STORMWATER REPORT
5-7 ELM STREET
NEWTON, MASSACHUSETTS

June 9, 2014
Revised: November 18, 2014;
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INTRODUCTION

VTP Associates has performed a stormwater management analysis to evaluate the post-development impacts created by the proposed residential at #5-7 Elm Street in Newton, Massachusetts. The project shall consist of a residential with 4 units, a surface driveway, landscaped areas, and an associated stormwater management system.

VTP Associates analyzed the hydrology for the drainage areas impacted by the proposed work utilizing the Soil Conservation Service's (SCS) Runoff Curve Number (CN) methodology. VTP Associates used the HydroCAD computer modeling system in conjunction with the SCS's methods to determine the peak rate of runoff for the 2, 10, and 100-year storm events.

VTP Associates proposes the use of best management practices (BMPs) as defined by the Massachusetts Department of Environmental Protection (MA DEP) for stormwater management onsite to protect downstream receiving waters from adverse water quality impacts due to stormwater runoff. Mitigating the rate and quality of stormwater runoff from the project site will also help to lessen the environmental impact of the proposed development.

METHODOLOGY

Hydrology and Hydraulics

VTP Associates analyzed the survey base plan and conducted a site visit to determine the existing drainage flow patterns onsite. The existing conditions survey, in conjunction with aerial photography, and site visits were used to determine existing surface coverage areas for the site. VTP Associates determined that a majority of the pre-developed surface cover for the study area is pervious cover. The balance of the study area consists mainly of a lightly wooded area and lawn. Initial soil research was determined using the Natural Resources Conservation Service (NRCS) soil survey maps for Middlesex County, Massachusetts via Web Soil Survey 1.1. According to the soil survey, the soil on the site consists of the following:

626B: Merrimac-Urban Land Complex

Soil borings were conducted (by others) and determined that the site consists of high draining sand. Based upon these findings, VTP Associates used a Hydrologic soil group 'A' for its drainage calculations. As per the Mass DEP Stormwater Hydrology Handbook for Conservation Commissions, VTP used a design infiltration rate of 6.0 in/hr for 'A' soils.

For each subcatchment area, VTP Associates determined drainage flow path lengths, surface cover type and slopes for sheet and shallow concentrated flow. The information was used to calculate the time of concentration (Tc) for each subcatchment areas. Where applicable, a minimum Tc of 5 minutes was used; the minimum value for highly developed, small catchment areas. SCS Runoff Curve Numbers were selected by using the cover type and hydrologic soil group of each area. The peak runoff rates for the 2, 10 and 100-year storm events were then determined by inputting the weighted CN, Tc, drainage areas, and drainage system information into the HydroCAD storm water modeling system computer program. The storm events were based on the 24-hour duration storm with a SCS Type III storm distribution curve.

Storm Event

VTP Associates used Massachusetts rainfall data maps from Technical Paper 40, Rainfall Frequency Atlas of the United States and the City of Newton's Requirements for On-Site Drainage to estimate the rainfall depth for the 2, 10 and 100-year storms. The rainfall depths for the 24-hour storm events used are as follows:

Storm Event	24-Hour Rainfall Depth (inches)
2-year	3.1
10-year	4.5
100-year	8.78

HYDROLOGICAL ANALYSIS

Pre-Development Conditions

The existing site consists of a two story residence, a driveway, and landscaped areas. The remainder of the site is lawn with some trees. Approximately 8,928 square feet (33.9%) of the site is impervious cover. The site is bound by homes to the south, northwest and southwest, River Street to the north and Elm Street to the east.

VTP Associates compiled the existing drainage areas from an existing conditions survey prepared by VTP Associates. Additionally, VTP Associates conducted site visits to evaluate the existing onsite drainage patterns and watershed divides from the existing conditions survey. At present, stormwater runoffs from the existing study are drain to the southwest (E2) and northwest (E3) abutters, to River Street to the north (E4) and Elm Street to the east (E1). The pre-development drainage areas are shown on "Figure 1: Pre-Development Drainage Areas."

Post Development Conditions

The proposed project includes the construction of a new multi-family residential, consisting in 4 units, surface driveway, landscaped areas, and associated drainage improvements. As a result, the proposed site will have approximately 11,013 square feet (41.8%) of impervious cover, which is an increase of 2,085 square feet. The same overall area was analyzed for the proposed conditions as the pre-development conditions and is shown on "Figure 2: Post-Development Drainage Areas." The post-development will include a new point of design (Swale).

The new residential will have approximately 5,863 square feet of impervious, or roof, surface and the driveway will be approximately 4,073 square feet. The roof runoff area will be collected by roof leaders and discharged into the onsite underground infiltration systems. The intent of the proposed stormwater management system is to infiltrate the clean roof runoff from the proposed buildings. The roof runoff areas are separated into four drainage areas and discharge to a respective underground infiltration system. Infiltration system #1 was designed to collect the roof runoff (PR1). Infiltration system #2 was designed to collect the roof runoff (PR2). Infiltration system #3 was designed to collect the roof runoff (PR3). Infiltration system #4 was designed to collect the roof runoff (PR4). The driveway runoff (PD1) and (PD2) will be collected by a two catch basins and discharge into onsite infiltration system #5. The driveway runoff (PD3) will be collected by a catch basin and discharge into onsite infiltration system #1. The swale runoff will be collected by four area drains and discharge into on site infiltration system #6. The six infiltration systems were designed to fully infiltrate runoff from the 100-year storm event. The remainder of the site's runoff can be seen on "Figure 2: Post-Development Drainage Areas."

VTP Associates analyzed the pre- and post-development site conditions to determine the peak rates of runoff at the design points. By incorporating the stormwater management features discussed above, the peak rates of runoff in the post-development condition is to be better than pre-development levels. Pre-development peak runoff rates vs. post-development peak runoff rates for the 2, 10, and 100-year storm events are presented in Table 1 below.

Table 1, Pre-development vs. Post-Development Peak Rate of Runoff

Design Point #1 – Elm Street (East)

STORM EVENT (DESIGN POINT)	*PRE-DEVELOPMENT PEAK RATE OF RUNOFF (CFS)*	*POST-DEVELOPMENT PEAK RATE OF RUNOFF (CFS)*	*PRE-DEVELOPMENT VOLUME OF RUNOFF (AF)*	*POST-DEVELOPMENT VOLUME OF RUNOFF (AF)*
2-YEAR	0.13	0.00	0.009	0.000
10-YEAR	0.24	0.00	0.016	0.001
100-YEAR	0.56	0.07	0.040	0.006

Design Point #2 – Southwest Abutter

STORM EVENT (DESIGN POINT)	*PRE-DEVELOPMENT PEAK RATE OF RUNOFF (CFS)*	*POST-DEVELOPMENT PEAK RATE OF RUNOFF (CFS)*	*PRE-DEVELOPMENT VOLUME OF RUNOFF (AF)*	*POST-DEVELOPMENT VOLUME OF RUNOFF (AF)*
2-YEAR	0.00	0.00	0.000	0.000
10-YEAR	0.00	0.00	0.001	0.000
100-YEAR	0.24	0.01	0.030	0.001

Design Point #3 – Northwest Abutter

STORM EVENT (DESIGN POINT)	*PRE-DEVELOPMENT PEAK RATE OF RUNOFF (CFS)*	*POST-DEVELOPMENT PEAK RATE OF RUNOFF (CFS)*	*PRE-DEVELOPMENT VOLUME OF RUNOFF (AF)*	*POST-DEVELOPMENT VOLUME OF RUNOFF (AF)*
2-YEAR	0.01	0.00	0.002	0.000
10-YEAR	0.07	0.00	0.007	0.000
100-YEAR	0.44	0.01	0.031	0.001

Design Point #4 – River Street (North)

STORM EVENT (DESIGN POINT)	*PRE-DEVELOPMENT PEAK RATE OF RUNOFF (CFS)*	*POST-DEVELOPMENT PEAK RATE OF RUNOFF (CFS)*	*PRE-DEVELOPMENT VOLUME OF RUNOFF (AF)*	*POST-DEVELOPMENT VOLUME OF RUNOFF (AF)*
2-YEAR	0.22	0.00	0.015	0.000
10-YEAR	0.39	0.01	0.027	0.002
100-YEAR	0.94	0.21	0.067	0.016

CONCLUSION

The post-development peak rates of runoff are expected to be less than pre-development rates for the 2, 10, and 100-year storm events. Although there is increased impervious coverage on the site as a result of the proposed development, the stormwater management system and the improved ground cover reduces the post-development runoff rates to less than pre-development flow rates.

ENCLOSURES

Soil Boring Log
NRCS Soil Map
Pre-Development Drainage Areas (Figure 1)
Post-Development Drainage Areas (Figure 2)
Pre & Post Development HydroCAD Calculations

TESTPIT LOG

TESTPIT #1
0–28" TOP&FILL

WATER @ 12"

TESTPIT #2
0–48" FILL
48–60" TOPSOIL
60–80" SUBSOIL
80–126 COARSE SAND
WITH GRAVEL

WATER @ 120"
NO REFUSAL
"A" SOIL

TESTPIT #3
0–32" TOP&FILL
32–52" SUBSOIL
52–70" COARSE SAND
WITH GRAVEL
& FEW COBBLES
70–126" MED SAND

NO WATER
NO REFUSAL
"A" SOIL

Custom Soil Resource Report
Soil Map

Map Scale: 1:527 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 5 10 20 30

Feet
0 25 50 100 150

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Middlesex County, Massachusetts
Survey Area Data: Version 13, Dec 17, 2013

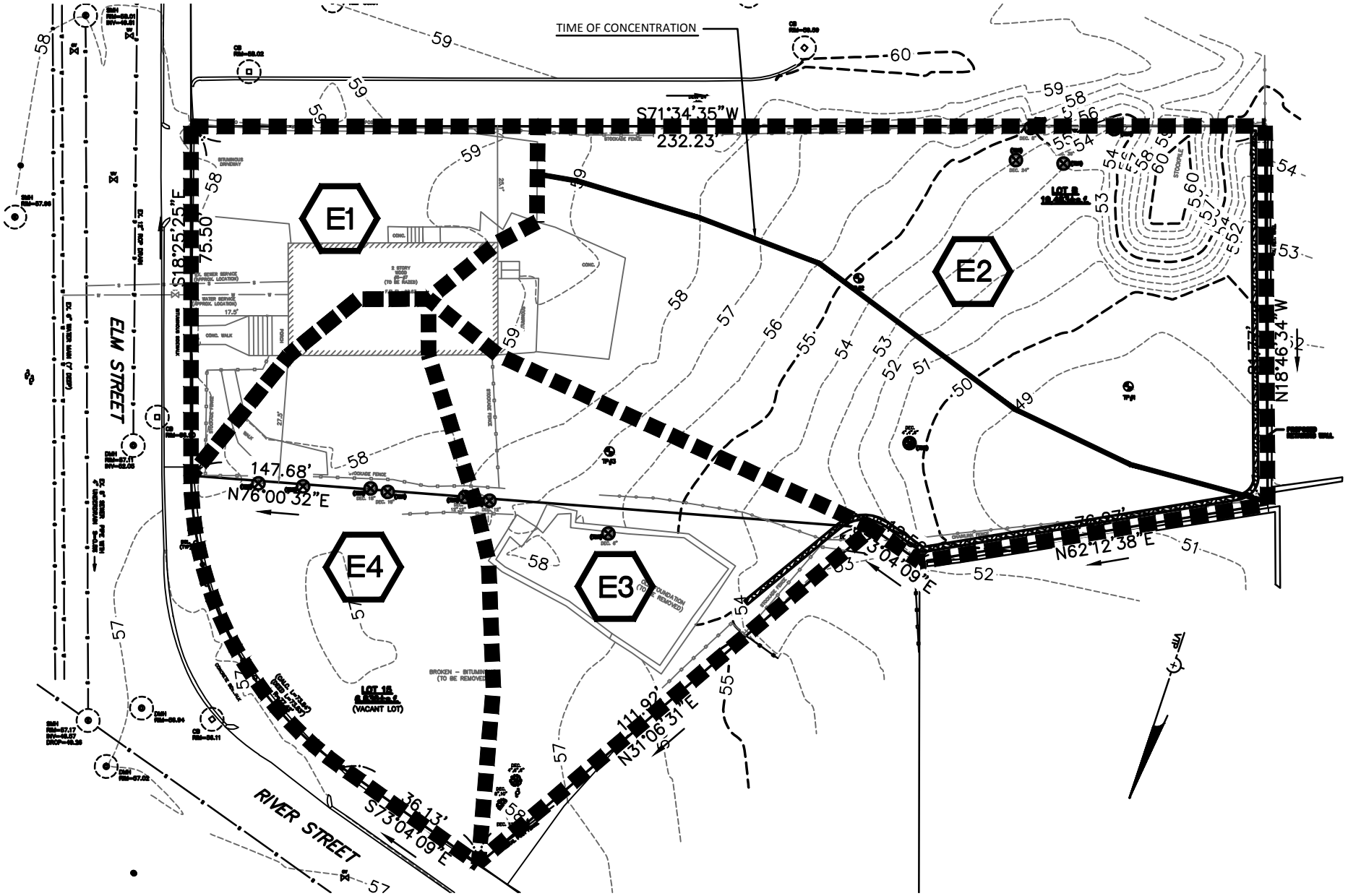
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 30, 2011—May 1, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

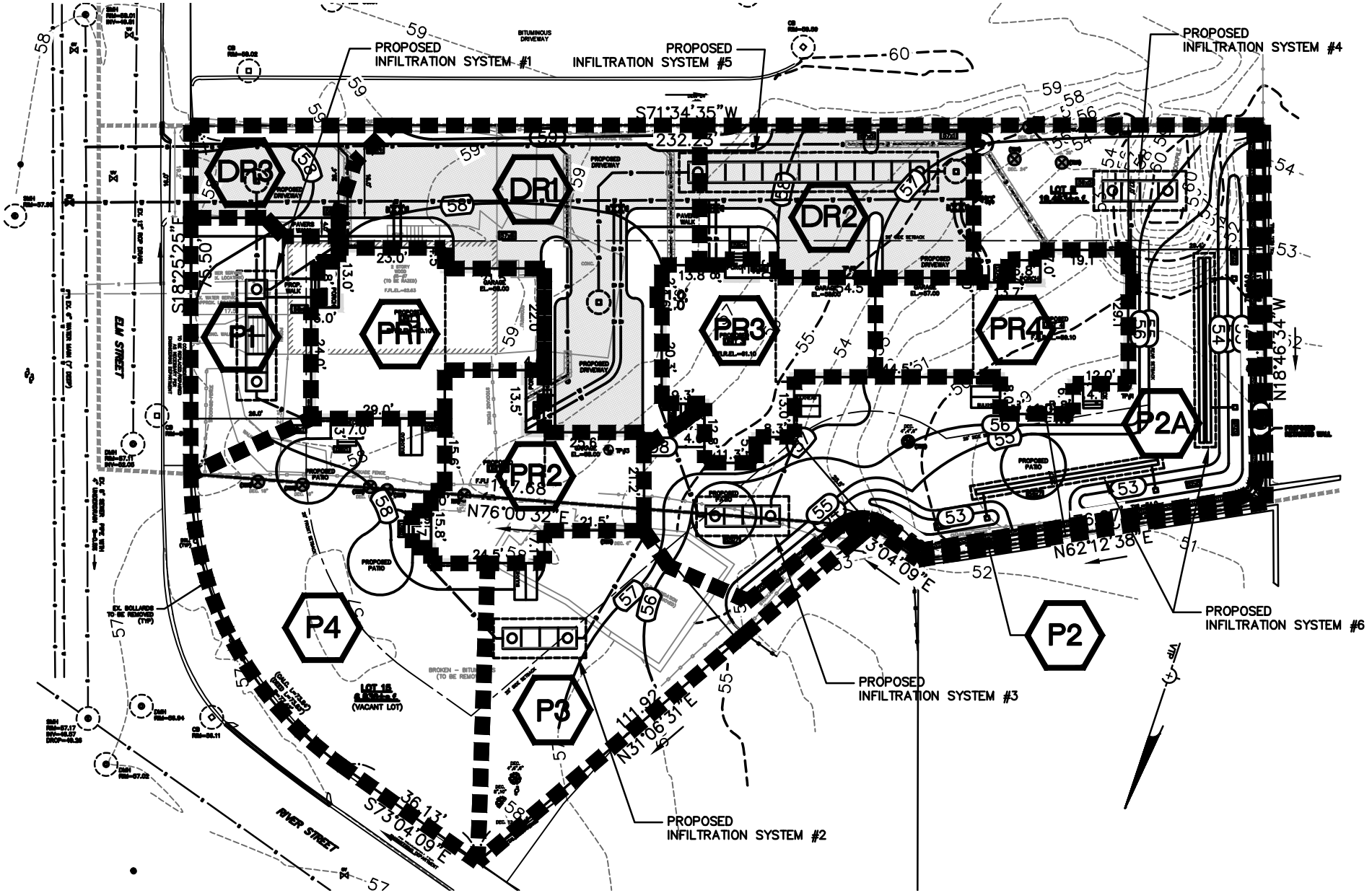
Map Unit Legend

Middlesex County, Massachusetts (MA017)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
626B	Merrimac-Urban land complex, 0 to 8 percent slopes	0.6	100.0%
Totals for Area of Interest		**0.6**	**100.0%**



SCALE: 1in.=30ft.
DATE: JUNE 9, 2014

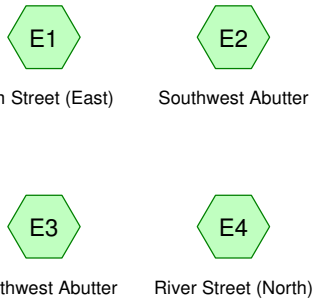
FIGURE 1:
PRE-DEVELOPMENT DRAINAGE AREAS
#5-7 ELM STREET



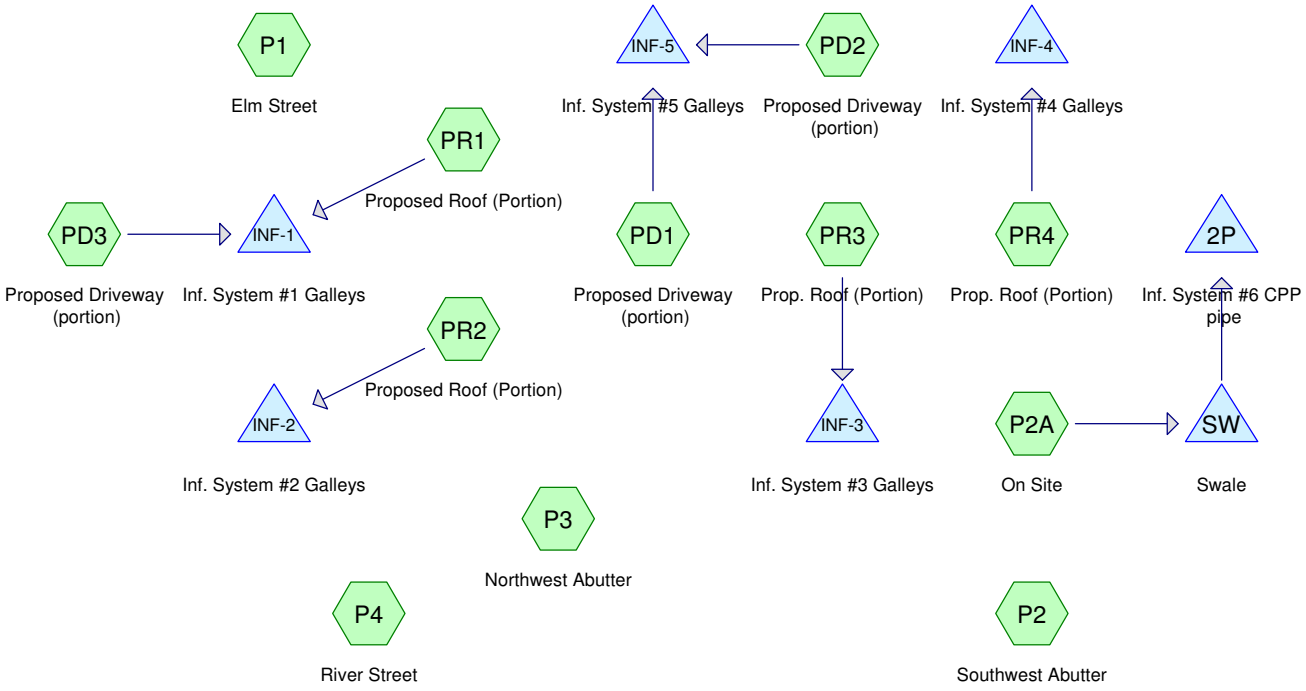
SCALE: 1in.=30ft.
DATE: JUNE 9, 2014
REVISED: NOVEMBER 18, 2014;
DECEMBER 19, 2017

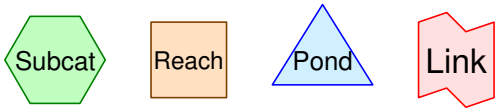
FIGURE 2:
POST-DEVELOPMENT DRAINAGE AREAS
#5-7 ELM STREET

PRE-DEVELOPMENT CONDITIONS



POST-DEVELOPMENT CONDITIONS





Routing Diagram for 214112_5-7 Elm Street Newton, MA_r2
Prepared by VTP associates, inc., Printed 12/19/2017
HydroCAD® 10.00-20 s/n 08174 © 2017 HydroCAD Software Solutions LLC

Summary for Subcatchment E1: Elm Street (East)

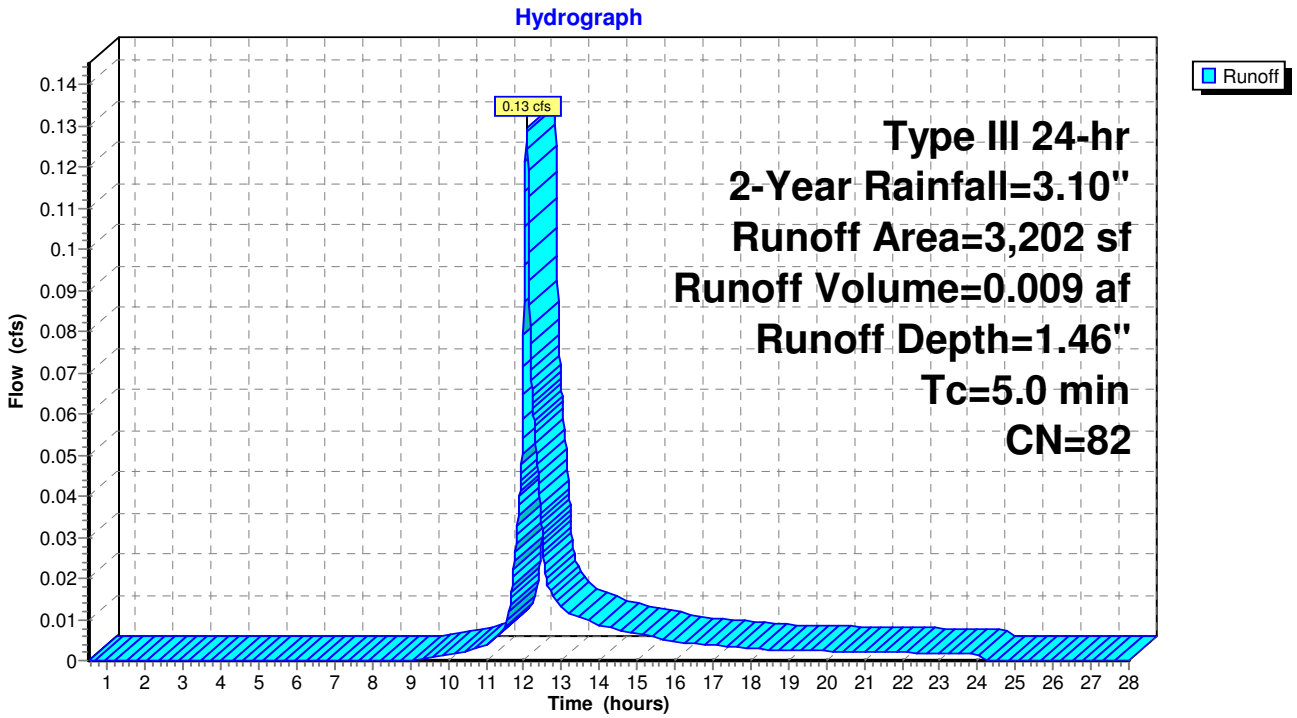
Runoff = 0.13 cfs @ 12.08 hrs, Volume= 0.009 af, Depth= 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	580	98	Roof (portion)
*	1,558	98	Paved Driveway
*	215	98	Walks
	849	39	>75% Grass cover, Good, HSG A
	3,202	82	Weighted Average
	849		26.51% Pervious Area
	2,353		73.49% Impervious Area

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

Subcatchment E1: Elm Street (East)



Summary for Subcatchment E2: Southwest Abutter

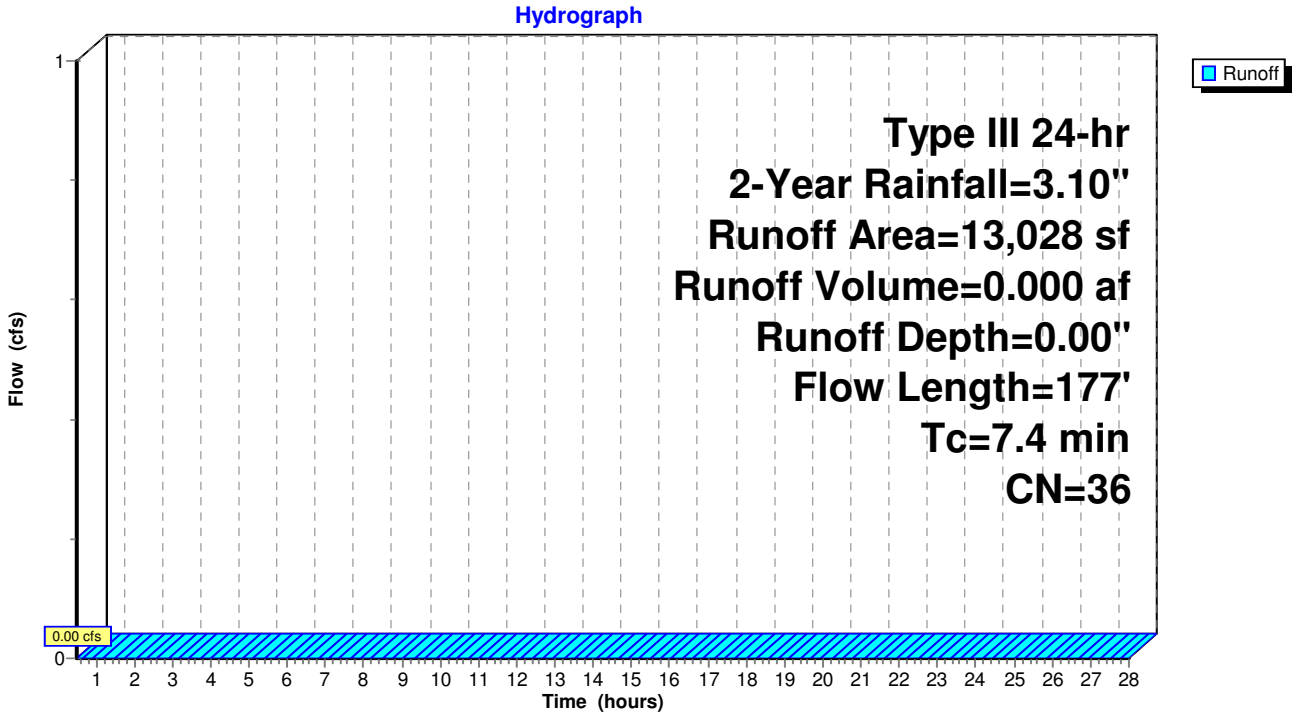
Runoff = 0.00 cfs @ 0.50 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	182	98	Roof (portion)
*	651	98	Patio
*	17	98	Bulkhead
	12,178	32	Woods/grass comb., Good, HSG A
	13,028	36	Weighted Average
	12,178		93.48% Pervious Area
	850		6.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	9	0.0113	0.08		**Sheet Flow, Segment: A-B** Grass: Short n= 0.150 P2= 3.10"
2.8	28	0.0362	0.16		**Sheet Flow, Segment: B-C** Grass: Short n= 0.150 P2= 3.10"
1.2	14	0.0735	0.19		**Sheet Flow, Segment: C-D** Grass: Short n= 0.150 P2= 3.10"
0.5	67	0.1142	2.37		**Shallow Concentrated Flow, Segment: D-E** Short Grass Pasture Kv= 7.0 fps
1.1	59	0.0171	0.92		**Shallow Concentrated Flow, Segment: E-F** Short Grass Pasture Kv= 7.0 fps
7.4	177	Total			

Subcatchment E2: Southwest Abutter



Summary for Subcatchment E3: Northwest Abutter

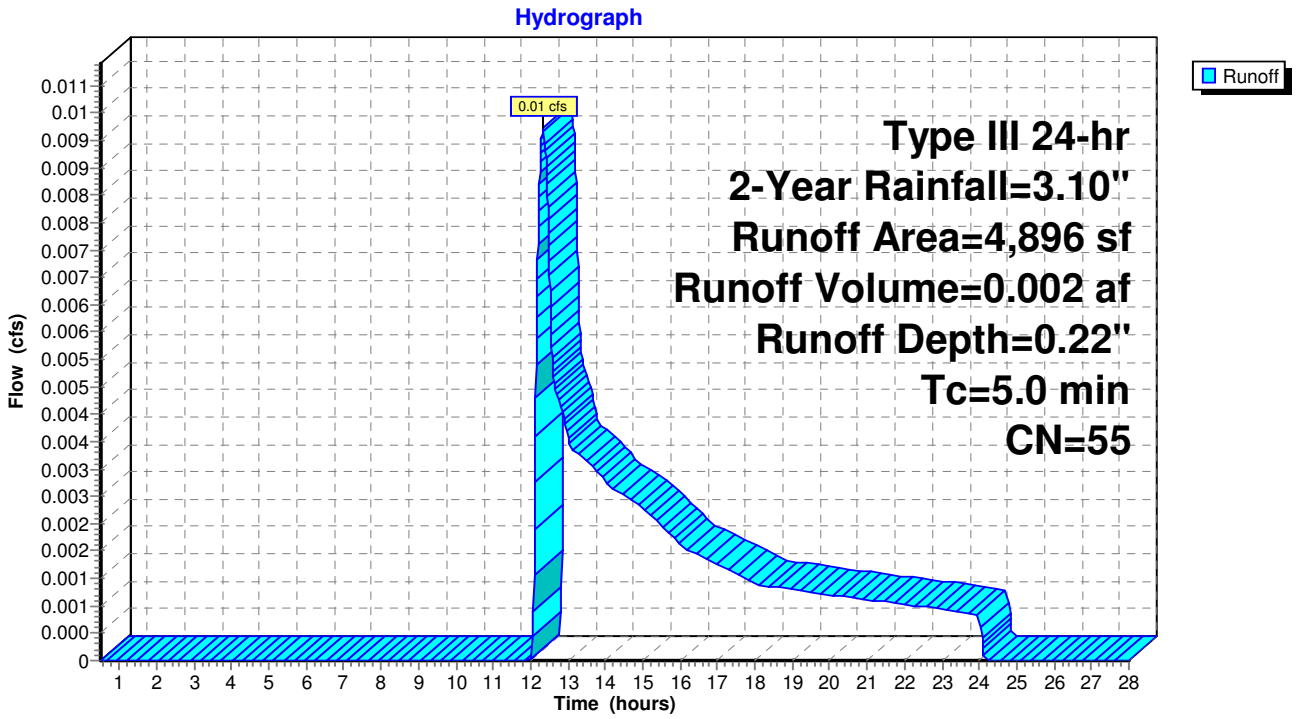
Runoff = 0.01 cfs @ 12.33 hrs, Volume= 0.002 af, Depth= 0.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	91	98	Roof (portion)
*	1,433	98	Paved Driveway
*	187	98	Walls
	3,185	32	Woods/grass comb., Good, HSG A
	4,896	55	Weighted Average
	3,185		65.05% Pervious Area
	1,711		34.95% Impervious Area

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

Subcatchment E3: Northwest Abutter



Summary for Subcatchment E4: River Street (North)

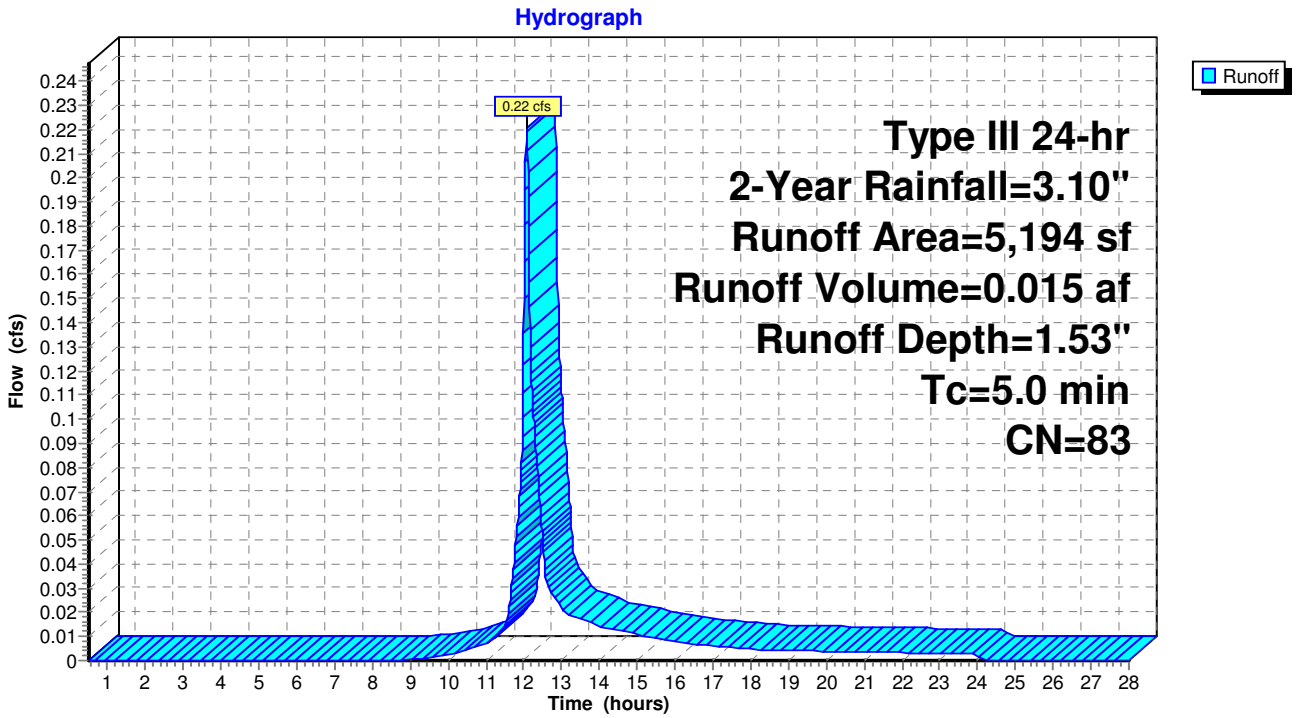
Runoff = 0.22 cfs @ 12.08 hrs, Volume= 0.015 af, Depth= 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	277	98	Roof (portion)
*	3,608	98	Paved Driveway
*	129	98	Walk
	1,180	32	Woods/grass comb., Good, HSG A
	5,194	83	Weighted Average
	1,180		22.72% Pervious Area
	4,014		77.28% Impervious Area

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

Subcatchment E4: River Street (North)



Summary for Subcatchment P1: Elm Street

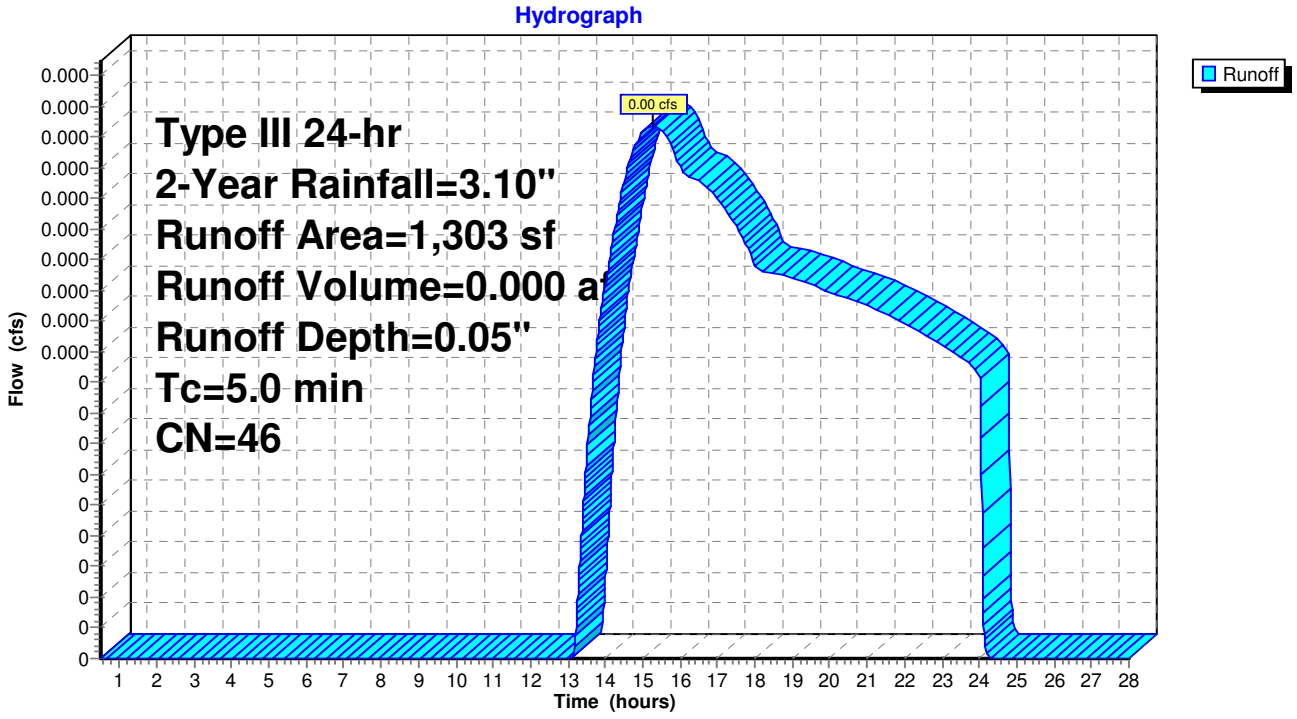
Runoff = 0.00 cfs @ 15.26 hrs, Volume= 0.000 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	155	98	Walk
	1,148	39	>75% Grass cover, Good, HSG A
	1,303	46	Weighted Average
	1,148		88.10% Pervious Area
	155		11.90% Impervious Area

