

ATTACHMENT D

NOAA ATLAS STORM DATA

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	Massachusetts
Location	
Longitude	71.763 degrees West
Latitude	42.190 degrees North
Elevation	0 feet
Date/Time	Fri, 29 Jan 2021 09:10:41 -0500

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.70	0.88	1.11	1yr	0.76	1.07	1.28	1.63	2.08	2.66	2.91	1yr	2.35	2.80	3.20	3.88	4.46	1yr
2yr	0.35	0.54	0.67	0.88	1.11	1.40	2yr	0.96	1.28	1.62	2.04	2.58	3.25	3.53	2yr	2.88	3.39	3.90	4.61	5.24	2yr
5yr	0.41	0.64	0.80	1.08	1.38	1.76	5yr	1.19	1.59	2.04	2.58	3.26	4.11	4.48	5yr	3.64	4.31	4.95	5.78	6.50	5yr
10yr	0.46	0.73	0.92	1.25	1.62	2.09	10yr	1.40	1.87	2.44	3.09	3.90	4.91	5.38	10yr	4.34	5.17	5.93	6.87	7.65	10yr
25yr	0.55	0.87	1.10	1.52	2.02	2.62	25yr	1.74	2.31	3.07	3.91	4.94	6.20	6.85	25yr	5.49	6.59	7.54	8.62	9.49	25yr
50yr	0.61	0.98	1.26	1.76	2.38	3.13	50yr	2.05	2.73	3.68	4.70	5.92	7.41	8.23	50yr	6.56	7.91	9.04	10.25	11.18	50yr
100yr	0.70	1.13	1.46	2.07	2.81	3.71	100yr	2.43	3.22	4.39	5.61	7.08	8.87	9.89	100yr	7.85	9.51	10.85	12.18	13.17	100yr
200yr	0.79	1.29	1.68	2.40	3.32	4.42	200yr	2.87	3.79	5.24	6.71	8.48	10.60	11.90	200yr	9.38	11.44	13.02	14.48	15.51	200yr
500yr	0.95	1.56	2.04	2.96	4.15	5.57	500yr	3.58	4.72	6.62	8.50	10.75	13.45	15.20	500yr	11.90	14.61	16.59	18.22	19.29	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.22	0.33	0.41	0.55	0.67	0.95	1yr	0.58	0.93	1.12	1.46	1.91	2.32	2.54	1yr	2.05	2.45	2.85	3.50	4.14	1yr
2yr	0.34	0.53	0.65	0.88	1.08	1.27	2yr	0.93	1.24	1.45	1.90	2.45	3.11	3.41	2yr	2.76	3.28	3.73	4.43	5.04	2yr
5yr	0.39	0.59	0.74	1.01	1.29	1.51	5yr	1.11	1.47	1.72	2.25	2.87	3.80	4.16	5yr	3.37	4.00	4.58	5.27	5.88	5yr
10yr	0.43	0.66	0.81	1.14	1.47	1.72	10yr	1.27	1.68	1.95	2.55	3.24	4.38	4.82	10yr	3.87	4.64	5.30	5.98	6.59	10yr
25yr	0.50	0.75	0.94	1.34	1.76	2.04	25yr	1.52	2.00	2.30	3.03	3.81	5.30	5.87	25yr	4.69	5.64	6.44	7.06	7.67	25yr
50yr	0.55	0.84	1.05	1.50	2.02	2.32	50yr	1.75	2.27	2.62	3.44	4.30	6.13	6.84	50yr	5.42	6.58	7.49	8.00	8.61	50yr
100yr	0.62	0.94	1.18	1.70	2.33	2.65	100yr	2.01	2.59	2.98	3.91	4.87	7.10	8.00	100yr	6.28	7.70	8.74	9.09	9.64	100yr
200yr	0.70	1.05	1.33	1.92	2.68	3.03	200yr	2.31	2.96	3.40	4.47	5.52	8.24	9.37	200yr	7.29	9.01	10.21	10.30	10.78	200yr
500yr	0.82	1.22	1.57	2.27	3.23	3.62	500yr	2.79	3.54	4.04	5.34	6.53	10.07	11.60	500yr	8.92	11.16	12.57	12.14	12.47	500yr

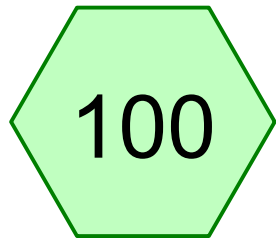
Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.31	0.48	0.59	0.79	0.97	1.20	1yr	0.84	1.17	1.38	1.77	2.32	3.02	3.26	1yr	2.67	3.14	3.61	4.21	4.82	1yr
2yr	0.36	0.56	0.69	0.93	1.15	1.35	2yr	0.99	1.32	1.55	2.02	2.59	3.41	3.69	2yr	3.02	3.55	4.10	4.84	5.50	2yr
5yr	0.44	0.68	0.84	1.16	1.47	1.76	5yr	1.27	1.72	2.01	2.59	3.26	4.41	4.84	5yr	3.91	4.65	5.33	6.32	7.22	5yr
10yr	0.52	0.79	0.98	1.37	1.77	2.14	10yr	1.53	2.09	2.45	3.12	3.88	5.41	5.99	10yr	4.78	5.76	6.56	7.79	8.87	10yr
25yr	0.64	0.98	1.21	1.73	2.28	2.78	25yr	1.97	2.72	3.17	3.97	4.90	7.08	7.92	25yr	6.27	7.62	8.63	10.29	11.67	25yr
50yr	0.75	1.15	1.43	2.05	2.76	3.40	50yr	2.38	3.32	3.87	4.78	5.83	8.67	9.77	50yr	7.68	9.40	10.62	12.70	14.38	50yr
100yr	0.89	1.35	1.69	2.44	3.35	4.15	100yr	2.89	4.05	4.72	5.76	6.96	10.61	12.07	100yr	9.39	11.61	13.08	15.67	17.75	100yr
200yr	1.05	1.58	2.01	2.91	4.05	5.07	200yr	3.50	4.96	5.77	6.93	8.28	12.99	14.89	200yr	11.50	14.32	16.07	19.36	21.90	200yr
500yr	1.32	1.96	2.53	3.67	5.22	6.62	500yr	4.50	6.47	7.50	8.85	10.43	16.97	19.63	500yr	15.02	18.88	21.09	25.62	28.95	500yr

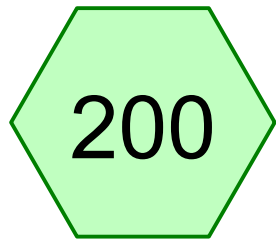
ATTACHMENT E

PRE-DEVELOPMENT HYDROLOGY CALCULATIONS

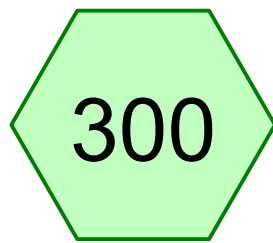
POST-DEVELOPMENT HYDROLOGY CALCULATIONS



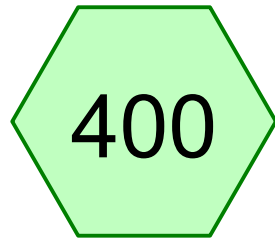
EDA100



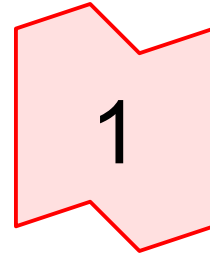
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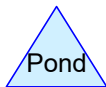
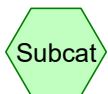
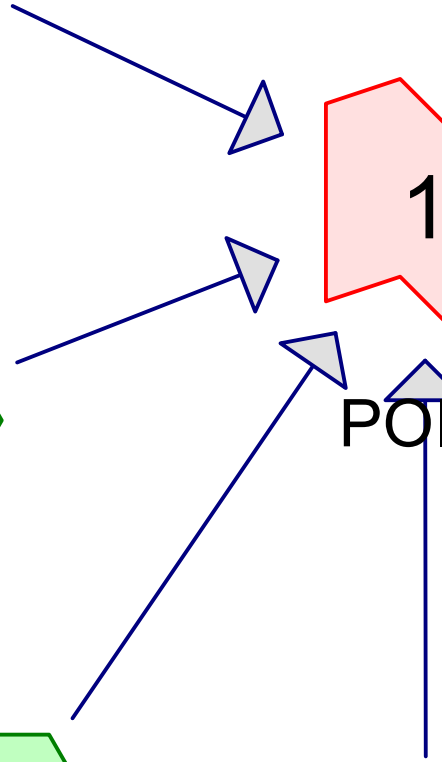
EDA300



EDA400



POI-1



Routing Diagram for C-DAT-2001487-PreConstruction
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.578	39	>75% Grass cover, Good, HSG A (200, 300, 400)
1.544	61	>75% Grass cover, Good, HSG B (100, 200, 300)
1.326	98	Paved parking, HSG A (200, 300, 400)
2.232	98	Paved parking, HSG B (100, 200, 300)
5.680	82	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
1.904	HSG A	200, 300, 400
3.776	HSG B	100, 200, 300
0.000	HSG C	
0.000	HSG D	
0.000	Other	
5.680		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.578	1.544	0.000	0.000	0.000	2.122	>75% Grass cover, Good	100, 200, 300, 400
1.326	2.232	0.000	0.000	0.000	3.558	Paved parking	100, 200, 300, 400
1.904	3.776	0.000	0.000	0.000	5.680	TOTAL AREA	

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Type III 24-hr 2YR Rainfall=3.20"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment100: EDA100 Runoff Area=133,156 sf 59.12% Impervious Runoff Depth=1.61"
Flow Length=322' Tc=7.8 min CN=83 Runoff=5.41 cfs 0.410 af

Subcatchment200: EDA200 Runoff Area=37,320 sf 77.64% Impervious Runoff Depth=2.08"
Tc=5.0 min CN=89 Runoff=2.15 cfs 0.149 af

Subcatchment300: EDA300 Runoff Area=71,616 sf 61.16% Impervious Runoff Depth=1.21"
Flow Length=191' Tc=8.1 min CN=77 Runoff=2.11 cfs 0.166 af

Subcatchment400: EDA400 Runoff Area=5,336 sf 65.18% Impervious Runoff Depth=1.21"
Tc=5.0 min CN=77 Runoff=0.18 cfs 0.012 af

Link 1: POI-1

Inflow=9.61 cfs 0.737 af
Primary=9.61 cfs 0.737 af

Total Runoff Area = 5.680 ac Runoff Volume = 0.737 af Average Runoff Depth = 1.56"
37.36% Pervious = 2.122 ac 62.64% Impervious = 3.558 ac

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Type III 24-hr 2YR Rainfall=3.20"

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Summary for Subcatchment 100: EDA100

Runoff = 5.41 cfs @ 12.11 hrs, Volume= 0.410 af, Depth= 1.61"

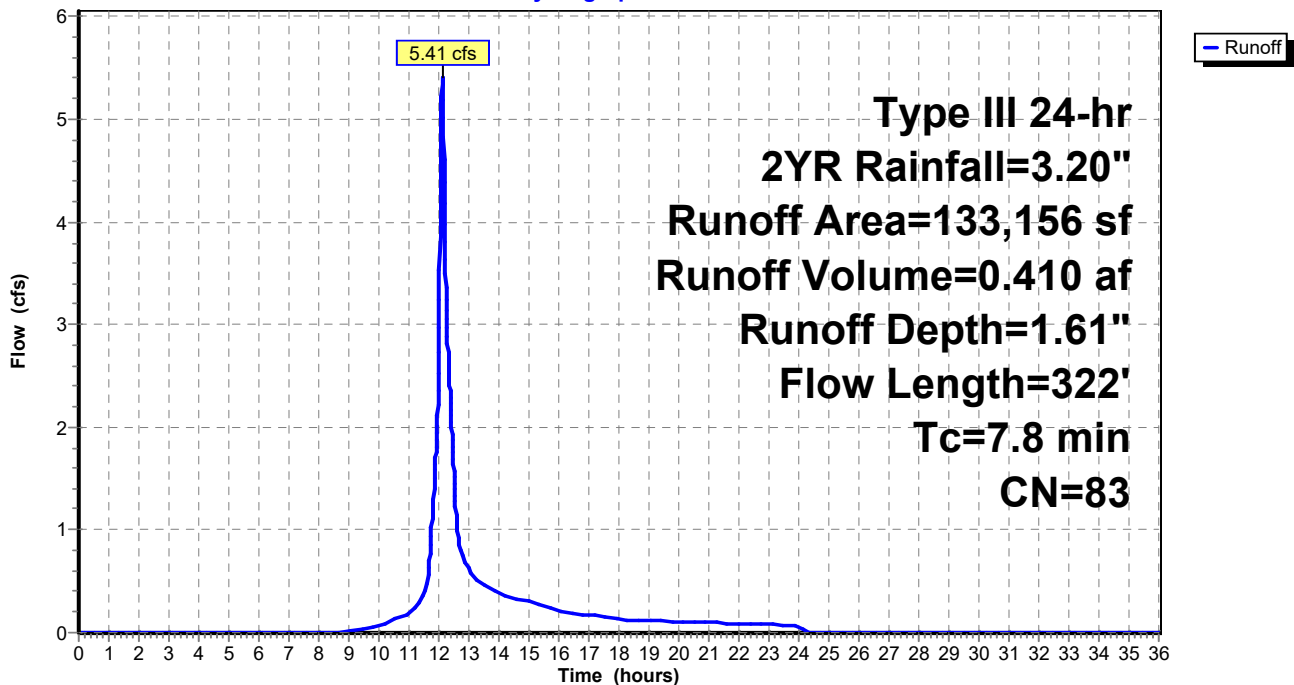
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR Rainfall=3.20"

Area (sf)	CN	Description
54,429	61	>75% Grass cover, Good, HSG B
78,727	98	Paved parking, HSG B
133,156	83	Weighted Average
54,429		40.88% Pervious Area
78,727		59.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0980	0.13		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.41"
0.4	52	0.0980	2.19		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.0	12	0.4580	13.74		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.9	208	0.0360	3.85		Shallow Concentrated Flow, Paved Kv= 20.3 fps
7.8	322	Total			

Subcatchment 100: EDA100

Hydrograph



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Type III 24-hr 2YR Rainfall=3.20"

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Summary for Subcatchment 200: EDA200

Runoff = 2.15 cfs @ 12.07 hrs, Volume= 0.149 af, Depth= 2.08"

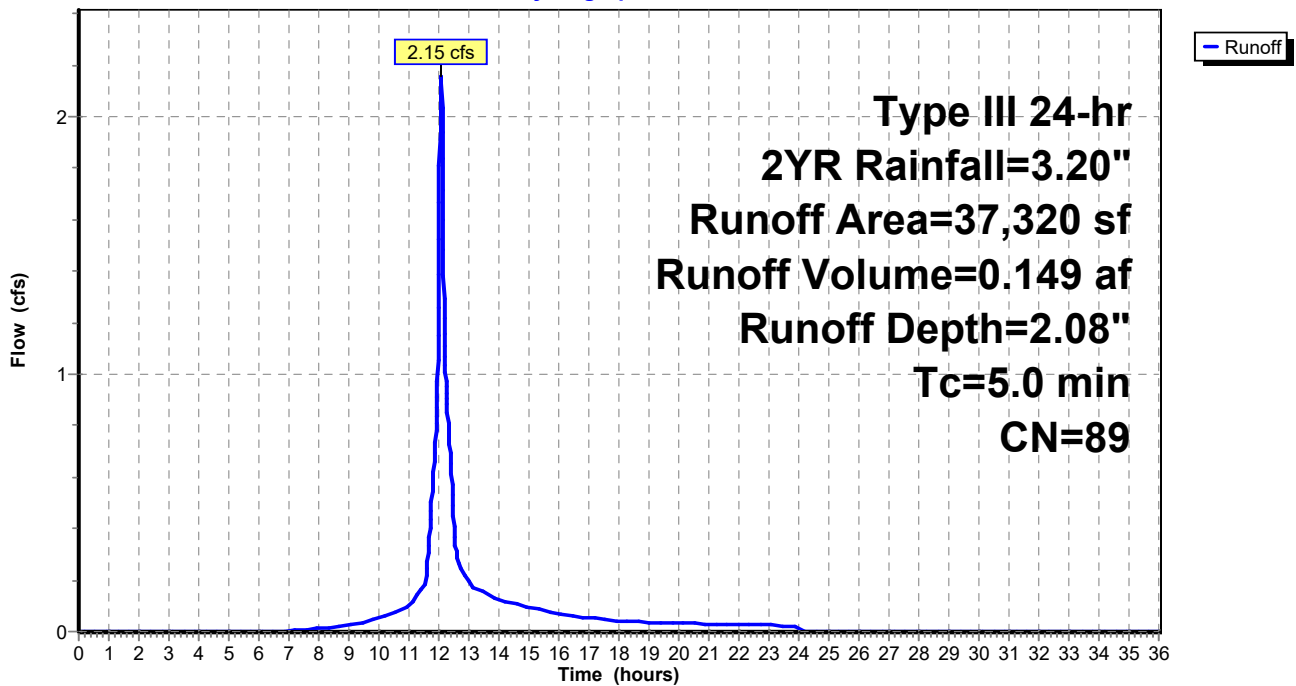
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR Rainfall=3.20"

Area (sf)	CN	Description
1,659	39	>75% Grass cover, Good, HSG A
6,687	61	>75% Grass cover, Good, HSG B
13,654	98	Paved parking, HSG A
15,320	98	Paved parking, HSG B
37,320	89	Weighted Average
8,346		22.36% Pervious Area
28,974		77.64% Impervious Area

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

Subcatchment 200: EDA200

Hydrograph



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Type III 24-hr 2YR Rainfall=3.20"

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Summary for Subcatchment 300: EDA300

Runoff = 2.11 cfs @ 12.12 hrs, Volume= 0.166 af, Depth= 1.21"

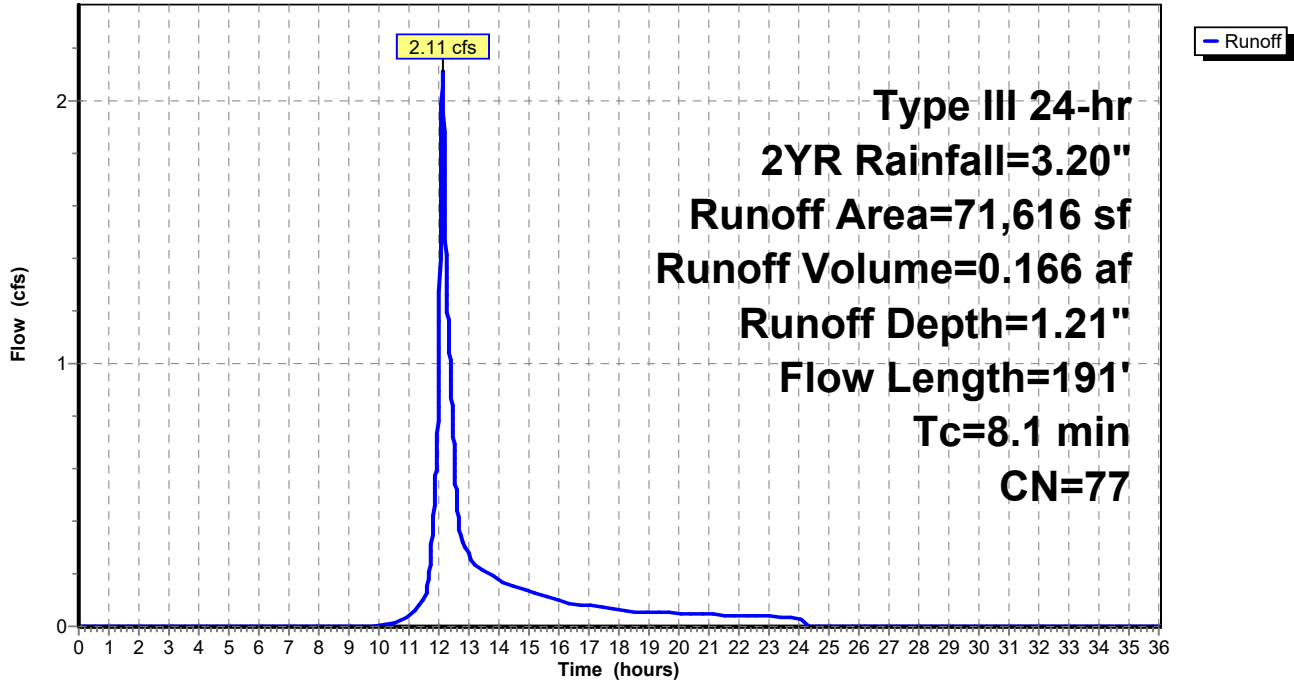
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR Rainfall=3.20"

Area (sf)	CN	Description
21,669	39	>75% Grass cover, Good, HSG A
6,146	61	>75% Grass cover, Good, HSG B
40,610	98	Paved parking, HSG A
3,191	98	Paved parking, HSG B
71,616	77	Weighted Average
27,815		38.84% Pervious Area
43,801		61.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0174	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.41"
0.4	29	0.0344	1.30		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.6	69	0.0112	0.74		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	20	0.0112	2.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	23	0.0330	3.69		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.1	191	Total			

Subcatchment 300: EDA300

Hydrograph



Summary for Subcatchment 400: EDA400

Runoff = 0.18 cfs @ 12.08 hrs, Volume= 0.012 af, Depth= 1.21"

