STORMWATER REPORT
17-31 HERRICK ROAD
(PARCEL A)
NEWTON, MASSACHUSETTS

January 4, 2017

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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 #17-31Herrick Road (Parcel A) in Newton, Massachusetts. The project will include a new building with six units, a surface driveways/parking lot, 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. 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:

602: Urban Land

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 paved parking lot, walkways and landscaped areas. Approximately 8,645 square feet (66.6%) of the site is impervious cover. The site is bound by residential building to the north and west, M.B.T.A. to the south and Herrick Road 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 area drain into three catch basin on site (E1 & E2). The pre-development drainage areas are shown on "Figure 1: Pre-Development Drainage Areas."

Post Development Conditions

The proposed project includes a three-story building with six units, a surface driveways/parking lot, walkways, landscaped areas and associated drainage improvements. As a result, the proposed site will have approximately 11,343 s.f. of impervious cover (87.3%). 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." Similar to pre-development conditions, the stormwater runoff flows in the same direction.

The new building will have approximately 3,748 square feet of impervious, or roof, and the driveway/parking lot will be approximately 5,263 square feet. The roof runoff area (PR) will be collected by roof leaders and discharge into the onsite infiltration system #2 (INF-2). The driveway runoff (PD1) will be collected by a catch basin and discharge into onsite infiltration system #1 (INF-1). The driveway runoff (PD2) will be collected by a catch basin and discharge into onsite infiltration system #2 (INF-2). The driveway runoff (PD3) will be collected by a catch basin and discharge into onsite infiltration system #2 (INF-2)The intent of the proposed stormwater management systems are to infiltrate stormwater runoff of the proposed building and driveway/parking lot. The infiltration system was designed to control the 100-year. The drainage areas can be seen on "Figure 2: Post-Development Drainage Areas."

Note: The entire pre-development stormwater runoff was control by three Dry-well (CB). The entire post-development stormwater runoff have been controlled on site with the addition of catch basin and underground infiltration systems. Because of this, VTP associates did not provide a table with the pre- & post-development peak rates comparisons.

CONCLUSION

Although there is increased impervious coverage on the site as a result of the proposed redevelopment, the addition of the underground infiltration systems controls the post-development runoff to pre-development levels or better.

ENCLOSURES

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

Custom Soil Resource Report
Soil Map

Map Scale: 1:327 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 4 9 18 27

Feet: 0 15 30 60 90

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:
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 16, Sep 14, 2016

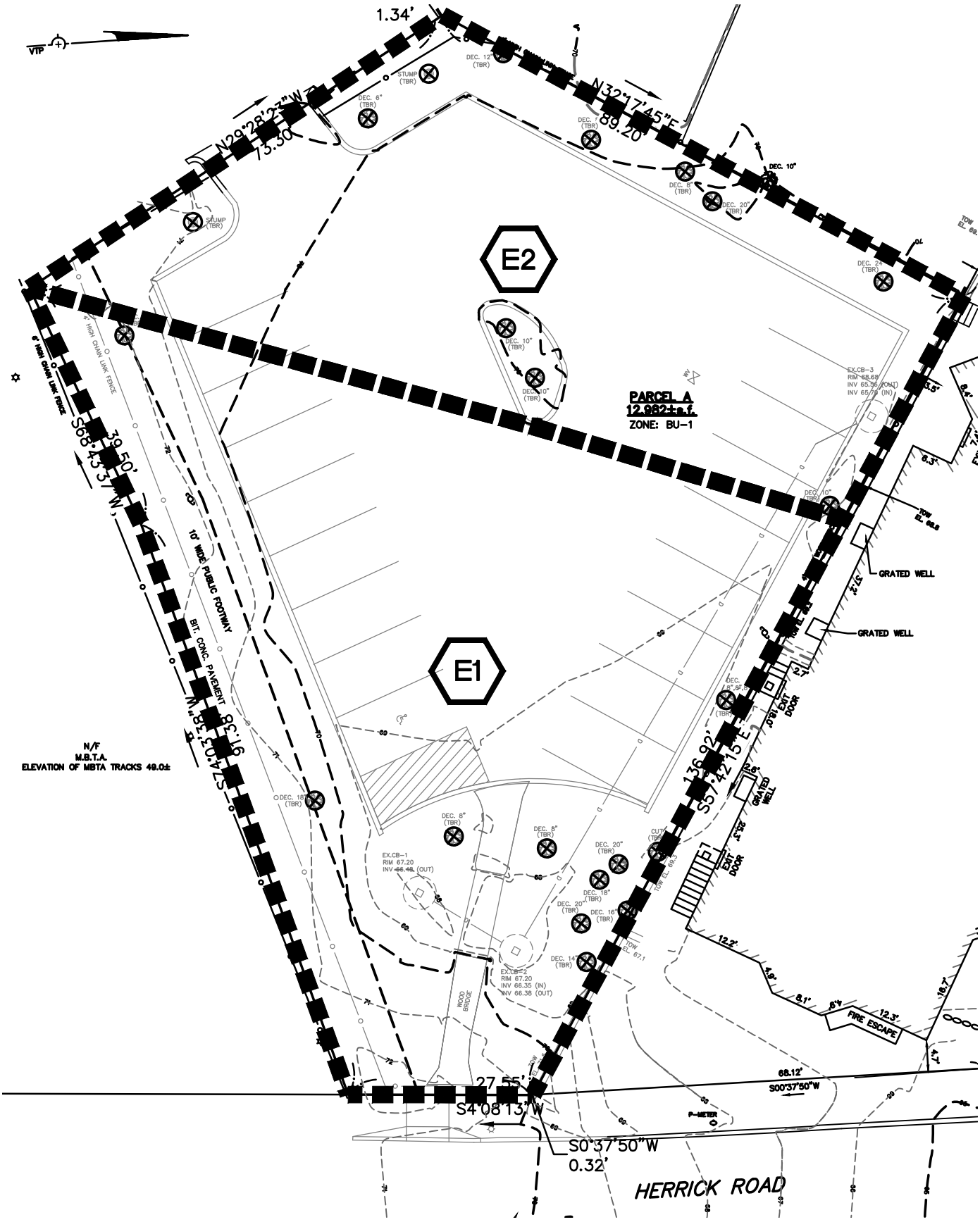
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 10, 2014—Aug 25, 2014

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**
602	Urban land	0.3	100.0%
Totals for Area of Interest		**0.3**	**100.0%**



SCALE: 1in.=20ft.
DATE: JANUARY 4, 2017

FIGURE 1:
PRE-DEVELOPMENT DRAINAGE AREAS
#17-31 HERRICK ROAD NEWTON, MA

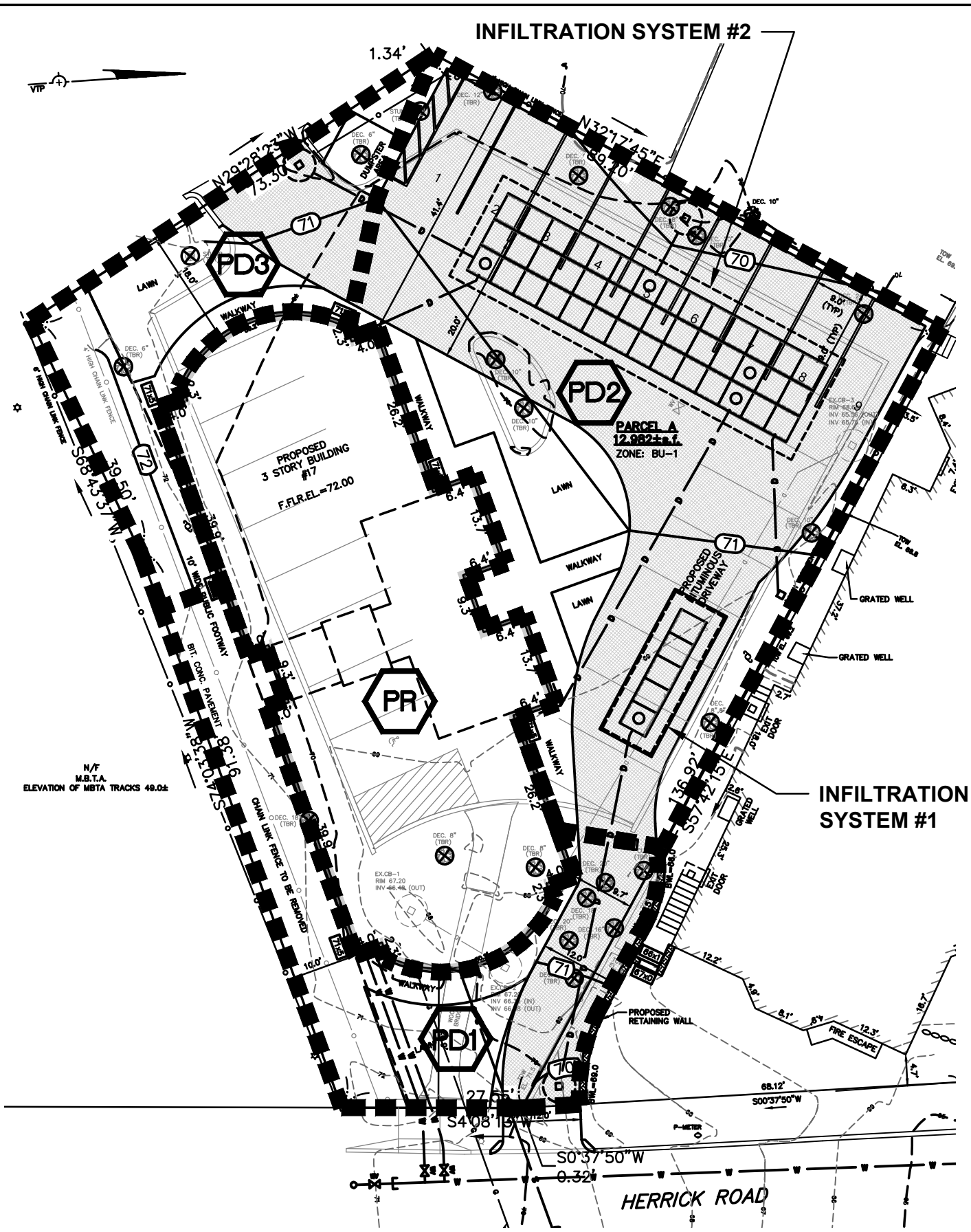
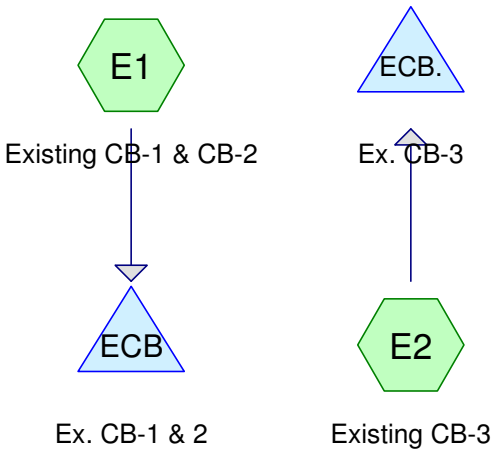


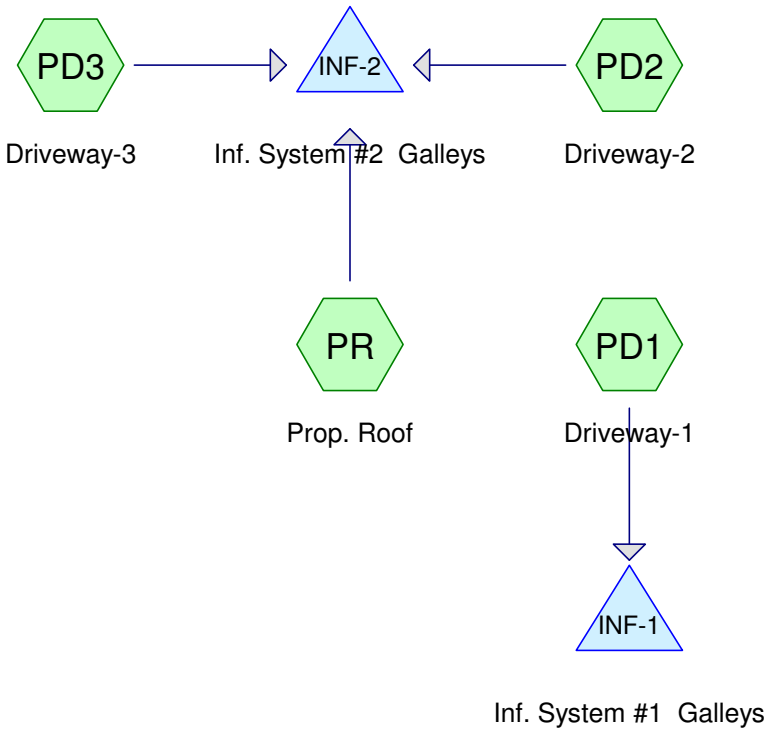
FIGURE 2:
POST-DEVELOPMENT DRAINAGE AREAS
#17-31 HERRICK ROAD NEWTON, MA

SCALE: 1in.=20ft.
DATE: JANUARY 4, 2017

PRE-DEVELOPMENT CONDITIONS



POST-DEVELOPMENT CONDITIONS



Subcat Reach Pond Link

Routing Diagram for 201224_17-31 Herrick Rd Newton, MA
Prepared by VTP associates, inc., Printed 1/4/2017