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

Subcatchment P1: Elm Street



Summary for Subcatchment P2: Southwest Abutter

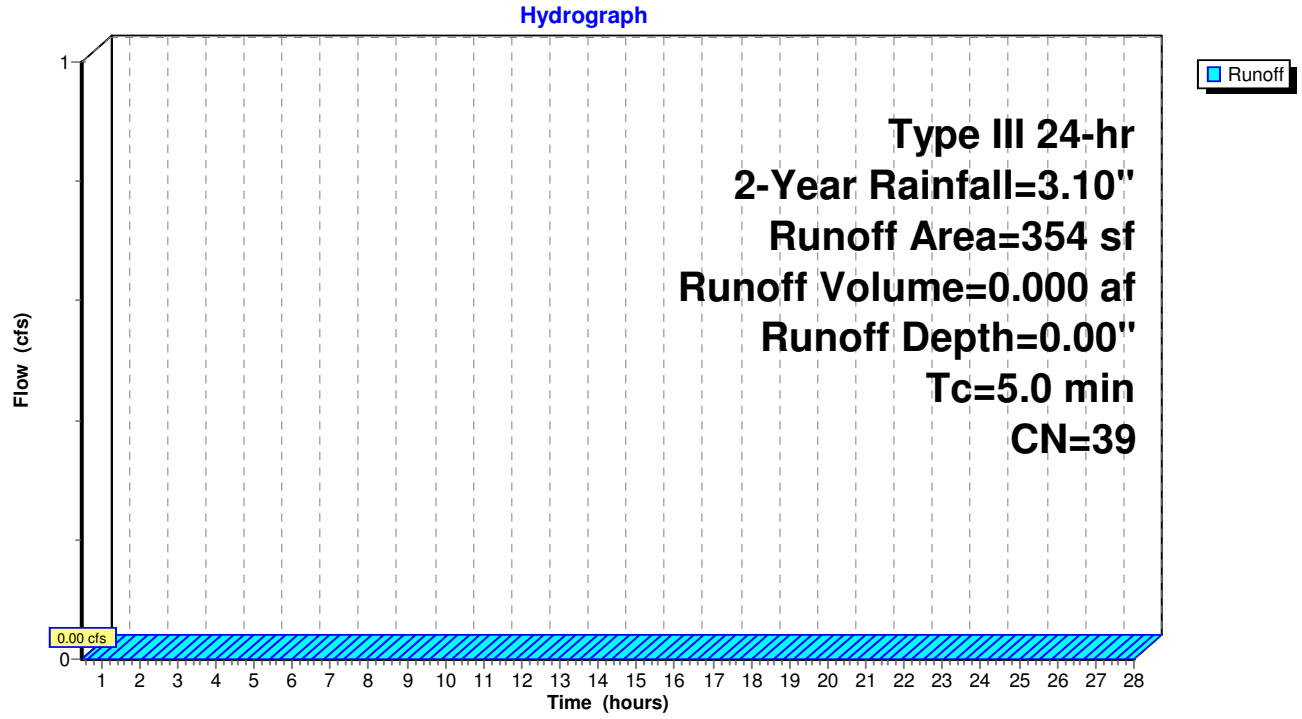
Runoff = 0.00 cfs @ 0.50 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
354	39	>75% Grass cover, Good, HSG A
354		100.00% Pervious Area

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

Subcatchment P2: Southwest Abutter



Summary for Subcatchment P2A: On Site

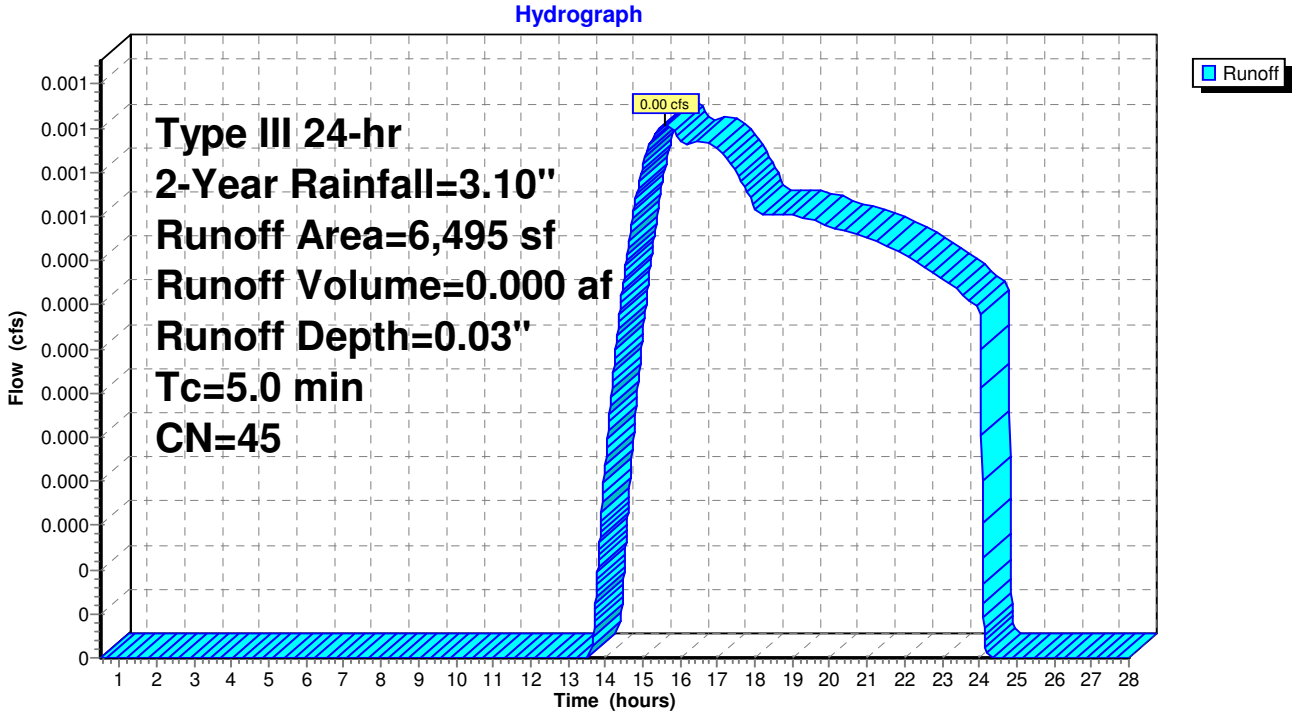
Runoff = 0.00 cfs @ 15.59 hrs, Volume= 0.000 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	35	98	Walks
*	197	98	Ret. Wall
*	84	98	Bulkhead
*	308	98	Patios
	5,871	39	>75% Grass cover, Good, HSG A
	6,495	45	Weighted Average
	5,871		90.39% Pervious Area
	624		9.61% Impervious Area

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

Subcatchment P2A: On Site



Summary for Subcatchment P3: Northwest Abutter

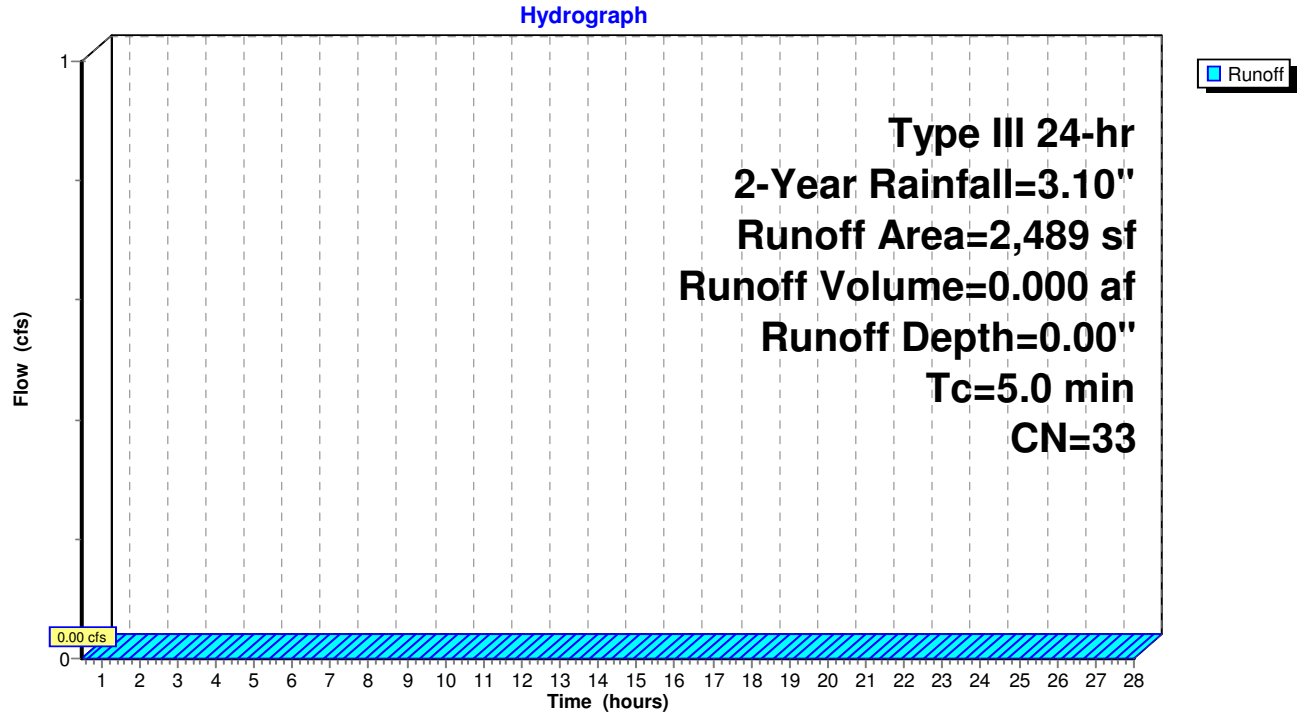
Runoff = 0.00 cfs @ 0.50 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	42	98	Bulkhead
	2,447	32	Woods/grass comb., Good, HSG A
	2,489	33	Weighted Average
	2,447		98.31% Pervious Area
	42		1.69% Impervious Area

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

Subcatchment P3: Northwest Abutter



Summary for Subcatchment P4: River Street

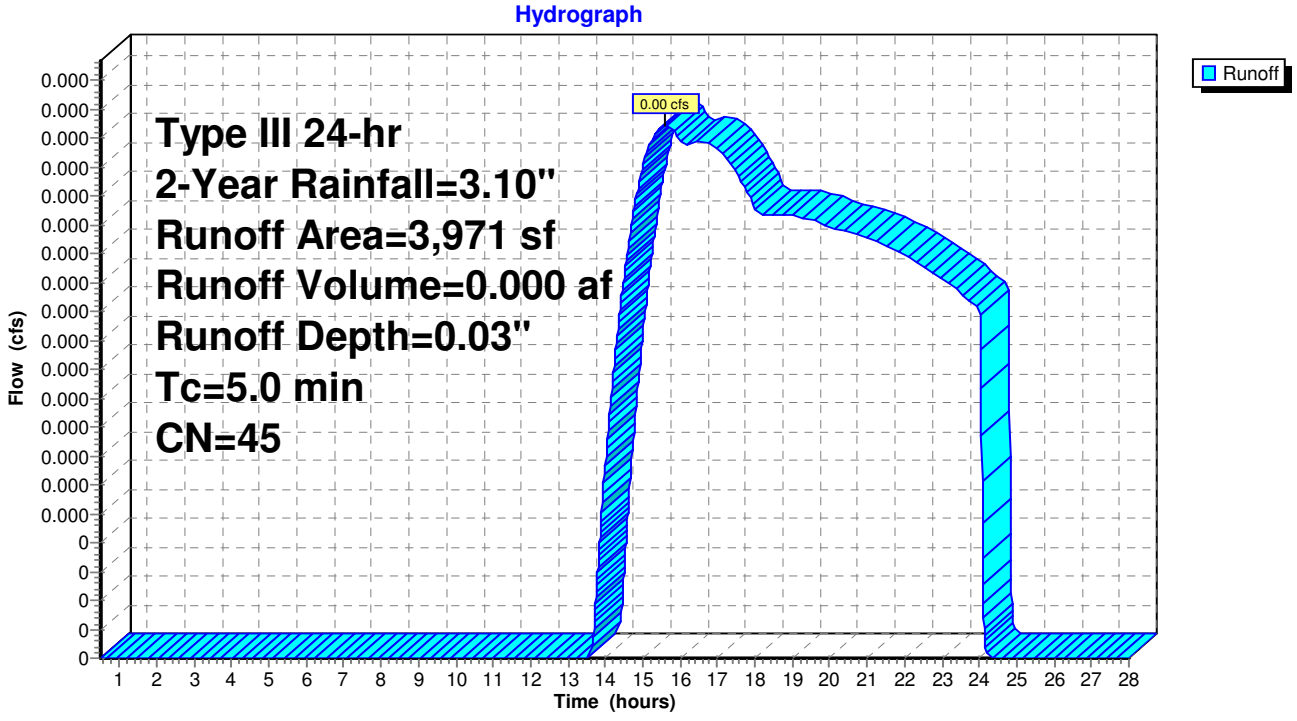
Runoff = 0.00 cfs @ 15.59 hrs, Volume= 0.000 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	384	98	Patios
*	42	98	Bulkhead
	3,545	39	>75% Grass cover, Good, HSG A
	3,971	45	Weighted Average
	3,545		89.27% Pervious Area
	426		10.73% Impervious Area

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

Subcatchment P4: River Street



Summary for Subcatchment PD1: Proposed Driveway (portion)

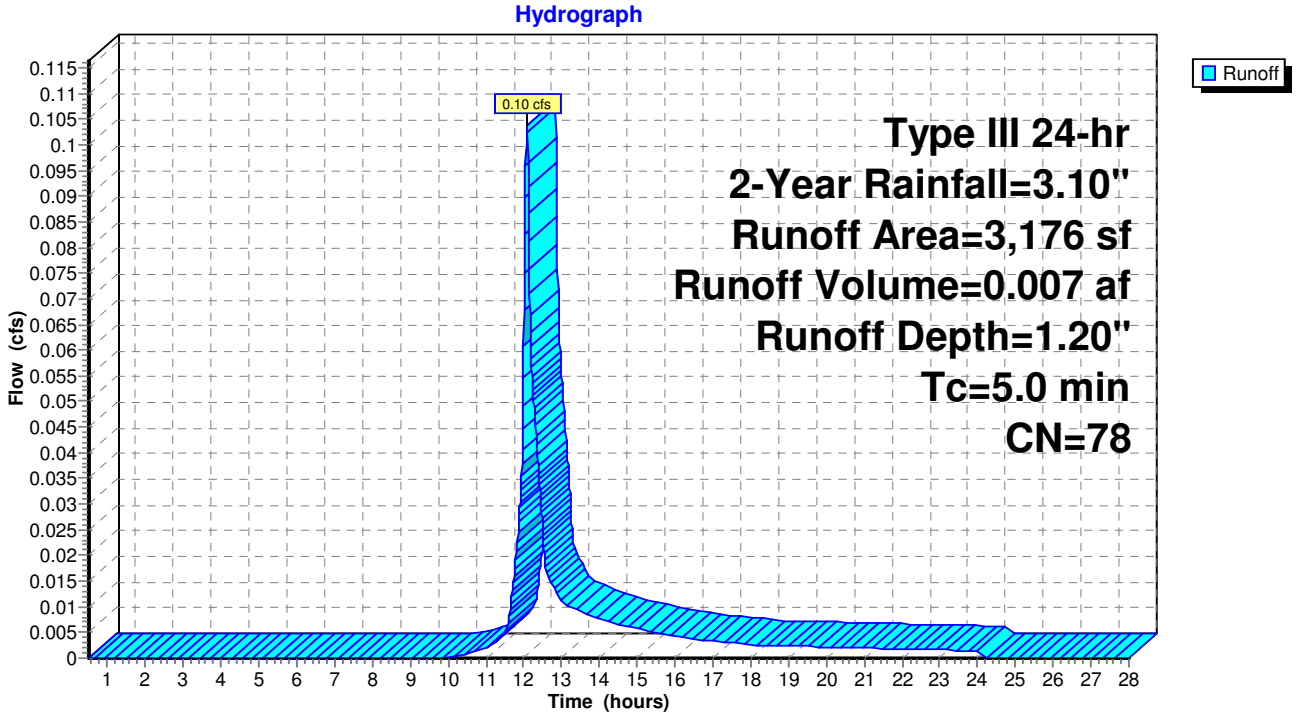
Runoff = 0.10 cfs @ 12.08 hrs, Volume= 0.007 af, Depth= 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	1,994	98	Paved Driveway
*	130	98	Walk
	1,052	39	>75% Grass cover, Good, HSG A
	3,176	78	Weighted Average
	1,052		33.12% Pervious Area
	2,124		66.88% Impervious Area

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

Subcatchment PD1: Proposed Driveway (portion)



Summary for Subcatchment PD2: Proposed Driveway (portion)

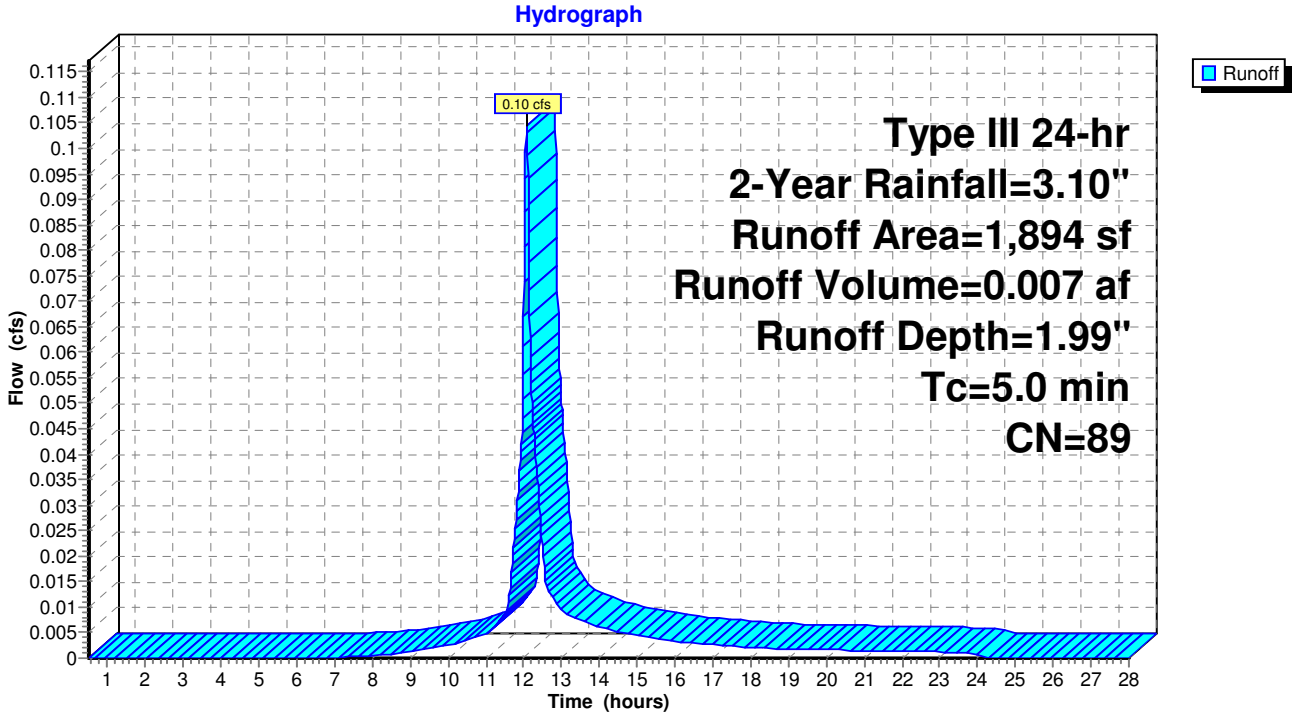
Runoff = 0.10 cfs @ 12.07 hrs, Volume= 0.007 af, Depth= 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	1,525	98	Paved Driveway
*	96	98	Walk
	273	39	>75% Grass cover, Good, HSG A
	1,894	89	Weighted Average
	273		14.41% Pervious Area
	1,621		85.59% Impervious Area

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

Subcatchment PD2: Proposed Driveway (portion)



Summary for Subcatchment PD3: Proposed Driveway (portion)

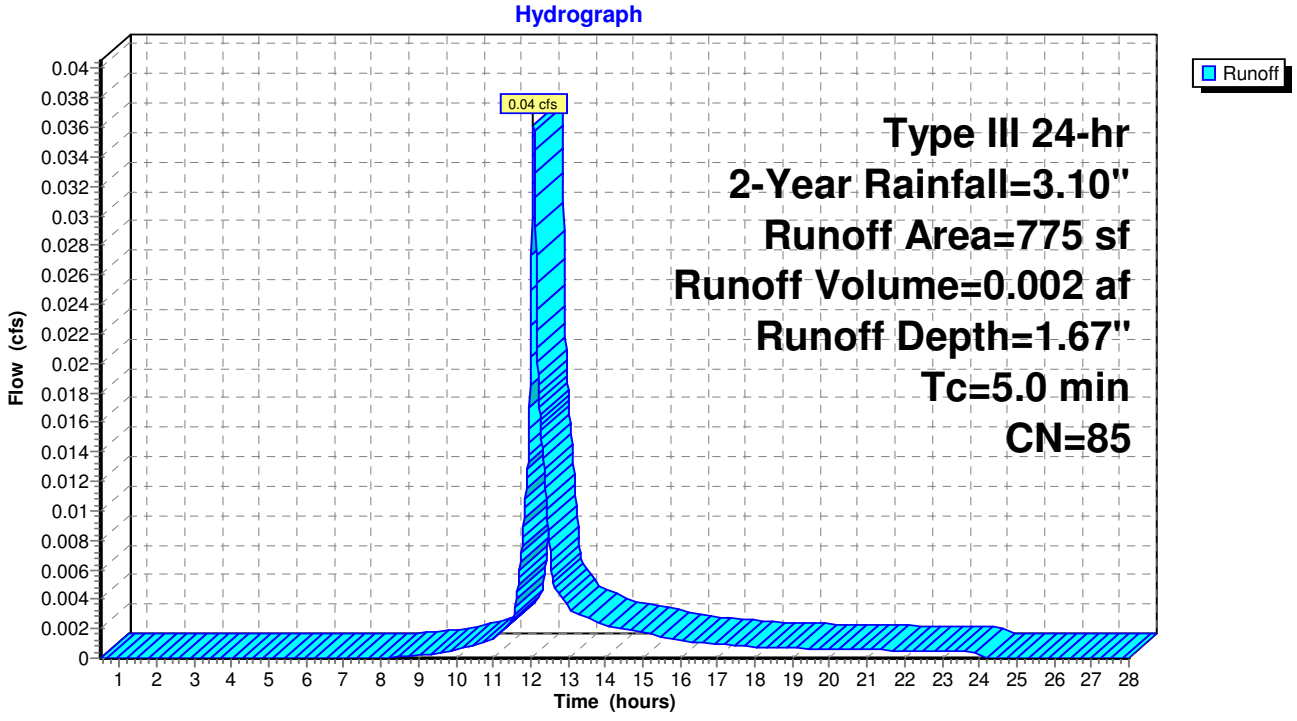
Runoff = 0.04 cfs @ 12.08 hrs, Volume= 0.002 af, Depth= 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	554	98	Paved Driveway
*	56	98	Walk
	165	39	>75% Grass cover, Good, HSG A
	775	85	Weighted Average
	165		21.29% Pervious Area
	610		78.71% Impervious Area

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

Subcatchment PD3: Proposed Driveway (portion)



Summary for Subcatchment PR1: Proposed Roof (Portion)

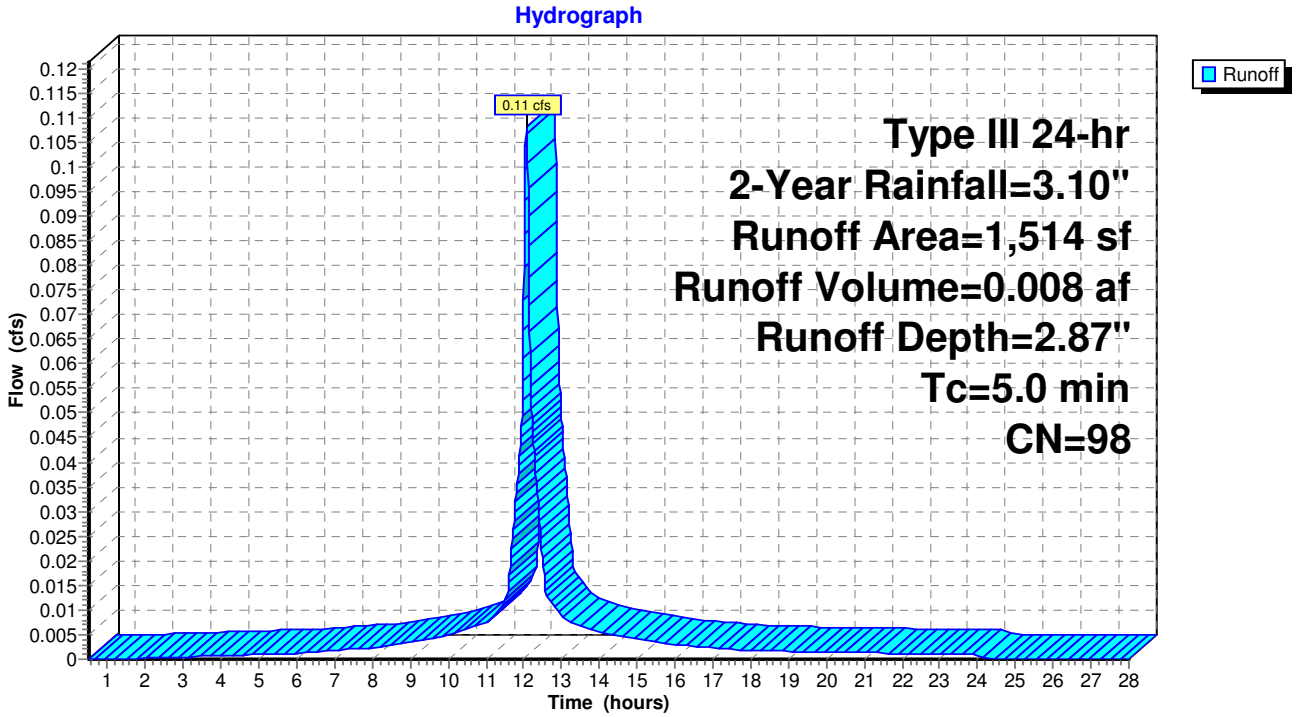
Runoff = 0.11 cfs @ 12.07 hrs, Volume= 0.008 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	1,514	98	Roof
	1,514		100.00% Impervious Area

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

Subcatchment PR1: Proposed Roof (Portion)



Summary for Subcatchment PR2: Proposed Roof (Portion)

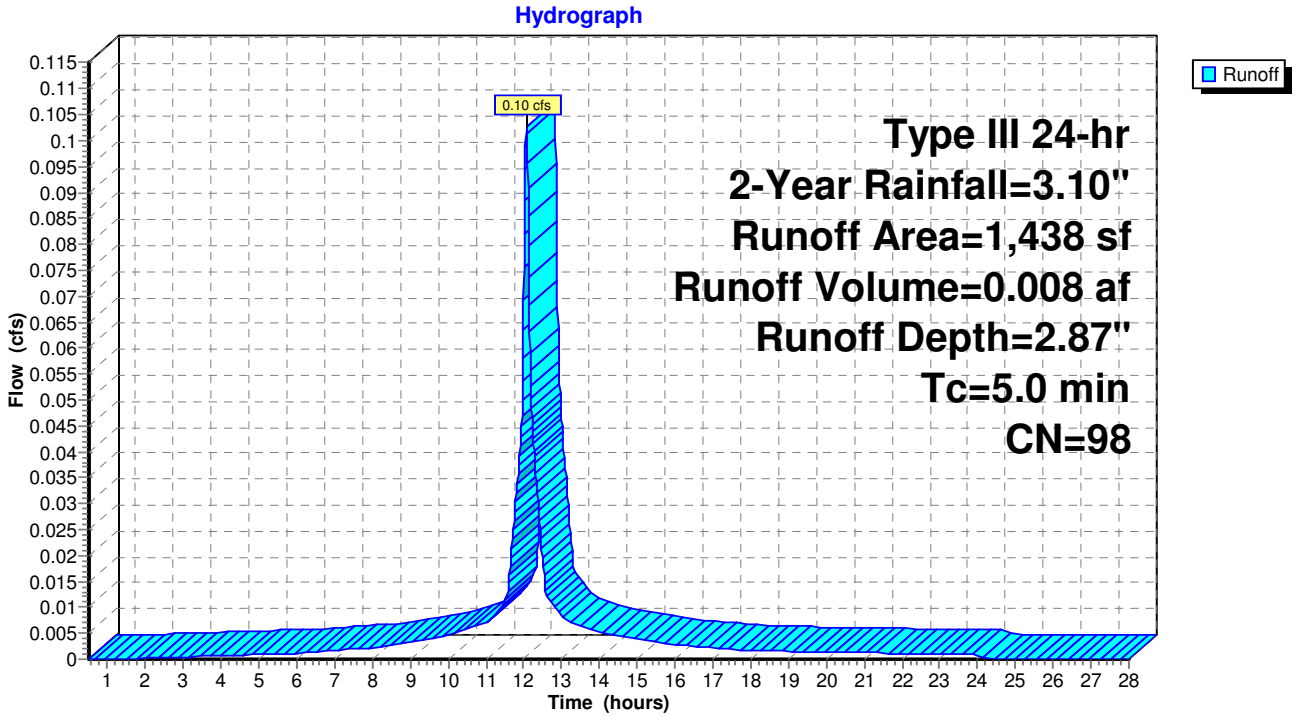
Runoff = 0.10 cfs @ 12.07 hrs, Volume= 0.008 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	1,438	98	Roof
	1,438		100.00% Impervious Area

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

Subcatchment PR2: Proposed Roof (Portion)



Summary for Subcatchment PR3: Prop. Roof (Portion)

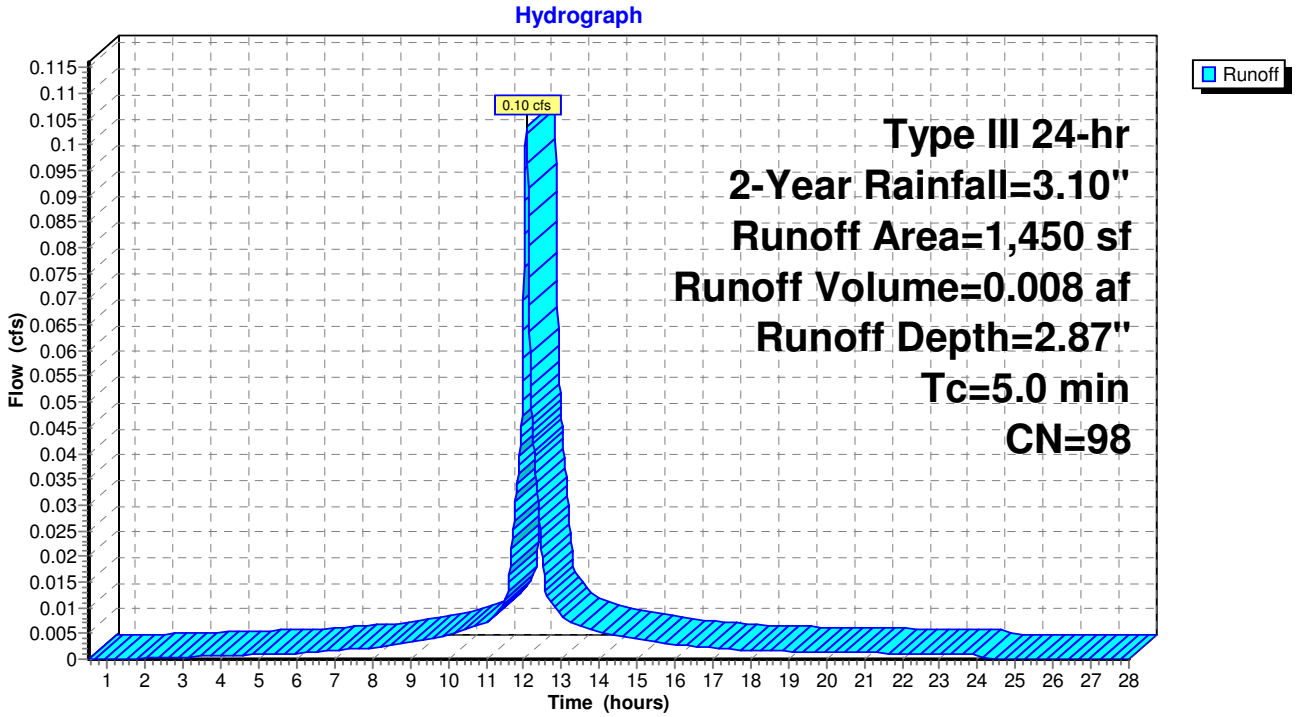
Runoff = 0.10 cfs @ 12.07 hrs, Volume= 0.008 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	1,450	98	Roof
	1,450		100.00% Impervious Area

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

Subcatchment PR3: Prop. Roof (Portion)



Summary for Subcatchment PR4: Prop. Roof (Portion)

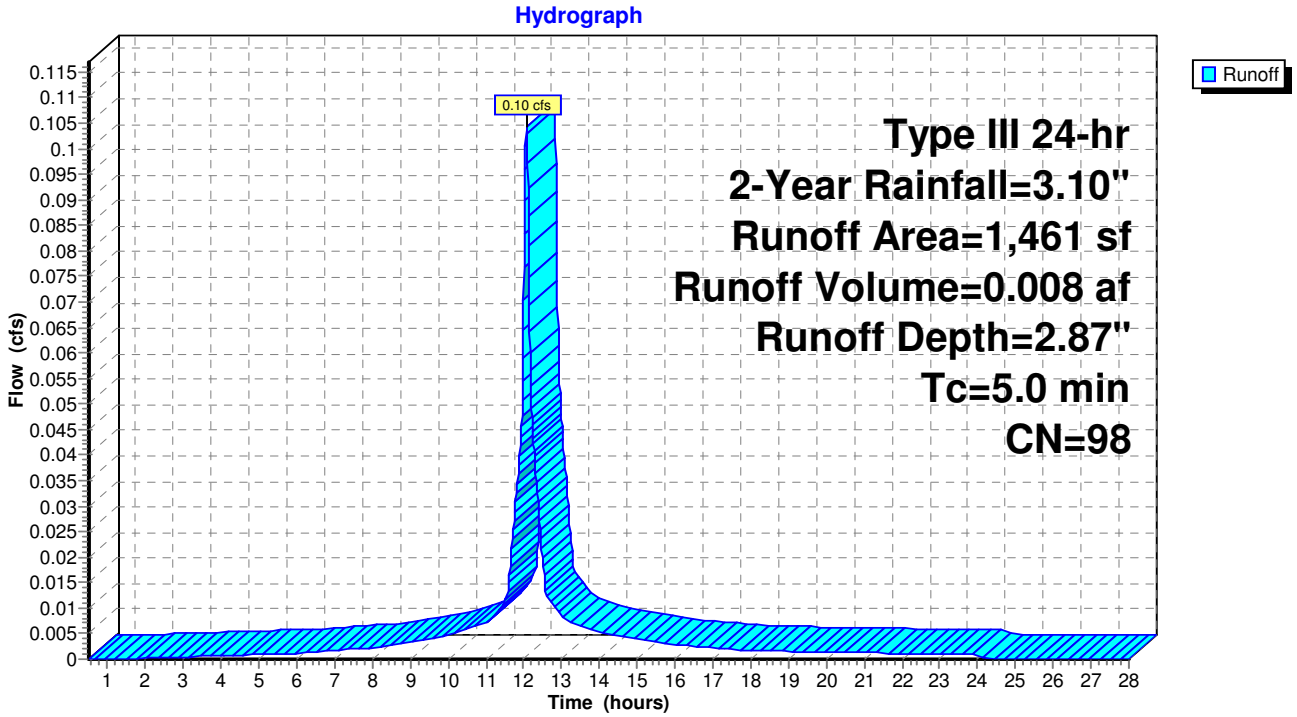
Runoff = 0.10 cfs @ 12.07 hrs, Volume= 0.008 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	1,461	98	Roof
	1,461		100.00% Impervious Area