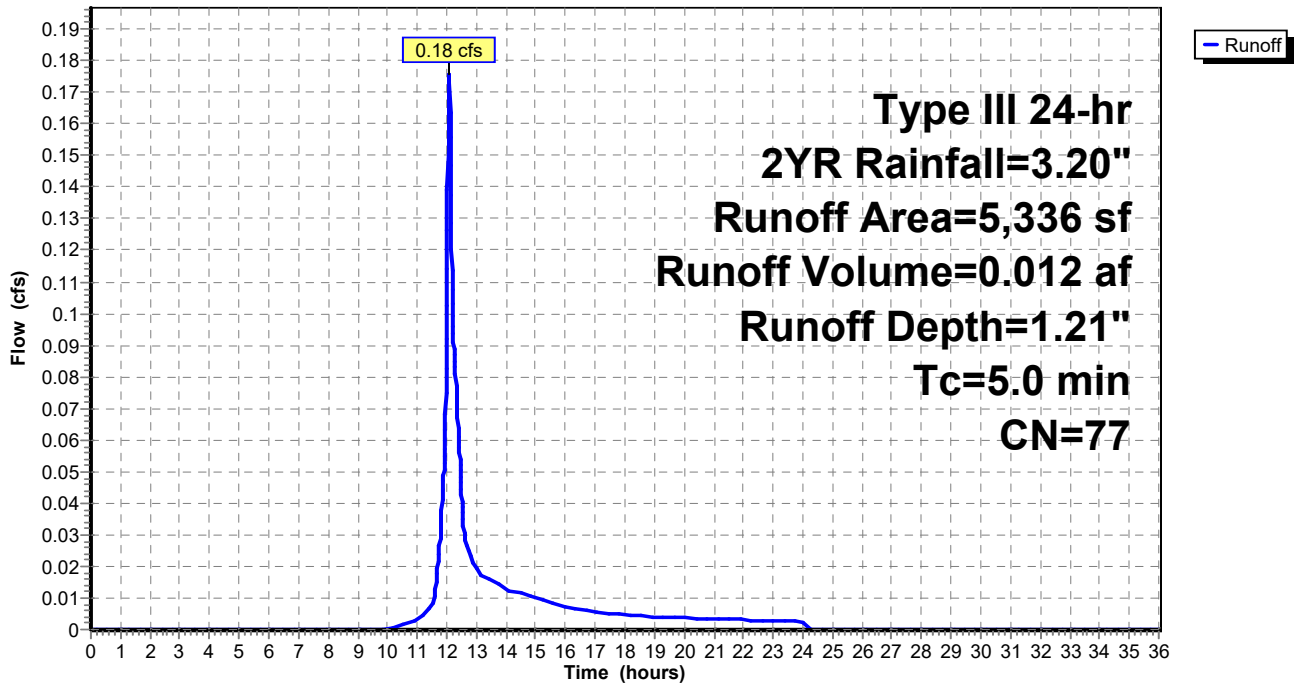
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR Rainfall=3.20"

Area (sf)	CN	Description
1,858	39	>75% Grass cover, Good, HSG A
3,478	98	Paved parking, HSG A
5,336	77	Weighted Average
1,858		34.82% Pervious Area
3,478		65.18% Impervious Area

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

Subcatchment 400: EDA400

Hydrograph



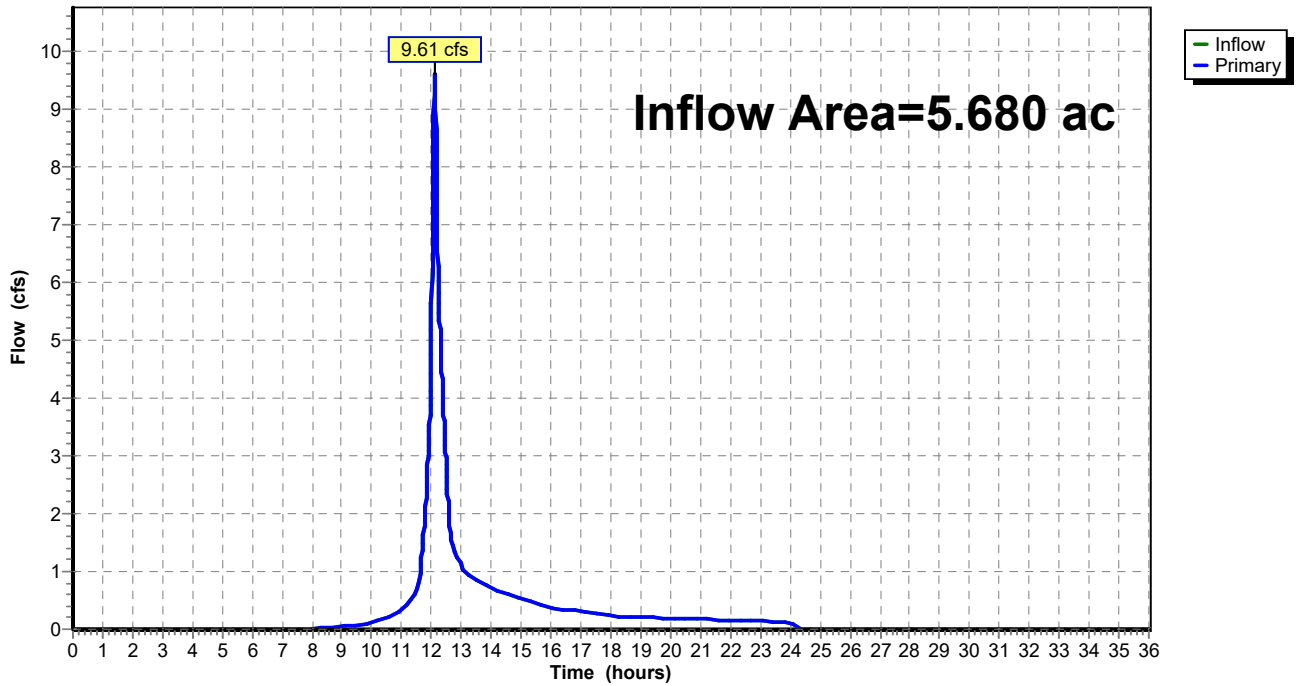
Summary for Link 1: POI-1

Inflow Area = 5.680 ac, 62.64% Impervious, Inflow Depth = 1.56" for 2YR event
Inflow = 9.61 cfs @ 12.11 hrs, Volume= 0.737 af
Primary = 9.61 cfs @ 12.11 hrs, Volume= 0.737 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 1: POI-1

Hydrograph



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Type III 24-hr 10YR Rainfall=4.90"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment100: EDA100

Runoff Area=133,156 sf 59.12% Impervious Runoff Depth=3.08"
Flow Length=322' Tc=7.8 min CN=83 Runoff=10.35 cfs 0.786 af

Subcatchment200: EDA200

Runoff Area=37,320 sf 77.64% Impervious Runoff Depth=3.68"
Tc=5.0 min CN=89 Runoff=3.72 cfs 0.262 af

Subcatchment300: EDA300

Runoff Area=71,616 sf 61.16% Impervious Runoff Depth=2.54"
Flow Length=191' Tc=8.1 min CN=77 Runoff=4.55 cfs 0.348 af

Subcatchment400: EDA400

Runoff Area=5,336 sf 65.18% Impervious Runoff Depth=2.54"
Tc=5.0 min CN=77 Runoff=0.38 cfs 0.026 af

Link 1: POI-1

Inflow=18.60 cfs 1.422 af
Primary=18.60 cfs 1.422 af

Total Runoff Area = 5.680 ac Runoff Volume = 1.422 af Average Runoff Depth = 3.00"
37.36% Pervious = 2.122 ac 62.64% Impervious = 3.558 ac

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Type III 24-hr 10YR Rainfall=4.90"

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Summary for Subcatchment 100: EDA100

Runoff = 10.35 cfs @ 12.11 hrs, Volume= 0.786 af, Depth= 3.08"

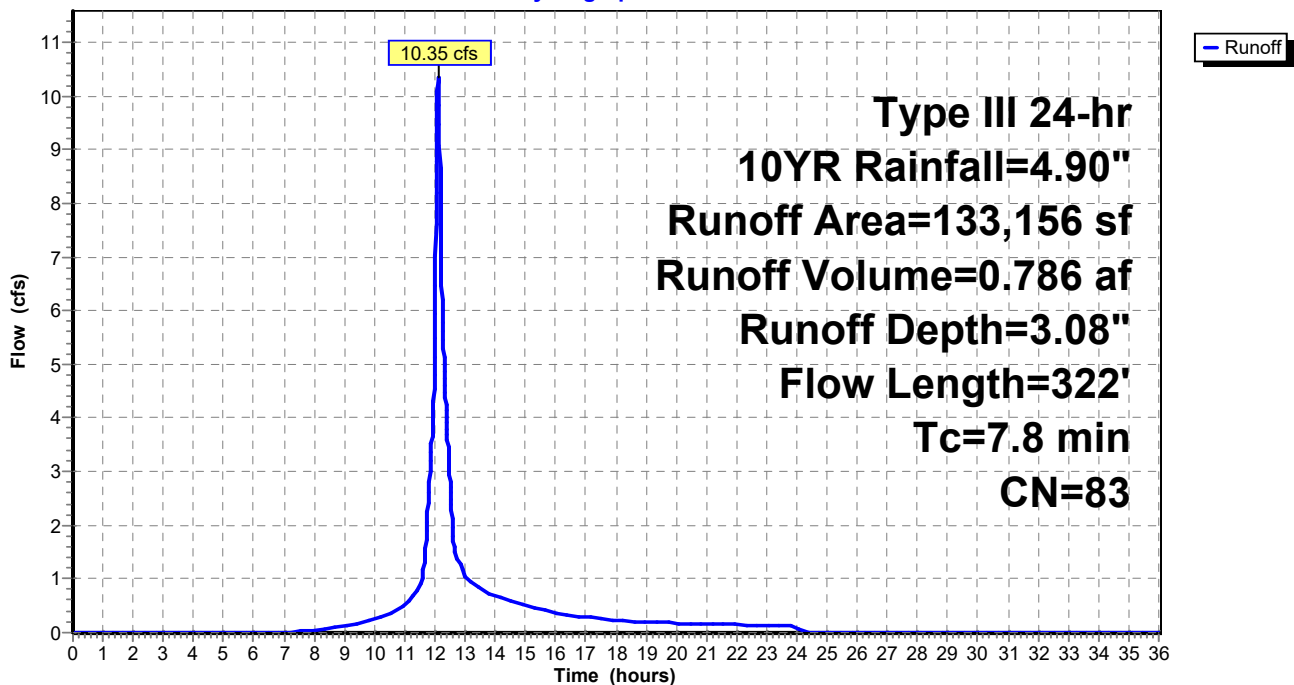
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=4.90"

Area (sf)	CN	Description
54,429	61	>75% Grass cover, Good, HSG B
78,727	98	Paved parking, HSG B
133,156	83	Weighted Average
54,429		40.88% Pervious Area
78,727		59.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0980	0.13		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.41"
0.4	52	0.0980	2.19		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.0	12	0.4580	13.74		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.9	208	0.0360	3.85		Shallow Concentrated Flow, Paved Kv= 20.3 fps
7.8	322	Total			

Subcatchment 100: EDA100

Hydrograph



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Type III 24-hr 10YR Rainfall=4.90"

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Summary for Subcatchment 200: EDA200

Runoff = 3.72 cfs @ 12.07 hrs, Volume= 0.262 af, Depth= 3.68"

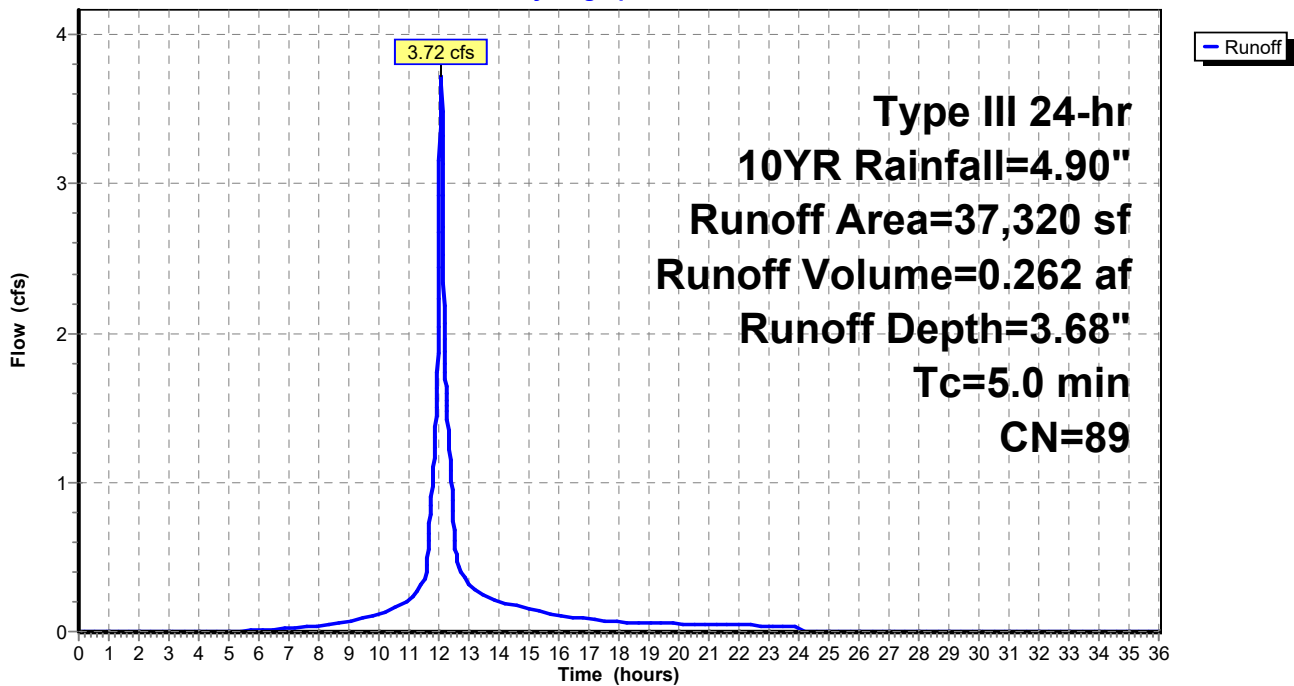
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=4.90"

Area (sf)	CN	Description
1,659	39	>75% Grass cover, Good, HSG A
6,687	61	>75% Grass cover, Good, HSG B
13,654	98	Paved parking, HSG A
15,320	98	Paved parking, HSG B
37,320	89	Weighted Average
8,346		22.36% Pervious Area
28,974		77.64% Impervious Area

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

Subcatchment 200: EDA200

Hydrograph



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Type III 24-hr 10YR Rainfall=4.90"

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Summary for Subcatchment 300: EDA300

Runoff = 4.55 cfs @ 12.12 hrs, Volume= 0.348 af, Depth= 2.54"

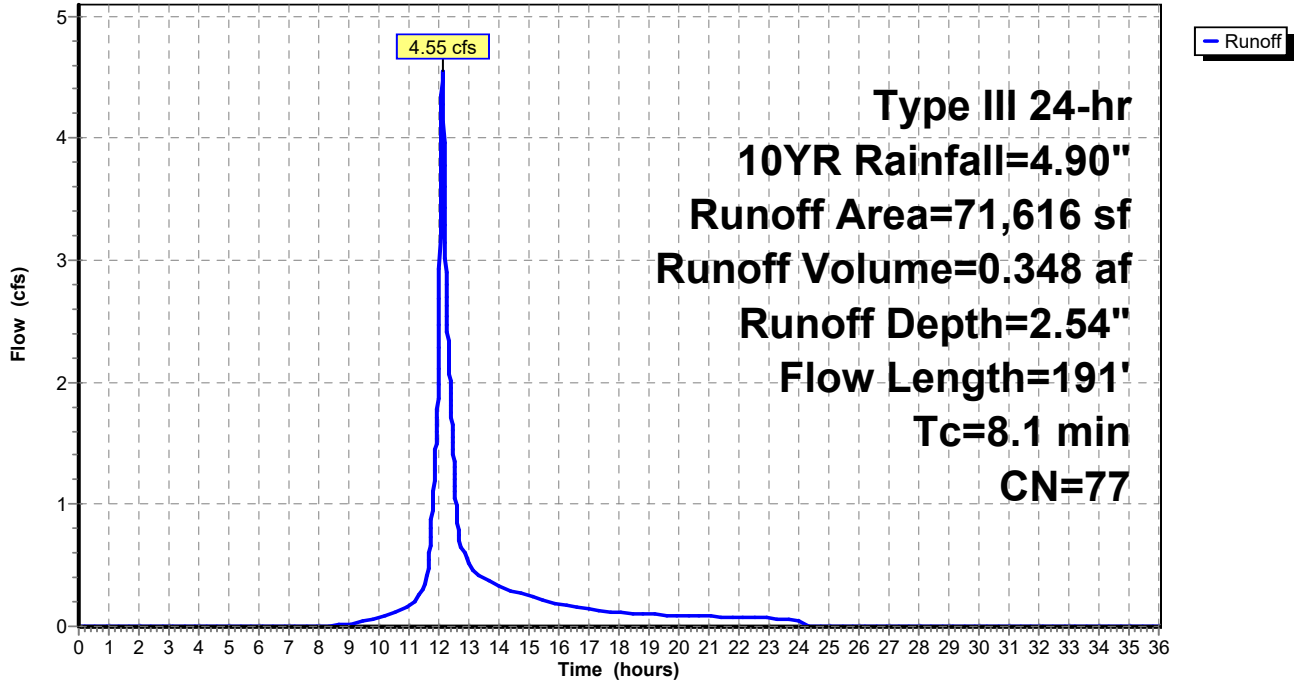
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=4.90"

Area (sf)	CN	Description
21,669	39	>75% Grass cover, Good, HSG A
6,146	61	>75% Grass cover, Good, HSG B
40,610	98	Paved parking, HSG A
3,191	98	Paved parking, HSG B
71,616	77	Weighted Average
27,815		38.84% Pervious Area
43,801		61.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0174	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.41"
0.4	29	0.0344	1.30		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.6	69	0.0112	0.74		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	20	0.0112	2.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	23	0.0330	3.69		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.1	191	Total			

Subcatchment 300: EDA300

Hydrograph



Summary for Subcatchment 400: EDA400

Runoff = 0.38 cfs @ 12.08 hrs, Volume= 0.026 af, Depth= 2.54"

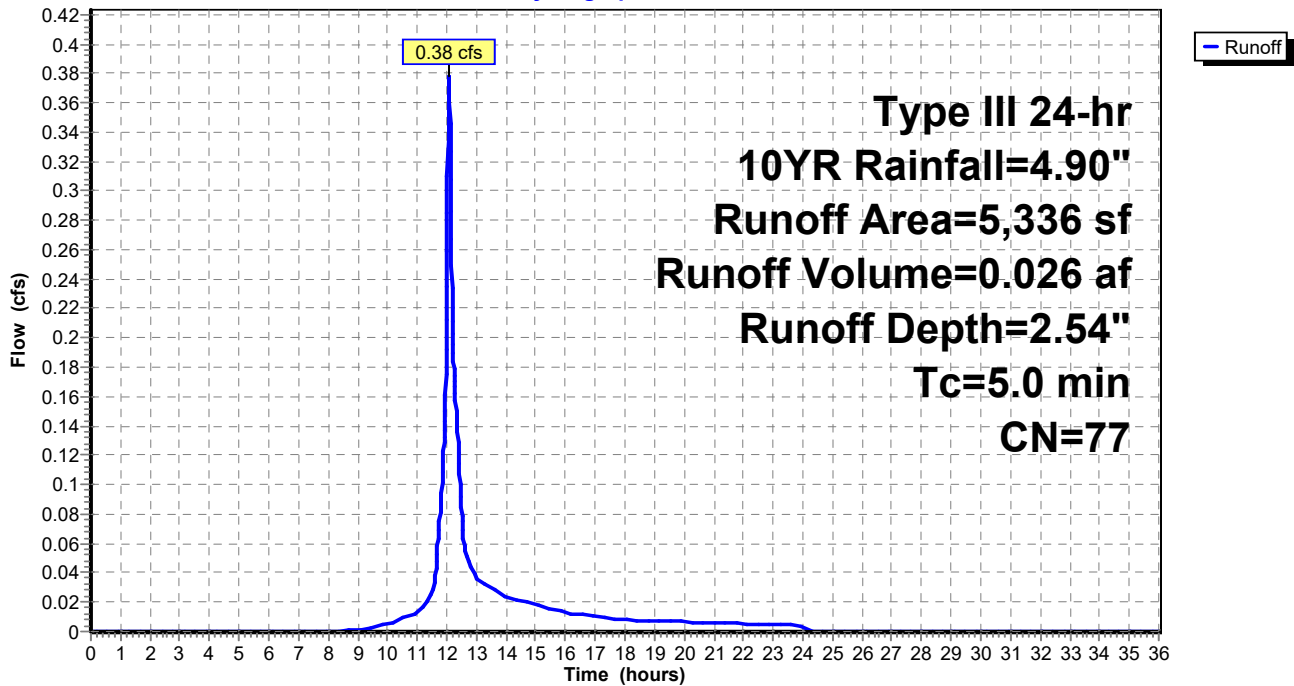
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=4.90"

Area (sf)	CN	Description
1,858	39	>75% Grass cover, Good, HSG A
3,478	98	Paved parking, HSG A
5,336	77	Weighted Average
1,858		34.82% Pervious Area
3,478		65.18% Impervious Area

