Storage=2,483 cf Inflow=3.30 cfs 0.316 af
Outflow=2.15 cfs 0.316 af

Total Runoff Area = 1.777 ac Runoff Volume = 0.694 af Average Runoff Depth = 4.69"
21.71% Pervious = 0.386 ac 78.29% Impervious = 1.391 ac

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Type III 24-hr 10-Year Rainfall=5.02", AMC=3

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Summary for Subcatchment 1S: existing conditions

Runoff = 3.69 cfs @ 12.13 hrs, Volume= 0.342 af, Depth= 4.62"

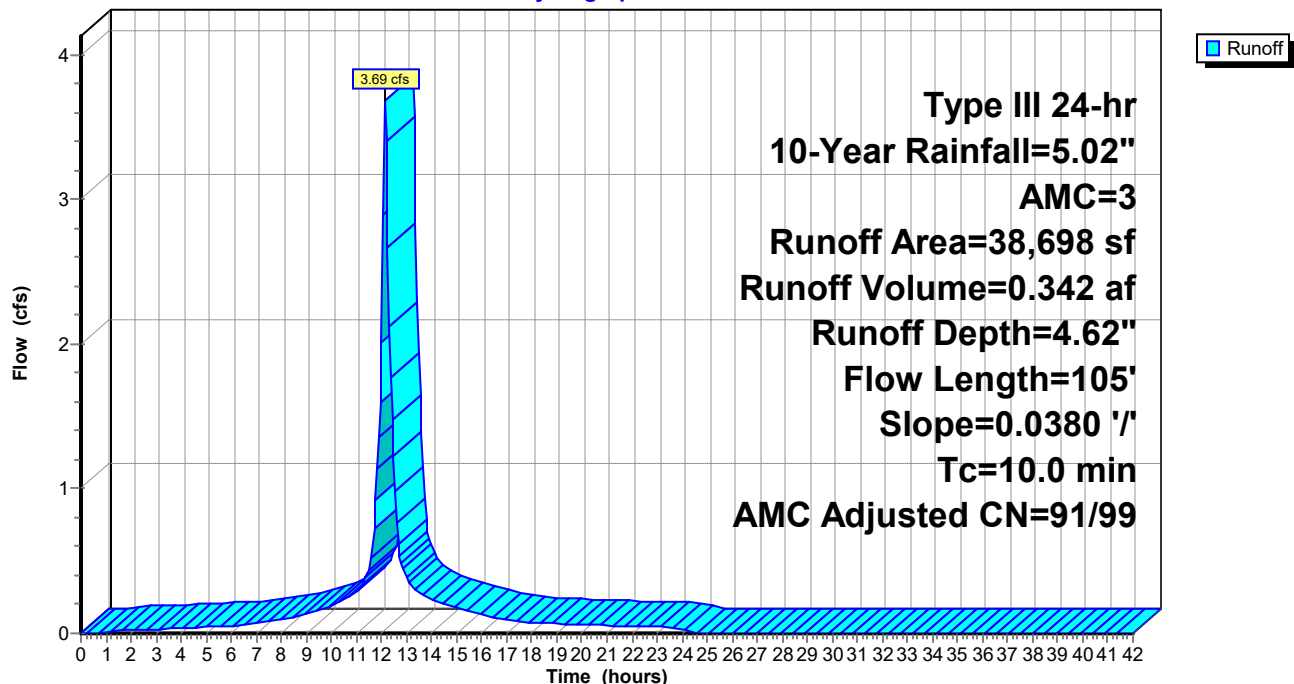
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-42.00 hrs, dt= 0.06 hrs
Type III 24-hr 10-Year Rainfall=5.02", AMC=3

Area (sf)	CN	Adj	Description
26,667	98		Paved parking, HSG C
12,031	79		50-75% Grass cover, Fair, HSG C
38,698	92	97	Weighted Average, AMC Adjusted
12,031	79	91	31.09% Pervious Area, AMC Adjusted
26,667	98	99	68.91% Impervious Area, AMC Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	105	0.0380	0.21		Sheet Flow, grass
					Grass: Short n= 0.150 P2= 2.80"
8.4	105	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 1S: existing conditions

Hydrograph



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Type III 24-hr 10-Year Rainfall=5.02", AMC=3

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Hydrograph for Subcatchment 1S: existing conditions

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.06	0.00	0.01	0.01
2.40	0.12	0.00	0.05	0.02
3.60	0.19	0.00	0.11	0.03
4.80	0.27	0.00	0.18	0.04
6.00	0.36	0.02	0.26	0.05
7.20	0.48	0.06	0.37	0.07
8.40	0.63	0.13	0.52	0.11
9.60	0.86	0.26	0.74	0.17
10.80	1.18	0.49	1.07	0.26
12.00	2.51	1.62	2.39	2.01
13.20	3.84	2.86	3.72	0.32
14.40	4.16	3.18	4.05	0.20
15.60	4.39	3.39	4.27	0.14
16.80	4.54	3.54	4.43	0.10
18.00	4.66	3.65	4.54	0.07
19.20	4.75	3.74	4.63	0.06
20.40	4.83	3.82	4.71	0.06
21.60	4.90	3.89	4.78	0.05
22.80	4.96	3.95	4.85	0.04
24.00	5.02	4.00	4.90	0.04
25.20	5.02	4.00	4.90	0.00
26.40	5.02	4.00	4.90	0.00
27.60	5.02	4.00	4.90	0.00
28.80	5.02	4.00	4.90	0.00
30.00	5.02	4.00	4.90	0.00
31.20	5.02	4.00	4.90	0.00
32.40	5.02	4.00	4.90	0.00
33.60	5.02	4.00	4.90	0.00
34.80	5.02	4.00	4.90	0.00
36.00	5.02	4.00	4.90	0.00
37.20	5.02	4.00	4.90	0.00
38.40	5.02	4.00	4.90	0.00
39.60	5.02	4.00	4.90	0.00
40.80	5.02	4.00	4.90	0.00
42.00	5.02	4.00	4.90	0.00

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Summary for Subcatchment 3S: proposed overland

Runoff = 0.42 cfs @ 12.14 hrs, Volume= 0.036 af, Depth= 3.74"

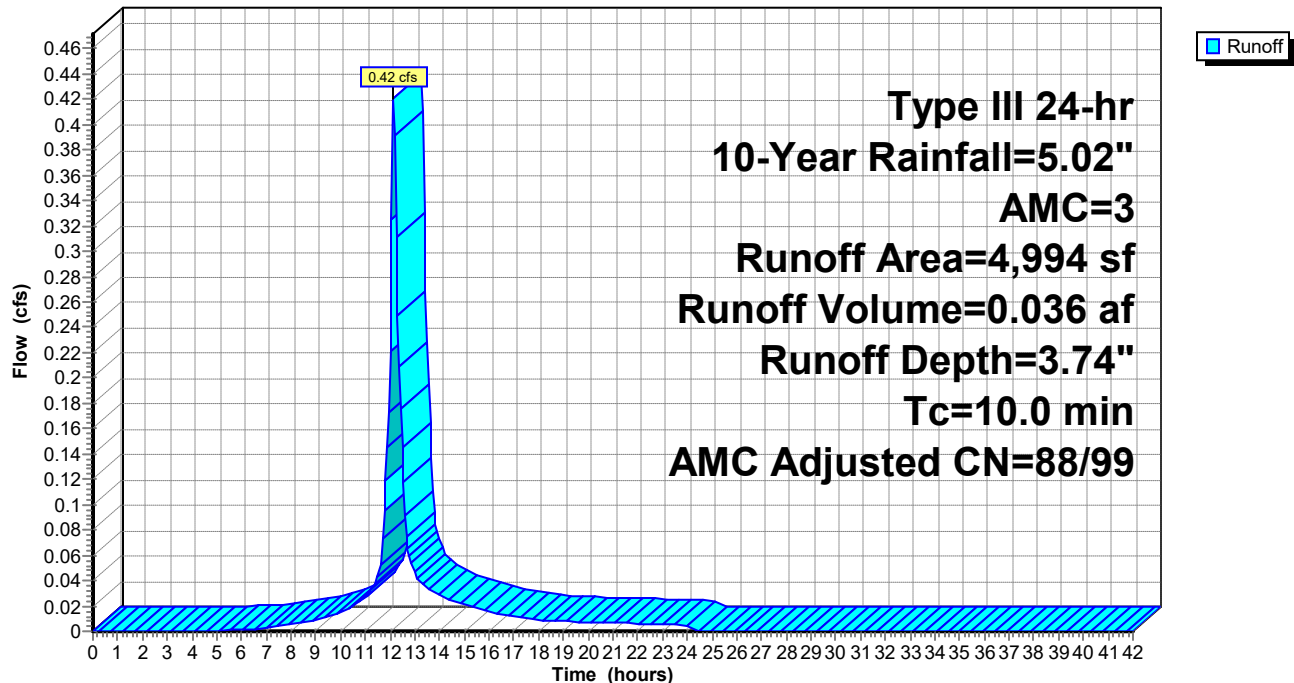
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-42.00 hrs, dt= 0.06 hrs
Type III 24-hr 10-Year Rainfall=5.02", AMC=3

Area (sf)	CN	Adj	Description
225	98		Paved parking, HSG C
4,769	74		>75% Grass cover, Good, HSG C
4,994	75	88	Weighted Average, AMC Adjusted
4,769	74	88	95.49% Pervious Area, AMC Adjusted
225	98	99	4.51% Impervious Area, AMC Adjusted