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

Subcatchment PR4: Prop. Roof (Portion)



Summary for Pond 2P: Inf. System #6 CPP pipe

Inflow Area = 0.149 ac, 9.61% Impervious, Inflow Depth = 0.03" for 2-Year event
Inflow = 0.00 cfs @ 15.66 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 15.67 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.00 cfs @ 15.67 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 50.00' @ 15.67 hrs Surf.Area= 0.008 ac Storage= 0.000 af

Plug-Flow detention time= 0.4 min calculated for 0.000 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (1,134.9 - 1,134.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	50.00'	0.004 af	**4.95'W x 42.00'L x 2.73'H Field A** 0.013 af Overall - 0.002 af Embedded = 0.011 af x 35.0% Voids
#2A	51.00'	0.002 af	**CPP single-wall 12"** x 4 Inside #1 Inside= 12.0"W x 12.0"H => 1.04 sf x 20.00'L = 20.8 cf Outside= 14.7"W x 14.7"H => 1.04 sf x 20.00'L = 20.8 cf 2 Rows of 2 Chambers
#3B	50.00'	0.003 af	**3.23'W x 42.00'L x 2.73'H Field B** 0.008 af Overall - 0.001 af Embedded = 0.008 af x 35.0% Voids
#4B	51.00'	0.001 af	**CPP single-wall 12"** x 2 Inside #3 Inside= 12.0"W x 12.0"H => 1.04 sf x 20.00'L = 20.8 cf Outside= 14.7"W x 14.7"H => 1.04 sf x 20.00'L = 20.8 cf
		0.009 af	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	50.00'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.00 cfs @ 15.67 hrs HW=50.00' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Pond 2P: Inf. System #6 CPP pipe - Chamber Wizard Field A

Chamber Model = CPP single-wall 12" (Single-wall corrugated HDPE pipe)
Inside= 12.0"W x 12.0"H => 1.04 sf x 20.00'L = 20.8 cf
Outside= 14.7"W x 14.7"H => 1.04 sf x 20.00'L = 20.8 cf

14.7" Wide + 6.0" Spacing = 20.7" C-C Row Spacing

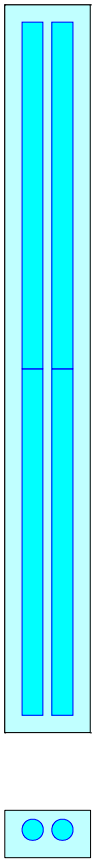
2 Chambers/Row x 20.00' Long = 40.00' Row Length +12.0" End Stone x 2 = 42.00' Base Length
2 Rows x 14.7" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 4.95' Base Width
12.0" Base + 14.7" Chamber Height + 6.0" Cover = 2.73' Field Height

4 Chambers x 20.8 cf = 83.3 cf Chamber Storage

566.5 cf Field - 83.3 cf Chambers = 483.2 cf Stone x 35.0% Voids = 169.1 cf Stone Storage

Chamber Storage + Stone Storage = 252.4 cf = 0.006 af
Overall Storage Efficiency = 44.6%
Overall System Size = 42.00' x 4.95' x 2.73'

4 Chambers
21.0 cy Field
17.9 cy Stone



Pond 2P: Inf. System #6 CPP pipe - Chamber Wizard Field B

Chamber Model = CPP single-wall 12" (Single-wall corrugated HDPE pipe)
Inside= 12.0"W x 12.0"H => 1.04 sf x 20.00'L = 20.8 cf
Outside= 14.7"W x 14.7"H => 1.04 sf x 20.00'L = 20.8 cf

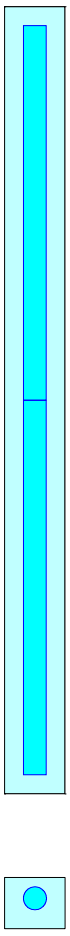
2 Chambers/Row x 20.00' Long = 40.00' Row Length +12.0" End Stone x 2 = 42.00' Base Length
1 Rows x 14.7" Wide + 12.0" Side Stone x 2 = 3.23' Base Width
12.0" Base + 14.7" Chamber Height + 6.0" Cover = 2.73' Field Height

2 Chambers x 20.8 cf = 41.6 cf Chamber Storage

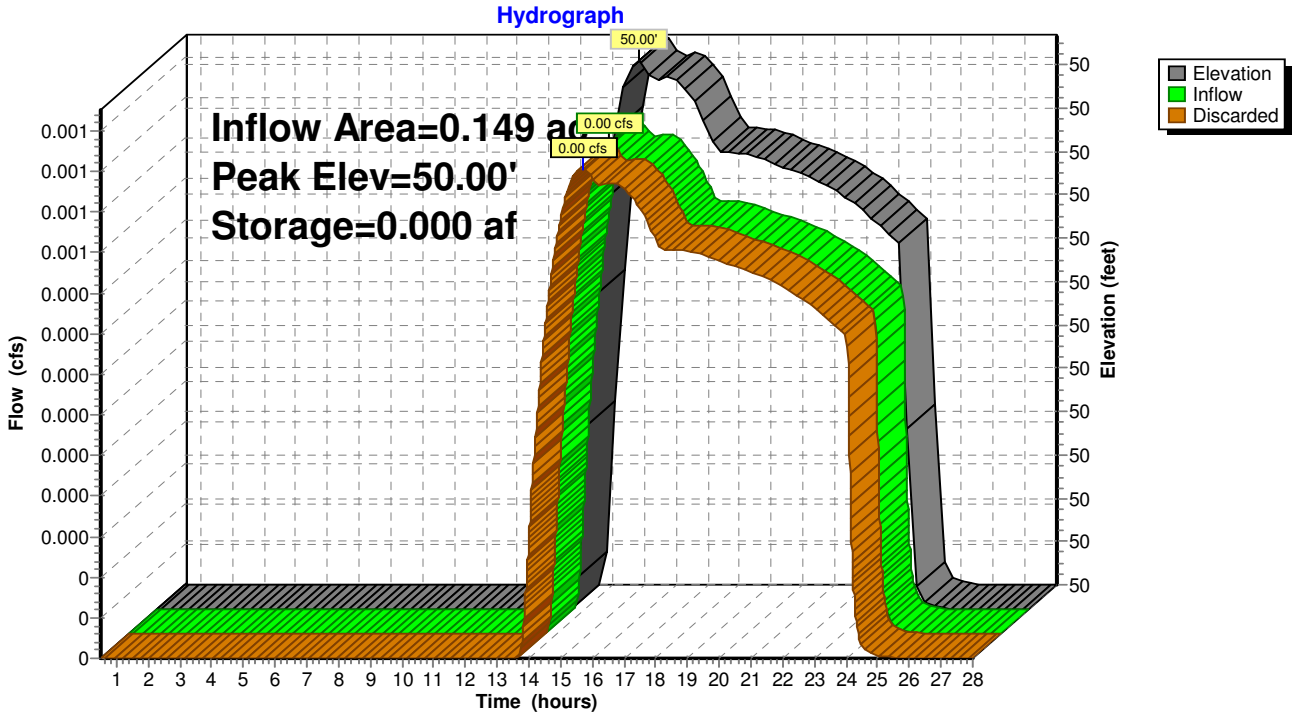
369.1 cf Field - 41.6 cf Chambers = 327.5 cf Stone x 35.0% Voids = 114.6 cf Stone Storage

Chamber Storage + Stone Storage = 156.3 cf = 0.004 af
Overall Storage Efficiency = 42.3%
Overall System Size = 42.00' x 3.23' x 2.73'

2 Chambers
13.7 cy Field
12.1 cy Stone



Pond 2P: Inf. System #6 CPP pipe



Summary for Pond INF-1: Inf. System #1 Galleys

Inflow Area = 0.053 ac, 92.79% Impervious, Inflow Depth = 2.46" for 2-Year event
Inflow = 0.14 cfs @ 12.07 hrs, Volume= 0.011 af
Outflow = 0.03 cfs @ 11.86 hrs, Volume= 0.011 af, Atten= 77%, Lag= 0.0 min
Discarded = 0.03 cfs @ 11.86 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 50.35' @ 12.46 hrs Surf.Area= 0.005 ac Storage= 0.002 af

Plug-Flow detention time= 13.8 min calculated for 0.011 af (100% of inflow)
Center-of-Mass det. time= 13.8 min (786.1 - 772.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	49.25'	0.007 af	**8.50'W x 28.00'L x 5.25'H Field A** 0.029 af Overall - 0.009 af Embedded = 0.020 af x 35.0% Voids
#2A	50.25'	0.006 af	**Concrete Galley 4x4x4.25** x 6 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
		0.013 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	49.25'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.03 cfs @ 11.86 hrs HW=49.31' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Pond INF-1: Inf. System #1 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent)
Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

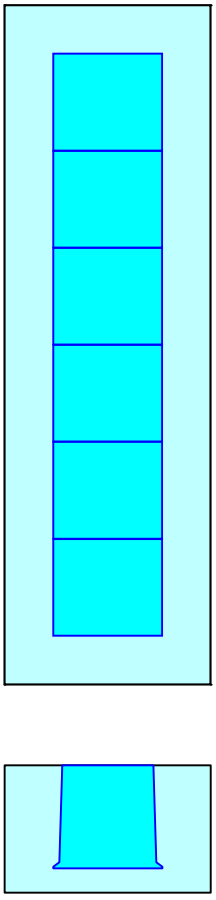
6 Chambers/Row x 4.00' Long = 24.00' Row Length +24.0" End Stone x 2 = 28.00' Base Length
1 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 8.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

6 Chambers x 46.4 cf = 278.3 cf Chamber Storage
6 Chambers x 62.3 cf = 374.0 cf Displacement

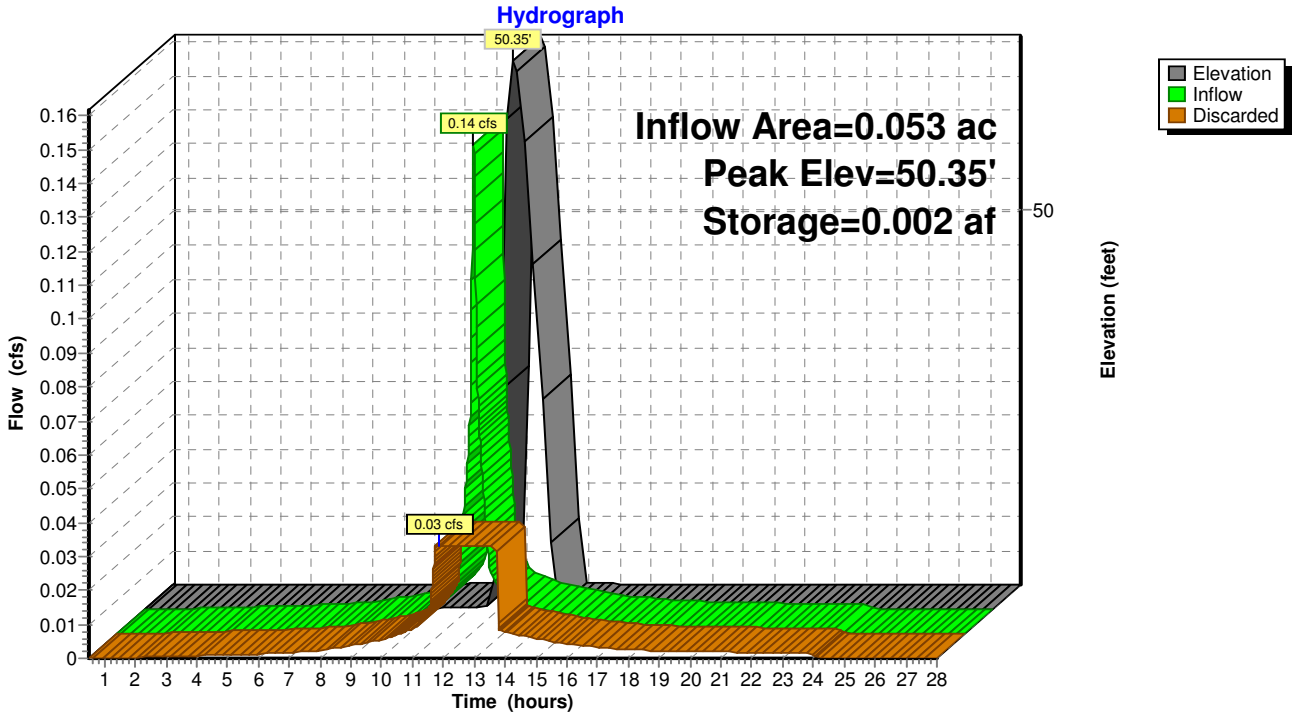
1,249.5 cf Field - 374.0 cf Chambers = 875.5 cf Stone x 35.0% Voids = 306.4 cf Stone Storage

Chamber Storage + Stone Storage = 584.7 cf = 0.013 af
Overall Storage Efficiency = 46.8%
Overall System Size = 28.00' x 8.50' x 5.25'

6 Chambers
46.3 cy Field
32.4 cy Stone



Pond INF-1: Inf. System #1 Galleys



Summary for Pond INF-2: Inf. System #2 Galleys

Inflow Area = 0.033 ac,100.00% Impervious, Inflow Depth = 2.87" for 2-Year event
Inflow = 0.10 cfs @ 12.07 hrs, Volume= 0.008 af
Outflow = 0.02 cfs @ 11.84 hrs, Volume= 0.008 af, Atten= 77%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.84 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 50.35' @ 12.45 hrs Surf.Area= 0.004 ac Storage= 0.002 af

Plug-Flow detention time= 13.3 min calculated for 0.008 af (100% of inflow)
Center-of-Mass det. time= 13.3 min (769.5 - 756.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	49.25'	0.005 af	**8.50'W x 20.00'L x 5.25'H Field A** 0.020 af Overall - 0.006 af Embedded = 0.015 af x 35.0% Voids
#2A	50.25'	0.004 af	**Concrete Galley 4x4x4.25** x 4 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
		0.009 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	49.25'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.02 cfs @ 11.84 hrs HW=49.31' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Pond INF-2: Inf. System #2 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent)
Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

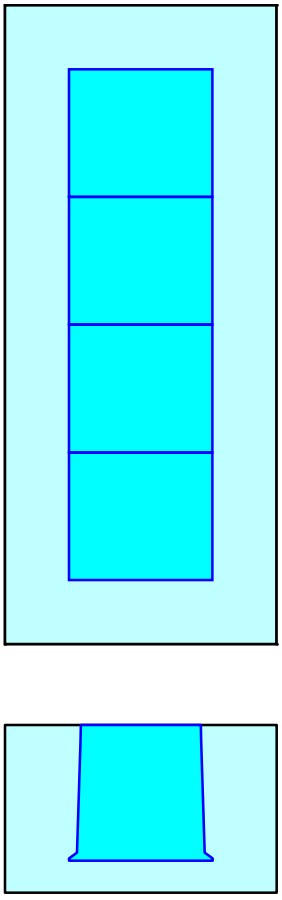
4 Chambers/Row x 4.00' Long = 16.00' Row Length +24.0" End Stone x 2 = 20.00' Base Length
1 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 8.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

4 Chambers x 46.4 cf = 185.5 cf Chamber Storage
4 Chambers x 62.3 cf = 249.3 cf Displacement

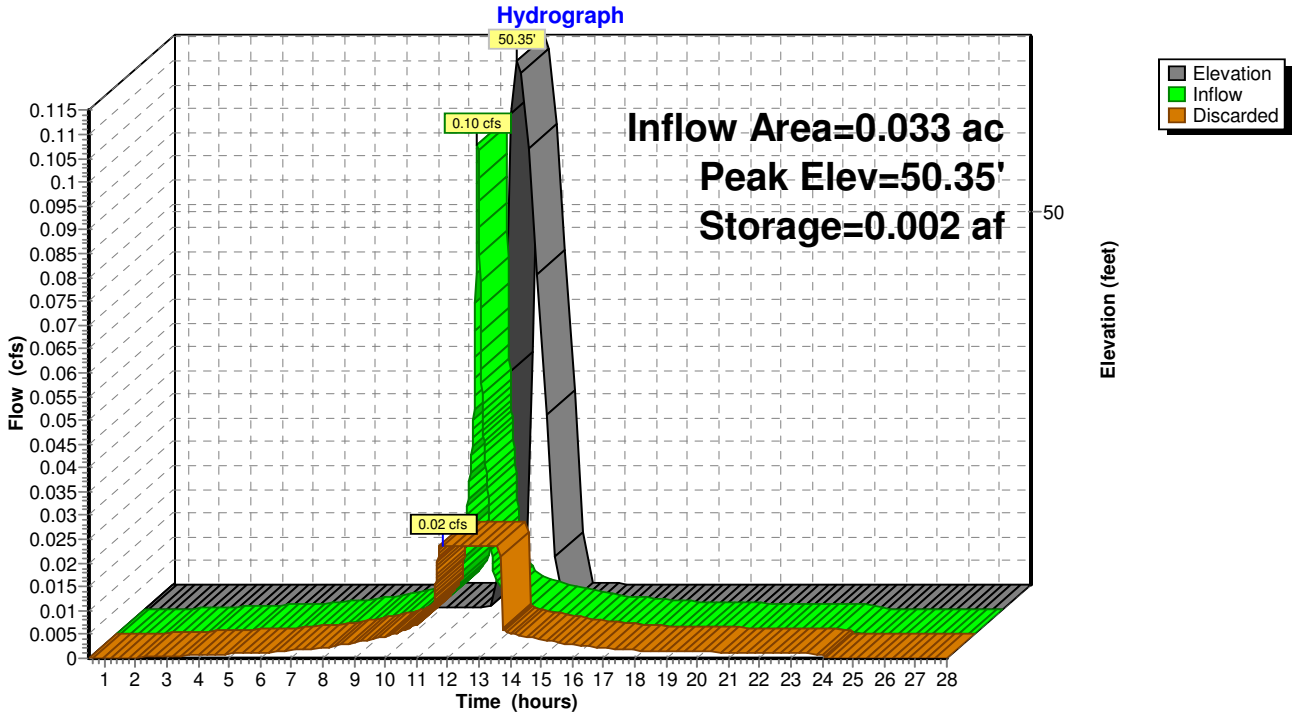
892.5 cf Field - 249.3 cf Chambers = 643.2 cf Stone x 35.0% Voids = 225.1 cf Stone Storage

Chamber Storage + Stone Storage = 410.6 cf = 0.009 af
Overall Storage Efficiency = 46.0%
Overall System Size = 20.00' x 8.50' x 5.25'

4 Chambers
33.1 cy Field
23.8 cy Stone



Pond INF-2: Inf. System #2 Galleys



Summary for Pond INF-3: Inf. System #3 Galleys

Inflow Area = 0.033 ac,100.00% Impervious, Inflow Depth = 2.87" for 2-Year event
Inflow = 0.10 cfs @ 12.07 hrs, Volume= 0.008 af
Outflow = 0.02 cfs @ 11.84 hrs, Volume= 0.008 af, Atten= 77%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.84 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 50.36' @ 12.45 hrs Surf.Area= 0.004 ac Storage= 0.002 af

Plug-Flow detention time= 13.6 min calculated for 0.008 af (100% of inflow)
Center-of-Mass det. time= 13.6 min (769.7 - 756.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	49.25'	0.005 af	**8.50'W x 20.00'L x 5.25'H Field A** 0.020 af Overall - 0.006 af Embedded = 0.015 af x 35.0% Voids
#2A	50.25'	0.004 af	**Concrete Galley 4x4x4.25** x 4 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
		0.009 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	49.25'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.02 cfs @ 11.84 hrs HW=49.31' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Pond INF-3: Inf. System #3 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent)
Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

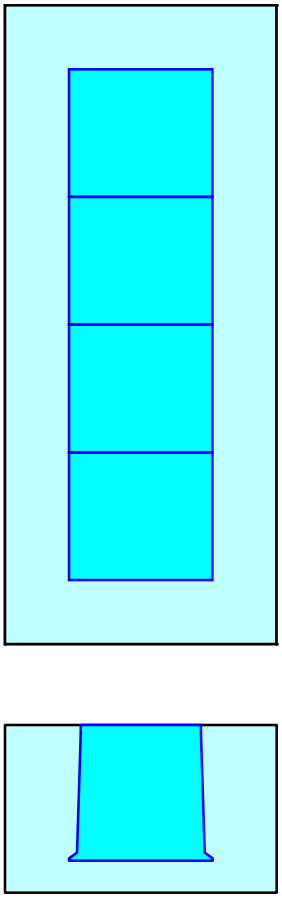
4 Chambers/Row x 4.00' Long = 16.00' Row Length +24.0" End Stone x 2 = 20.00' Base Length
1 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 8.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

4 Chambers x 46.4 cf = 185.5 cf Chamber Storage
4 Chambers x 62.3 cf = 249.3 cf Displacement

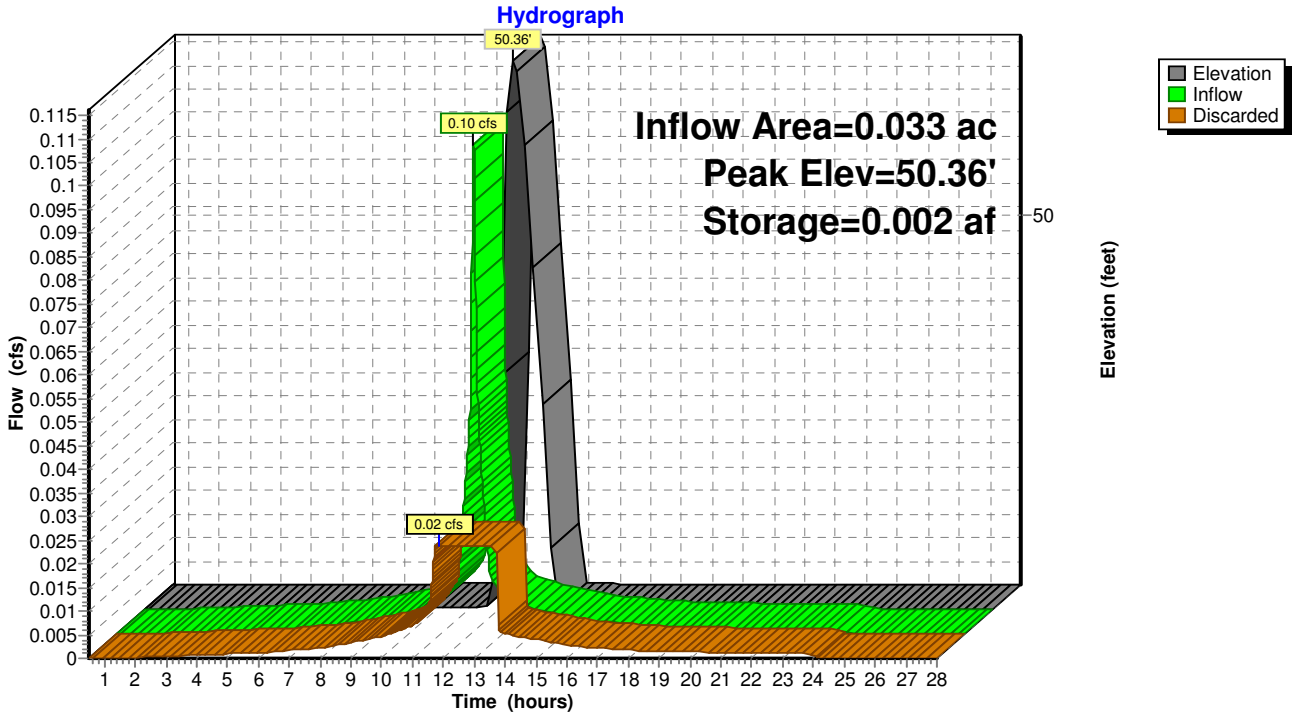
892.5 cf Field - 249.3 cf Chambers = 643.2 cf Stone x 35.0% Voids = 225.1 cf Stone Storage

Chamber Storage + Stone Storage = 410.6 cf = 0.009 af
Overall Storage Efficiency = 46.0%
Overall System Size = 20.00' x 8.50' x 5.25'

4 Chambers
33.1 cy Field
23.8 cy Stone



Pond INF-3: Inf. System #3 Galleys



Summary for Pond INF-4: Inf. System #4 Galleys

Inflow Area = 0.034 ac,100.00% Impervious, Inflow Depth = 2.87" for 2-Year event
Inflow = 0.10 cfs @ 12.07 hrs, Volume= 0.008 af
Outflow = 0.02 cfs @ 11.84 hrs, Volume= 0.008 af, Atten= 77%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.84 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 50.37' @ 12.45 hrs Surf.Area= 0.004 ac Storage= 0.002 af

Plug-Flow detention time= 13.8 min calculated for 0.008 af (100% of inflow)
Center-of-Mass det. time= 13.8 min (770.0 - 756.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	49.25'	0.005 af	**8.50'W x 20.00'L x 5.25'H Field A** 0.020 af Overall - 0.006 af Embedded = 0.015 af x 35.0% Voids
#2A	50.25'	0.004 af	**Concrete Galley 4x4x4.25** x 4 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
		0.009 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	49.25'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.02 cfs @ 11.84 hrs HW=49.31' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Pond INF-4: Inf. System #4 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent)
Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

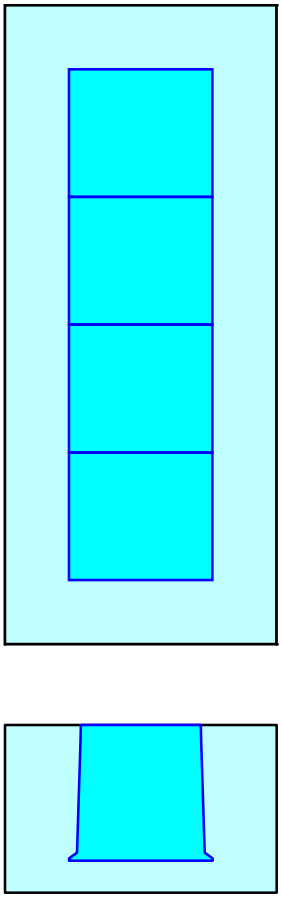
4 Chambers/Row x 4.00' Long = 16.00' Row Length +24.0" End Stone x 2 = 20.00' Base Length
1 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 8.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

4 Chambers x 46.4 cf = 185.5 cf Chamber Storage
4 Chambers x 62.3 cf = 249.3 cf Displacement

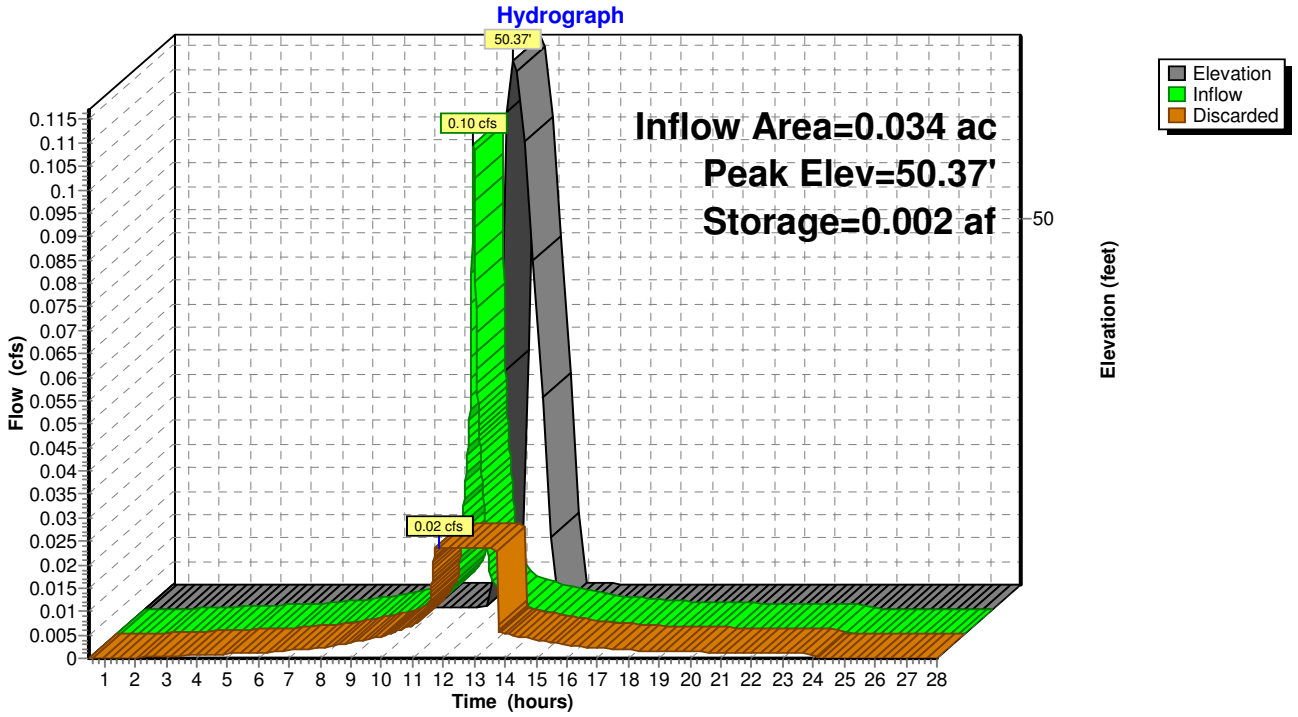
892.5 cf Field - 249.3 cf Chambers = 643.2 cf Stone x 35.0% Voids = 225.1 cf Stone Storage

Chamber Storage + Stone Storage = 410.6 cf = 0.009 af
Overall Storage Efficiency = 46.0%
Overall System Size = 20.00' x 8.50' x 5.25'

4 Chambers
33.1 cy Field
23.8 cy Stone



Pond INF-4: Inf. System #4 Galleys



Summary for Pond INF-5: Inf. System #5 Galleys

Inflow Area = 0.116 ac, 73.87% Impervious, Inflow Depth = 1.50" for 2-Year event
Inflow = 0.21 cfs @ 12.08 hrs, Volume= 0.015 af
Outflow = 0.07 cfs @ 12.00 hrs, Volume= 0.015 af, Atten= 68%, Lag= 0.0 min
Discarded = 0.07 cfs @ 12.00 hrs, Volume= 0.015 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 50.34' @ 12.41 hrs Surf.Area= 0.011 ac Storage= 0.002 af

Plug-Flow detention time= 7.0 min calculated for 0.015 af (100% of inflow)
Center-of-Mass det. time= 7.0 min (837.8 - 830.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	49.75'	0.014 af	**8.50'W x 56.00'L x 5.25'H Field A** 0.057 af Overall - 0.019 af Embedded = 0.039 af x 35.0% Voids
#2A	50.75'	0.014 af	**Concrete Galley 4x4x4.25** x 13 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
		0.027 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	49.75'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.07 cfs @ 12.00 hrs HW=49.81' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Pond INF-5: Inf. System #5 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent)
Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

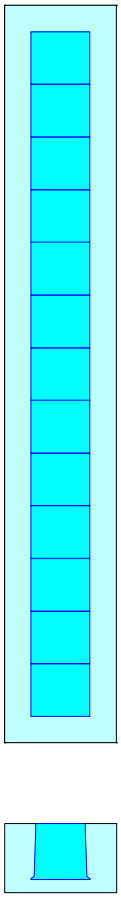
13 Chambers/Row x 4.00' Long = 52.00' Row Length +24.0" End Stone x 2 = 56.00' Base Length
1 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 8.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

13 Chambers x 46.4 cf = 602.9 cf Chamber Storage
13 Chambers x 62.3 cf = 810.3 cf Displacement

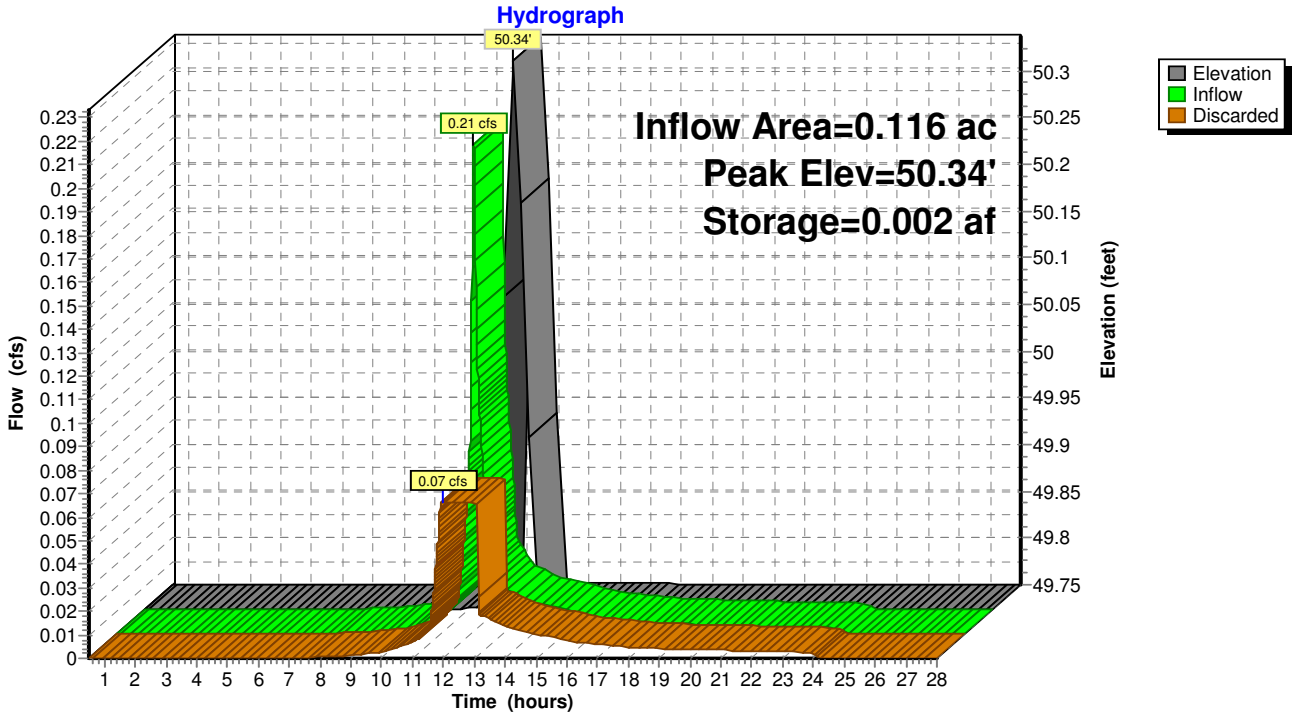
2,499.0 cf Field - 810.3 cf Chambers = 1,688.7 cf Stone x 35.0% Voids = 591.0 cf Stone Storage

Chamber Storage + Stone Storage = 1,194.0 cf = 0.027 af
Overall Storage Efficiency = 47.8%
Overall System Size = 56.00' x 8.50' x 5.25'

13 Chambers
92.6 cy Field
62.5 cy Stone



Pond INF-5: Inf. System #5 Galleys



Summary for Pond SW: Swale

Inflow Area = 0.149 ac, 9.61% Impervious, Inflow Depth = 0.03" for 2-Year event
Inflow = 0.00 cfs @ 15.59 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 15.66 hrs, Volume= 0.000 af, Atten= 0%, Lag= 4.4 min
Primary = 0.00 cfs @ 15.66 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 52.50' @ 15.66 hrs Surf.Area= 151 sf Storage= 0 cf
Flood Elev= 54.00' Surf.Area= 1,377 sf Storage= 994 cf

Plug-Flow detention time= 6.1 min calculated for 0.000 af (100% of inflow)
Center-of-Mass det. time= 6.1 min (1,134.5 - 1,128.4)