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

Subcatchment 400: EDA400

Hydrograph



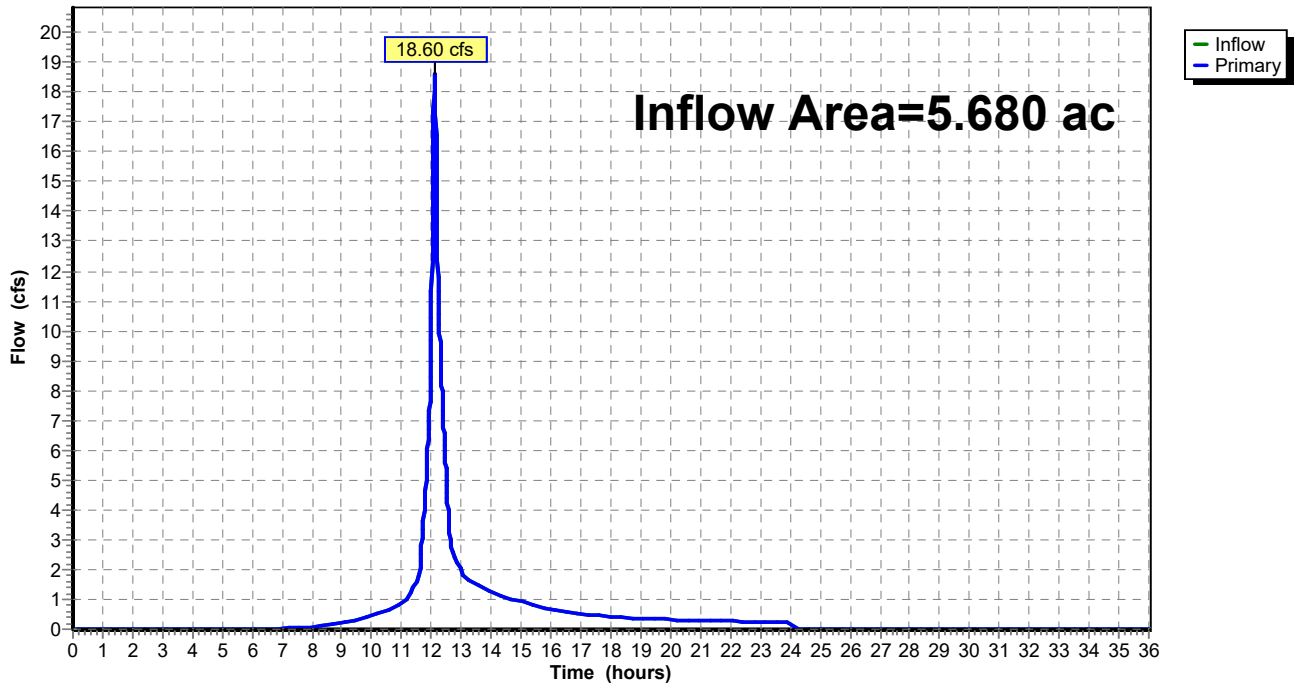
Summary for Link 1: POI-1

Inflow Area = 5.680 ac, 62.64% Impervious, Inflow Depth = 3.00" for 10YR event
Inflow = 18.60 cfs @ 12.10 hrs, Volume= 1.422 af
Primary = 18.60 cfs @ 12.10 hrs, Volume= 1.422 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 1: POI-1

Hydrograph



C-DAT-2001487-PreConstruction

Type III 24-hr 25YR Rainfall=6.10"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment100: EDA100

Runoff Area=133,156 sf 59.12% Impervious Runoff Depth=4.18"
Flow Length=322' Tc=7.8 min CN=83 Runoff=13.93 cfs 1.066 af

Subcatchment200: EDA200

Runoff Area=37,320 sf 77.64% Impervious Runoff Depth=4.83"
Tc=5.0 min CN=89 Runoff=4.82 cfs 0.345 af

Subcatchment300: EDA300

Runoff Area=71,616 sf 61.16% Impervious Runoff Depth=3.57"
Flow Length=191' Tc=8.1 min CN=77 Runoff=6.39 cfs 0.489 af

Subcatchment400: EDA400

Runoff Area=5,336 sf 65.18% Impervious Runoff Depth=3.57"
Tc=5.0 min CN=77 Runoff=0.53 cfs 0.036 af

Link 1: POI-1

Inflow=25.16 cfs 1.936 af
Primary=25.16 cfs 1.936 af

Total Runoff Area = 5.680 ac Runoff Volume = 1.936 af Average Runoff Depth = 4.09"
37.36% Pervious = 2.122 ac 62.64% Impervious = 3.558 ac

Summary for Subcatchment 100: EDA100

Runoff = 13.93 cfs @ 12.11 hrs, Volume= 1.066 af, Depth= 4.18"

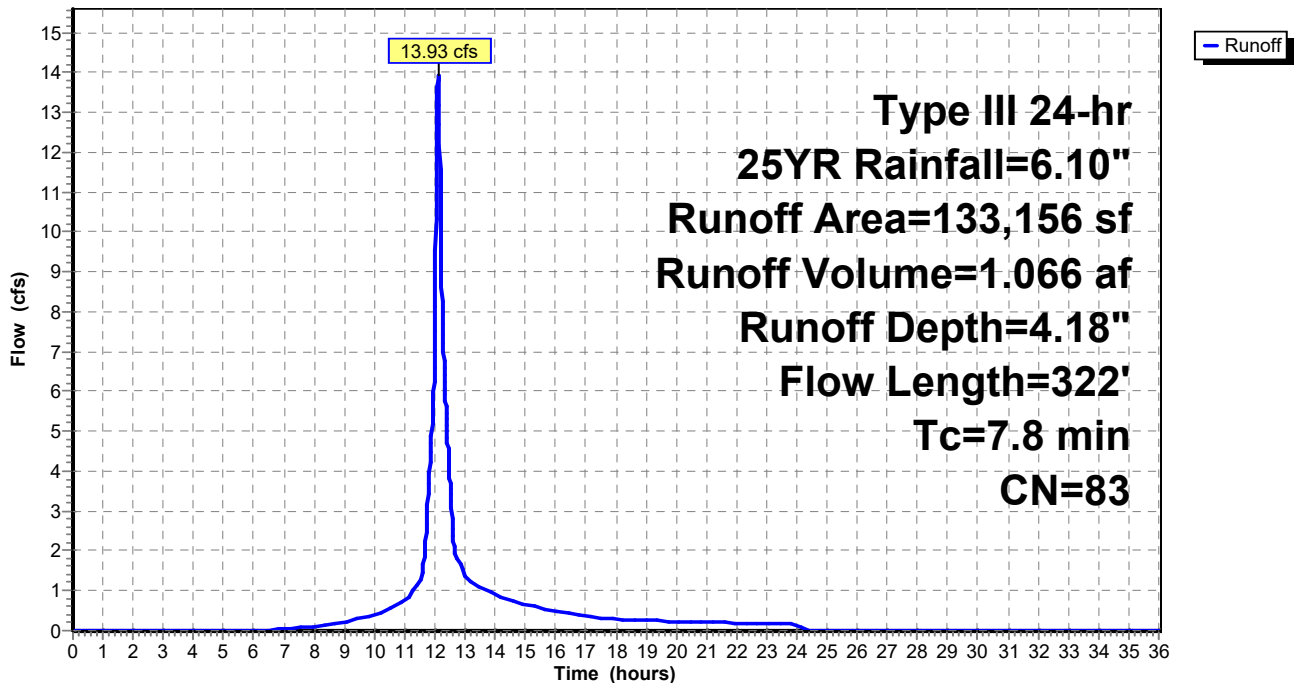
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YR Rainfall=6.10"

Area (sf)	CN	Description
54,429	61	>75% Grass cover, Good, HSG B
78,727	98	Paved parking, HSG B
133,156	83	Weighted Average
54,429		40.88% Pervious Area
78,727		59.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0980	0.13		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.41"
0.4	52	0.0980	2.19		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.0	12	0.4580	13.74		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.9	208	0.0360	3.85		Shallow Concentrated Flow, Paved Kv= 20.3 fps
7.8	322	Total			

Subcatchment 100: EDA100

Hydrograph



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Type III 24-hr 25YR Rainfall=6.10"

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Summary for Subcatchment 200: EDA200

Runoff = 4.82 cfs @ 12.07 hrs, Volume= 0.345 af, Depth= 4.83"

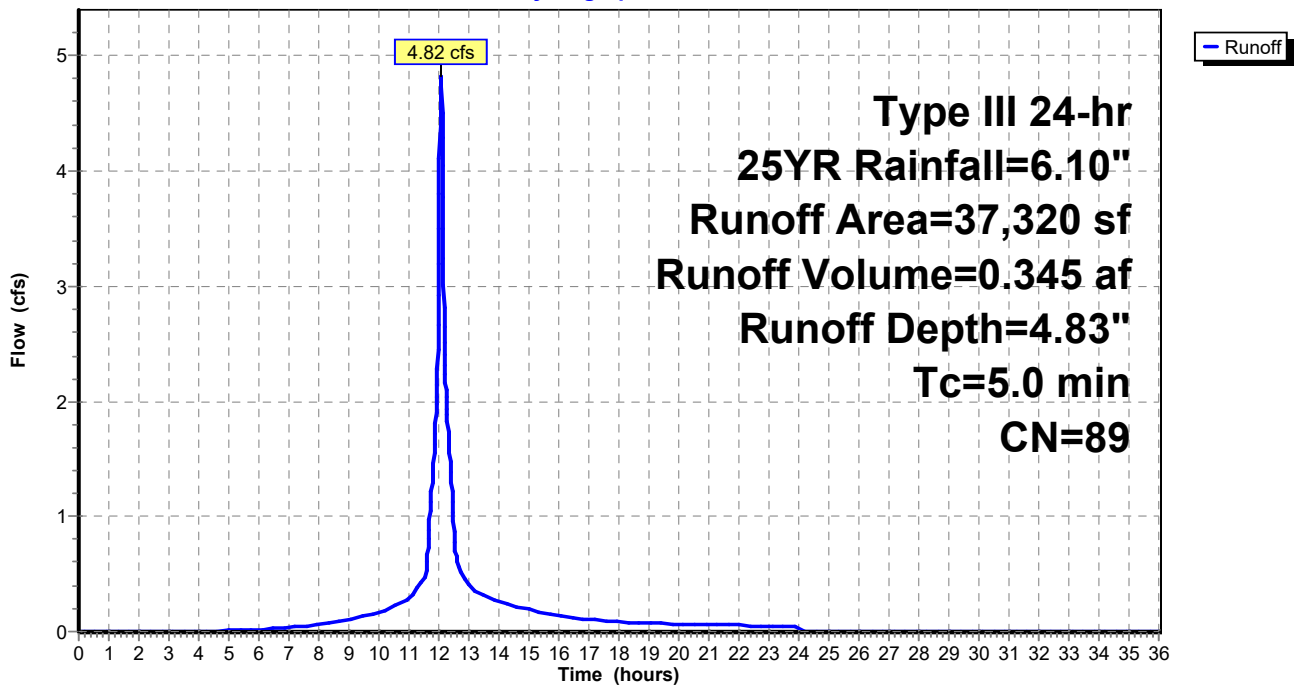
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YR Rainfall=6.10"

Area (sf)	CN	Description
1,659	39	>75% Grass cover, Good, HSG A
6,687	61	>75% Grass cover, Good, HSG B
13,654	98	Paved parking, HSG A
15,320	98	Paved parking, HSG B
37,320	89	Weighted Average
8,346		22.36% Pervious Area
28,974		77.64% Impervious Area

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

Subcatchment 200: EDA200

Hydrograph



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Type III 24-hr 25YR Rainfall=6.10"

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Summary for Subcatchment 300: EDA300

Runoff = 6.39 cfs @ 12.12 hrs, Volume= 0.489 af, Depth= 3.57"

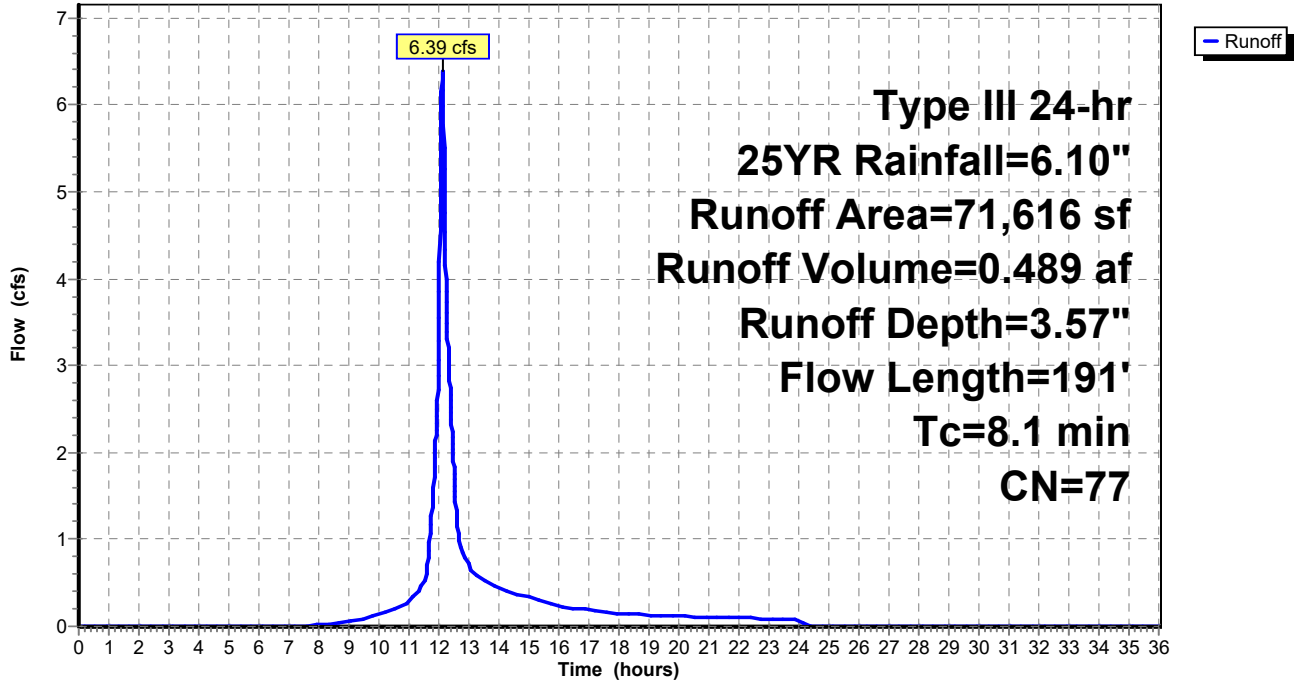
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YR Rainfall=6.10"

Area (sf)	CN	Description
21,669	39	>75% Grass cover, Good, HSG A
6,146	61	>75% Grass cover, Good, HSG B
40,610	98	Paved parking, HSG A
3,191	98	Paved parking, HSG B
71,616	77	Weighted Average
27,815		38.84% Pervious Area
43,801		61.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0174	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.41"
0.4	29	0.0344	1.30		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.6	69	0.0112	0.74		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	20	0.0112	2.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	23	0.0330	3.69		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.1	191	Total			

Subcatchment 300: EDA300

Hydrograph



Summary for Subcatchment 400: EDA400

Runoff = 0.53 cfs @ 12.07 hrs, Volume= 0.036 af, Depth= 3.57"

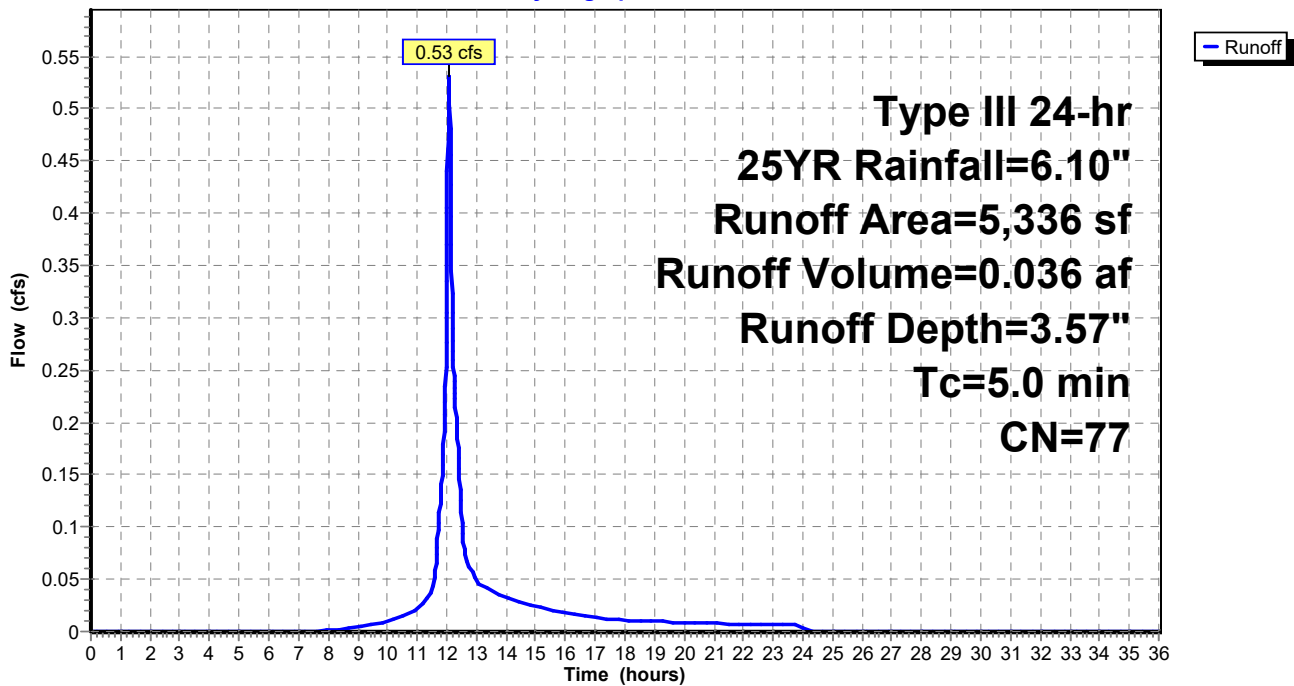
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YR Rainfall=6.10"

Area (sf)	CN	Description
1,858	39	>75% Grass cover, Good, HSG A
3,478	98	Paved parking, HSG A
5,336	77	Weighted Average
1,858		34.82% Pervious Area
3,478		65.18% Impervious Area

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

Subcatchment 400: EDA400

Hydrograph



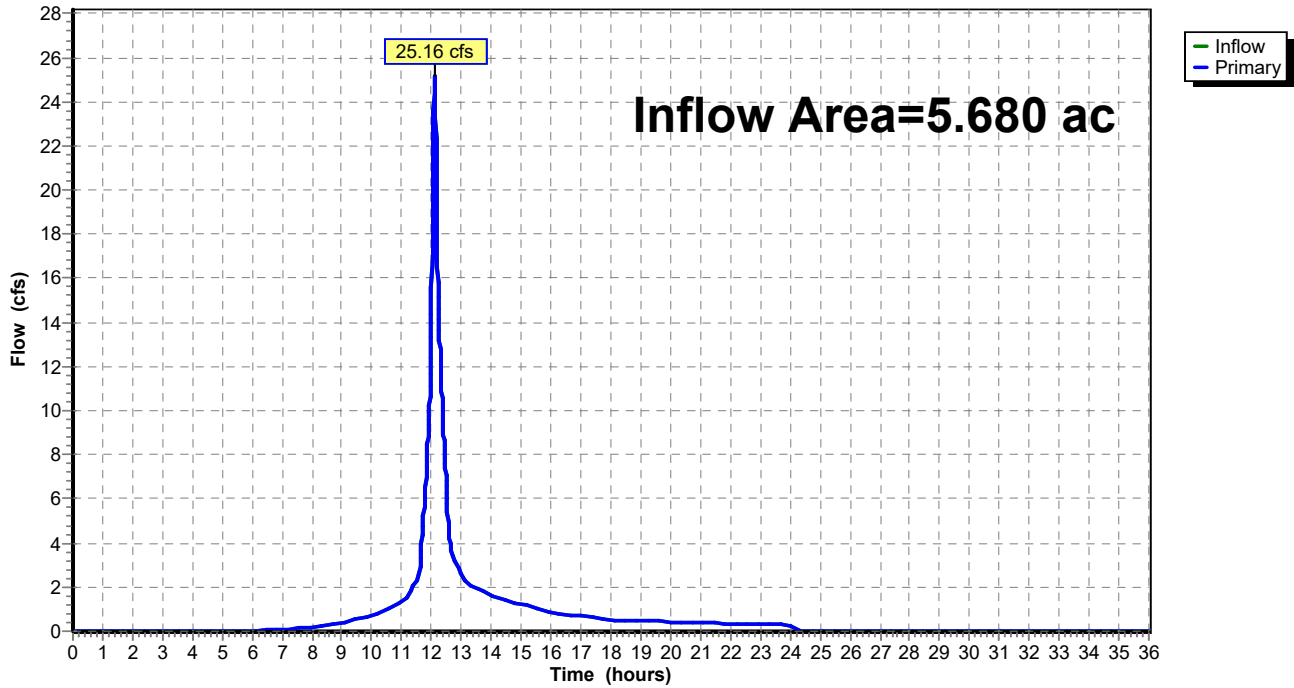
Summary for Link 1: POI-1

Inflow Area = 5.680 ac, 62.64% Impervious, Inflow Depth = 4.09" for 25YR event
Inflow = 25.16 cfs @ 12.10 hrs, Volume= 1.936 af
Primary = 25.16 cfs @ 12.10 hrs, Volume= 1.936 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 1: POI-1

Hydrograph



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Type III 24-hr 100YR Rainfall=8.50"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment100: EDA100

Runoff Area=133,156 sf 59.12% Impervious Runoff Depth=6.46"
Flow Length=322' Tc=7.8 min CN=83 Runoff=21.11 cfs 1.645 af

Subcatchment200: EDA200

Runoff Area=37,320 sf 77.64% Impervious Runoff Depth=7.18"
Tc=5.0 min CN=89 Runoff=7.01 cfs 0.512 af

Subcatchment300: EDA300

Runoff Area=71,616 sf 61.16% Impervious Runoff Depth=5.73"
Flow Length=191' Tc=8.1 min CN=77 Runoff=10.18 cfs 0.786 af

Subcatchment400: EDA400

Runoff Area=5,336 sf 65.18% Impervious Runoff Depth=5.73"
Tc=5.0 min CN=77 Runoff=0.84 cfs 0.059 af

Link 1: POI-1

Inflow=38.41 cfs 3.001 af
Primary=38.41 cfs 3.001 af

Total Runoff Area = 5.680 ac Runoff Volume = 3.001 af Average Runoff Depth = 6.34"
37.36% Pervious = 2.122 ac 62.64% Impervious = 3.558 ac