Summary for Subcatchment E1: Existing CB-1 & CB-2

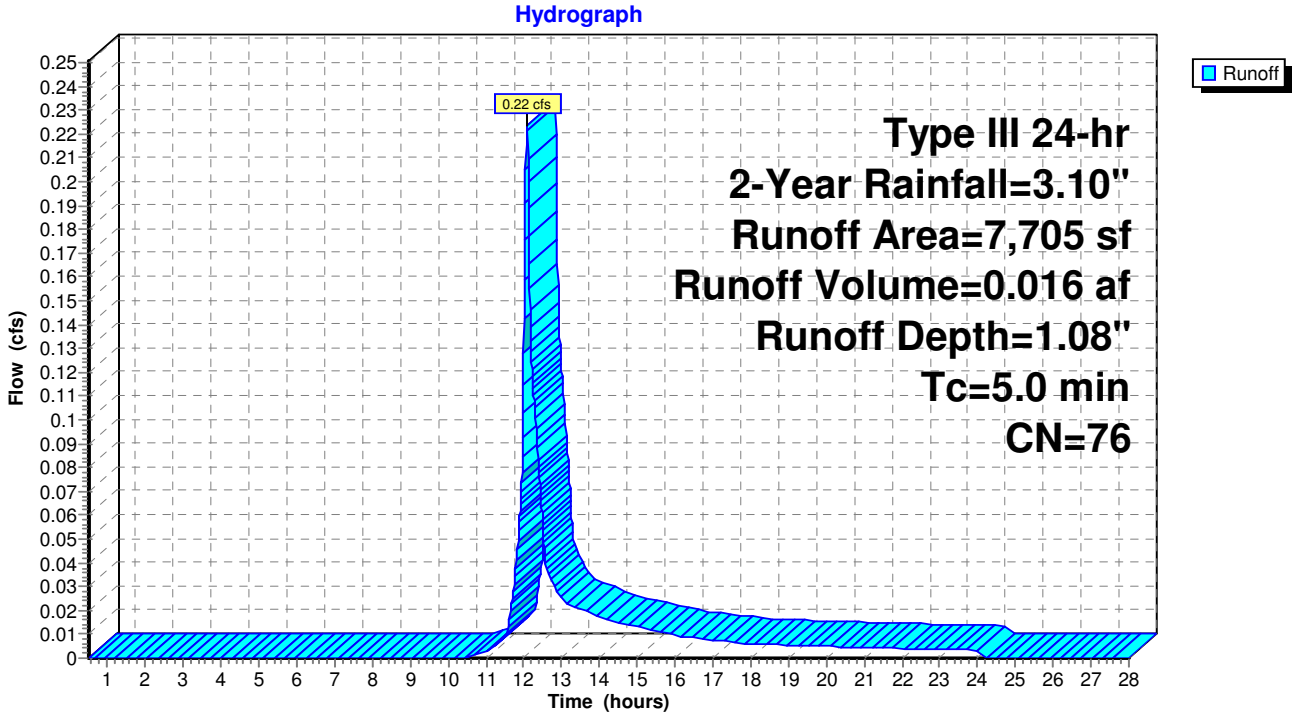
Runoff = 0.22 cfs @ 12.08 hrs, Volume= 0.016 af, Depth= 1.08"

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
*	4,013	98	Paved Parking (portion)
*	840	98	Walks
	2,852	39	>75% Grass cover, Good, HSG A
	7,705	76	Weighted Average
	2,852		37.01% Pervious Area
	4,853		62.99% Impervious Area

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

Subcatchment E1: Existing CB-1 & CB-2



Summary for Subcatchment E2: Existing CB-3

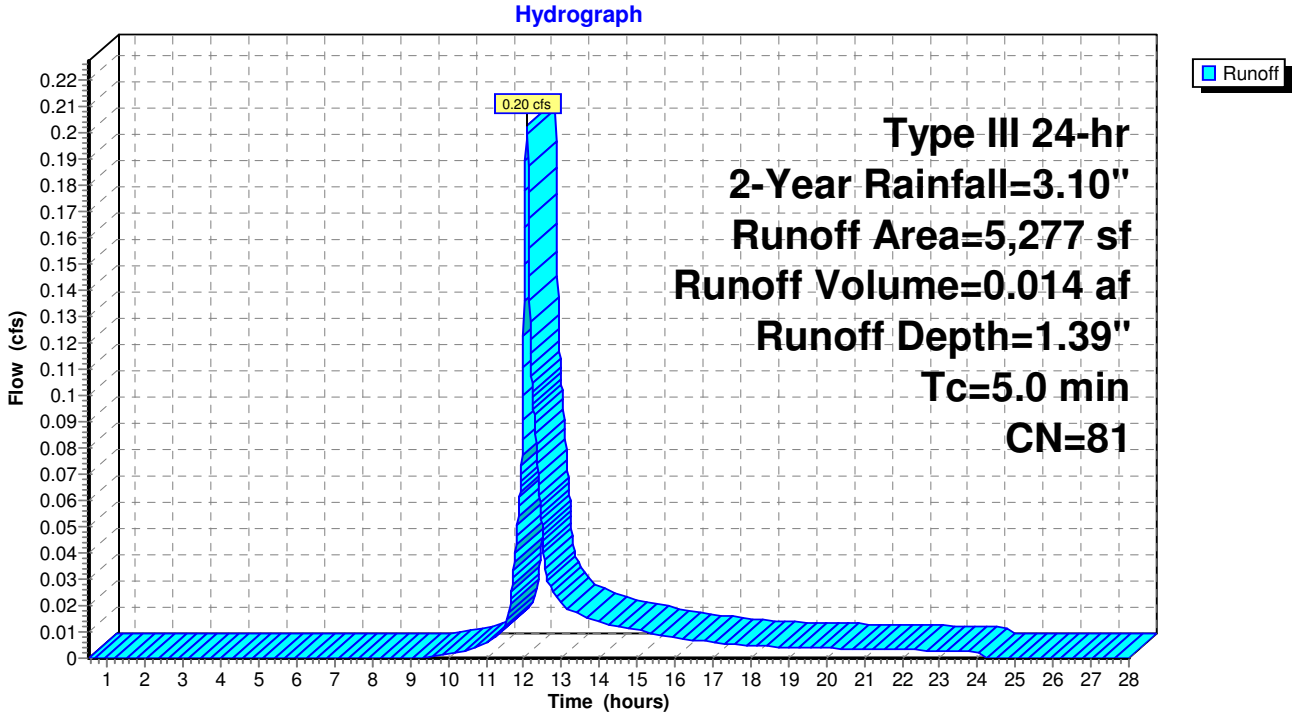
Runoff = 0.20 cfs @ 12.08 hrs, Volume= 0.014 af, Depth= 1.39"

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
*	3,765	98	Paved Parking (portion)
*	27	98	Walks
	1,485	39	>75% Grass cover, Good, HSG A
	5,277	81	Weighted Average
	1,485		28.14% Pervious Area
	3,792		71.86% Impervious Area

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

Subcatchment E2: Existing CB-3



Summary for Subcatchment PD1: Driveway-1

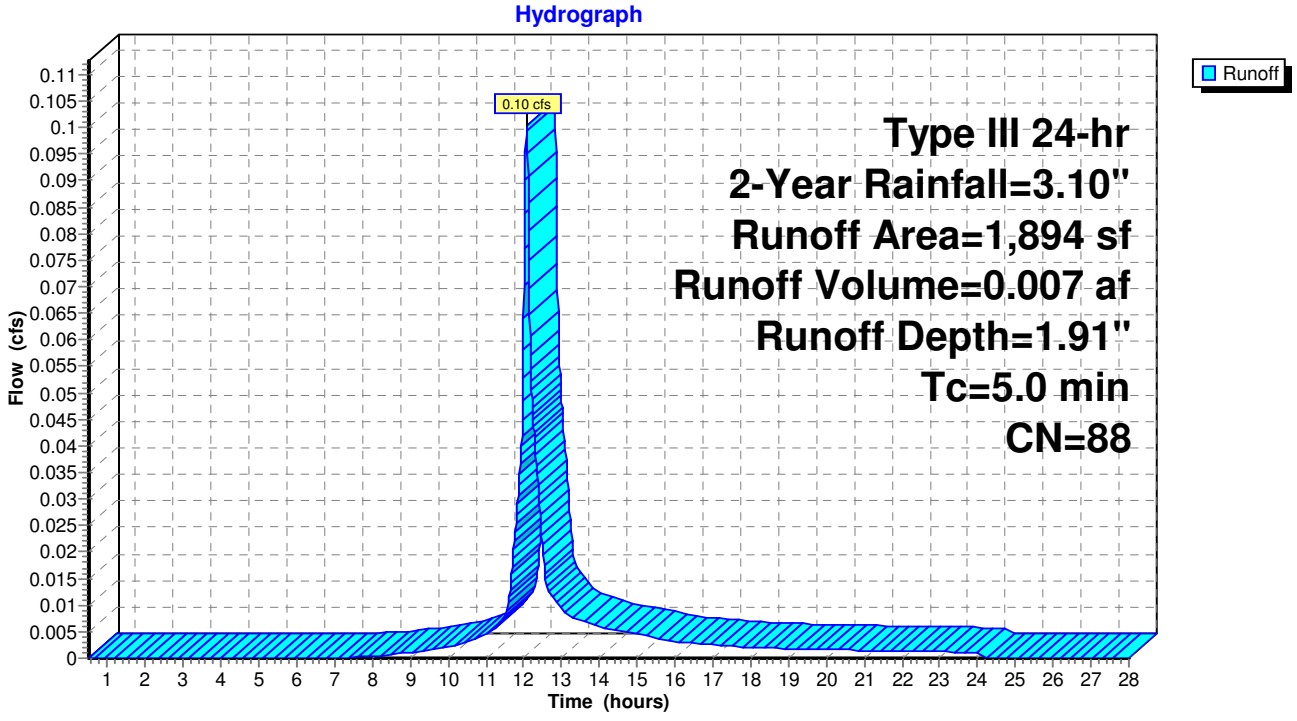
Runoff = 0.10 cfs @ 12.07 hrs, Volume= 0.007 af, Depth= 1.91"

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 2-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	526	98	Prop. Driveway (portion)
*	1,057	98	Walks
	311	39	>75% Grass cover, Good, HSG A
	1,894	88	Weighted Average
	311		16.42% Pervious Area
	1,583		83.58% Impervious Area