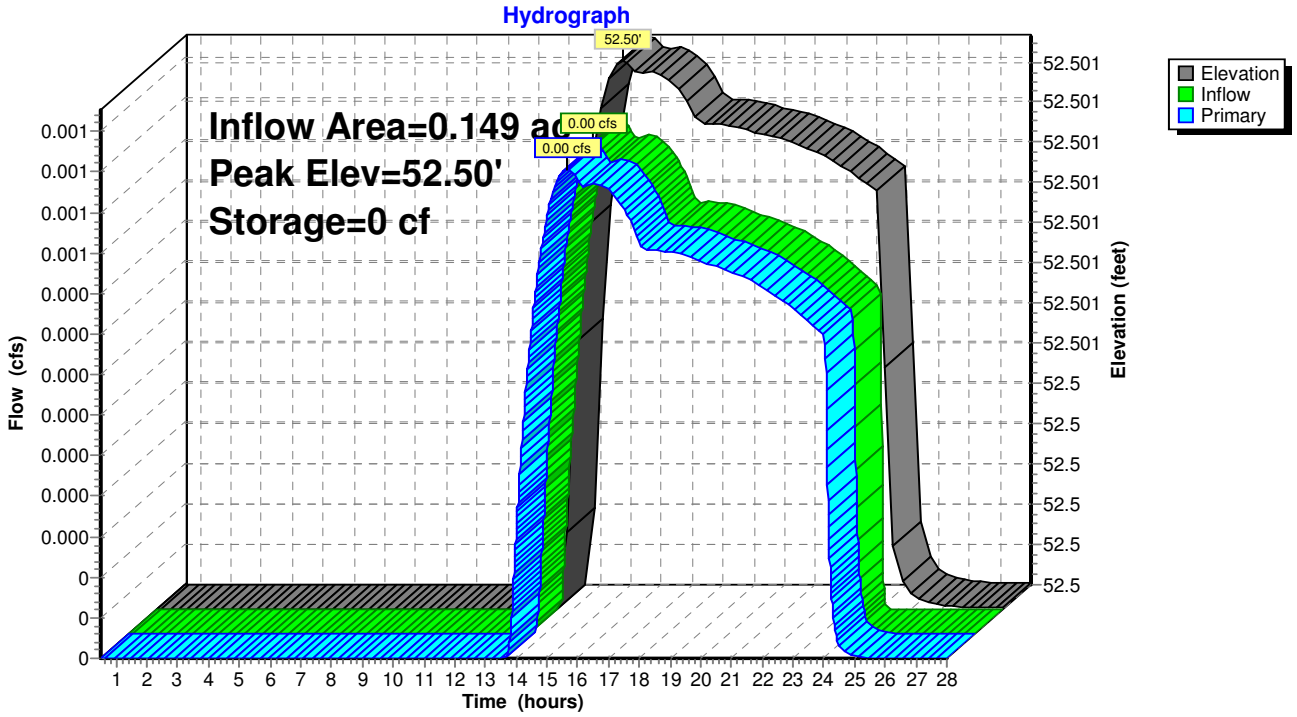
Volume	Invert	Avail.Storage	Storage Description
#1	52.50'	994 cf	**Swale (pond) (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
52.50	150	282.4	0	0	150
53.00	425	294.1	138	138	706
54.00	1,377	376.6	856	994	5,122

Device	Routing	Invert	Outlet Devices
#1	Primary	52.50'	**1.5" x 9.0" Horiz. Orifice/Grate** X 4 rows C= 0.600 in 11.0" x 11.0" Grate (45% open area) Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 15.66 hrs HW=52.50' TW=50.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Weir Controls 0.00 cfs @ 0.12 fps)

Pond SW: Swale



Summary for Subcatchment E1: Elm Street (East)

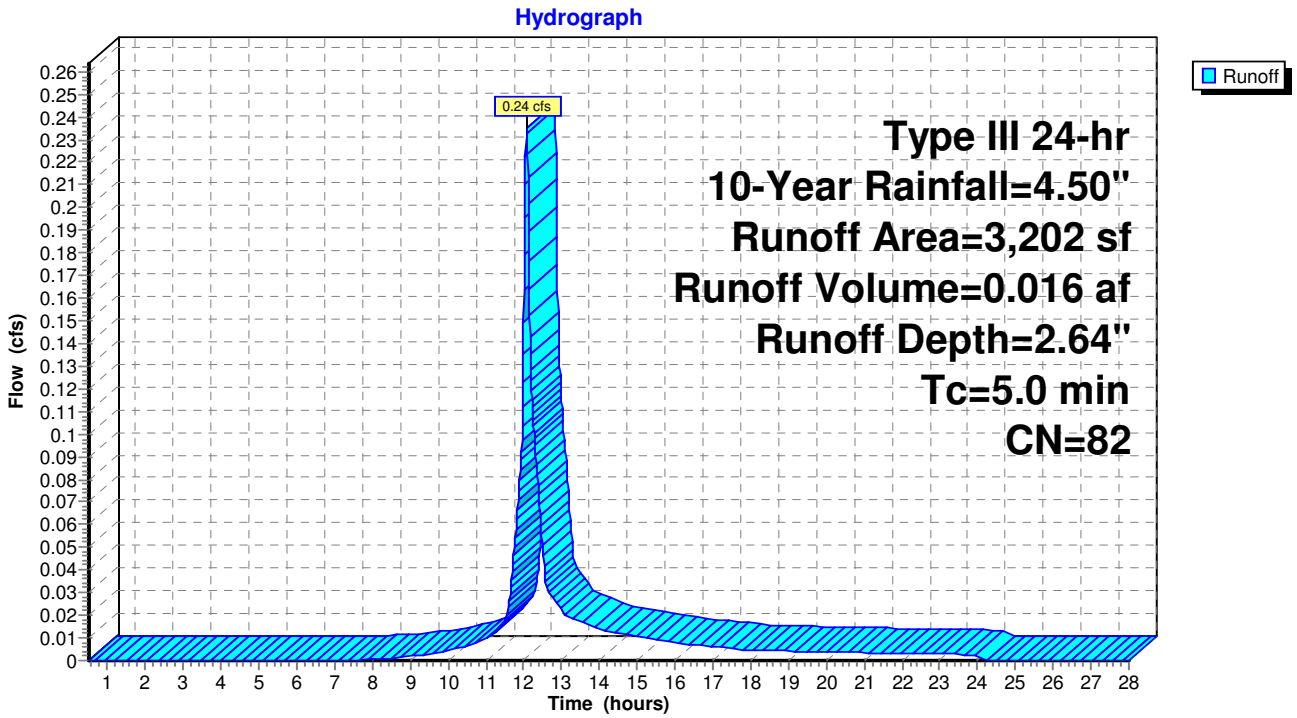
Runoff = 0.24 cfs @ 12.07 hrs, Volume= 0.016 af, Depth= 2.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	580	98	Roof (portion)
*	1,558	98	Paved Driveway
*	215	98	Walks
	849	39	>75% Grass cover, Good, HSG A
	3,202	82	Weighted Average
	849		26.51% Pervious Area
	2,353		73.49% Impervious Area

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

Subcatchment E1: Elm Street (East)



Summary for Subcatchment E2: Southwest Abutter

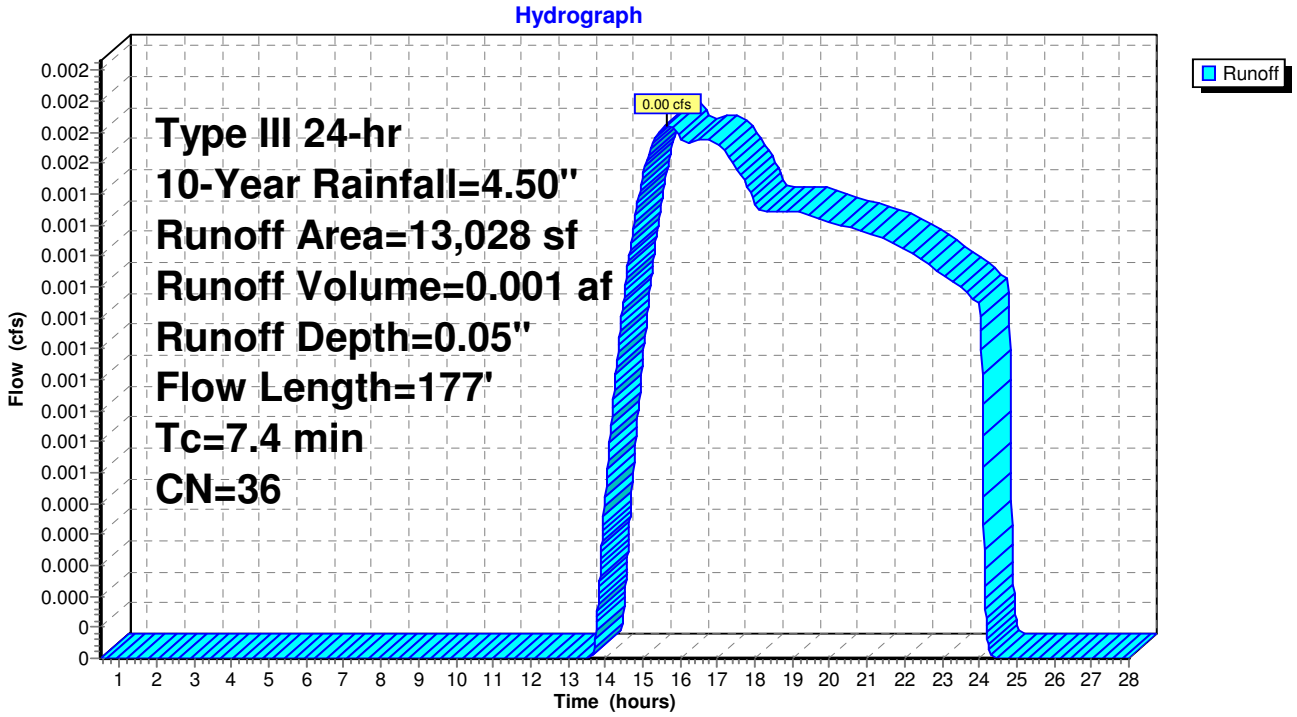
Runoff = 0.00 cfs @ 15.63 hrs, Volume= 0.001 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	182	98	Roof (portion)
*	651	98	Patio
*	17	98	Bulkhead
	12,178	32	Woods/grass comb., Good, HSG A
	13,028	36	Weighted Average
	12,178		93.48% Pervious Area
	850		6.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	9	0.0113	0.08		**Sheet Flow, Segment: A-B** Grass: Short n= 0.150 P2= 3.10"
2.8	28	0.0362	0.16		**Sheet Flow, Segment: B-C** Grass: Short n= 0.150 P2= 3.10"
1.2	14	0.0735	0.19		**Sheet Flow, Segment: C-D** Grass: Short n= 0.150 P2= 3.10"
0.5	67	0.1142	2.37		**Shallow Concentrated Flow, Segment: D-E** Short Grass Pasture Kv= 7.0 fps
1.1	59	0.0171	0.92		**Shallow Concentrated Flow, Segment: E-F** Short Grass Pasture Kv= 7.0 fps
7.4	177	Total			

Subcatchment E2: Southwest Abutter



Summary for Subcatchment E3: Northwest Abutter

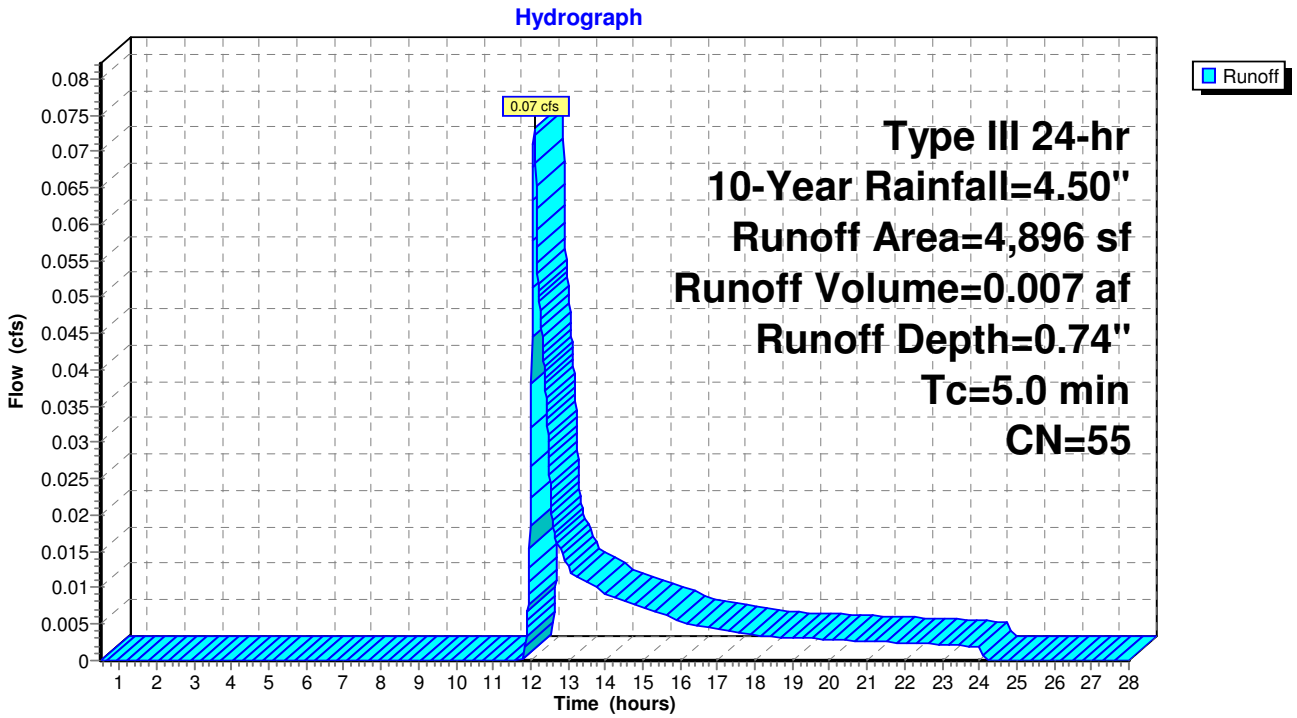
Runoff = 0.07 cfs @ 12.10 hrs, Volume= 0.007 af, Depth= 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	91	98	Roof (portion)
*	1,433	98	Paved Driveway
*	187	98	Walls
	3,185	32	Woods/grass comb., Good, HSG A
	4,896	55	Weighted Average
	3,185		65.05% Pervious Area
	1,711		34.95% Impervious Area

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

Subcatchment E3: Northwest Abutter



Summary for Subcatchment E4: River Street (North)

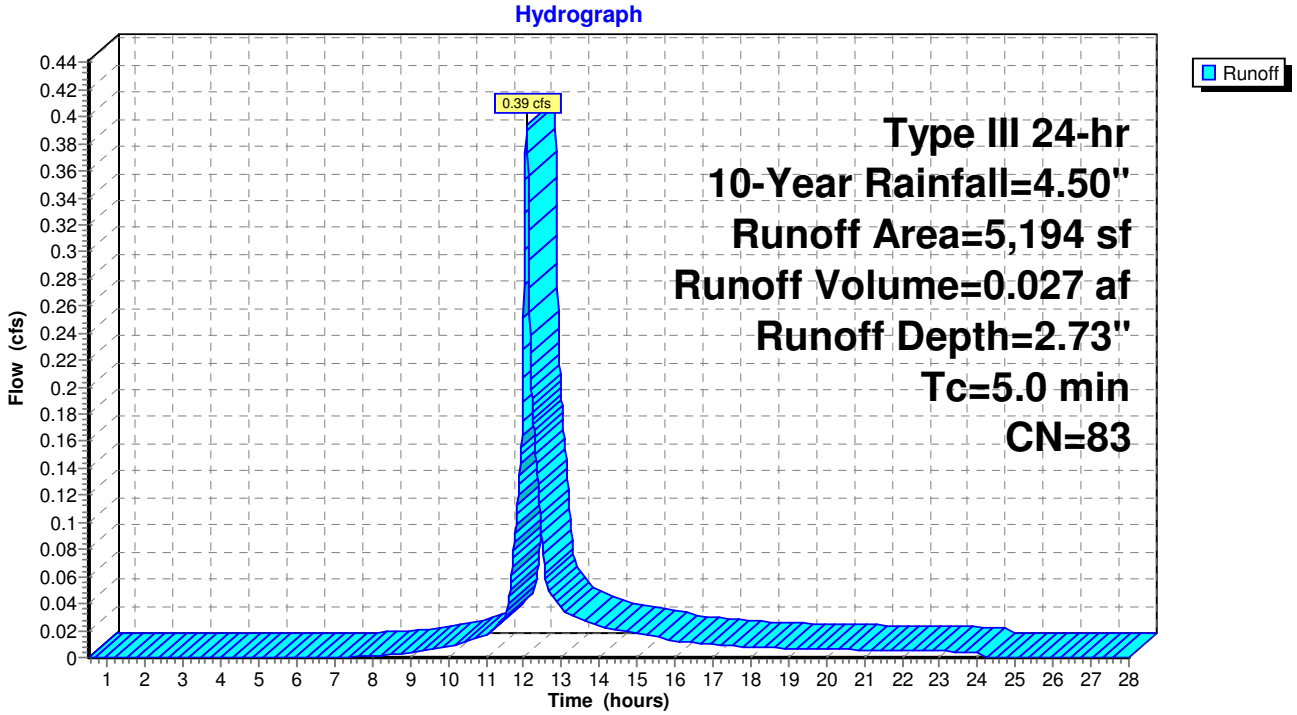
Runoff = 0.39 cfs @ 12.07 hrs, Volume= 0.027 af, Depth= 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	277	98	Roof (portion)
*	3,608	98	Paved Driveway
*	129	98	Walk
	1,180	32	Woods/grass comb., Good, HSG A
	5,194	83	Weighted Average
	1,180		22.72% Pervious Area
	4,014		77.28% Impervious Area

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

Subcatchment E4: River Street (North)



Summary for Subcatchment P1: Elm Street

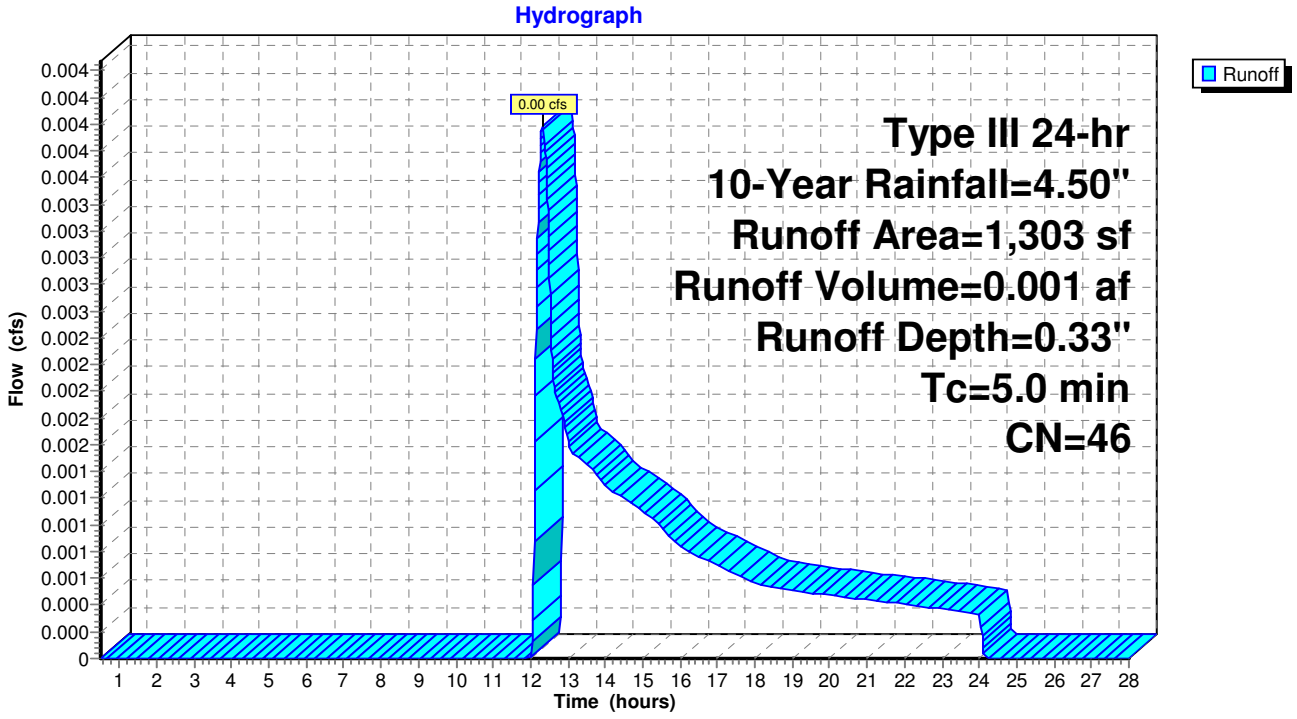
Runoff = 0.00 cfs @ 12.33 hrs, Volume= 0.001 af, Depth= 0.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	155	98	Walk
	1,148	39	>75% Grass cover, Good, HSG A
	1,303	46	Weighted Average
	1,148		88.10% Pervious Area
	155		11.90% Impervious Area

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

Subcatchment P1: Elm Street



Summary for Subcatchment P2: Southwest Abutter

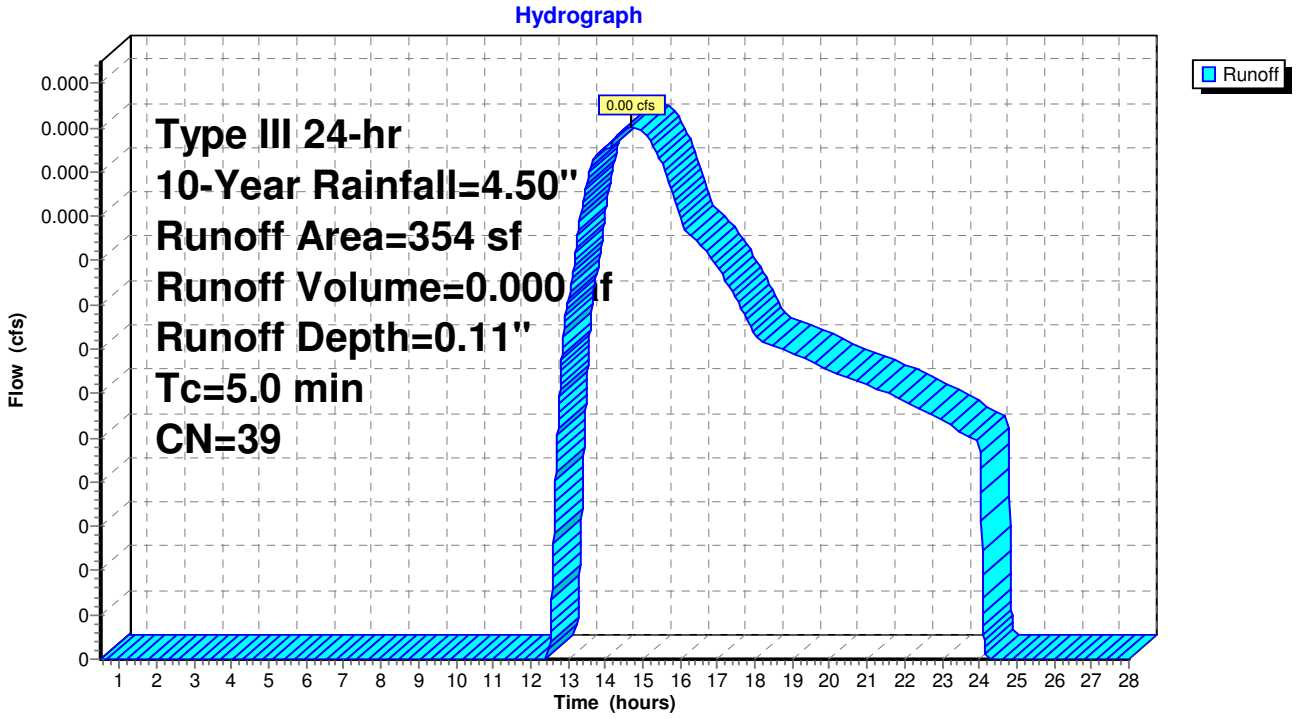
Runoff = 0.00 cfs @ 14.68 hrs, Volume= 0.000 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
354	39	>75% Grass cover, Good, HSG A
354		100.00% Pervious Area

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

Subcatchment P2: Southwest Abutter



Summary for Subcatchment P2A: On Site

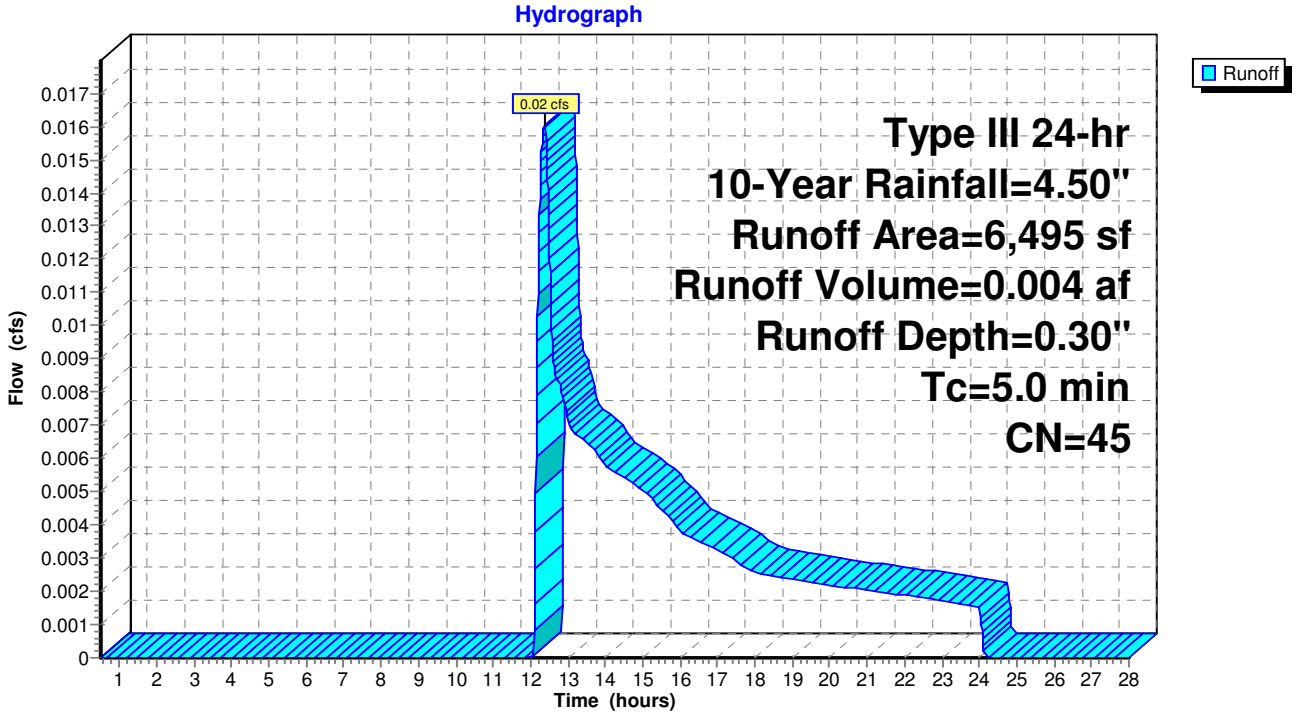
Runoff = 0.02 cfs @ 12.35 hrs, Volume= 0.004 af, Depth= 0.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	35	98	Walks
*	197	98	Ret. Wall
*	84	98	Bulkhead
*	308	98	Patios
	5,871	39	>75% Grass cover, Good, HSG A
	6,495	45	Weighted Average
	5,871		90.39% Pervious Area
	624		9.61% Impervious Area

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

Subcatchment P2A: On Site



Summary for Subcatchment P3: Northwest Abutter

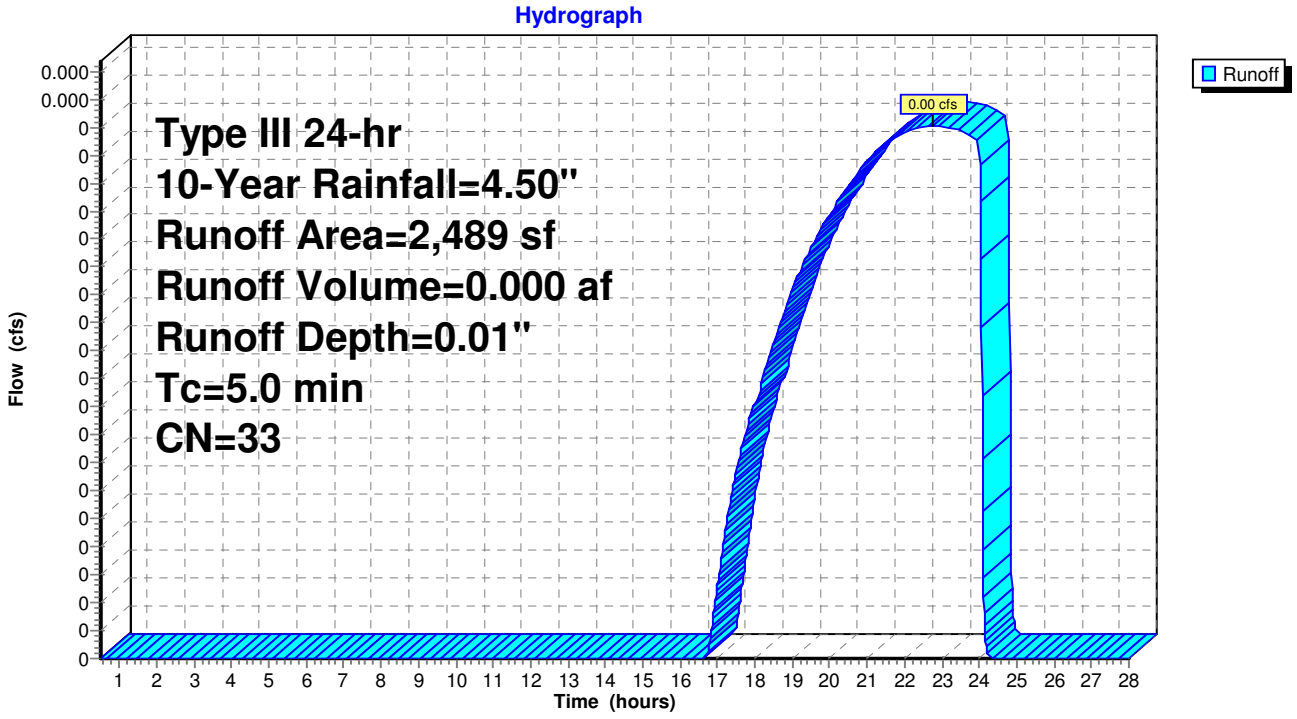
Runoff = 0.00 cfs @ 22.75 hrs, Volume= 0.000 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	42	98	Bulkhead
	2,447	32	Woods/grass comb., Good, HSG A
	2,489	33	Weighted Average
	2,447		98.31% Pervious Area
	42		1.69% Impervious Area

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

Subcatchment P3: Northwest Abutter



Summary for Subcatchment P4: River Street

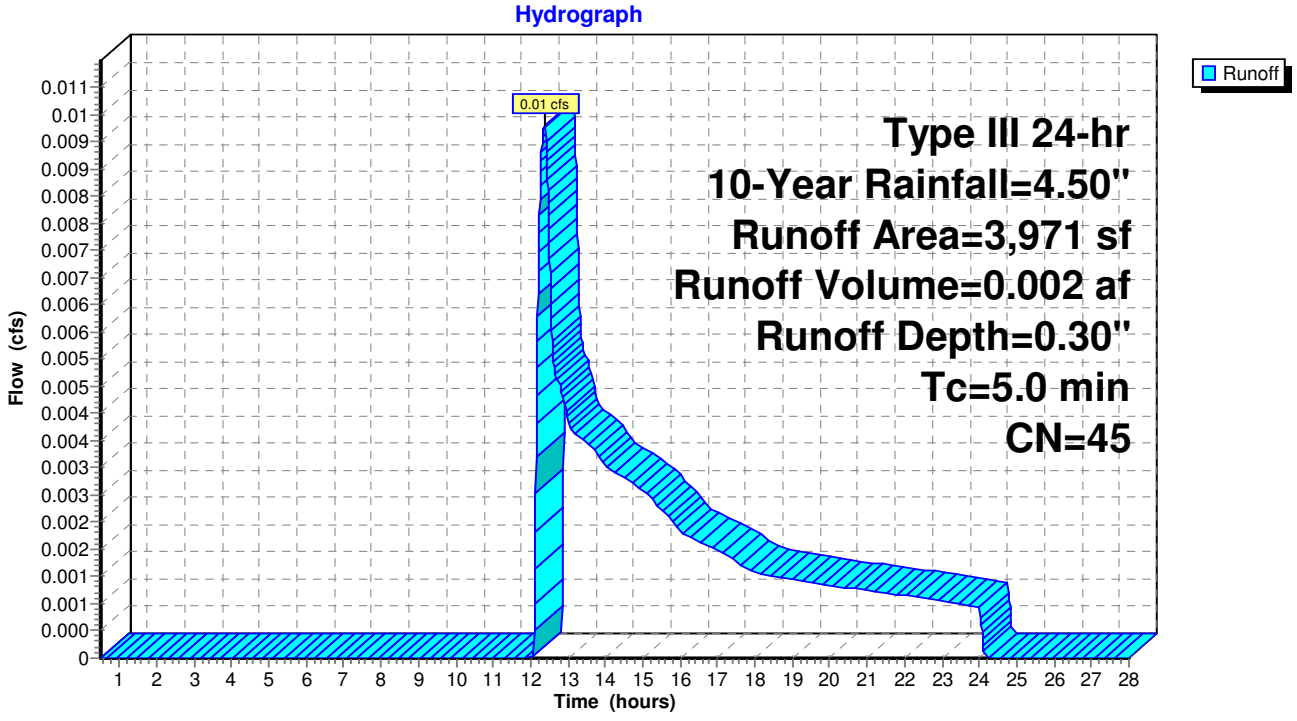
Runoff = 0.01 cfs @ 12.35 hrs, Volume= 0.002 af, Depth= 0.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	384	98	Patios
*	42	98	Bulkhead
	3,545	39	>75% Grass cover, Good, HSG A
	3,971	45	Weighted Average
	3,545		89.27% Pervious Area
	426		10.73% Impervious Area

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

Subcatchment P4: River Street



Summary for Subcatchment PD1: Proposed Driveway (portion)

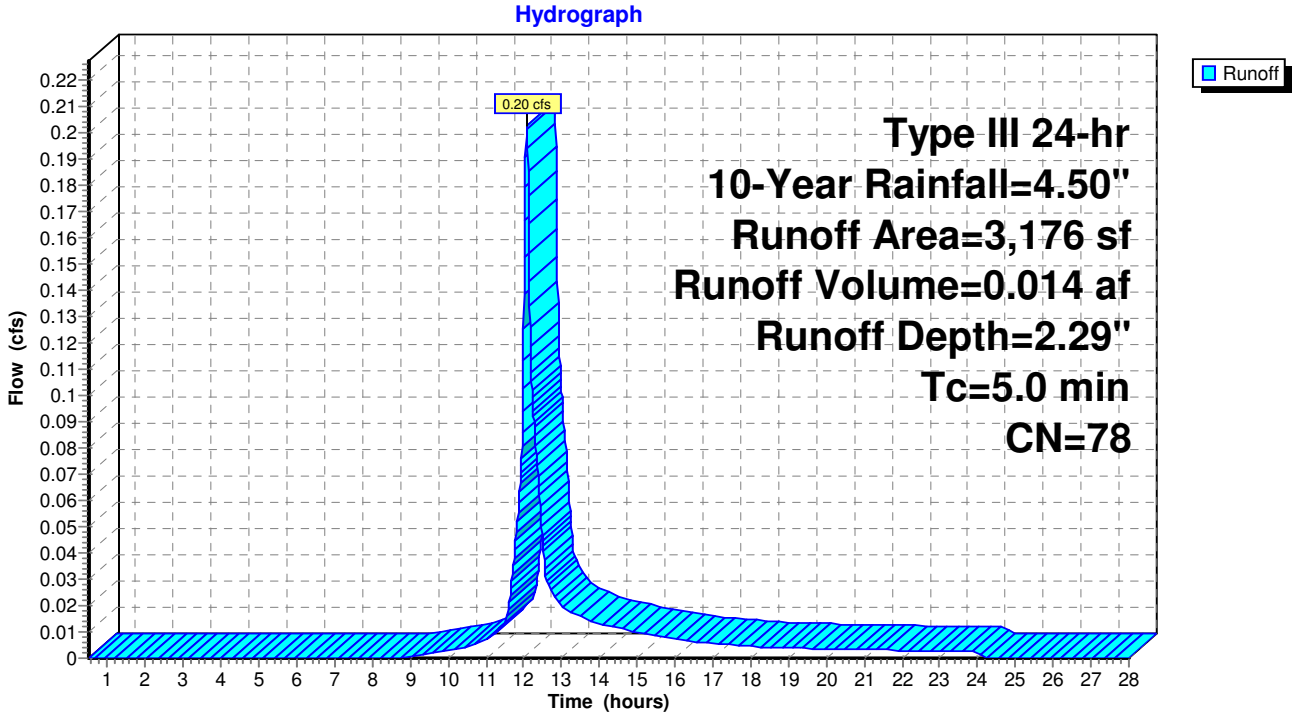
Runoff = 0.20 cfs @ 12.08 hrs, Volume= 0.014 af, Depth= 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	1,994	98	Paved Driveway
*	130	98	Walk
	1,052	39	>75% Grass cover, Good, HSG A
	3,176	78	Weighted Average
	1,052		33.12% Pervious Area
	2,124		66.88% Impervious Area

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

Subcatchment PD1: Proposed Driveway (portion)



Summary for Subcatchment PD2: Proposed Driveway (portion)