Summary for Subcatchment 100: EDA100

Runoff = 21.11 cfs @ 12.11 hrs, Volume= 1.645 af, Depth= 6.46"

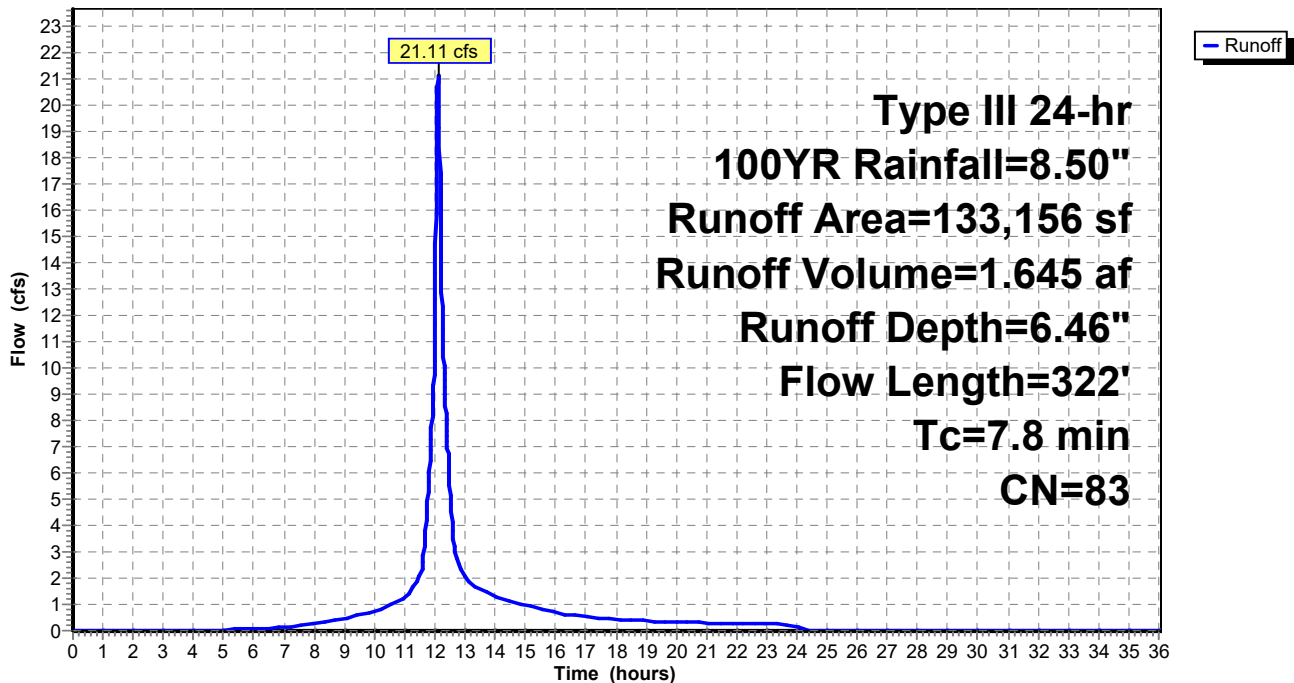
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR Rainfall=8.50"

Area (sf)	CN	Description
54,429	61	>75% Grass cover, Good, HSG B
78,727	98	Paved parking, HSG B
133,156	83	Weighted Average
54,429		40.88% Pervious Area
78,727		59.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0980	0.13		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.41"
0.4	52	0.0980	2.19		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.0	12	0.4580	13.74		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.9	208	0.0360	3.85		Shallow Concentrated Flow, Paved Kv= 20.3 fps
7.8	322	Total			

Subcatchment 100: EDA100

Hydrograph



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Type III 24-hr 100YR Rainfall=8.50"

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Summary for Subcatchment 200: EDA200

Runoff = 7.01 cfs @ 12.07 hrs, Volume= 0.512 af, Depth= 7.18"

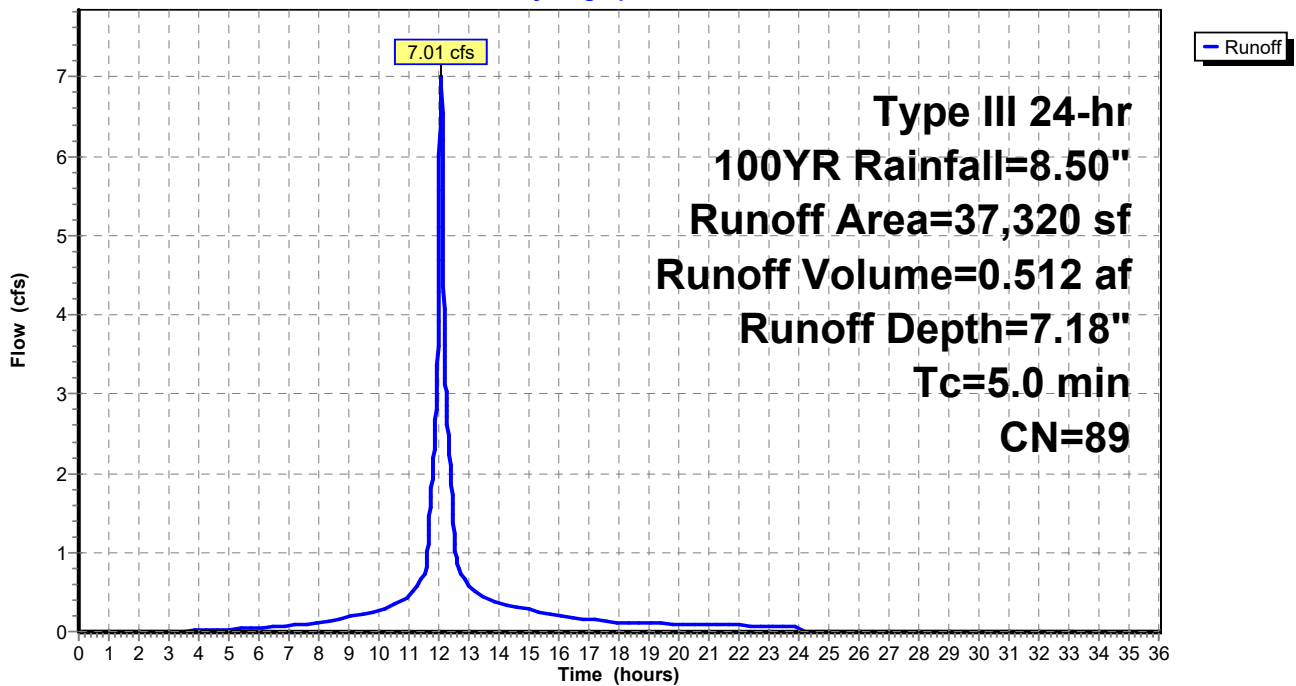
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR Rainfall=8.50"

Area (sf)	CN	Description
1,659	39	>75% Grass cover, Good, HSG A
6,687	61	>75% Grass cover, Good, HSG B
13,654	98	Paved parking, HSG A
15,320	98	Paved parking, HSG B
37,320	89	Weighted Average
8,346		22.36% Pervious Area
28,974		77.64% Impervious Area

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

Subcatchment 200: EDA200

Hydrograph



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Type III 24-hr 100YR Rainfall=8.50"

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Summary for Subcatchment 300: EDA300

Runoff = 10.18 cfs @ 12.11 hrs, Volume= 0.786 af, Depth= 5.73"

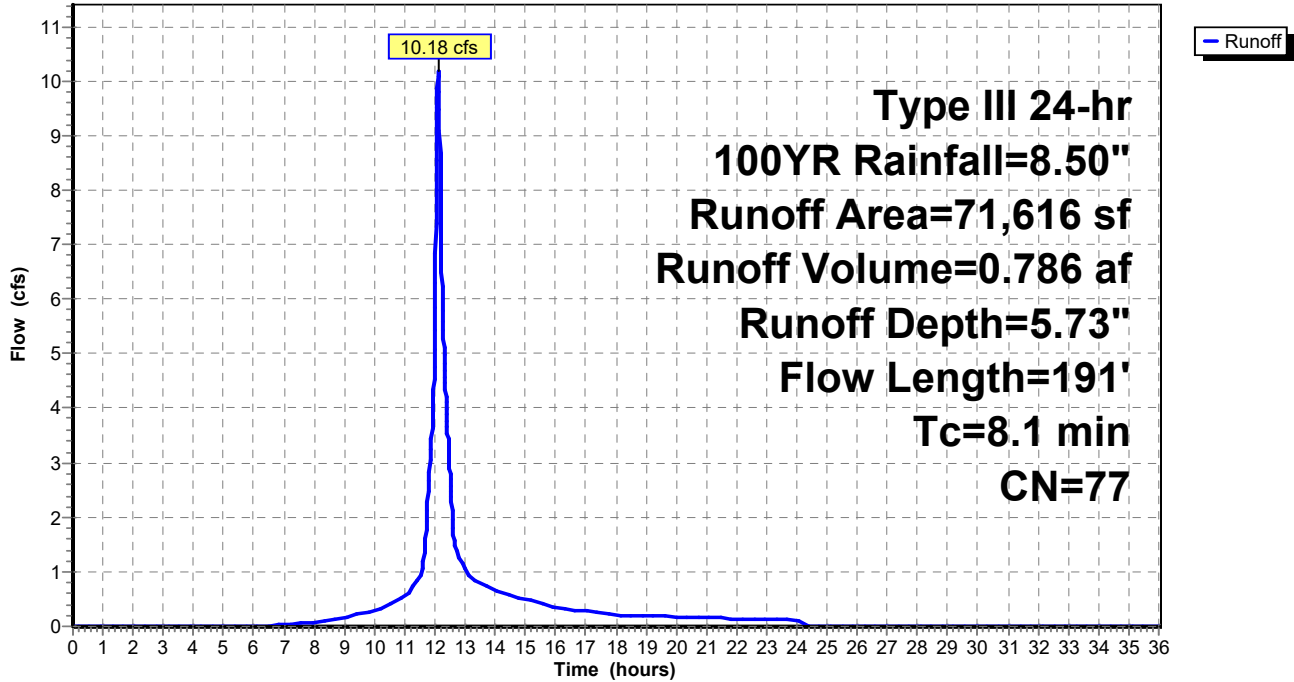
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR Rainfall=8.50"

Area (sf)	CN	Description
21,669	39	>75% Grass cover, Good, HSG A
6,146	61	>75% Grass cover, Good, HSG B
40,610	98	Paved parking, HSG A
3,191	98	Paved parking, HSG B
71,616	77	Weighted Average
27,815		38.84% Pervious Area
43,801		61.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0174	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.41"
0.4	29	0.0344	1.30		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.6	69	0.0112	0.74		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	20	0.0112	2.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.1	23	0.0330	3.69		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.1	191	Total			

Subcatchment 300: EDA300

Hydrograph



Summary for Subcatchment 400: EDA400

Runoff = 0.84 cfs @ 12.07 hrs, Volume= 0.059 af, Depth= 5.73"

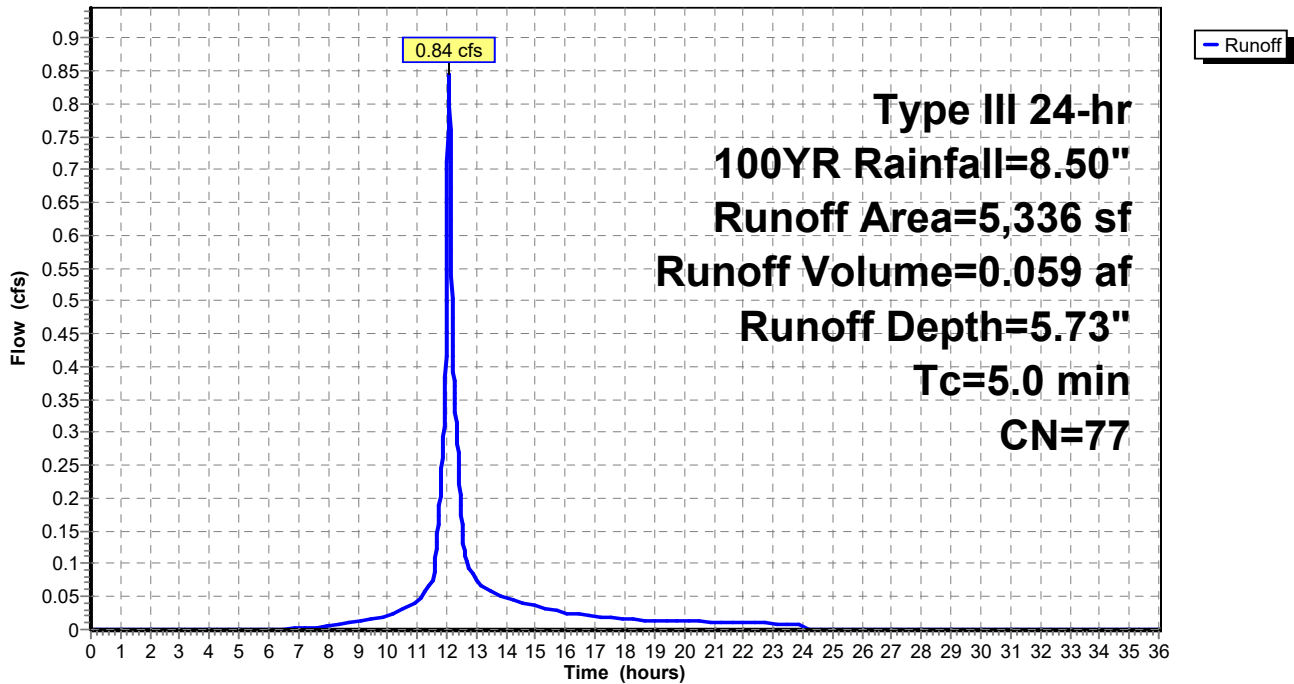
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100YR Rainfall=8.50"

Area (sf)	CN	Description
1,858	39	>75% Grass cover, Good, HSG A
3,478	98	Paved parking, HSG A
5,336	77	Weighted Average
1,858		34.82% Pervious Area
3,478		65.18% Impervious Area

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

Subcatchment 400: EDA400

Hydrograph



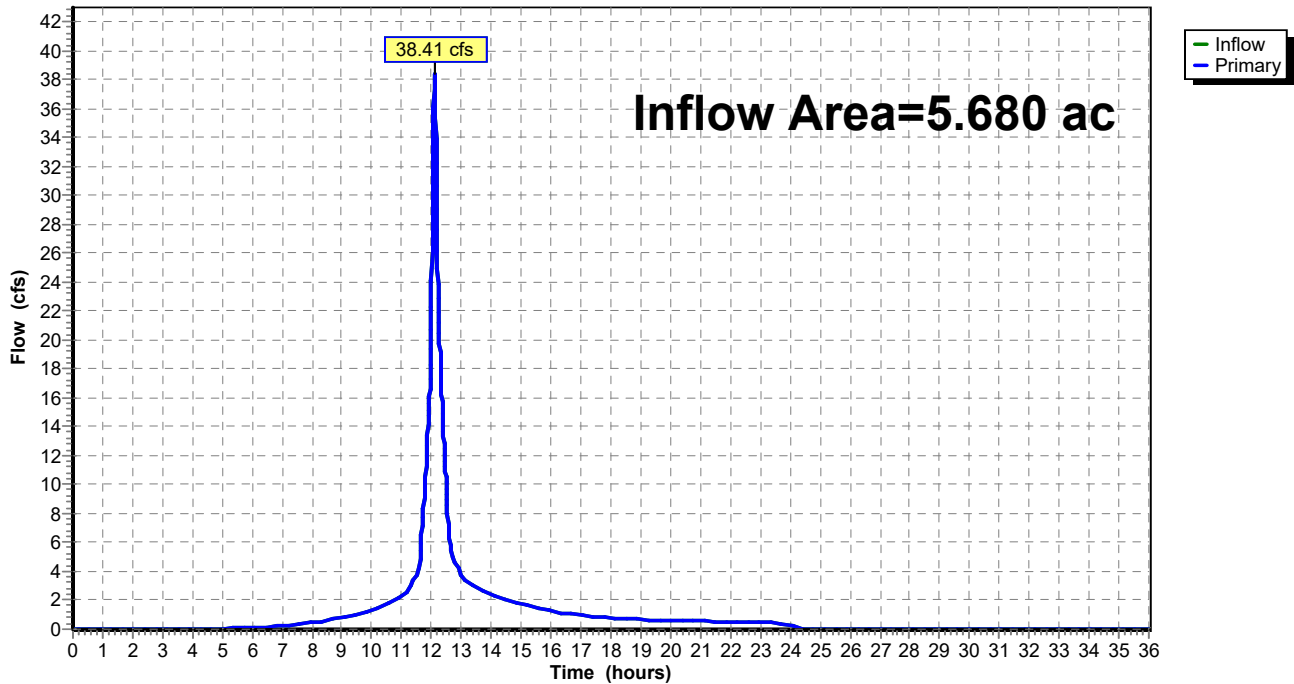
Summary for Link 1: POI-1

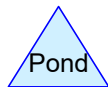
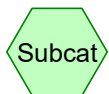
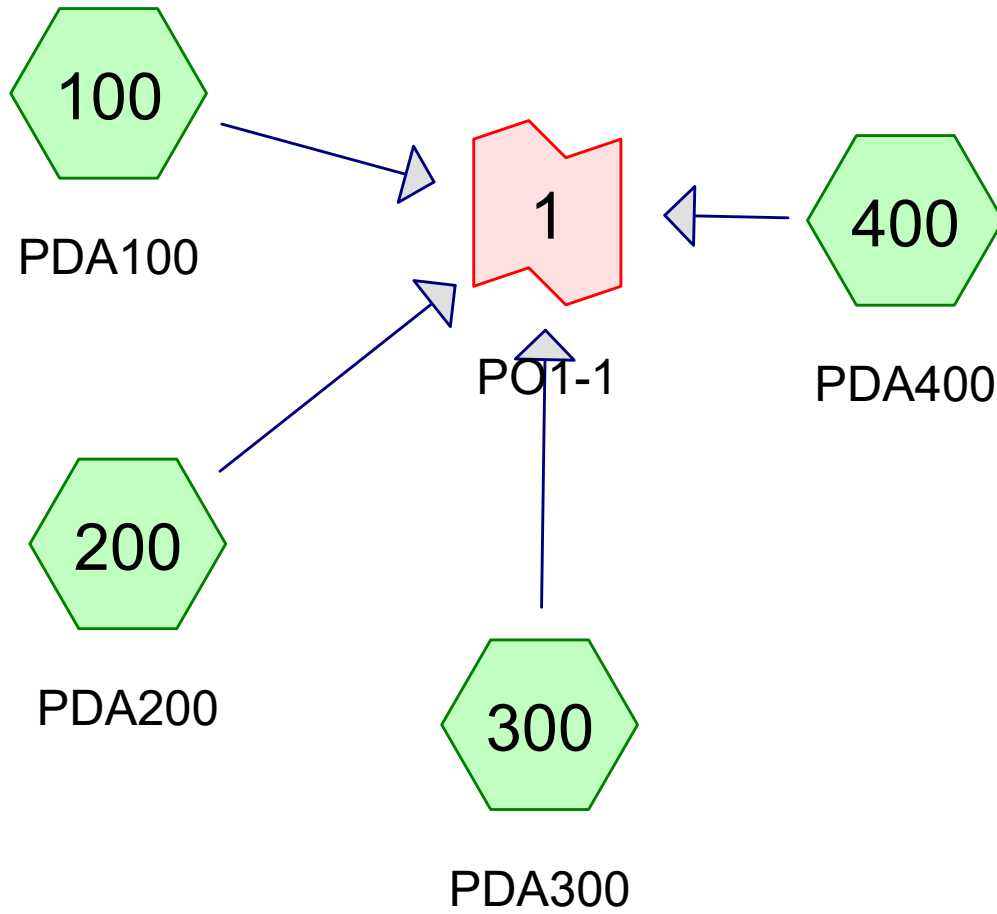
Inflow Area = 5.680 ac, 62.64% Impervious, Inflow Depth = 6.34" for 100YR event
Inflow = 38.41 cfs @ 12.10 hrs, Volume= 3.001 af
Primary = 38.41 cfs @ 12.10 hrs, Volume= 3.001 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 1: POI-1

Hydrograph





Routing Diagram for C-DAT-2001487-PostConstruction
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.597	39	>75% Grass cover, Good, HSG A (200, 300, 400)
1.572	61	>75% Grass cover, Good, HSG B (100, 200, 300)
1.306	98	Paved parking, HSG A (200, 300, 400)
2.204	98	Paved parking, HSG B (100, 200, 300)
5.680	82	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
1.904	HSG A	200, 300, 400
3.776	HSG B	100, 200, 300
0.000	HSG C	
0.000	HSG D	
0.000	Other	
5.680		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.597	1.572	0.000	0.000	0.000	2.170	>75% Grass cover, Good	100, 200, 300, 400
1.306	2.204	0.000	0.000	0.000	3.510	Paved parking	100, 200, 300, 400
1.904	3.776	0.000	0.000	0.000	5.680	TOTAL AREA	

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Type III 24-hr 2YR Rainfall=3.20"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment100: PDA100

Runoff Area=133,268 sf 59.12% Impervious Runoff Depth=1.61"
Flow Length=322' Tc=7.8 min CN=88 Runoff=5.41 cfs 0.410 af

Subcatchment200: PDA200

Runoff Area=37,217 sf 75.02% Impervious Runoff Depth=2.00"
Tc=5.0 min CN=88 Runoff=2.07 cfs 0.142 af

Subcatchment300: PDA300

Runoff Area=71,600 sf 59.57% Impervious Runoff Depth=1.15"
Flow Length=278' Tc=8.5 min CN=76 Runoff=1.96 cfs 0.158 af

Subcatchment400: PDA400

Runoff Area=5,336 sf 66.62% Impervious Runoff Depth=1.27"
Tc=5.0 min CN=78 Runoff=0.19 cfs 0.013 af