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

Subcatchment PD1: Driveway-1



Summary for Subcatchment PD2: Driveway-2

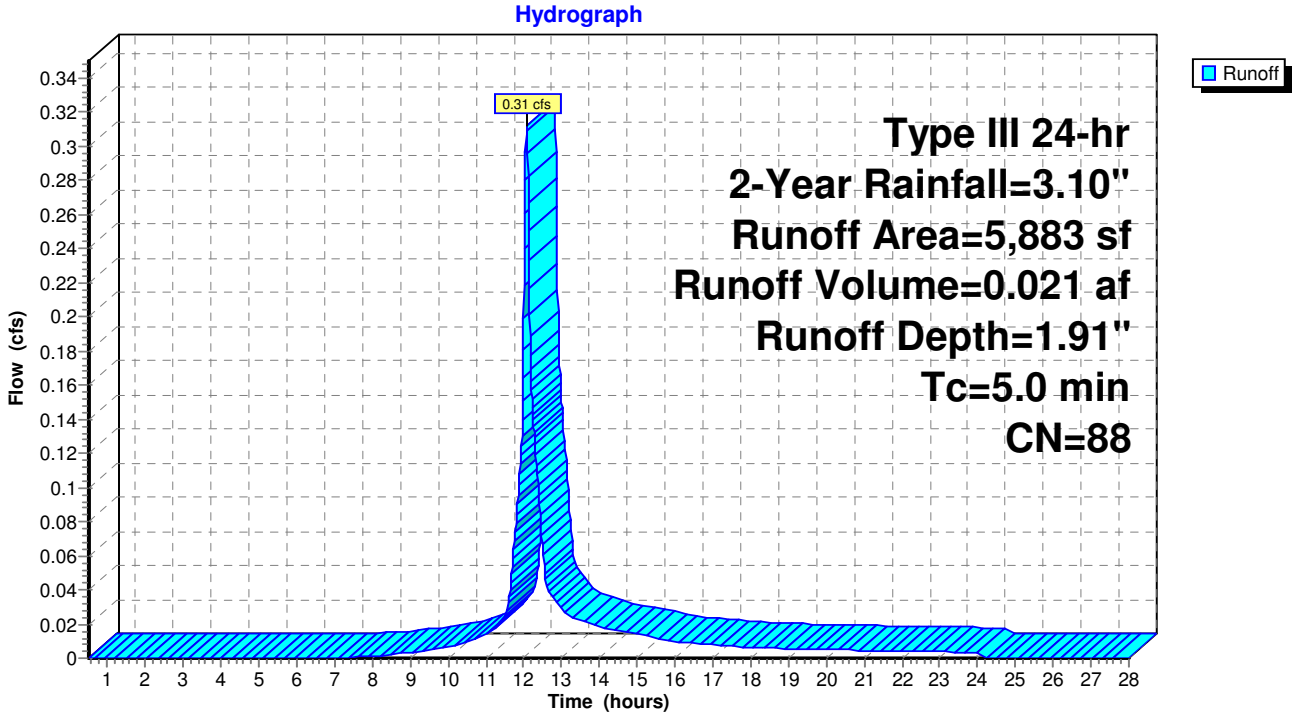
Runoff = 0.31 cfs @ 12.07 hrs, Volume= 0.021 af, Depth= 1.91"

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 2-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	4,289	98	Prop. Driveway (portion)
*	588	98	Walk
	1,006	39	>75% Grass cover, Good, HSG A
	5,883	88	Weighted Average
	1,006		17.10% Pervious Area
	4,877		82.90% Impervious Area

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

Subcatchment PD2: Driveway-2



Summary for Subcatchment PD3: Driveway-3

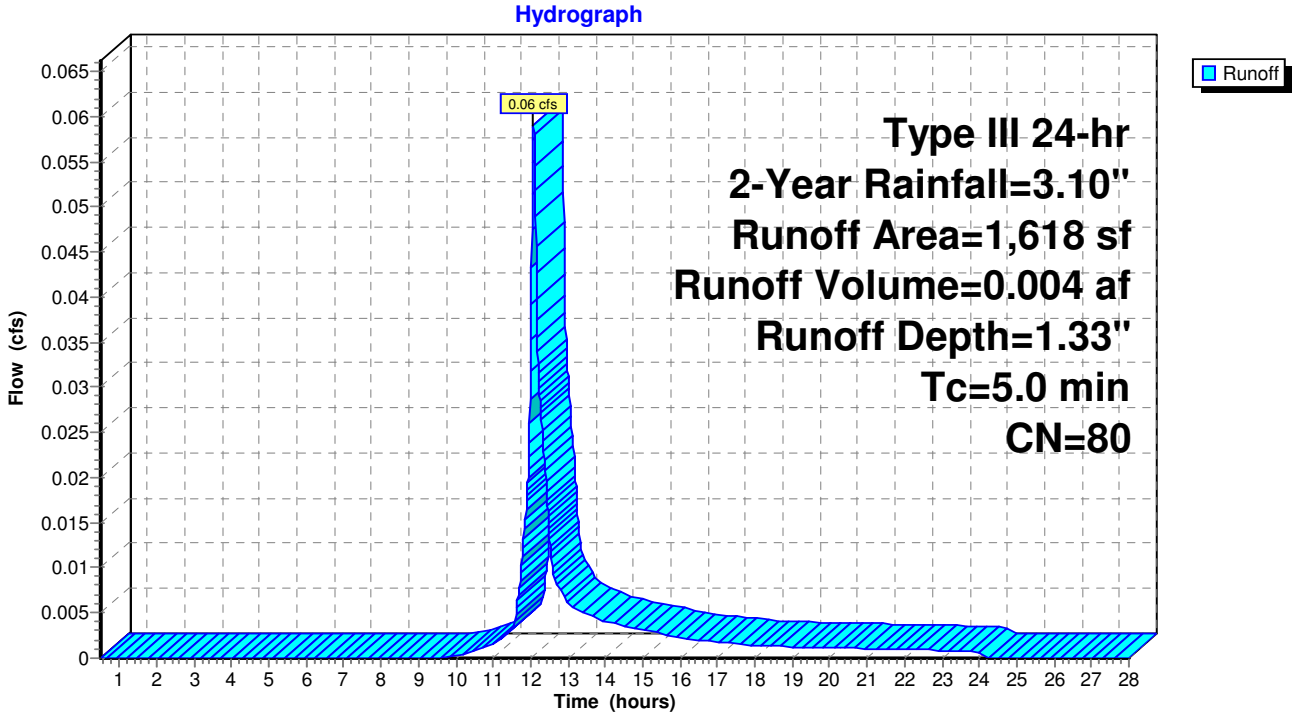
Runoff = 0.06 cfs @ 12.08 hrs, Volume= 0.004 af, Depth= 1.33"

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 2-Year Rainfall=3.10"

	Area (sf)	CN	Description
*	448	98	Prop. Driveway (portion)
*	687	98	Walk
	483	39	>75% Grass cover, Good, HSG A
	1,618	80	Weighted Average
	483		29.85% Pervious Area
	1,135		70.15% Impervious Area

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

Subcatchment PD3: Driveway-3



Summary for Subcatchment PR: Prop. Roof

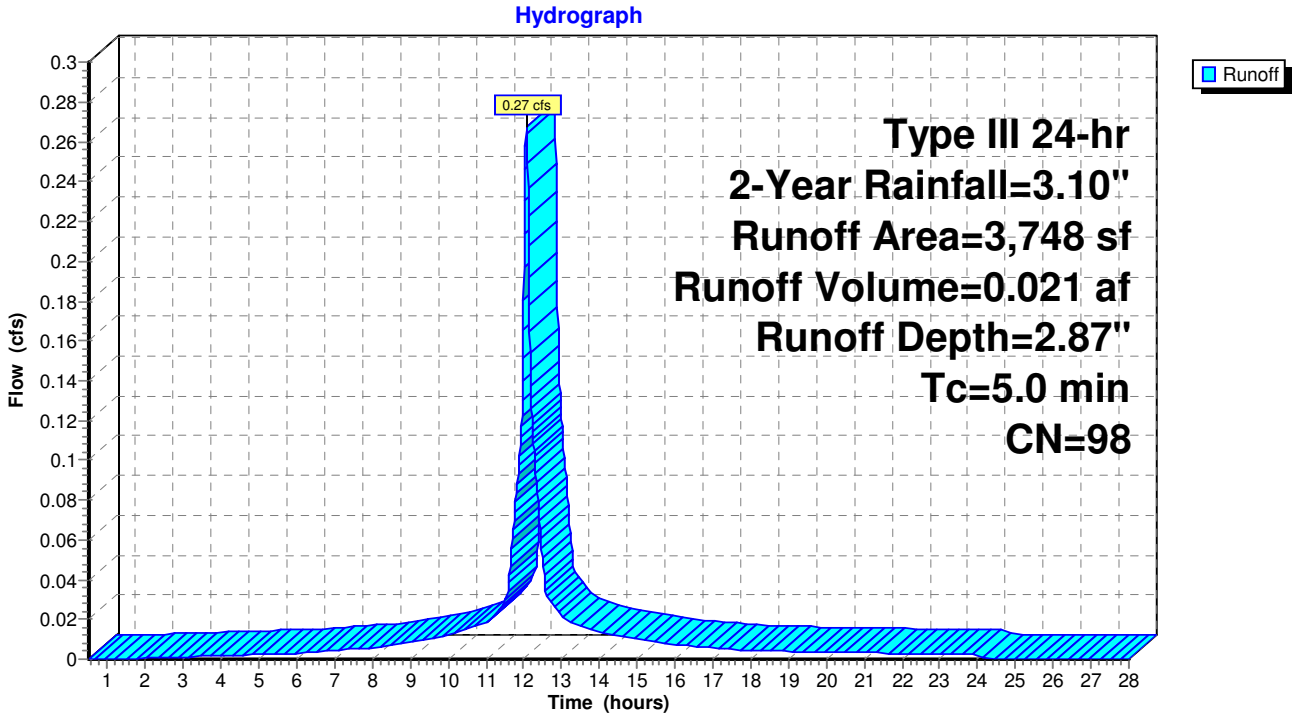
Runoff = 0.27 cfs @ 12.07 hrs, Volume= 0.021 af, Depth= 2.87"

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
*	3,748	98	Prop. Roof (Addition)
	3,748		100.00% Impervious Area

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

Subcatchment PR: Prop. Roof

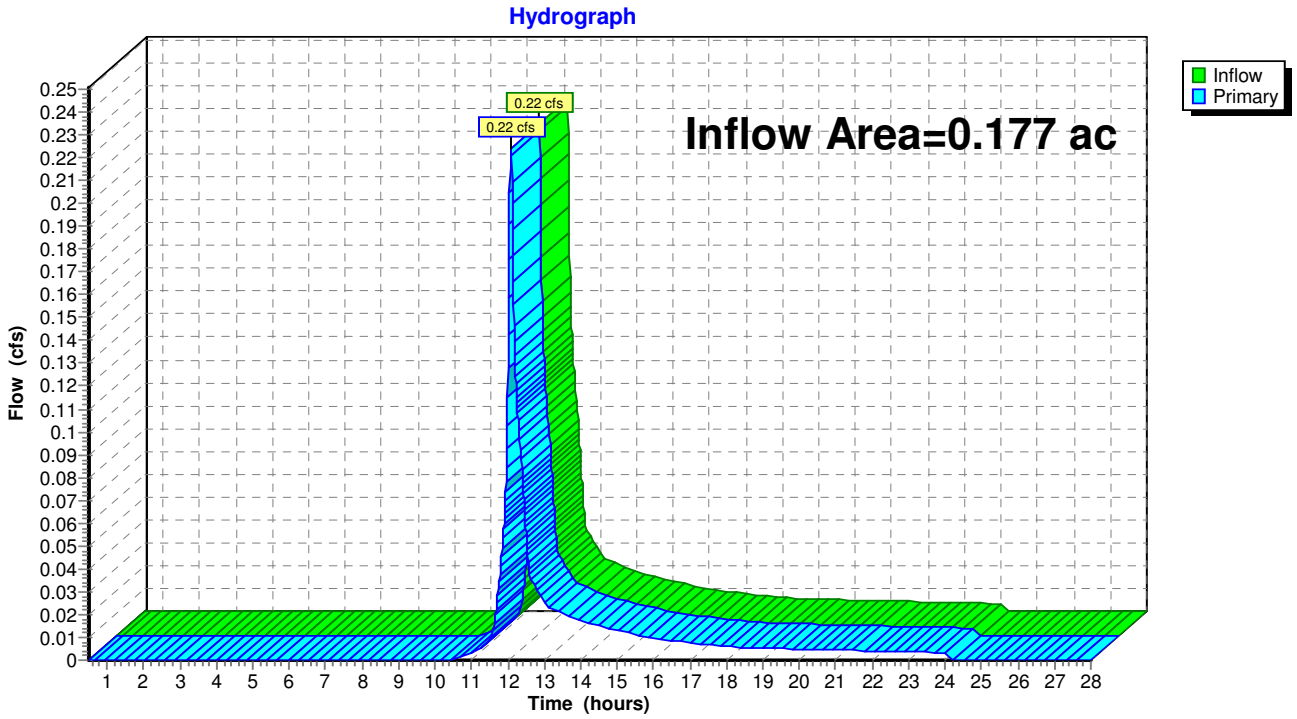


Summary for Pond ECB: Ex. CB-1 & 2

Inflow Area = 0.177 ac, 62.99% Impervious, Inflow Depth = 1.08" for 2-Year event
Inflow = 0.22 cfs @ 12.08 hrs, Volume= 0.016 af
Primary = 0.22 cfs @ 12.08 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs