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

Subcatchment 3S: proposed overland

Hydrograph



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Hydrograph for Subcatchment 3S: proposed overland

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.06	0.00	0.01	0.00
2.40	0.12	0.00	0.05	0.00
3.60	0.19	0.00	0.11	0.00
4.80	0.27	0.00	0.18	0.00
6.00	0.36	0.01	0.26	0.00
7.20	0.48	0.03	0.37	0.00
8.40	0.63	0.07	0.52	0.01
9.60	0.86	0.17	0.74	0.01
10.80	1.18	0.37	1.07	0.02
12.00	2.51	1.39	2.39	0.22
13.20	3.84	2.58	3.72	0.04
14.40	4.16	2.88	4.05	0.03
15.60	4.39	3.09	4.27	0.02
16.80	4.54	3.24	4.43	0.01
18.00	4.66	3.35	4.54	0.01
19.20	4.75	3.43	4.63	0.01
20.40	4.83	3.51	4.71	0.01
21.60	4.90	3.58	4.78	0.01
22.80	4.96	3.64	4.85	0.01
24.00	5.02	3.69	4.90	0.00
25.20	5.02	3.69	4.90	0.00
26.40	5.02	3.69	4.90	0.00
27.60	5.02	3.69	4.90	0.00
28.80	5.02	3.69	4.90	0.00
30.00	5.02	3.69	4.90	0.00
31.20	5.02	3.69	4.90	0.00
32.40	5.02	3.69	4.90	0.00
33.60	5.02	3.69	4.90	0.00
34.80	5.02	3.69	4.90	0.00
36.00	5.02	3.69	4.90	0.00
37.20	5.02	3.69	4.90	0.00
38.40	5.02	3.69	4.90	0.00
39.60	5.02	3.69	4.90	0.00
40.80	5.02	3.69	4.90	0.00
42.00	5.02	3.69	4.90	0.00

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Summary for Subcatchment 8S: roof & parking

Runoff = 3.30 cfs @ 12.13 hrs, Volume= 0.316 af, Depth= 4.90"

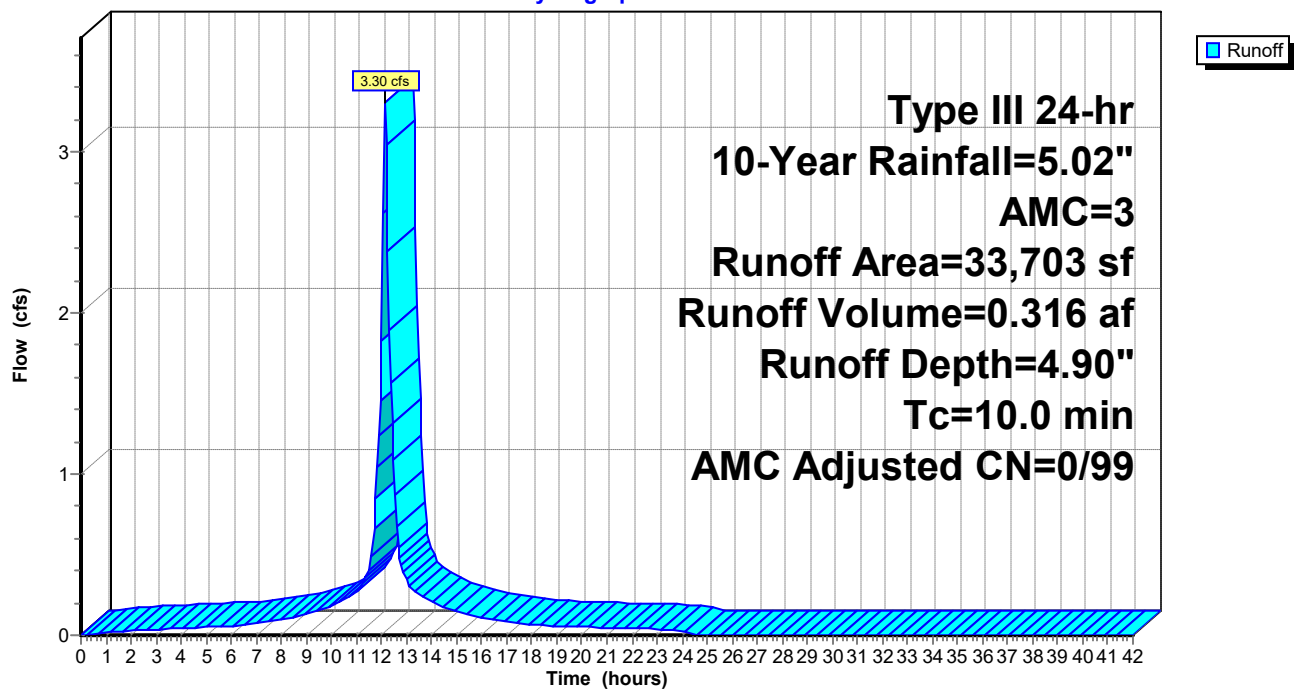
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-42.00 hrs, dt= 0.06 hrs
Type III 24-hr 10-Year Rainfall=5.02", AMC=3

Area (sf)	CN	Adj	Description
33,703	98		Roofs, HSG C
33,703	98	99	Weighted Average, AMC Adjusted
33,703	98	99	100.00% Impervious Area, AMC Adjusted

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

Subcatchment 8S: roof & parking

Hydrograph



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Hydrograph for Subcatchment 8S: roof & parking

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.06	0.00	0.01	0.02
2.40	0.12	0.00	0.05	0.03
3.60	0.19	0.00	0.11	0.04
4.80	0.27	0.00	0.18	0.05
6.00	0.36	0.00	0.26	0.06
7.20	0.48	0.00	0.37	0.08
8.40	0.63	0.00	0.52	0.11
9.60	0.86	0.00	0.74	0.16
10.80	1.18	0.00	1.07	0.25
12.00	2.51	0.00	2.39	1.82
13.20	3.84	0.00	3.72	0.29
14.40	4.16	0.00	4.05	0.18
15.60	4.39	0.00	4.27	0.13
16.80	4.54	0.00	4.43	0.09
18.00	4.66	0.00	4.54	0.07
19.20	4.75	0.00	4.63	0.06
20.40	4.83	0.00	4.71	0.05
21.60	4.90	0.00	4.78	0.04
22.80	4.96	0.00	4.85	0.04
24.00	5.02	0.00	4.90	0.03
25.20	5.02	0.00	4.90	0.00
26.40	5.02	0.00	4.90	0.00
27.60	5.02	0.00	4.90	0.00
28.80	5.02	0.00	4.90	0.00
30.00	5.02	0.00	4.90	0.00
31.20	5.02	0.00	4.90	0.00
32.40	5.02	0.00	4.90	0.00
33.60	5.02	0.00	4.90	0.00
34.80	5.02	0.00	4.90	0.00
36.00	5.02	0.00	4.90	0.00
37.20	5.02	0.00	4.90	0.00
38.40	5.02	0.00	4.90	0.00
39.60	5.02	0.00	4.90	0.00
40.80	5.02	0.00	4.90	0.00
42.00	5.02	0.00	4.90	0.00

1110 South Ave Drainage rev 21100 South Ave
Type III 24-hr 10-Year Rainfall=5.02", AMC=3

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Summary for Pond 9P: detention tank

Inflow Area = 0.774 ac, 100.00% Impervious, Inflow Depth = 4.90" for 10-Year event
 Inflow = 3.30 cfs @ 12.13 hrs, Volume= 0.316 af
 Outflow = 2.15 cfs @ 12.27 hrs, Volume= 0.316 af, Atten= 35%, Lag= 8.2 min
 Primary = 2.15 cfs @ 12.27 hrs, Volume= 0.316 af

Routing by Stor-Ind method, Time Span= 0.00-42.00 hrs, dt= 0.06 hrs
 Peak Elev= 122.26' @ 12.27 hrs Surf.Area= 900 sf Storage= 2,483 cf

Plug-Flow detention time= 27.9 min calculated for 0.316 af (100% of inflow)
 Center-of-Mass det. time= 28.2 min (770.4 - 742.2)

Volume	Invert	Avail.Storage	Storage Description
#1	119.50'	4,050 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
119.50	900	0	0
124.00	900	4,050	4,050

Device	Routing	Invert	Outlet Devices
#1	Primary	119.50'	5.0" Vert. Orifice/Grate C= 0.600
#2	Primary	121.60'	15.0" W x 3.0" H Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=2.13 cfs @ 12.27 hrs HW=122.25' (Free Discharge)

1=Orifice/Grate (Orifice Controls 1.05 cfs @ 7.67 fps)

2=Orifice/Grate (Orifice Controls 1.09 cfs @ 3.48 fps)