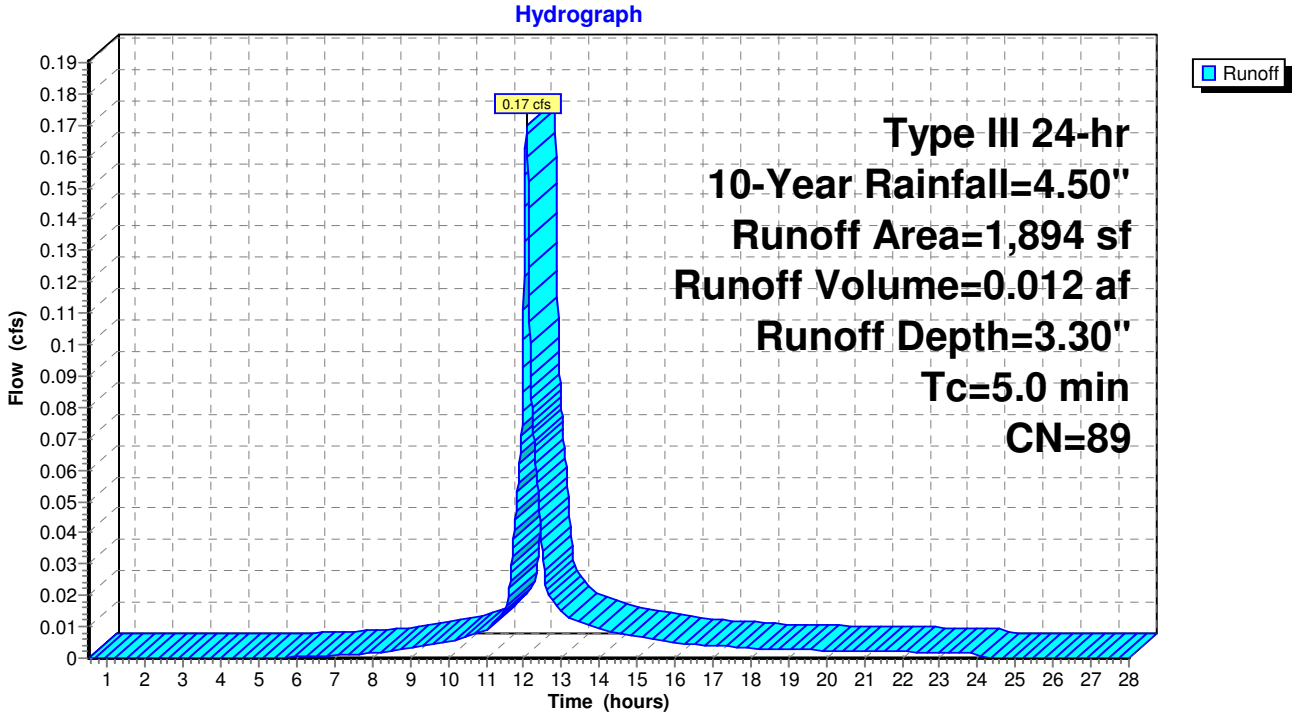
Runoff = 0.17 cfs @ 12.07 hrs, Volume= 0.012 af, Depth= 3.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	1,525	98	Paved Driveway
*	96	98	Walk
	273	39	>75% Grass cover, Good, HSG A
	1,894	89	Weighted Average
	273		14.41% Pervious Area
	1,621		85.59% Impervious Area

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

Subcatchment PD2: Proposed Driveway (portion)



Summary for Subcatchment PD3: Proposed Driveway (portion)

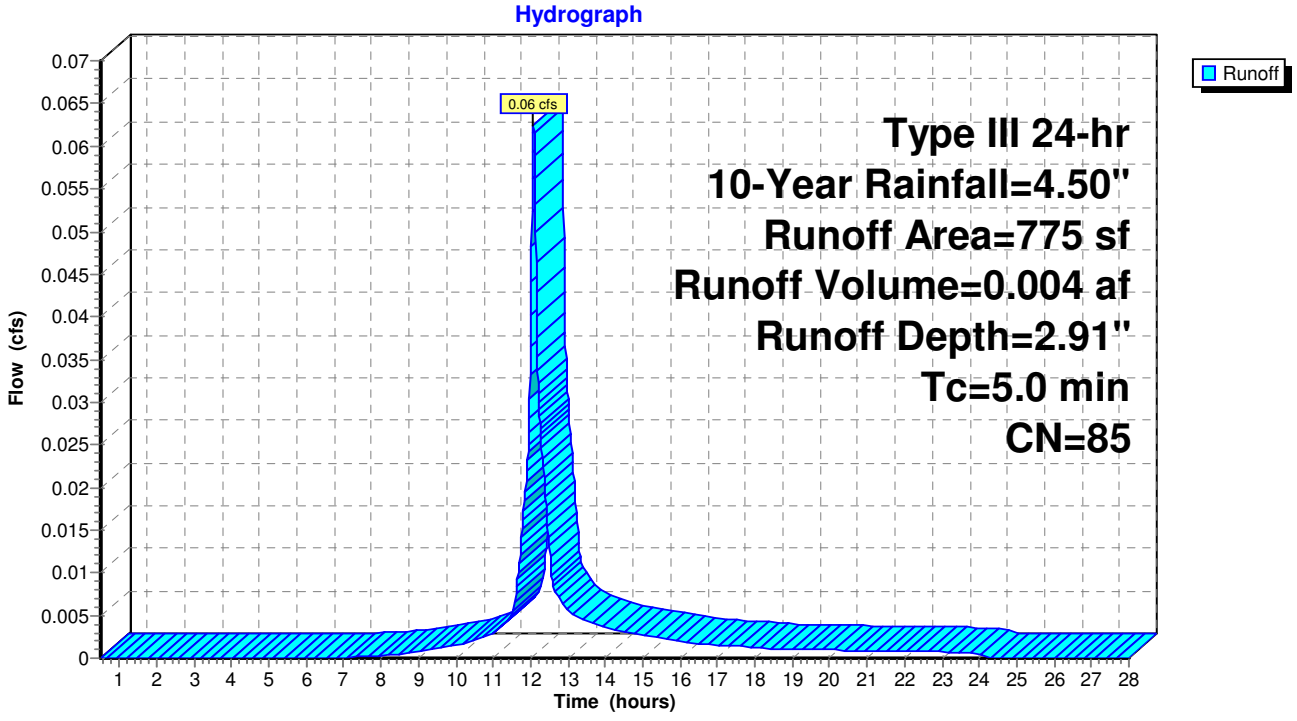
Runoff = 0.06 cfs @ 12.07 hrs, Volume= 0.004 af, Depth= 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	554	98	Paved Driveway
*	56	98	Walk
	165	39	>75% Grass cover, Good, HSG A
	775	85	Weighted Average
	165		21.29% Pervious Area
	610		78.71% Impervious Area

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

Subcatchment PD3: Proposed Driveway (portion)



Summary for Subcatchment PR1: Proposed Roof (Portion)

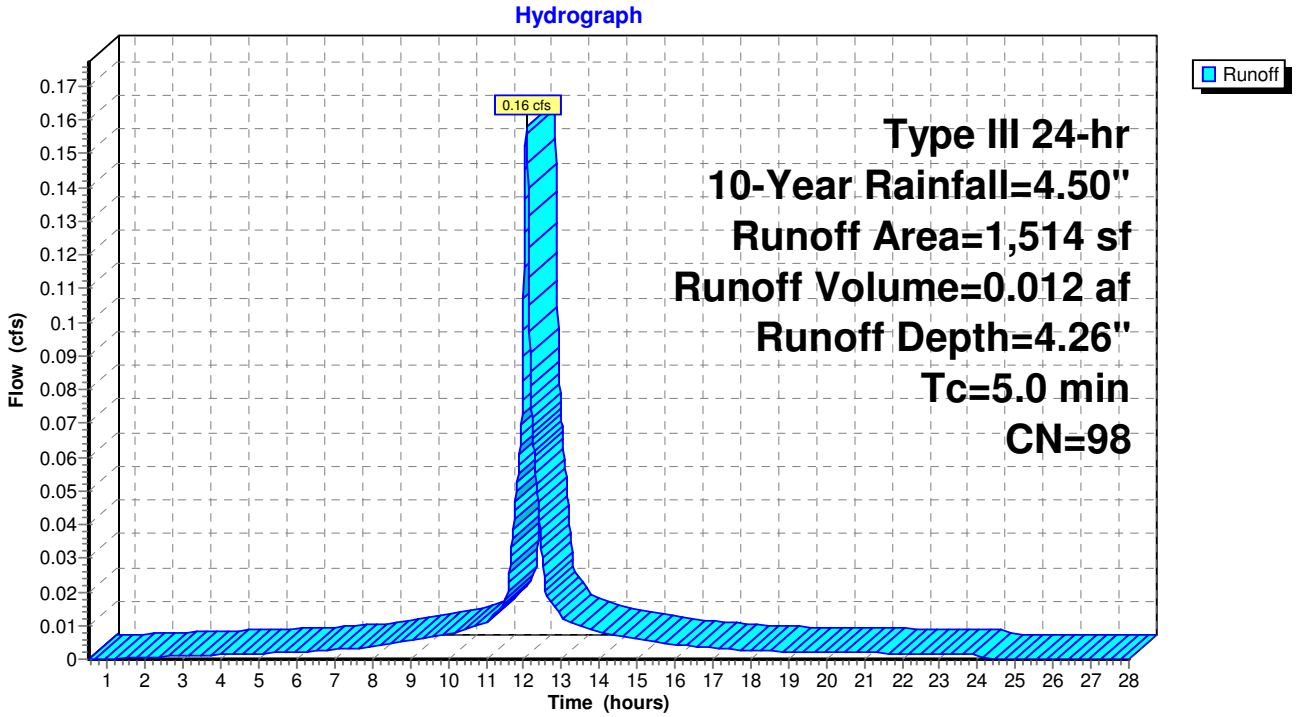
Runoff = 0.16 cfs @ 12.07 hrs, Volume= 0.012 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	1,514	98	Roof
	1,514		100.00% Impervious Area

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

Subcatchment PR1: Proposed Roof (Portion)



Summary for Subcatchment PR2: Proposed Roof (Portion)

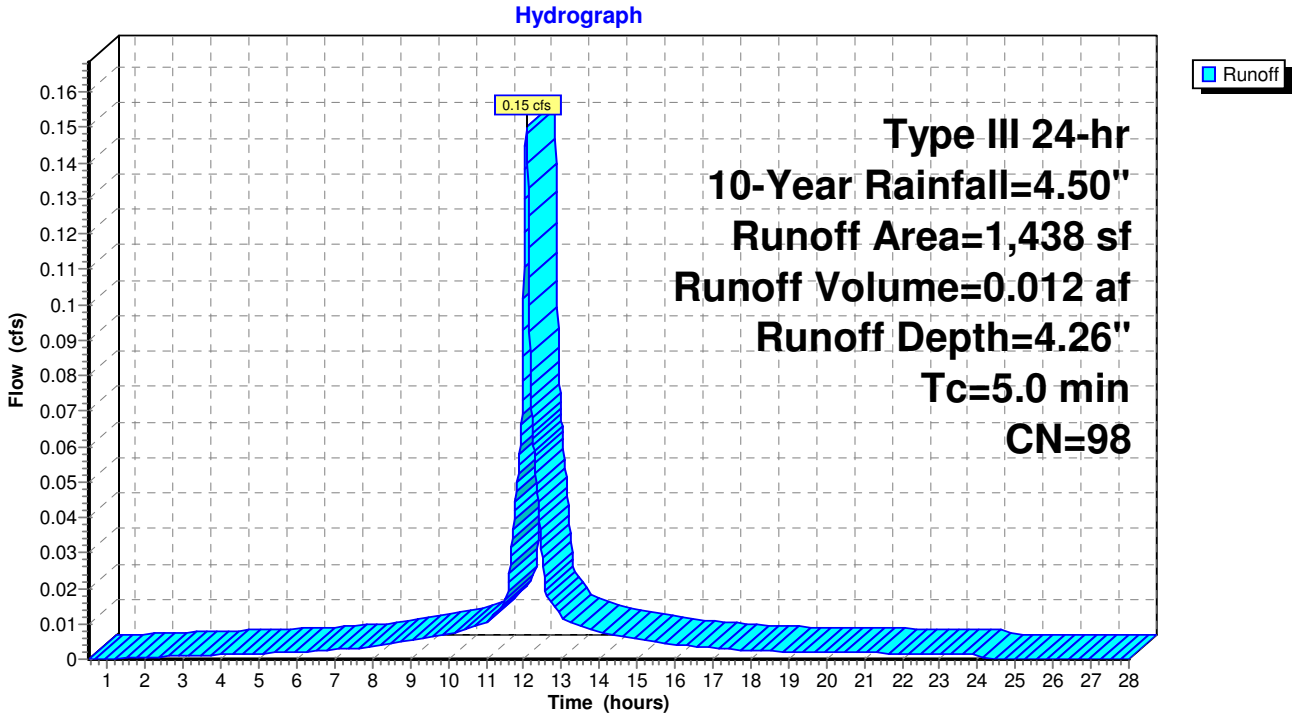
Runoff = 0.15 cfs @ 12.07 hrs, Volume= 0.012 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	1,438	98	Roof
	1,438		100.00% Impervious Area

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

Subcatchment PR2: Proposed Roof (Portion)



Summary for Subcatchment PR3: Prop. Roof (Portion)

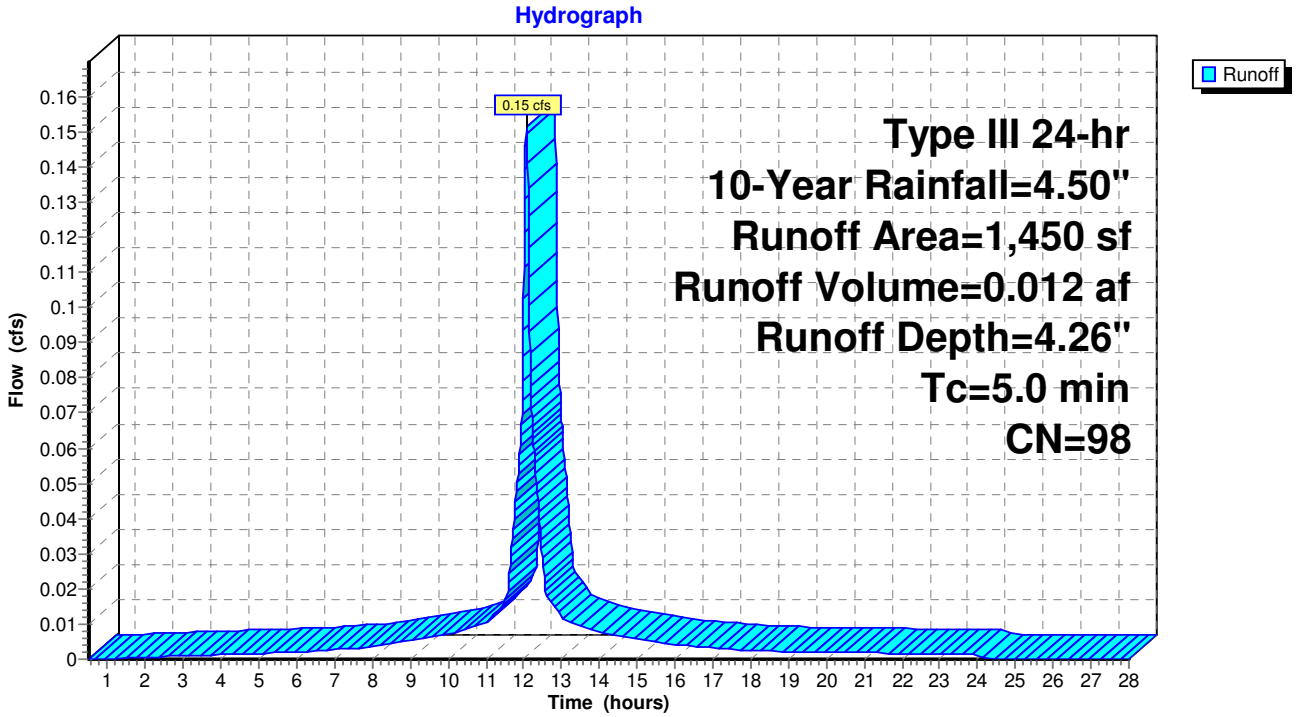
Runoff = 0.15 cfs @ 12.07 hrs, Volume= 0.012 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	1,450	98	Roof
	1,450		100.00% Impervious Area

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

Subcatchment PR3: Prop. Roof (Portion)



Summary for Subcatchment PR4: Prop. Roof (Portion)

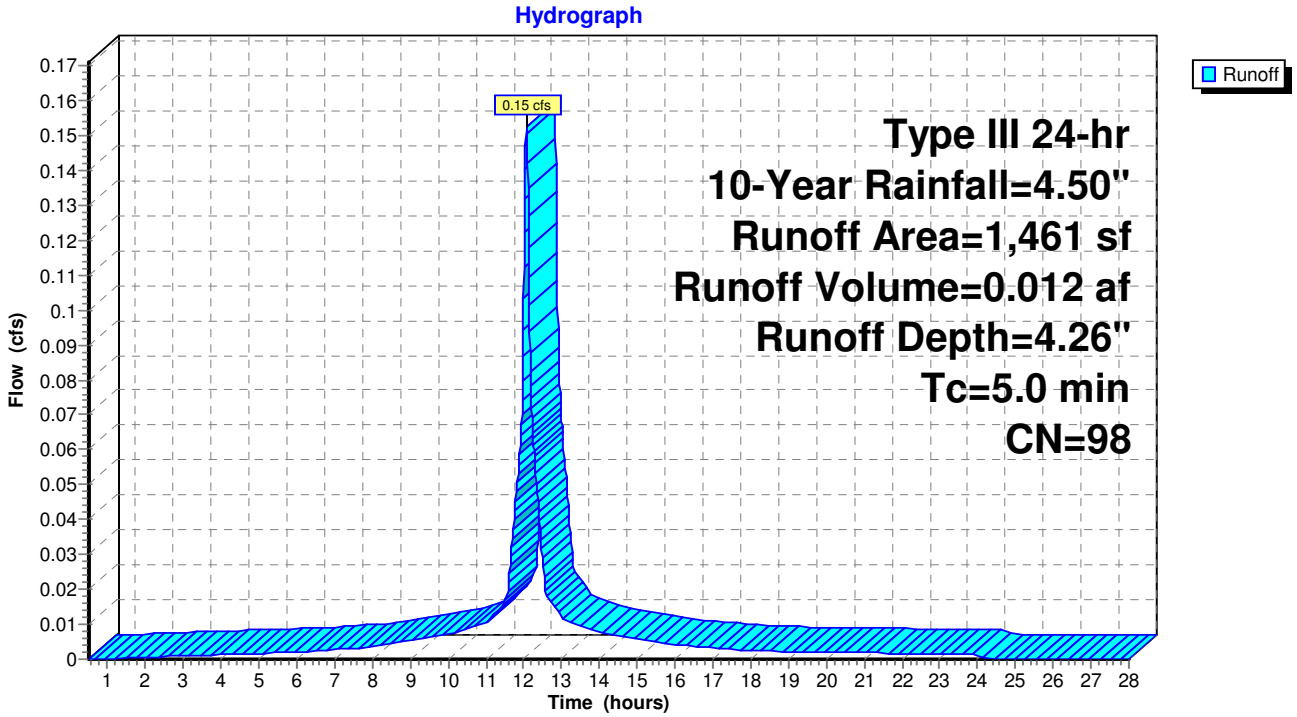
Runoff = 0.15 cfs @ 12.07 hrs, Volume= 0.012 af, Depth= 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	1,461	98	Roof
	1,461		100.00% Impervious Area

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

Subcatchment PR4: Prop. Roof (Portion)



Summary for Pond 2P: Inf. System #6 CPP pipe

Inflow Area = 0.149 ac, 9.61% Impervious, Inflow Depth = 0.30" for 10-Year event
Inflow = 0.02 cfs @ 12.37 hrs, Volume= 0.004 af
Outflow = 0.02 cfs @ 12.38 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.4 min
Discarded = 0.02 cfs @ 12.38 hrs, Volume= 0.004 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 50.00' @ 12.38 hrs Surf.Area= 0.008 ac Storage= 0.000 af

Plug-Flow detention time= 0.4 min calculated for 0.004 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (971.5 - 971.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	50.00'	0.004 af	**4.95'W x 42.00'L x 2.73'H Field A** 0.013 af Overall - 0.002 af Embedded = 0.011 af x 35.0% Voids
#2A	51.00'	0.002 af	**CPP single-wall 12"** x 4 Inside #1 Inside= 12.0"W x 12.0"H => 1.04 sf x 20.00'L = 20.8 cf Outside= 14.7"W x 14.7"H => 1.04 sf x 20.00'L = 20.8 cf 2 Rows of 2 Chambers
#3B	50.00'	0.003 af	**3.23'W x 42.00'L x 2.73'H Field B** 0.008 af Overall - 0.001 af Embedded = 0.008 af x 35.0% Voids
#4B	51.00'	0.001 af	**CPP single-wall 12"** x 2 Inside #3 Inside= 12.0"W x 12.0"H => 1.04 sf x 20.00'L = 20.8 cf Outside= 14.7"W x 14.7"H => 1.04 sf x 20.00'L = 20.8 cf
		0.009 af	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	50.00'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.02 cfs @ 12.38 hrs HW=50.00' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Pond 2P: Inf. System #6 CPP pipe - Chamber Wizard Field A

Chamber Model = CPP single-wall 12" (Single-wall corrugated HDPE pipe)
Inside= 12.0"W x 12.0"H => 1.04 sf x 20.00'L = 20.8 cf
Outside= 14.7"W x 14.7"H => 1.04 sf x 20.00'L = 20.8 cf

14.7" Wide + 6.0" Spacing = 20.7" C-C Row Spacing

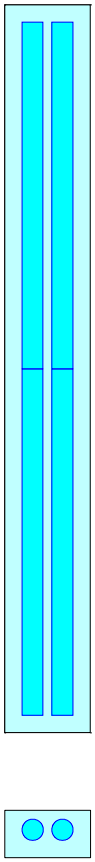
2 Chambers/Row x 20.00' Long = 40.00' Row Length +12.0" End Stone x 2 = 42.00' Base Length
2 Rows x 14.7" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 4.95' Base Width
12.0" Base + 14.7" Chamber Height + 6.0" Cover = 2.73' Field Height

4 Chambers x 20.8 cf = 83.3 cf Chamber Storage

566.5 cf Field - 83.3 cf Chambers = 483.2 cf Stone x 35.0% Voids = 169.1 cf Stone Storage

Chamber Storage + Stone Storage = 252.4 cf = 0.006 af
Overall Storage Efficiency = 44.6%
Overall System Size = 42.00' x 4.95' x 2.73'

4 Chambers
21.0 cy Field
17.9 cy Stone



Pond 2P: Inf. System #6 CPP pipe - Chamber Wizard Field B

Chamber Model = CPP single-wall 12" (Single-wall corrugated HDPE pipe)
Inside= 12.0"W x 12.0"H => 1.04 sf x 20.00'L = 20.8 cf
Outside= 14.7"W x 14.7"H => 1.04 sf x 20.00'L = 20.8 cf

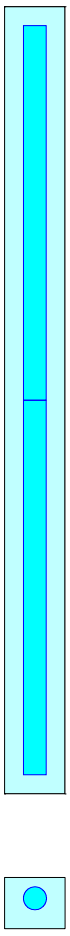
2 Chambers/Row x 20.00' Long = 40.00' Row Length +12.0" End Stone x 2 = 42.00' Base Length
1 Rows x 14.7" Wide + 12.0" Side Stone x 2 = 3.23' Base Width
12.0" Base + 14.7" Chamber Height + 6.0" Cover = 2.73' Field Height

2 Chambers x 20.8 cf = 41.6 cf Chamber Storage

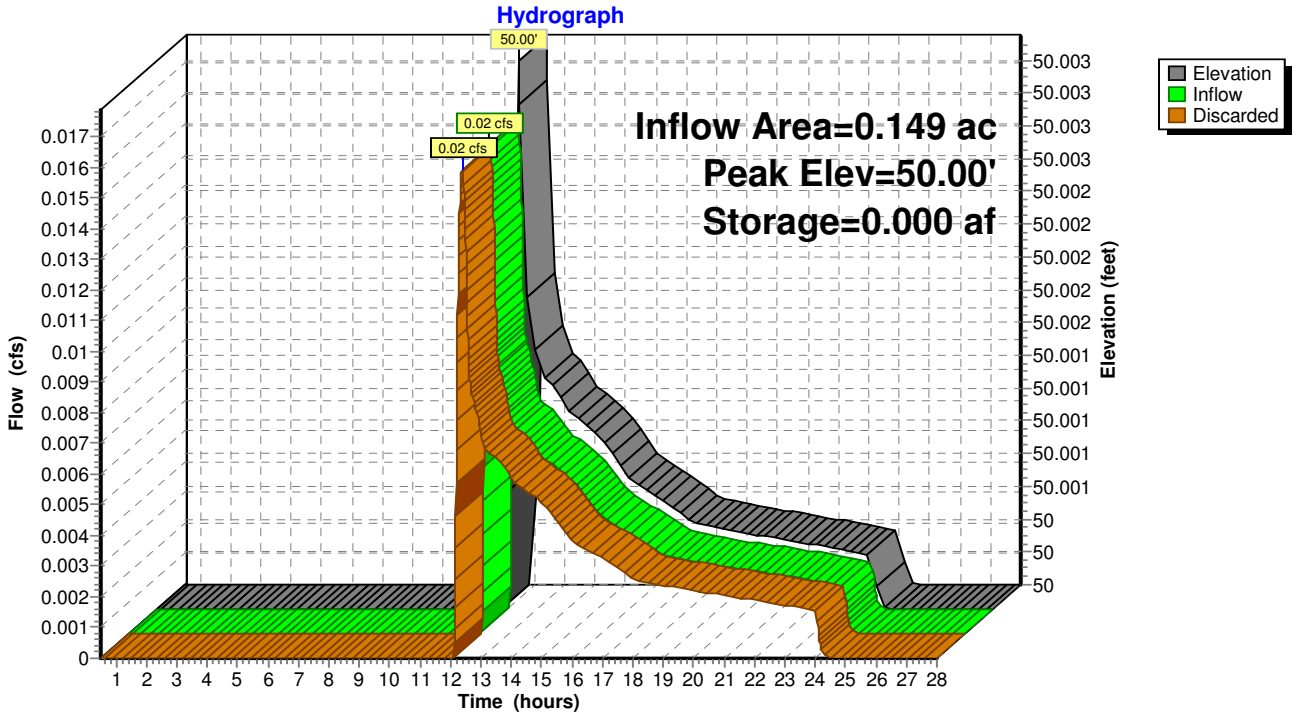
369.1 cf Field - 41.6 cf Chambers = 327.5 cf Stone x 35.0% Voids = 114.6 cf Stone Storage

Chamber Storage + Stone Storage = 156.3 cf = 0.004 af
Overall Storage Efficiency = 42.3%
Overall System Size = 42.00' x 3.23' x 2.73'

2 Chambers
13.7 cy Field
12.1 cy Stone



Pond 2P: Inf. System #6 CPP pipe



Summary for Pond INF-1: Inf. System #1 Galleys

Inflow Area = 0.053 ac, 92.79% Impervious, Inflow Depth = 3.81" for 10-Year event
Inflow = 0.22 cfs @ 12.07 hrs, Volume= 0.017 af
Outflow = 0.03 cfs @ 11.73 hrs, Volume= 0.017 af, Atten= 85%, Lag= 0.0 min
Discarded = 0.03 cfs @ 11.73 hrs, Volume= 0.017 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 51.15' @ 12.55 hrs Surf.Area= 0.005 ac Storage= 0.005 af

Plug-Flow detention time= 33.9 min calculated for 0.017 af (100% of inflow)
Center-of-Mass det. time= 33.9 min (798.8 - 764.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	49.25'	0.007 af	**8.50'W x 28.00'L x 5.25'H Field A** 0.029 af Overall - 0.009 af Embedded = 0.020 af x 35.0% Voids
#2A	50.25'	0.006 af	**Concrete Galley 4x4x4.25** x 6 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
		0.013 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	49.25'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.03 cfs @ 11.73 hrs HW=49.30' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.03 cfs)

Pond INF-1: Inf. System #1 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent)
Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

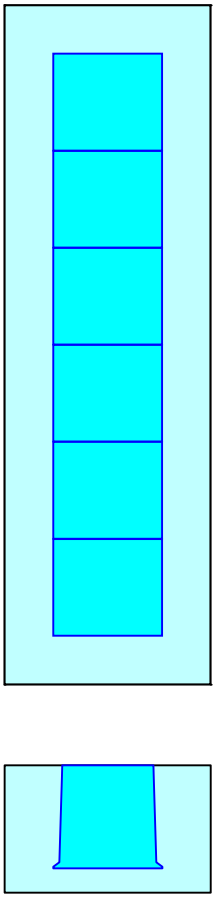
6 Chambers/Row x 4.00' Long = 24.00' Row Length +24.0" End Stone x 2 = 28.00' Base Length
1 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 8.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

6 Chambers x 46.4 cf = 278.3 cf Chamber Storage
6 Chambers x 62.3 cf = 374.0 cf Displacement

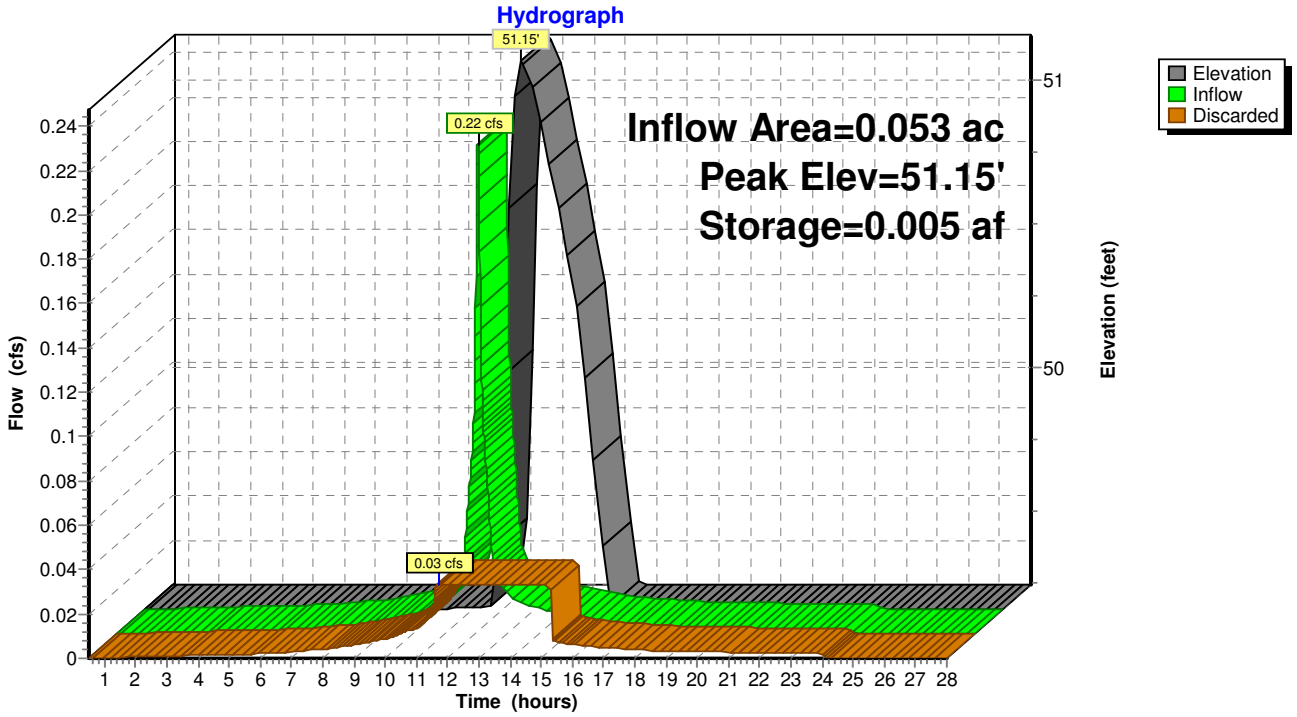
1,249.5 cf Field - 374.0 cf Chambers = 875.5 cf Stone x 35.0% Voids = 306.4 cf Stone Storage

Chamber Storage + Stone Storage = 584.7 cf = 0.013 af
Overall Storage Efficiency = 46.8%
Overall System Size = 28.00' x 8.50' x 5.25'

6 Chambers
46.3 cy Field
32.4 cy Stone



Pond INF-1: Inf. System #1 Galleys



Summary for Pond INF-2: Inf. System #2 Galleys

Inflow Area = 0.033 ac,100.00% Impervious, Inflow Depth = 4.26" for 10-Year event
Inflow = 0.15 cfs @ 12.07 hrs, Volume= 0.012 af
Outflow = 0.02 cfs @ 11.73 hrs, Volume= 0.012 af, Atten= 84%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.73 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 51.07' @ 12.53 hrs Surf.Area= 0.004 ac Storage= 0.003 af

Plug-Flow detention time= 29.7 min calculated for 0.012 af (100% of inflow)
Center-of-Mass det. time= 29.7 min (778.6 - 748.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	49.25'	0.005 af	**8.50'W x 20.00'L x 5.25'H Field A** 0.020 af Overall - 0.006 af Embedded = 0.015 af x 35.0% Voids
#2A	50.25'	0.004 af	**Concrete Galley 4x4x4.25** x 4 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
		0.009 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	49.25'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.02 cfs @ 11.73 hrs HW=49.30' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.02 cfs)

Pond INF-2: Inf. System #2 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent)
Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

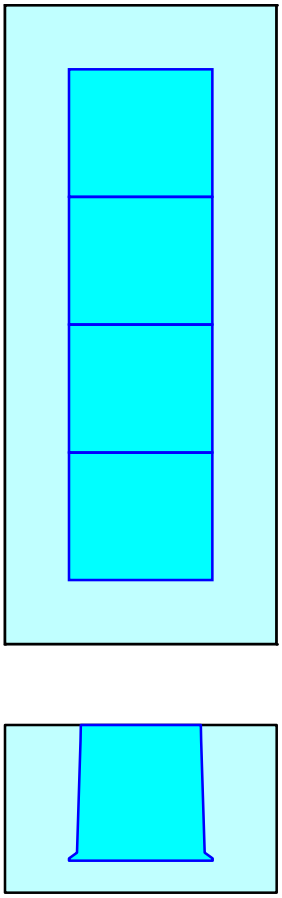
4 Chambers/Row x 4.00' Long = 16.00' Row Length +24.0" End Stone x 2 = 20.00' Base Length
1 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 8.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

4 Chambers x 46.4 cf = 185.5 cf Chamber Storage
4 Chambers x 62.3 cf = 249.3 cf Displacement

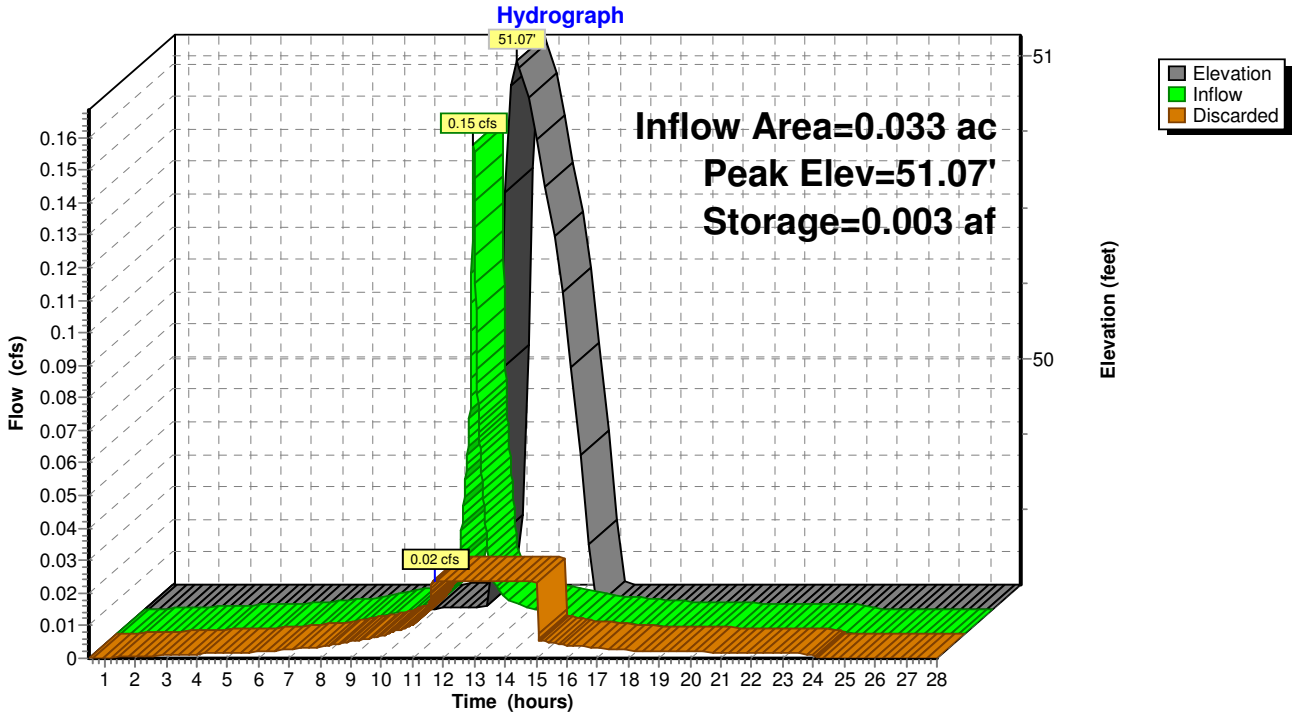
892.5 cf Field - 249.3 cf Chambers = 643.2 cf Stone x 35.0% Voids = 225.1 cf Stone Storage

Chamber Storage + Stone Storage = 410.6 cf = 0.009 af
Overall Storage Efficiency = 46.0%
Overall System Size = 20.00' x 8.50' x 5.25'