Link 1: PO1-1

Inflow=9.38 cfs 0.723 af
Primary=9.38 cfs 0.723 af

Total Runoff Area = 5.680 ac Runoff Volume = 0.723 af Average Runoff Depth = 1.53"
38.20% Pervious = 2.170 ac 61.80% Impervious = 3.510 ac

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Type III 24-hr 2YR Rainfall=3.20"

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Summary for Subcatchment 100: PDA100

Runoff = 5.41 cfs @ 12.11 hrs, Volume= 0.410 af, Depth= 1.61"

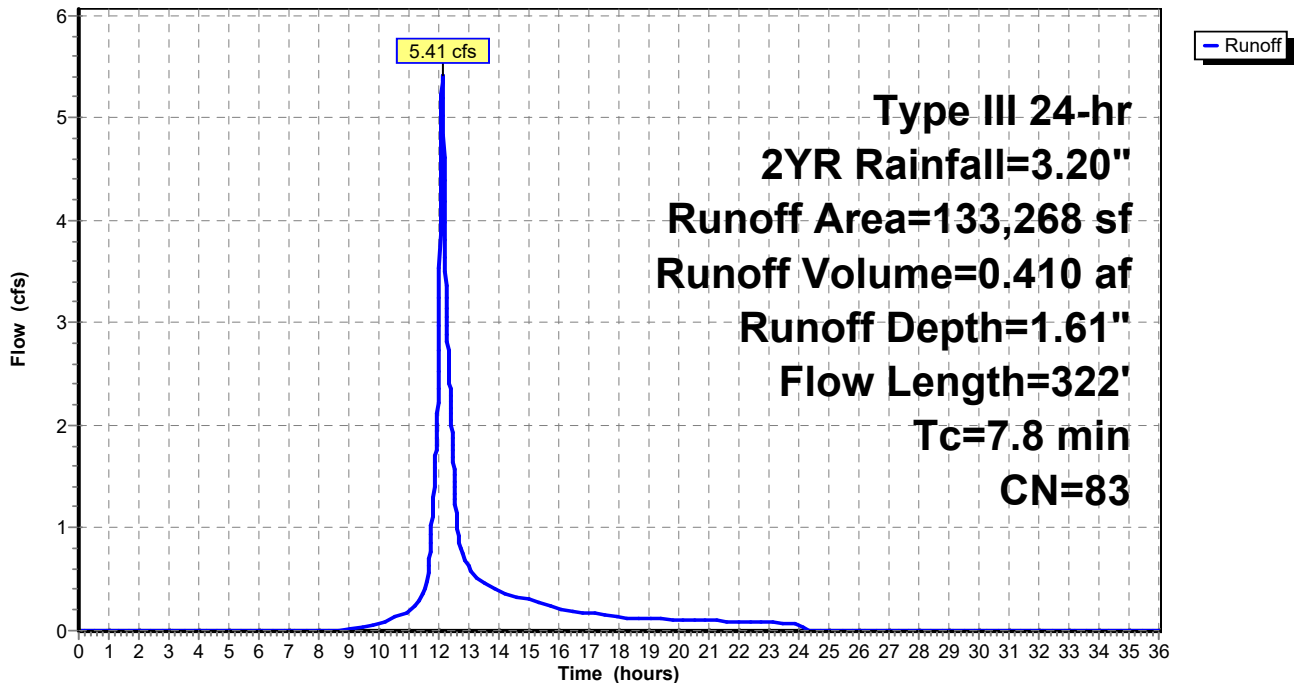
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR Rainfall=3.20"

Area (sf)	CN	Description
54,481	61	>75% Grass cover, Good, HSG B
78,787	98	Paved parking, HSG B
133,268	83	Weighted Average
54,481		40.88% Pervious Area
78,787		59.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0980	0.13		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.41"
0.4	52	0.0980	2.19		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.0	12	0.4580	13.74		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.9	208	0.0360	3.85		Shallow Concentrated Flow, Paved Kv= 20.3 fps
7.8	322	Total			

Subcatchment 100: PDA100

Hydrograph



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Type III 24-hr 2YR Rainfall=3.20"

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Summary for Subcatchment 200: PDA200

Runoff = 2.07 cfs @ 12.07 hrs, Volume= 0.142 af, Depth= 2.00"

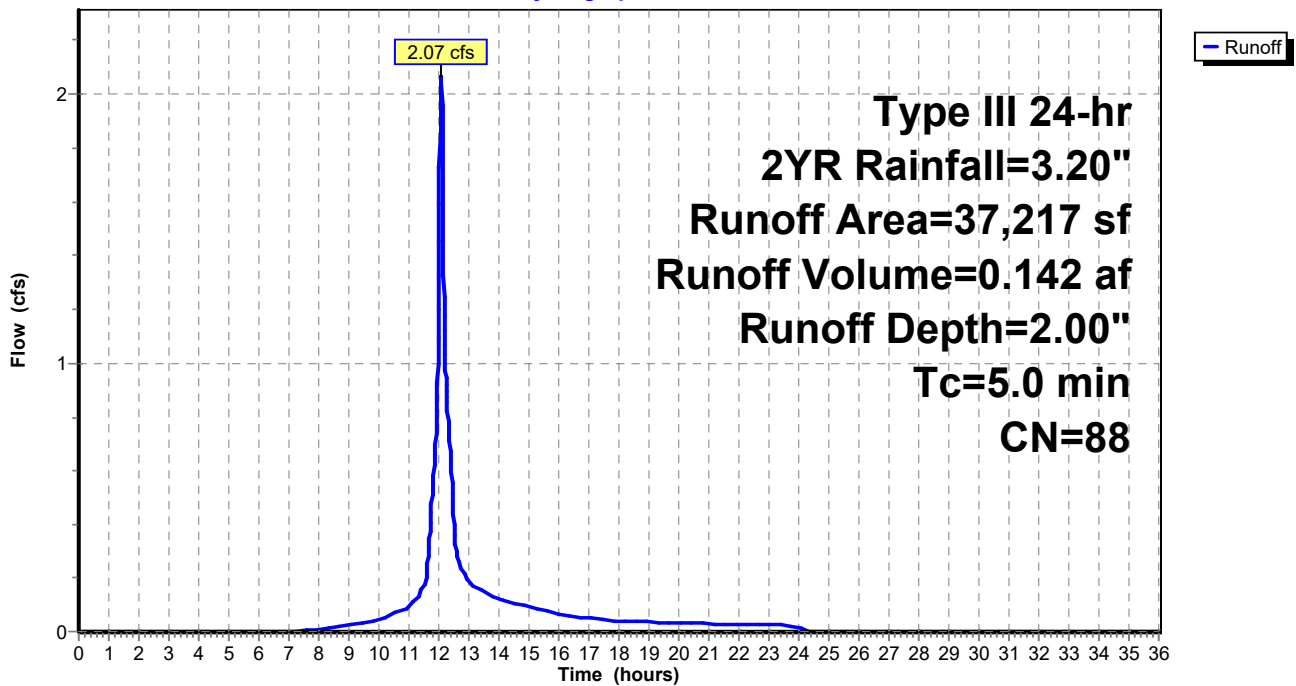
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR Rainfall=3.20"

Area (sf)	CN	Description
1,923	39	>75% Grass cover, Good, HSG A
7,375	61	>75% Grass cover, Good, HSG B
13,347	98	Paved parking, HSG A
14,572	98	Paved parking, HSG B
37,217	88	Weighted Average
9,298		24.98% Pervious Area
27,919		75.02% Impervious Area

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

Subcatchment 200: PDA200

Hydrograph



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Type III 24-hr 2YR Rainfall=3.20"

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Summary for Subcatchment 300: PDA300

Runoff = 1.96 cfs @ 12.13 hrs, Volume= 0.158 af, Depth= 1.15"

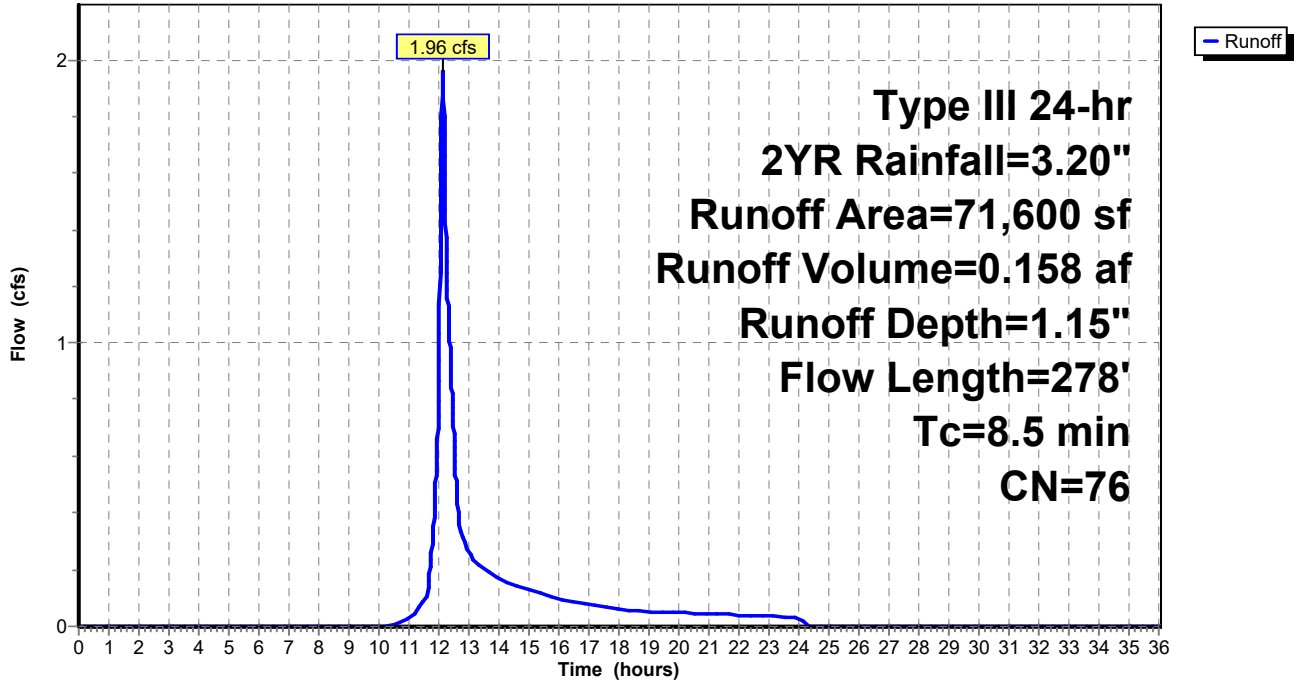
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR Rainfall=3.20"

Area (sf)	CN	Description
22,322	39	>75% Grass cover, Good, HSG A
6,628	61	>75% Grass cover, Good, HSG B
40,002	98	Paved parking, HSG A
2,648	98	Paved parking, HSG B
71,600	76	Weighted Average
28,950		40.43% Pervious Area
42,650		59.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0174	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.41"
0.4	29	0.0344	1.30		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.6	69	0.0112	0.74		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	20	0.0112	2.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	110	0.0330	3.69		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.5	278	Total			

Subcatchment 300: PDA300

Hydrograph



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Type III 24-hr 2YR Rainfall=3.20"

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Summary for Subcatchment 400: PDA400

Runoff = 0.19 cfs @ 12.08 hrs, Volume= 0.013 af, Depth= 1.27"

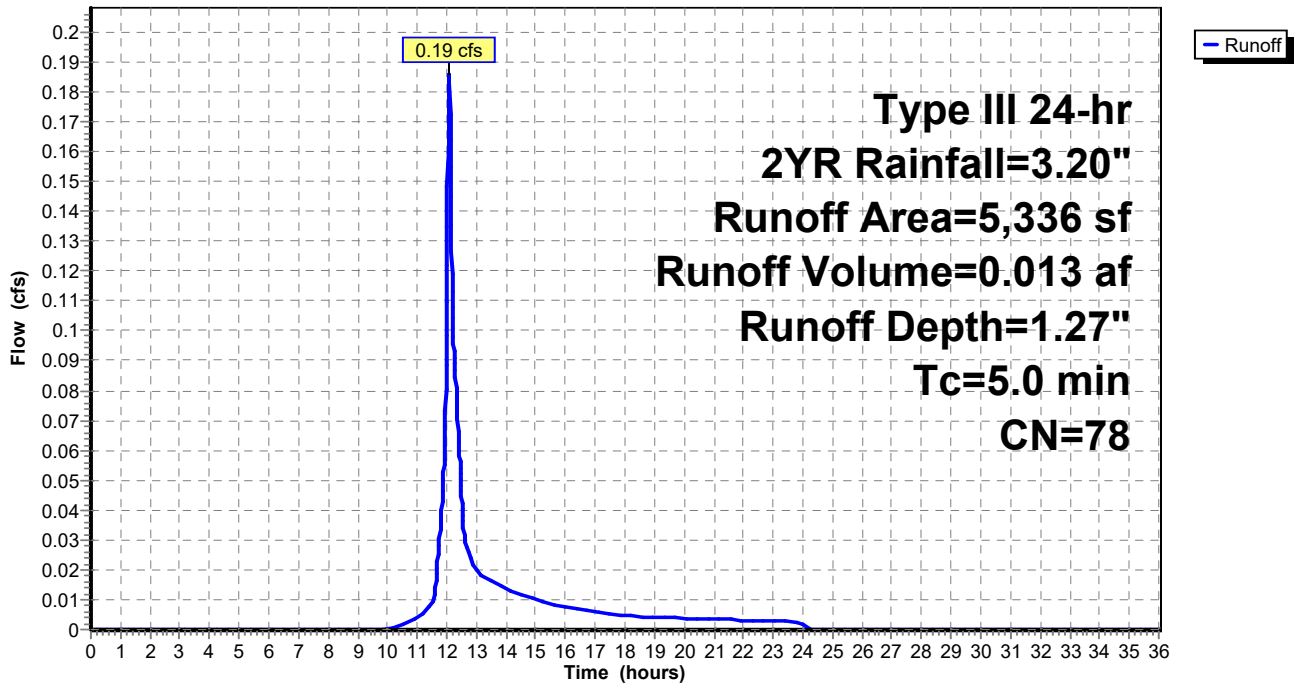
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YR Rainfall=3.20"

Area (sf)	CN	Description
1,781	39	>75% Grass cover, Good, HSG A
3,555	98	Paved parking, HSG A
5,336	78	Weighted Average
1,781		33.38% Pervious Area
3,555		66.62% Impervious Area

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

Subcatchment 400: PDA400

Hydrograph



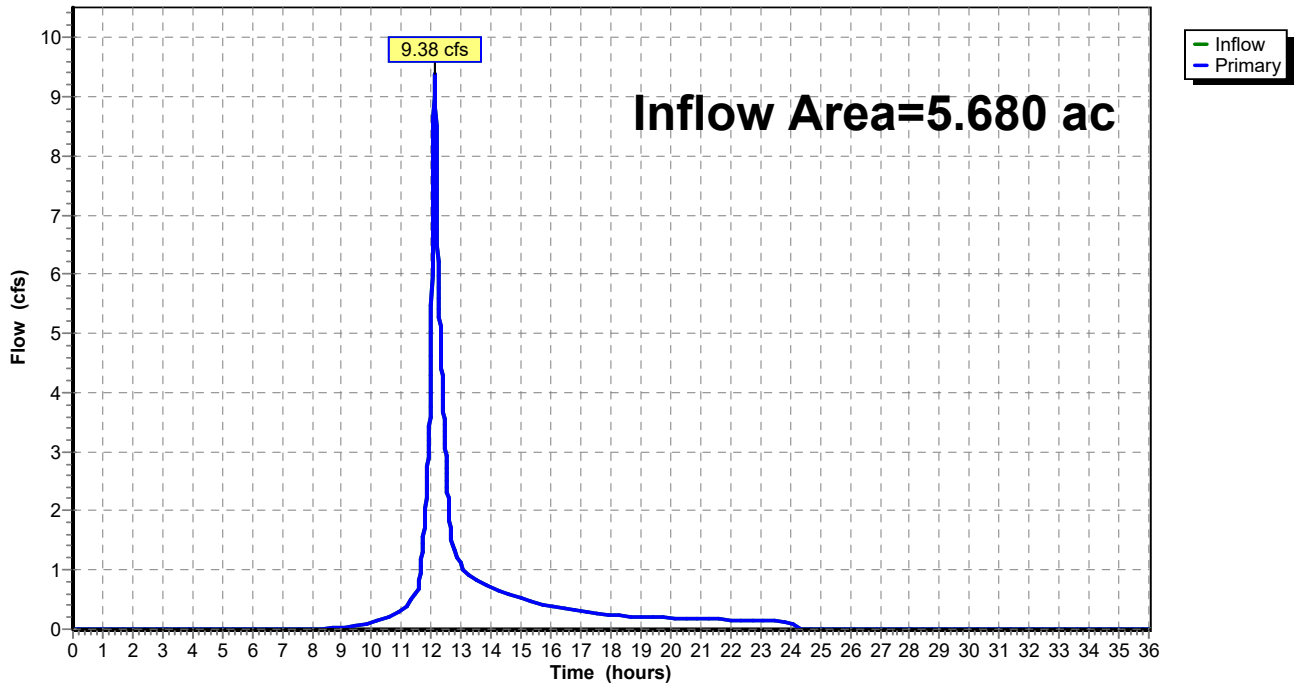
Summary for Link 1: PO1-1

Inflow Area = 5.680 ac, 61.80% Impervious, Inflow Depth = 1.53" for 2YR event
Inflow = 9.38 cfs @ 12.11 hrs, Volume= 0.723 af
Primary = 9.38 cfs @ 12.11 hrs, Volume= 0.723 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 1: PO1-1

Hydrograph



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Type III 24-hr 10YR Rainfall=4.90"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment100: PDA100

Runoff Area=133,268 sf 59.12% Impervious Runoff Depth=3.08"
Flow Length=322' Tc=7.8 min CN=83 Runoff=10.36 cfs 0.786 af

Subcatchment200: PDA200

Runoff Area=37,217 sf 75.02% Impervious Runoff Depth=3.57"
Tc=5.0 min CN=88 Runoff=3.63 cfs 0.254 af

Subcatchment300: PDA300

Runoff Area=71,600 sf 59.57% Impervious Runoff Depth=2.45"
Flow Length=278' Tc=8.5 min CN=76 Runoff=4.33 cfs 0.336 af

Subcatchment400: PDA400

Runoff Area=5,336 sf 66.62% Impervious Runoff Depth=2.63"
Tc=5.0 min CN=78 Runoff=0.39 cfs 0.027 af

Link 1: PO1-1

Inflow=18.28 cfs 1.404 af
Primary=18.28 cfs 1.404 af

Total Runoff Area = 5.680 ac Runoff Volume = 1.404 af Average Runoff Depth = 2.97"
38.20% Pervious = 2.170 ac 61.80% Impervious = 3.510 ac

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Type III 24-hr 10YR Rainfall=4.90"

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Summary for Subcatchment 100: PDA100

Runoff = 10.36 cfs @ 12.11 hrs, Volume= 0.786 af, Depth= 3.08"

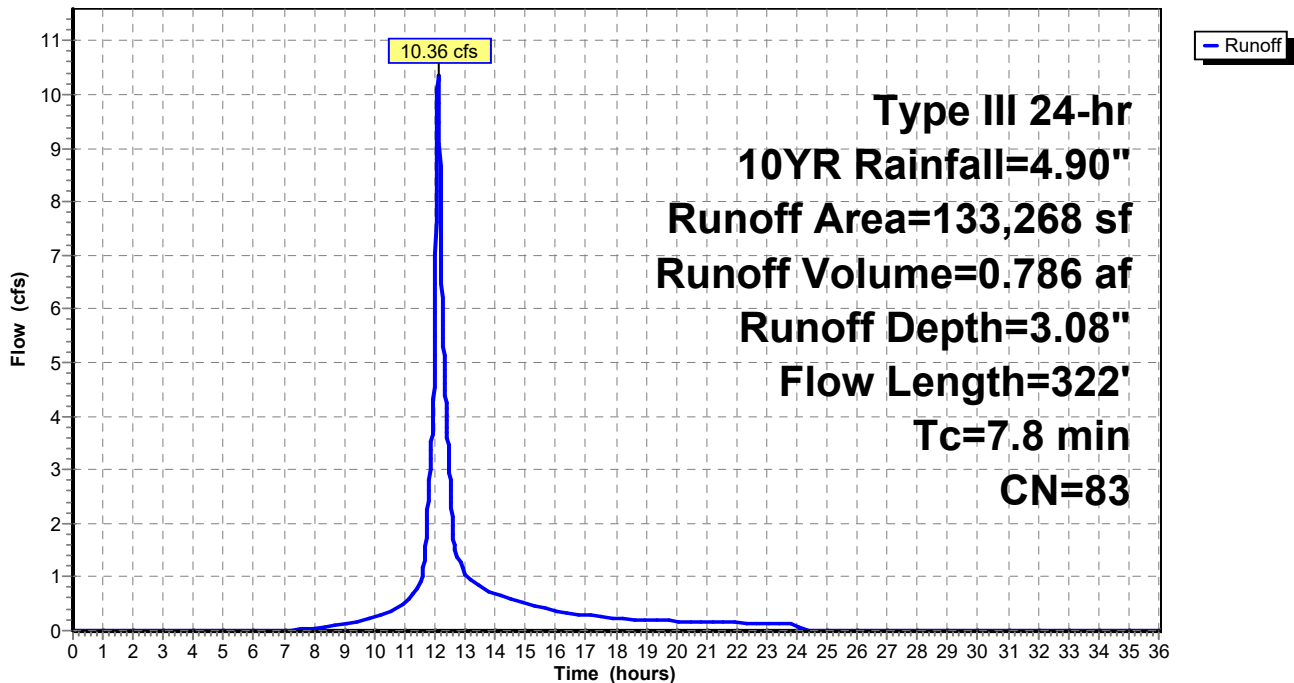
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=4.90"