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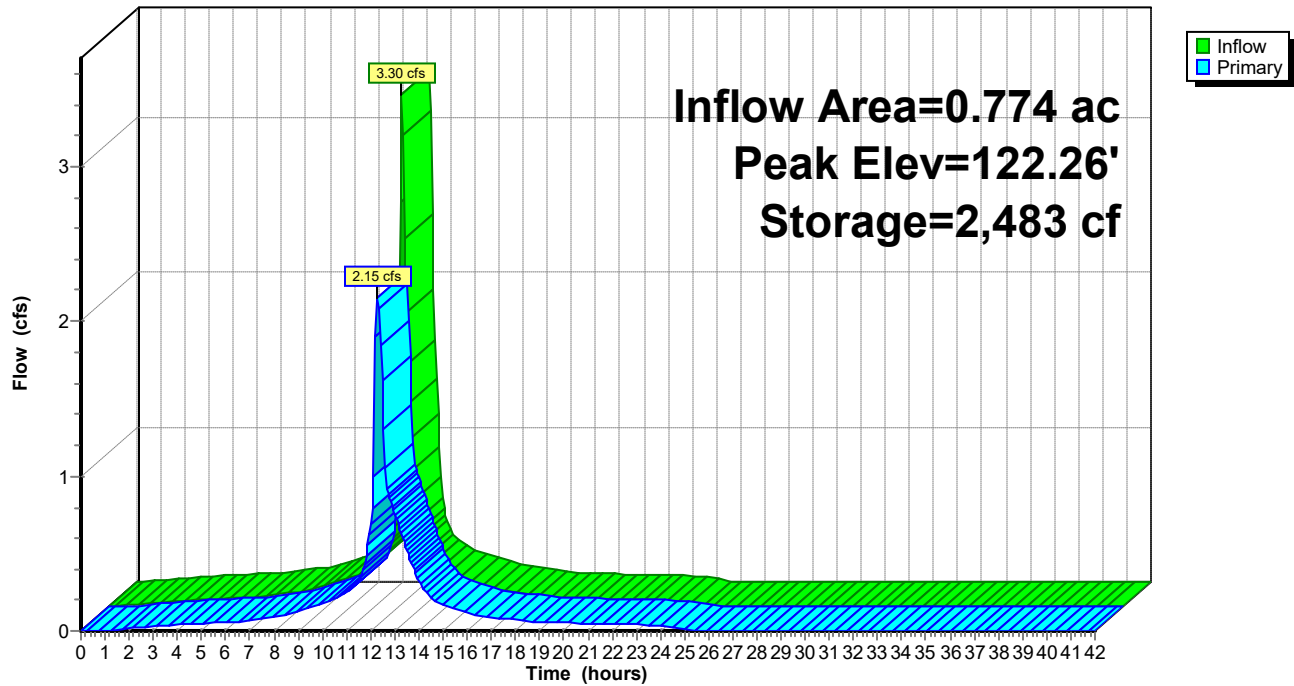
1100 South Ave
Type III 24-hr 10-Year Rainfall=5.02", AMC=3

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Pond 9P: detention tank

Hydrograph



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Hydrograph for Pond 9P: detention tank

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	119.50	0.00
1.20	0.02	20	119.52	0.00
2.40	0.03	76	119.58	0.02
3.60	0.04	103	119.61	0.04
4.80	0.05	119	119.63	0.05
6.00	0.06	131	119.65	0.06
7.20	0.08	153	119.67	0.07
8.40	0.11	182	119.70	0.10
9.60	0.16	232	119.76	0.15
10.80	0.25	299	119.83	0.23
12.00	1.82	1,196	120.83	0.69
13.20	0.29	1,101	120.72	0.66
14.40	0.18	296	119.83	0.22
15.60	0.13	218	119.74	0.14
16.80	0.09	176	119.70	0.10
18.00	0.07	151	119.67	0.07
19.20	0.06	135	119.65	0.06
20.40	0.05	126	119.64	0.05
21.60	0.04	119	119.63	0.05
22.80	0.04	111	119.62	0.04
24.00	0.03	103	119.61	0.04
25.20	0.00	43	119.55	0.01
26.40	0.00	23	119.53	0.00
27.60	0.00	12	119.51	0.00
28.80	0.00	7	119.51	0.00
30.00	0.00	4	119.50	0.00
31.20	0.00	2	119.50	0.00
32.40	0.00	1	119.50	0.00
33.60	0.00	1	119.50	0.00
34.80	0.00	0	119.50	0.00
36.00	0.00	0	119.50	0.00
37.20	0.00	0	119.50	0.00
38.40	0.00	0	119.50	0.00
39.60	0.00	0	119.50	0.00
40.80	0.00	0	119.50	0.00
42.00	0.00	0	119.50	0.00

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Stage-Discharge for Pond 9P: detention tank

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
119.50	0.00	122.05	1.86
119.55	0.01	122.10	1.93
119.60	0.03	122.15	2.00
119.65	0.06	122.20	2.07
119.70	0.10	122.25	2.13
119.75	0.15	122.30	2.20
119.80	0.20	122.35	2.25
119.85	0.25	122.40	2.31
119.90	0.29	122.45	2.37
119.95	0.32	122.50	2.42
120.00	0.35	122.55	2.47
120.05	0.38	122.60	2.52
120.10	0.41	122.65	2.57
120.15	0.44	122.70	2.62
120.20	0.46	122.75	2.67
120.25	0.48	122.80	2.71
120.30	0.51	122.85	2.76
120.35	0.53	122.90	2.80
120.40	0.55	122.95	2.85
120.45	0.57	123.00	2.89
120.50	0.58	123.05	2.93
120.55	0.60	123.10	2.97
120.60	0.62	123.15	3.01
120.65	0.64	123.20	3.05
120.70	0.65	123.25	3.09
120.75	0.67	123.30	3.13
120.80	0.69	123.35	3.17
120.85	0.70	123.40	3.21
120.90	0.72	123.45	3.25
120.95	0.73	123.50	3.28
121.00	0.75	123.55	3.32
121.05	0.76	123.60	3.36
121.10	0.77	123.65	3.39
121.15	0.79	123.70	3.43
121.20	0.80	123.75	3.46
121.25	0.82	123.80	3.50
121.30	0.83	123.85	3.53
121.35	0.84	123.90	3.56
121.40	0.85	123.95	3.60
121.45	0.87	124.00	3.63
121.50	0.88		
121.55	0.89		
121.60	0.90		
121.65	0.96		
121.70	1.05		
121.75	1.17		
121.80	1.31		
121.85	1.46		
121.90	1.59		
121.95	1.69		
122.00	1.78		

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Time span=0.00-42.00 hrs, dt=0.06 hrs, 701 points

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: existing conditions Runoff Area=38,698 sf 68.91% Impervious Runoff Depth=7.89"
Flow Length=105' Slope=0.0380 '/' Tc=10.0 min AMC Adjusted CN=91/99 Runoff=6.21 cfs 0.584 af

Subcatchment 3S: proposed overland Runoff Area=4,994 sf 4.51% Impervious Runoff Depth=6.93"
Tc=10.0 min AMC Adjusted CN=88/99 Runoff=0.76 cfs 0.066 af

Subcatchment 8S: roof & parking Runoff Area=33,703 sf 100.00% Impervious Runoff Depth=8.19"
Tc=10.0 min AMC Adjusted CN=0/99 Runoff=5.48 cfs 0.528 af

Pond 9P: detention tank Peak Elev=123.73' Storage=3,803 cf Inflow=5.48 cfs 0.528 af
Outflow=3.44 cfs 0.528 af

Total Runoff Area = 1.777 ac Runoff Volume = 1.179 af Average Runoff Depth = 7.96"
21.71% Pervious = 0.386 ac 78.29% Impervious = 1.391 ac

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Summary for Subcatchment 1S: existing conditions

Runoff = 6.21 cfs @ 12.13 hrs, Volume= 0.584 af, Depth= 7.89"

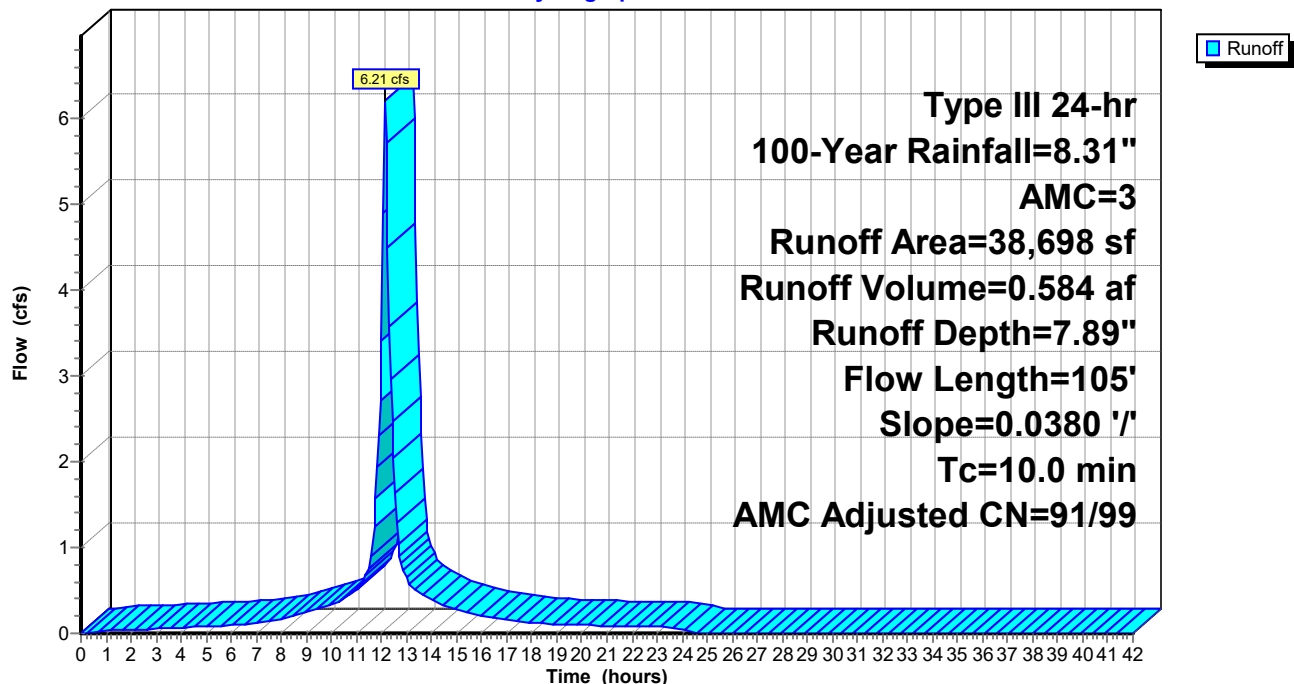
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-42.00 hrs, dt= 0.06 hrs
Type III 24-hr 100-Year Rainfall=8.31", AMC=3