4 Chambers
33.1 cy Field
23.8 cy Stone



Pond INF-2: Inf. System #2 Galleys



Summary for Pond INF-3: Inf. System #3 Galleys

Inflow Area = 0.033 ac,100.00% Impervious, Inflow Depth = 4.26" for 10-Year event
Inflow = 0.15 cfs @ 12.07 hrs, Volume= 0.012 af
Outflow = 0.02 cfs @ 11.73 hrs, Volume= 0.012 af, Atten= 84%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.73 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 51.09' @ 12.53 hrs Surf.Area= 0.004 ac Storage= 0.003 af

Plug-Flow detention time= 30.2 min calculated for 0.012 af (100% of inflow)
Center-of-Mass det. time= 30.2 min (779.1 - 748.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	49.25'	0.005 af	**8.50'W x 20.00'L x 5.25'H Field A** 0.020 af Overall - 0.006 af Embedded = 0.015 af x 35.0% Voids
#2A	50.25'	0.004 af	**Concrete Galley 4x4x4.25** x 4 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
		0.009 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	49.25'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.02 cfs @ 11.73 hrs HW=49.31' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Pond INF-3: Inf. System #3 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent)
Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

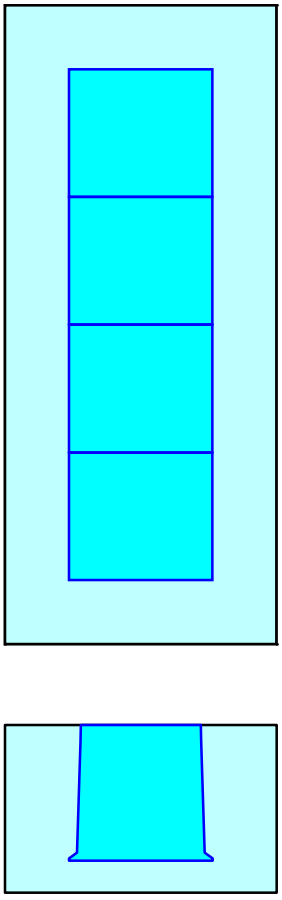
4 Chambers/Row x 4.00' Long = 16.00' Row Length +24.0" End Stone x 2 = 20.00' Base Length
1 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 8.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

4 Chambers x 46.4 cf = 185.5 cf Chamber Storage
4 Chambers x 62.3 cf = 249.3 cf Displacement

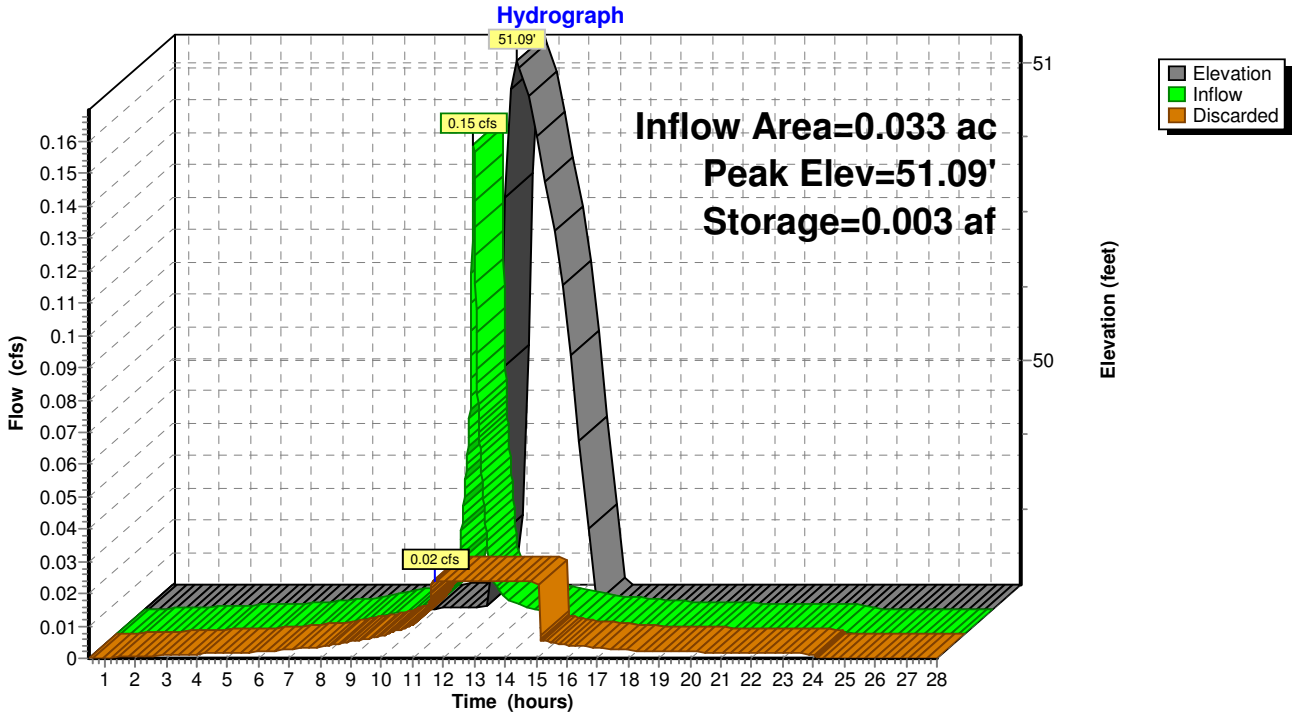
892.5 cf Field - 249.3 cf Chambers = 643.2 cf Stone x 35.0% Voids = 225.1 cf Stone Storage

Chamber Storage + Stone Storage = 410.6 cf = 0.009 af
Overall Storage Efficiency = 46.0%
Overall System Size = 20.00' x 8.50' x 5.25'

4 Chambers
33.1 cy Field
23.8 cy Stone



Pond INF-3: Inf. System #3 Galleys



Summary for Pond INF-4: Inf. System #4 Galleys

Inflow Area = 0.034 ac,100.00% Impervious, Inflow Depth = 4.26" for 10-Year event
Inflow = 0.15 cfs @ 12.07 hrs, Volume= 0.012 af
Outflow = 0.02 cfs @ 11.73 hrs, Volume= 0.012 af, Atten= 85%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.73 hrs, Volume= 0.012 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 51.10' @ 12.54 hrs Surf.Area= 0.004 ac Storage= 0.003 af

Plug-Flow detention time= 30.6 min calculated for 0.012 af (100% of inflow)
Center-of-Mass det. time= 30.6 min (779.5 - 748.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	49.25'	0.005 af	**8.50'W x 20.00'L x 5.25'H Field A** 0.020 af Overall - 0.006 af Embedded = 0.015 af x 35.0% Voids
#2A	50.25'	0.004 af	**Concrete Galley 4x4x4.25** x 4 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
		0.009 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	49.25'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.02 cfs @ 11.73 hrs HW=49.31' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Pond INF-4: Inf. System #4 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent)
Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

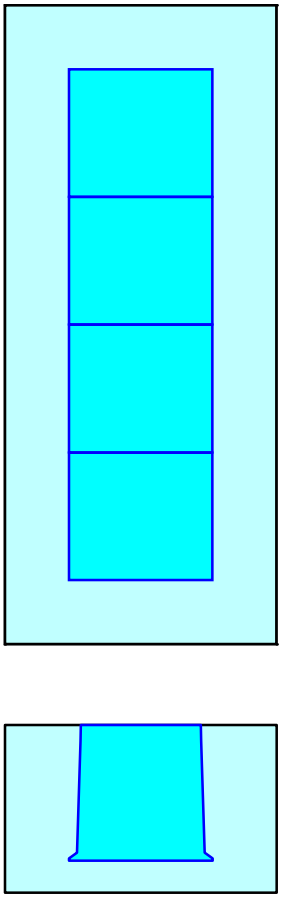
4 Chambers/Row x 4.00' Long = 16.00' Row Length +24.0" End Stone x 2 = 20.00' Base Length
1 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 8.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

4 Chambers x 46.4 cf = 185.5 cf Chamber Storage
4 Chambers x 62.3 cf = 249.3 cf Displacement

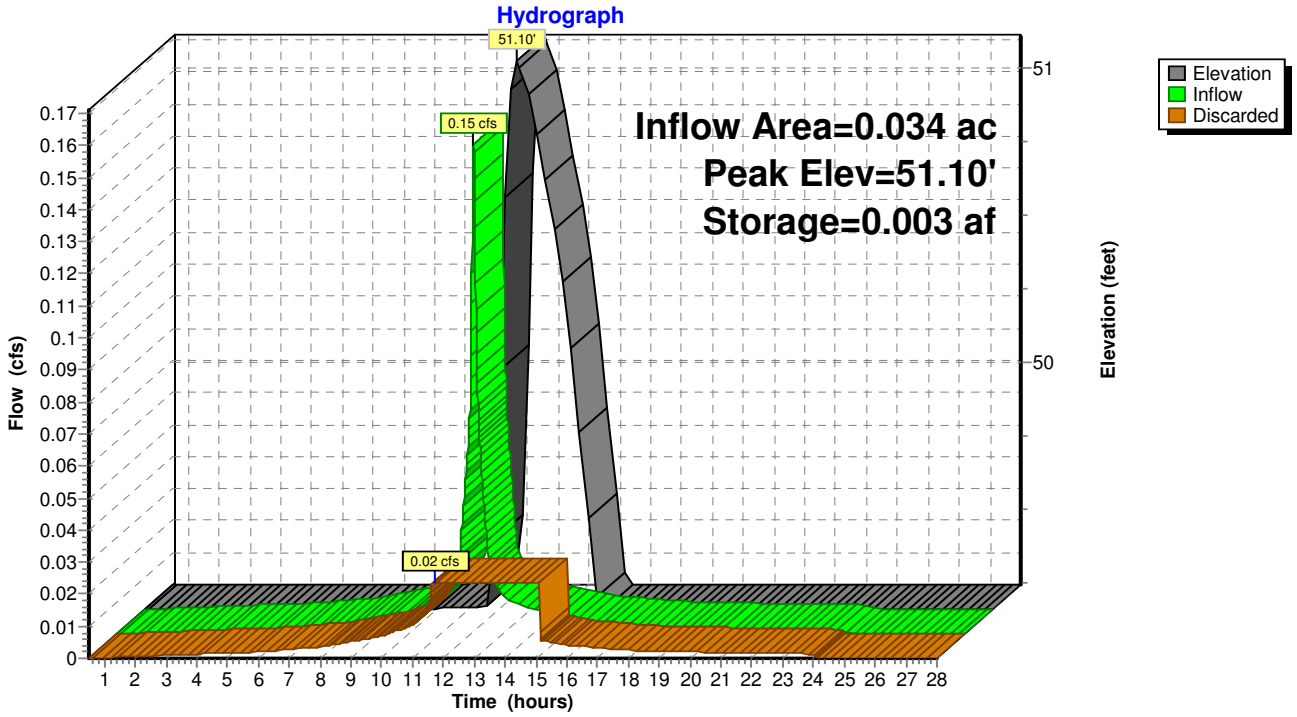
892.5 cf Field - 249.3 cf Chambers = 643.2 cf Stone x 35.0% Voids = 225.1 cf Stone Storage

Chamber Storage + Stone Storage = 410.6 cf = 0.009 af
Overall Storage Efficiency = 46.0%
Overall System Size = 20.00' x 8.50' x 5.25'

4 Chambers
33.1 cy Field
23.8 cy Stone



Pond INF-4: Inf. System #4 Galleys



Summary for Pond INF-5: Inf. System #5 Galleys

Inflow Area = 0.116 ac, 73.87% Impervious, Inflow Depth = 2.67" for 10-Year event
Inflow = 0.37 cfs @ 12.07 hrs, Volume= 0.026 af
Outflow = 0.07 cfs @ 11.82 hrs, Volume= 0.026 af, Atten= 82%, Lag= 0.0 min
Discarded = 0.07 cfs @ 11.82 hrs, Volume= 0.026 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 51.25' @ 12.53 hrs Surf.Area= 0.011 ac Storage= 0.007 af

Plug-Flow detention time= 26.7 min calculated for 0.026 af (100% of inflow)
Center-of-Mass det. time= 26.7 min (842.1 - 815.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	49.75'	0.014 af	**8.50'W x 56.00'L x 5.25'H Field A** 0.057 af Overall - 0.019 af Embedded = 0.039 af x 35.0% Voids
#2A	50.75'	0.014 af	**Concrete Galley 4x4x4.25** x 13 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
		0.027 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	49.75'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.07 cfs @ 11.82 hrs HW=49.80' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Pond INF-5: Inf. System #5 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent)
Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

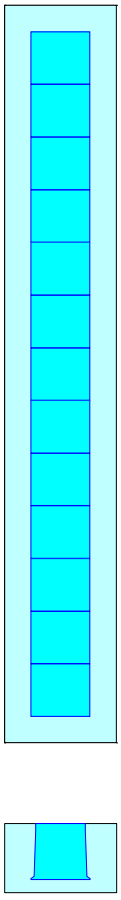
13 Chambers/Row x 4.00' Long = 52.00' Row Length +24.0" End Stone x 2 = 56.00' Base Length
1 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 8.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

13 Chambers x 46.4 cf = 602.9 cf Chamber Storage
13 Chambers x 62.3 cf = 810.3 cf Displacement

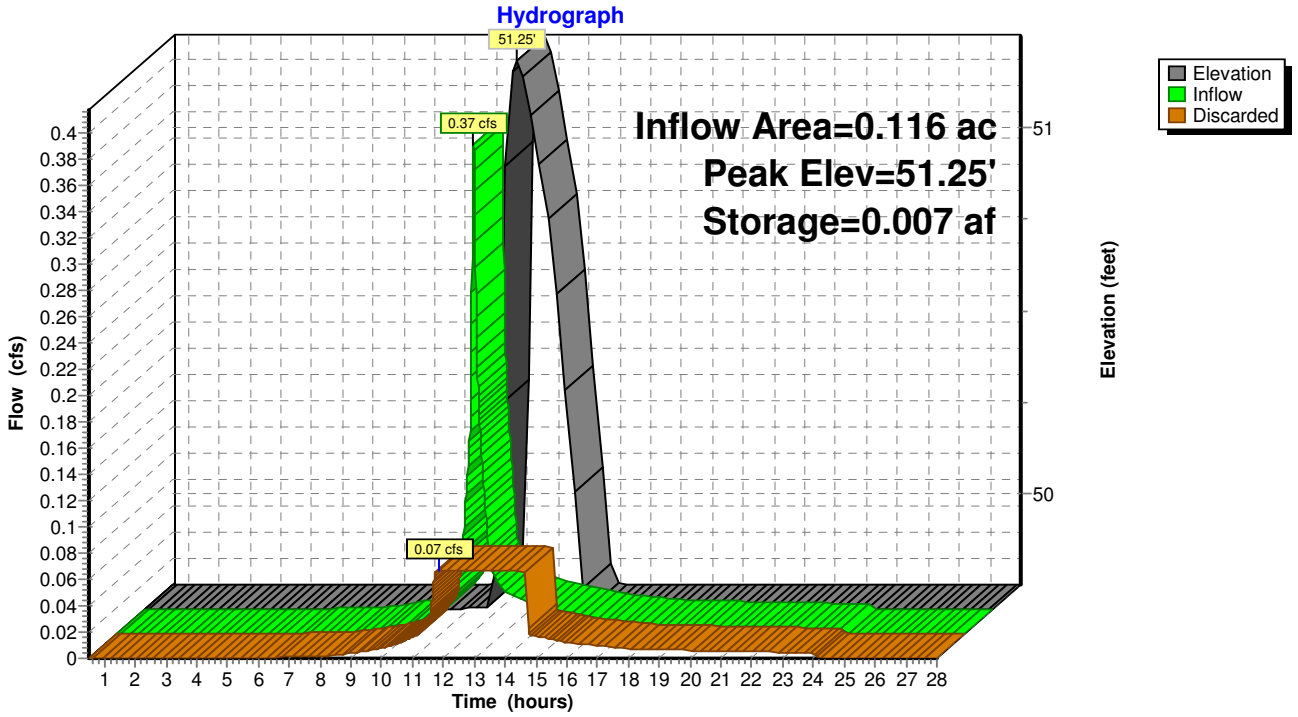
2,499.0 cf Field - 810.3 cf Chambers = 1,688.7 cf Stone x 35.0% Voids = 591.0 cf Stone Storage

Chamber Storage + Stone Storage = 1,194.0 cf = 0.027 af
Overall Storage Efficiency = 47.8%
Overall System Size = 56.00' x 8.50' x 5.25'

13 Chambers
92.6 cy Field
62.5 cy Stone



Pond INF-5: Inf. System #5 Galleys



Summary for Pond SW: Swale

Inflow Area = 0.149 ac, 9.61% Impervious, Inflow Depth = 0.30" for 10-Year event
Inflow = 0.02 cfs @ 12.35 hrs, Volume= 0.004 af
Outflow = 0.02 cfs @ 12.37 hrs, Volume= 0.004 af, Atten= 1%, Lag= 1.4 min
Primary = 0.02 cfs @ 12.37 hrs, Volume= 0.004 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 52.51' @ 12.37 hrs Surf.Area= 155 sf Storage= 2 cf
Flood Elev= 54.00' Surf.Area= 1,377 sf Storage= 994 cf

Plug-Flow detention time= 3.0 min calculated for 0.004 af (100% of inflow)
Center-of-Mass det. time= 3.0 min (971.1 - 968.1)

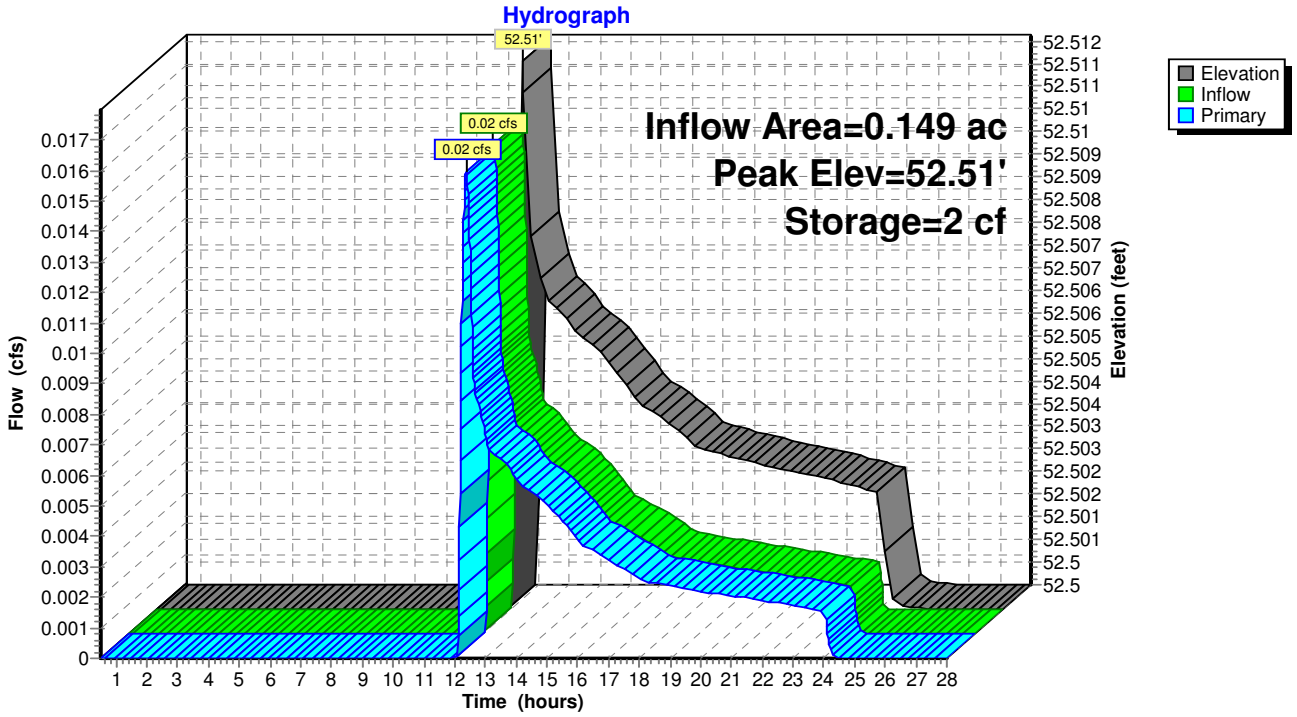
Volume	Invert	Avail.Storage	Storage Description
#1	52.50'	994 cf	**Swale (pond) (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
52.50	150	282.4	0	0	150
53.00	425	294.1	138	138	706
54.00	1,377	376.6	856	994	5,122

Device	Routing	Invert	Outlet Devices
#1	Primary	52.50'	**1.5" x 9.0" Horiz. Orifice/Grate** X 4 rows C= 0.600 in 11.0" x 11.0" Grate (45% open area) Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 12.37 hrs HW=52.51' TW=50.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Weir Controls 0.02 cfs @ 0.36 fps)

Pond SW: Swale



Summary for Subcatchment E1: Elm Street (East)

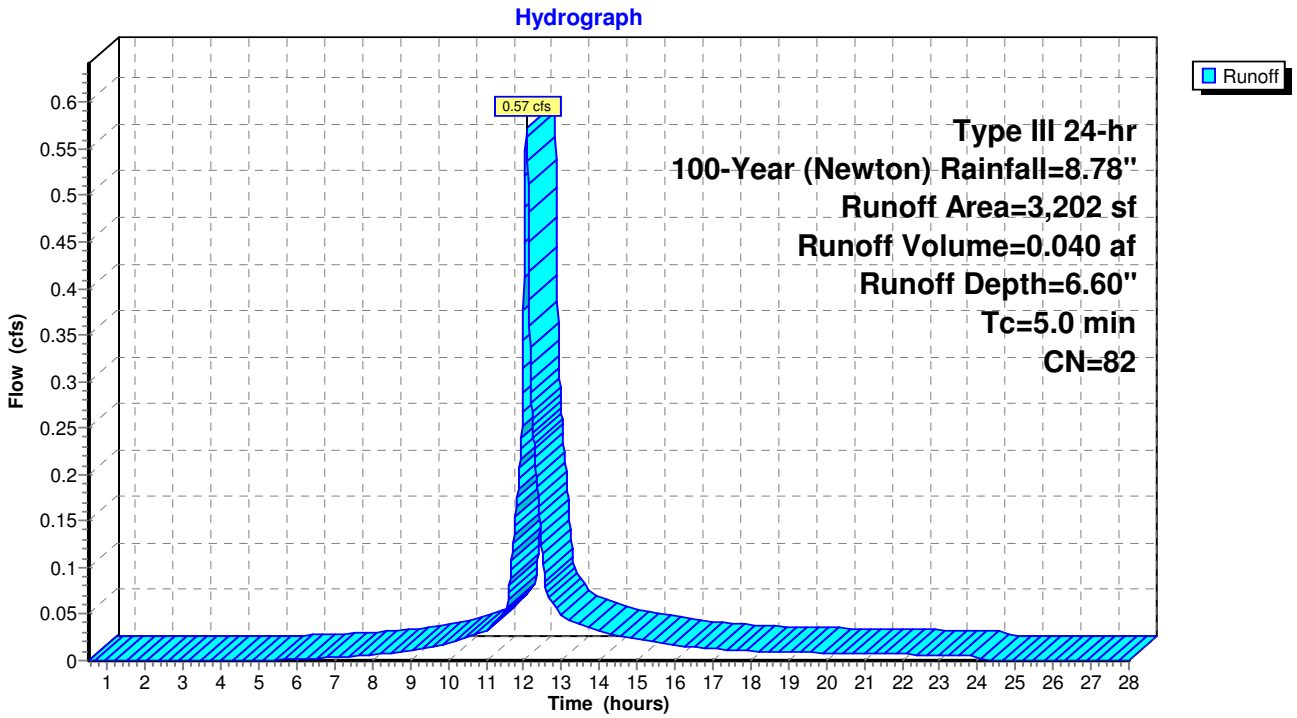
Runoff = 0.57 cfs @ 12.07 hrs, Volume= 0.040 af, Depth= 6.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description
*	580	98	Roof (portion)
*	1,558	98	Paved Driveway
*	215	98	Walks
	849	39	>75% Grass cover, Good, HSG A
	3,202	82	Weighted Average
	849		26.51% Pervious Area
	2,353		73.49% Impervious Area

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

Subcatchment E1: Elm Street (East)



Summary for Subcatchment E2: Southwest Abutter

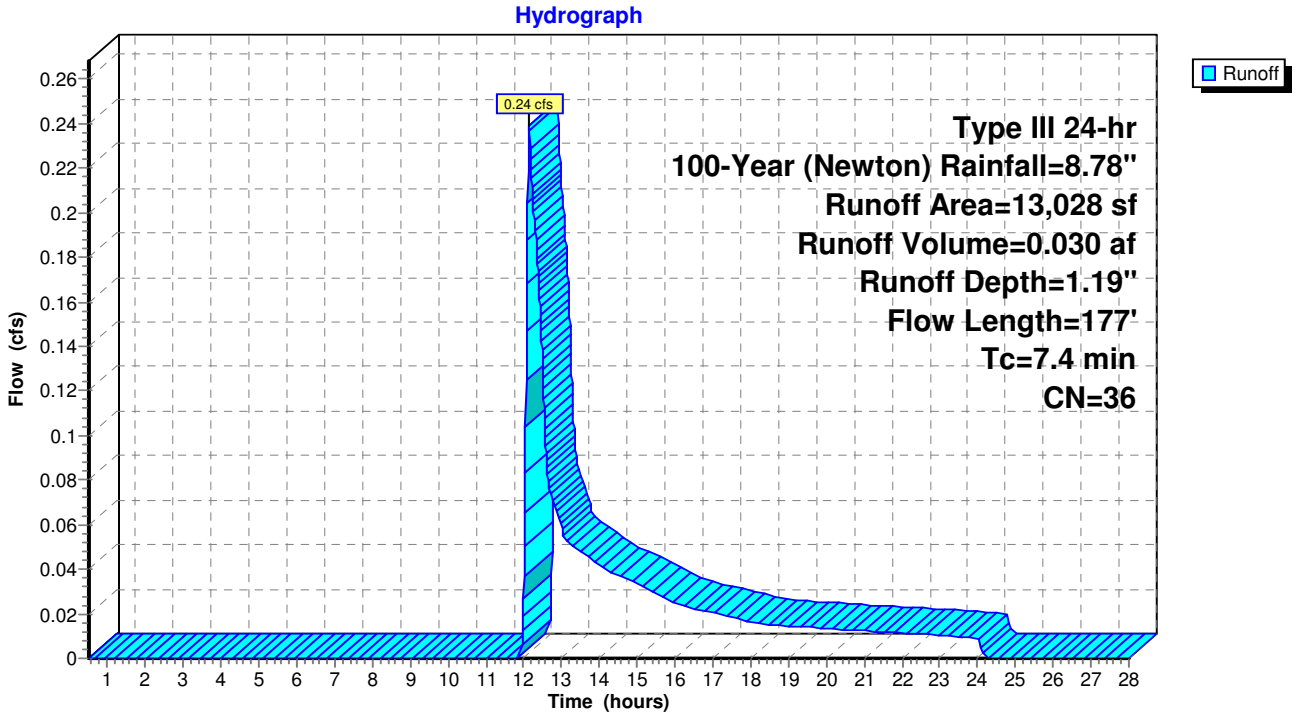
Runoff = 0.24 cfs @ 12.15 hrs, Volume= 0.030 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description
*	182	98	Roof (portion)
*	651	98	Patio
*	17	98	Bulkhead
	12,178	32	Woods/grass comb., Good, HSG A
	13,028	36	Weighted Average
	12,178		93.48% Pervious Area
	850		6.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	9	0.0113	0.08		**Sheet Flow, Segment: A-B** Grass: Short n= 0.150 P2= 3.10"
2.8	28	0.0362	0.16		**Sheet Flow, Segment: B-C** Grass: Short n= 0.150 P2= 3.10"
1.2	14	0.0735	0.19		**Sheet Flow, Segment: C-D** Grass: Short n= 0.150 P2= 3.10"
0.5	67	0.1142	2.37		**Shallow Concentrated Flow, Segment: D-E** Short Grass Pasture Kv= 7.0 fps
1.1	59	0.0171	0.92		**Shallow Concentrated Flow, Segment: E-F** Short Grass Pasture Kv= 7.0 fps
7.4	177	Total			

Subcatchment E2: Southwest Abutter



Summary for Subcatchment E3: Northwest Abutter

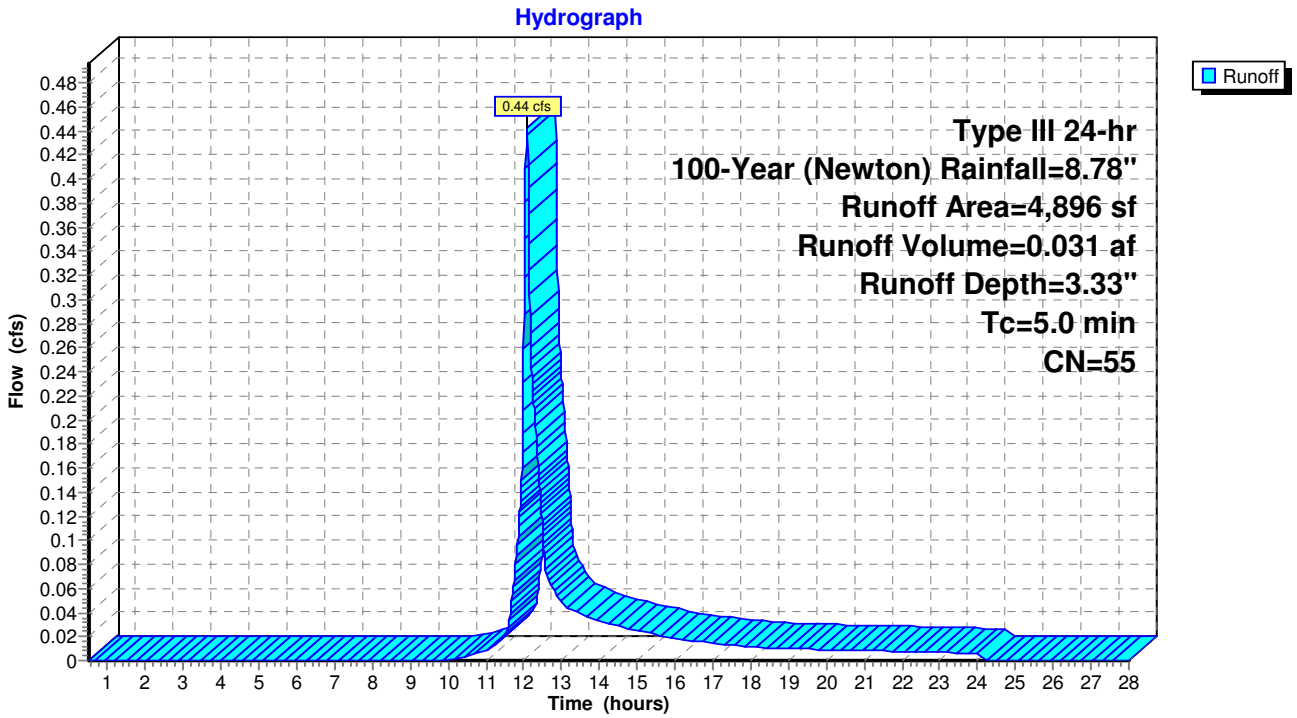
Runoff = 0.44 cfs @ 12.08 hrs, Volume= 0.031 af, Depth= 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description
*	91	98	Roof (portion)
*	1,433	98	Paved Driveway
*	187	98	Walls
	3,185	32	Woods/grass comb., Good, HSG A
	4,896	55	Weighted Average
	3,185		65.05% Pervious Area
	1,711		34.95% Impervious Area

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

Subcatchment E3: Northwest Abutter



Summary for Subcatchment E4: River Street (North)

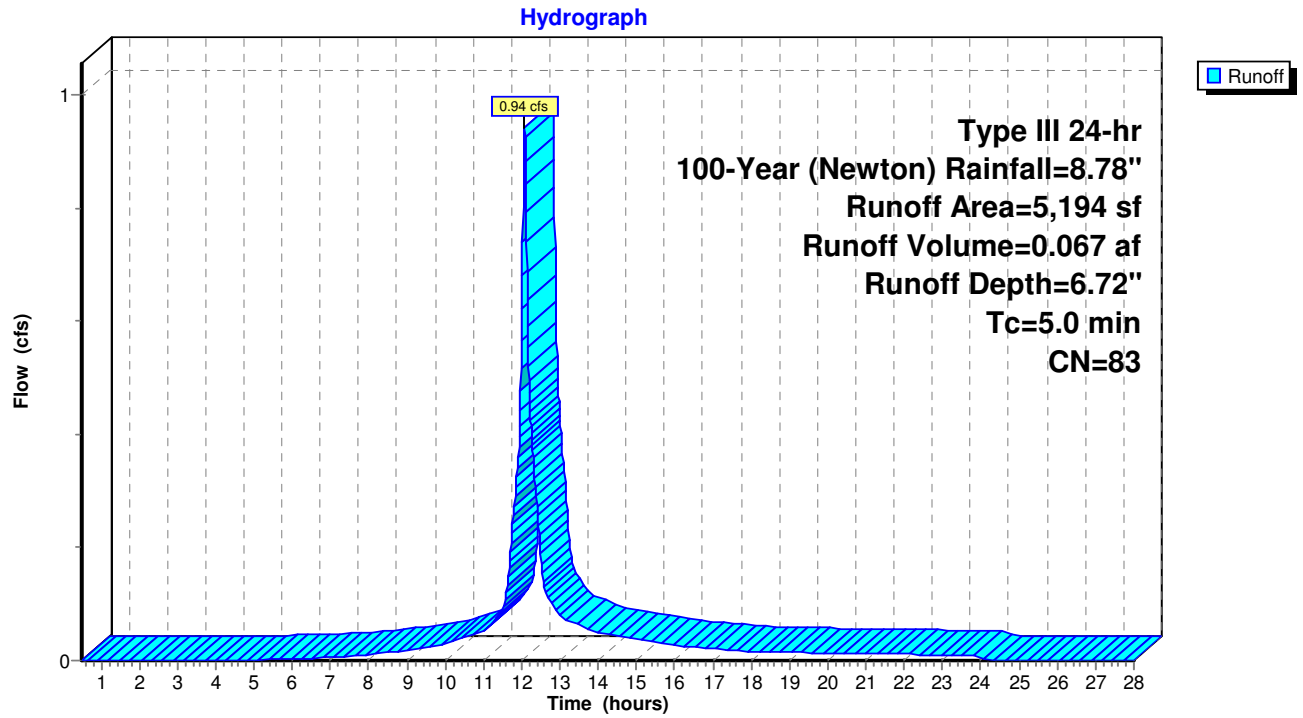
Runoff = 0.94 cfs @ 12.07 hrs, Volume= 0.067 af, Depth= 6.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description
*	277	98	Roof (portion)
*	3,608	98	Paved Driveway
*	129	98	Walk
	1,180	32	Woods/grass comb., Good, HSG A
	5,194	83	Weighted Average
	1,180		22.72% Pervious Area
	4,014		77.28% Impervious Area

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

Subcatchment E4: River Street (North)



Summary for Subcatchment P1: Elm Street

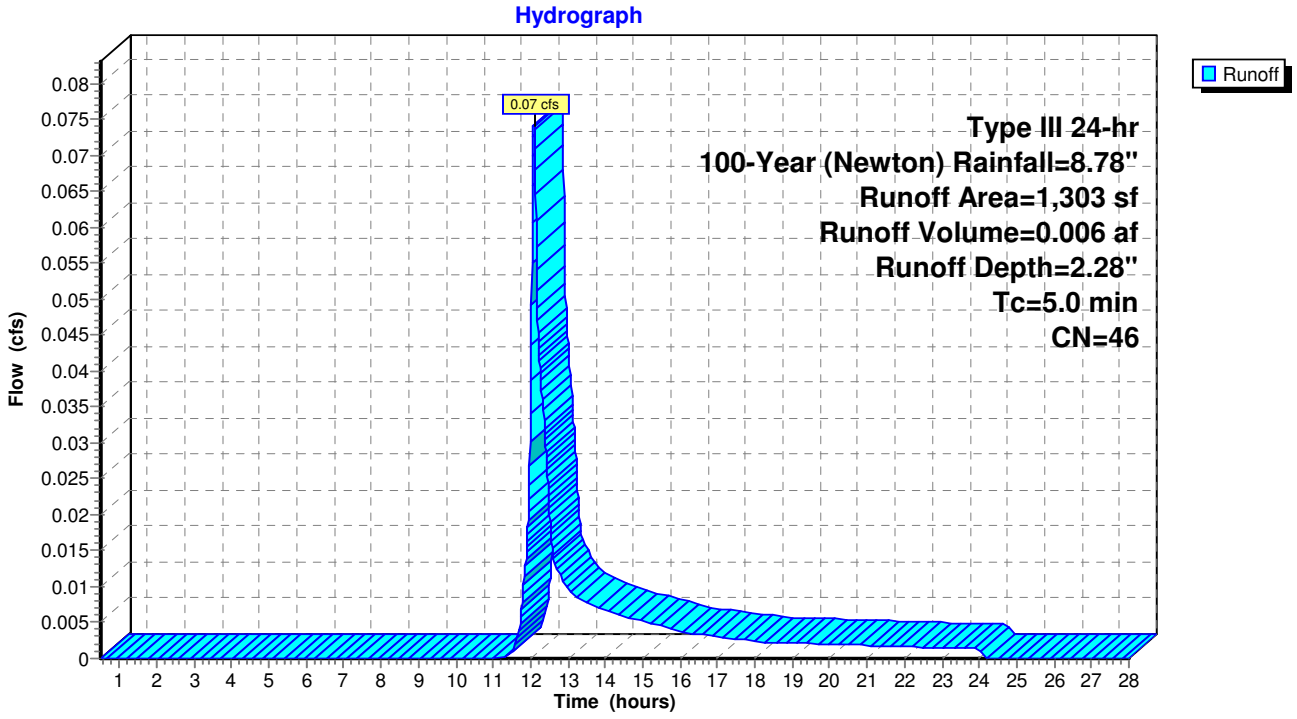
Runoff = 0.07 cfs @ 12.09 hrs, Volume= 0.006 af, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description
*	155	98	Walk
	1,148	39	>75% Grass cover, Good, HSG A
	1,303	46	Weighted Average
	1,148		88.10% Pervious Area
	155		11.90% Impervious Area