Pond ECB: Ex. CB-1 & 2

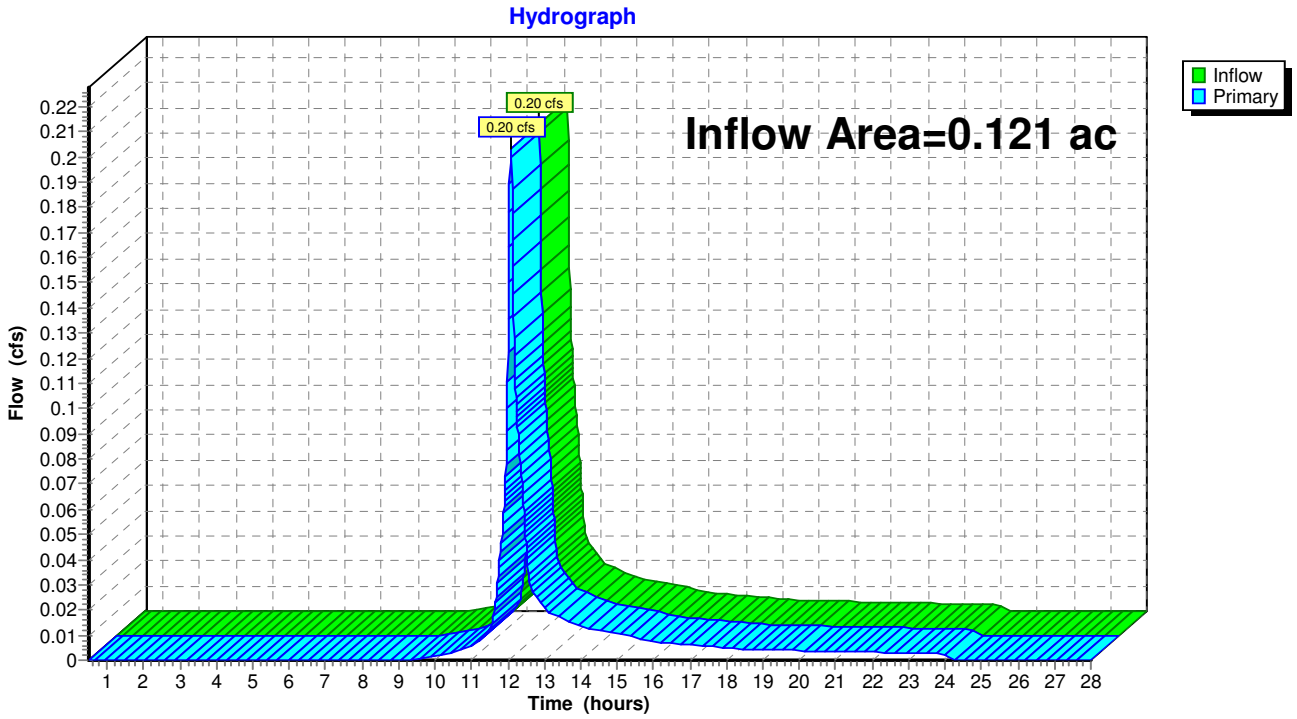


Summary for Pond ECB.: Ex. CB-3

Inflow Area = 0.121 ac, 71.86% Impervious, Inflow Depth = 1.39" for 2-Year event
Inflow = 0.20 cfs @ 12.08 hrs, Volume= 0.014 af
Primary = 0.20 cfs @ 12.08 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs

Pond ECB.: Ex. CB-3



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

Inflow Area = 0.043 ac, 83.58% Impervious, Inflow Depth = 1.91" for 2-Year event
Inflow = 0.10 cfs @ 12.07 hrs, Volume= 0.007 af
Outflow = 0.03 cfs @ 11.87 hrs, Volume= 0.007 af, Atten= 72%, Lag= 0.0 min
Discarded = 0.03 cfs @ 11.87 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 63.54' @ 12.42 hrs Surf.Area= 0.005 ac Storage= 0.001 af

Plug-Flow detention time= 10.9 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 10.9 min (826.3 - 815.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	62.75'	0.006 af	**8.50'W x 24.00'L x 5.25'H Field A** 0.025 af Overall - 0.007 af Embedded = 0.017 af x 35.0% Voids
#2A	63.75'	0.005 af	**Galley 4x4x4.25** x 5 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
		0.011 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	62.75'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.03 cfs @ 11.87 hrs HW=62.80' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

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

Chamber Model = 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

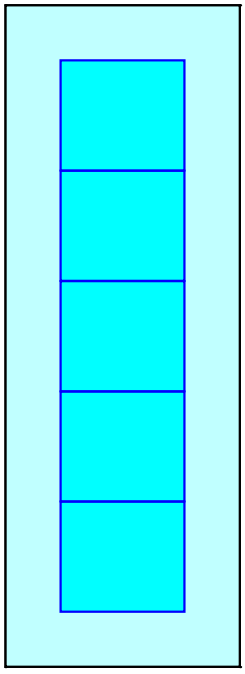
5 Chambers/Row x 4.00' Long = 20.00' Row Length +24.0" End Stone x 2 = 24.00' Base Length
1 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 8.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

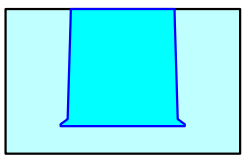
5 Chambers x 46.4 cf = 231.9 cf Chamber Storage
5 Chambers x 62.3 cf = 311.7 cf Displacement

1,071.0 cf Field - 311.7 cf Chambers = 759.3 cf Stone x 35.0% Voids = 265.8 cf Stone Storage

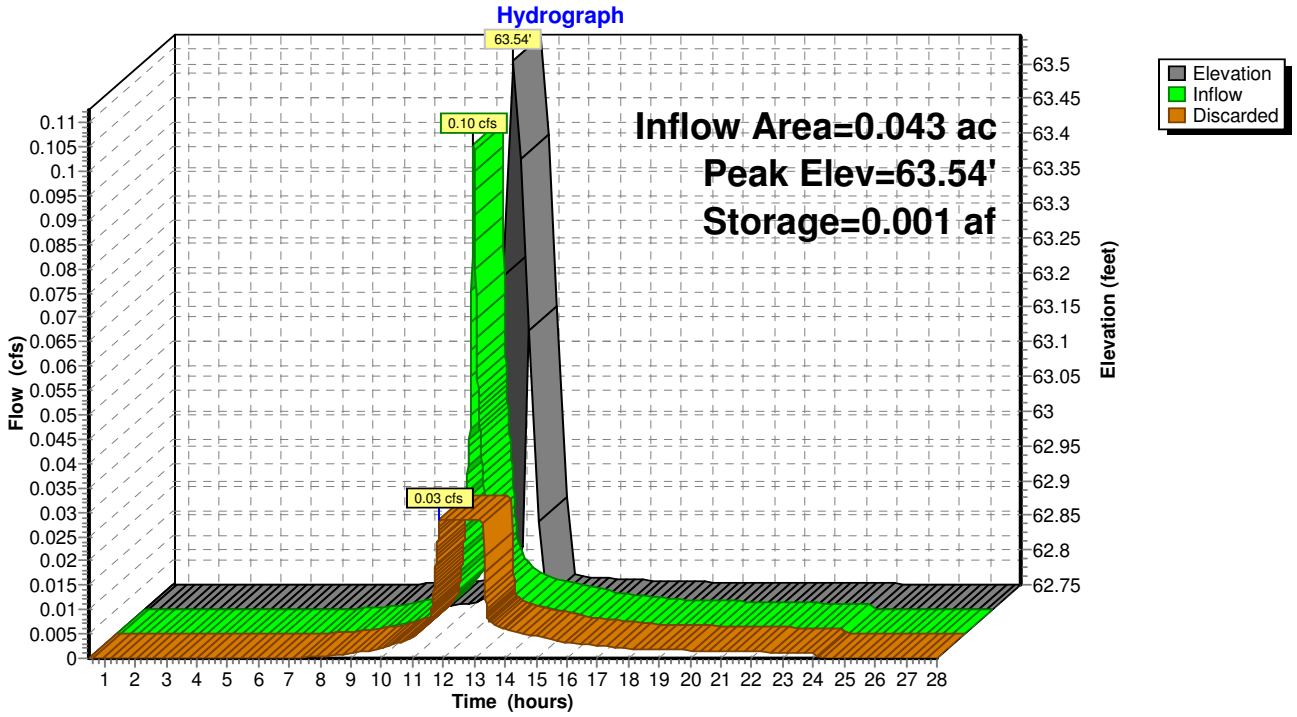
Chamber Storage + Stone Storage = 497.7 cf = 0.011 af
Overall Storage Efficiency = 46.5%
Overall System Size = 24.00' x 8.50' x 5.25'

5 Chambers
39.7 cy Field
28.1 cy Stone





Pond INF-1: Inf. System #1 Galleys



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

Inflow Area = 0.258 ac, 86.76% Impervious, Inflow Depth = 2.14" for 2-Year event
Inflow = 0.64 cfs @ 12.07 hrs, Volume= 0.046 af
Outflow = 0.15 cfs @ 11.79 hrs, Volume= 0.046 af, Atten= 77%, Lag= 0.0 min
Discarded = 0.15 cfs @ 11.79 hrs, Volume= 0.046 af

Routing by Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 63.35' @ 12.47 hrs Surf.Area= 0.024 ac Storage= 0.010 af

Plug-Flow detention time= 16.1 min calculated for 0.046 af (100% of inflow)
Center-of-Mass det. time= 16.1 min (807.6 - 791.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	62.25'	0.023 af	**17.50'W x 60.00'L x 5.25'H Field A** 0.127 af Overall - 0.060 af Embedded = 0.066 af x 35.0% Voids
#2A	63.25'	0.045 af	**Galley 4x4x4.25** x 42 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 3 Rows of 14 Chambers
		0.068 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	62.25'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.15 cfs @ 11.79 hrs HW=62.30' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

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

Chamber Model = 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

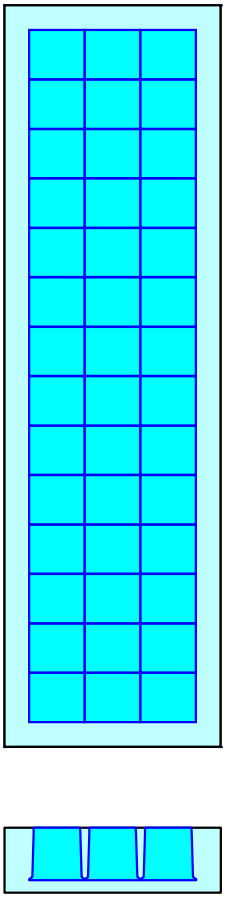
14 Chambers/Row x 4.00' Long = 56.00' Row Length +24.0" End Stone x 2 = 60.00' Base Length
3 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 17.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

42 Chambers x 46.4 cf = 1,948.0 cf Chamber Storage
42 Chambers x 62.3 cf = 2,617.9 cf Displacement

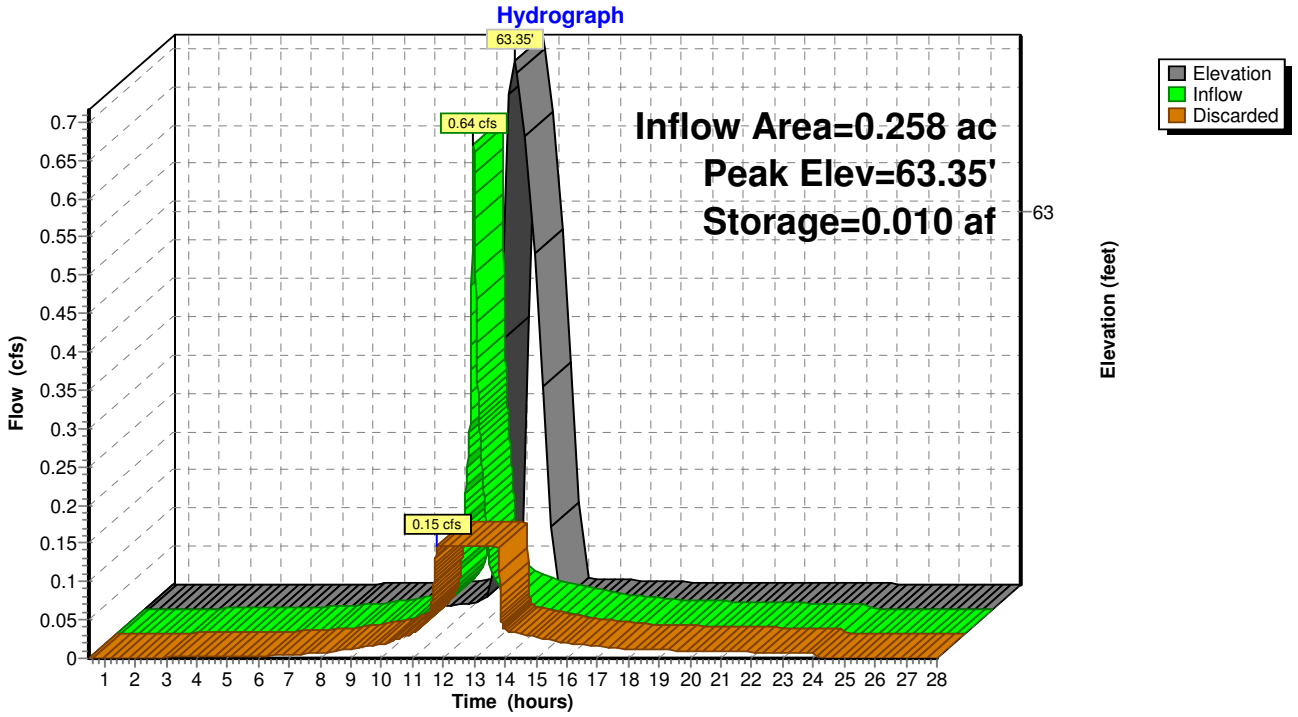
5,512.5 cf Field - 2,617.9 cf Chambers = 2,894.6 cf Stone x 35.0% Voids = 1,013.1 cf Stone Storage