Area (sf)	CN	Adj	Description
26,667	98		Paved parking, HSG C
12,031	79		50-75% Grass cover, Fair, HSG C
38,698	92	97	Weighted Average, AMC Adjusted
12,031	79	91	31.09% Pervious Area, AMC Adjusted
26,667	98	99	68.91% Impervious Area, AMC Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	105	0.0380	0.21		Sheet Flow, grass
					Grass: Short n= 0.150 P2= 2.80"
8.4	105	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 1S: existing conditions

Hydrograph



1110 South Ave Drainage rev 2

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Hydrograph for Subcatchment 1S: existing conditions

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.10	0.00	0.04	0.03
2.40	0.20	0.00	0.12	0.05
3.60	0.32	0.01	0.22	0.06
4.80	0.45	0.05	0.35	0.08
6.00	0.60	0.12	0.49	0.10
7.20	0.79	0.22	0.68	0.14
8.40	1.04	0.39	0.93	0.19
9.60	1.42	0.67	1.30	0.30
10.80	1.96	1.13	1.84	0.46
12.00	4.15	3.17	4.04	3.40
13.20	6.35	5.30	6.23	0.54
14.40	6.89	5.84	6.77	0.34
15.60	7.27	6.20	7.15	0.24
16.80	7.52	6.45	7.40	0.17
18.00	7.71	6.64	7.59	0.12
19.20	7.86	6.79	7.74	0.11
20.40	8.00	6.92	7.88	0.09
21.60	8.11	7.04	7.99	0.08
22.80	8.22	7.14	8.10	0.07
24.00	8.31	7.23	8.19	0.06
25.20	8.31	7.23	8.19	0.00
26.40	8.31	7.23	8.19	0.00
27.60	8.31	7.23	8.19	0.00
28.80	8.31	7.23	8.19	0.00
30.00	8.31	7.23	8.19	0.00
31.20	8.31	7.23	8.19	0.00
32.40	8.31	7.23	8.19	0.00
33.60	8.31	7.23	8.19	0.00
34.80	8.31	7.23	8.19	0.00
36.00	8.31	7.23	8.19	0.00
37.20	8.31	7.23	8.19	0.00
38.40	8.31	7.23	8.19	0.00
39.60	8.31	7.23	8.19	0.00
40.80	8.31	7.23	8.19	0.00
42.00	8.31	7.23	8.19	0.00

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Type III 24-hr 100-Year Rainfall=8.31", AMC=3

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Summary for Subcatchment 3S: proposed overland

Runoff = 0.76 cfs @ 12.14 hrs, Volume= 0.066 af, Depth= 6.93"

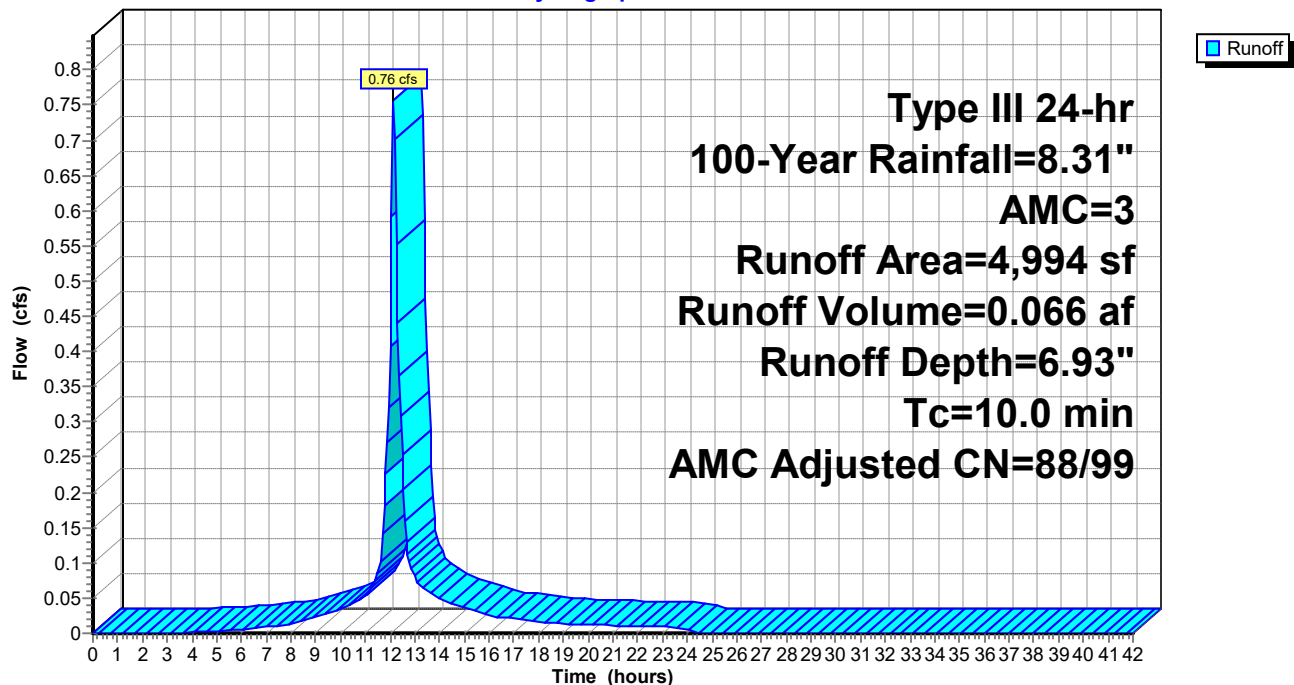
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-42.00 hrs, dt= 0.06 hrs
Type III 24-hr 100-Year Rainfall=8.31", AMC=3

Area (sf)	CN	Adj	Description
225	98		Paved parking, HSG C
4,769	74		>75% Grass cover, Good, HSG C
4,994	75	88	Weighted Average, AMC Adjusted
4,769	74	88	95.49% Pervious Area, AMC Adjusted
225	98	99	4.51% Impervious Area, AMC Adjusted

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

Subcatchment 3S: proposed overland

Hydrograph



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Hydrograph for Subcatchment 3S: proposed overland

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.10	0.00	0.04	0.00
2.40	0.20	0.00	0.12	0.00
3.60	0.32	0.00	0.22	0.00
4.80	0.45	0.02	0.35	0.00
6.00	0.60	0.06	0.49	0.01
7.20	0.79	0.14	0.68	0.01
8.40	1.04	0.28	0.93	0.02
9.60	1.42	0.52	1.30	0.03
10.80	1.96	0.93	1.84	0.05
12.00	4.15	2.87	4.04	0.41
13.20	6.35	4.96	6.23	0.07
14.40	6.89	5.49	6.77	0.04
15.60	7.27	5.85	7.15	0.03
16.80	7.52	6.10	7.40	0.02
18.00	7.71	6.29	7.59	0.02
19.20	7.86	6.43	7.74	0.01
20.40	8.00	6.56	7.88	0.01
21.60	8.11	6.68	7.99	0.01
22.80	8.22	6.78	8.10	0.01
24.00	8.31	6.87	8.19	0.01
25.20	8.31	6.87	8.19	0.00
26.40	8.31	6.87	8.19	0.00
27.60	8.31	6.87	8.19	0.00
28.80	8.31	6.87	8.19	0.00
30.00	8.31	6.87	8.19	0.00
31.20	8.31	6.87	8.19	0.00
32.40	8.31	6.87	8.19	0.00
33.60	8.31	6.87	8.19	0.00
34.80	8.31	6.87	8.19	0.00
36.00	8.31	6.87	8.19	0.00
37.20	8.31	6.87	8.19	0.00
38.40	8.31	6.87	8.19	0.00
39.60	8.31	6.87	8.19	0.00
40.80	8.31	6.87	8.19	0.00
42.00	8.31	6.87	8.19	0.00

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Summary for Subcatchment 8S: roof & parking

Runoff = 5.48 cfs @ 12.13 hrs, Volume= 0.528 af, Depth= 8.19"