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

Subcatchment P1: Elm Street



Summary for Subcatchment P2: Southwest Abutter

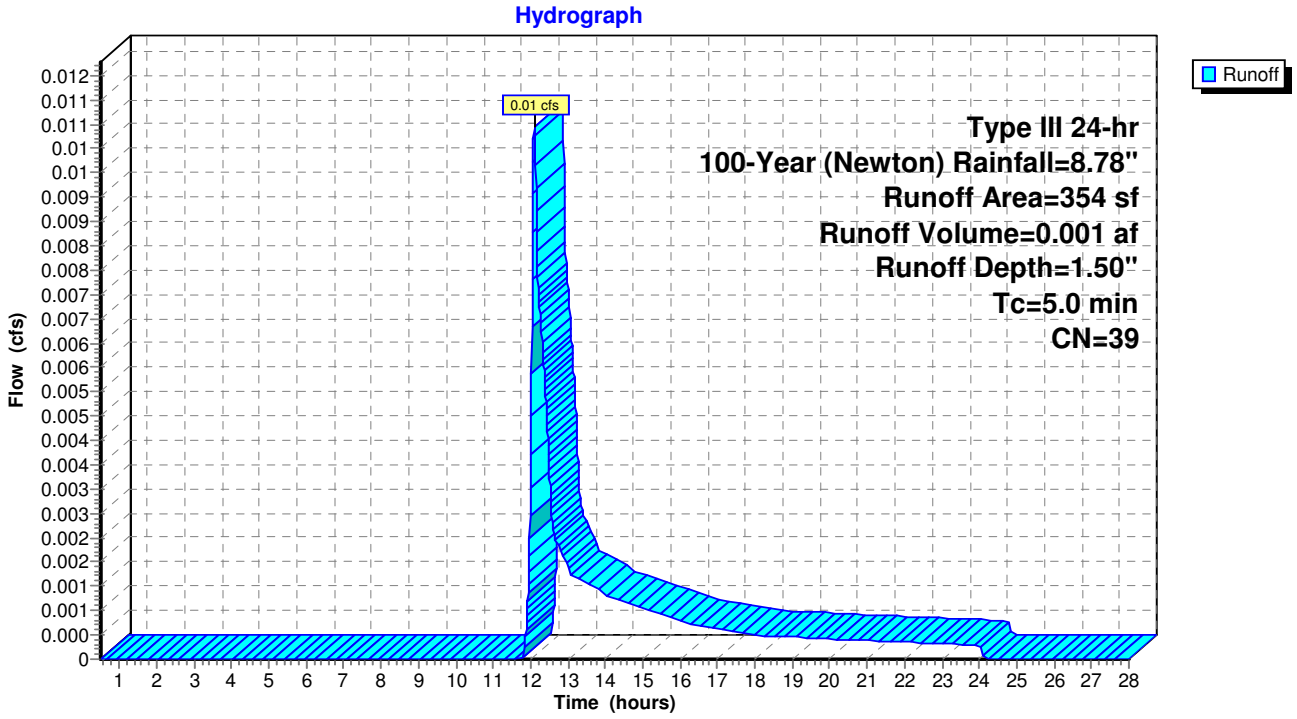
Runoff = 0.01 cfs @ 12.10 hrs, Volume= 0.001 af, Depth= 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year (Newton) Rainfall=8.78"

Area (sf)	CN	Description
354	39	>75% Grass cover, Good, HSG A
354		100.00% Pervious Area

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

Subcatchment P2: Southwest Abutter



Summary for Subcatchment P2A: On Site

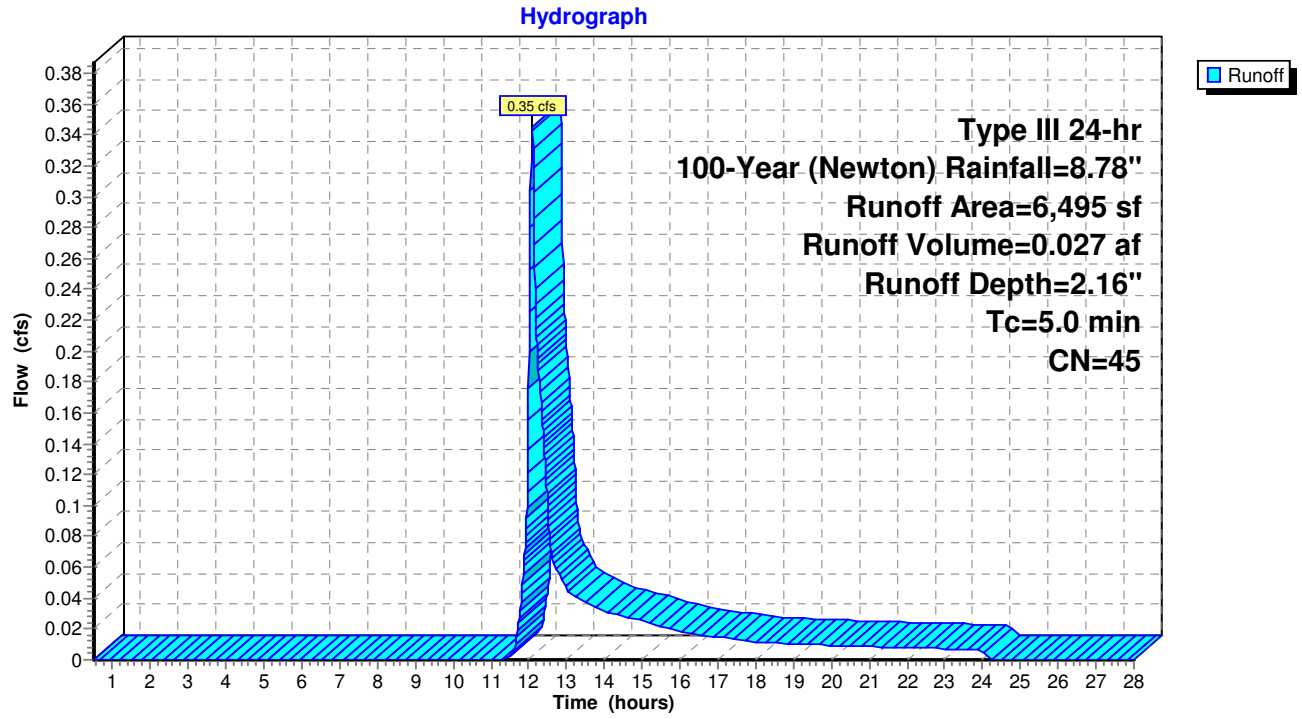
Runoff = 0.35 cfs @ 12.09 hrs, Volume= 0.027 af, Depth= 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description
*	35	98	Walks
*	197	98	Ret. Wall
*	84	98	Bulkhead
*	308	98	Patios
	5,871	39	>75% Grass cover, Good, HSG A
	6,495	45	Weighted Average
	5,871		90.39% Pervious Area
	624		9.61% Impervious Area

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

Subcatchment P2A: On Site



Summary for Subcatchment P3: Northwest Abutter

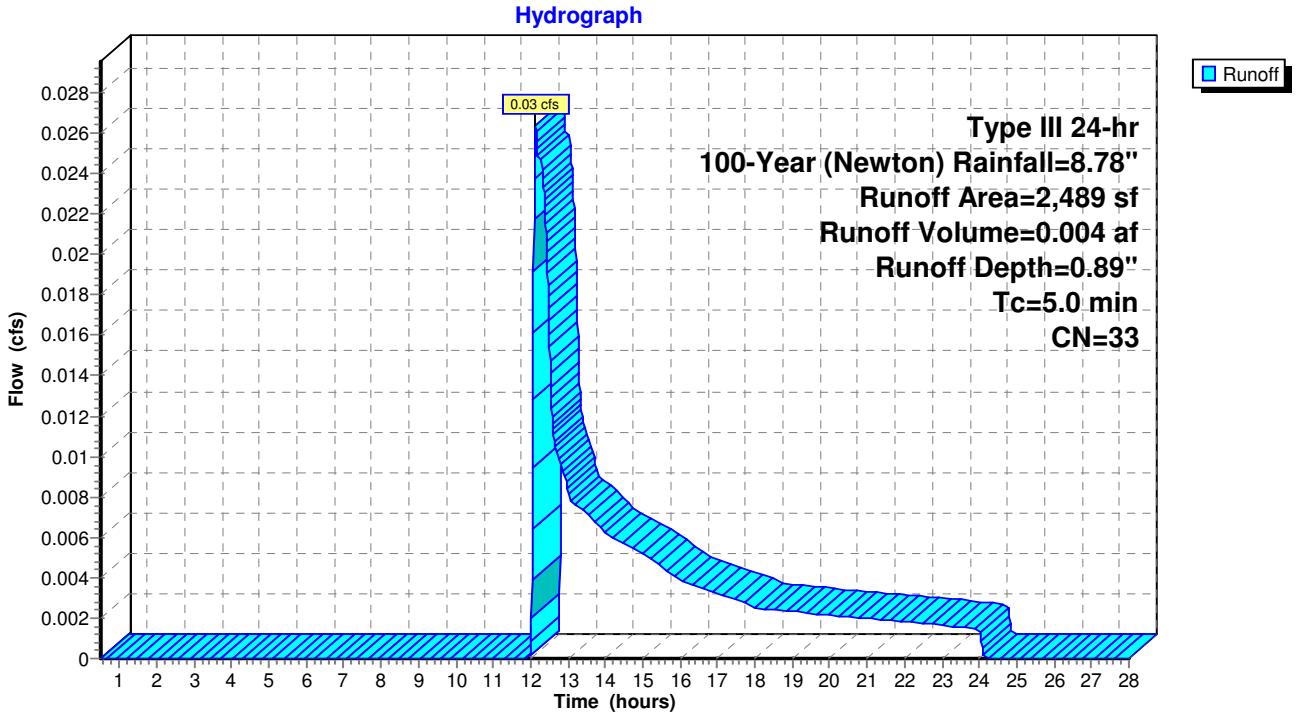
Runoff = 0.03 cfs @ 12.13 hrs, Volume= 0.004 af, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description
*	42	98	Bulkhead
	2,447	32	Woods/grass comb., Good, HSG A
	2,489	33	Weighted Average
	2,447		98.31% Pervious Area
	42		1.69% Impervious Area

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

Subcatchment P3: Northwest Abutter



Summary for Subcatchment P4: River Street

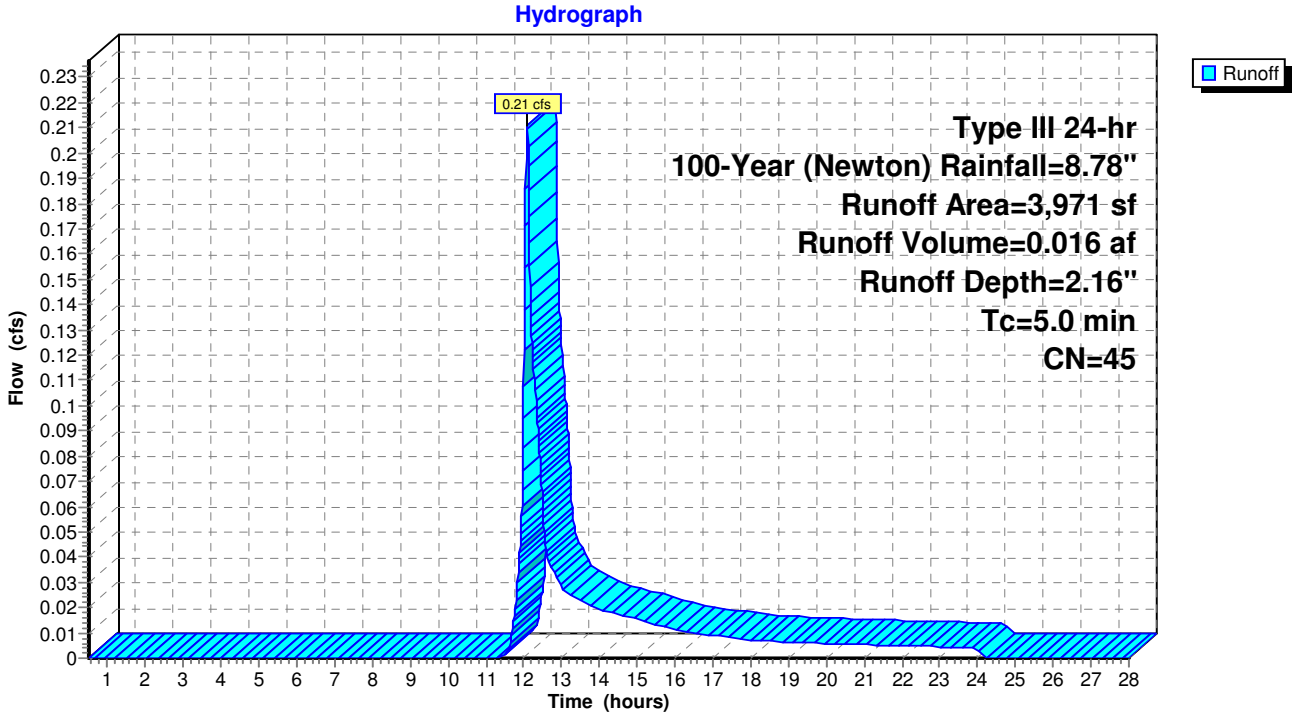
Runoff = 0.21 cfs @ 12.09 hrs, Volume= 0.016 af, Depth= 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description
*	384	98	Patios
*	42	98	Bulkhead
	3,545	39	>75% Grass cover, Good, HSG A
	3,971	45	Weighted Average
	3,545		89.27% Pervious Area
	426		10.73% Impervious Area

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

Subcatchment P4: River Street



Summary for Subcatchment PD1: Proposed Driveway (portion)

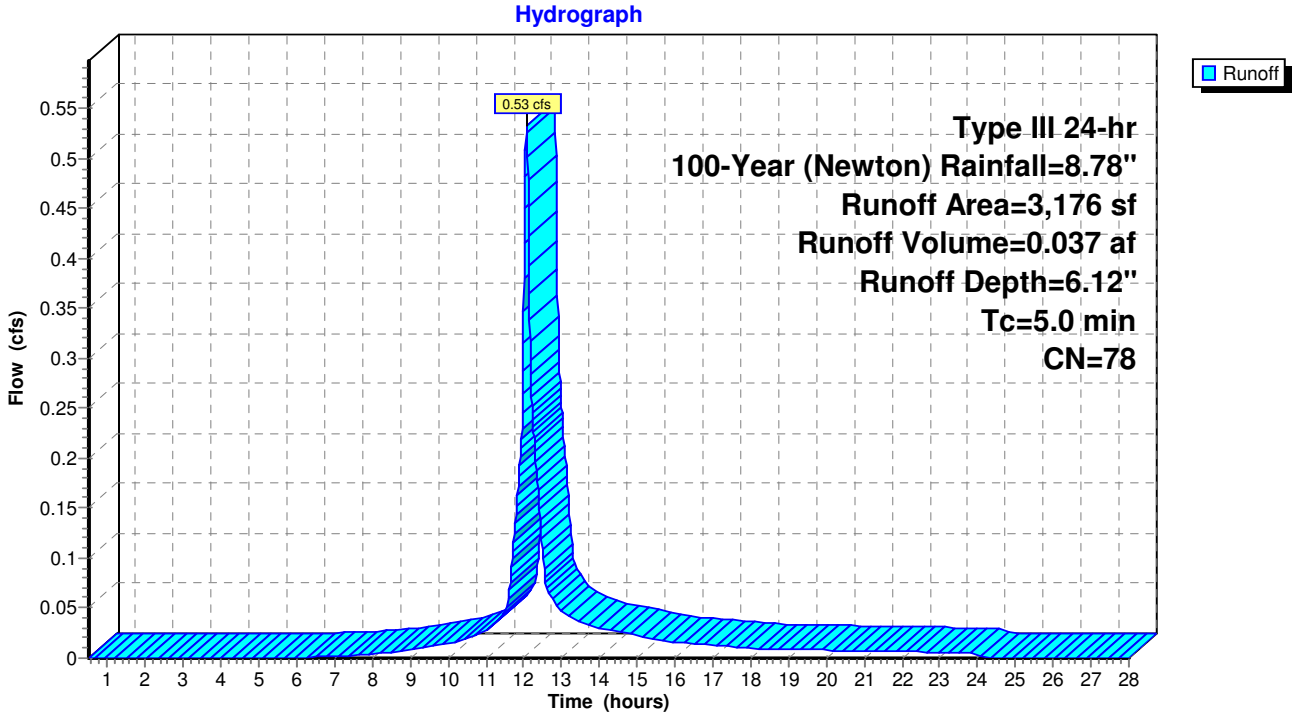
Runoff = 0.53 cfs @ 12.07 hrs, Volume= 0.037 af, Depth= 6.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description
*	1,994	98	Paved Driveway
*	130	98	Walk
	1,052	39	>75% Grass cover, Good, HSG A
	3,176	78	Weighted Average
	1,052		33.12% Pervious Area
	2,124		66.88% Impervious Area

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

Subcatchment PD1: Proposed Driveway (portion)



Summary for Subcatchment PD2: Proposed Driveway (portion)

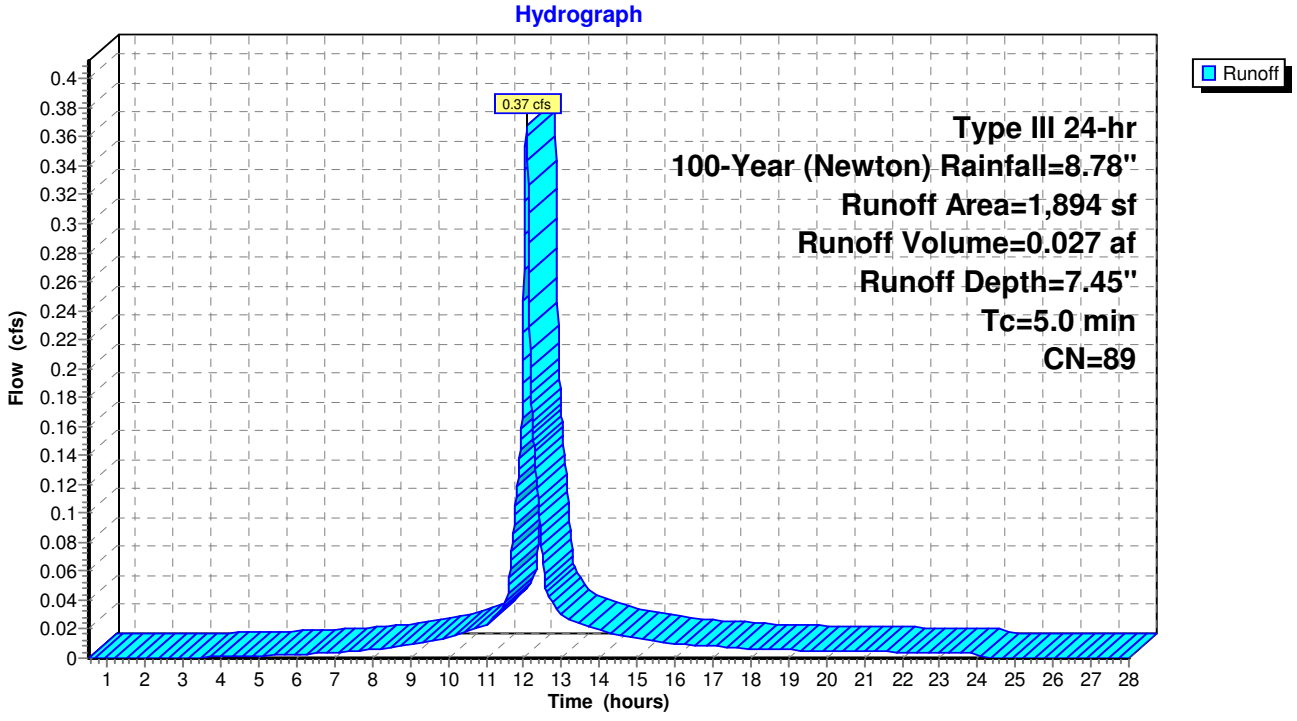
Runoff = 0.37 cfs @ 12.07 hrs, Volume= 0.027 af, Depth= 7.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description
*	1,525	98	Paved Driveway
*	96	98	Walk
	273	39	>75% Grass cover, Good, HSG A
	1,894	89	Weighted Average
	273		14.41% Pervious Area
	1,621		85.59% Impervious Area

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

Subcatchment PD2: Proposed Driveway (portion)



Summary for Subcatchment PD3: Proposed Driveway (portion)

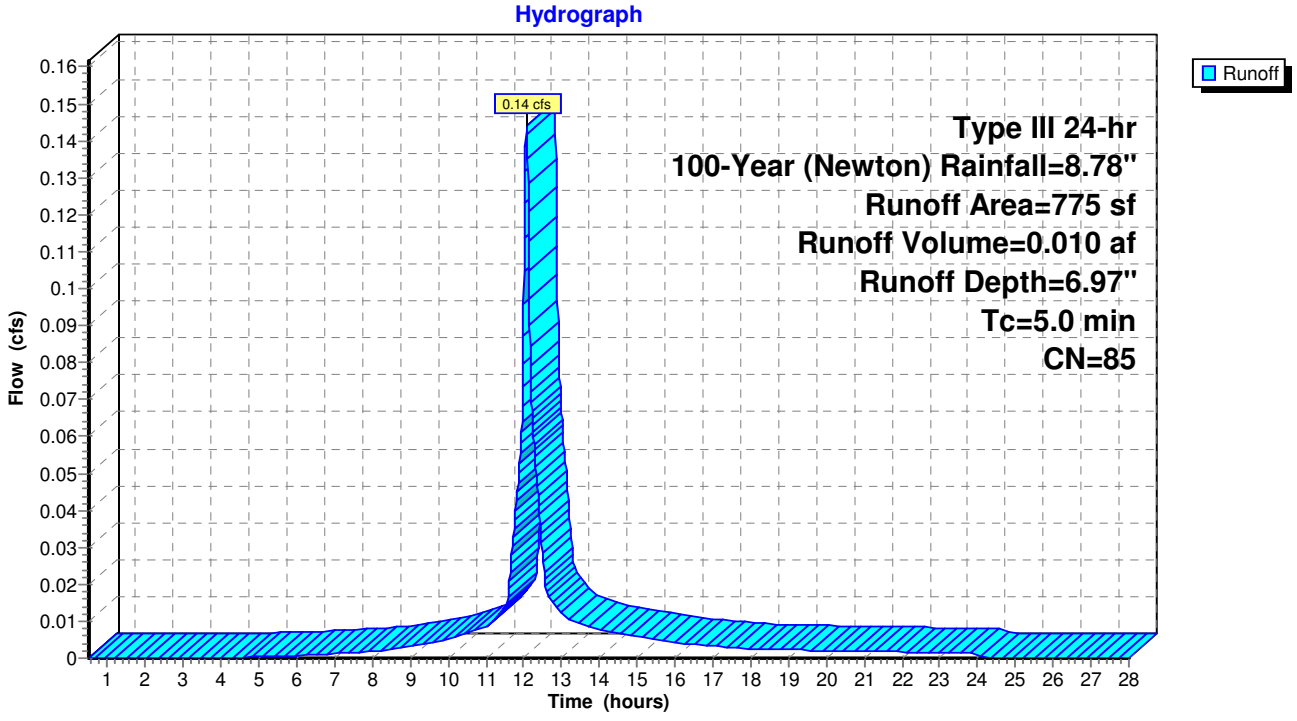
Runoff = 0.14 cfs @ 12.07 hrs, Volume= 0.010 af, Depth= 6.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description
*	554	98	Paved Driveway
*	56	98	Walk
	165	39	>75% Grass cover, Good, HSG A
	775	85	Weighted Average
	165		21.29% Pervious Area
	610		78.71% Impervious Area

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

Subcatchment PD3: Proposed Driveway (portion)



Summary for Subcatchment PR1: Proposed Roof (Portion)

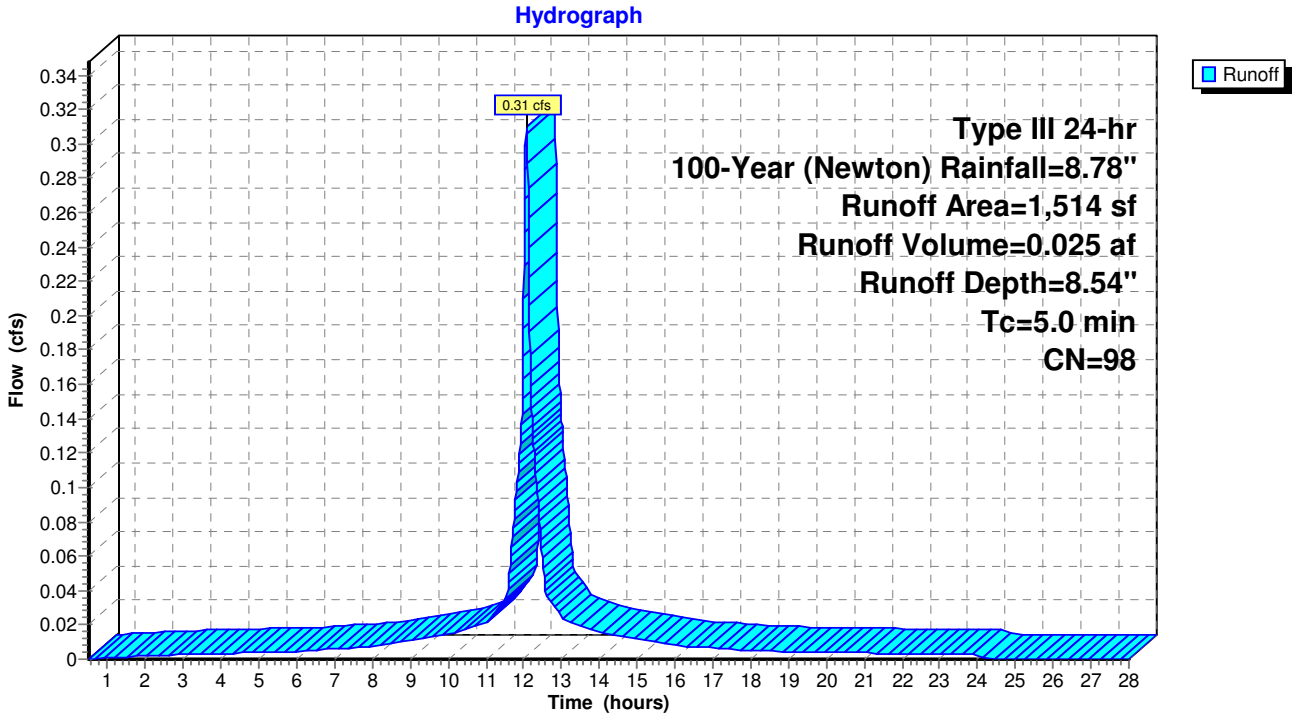
Runoff = 0.31 cfs @ 12.07 hrs, Volume= 0.025 af, Depth= 8.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description
*	1,514	98	Roof
	1,514		100.00% Impervious Area

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

Subcatchment PR1: Proposed Roof (Portion)



Summary for Subcatchment PR2: Proposed Roof (Portion)

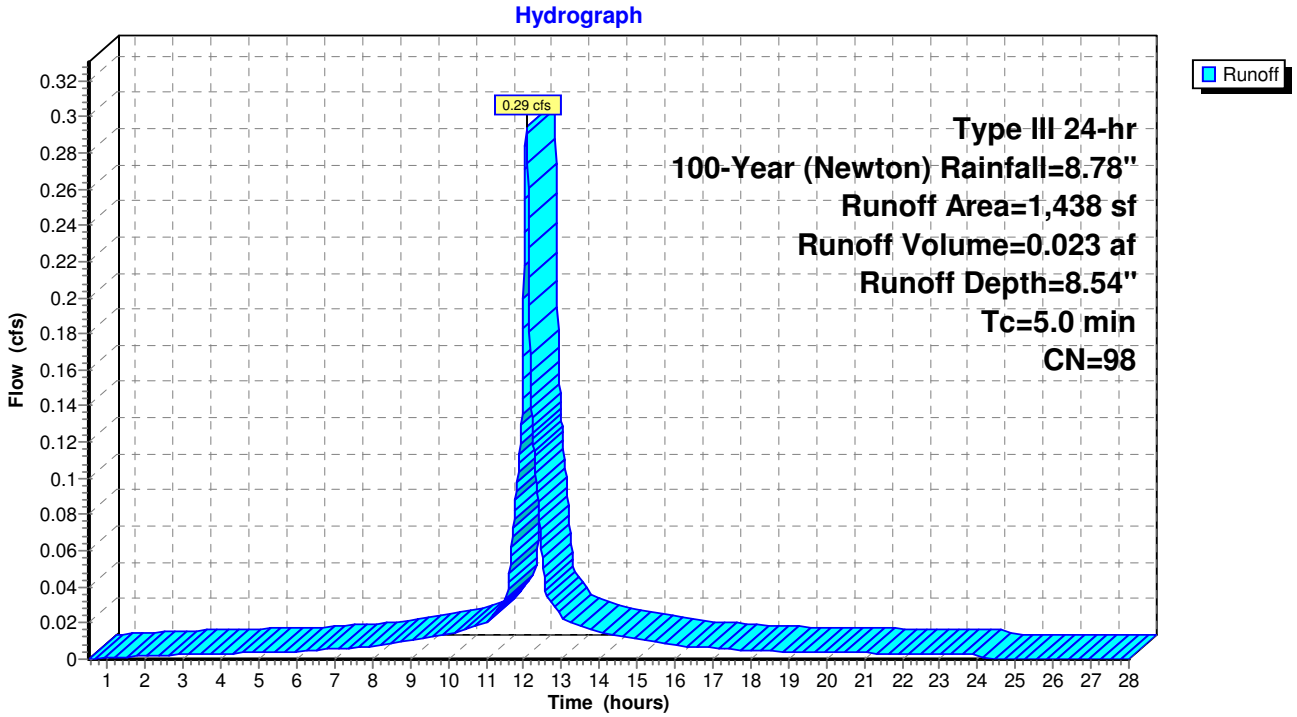
Runoff = 0.29 cfs @ 12.07 hrs, Volume= 0.023 af, Depth= 8.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description
*	1,438	98	Roof
	1,438		100.00% Impervious Area

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

Subcatchment PR2: Proposed Roof (Portion)



Summary for Subcatchment PR3: Prop. Roof (Portion)

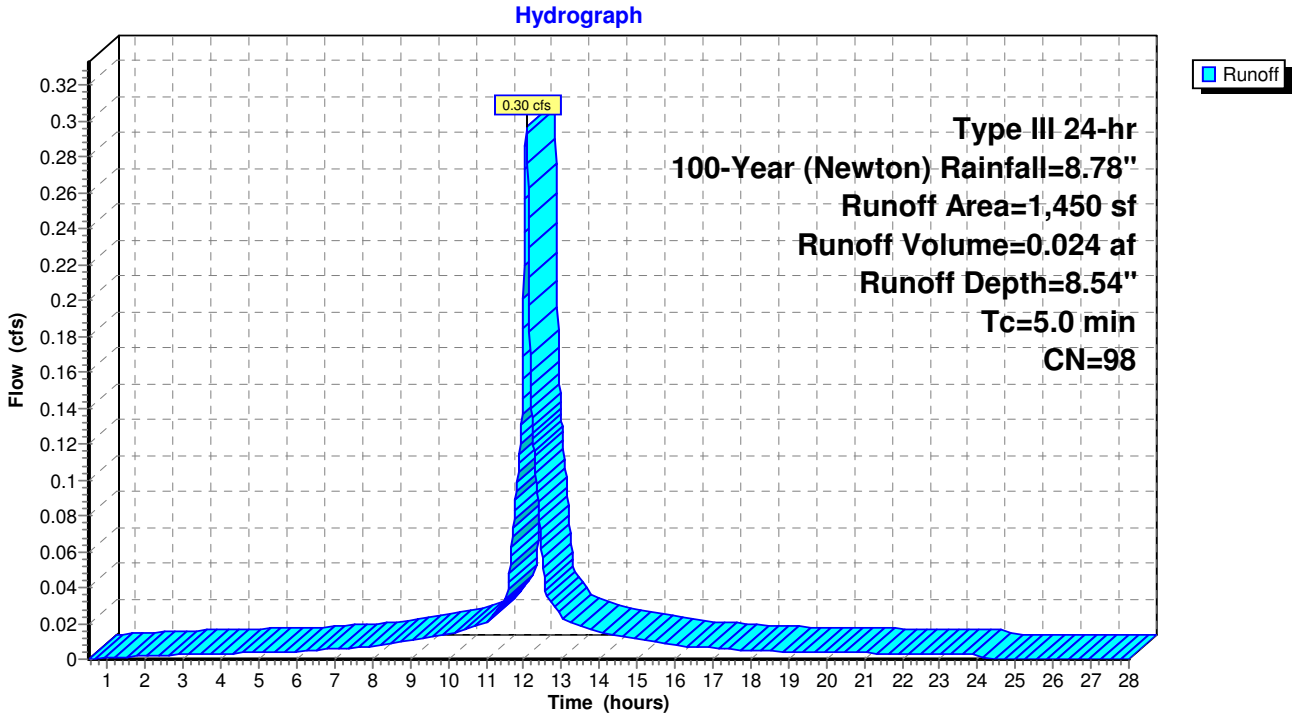
Runoff = 0.30 cfs @ 12.07 hrs, Volume= 0.024 af, Depth= 8.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description
*	1,450	98	Roof
	1,450		100.00% Impervious Area

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

Subcatchment PR3: Prop. Roof (Portion)



Summary for Subcatchment PR4: Prop. Roof (Portion)

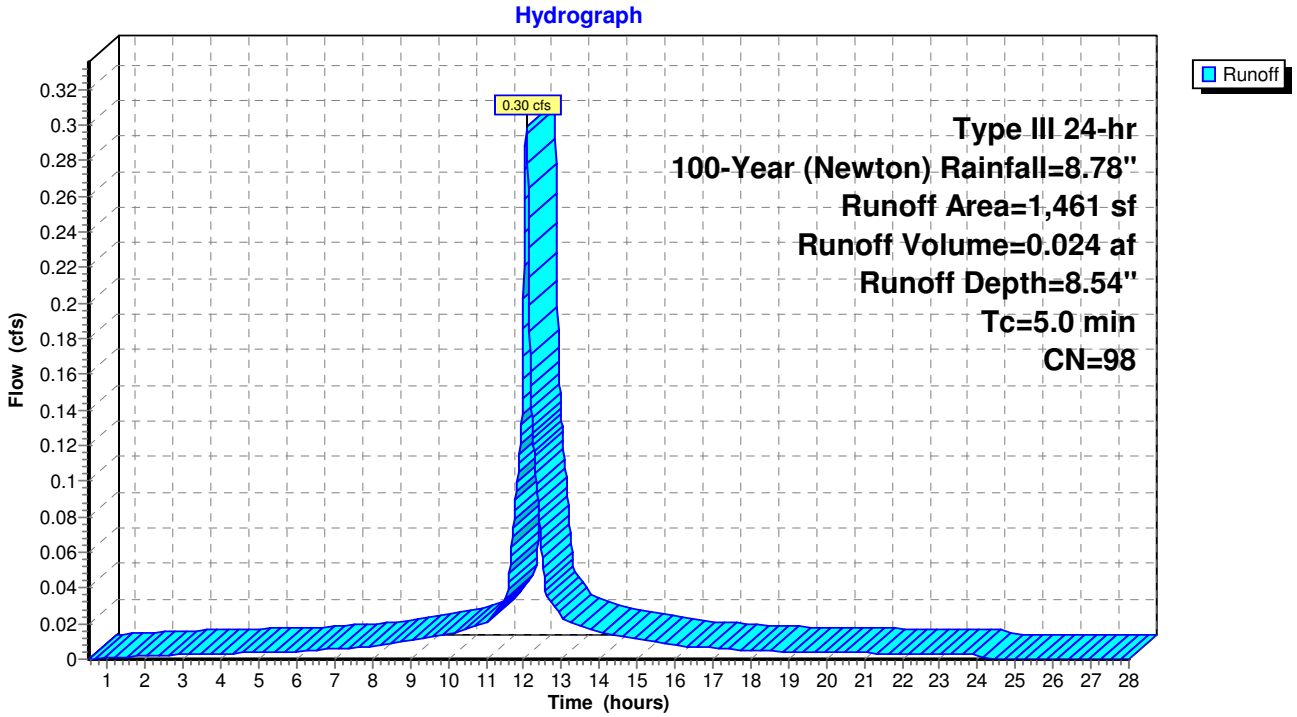
Runoff = 0.30 cfs @ 12.07 hrs, Volume= 0.024 af, Depth= 8.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description
*	1,461	98	Roof
	1,461		100.00% Impervious Area