Chamber Storage + Stone Storage = 2,961.1 cf = 0.068 af
Overall Storage Efficiency = 53.7%
Overall System Size = 60.00' x 17.50' x 5.25'

42 Chambers
204.2 cy Field
107.2 cy Stone



Pond INF-2: Inf. System #2 Galleys



Summary for Subcatchment E1: Existing CB-1 & CB-2

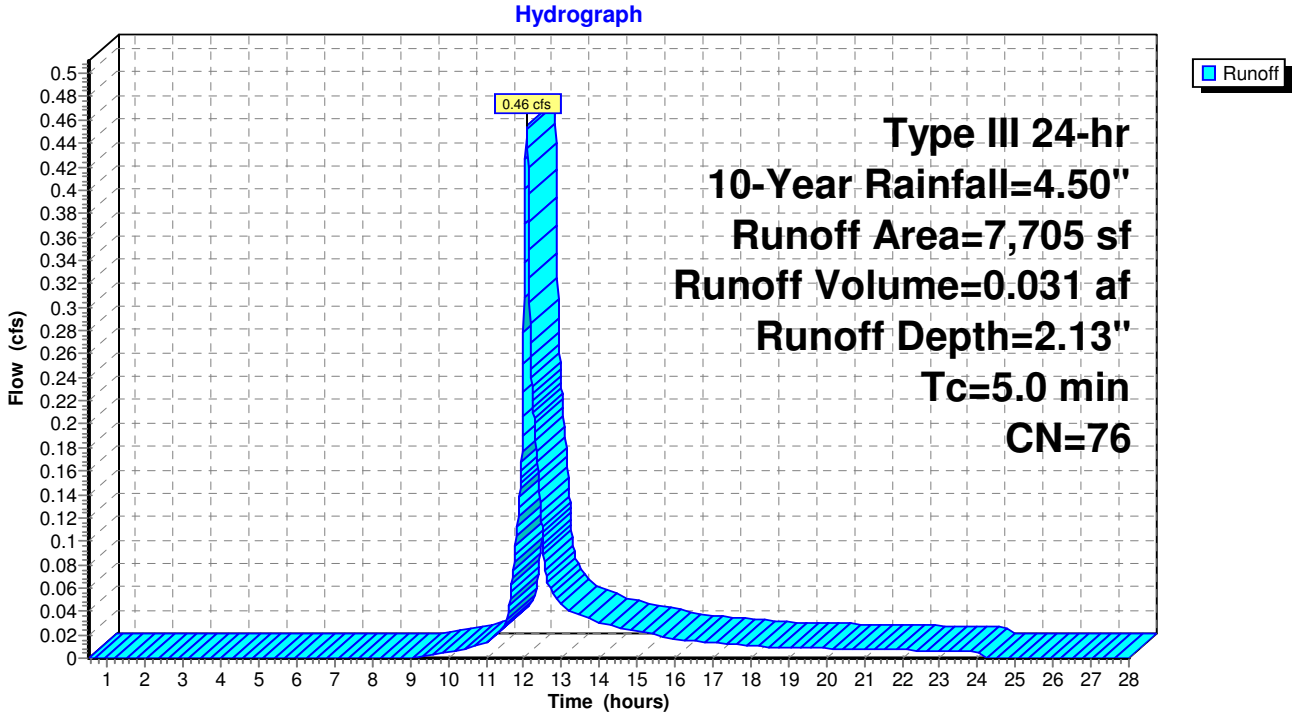
Runoff = 0.46 cfs @ 12.08 hrs, Volume= 0.031 af, Depth= 2.13"

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
*	4,013	98	Paved Parking (portion)
*	840	98	Walks
	2,852	39	>75% Grass cover, Good, HSG A
	7,705	76	Weighted Average
	2,852		37.01% Pervious Area
	4,853		62.99% Impervious Area

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

Subcatchment E1: Existing CB-1 & CB-2



Summary for Subcatchment E2: Existing CB-3

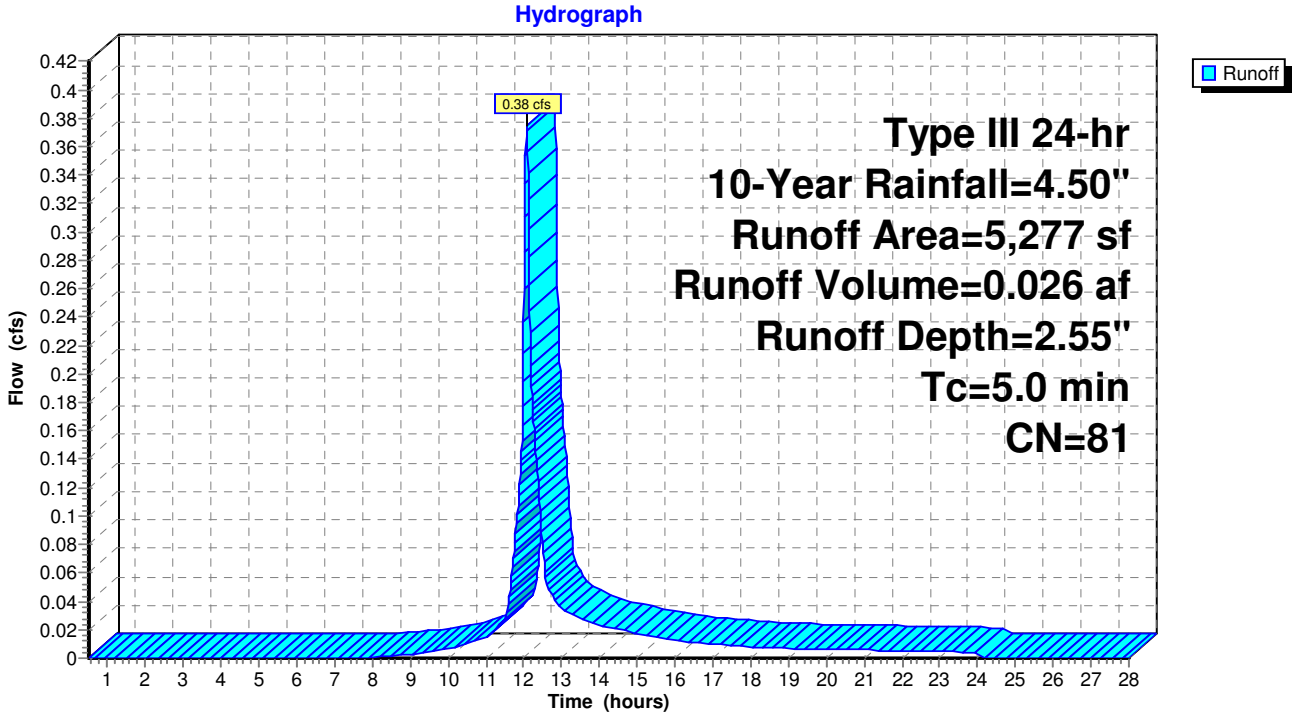
Runoff = 0.38 cfs @ 12.07 hrs, Volume= 0.026 af, Depth= 2.55"

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
*	3,765	98	Paved Parking (portion)
*	27	98	Walks
	1,485	39	>75% Grass cover, Good, HSG A
	5,277	81	Weighted Average
	1,485		28.14% Pervious Area
	3,792		71.86% Impervious Area

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

Subcatchment E2: Existing CB-3



Summary for Subcatchment PD1: Driveway-1

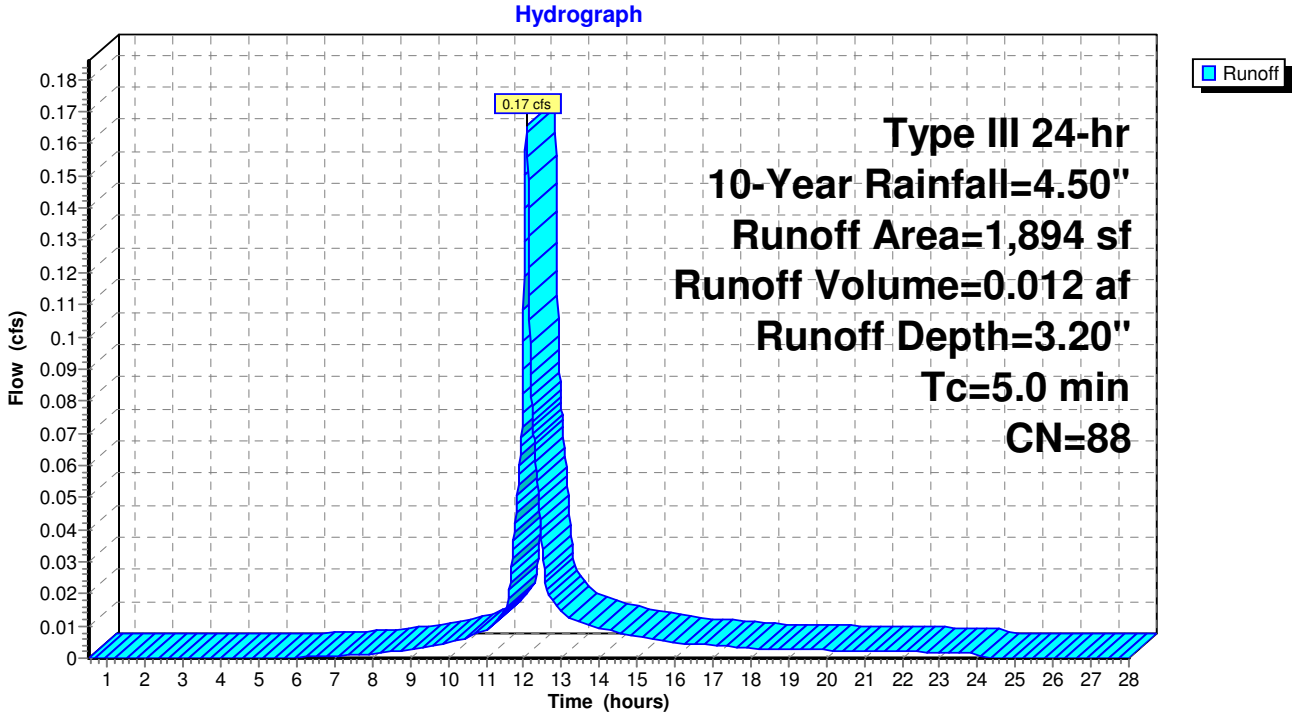
Runoff = 0.17 cfs @ 12.07 hrs, Volume= 0.012 af, Depth= 3.20"

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 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	526	98	Prop. Driveway (portion)
*	1,057	98	Walks
	311	39	>75% Grass cover, Good, HSG A
	1,894	88	Weighted Average
	311		16.42% Pervious Area
	1,583		83.58% Impervious Area