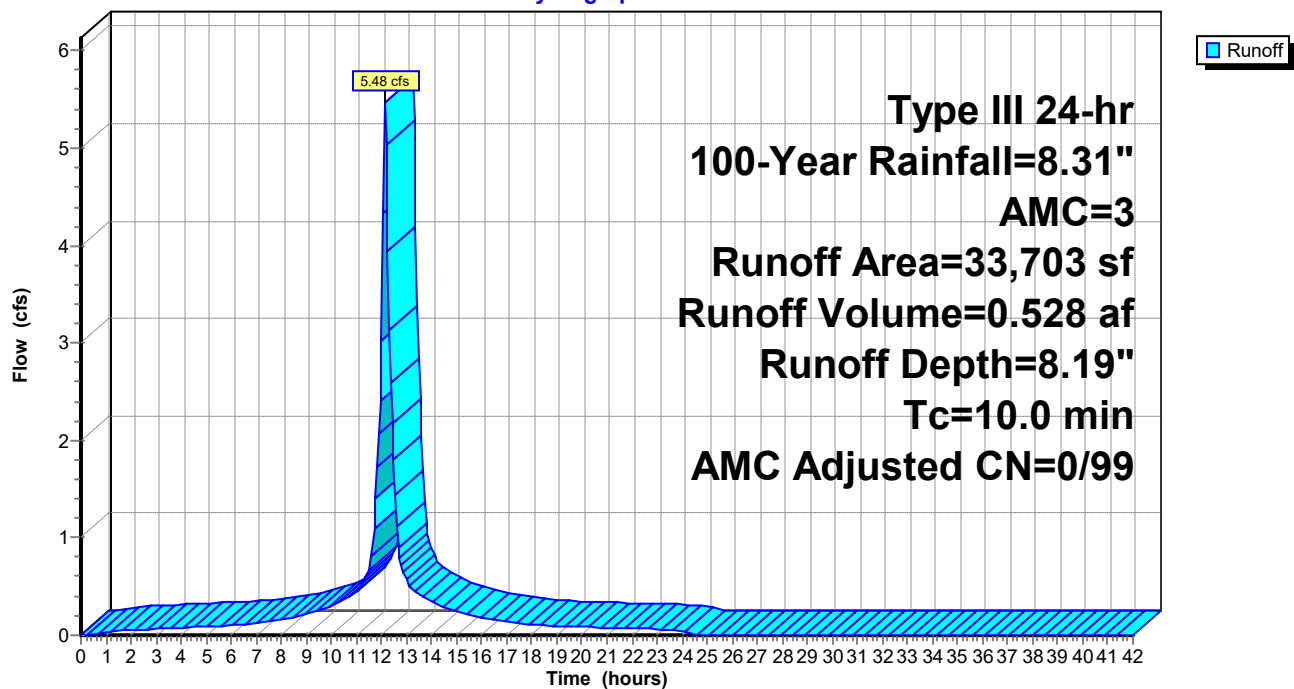
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-42.00 hrs, dt= 0.06 hrs
Type III 24-hr 100-Year Rainfall=8.31", AMC=3

Area (sf)	CN	Adj	Description
33,703	98		Roofs, HSG C
33,703	98	99	Weighted Average, AMC Adjusted
33,703	98	99	100.00% Impervious Area, AMC Adjusted

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

Subcatchment 8S: roof & parking

Hydrograph



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Hydrograph for Subcatchment 8S: roof & parking

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.10	0.00	0.04	0.04
2.40	0.20	0.00	0.12	0.06
3.60	0.32	0.00	0.22	0.07
4.80	0.45	0.00	0.35	0.09
6.00	0.60	0.00	0.49	0.10
7.20	0.79	0.00	0.68	0.14
8.40	1.04	0.00	0.93	0.19
9.60	1.42	0.00	1.30	0.27
10.80	1.96	0.00	1.84	0.42
12.00	4.15	0.00	4.04	3.02
13.20	6.35	0.00	6.23	0.47
14.40	6.89	0.00	6.77	0.30
15.60	7.27	0.00	7.15	0.21
16.80	7.52	0.00	7.40	0.15
18.00	7.71	0.00	7.59	0.11
19.20	7.86	0.00	7.74	0.09
20.40	8.00	0.00	7.88	0.08
21.60	8.11	0.00	7.99	0.07
22.80	8.22	0.00	8.10	0.06
24.00	8.31	0.00	8.19	0.06
25.20	8.31	0.00	8.19	0.00
26.40	8.31	0.00	8.19	0.00
27.60	8.31	0.00	8.19	0.00
28.80	8.31	0.00	8.19	0.00
30.00	8.31	0.00	8.19	0.00
31.20	8.31	0.00	8.19	0.00
32.40	8.31	0.00	8.19	0.00
33.60	8.31	0.00	8.19	0.00
34.80	8.31	0.00	8.19	0.00
36.00	8.31	0.00	8.19	0.00
37.20	8.31	0.00	8.19	0.00
38.40	8.31	0.00	8.19	0.00
39.60	8.31	0.00	8.19	0.00
40.80	8.31	0.00	8.19	0.00
42.00	8.31	0.00	8.19	0.00

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Summary for Pond 9P: detention tank

Inflow Area = 0.774 ac, 100.00% Impervious, Inflow Depth = 8.19" for 100-Year event
 Inflow = 5.48 cfs @ 12.13 hrs, Volume= 0.528 af
 Outflow = 3.44 cfs @ 12.28 hrs, Volume= 0.528 af, Atten= 37%, Lag= 8.8 min
 Primary = 3.44 cfs @ 12.28 hrs, Volume= 0.528 af

Routing by Stor-Ind method, Time Span= 0.00-42.00 hrs, dt= 0.06 hrs
 Peak Elev= 123.73' @ 12.28 hrs Surf.Area= 900 sf Storage= 3,803 cf

Plug-Flow detention time= 24.4 min calculated for 0.527 af (100% of inflow)
 Center-of-Mass det. time= 24.7 min (762.4 - 737.7)

Volume	Invert	Avail.Storage	Storage Description
#1	119.50'	4,050 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
119.50	900	0	0
124.00	900	4,050	4,050

Device	Routing	Invert	Outlet Devices
#1	Primary	119.50'	5.0" Vert. Orifice/Grate C= 0.600
#2	Primary	121.60'	15.0" W x 3.0" H Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=3.43 cfs @ 12.28 hrs HW=123.71' (Free Discharge)

1=Orifice/Grate (Orifice Controls 1.31 cfs @ 9.63 fps)

2=Orifice/Grate (Orifice Controls 2.12 cfs @ 6.78 fps)

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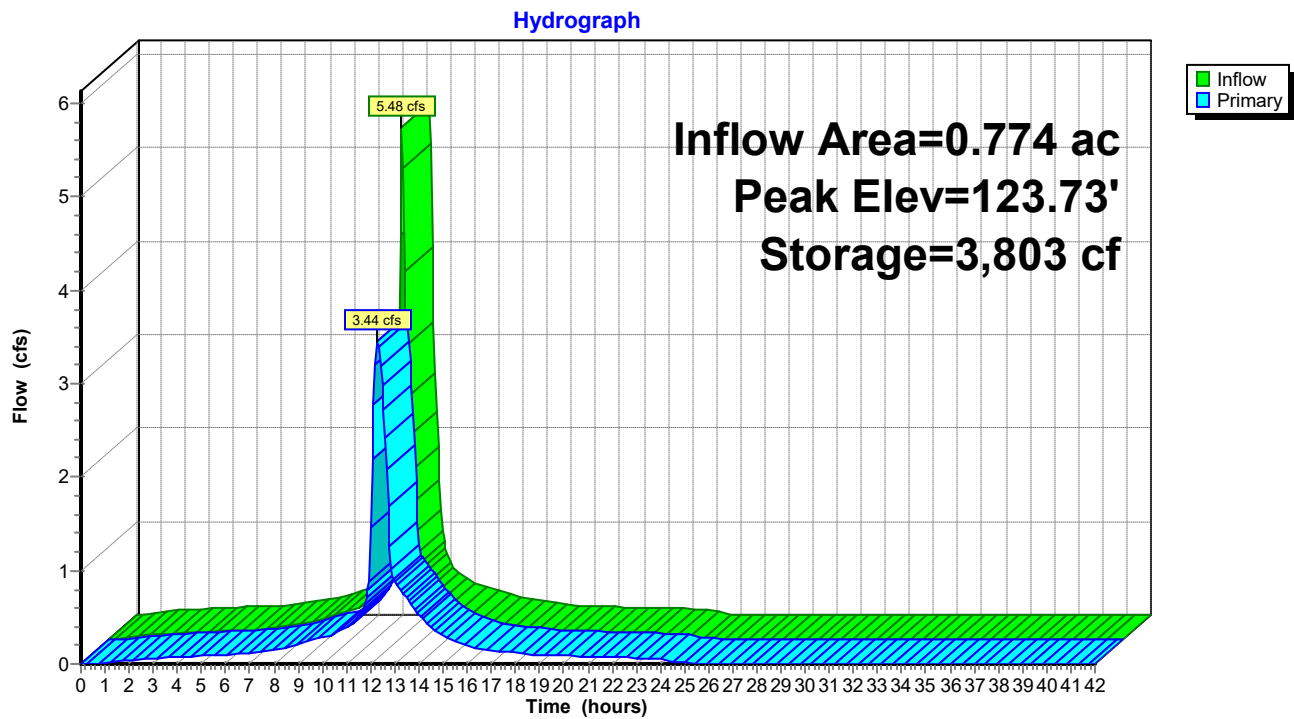
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Pond 9P: detention tank



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Hydrograph for Pond 9P: detention tank