Area (sf)	CN	Description
54,481	61	>75% Grass cover, Good, HSG B
78,787	98	Paved parking, HSG B
133,268	83	Weighted Average
54,481		40.88% Pervious Area
78,787		59.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0980	0.13		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.41"
0.4	52	0.0980	2.19		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.0	12	0.4580	13.74		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.9	208	0.0360	3.85		Shallow Concentrated Flow, Paved Kv= 20.3 fps
7.8	322	Total			

Subcatchment 100: PDA100

Hydrograph



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Type III 24-hr 10YR Rainfall=4.90"

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Summary for Subcatchment 200: PDA200

Runoff = 3.63 cfs @ 12.07 hrs, Volume= 0.254 af, Depth= 3.57"

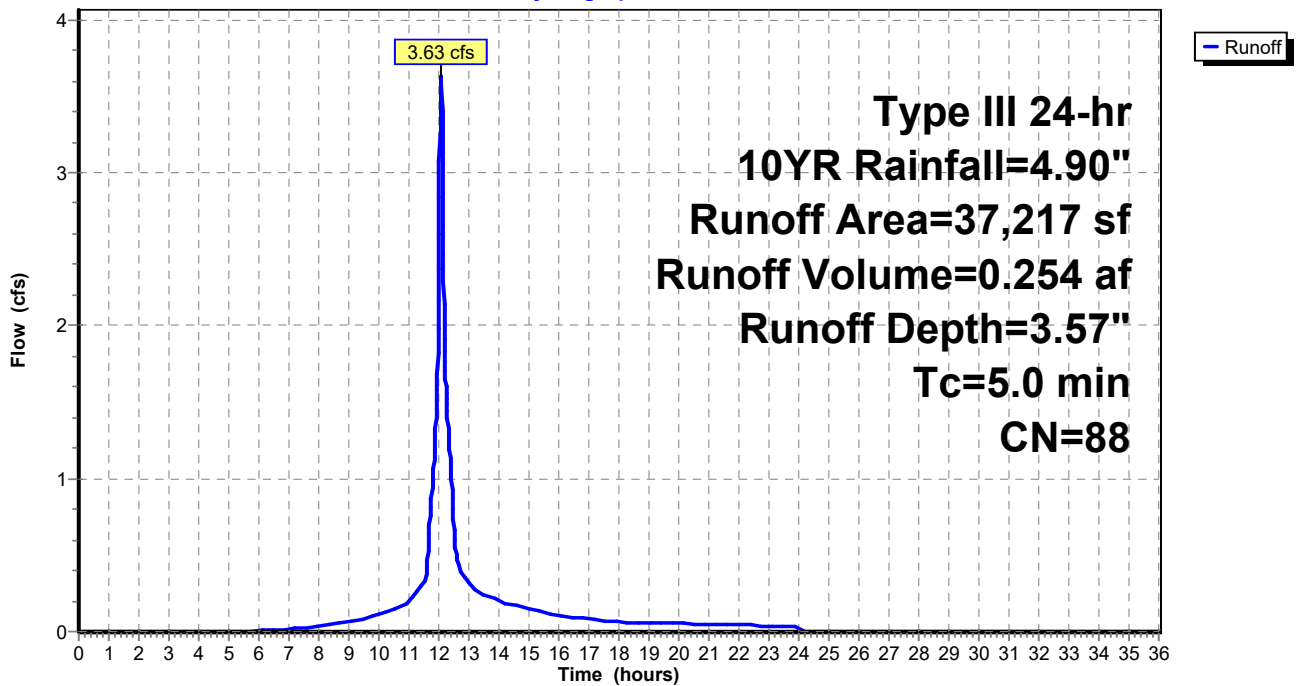
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=4.90"

Area (sf)	CN	Description
1,923	39	>75% Grass cover, Good, HSG A
7,375	61	>75% Grass cover, Good, HSG B
13,347	98	Paved parking, HSG A
14,572	98	Paved parking, HSG B
37,217	88	Weighted Average
9,298		24.98% Pervious Area
27,919		75.02% Impervious Area

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

Subcatchment 200: PDA200

Hydrograph



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Type III 24-hr 10YR Rainfall=4.90"

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Summary for Subcatchment 300: PDA300

Runoff = 4.33 cfs @ 12.12 hrs, Volume= 0.336 af, Depth= 2.45"

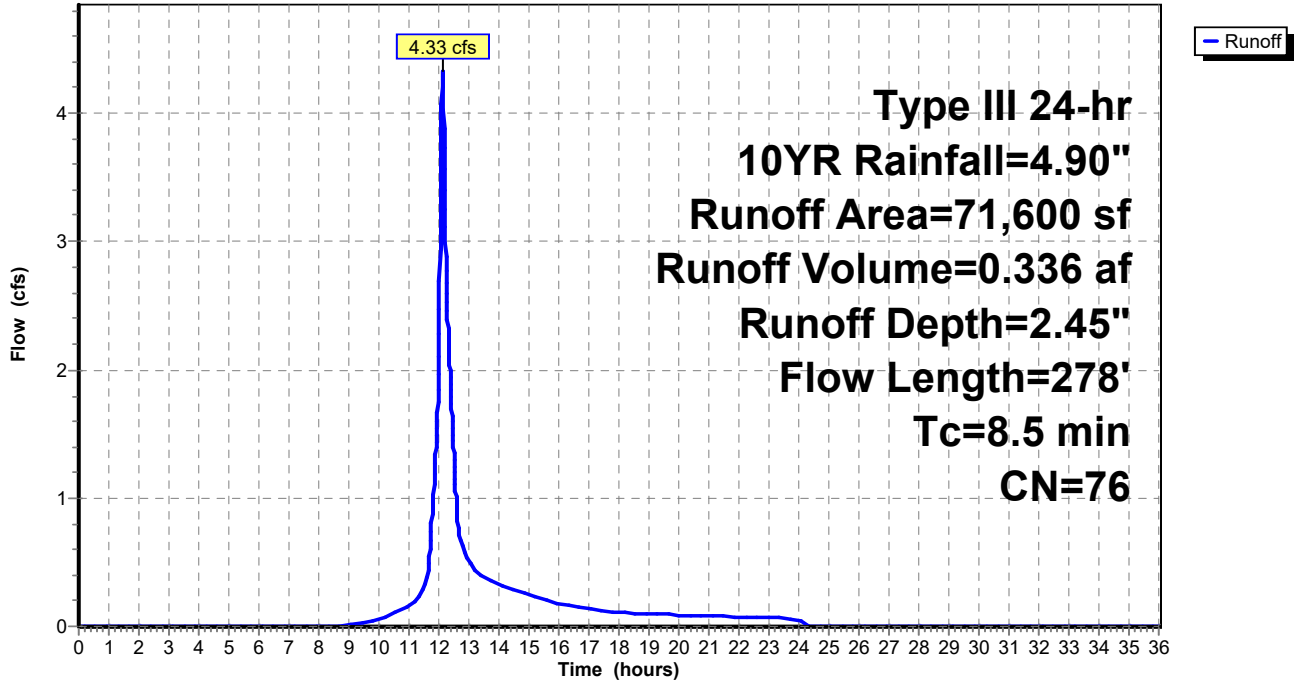
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=4.90"

Area (sf)	CN	Description
22,322	39	>75% Grass cover, Good, HSG A
6,628	61	>75% Grass cover, Good, HSG B
40,002	98	Paved parking, HSG A
2,648	98	Paved parking, HSG B
71,600	76	Weighted Average
28,950		40.43% Pervious Area
42,650		59.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0174	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.41"
0.4	29	0.0344	1.30		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.6	69	0.0112	0.74		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	20	0.0112	2.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	110	0.0330	3.69		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.5	278	Total			

Subcatchment 300: PDA300

Hydrograph



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Type III 24-hr 10YR Rainfall=4.90"

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Summary for Subcatchment 400: PDA400

Runoff = 0.39 cfs @ 12.08 hrs, Volume= 0.027 af, Depth= 2.63"

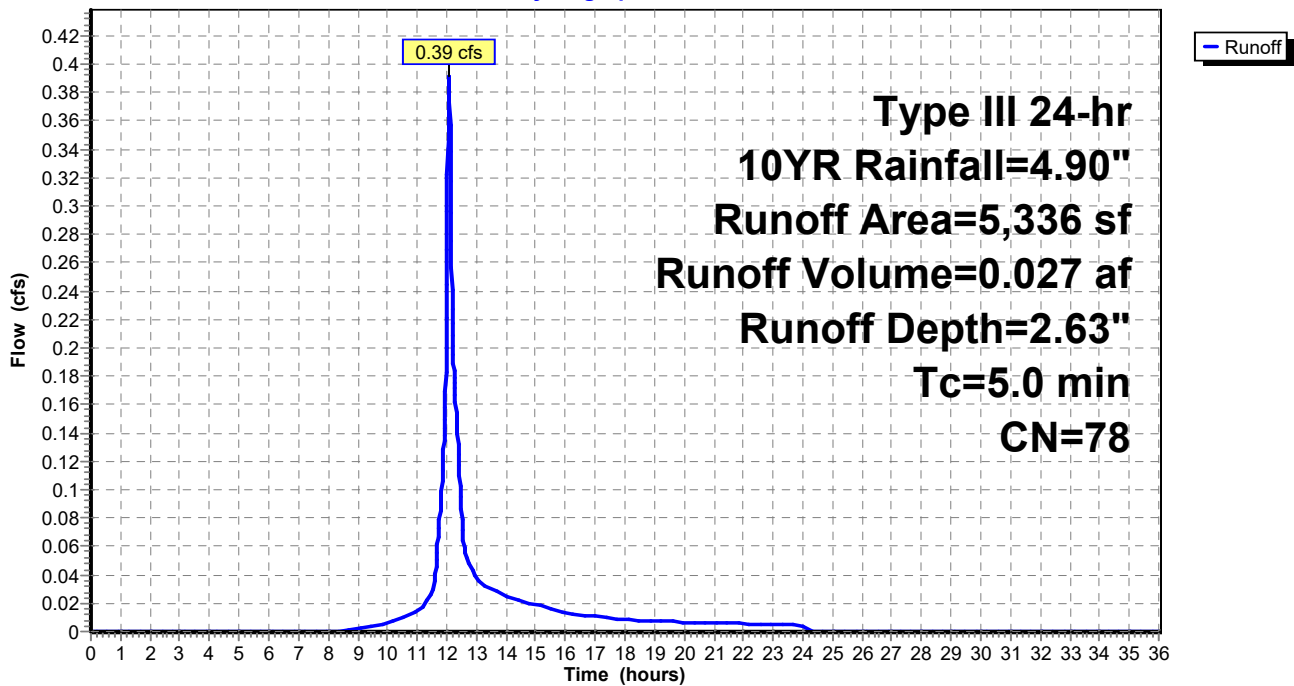
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YR Rainfall=4.90"

Area (sf)	CN	Description
1,781	39	>75% Grass cover, Good, HSG A
3,555	98	Paved parking, HSG A
5,336	78	Weighted Average
1,781		33.38% Pervious Area
3,555		66.62% Impervious Area

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

Subcatchment 400: PDA400

Hydrograph



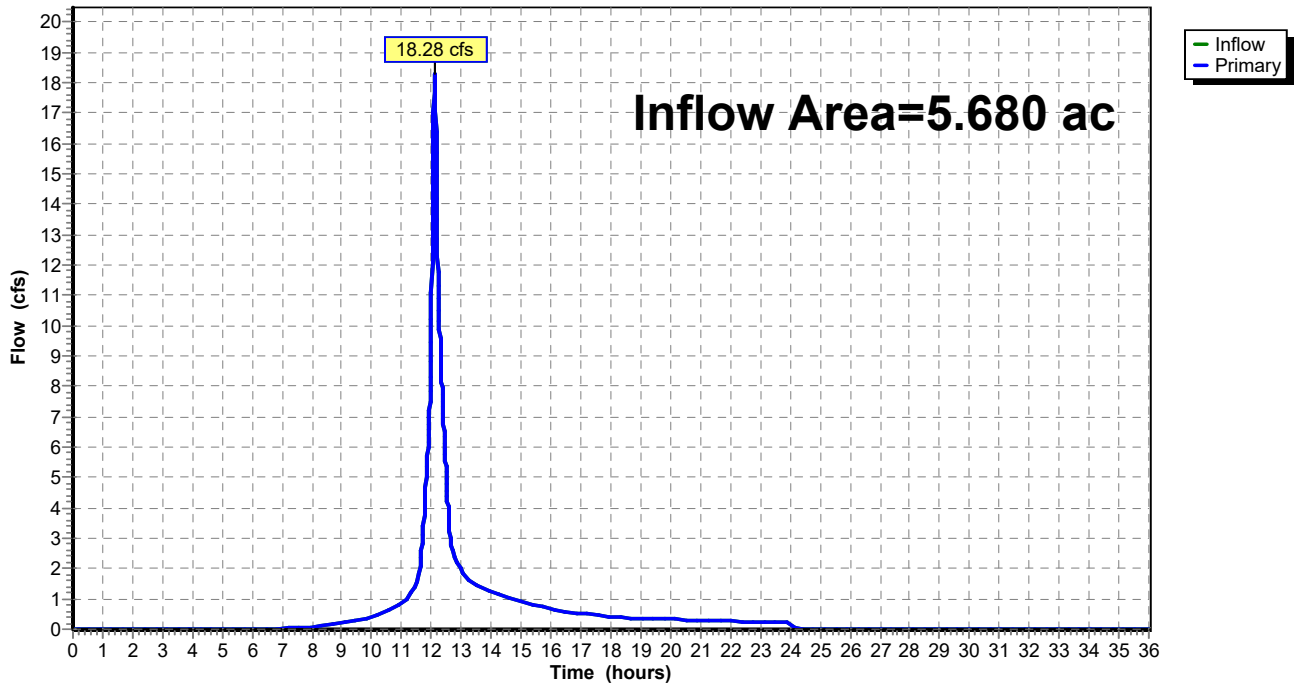
Summary for Link 1: PO1-1

Inflow Area = 5.680 ac, 61.80% Impervious, Inflow Depth = 2.97" for 10YR event
Inflow = 18.28 cfs @ 12.10 hrs, Volume= 1.404 af
Primary = 18.28 cfs @ 12.10 hrs, Volume= 1.404 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 1: PO1-1

Hydrograph



C-DAT-2001487-PostConstruction*Type III 24-hr 25YR Rainfall=6.10"*

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment100: PDA100

Runoff Area=133,268 sf 59.12% Impervious Runoff Depth=4.18"
Flow Length=322' Tc=7.8 min CN=83 Runoff=13.94 cfs 1.067 af

Subcatchment200: PDA200

Runoff Area=37,217 sf 75.02% Impervious Runoff Depth=4.72"
Tc=5.0 min CN=88 Runoff=4.73 cfs 0.336 af

Subcatchment300: PDA300

Runoff Area=71,600 sf 59.57% Impervious Runoff Depth=3.47"
Flow Length=278' Tc=8.5 min CN=76 Runoff=6.13 cfs 0.475 af

Subcatchment400: PDA400

Runoff Area=5,336 sf 66.62% Impervious Runoff Depth=3.67"
Tc=5.0 min CN=78 Runoff=0.55 cfs 0.037 af

Link 1: PO1-1

Inflow=24.80 cfs 1.915 af
Primary=24.80 cfs 1.915 af

Total Runoff Area = 5.680 ac Runoff Volume = 1.915 af Average Runoff Depth = 4.05"
38.20% Pervious = 2.170 ac 61.80% Impervious = 3.510 ac

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Type III 24-hr 25YR Rainfall=6.10"

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Summary for Subcatchment 100: PDA100

Runoff = 13.94 cfs @ 12.11 hrs, Volume= 1.067 af, Depth= 4.18"

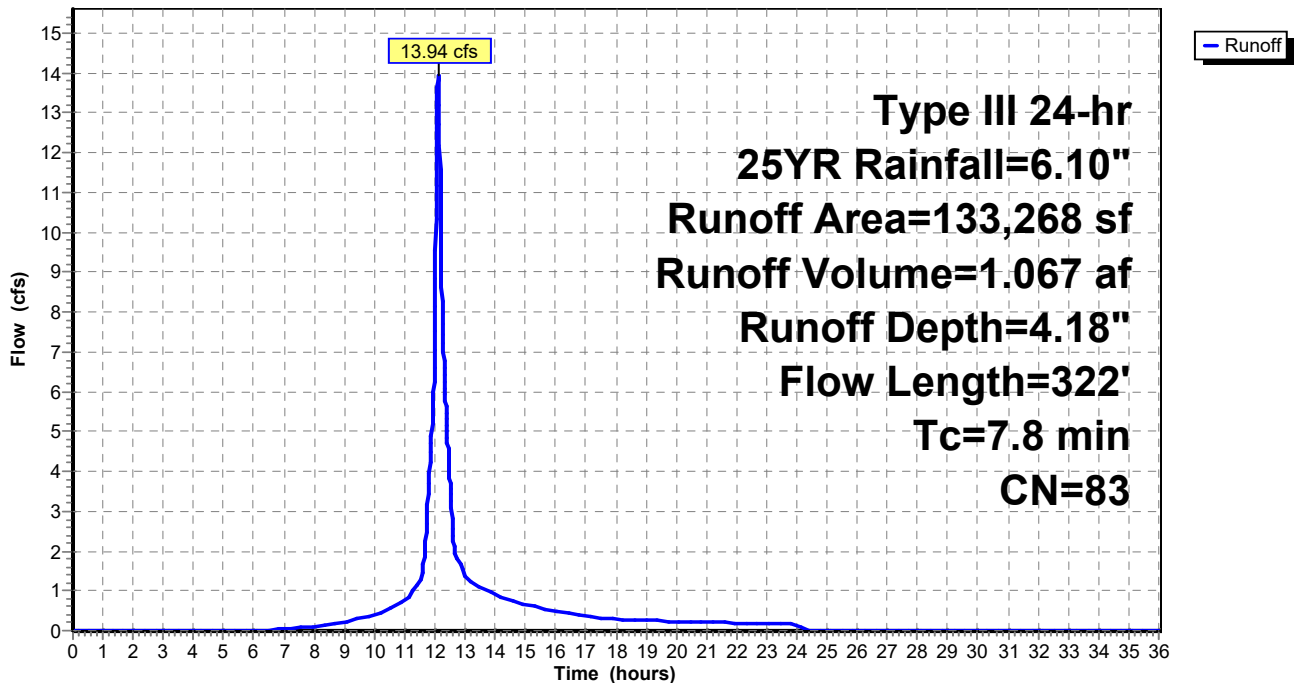
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YR Rainfall=6.10"

Area (sf)	CN	Description
54,481	61	>75% Grass cover, Good, HSG B
78,787	98	Paved parking, HSG B
133,268	83	Weighted Average
54,481		40.88% Pervious Area
78,787		59.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0980	0.13		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.41"
0.4	52	0.0980	2.19		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.0	12	0.4580	13.74		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.9	208	0.0360	3.85		Shallow Concentrated Flow, Paved Kv= 20.3 fps
7.8	322	Total			

Subcatchment 100: PDA100

Hydrograph



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Type III 24-hr 25YR Rainfall=6.10"

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Summary for Subcatchment 200: PDA200

Runoff = 4.73 cfs @ 12.07 hrs, Volume= 0.336 af, Depth= 4.72"

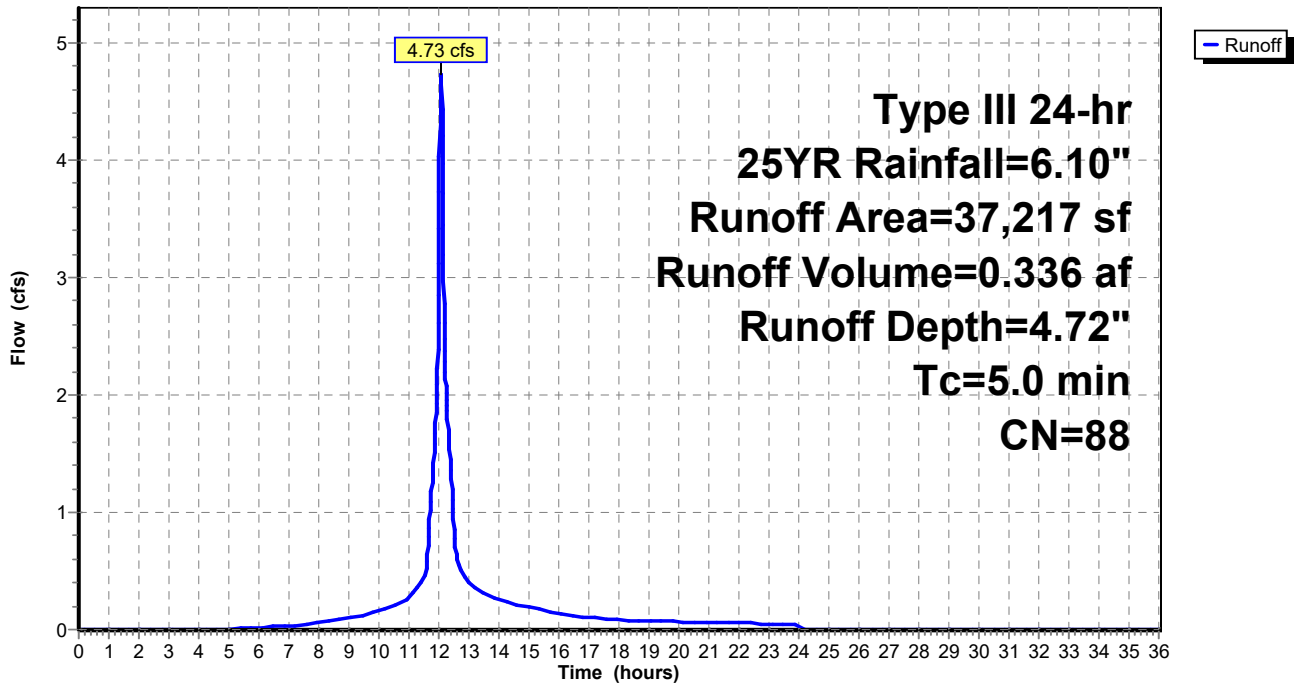
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YR Rainfall=6.10"