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

Subcatchment PD1: Driveway-1



Summary for Subcatchment PD2: Driveway-2

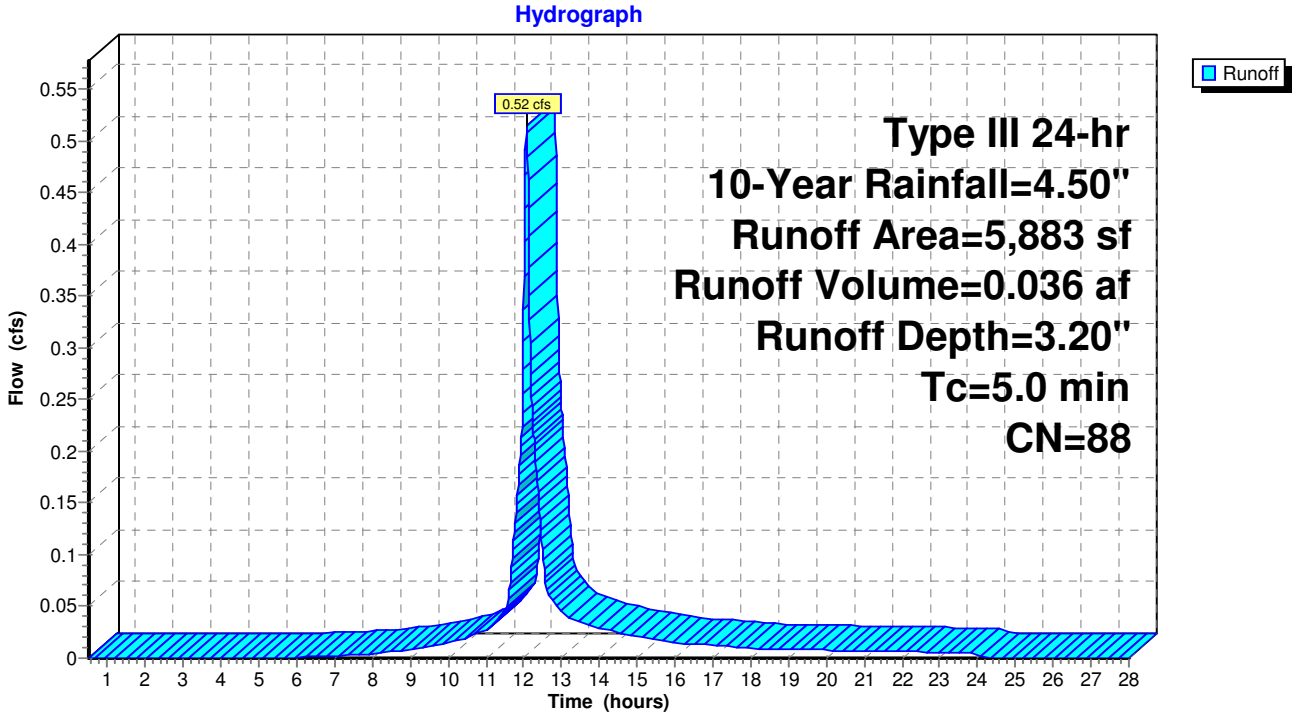
Runoff = 0.52 cfs @ 12.07 hrs, Volume= 0.036 af, Depth= 3.20"

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 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	4,289	98	Prop. Driveway (portion)
*	588	98	Walk
	1,006	39	>75% Grass cover, Good, HSG A
	5,883	88	Weighted Average
	1,006		17.10% Pervious Area
	4,877		82.90% Impervious Area

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

Subcatchment PD2: Driveway-2



Summary for Subcatchment PD3: Driveway-3

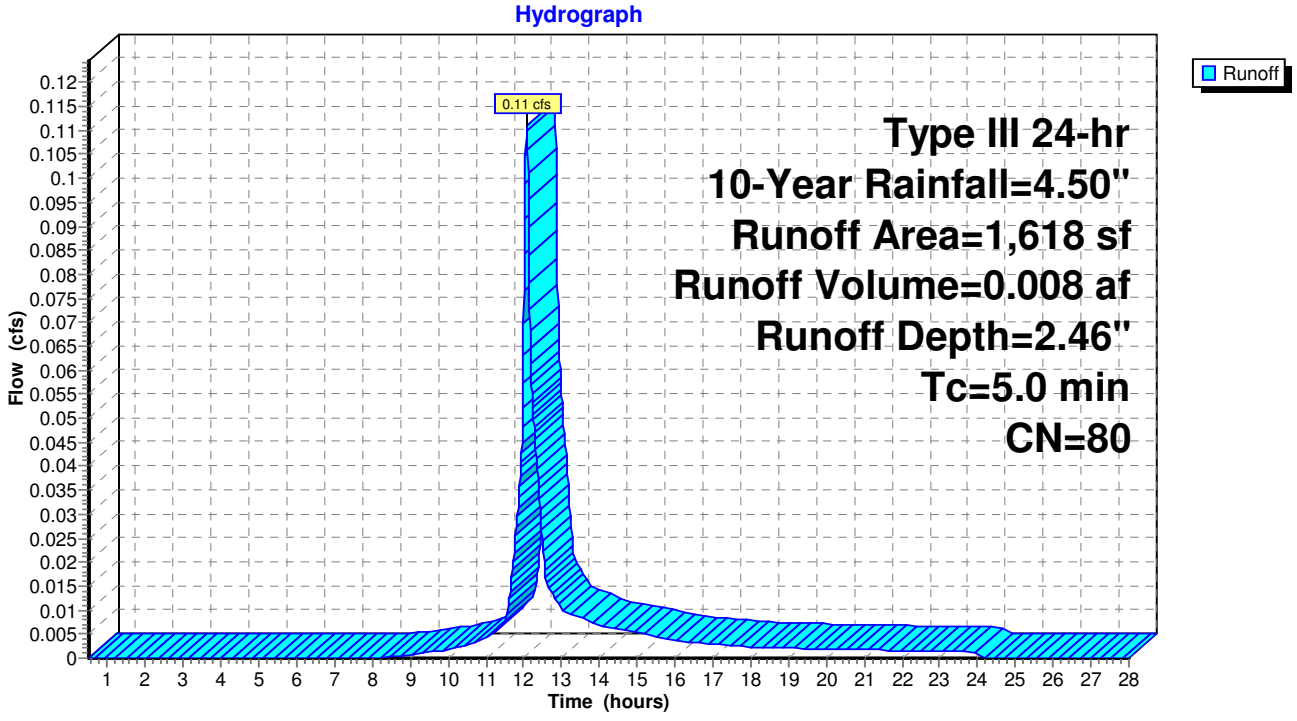
Runoff = 0.11 cfs @ 12.08 hrs, Volume= 0.008 af, Depth= 2.46"

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 10-Year Rainfall=4.50"

	Area (sf)	CN	Description
*	448	98	Prop. Driveway (portion)
*	687	98	Walk
	483	39	>75% Grass cover, Good, HSG A
	1,618	80	Weighted Average
	483		29.85% Pervious Area
	1,135		70.15% Impervious Area

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

Subcatchment PD3: Driveway-3



Summary for Subcatchment PR: Prop. Roof

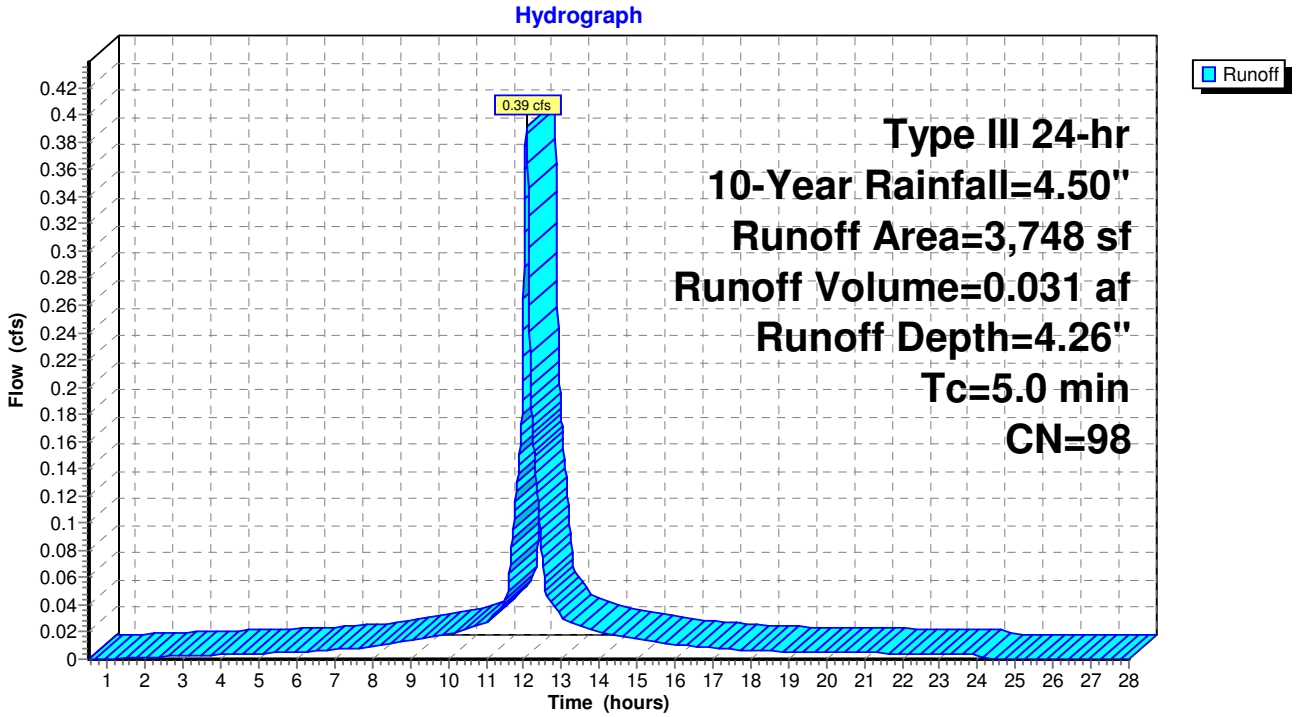
Runoff = 0.39 cfs @ 12.07 hrs, Volume= 0.031 af, Depth= 4.26"

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
*	3,748	98	Prop. Roof (Addition)
	3,748		100.00% Impervious Area

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

Subcatchment PR: Prop. Roof

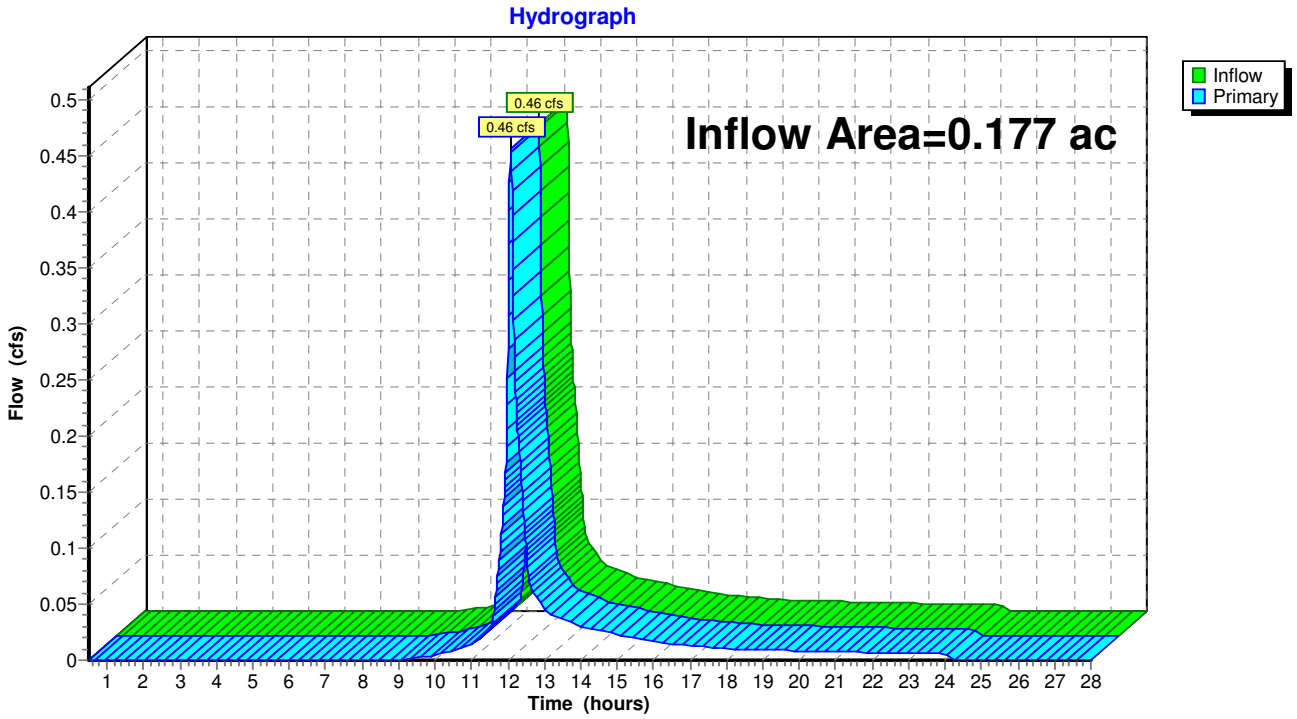


Summary for Pond ECB: Ex. CB-1 & 2

Inflow Area = 0.177 ac, 62.99% Impervious, Inflow Depth = 2.13" for 10-Year event
Inflow = 0.46 cfs @ 12.08 hrs, Volume= 0.031 af
Primary = 0.46 cfs @ 12.08 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs