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	119.50	0.00
1.20	0.04	62	119.57	0.01
2.40	0.06	125	119.64	0.05
3.60	0.07	147	119.66	0.07
4.80	0.09	164	119.68	0.08
6.00	0.10	178	119.70	0.10
7.20	0.14	208	119.73	0.13
8.40	0.19	248	119.78	0.17
9.60	0.27	324	119.86	0.26
10.80	0.42	463	120.01	0.36
12.00	3.02	2,119	121.85	1.47
13.20	0.47	1,549	121.22	0.81
14.40	0.30	559	120.12	0.42
15.60	0.21	304	119.84	0.23
16.80	0.15	235	119.76	0.16
18.00	0.11	198	119.72	0.12
19.20	0.09	177	119.70	0.10
20.40	0.08	165	119.68	0.08
21.60	0.07	156	119.67	0.08
22.80	0.06	145	119.66	0.07
24.00	0.06	135	119.65	0.06
25.20	0.00	48	119.55	0.01
26.40	0.00	25	119.53	0.00
27.60	0.00	14	119.52	0.00
28.80	0.00	7	119.51	0.00
30.00	0.00	4	119.50	0.00
31.20	0.00	2	119.50	0.00
32.40	0.00	1	119.50	0.00
33.60	0.00	1	119.50	0.00
34.80	0.00	0	119.50	0.00
36.00	0.00	0	119.50	0.00
37.20	0.00	0	119.50	0.00
38.40	0.00	0	119.50	0.00
39.60	0.00	0	119.50	0.00
40.80	0.00	0	119.50	0.00
42.00	0.00	0	119.50	0.00

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Stage-Discharge for Pond 9P: detention tank

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
119.50	0.00	122.05	1.86
119.55	0.01	122.10	1.93
119.60	0.03	122.15	2.00
119.65	0.06	122.20	2.07
119.70	0.10	122.25	2.13
119.75	0.15	122.30	2.20
119.80	0.20	122.35	2.25
119.85	0.25	122.40	2.31
119.90	0.29	122.45	2.37
119.95	0.32	122.50	2.42
120.00	0.35	122.55	2.47
120.05	0.38	122.60	2.52
120.10	0.41	122.65	2.57
120.15	0.44	122.70	2.62
120.20	0.46	122.75	2.67
120.25	0.48	122.80	2.71
120.30	0.51	122.85	2.76
120.35	0.53	122.90	2.80
120.40	0.55	122.95	2.85
120.45	0.57	123.00	2.89
120.50	0.58	123.05	2.93
120.55	0.60	123.10	2.97
120.60	0.62	123.15	3.01
120.65	0.64	123.20	3.05
120.70	0.65	123.25	3.09
120.75	0.67	123.30	3.13
120.80	0.69	123.35	3.17
120.85	0.70	123.40	3.21
120.90	0.72	123.45	3.25
120.95	0.73	123.50	3.28
121.00	0.75	123.55	3.32
121.05	0.76	123.60	3.36
121.10	0.77	123.65	3.39
121.15	0.79	123.70	3.43
121.20	0.80	123.75	3.46
121.25	0.82	123.80	3.50
121.30	0.83	123.85	3.53
121.35	0.84	123.90	3.56
121.40	0.85	123.95	3.60
121.45	0.87	124.00	3.63
121.50	0.88		
121.55	0.89		
121.60	0.90		
121.65	0.96		
121.70	1.05		
121.75	1.17		
121.80	1.31		
121.85	1.46		
121.90	1.59		
121.95	1.69		
122.00	1.78		

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Time span=0.00-42.00 hrs, dt=0.06 hrs, 701 points

Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv.

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: existing conditions Runoff Area=38,698 sf 68.91% Impervious Runoff Depth=7.89"
Flow Length=105' Slope=0.0380 '/' Tc=10.0 min AMC Adjusted CN=91/99 Runoff=6.21 cfs 0.584 af

Subcatchment 3S: proposed overland Runoff Area=4,994 sf 4.51% Impervious Runoff Depth=6.93"
Tc=10.0 min AMC Adjusted CN=88/99 Runoff=0.76 cfs 0.066 af

Subcatchment 8S: roof & parking Runoff Area=33,703 sf 100.00% Impervious Runoff Depth=8.19"
Tc=10.0 min AMC Adjusted CN=0/99 Runoff=5.48 cfs 0.528 af

Pond 9P: detention tank Peak Elev=123.73' Storage=3,803 cf Inflow=5.48 cfs 0.528 af
Outflow=3.44 cfs 0.528 af

Total Runoff Area = 1.777 ac Runoff Volume = 1.179 af Average Runoff Depth = 7.96"
21.71% Pervious = 0.386 ac 78.29% Impervious = 1.391 ac

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Summary for Subcatchment 1S: existing conditions

Runoff = 6.21 cfs @ 12.13 hrs, Volume= 0.584 af, Depth= 7.89"

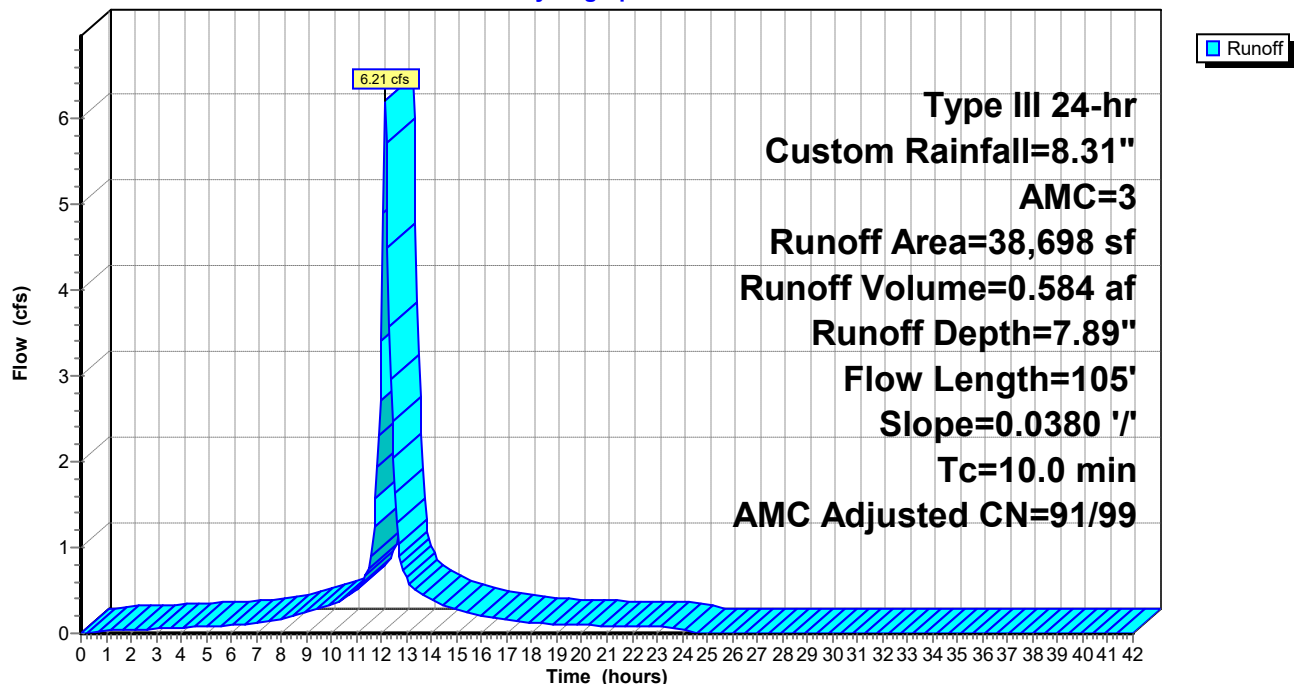
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-42.00 hrs, dt= 0.06 hrs
Type III 24-hr Custom Rainfall=8.31", AMC=3

Area (sf)	CN	Adj	Description
26,667	98		Paved parking, HSG C
12,031	79		50-75% Grass cover, Fair, HSG C
38,698	92	97	Weighted Average, AMC Adjusted
12,031	79	91	31.09% Pervious Area, AMC Adjusted
26,667	98	99	68.91% Impervious Area, AMC Adjusted

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	105	0.0380	0.21		Sheet Flow, grass
					Grass: Short n= 0.150 P2= 2.80"
8.4	105	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 1S: existing conditions

Hydrograph



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Hydrograph for Subcatchment 1S: existing conditions

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.10	0.00	0.04	0.03
2.40	0.20	0.00	0.12	0.05
3.60	0.32	0.01	0.22	0.06
4.80	0.45	0.05	0.35	0.08
6.00	0.60	0.12	0.49	0.10
7.20	0.79	0.22	0.68	0.14
8.40	1.04	0.39	0.93	0.19
9.60	1.42	0.67	1.30	0.30
10.80	1.96	1.13	1.84	0.46
12.00	4.15	3.17	4.04	3.40
13.20	6.35	5.30	6.23	0.54
14.40	6.89	5.84	6.77	0.34
15.60	7.27	6.20	7.15	0.24
16.80	7.52	6.45	7.40	0.17
18.00	7.71	6.64	7.59	0.12
19.20	7.86	6.79	7.74	0.11
20.40	8.00	6.92	7.88	0.09
21.60	8.11	7.04	7.99	0.08
22.80	8.22	7.14	8.10	0.07
24.00	8.31	7.23	8.19	0.06
25.20	8.31	7.23	8.19	0.00
26.40	8.31	7.23	8.19	0.00
27.60	8.31	7.23	8.19	0.00
28.80	8.31	7.23	8.19	0.00
30.00	8.31	7.23	8.19	0.00
31.20	8.31	7.23	8.19	0.00
32.40	8.31	7.23	8.19	0.00
33.60	8.31	7.23	8.19	0.00
34.80	8.31	7.23	8.19	0.00
36.00	8.31	7.23	8.19	0.00
37.20	8.31	7.23	8.19	0.00
38.40	8.31	7.23	8.19	0.00
39.60	8.31	7.23	8.19	0.00
40.80	8.31	7.23	8.19	0.00
42.00	8.31	7.23	8.19	0.00