Area (sf)	CN	Description
1,923	39	>75% Grass cover, Good, HSG A
7,375	61	>75% Grass cover, Good, HSG B
13,347	98	Paved parking, HSG A
14,572	98	Paved parking, HSG B
37,217	88	Weighted Average
9,298		24.98% Pervious Area
27,919		75.02% Impervious Area

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

Subcatchment 200: PDA200

Hydrograph



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Type III 24-hr 25YR Rainfall=6.10"

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Summary for Subcatchment 300: PDA300

Runoff = 6.13 cfs @ 12.12 hrs, Volume= 0.475 af, Depth= 3.47"

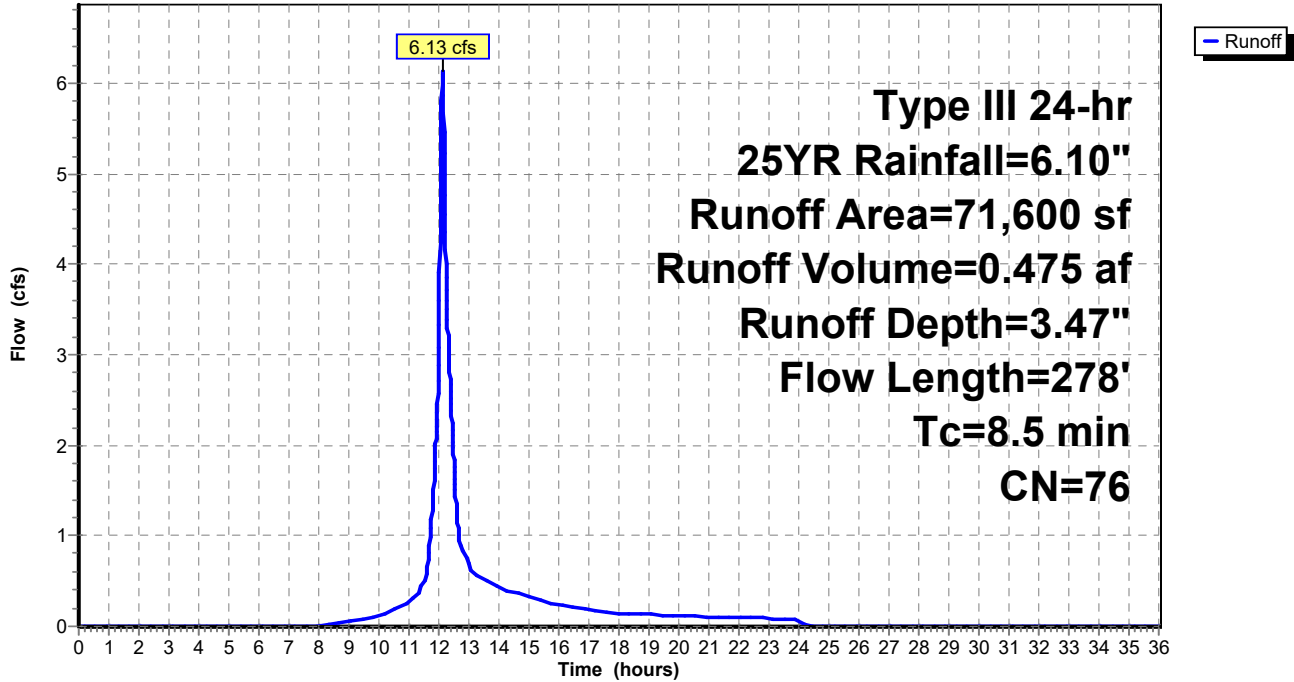
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YR Rainfall=6.10"

Area (sf)	CN	Description
22,322	39	>75% Grass cover, Good, HSG A
6,628	61	>75% Grass cover, Good, HSG B
40,002	98	Paved parking, HSG A
2,648	98	Paved parking, HSG B
71,600	76	Weighted Average
28,950		40.43% Pervious Area
42,650		59.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0174	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.41"
0.4	29	0.0344	1.30		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.6	69	0.0112	0.74		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	20	0.0112	2.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	110	0.0330	3.69		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.5	278	Total			

Subcatchment 300: PDA300

Hydrograph



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Type III 24-hr 25YR Rainfall=6.10"

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Summary for Subcatchment 400: PDA400

Runoff = 0.55 cfs @ 12.07 hrs, Volume= 0.037 af, Depth= 3.67"

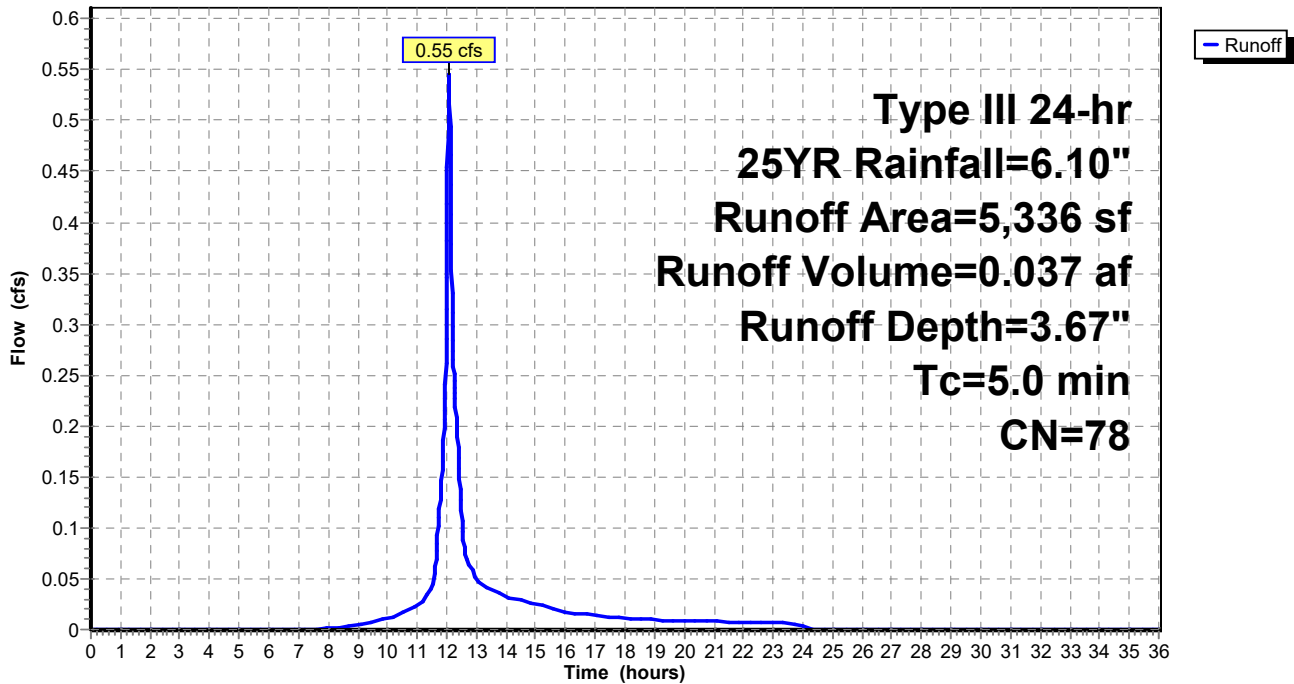
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YR Rainfall=6.10"

Area (sf)	CN	Description
1,781	39	>75% Grass cover, Good, HSG A
3,555	98	Paved parking, HSG A
5,336	78	Weighted Average
1,781		33.38% Pervious Area
3,555		66.62% Impervious Area

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

Subcatchment 400: PDA400

Hydrograph



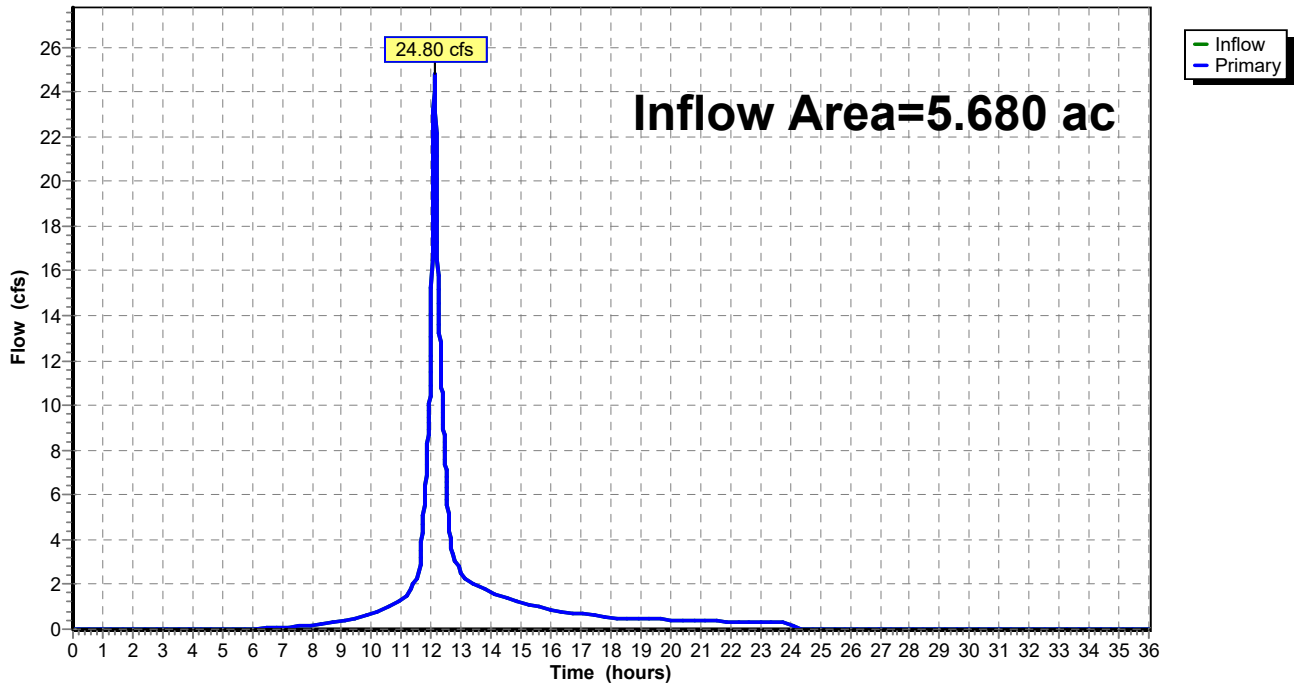
Summary for Link 1: PO1-1

Inflow Area = 5.680 ac, 61.80% Impervious, Inflow Depth = 4.05" for 25YR event
Inflow = 24.80 cfs @ 12.10 hrs, Volume= 1.915 af
Primary = 24.80 cfs @ 12.10 hrs, Volume= 1.915 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 1: PO1-1

Hydrograph



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Type III 24-hr 100YR Rainfall=8.50"

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Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment100: PDA100

Runoff Area=133,268 sf 59.12% Impervious Runoff Depth=6.46"
Flow Length=322' Tc=7.8 min CN=83 Runoff=21.12 cfs 1.646 af

Subcatchment200: PDA200

Runoff Area=37,217 sf 75.02% Impervious Runoff Depth=7.06"
Tc=5.0 min CN=88 Runoff=6.91 cfs 0.502 af

Subcatchment300: PDA300

Runoff Area=71,600 sf 59.57% Impervious Runoff Depth=5.61"
Flow Length=278' Tc=8.5 min CN=76 Runoff=9.86 cfs 0.769 af

Subcatchment400: PDA400

Runoff Area=5,336 sf 66.62% Impervious Runoff Depth=5.85"
Tc=5.0 min CN=78 Runoff=0.86 cfs 0.060 af

Link 1: PO1-1

Inflow=37.96 cfs 2.977 af
Primary=37.96 cfs 2.977 af

Total Runoff Area = 5.680 ac Runoff Volume = 2.977 af Average Runoff Depth = 6.29"
38.20% Pervious = 2.170 ac 61.80% Impervious = 3.510 ac

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Type III 24-hr 100YR Rainfall=8.50"

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Summary for Subcatchment 100: PDA100

Runoff = 21.12 cfs @ 12.11 hrs, Volume= 1.646 af, Depth= 6.46"

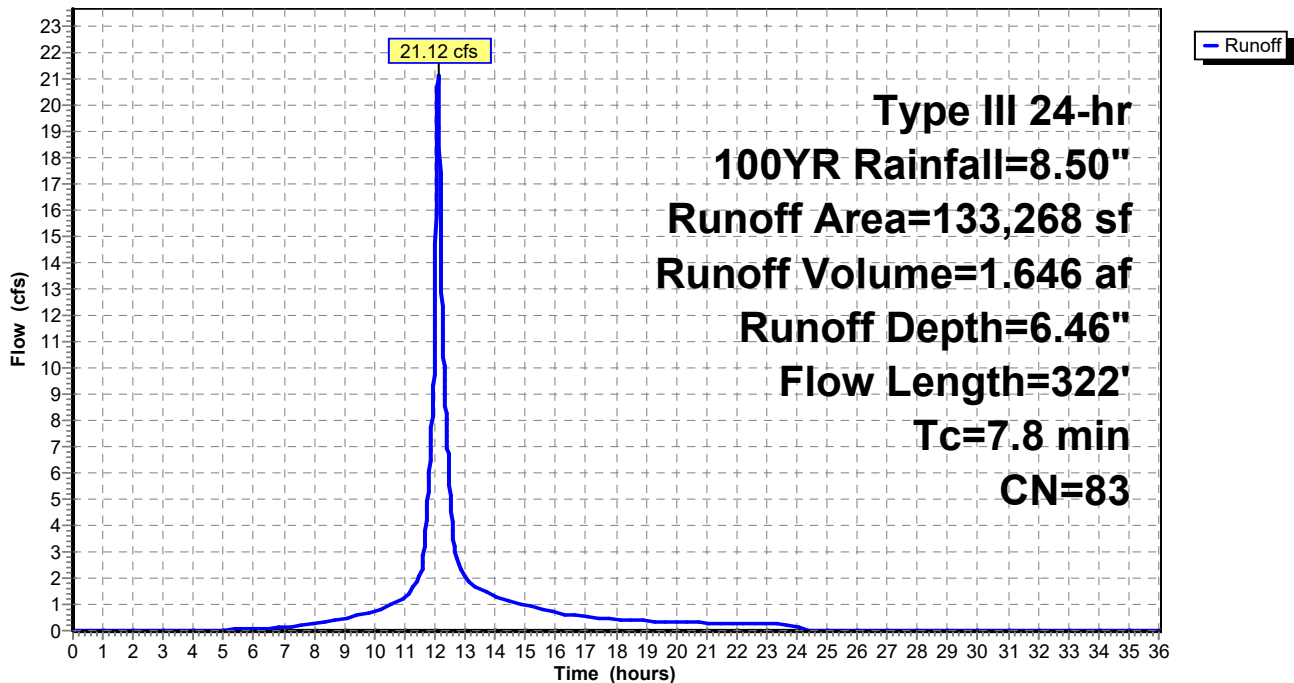
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR Rainfall=8.50"

Area (sf)	CN	Description
54,481	61	>75% Grass cover, Good, HSG B
78,787	98	Paved parking, HSG B
133,268	83	Weighted Average
54,481		40.88% Pervious Area
78,787		59.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.0980	0.13		Sheet Flow, Grass: Bermuda n= 0.410 P2= 3.41"
0.4	52	0.0980	2.19		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.0	12	0.4580	13.74		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.9	208	0.0360	3.85		Shallow Concentrated Flow, Paved Kv= 20.3 fps
7.8	322	Total			

Subcatchment 100: PDA100

Hydrograph



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Type III 24-hr 100YR Rainfall=8.50"

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Summary for Subcatchment 200: PDA200

Runoff = 6.91 cfs @ 12.07 hrs, Volume= 0.502 af, Depth= 7.06"

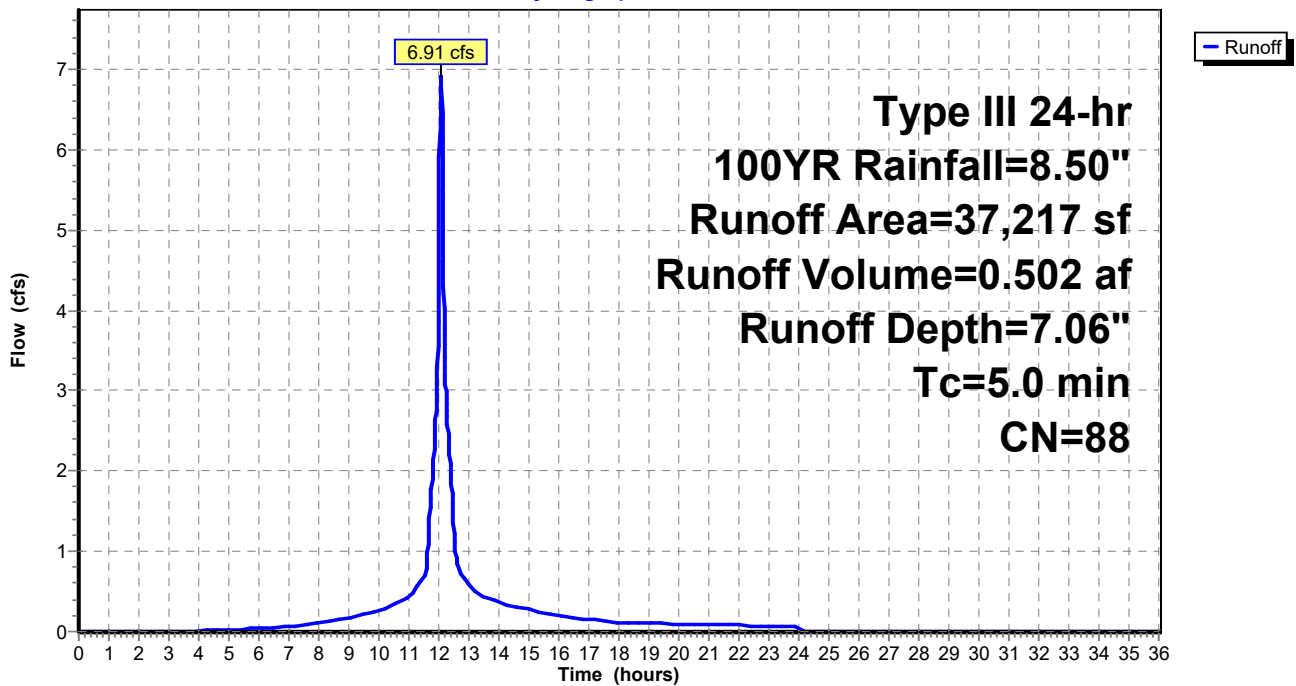
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR Rainfall=8.50"

Area (sf)	CN	Description
1,923	39	>75% Grass cover, Good, HSG A
7,375	61	>75% Grass cover, Good, HSG B
13,347	98	Paved parking, HSG A
14,572	98	Paved parking, HSG B
37,217	88	Weighted Average
9,298		24.98% Pervious Area
27,919		75.02% Impervious Area

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

Subcatchment 200: PDA200

Hydrograph



C-DAT-2001487-PostConstruction

Type III 24-hr 100YR Rainfall=8.50"

Prepared by BL Companies

Printed 5/25/2021

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Summary for Subcatchment 300: PDA300

Runoff = 9.86 cfs @ 12.12 hrs, Volume= 0.769 af, Depth= 5.61"

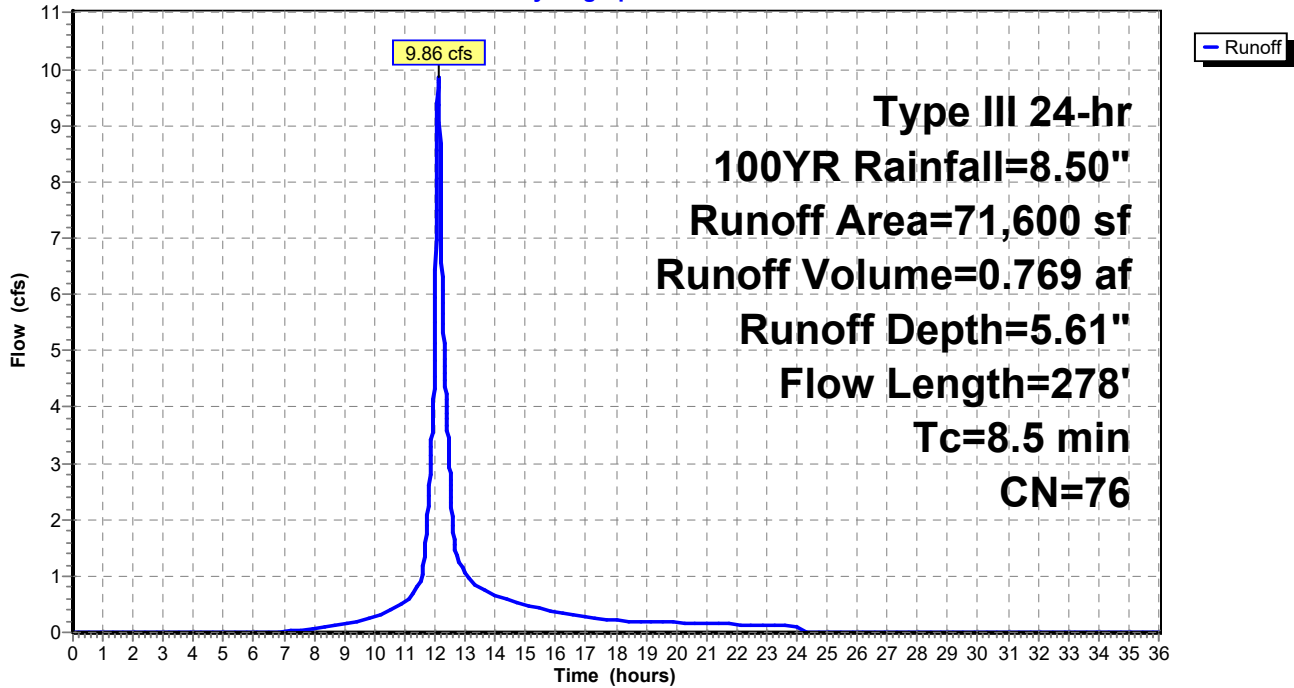
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR Rainfall=8.50"