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

Subcatchment PR4: Prop. Roof (Portion)



Summary for Pond 2P: Inf. System #6 CPP pipe

Inflow Area = 0.149 ac, 9.61% Impervious, Inflow Depth = 2.16" for 100-Year (Newton) event
Inflow = 0.34 cfs @ 12.10 hrs, Volume= 0.027 af
Outflow = 0.05 cfs @ 11.91 hrs, Volume= 0.027 af, Atten= 86%, Lag= 0.0 min
Discarded = 0.05 cfs @ 11.91 hrs, Volume= 0.027 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 52.13' @ 12.99 hrs Surf.Area= 0.008 ac Storage= 0.008 af

Plug-Flow detention time= 57.8 min calculated for 0.027 af (100% of inflow)
Center-of-Mass det. time= 57.8 min (937.0 - 879.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	50.00'	0.004 af	**4.95'W x 42.00'L x 2.73'H Field A** 0.013 af Overall - 0.002 af Embedded = 0.011 af x 35.0% Voids
#2A	51.00'	0.002 af	**CPP single-wall 12"** x 4 Inside #1 Inside= 12.0"W x 12.0"H => 1.04 sf x 20.00'L = 20.8 cf Outside= 14.7"W x 14.7"H => 1.04 sf x 20.00'L = 20.8 cf 2 Rows of 2 Chambers
#3B	50.00'	0.003 af	**3.23'W x 42.00'L x 2.73'H Field B** 0.008 af Overall - 0.001 af Embedded = 0.008 af x 35.0% Voids
#4B	51.00'	0.001 af	**CPP single-wall 12"** x 2 Inside #3 Inside= 12.0"W x 12.0"H => 1.04 sf x 20.00'L = 20.8 cf Outside= 14.7"W x 14.7"H => 1.04 sf x 20.00'L = 20.8 cf
		0.009 af	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	50.00'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.05 cfs @ 11.91 hrs HW=50.03' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Pond 2P: Inf. System #6 CPP pipe - Chamber Wizard Field A

Chamber Model = CPP single-wall 12" (Single-wall corrugated HDPE pipe)
Inside= 12.0"W x 12.0"H => 1.04 sf x 20.00'L = 20.8 cf
Outside= 14.7"W x 14.7"H => 1.04 sf x 20.00'L = 20.8 cf

14.7" Wide + 6.0" Spacing = 20.7" C-C Row Spacing

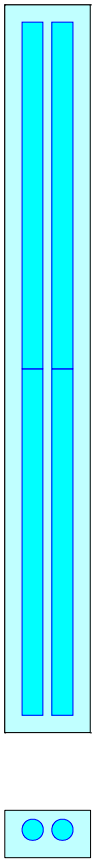
2 Chambers/Row x 20.00' Long = 40.00' Row Length +12.0" End Stone x 2 = 42.00' Base Length
2 Rows x 14.7" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 4.95' Base Width
12.0" Base + 14.7" Chamber Height + 6.0" Cover = 2.73' Field Height

4 Chambers x 20.8 cf = 83.3 cf Chamber Storage

566.5 cf Field - 83.3 cf Chambers = 483.2 cf Stone x 35.0% Voids = 169.1 cf Stone Storage

Chamber Storage + Stone Storage = 252.4 cf = 0.006 af
Overall Storage Efficiency = 44.6%
Overall System Size = 42.00' x 4.95' x 2.73'

4 Chambers
21.0 cy Field
17.9 cy Stone



Pond 2P: Inf. System #6 CPP pipe - Chamber Wizard Field B

Chamber Model = CPP single-wall 12" (Single-wall corrugated HDPE pipe)
Inside= 12.0"W x 12.0"H => 1.04 sf x 20.00'L = 20.8 cf
Outside= 14.7"W x 14.7"H => 1.04 sf x 20.00'L = 20.8 cf

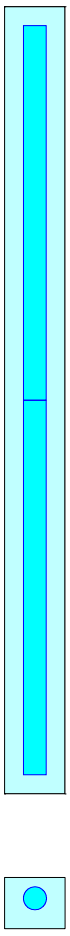
2 Chambers/Row x 20.00' Long = 40.00' Row Length +12.0" End Stone x 2 = 42.00' Base Length
1 Rows x 14.7" Wide + 12.0" Side Stone x 2 = 3.23' Base Width
12.0" Base + 14.7" Chamber Height + 6.0" Cover = 2.73' Field Height

2 Chambers x 20.8 cf = 41.6 cf Chamber Storage

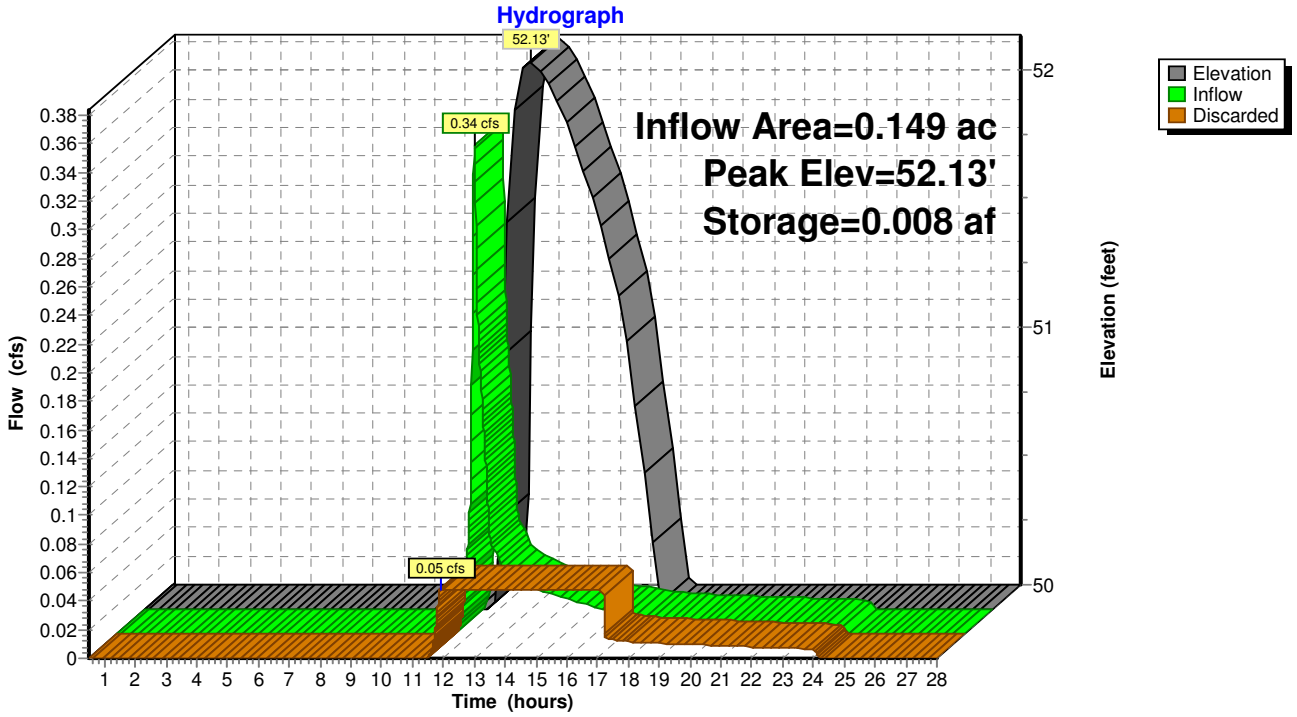
369.1 cf Field - 41.6 cf Chambers = 327.5 cf Stone x 35.0% Voids = 114.6 cf Stone Storage

Chamber Storage + Stone Storage = 156.3 cf = 0.004 af
Overall Storage Efficiency = 42.3%
Overall System Size = 42.00' x 3.23' x 2.73'

2 Chambers
13.7 cy Field
12.1 cy Stone



Pond 2P: Inf. System #6 CPP pipe



Summary for Pond INF-1: Inf. System #1 Galleys

Inflow Area = 0.053 ac, 92.79% Impervious, Inflow Depth = 8.01" for 100-Year (Newton) event
Inflow = 0.45 cfs @ 12.07 hrs, Volume= 0.035 af
Outflow = 0.03 cfs @ 11.35 hrs, Volume= 0.035 af, Atten= 93%, Lag= 0.0 min
Discarded = 0.03 cfs @ 11.35 hrs, Volume= 0.035 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 54.19' @ 13.12 hrs Surf.Area= 0.005 ac Storage= 0.013 af

Plug-Flow detention time= 126.2 min calculated for 0.035 af (100% of inflow)
Center-of-Mass det. time= 126.1 min (879.2 - 753.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	49.25'	0.007 af	**8.50'W x 28.00'L x 5.25'H Field A** 0.029 af Overall - 0.009 af Embedded = 0.020 af x 35.0% Voids
#2A	50.25'	0.006 af	**Concrete Galley 4x4x4.25** x 6 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
		0.013 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	49.25'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.03 cfs @ 11.35 hrs HW=49.30' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.03 cfs)

Pond INF-1: Inf. System #1 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent)
Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

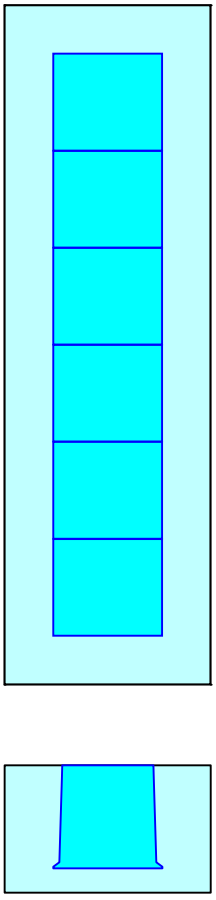
6 Chambers/Row x 4.00' Long = 24.00' Row Length +24.0" End Stone x 2 = 28.00' Base Length
1 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 8.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

6 Chambers x 46.4 cf = 278.3 cf Chamber Storage
6 Chambers x 62.3 cf = 374.0 cf Displacement

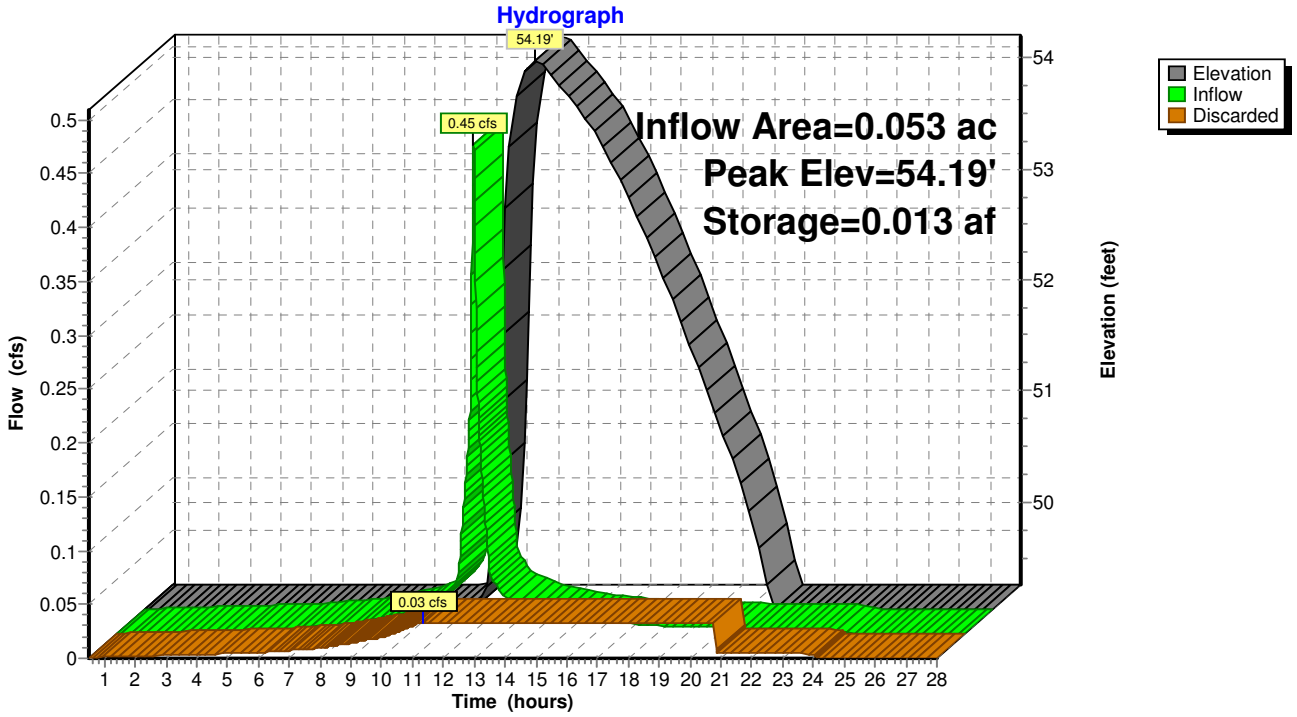
1,249.5 cf Field - 374.0 cf Chambers = 875.5 cf Stone x 35.0% Voids = 306.4 cf Stone Storage

Chamber Storage + Stone Storage = 584.7 cf = 0.013 af
Overall Storage Efficiency = 46.8%
Overall System Size = 28.00' x 8.50' x 5.25'

6 Chambers
46.3 cy Field
32.4 cy Stone



Pond INF-1: Inf. System #1 Galleys



Summary for Pond INF-2: Inf. System #2 Galleys

Inflow Area = 0.033 ac,100.00% Impervious, Inflow Depth = 8.54" for 100-Year (Newton) event
Inflow = 0.29 cfs @ 12.07 hrs, Volume= 0.023 af
Outflow = 0.02 cfs @ 11.40 hrs, Volume= 0.023 af, Atten= 92%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.40 hrs, Volume= 0.023 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 53.60' @ 12.99 hrs Surf.Area= 0.004 ac Storage= 0.008 af

Plug-Flow detention time= 103.1 min calculated for 0.023 af (100% of inflow)
Center-of-Mass det. time= 103.0 min (842.2 - 739.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	49.25'	0.005 af	**8.50'W x 20.00'L x 5.25'H Field A** 0.020 af Overall - 0.006 af Embedded = 0.015 af x 35.0% Voids
#2A	50.25'	0.004 af	**Concrete Galley 4x4x4.25** x 4 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
		0.009 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	49.25'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.02 cfs @ 11.40 hrs HW=49.30' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Pond INF-2: Inf. System #2 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent)
Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

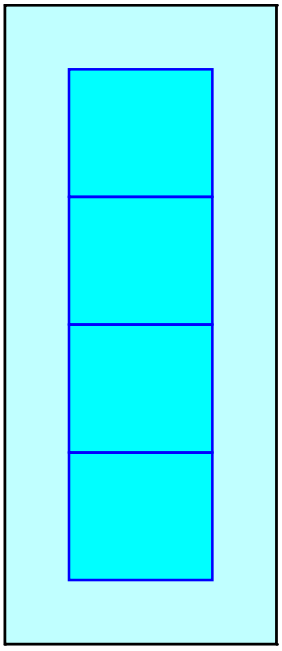
4 Chambers/Row x 4.00' Long = 16.00' Row Length +24.0" End Stone x 2 = 20.00' Base Length
1 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 8.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

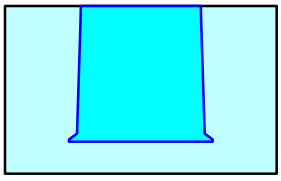
4 Chambers x 46.4 cf = 185.5 cf Chamber Storage
4 Chambers x 62.3 cf = 249.3 cf Displacement

892.5 cf Field - 249.3 cf Chambers = 643.2 cf Stone x 35.0% Voids = 225.1 cf Stone Storage

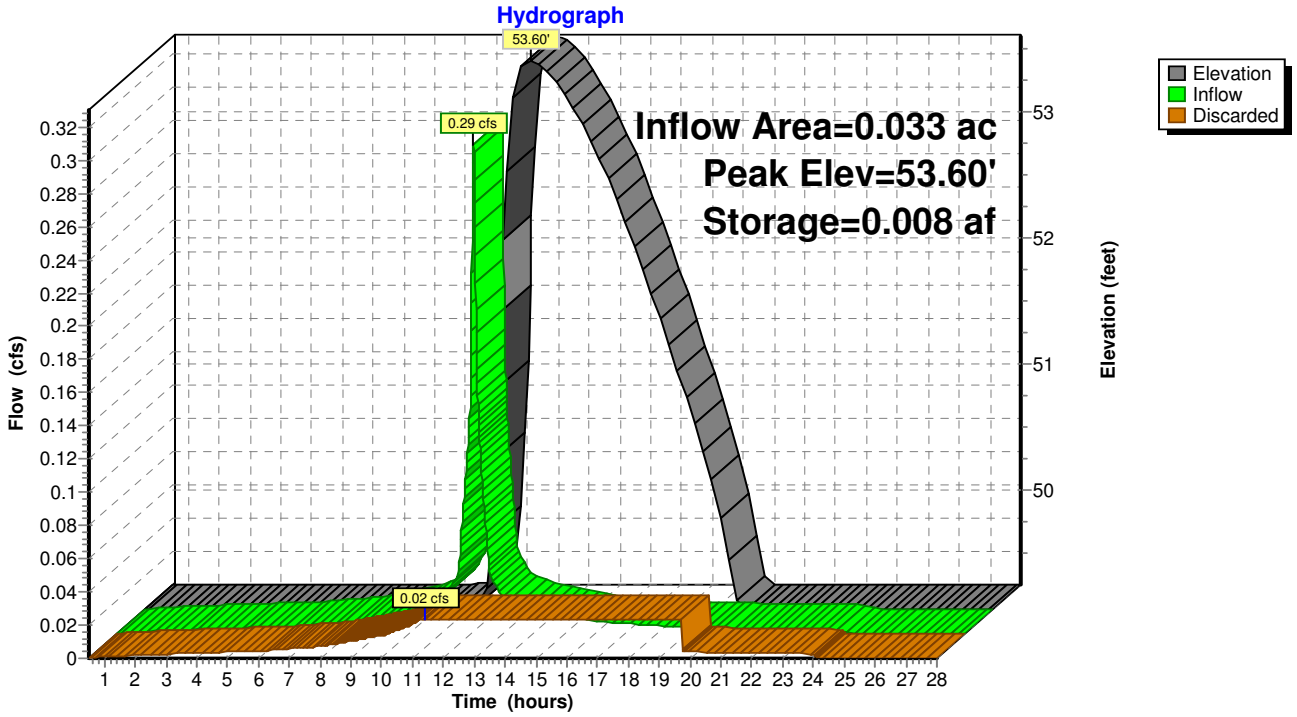
Chamber Storage + Stone Storage = 410.6 cf = 0.009 af
Overall Storage Efficiency = 46.0%
Overall System Size = 20.00' x 8.50' x 5.25'

4 Chambers
33.1 cy Field
23.8 cy Stone





Pond INF-2: Inf. System #2 Galleys



Summary for Pond INF-3: Inf. System #3 Galleys

Inflow Area = 0.033 ac,100.00% Impervious, Inflow Depth = 8.54" for 100-Year (Newton) event
Inflow = 0.30 cfs @ 12.07 hrs, Volume= 0.024 af
Outflow = 0.02 cfs @ 11.39 hrs, Volume= 0.024 af, Atten= 92%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.39 hrs, Volume= 0.024 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 53.65' @ 13.00 hrs Surf.Area= 0.004 ac Storage= 0.008 af

Plug-Flow detention time= 104.6 min calculated for 0.024 af (100% of inflow)
Center-of-Mass det. time= 104.6 min (843.7 - 739.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	49.25'	0.005 af	**8.50'W x 20.00'L x 5.25'H Field A** 0.020 af Overall - 0.006 af Embedded = 0.015 af x 35.0% Voids
#2A	50.25'	0.004 af	**Concrete Galley 4x4x4.25** x 4 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
		0.009 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	49.25'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.02 cfs @ 11.39 hrs HW=49.30' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Pond INF-3: Inf. System #3 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent)
Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

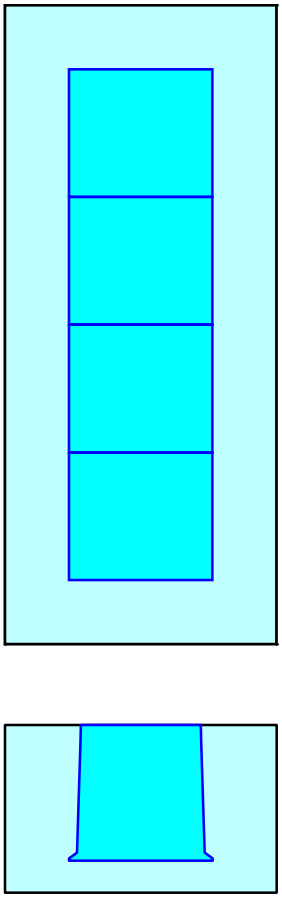
4 Chambers/Row x 4.00' Long = 16.00' Row Length +24.0" End Stone x 2 = 20.00' Base Length
1 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 8.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

4 Chambers x 46.4 cf = 185.5 cf Chamber Storage
4 Chambers x 62.3 cf = 249.3 cf Displacement

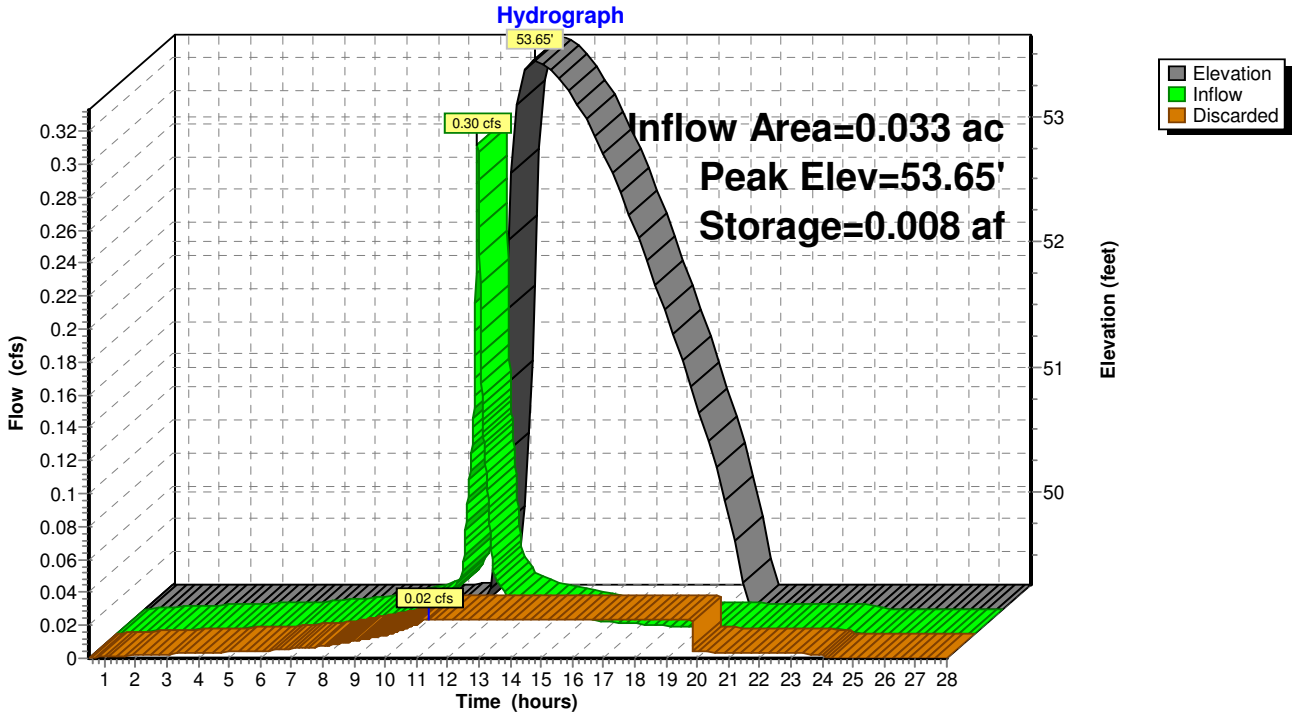
892.5 cf Field - 249.3 cf Chambers = 643.2 cf Stone x 35.0% Voids = 225.1 cf Stone Storage

Chamber Storage + Stone Storage = 410.6 cf = 0.009 af
Overall Storage Efficiency = 46.0%
Overall System Size = 20.00' x 8.50' x 5.25'

4 Chambers
33.1 cy Field
23.8 cy Stone



Pond INF-3: Inf. System #3 Galleys



Summary for Pond INF-4: Inf. System #4 Galleys

Inflow Area = 0.034 ac,100.00% Impervious, Inflow Depth = 8.54" for 100-Year (Newton) event
Inflow = 0.30 cfs @ 12.07 hrs, Volume= 0.024 af
Outflow = 0.02 cfs @ 11.39 hrs, Volume= 0.024 af, Atten= 92%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.39 hrs, Volume= 0.024 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 53.69' @ 13.01 hrs Surf.Area= 0.004 ac Storage= 0.008 af

Plug-Flow detention time= 106.0 min calculated for 0.024 af (100% of inflow)
Center-of-Mass det. time= 106.0 min (845.1 - 739.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	49.25'	0.005 af	**8.50'W x 20.00'L x 5.25'H Field A** 0.020 af Overall - 0.006 af Embedded = 0.015 af x 35.0% Voids
#2A	50.25'	0.004 af	**Concrete Galley 4x4x4.25** x 4 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
		0.009 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	49.25'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.02 cfs @ 11.39 hrs HW=49.31' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Pond INF-4: Inf. System #4 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent)
Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

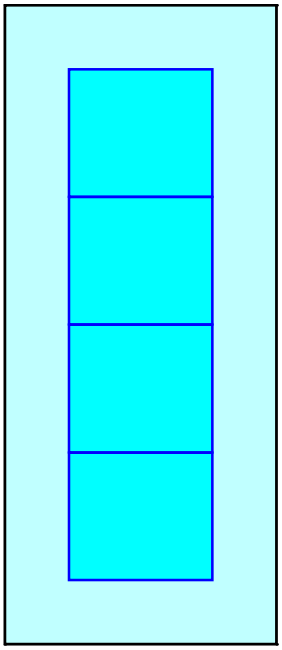
4 Chambers/Row x 4.00' Long = 16.00' Row Length +24.0" End Stone x 2 = 20.00' Base Length
1 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 8.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

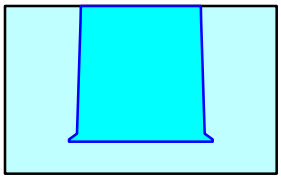
4 Chambers x 46.4 cf = 185.5 cf Chamber Storage
4 Chambers x 62.3 cf = 249.3 cf Displacement

892.5 cf Field - 249.3 cf Chambers = 643.2 cf Stone x 35.0% Voids = 225.1 cf Stone Storage

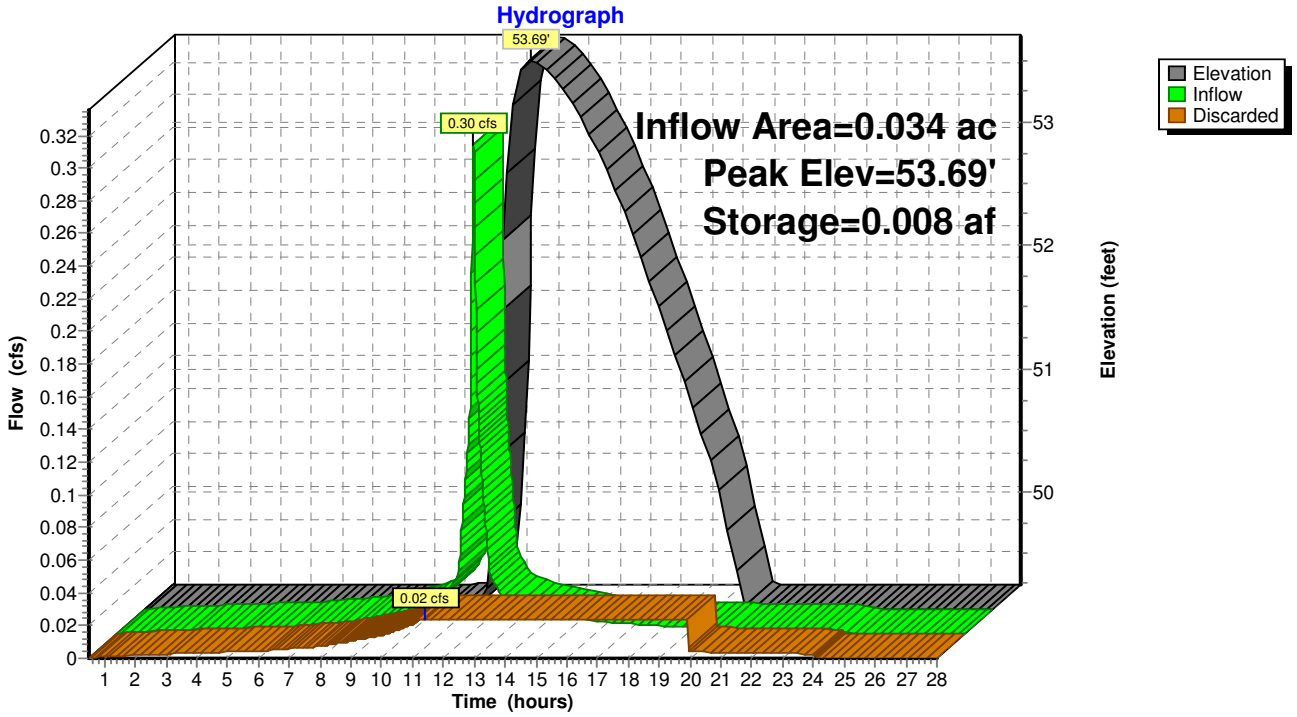
Chamber Storage + Stone Storage = 410.6 cf = 0.009 af
Overall Storage Efficiency = 46.0%
Overall System Size = 20.00' x 8.50' x 5.25'

4 Chambers
33.1 cy Field
23.8 cy Stone





Pond INF-4: Inf. System #4 Galleys



Summary for Pond INF-5: Inf. System #5 Galleys

Inflow Area = 0.116 ac, 73.87% Impervious, Inflow Depth = 6.62" for 100-Year (Newton) event
Inflow = 0.90 cfs @ 12.07 hrs, Volume= 0.064 af
Outflow = 0.07 cfs @ 11.49 hrs, Volume= 0.064 af, Atten= 93%, Lag= 0.0 min
Discarded = 0.07 cfs @ 11.49 hrs, Volume= 0.064 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 54.36' @ 13.24 hrs Surf.Area= 0.011 ac Storage= 0.025 af

Plug-Flow detention time= 135.7 min calculated for 0.064 af (100% of inflow)
Center-of-Mass det. time= 135.7 min (927.1 - 791.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	49.75'	0.014 af	**8.50'W x 56.00'L x 5.25'H Field A** 0.057 af Overall - 0.019 af Embedded = 0.039 af x 35.0% Voids
#2A	50.75'	0.014 af	**Concrete Galley 4x4x4.25** x 13 Inside #1 Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf
		0.027 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	49.75'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.07 cfs @ 11.49 hrs HW=49.80' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Pond INF-5: Inf. System #5 Galleys - Chamber Wizard Field A

Chamber Model = Concrete Galley 4x4x4.25 (Concrete Galley, Shea LE-EGH, LE-CGH or equivalent)
Inside= 42.2"W x 45.0"H => 13.25 sf x 3.50'L = 46.4 cf
Outside= 54.0"W x 51.0"H => 15.58 sf x 4.00'L = 62.3 cf

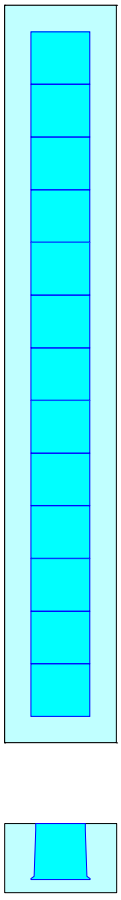
13 Chambers/Row x 4.00' Long = 52.00' Row Length +24.0" End Stone x 2 = 56.00' Base Length
1 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 8.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

13 Chambers x 46.4 cf = 602.9 cf Chamber Storage
13 Chambers x 62.3 cf = 810.3 cf Displacement

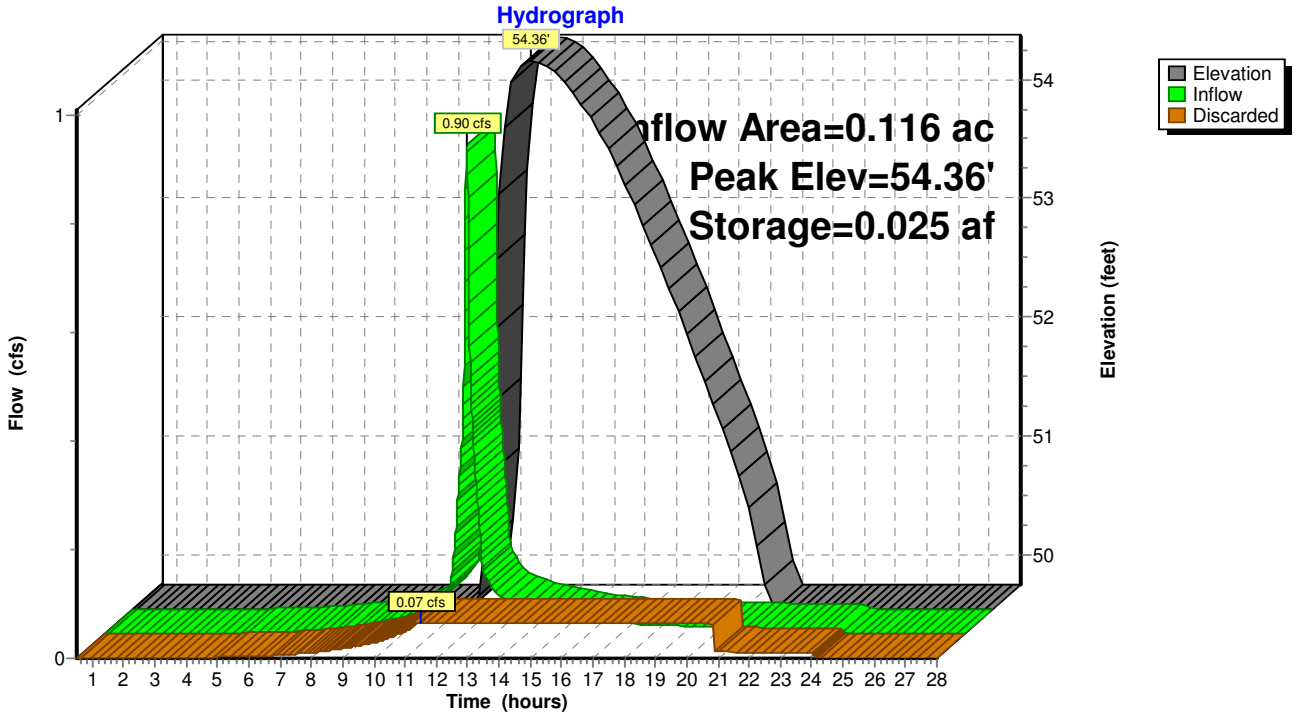
2,499.0 cf Field - 810.3 cf Chambers = 1,688.7 cf Stone x 35.0% Voids = 591.0 cf Stone Storage

Chamber Storage + Stone Storage = 1,194.0 cf = 0.027 af
Overall Storage Efficiency = 47.8%
Overall System Size = 56.00' x 8.50' x 5.25'

13 Chambers
92.6 cy Field
62.5 cy Stone



Pond INF-5: Inf. System #5 Galleys



Summary for Pond SW: Swale

Inflow Area = 0.149 ac, 9.61% Impervious, Inflow Depth = 2.16" for 100-Year (Newton) event
Inflow = 0.35 cfs @ 12.09 hrs, Volume= 0.027 af
Outflow = 0.34 cfs @ 12.10 hrs, Volume= 0.027 af, Atten= 1%, Lag= 0.6 min
Primary = 0.34 cfs @ 12.10 hrs, Volume= 0.027 af

Routing by Dyn-Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 52.59' @ 12.10 hrs Surf.Area= 191 sf Storage= 16 cf
Flood Elev= 54.00' Surf.Area= 1,377 sf Storage= 994 cf

Plug-Flow detention time= 1.5 min calculated for 0.027 af (100% of inflow)
Center-of-Mass det. time= 1.5 min (879.2 - 877.8)

Volume	Invert	Avail.Storage	Storage Description
#1	52.50'	994 cf	**Swale (pond) (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
52.50	150	282.4	0	0	150
53.00	425	294.1	138	138	706
54.00	1,377	376.6	856	994	5,122

Device	Routing	Invert	Outlet Devices
#1	Primary	52.50'	**1.5" x 9.0" Horiz. Orifice/Grate** X 4 rows C= 0.600 in 11.0" x 11.0" Grate (45% open area) Limited to weir flow at low heads

Primary OutFlow Max=0.34 cfs @ 12.10 hrs HW=52.59' TW=50.80' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Weir Controls 0.34 cfs @ 1.00 fps)

Pond SW: Swale