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Summary for Subcatchment 3S: proposed overland

Runoff = 0.76 cfs @ 12.14 hrs, Volume= 0.066 af, Depth= 6.93"

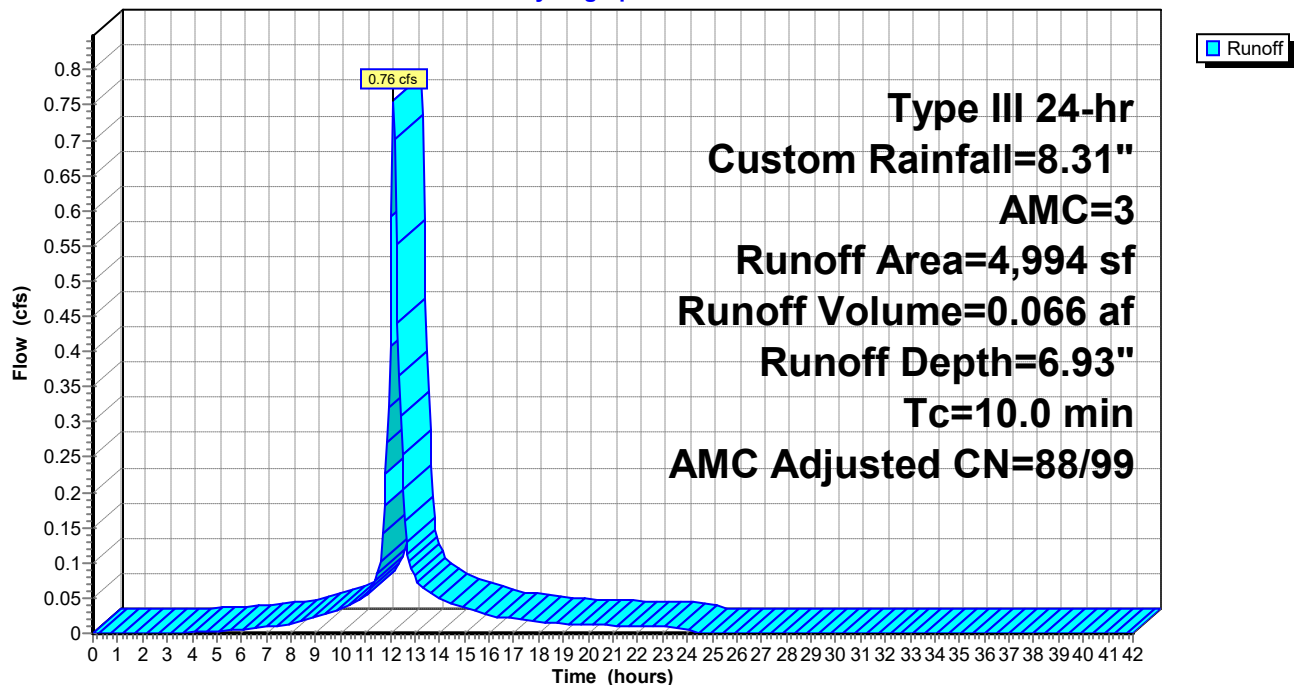
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-42.00 hrs, dt= 0.06 hrs
Type III 24-hr Custom Rainfall=8.31", AMC=3

Area (sf)	CN	Adj	Description
225	98		Paved parking, HSG C
4,769	74		>75% Grass cover, Good, HSG C
4,994	75	88	Weighted Average, AMC Adjusted
4,769	74	88	95.49% Pervious Area, AMC Adjusted
225	98	99	4.51% Impervious Area, AMC Adjusted

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

Subcatchment 3S: proposed overland

Hydrograph



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Type III 24-hr Custom Rainfall=8.31", AMC=3

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Hydrograph for Subcatchment 3S: proposed overland

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.10	0.00	0.04	0.00
2.40	0.20	0.00	0.12	0.00
3.60	0.32	0.00	0.22	0.00
4.80	0.45	0.02	0.35	0.00
6.00	0.60	0.06	0.49	0.01
7.20	0.79	0.14	0.68	0.01
8.40	1.04	0.28	0.93	0.02
9.60	1.42	0.52	1.30	0.03
10.80	1.96	0.93	1.84	0.05
12.00	4.15	2.87	4.04	0.41
13.20	6.35	4.96	6.23	0.07
14.40	6.89	5.49	6.77	0.04
15.60	7.27	5.85	7.15	0.03
16.80	7.52	6.10	7.40	0.02
18.00	7.71	6.29	7.59	0.02
19.20	7.86	6.43	7.74	0.01
20.40	8.00	6.56	7.88	0.01
21.60	8.11	6.68	7.99	0.01
22.80	8.22	6.78	8.10	0.01
24.00	8.31	6.87	8.19	0.01
25.20	8.31	6.87	8.19	0.00
26.40	8.31	6.87	8.19	0.00
27.60	8.31	6.87	8.19	0.00
28.80	8.31	6.87	8.19	0.00
30.00	8.31	6.87	8.19	0.00
31.20	8.31	6.87	8.19	0.00
32.40	8.31	6.87	8.19	0.00
33.60	8.31	6.87	8.19	0.00
34.80	8.31	6.87	8.19	0.00
36.00	8.31	6.87	8.19	0.00
37.20	8.31	6.87	8.19	0.00
38.40	8.31	6.87	8.19	0.00
39.60	8.31	6.87	8.19	0.00
40.80	8.31	6.87	8.19	0.00
42.00	8.31	6.87	8.19	0.00

1110 South Ave Drainage rev 2

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Summary for Subcatchment 8S: roof & parking

Runoff = 5.48 cfs @ 12.13 hrs, Volume= 0.528 af, Depth= 8.19"

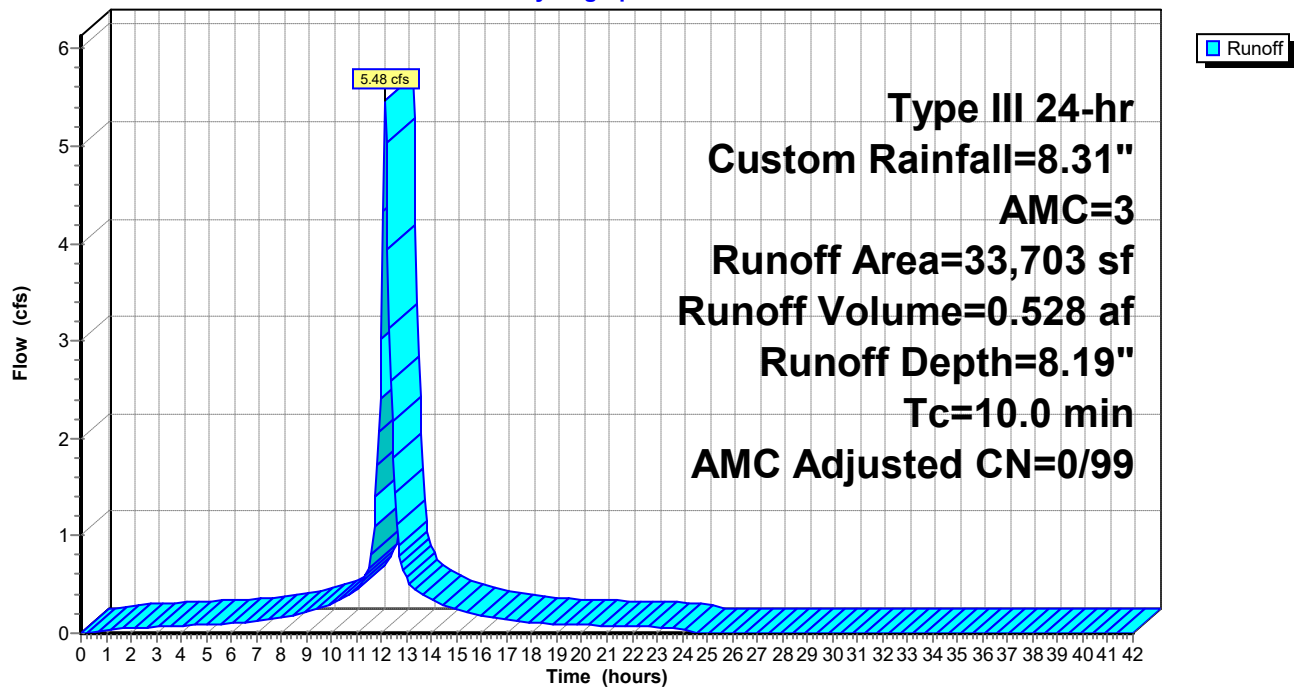
Runoff by SCS TR-20 method, UH=SCS, Split Pervious/Imperv., Time Span= 0.00-42.00 hrs, dt= 0.06 hrs
Type III 24-hr Custom Rainfall=8.31", AMC=3

Area (sf)	CN	Adj	Description
33,703	98		Roofs, HSG C
33,703	98	99	Weighted Average, AMC Adjusted
33,703	98	99	100.00% Impervious Area, AMC Adjusted

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

Subcatchment 8S: roof & parking

Hydrograph



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Hydrograph for Subcatchment 8S: roof & parking