Area (sf)	CN	Description
22,322	39	>75% Grass cover, Good, HSG A
6,628	61	>75% Grass cover, Good, HSG B
40,002	98	Paved parking, HSG A
2,648	98	Paved parking, HSG B
71,600	76	Weighted Average
28,950		40.43% Pervious Area
42,650		59.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	50	0.0174	0.14		Sheet Flow, Grass: Short n= 0.150 P2= 3.41"
0.4	29	0.0344	1.30		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.6	69	0.0112	0.74		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.2	20	0.0112	2.15		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	110	0.0330	3.69		Shallow Concentrated Flow, Paved Kv= 20.3 fps
8.5	278	Total			

Subcatchment 300: PDA300

Hydrograph



C-DAT-2001487-PostConstruction

Type III 24-hr 100YR Rainfall=8.50"

Prepared by BL Companies

Printed 5/25/2021

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Summary for Subcatchment 400: PDA400

Runoff = 0.86 cfs @ 12.07 hrs, Volume= 0.060 af, Depth= 5.85"

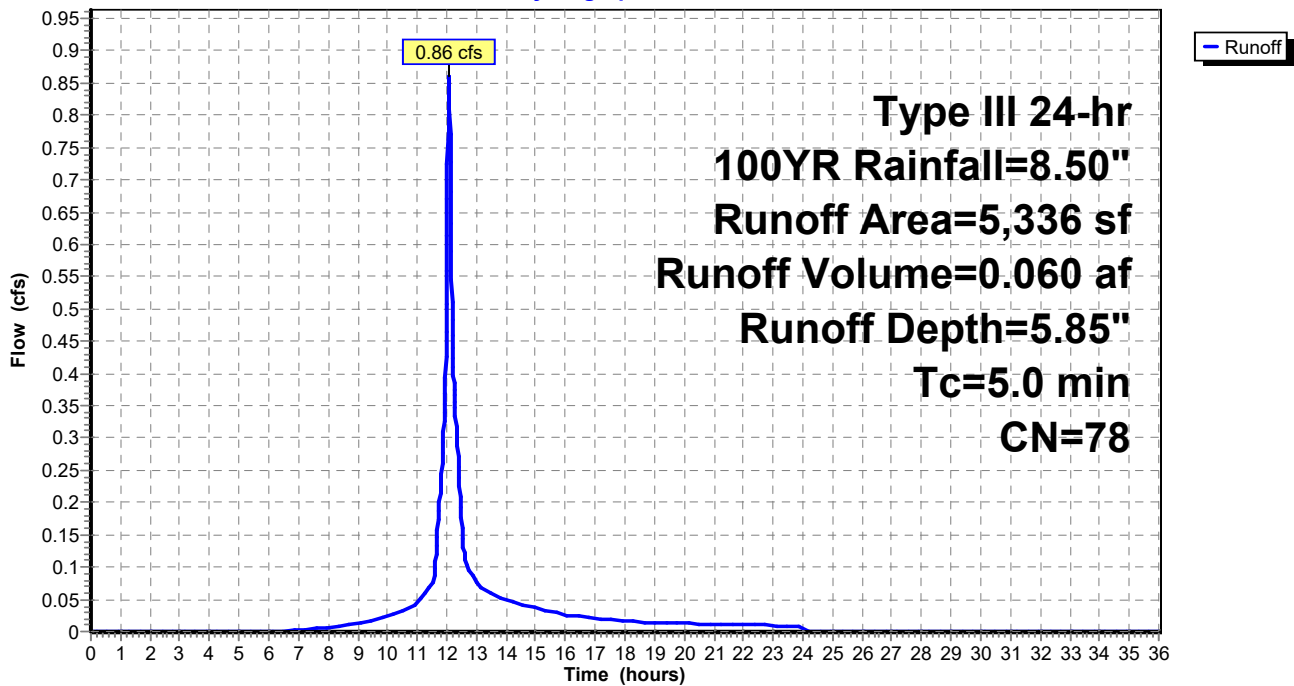
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR Rainfall=8.50"

Area (sf)	CN	Description
1,781	39	>75% Grass cover, Good, HSG A
3,555	98	Paved parking, HSG A
5,336	78	Weighted Average
1,781		33.38% Pervious Area
3,555		66.62% Impervious Area

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

Subcatchment 400: PDA400

Hydrograph



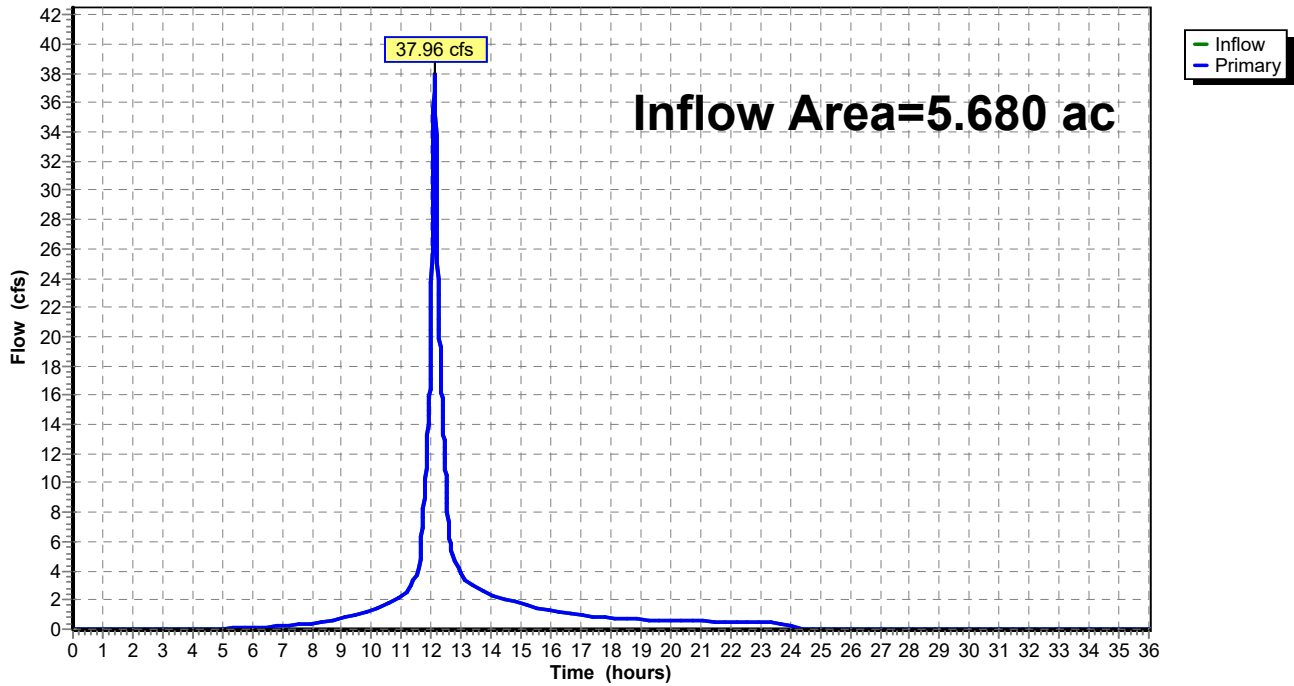
Summary for Link 1: PO1-1

Inflow Area = 5.680 ac, 61.80% Impervious, Inflow Depth = 6.29" for 100YR event
Inflow = 37.96 cfs @ 12.10 hrs, Volume= 2.977 af
Primary = 37.96 cfs @ 12.10 hrs, Volume= 2.977 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Link 1: PO1-1

Hydrograph



ATTACHMENT F

WATER QUALITY CALCULATIONS

RECHARGE CALCULATIONS

TSS REMOVAL WORKSHEETS

Pollutant Removal Calculations

Prepared for:
Downtown Redevelopment Project
Elm Street
Millbury, Massachusetts

Prepared by:
BL Companies
220 Norwood Park
Norwood, MA

Pollutant Loading Factors - Commercial Land Use

Loading Factor	
TSS (lb/ac/yr)	377.39
TN (lb/ac/yr)	15.08
TP (lb/ac/yr)	1.78

BMP	TSS Removal Rate	TP Removal Rate	TN Removal Rate
Bioswale	0.70	0.55	0.50
Rain Garden	0.90	0.60	0.40
Porous Paver	0.80	0.60	0.40
Deep Hooded Sump Catch Basin	0.35	--	--

Discharge Location	Drainage Area (sf)	Impervious Area (sf)	Water Quality Volume Required (CF)	Water Quality Volume Provided (CF)	Incoming TSS (lb)	Incoming TN (lb)	Incoming TP (lb)
Bioswale	26,288	12,973	1,081	0	112.39	4.49	0.53
Rain Garden	95,522	63,841	5,320	7,479	553.10	22.10	2.61
Porous Paver	42,855	13,825	1,152	4,704	119.78	4.79	0.56
Deep Hooded Sump Catch Basin	19,872	12,172	1,014	0	105.45	4.21	0.50
Existing System	61,537	49,774	4,148	0	431.23	17.23	2.03

BMP	Incoming TSS (lb)	TSS Removal (lb)	Incoming TP (lb)	TP Removal (lb)	Incoming TN (lb)	TN Removal (lb)
Bioswale	112.39	78.68	0.53	0.29	4.49	2.25
Rain Garden	553.10	497.79	2.61	1.57	22.10	8.84
Porous Paver	119.78	95.82	0.56	0.34	4.79	1.91
Deep Hooded Sump Catch Basin	105.45	36.91	0.50	--	4.21	--
Existing System	431.23	--	2.03	--	17.23	--

Pollutant Removal Summary

Value	lb/yr (cf for Water Quality Volume)	Removal Percentage
TSS Removal	709.19	0.54
TN Removal	13.00	0.25
TP Removal	2.20	0.35
Water Quality Volume Required	12,715	
Water Quality Volume Provided	13,502	

1. Loading Factors for TSS, TN and TP are based on values accepted by EPA in the MS4 Permit.
2. Removal rates obtained from MassDEP Stormwater Handbook
3. Water Quality Volume was calculated by multiplying 1 in times the impervious cover.
4. Google earth and the Town of Millbury GIS system was used to supplement the survey to determine existing land use cover and existing topography
5. Project is considered a redevelopment project, therefore pretreatment is not required to meet TSS removal rates

Green Infrastructure BMPs

BMP	Catchment Size (sf)	Impervious Area Draining to BMP (sf)	BMP Surface Area (sf)	Surface Volume (cf)	Subsurface Volume (cf)	Total Volume (cf)	Required Water Quality Volume (cf)	TSS Removal Rate	Meets Min. Size Requirement
RG-1	3,763	2,268	777	389	1,036	1,425	189	80%	Yes
RG-2	3,740	2,399	705	353	940	1,293	200	80%	Yes
RG-3	3,692	2,053	149	75	199	273	171	80%	No
RG-4	2,780	2,544	137	69	183	251	212	80%	No
RG-5	2,650	2,126	175	88	233	321	177	80%	Yes
RG-6	10,890	9,912	174	87	232	319	826	80%	No
RG-7	15,659	7,787	460	230	613	843	649	80%	No
RG-8	4,402	3,516	80	40	107	147	293	80%	No
RG-9	6,478	4,878	272	136	363	499	407	80%	No
RG-10	24,318	16,319	145	73	193	266	1,360	80%	No
RG-11	5,937	263	745	373	993	1,366	22	80%	Yes
RG-12	2,880	2,299	478	239	637	876	192	80%	Yes
RG-13	7,070	6,312	230	115	307	422	526	80%	No
RG-14	3,270	3,172	115	58	153	211	264	80%	No
Pavers-1	1,718	539	157	0	209	209	45	80%	Yes
Pavers-2	3,849	2,131	152	0	203	203	178	80%	Yes
Pavers-4	2,903	867	111	0	148	148	72	80%	Yes
Pavers-5	6,433	1,548	161	0	215	215	129	80%	Yes
Pavers-6	698	698	157	0	209	209	58	80%	Yes
Pavers-7	15,188	3,022	265	0	353	353	252	80%	Yes
Paver-11	7,172	2,096	489	0	652	652	175	80%	Yes
Pavers-12	1,927	1,063	558	0	744	744	89	80%	Yes
Pavers-13	1,064	845	816	0	1,088	1,088	70	80%	Yes
Pavers-15	1,872	985	136	0	181	181	82	80%	Yes
Pavers-16	486	486	60	0	80	80	41	80%	Yes

Notes:

1. To calculate surface volume rain gardens were assumed to have an open ponding depth of 6" (MassDEP Stormwater Standard)
2. Rain Gardens have a subsurface depth of 40 inches
3. Porous Pavers have a subsurface depth of 27 inches
4. Assume subsurface depth is 40% voids
5. Required Water Quality Volume is 1 inches times the impervious area
6. Per MassDEP Stormwater Handbook, porous pavers provide 80% TSS removal if BMP is sized to hold the required Water Quality Volume
7. Redevelopment projects do not need to provide pretreatment for TSS removal
8. Per MassDEP Stormwater Handbook, rain garden surface area shall be a min. 5% of the area draining to them

Pollutant Removal Retention Requirement

Post Construction Impervious Area (sf)	Rainfall (inch)	Required Retention Volume (cf)	Provided Retention Volume (cf)
157,260	0.80	10,484	12,593

Water Quality Volume Summary

$$V_{WQ} = (D_{WQ} / 12 \text{ in/ft}) \times (A_{IMP}) \text{ where:}$$

V_{WQ} = Required Water Quality Volume [CF]

D_{WQ} = Water Quality Depth : 1-inch for discharges within a Zone II or Interim Wellhead Protection Area, to or near critical areas, runoff from LUHPPL, or exfiltration to soil with infiltration rate 2.4 in/hr or greater; ½-inch for discharges to other areas.

A_{IMP} = Post-development Impervious Area; may exclude roof top areas [Ac]

Required Water Quality Volume:

Drainage Area/ Treatment Train	A_{IMP} [SF]	D_{WQ} [in]	V_{WQ} Required [CF]	Water Quality Volume Provided [CF]
Rain Garden 1	2,268	1	189	1,425
Rain Garden 2	2,399	1	200	1,293
Rain Garden 3	2,053	1	171	273
Rain Garden 4	2,544	1	212	251
Rain Garden 5	2,126	1	177	321
Rain Garden 6	9,912	1	826	319
Rain Garden 7	7,787	1	649	843
Rain Garden 8	3,516	1	293	147
Rain Garden 9	4,878	1	407	499
Rain Garden 10	16,319	1	1,360	266
Rain Garden 11	263	1	22	1,366
Rain Garden 12	2,299	1	192	876
Rain Garden 13	4,305	1	359	422
Rain Garden 14	3,172	1	264	211
Porous Paver 1	539	1	45	209
Porous Paver 2	2,131	1	178	203
Porous Paver 4	867	1	72	148
Porous Paver 5	1,548	1	129	215
Porous Paver 6	698	1	58	209
Porous Paver 7	3,022	1	252	353
Porous Paver 11	2,096	1	175	652
Porous Paver 12	608	1	51	744
Porous Paver 13	845	1	70	1,088
Porous Paver 15	985	1	82	181
Porous Paver 16	486	1	41	80
Area not Draining to BMP	74,919	1	6,243	
Total Required Water Quality Volume (cf):			12,715	
Total Provided Water Quality Volume (CF):				12,593

Groundwater Recharge Requirement

Groundwater Recharge Volume Required:

$R_v = F \times \text{Impervious Area}$, where:

R_v = Required Recharge Volume [Ac-ft]

F = Target Depth Factor associated with each Hydrologic Soil Group (HSG) [in]

Impervious Area = Total Pavement and Rooftop Area under Post-development Conditions [Ac]

			Impervious Area (sf)	Required Recharge Volume (cf)
HSG "A", use F =	0.6	in	58,232	2,912
HSG "B", use F =	0.35	in	99,028	2,888
HSG "C", use F =	0.25	in		0
HSG "D", use F =	0.1	in		0
Total Required Recharge Volume (Rv) =				<u>5,800</u> cf

Capture Area Adjustment: (Ref: DEP Handbook V.3 Ch.1 P.27-28)

Total Site Impervious Area (Total)= 152,585 SF

Impervious Area Draining to Infiltrative BMPs (infil) = 77,666

Percent Imp. Area Draining to Infiltrative BMPs = 50.9%

Less than 66% of the Site drains to an infiltrative BMP - Project Does not comply with the standard

Capture Area Adjustment Factor = (Total)/(Infil) = Ca = 1.96

Adjusted Required Recharge Volume = Ca x Rv **11,395** cf

Groundwater Recharge Volume Provided :

BMP	Provided Recharge Volume (cf)	Impervious Area Draining to Infiltrative BMP (sf)
Rain Garden 1	1,425	2,268
Rain Garden 2	1,293	2,399
Rain Garden 3	273	2,053
Rain Garden 4	251	2,544
Rain Garden 5	321	2,126
Rain Garden 6	319	9,912
Rain Garden 7	843	7,787
Rain Garden 8	147	3,516
Rain Garden 9	499	4,878
Rain Garden 10	266	16,319
Rain Garden 11	1,366	263
Rain Garden 12	876	2,299
Rain Garden 13	422	6,312
Rain Garden 14	211	3,172
Porous Paver 1	209	539
Porous Paver 2	203	2,131
Porous Paver 4	148	867
Porous Paver 5	215	1,548
Porous Paver 6	209	698
Porous Paver 7	353	3,022
Porous Paver 11	652	2,096
Porous Paver 12	744	1,063
Porous Paver 13	1,088	845
Porous Paver 15	181	985
Porous Paver 16	80	486
Total Provided Recharge Volume (sf)=	12,593	
Total Impervious Area Draining to Infiltrative BMP (sf) =		80,128

DrawDown Time

$$\text{Drawdown Time} = \frac{\text{Rv}}{\text{(K) (Bottom Area)}}$$

where:

Rv = Storage Volume Below Outlet [cf]

K= Infiltration Rate [in/hr]

Bottom Area= Bottom Area of Recharge System [sf]

Stormwater BMP	Rv (cf)	K (in/hr)	Bottom Area (sf)	Drawdown Time (hr)
Rain Garden 1	1,425	2.41	777	0.76
Rain Garden 2	1,293	2.41	705	0.76
Rain Garden 3	273	2.41	149	0.76
Rain Garden 4	251	1.02	137	1.80
Rain Garden 5	321	1.02	175	1.80
Rain Garden 6	319	1.02	174	1.80
Rain Garden 7	843	1.02	460	1.80
Rain Garden 8	147	1.02	80	1.80
Rain Garden 9	499	1.02	272	1.80
Rain Garden 10	266	1.02	145	1.80
Rain Garden 11	1,366	1.02	745	1.80
Rain Garden 12	876	1.02	478	1.80
Rain Garden 13	422	1.02	230	1.80
Rain Garden 14	211	2.41	115	0.76
Porous Paver 1	209	1.02	157	1.31
Porous Paver 2	203	1.02	152	1.31
Porous Paver 4	148	1.02	111	1.31
Porous Paver 5	215	1.02	161	1.31
Porous Paver 6	209	1.02	157	1.31
Porous Paver 7	353	1.02	265	1.31
Porous Paver 11	652	1.02	489	1.31
Porous Paver 12	744	1.02	558	1.31
Porous Paver 13	1,088	1.02	816	1.31
Porous Paver 15	181	1.02	136	1.31
Porous Paver 16	80	1.02	60	1.31

INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location:

	B	C	D	E	F
	BMP ¹	TSS Removal Rate ¹	Starting TSS Load*	Amount Removed (C*D)	Remaining Load (D-E)
TSS Removal Calculation Worksheet	Street Sweeping - 10%	0.10	1.00	0.10	0.90
	Water Quality Swale - Wet	0.70	0.90	0.63	0.27
		0.00	0.27	0.00	0.27
		0.00	0.27	0.00	0.27
		0.00	0.27	0.00	0.27

Total TSS Removal =

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project:
 Prepared By:
 Date:

*Equals remaining load from previous BMP (E) which enters the BMP

INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location:

	B	C	D	E	F
	BMP ¹	TSS Removal Rate ¹	Starting TSS Load*	Amount Removed (C*D)	Remaining Load (D-E)
TSS Removal Calculation Worksheet	Street Sweeping - 10%	0.10	1.00	0.10	0.90
	Porous Pavement	0.80	0.90	0.72	0.18
		0.00	0.18	0.00	0.18
		0.00	0.18	0.00	0.18
		0.00	0.18	0.00	0.18

Total TSS Removal =

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project:
 Prepared By:
 Date:

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
 1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location:

	B	C	D	E	F
	BMP ¹	TSS Removal Rate ¹	Starting TSS Load*	Amount Removed (C*D)	Remaining Load (D-E)
TSS Removal Calculation Worksheet	Street Sweeping - 10%	0.10	1.00	0.10	0.90
	Rain Garden	0.90	0.90	0.81	0.09
		0.00	0.09	0.00	0.09
		0.00	0.09	0.00	0.09
		0.00	0.09	0.00	0.09

Total TSS Removal =

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project:
 Prepared By:
 Date:

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
 1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location:

	B	C	D	E	F
	BMP ¹	TSS Removal Rate ¹	Starting TSS Load*	Amount Removed (C*D)	Remaining Load (D-E)
TSS Removal Calculation Worksheet	Street Sweeping - 10%	0.10	1.00	0.10	0.90
	Deep Sump and Hooded Catch Basin	0.25	0.90	0.23	0.68
		0.00	0.68	0.00	0.68
		0.00	0.68	0.00	0.68
		0.00	0.68	0.00	0.68

Total TSS Removal =

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project:
 Prepared By:
 Date:

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
 1. From MassDEP Stormwater Handbook Vol. 1