Pond ECB: Ex. CB-1 & 2

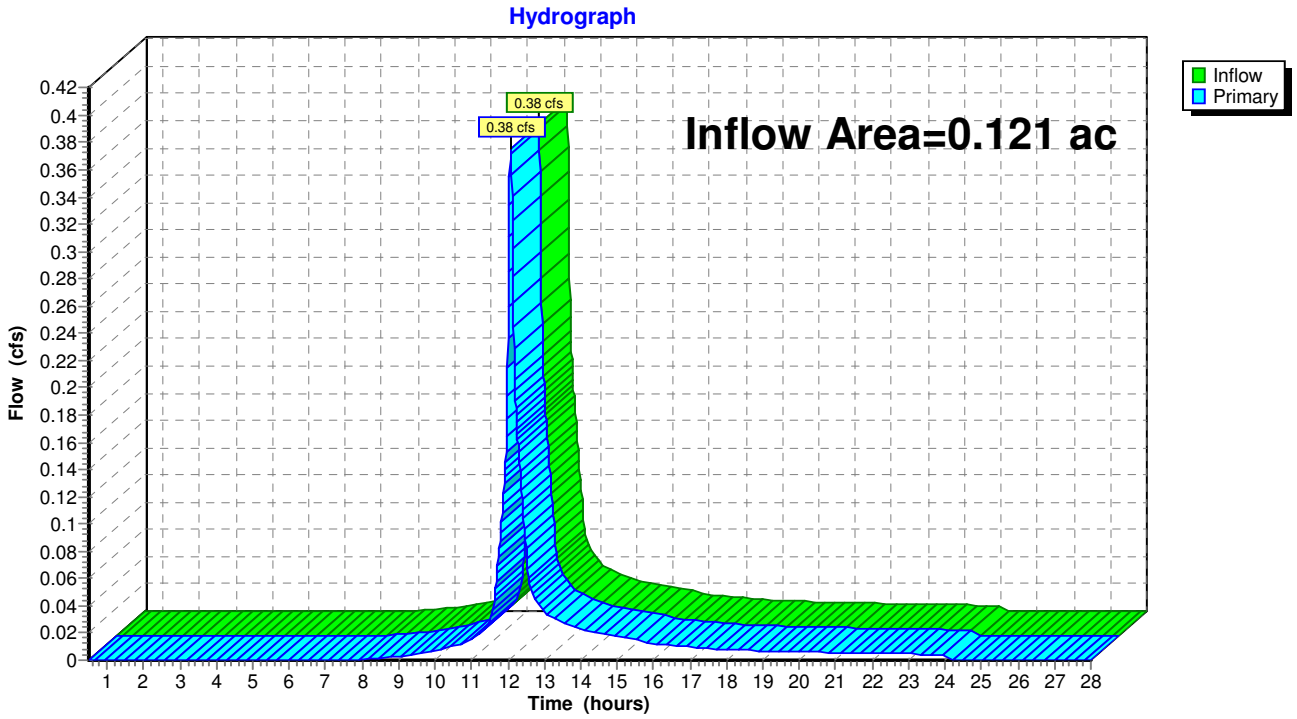


Summary for Pond ECB.: Ex. CB-3

Inflow Area = 0.121 ac, 71.86% Impervious, Inflow Depth = 2.55" for 10-Year event
Inflow = 0.38 cfs @ 12.07 hrs, Volume= 0.026 af
Primary = 0.38 cfs @ 12.07 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs

Pond ECB.: Ex. CB-3



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

Inflow Area = 0.043 ac, 83.58% Impervious, Inflow Depth = 3.20" for 10-Year event
Inflow = 0.17 cfs @ 12.07 hrs, Volume= 0.012 af
Outflow = 0.03 cfs @ 11.71 hrs, Volume= 0.012 af, Atten= 83%, Lag= 0.0 min
Discarded = 0.03 cfs @ 11.71 hrs, Volume= 0.012 af

Routing by Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 64.38' @ 12.53 hrs Surf.Area= 0.005 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 (830.5 - 800.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	62.75'	0.006 af	**8.50'W x 24.00'L x 5.25'H Field A** 0.025 af Overall - 0.007 af Embedded = 0.017 af x 35.0% Voids
#2A	63.75'	0.005 af	**Galley 4x4x4.25** x 5 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
		0.011 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	62.75'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.03 cfs @ 11.71 hrs HW=62.80' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

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

Chamber Model = 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

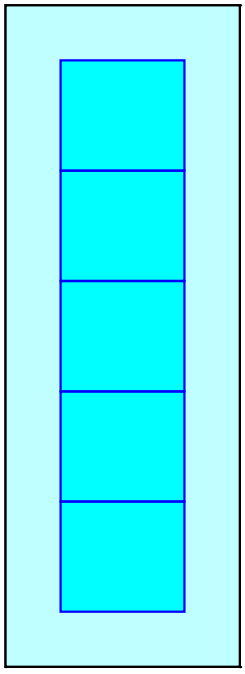
5 Chambers/Row x 4.00' Long = 20.00' Row Length +24.0" End Stone x 2 = 24.00' Base Length
1 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 8.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

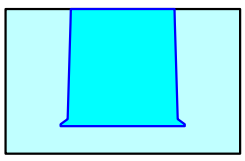
5 Chambers x 46.4 cf = 231.9 cf Chamber Storage
5 Chambers x 62.3 cf = 311.7 cf Displacement

1,071.0 cf Field - 311.7 cf Chambers = 759.3 cf Stone x 35.0% Voids = 265.8 cf Stone Storage

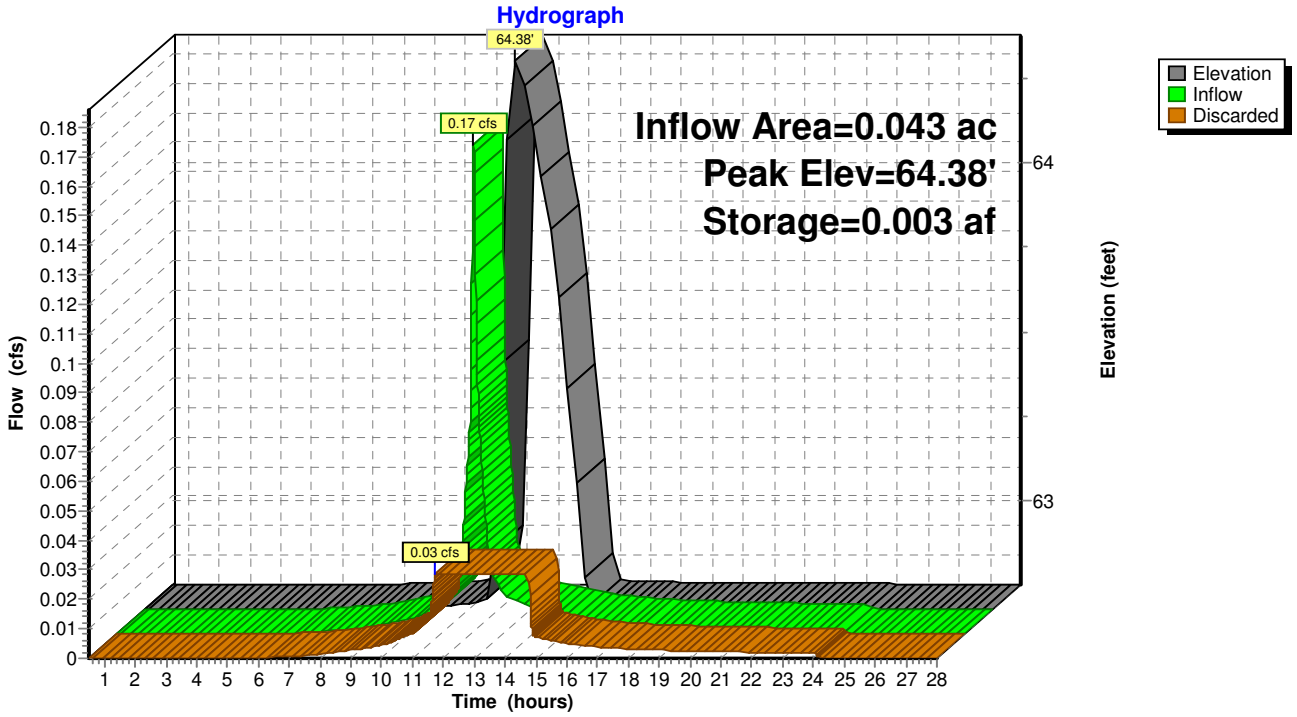
Chamber Storage + Stone Storage = 497.7 cf = 0.011 af
Overall Storage Efficiency = 46.5%
Overall System Size = 24.00' x 8.50' x 5.25'

5 Chambers
39.7 cy Field
28.1 cy Stone





Pond INF-1: Inf. System #1 Galleys



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

Inflow Area = 0.258 ac, 86.76% Impervious, Inflow Depth = 3.45" for 10-Year event
Inflow = 1.02 cfs @ 12.07 hrs, Volume= 0.074 af
Outflow = 0.15 cfs @ 11.66 hrs, Volume= 0.074 af, Atten= 86%, Lag= 0.0 min
Discarded = 0.15 cfs @ 11.66 hrs, Volume= 0.074 af

Routing by Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 64.10' @ 12.56 hrs Surf.Area= 0.024 ac Storage= 0.022 af

Plug-Flow detention time= 40.3 min calculated for 0.074 af (100% of inflow)
Center-of-Mass det. time= 40.3 min (822.2 - 781.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	62.25'	0.023 af	**17.50'W x 60.00'L x 5.25'H Field A** 0.127 af Overall - 0.060 af Embedded = 0.066 af x 35.0% Voids
#2A	63.25'	0.045 af	**Galley 4x4x4.25** x 42 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 3 Rows of 14 Chambers
		0.068 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	62.25'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.15 cfs @ 11.66 hrs HW=62.30' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

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

Chamber Model = 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

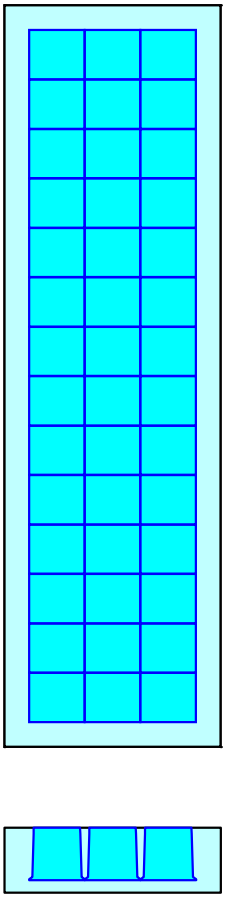
14 Chambers/Row x 4.00' Long = 56.00' Row Length +24.0" End Stone x 2 = 60.00' Base Length
3 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 17.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