Time (hours)	Precip. (inches)	Perv.Excess (inches)	Imp.Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	0.00
1.20	0.10	0.00	0.04	0.04
2.40	0.20	0.00	0.12	0.06
3.60	0.32	0.00	0.22	0.07
4.80	0.45	0.00	0.35	0.09
6.00	0.60	0.00	0.49	0.10
7.20	0.79	0.00	0.68	0.14
8.40	1.04	0.00	0.93	0.19
9.60	1.42	0.00	1.30	0.27
10.80	1.96	0.00	1.84	0.42
12.00	4.15	0.00	4.04	3.02
13.20	6.35	0.00	6.23	0.47
14.40	6.89	0.00	6.77	0.30
15.60	7.27	0.00	7.15	0.21
16.80	7.52	0.00	7.40	0.15
18.00	7.71	0.00	7.59	0.11
19.20	7.86	0.00	7.74	0.09
20.40	8.00	0.00	7.88	0.08
21.60	8.11	0.00	7.99	0.07
22.80	8.22	0.00	8.10	0.06
24.00	8.31	0.00	8.19	0.06
25.20	8.31	0.00	8.19	0.00
26.40	8.31	0.00	8.19	0.00
27.60	8.31	0.00	8.19	0.00
28.80	8.31	0.00	8.19	0.00
30.00	8.31	0.00	8.19	0.00
31.20	8.31	0.00	8.19	0.00
32.40	8.31	0.00	8.19	0.00
33.60	8.31	0.00	8.19	0.00
34.80	8.31	0.00	8.19	0.00
36.00	8.31	0.00	8.19	0.00
37.20	8.31	0.00	8.19	0.00
38.40	8.31	0.00	8.19	0.00
39.60	8.31	0.00	8.19	0.00
40.80	8.31	0.00	8.19	0.00
42.00	8.31	0.00	8.19	0.00

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Summary for Pond 9P: detention tank

Inflow Area = 0.774 ac, 100.00% Impervious, Inflow Depth = 8.19" for Custom event
 Inflow = 5.48 cfs @ 12.13 hrs, Volume= 0.528 af
 Outflow = 3.44 cfs @ 12.28 hrs, Volume= 0.528 af, Atten= 37%, Lag= 8.8 min
 Primary = 3.44 cfs @ 12.28 hrs, Volume= 0.528 af

Routing by Stor-Ind method, Time Span= 0.00-42.00 hrs, dt= 0.06 hrs
 Peak Elev= 123.73' @ 12.28 hrs Surf.Area= 900 sf Storage= 3,803 cf

Plug-Flow detention time= 24.4 min calculated for 0.527 af (100% of inflow)
 Center-of-Mass det. time= 24.7 min (762.4 - 737.7)

Volume	Invert	Avail.Storage	Storage Description
#1	119.50'	4,050 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
119.50	900	0	0
124.00	900	4,050	4,050

Device	Routing	Invert	Outlet Devices
#1	Primary	119.50'	5.0" Vert. Orifice/Grate C= 0.600
#2	Primary	121.60'	15.0" W x 3.0" H Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=3.43 cfs @ 12.28 hrs HW=123.71' (Free Discharge)

1=Orifice/Grate (Orifice Controls 1.31 cfs @ 9.63 fps)

2=Orifice/Grate (Orifice Controls 2.12 cfs @ 6.78 fps)

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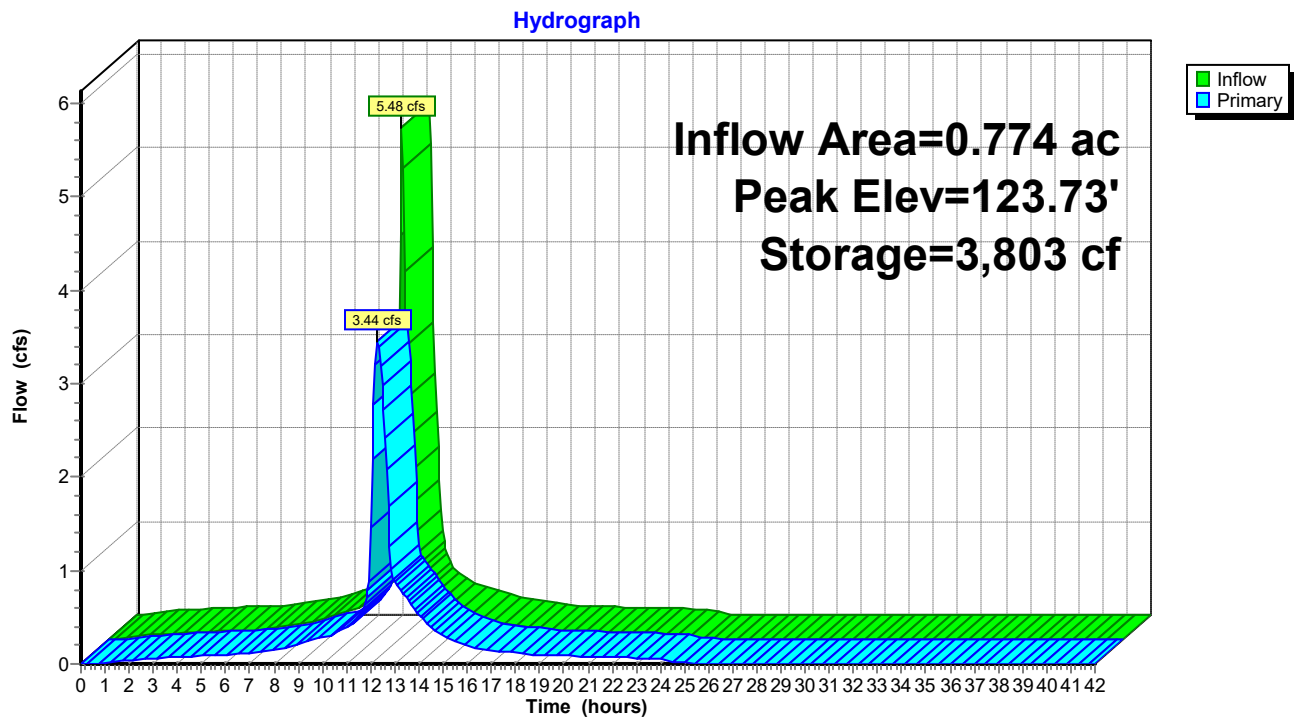
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Pond 9P: detention tank



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Hydrograph for Pond 9P: detention tank

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	119.50	0.00
1.20	0.04	62	119.57	0.01
2.40	0.06	125	119.64	0.05
3.60	0.07	147	119.66	0.07
4.80	0.09	164	119.68	0.08
6.00	0.10	178	119.70	0.10
7.20	0.14	208	119.73	0.13
8.40	0.19	248	119.78	0.17
9.60	0.27	324	119.86	0.26
10.80	0.42	463	120.01	0.36
12.00	3.02	2,119	121.85	1.47
13.20	0.47	1,549	121.22	0.81
14.40	0.30	559	120.12	0.42
15.60	0.21	304	119.84	0.23
16.80	0.15	235	119.76	0.16
18.00	0.11	198	119.72	0.12
19.20	0.09	177	119.70	0.10
20.40	0.08	165	119.68	0.08
21.60	0.07	156	119.67	0.08
22.80	0.06	145	119.66	0.07
24.00	0.06	135	119.65	0.06
25.20	0.00	48	119.55	0.01
26.40	0.00	25	119.53	0.00
27.60	0.00	14	119.52	0.00
28.80	0.00	7	119.51	0.00
30.00	0.00	4	119.50	0.00
31.20	0.00	2	119.50	0.00
32.40	0.00	1	119.50	0.00
33.60	0.00	1	119.50	0.00
34.80	0.00	0	119.50	0.00
36.00	0.00	0	119.50	0.00
37.20	0.00	0	119.50	0.00
38.40	0.00	0	119.50	0.00
39.60	0.00	0	119.50	0.00
40.80	0.00	0	119.50	0.00
42.00	0.00	0	119.50	0.00

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Stage-Discharge for Pond 9P: detention tank

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
119.50	0.00	122.05	1.86
119.55	0.01	122.10	1.93
119.60	0.03	122.15	2.00
119.65	0.06	122.20	2.07
119.70	0.10	122.25	2.13
119.75	0.15	122.30	2.20
119.80	0.20	122.35	2.25
119.85	0.25	122.40	2.31
119.90	0.29	122.45	2.37
119.95	0.32	122.50	2.42
120.00	0.35	122.55	2.47
120.05	0.38	122.60	2.52
120.10	0.41	122.65	2.57
120.15	0.44	122.70	2.62
120.20	0.46	122.75	2.67
120.25	0.48	122.80	2.71
120.30	0.51	122.85	2.76
120.35	0.53	122.90	2.80
120.40	0.55	122.95	2.85
120.45	0.57	123.00	2.89
120.50	0.58	123.05	2.93
120.55	0.60	123.10	2.97
120.60	0.62	123.15	3.01
120.65	0.64	123.20	3.05
120.70	0.65	123.25	3.09
120.75	0.67	123.30	3.13
120.80	0.69	123.35	3.17
120.85	0.70	123.40	3.21
120.90	0.72	123.45	3.25
120.95	0.73	123.50	3.28
121.00	0.75	123.55	3.32
121.05	0.76	123.60	3.36
121.10	0.77	123.65	3.39
121.15	0.79	123.70	3.43
121.20	0.80	123.75	3.46
121.25	0.82	123.80	3.50
121.30	0.83	123.85	3.53
121.35	0.84	123.90	3.56
121.40	0.85	123.95	3.60
121.45	0.87	124.00	3.63
121.50	0.88		
121.55	0.89		
121.60	0.90		
121.65	0.96		
121.70	1.05		
121.75	1.17		
121.80	1.31		
121.85	1.46		
121.90	1.59		
121.95	1.69		
122.00	1.78		