42 Chambers x 46.4 cf = 1,948.0 cf Chamber Storage
42 Chambers x 62.3 cf = 2,617.9 cf Displacement

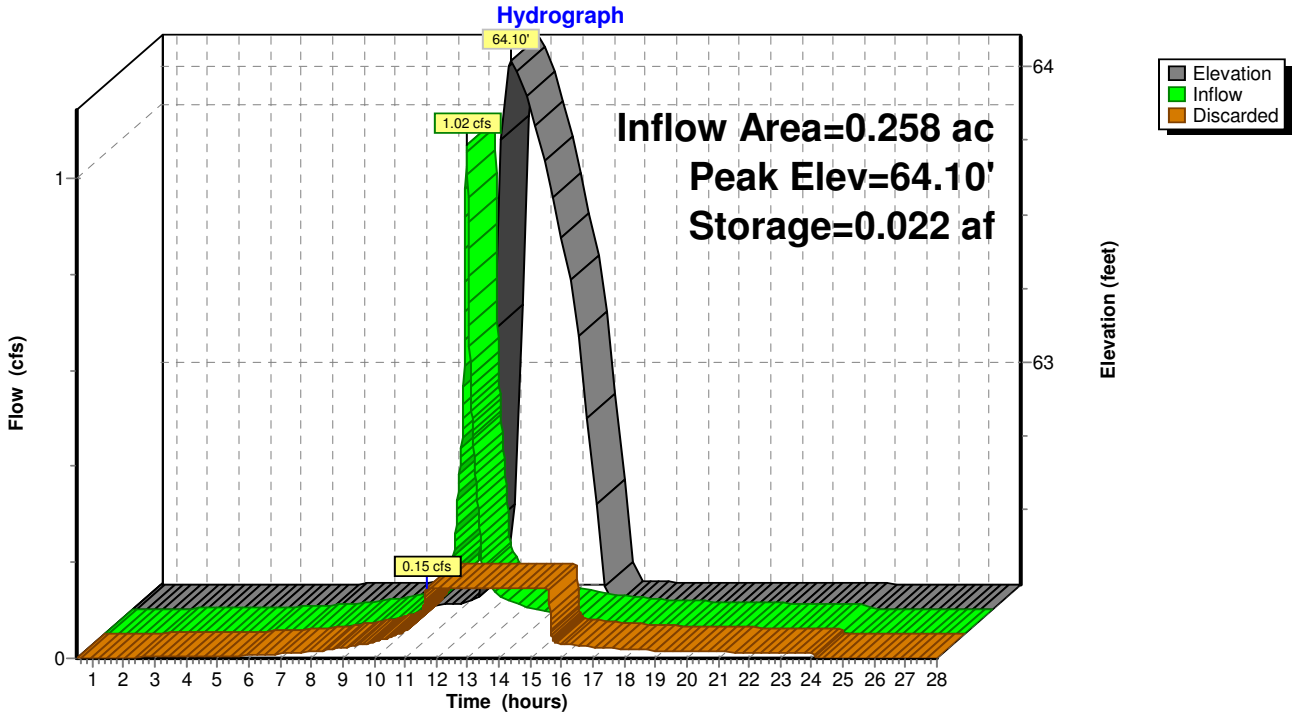
5,512.5 cf Field - 2,617.9 cf Chambers = 2,894.6 cf Stone x 35.0% Voids = 1,013.1 cf Stone Storage

Chamber Storage + Stone Storage = 2,961.1 cf = 0.068 af
Overall Storage Efficiency = 53.7%
Overall System Size = 60.00' x 17.50' x 5.25'

42 Chambers
204.2 cy Field
107.2 cy Stone



Pond INF-2: Inf. System #2 Galleys



Summary for Subcatchment E1: Existing CB-1 & CB-2

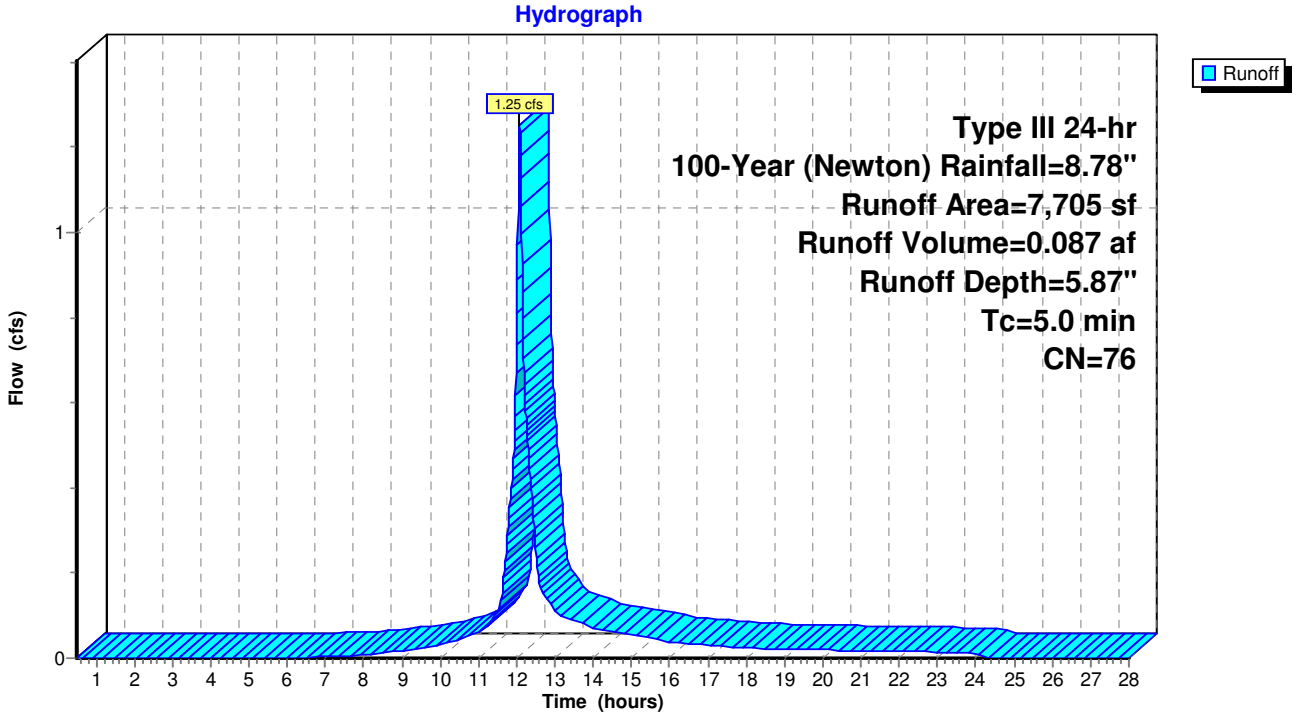
Runoff = 1.25 cfs @ 12.07 hrs, Volume= 0.087 af, Depth= 5.87"

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 100-Year (Newton) Rainfall=8.78"

	Area (sf)	CN	Description
*	4,013	98	Paved Parking (portion)
*	840	98	Walks
	2,852	39	>75% Grass cover, Good, HSG A
	7,705	76	Weighted Average
	2,852		37.01% Pervious Area
	4,853		62.99% Impervious Area

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

Subcatchment E1: Existing CB-1 & CB-2



Summary for Subcatchment E2: Existing CB-3

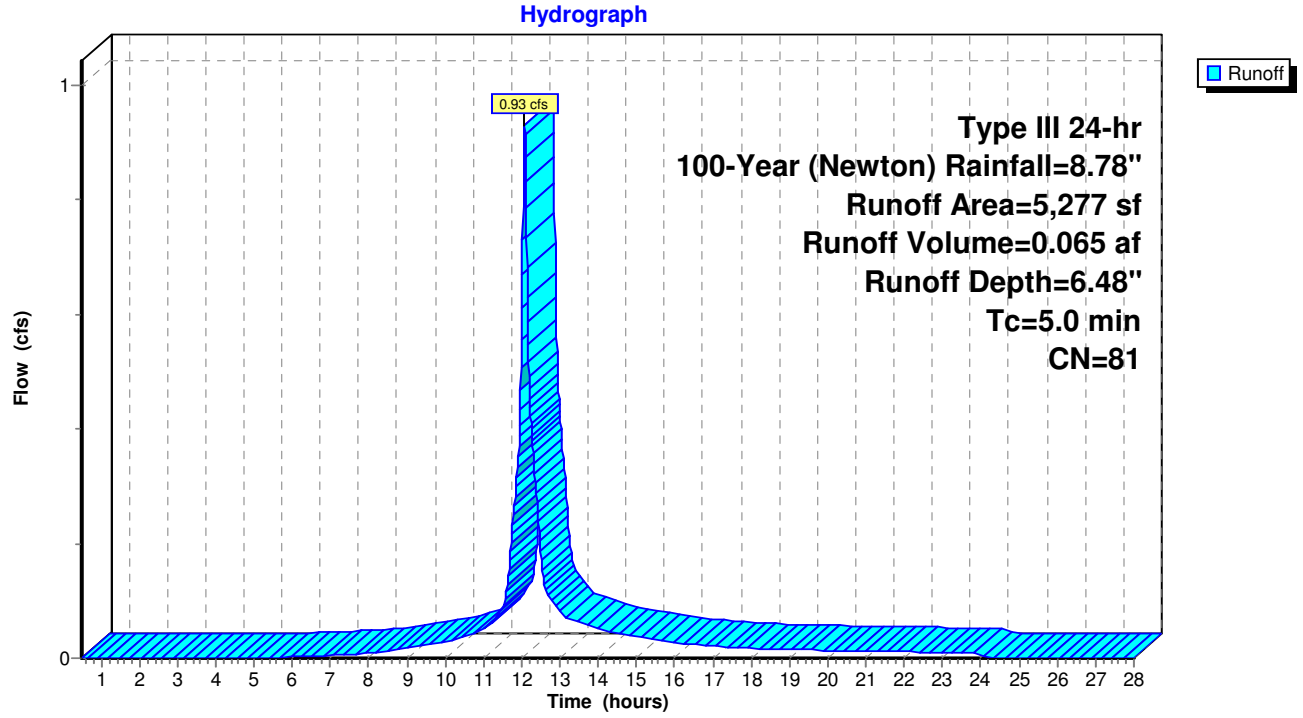
Runoff = 0.93 cfs @ 12.07 hrs, Volume= 0.065 af, Depth= 6.48"

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
*	3,765	98	Paved Parking (portion)
*	27	98	Walks
	1,485	39	>75% Grass cover, Good, HSG A
	5,277	81	Weighted Average
	1,485		28.14% Pervious Area
	3,792		71.86% Impervious Area

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

Subcatchment E2: Existing CB-3



Summary for Subcatchment PD1: Driveway-1

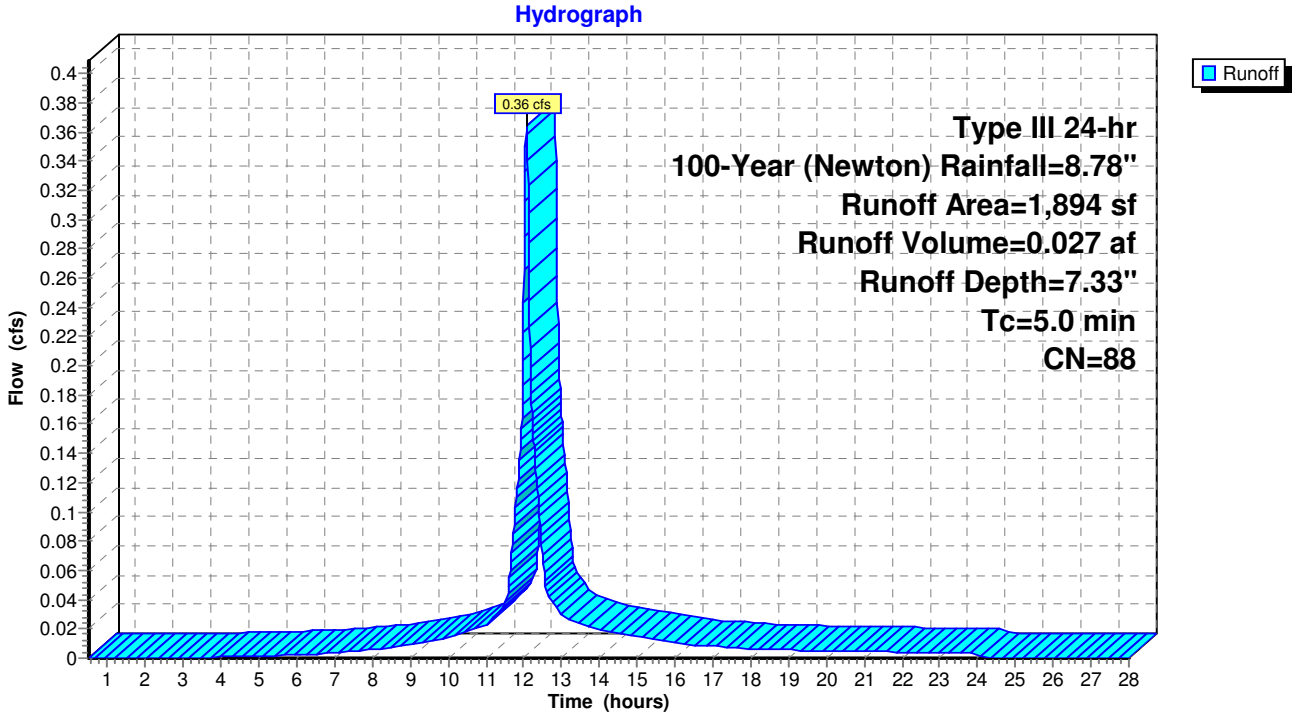
Runoff = 0.36 cfs @ 12.07 hrs, Volume= 0.027 af, Depth= 7.33"

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
*	526	98	Prop. Driveway (portion)
*	1,057	98	Walks
	311	39	>75% Grass cover, Good, HSG A
	1,894	88	Weighted Average
	311		16.42% Pervious Area
	1,583		83.58% Impervious Area

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

Subcatchment PD1: Driveway-1



Summary for Subcatchment PD2: Driveway-2

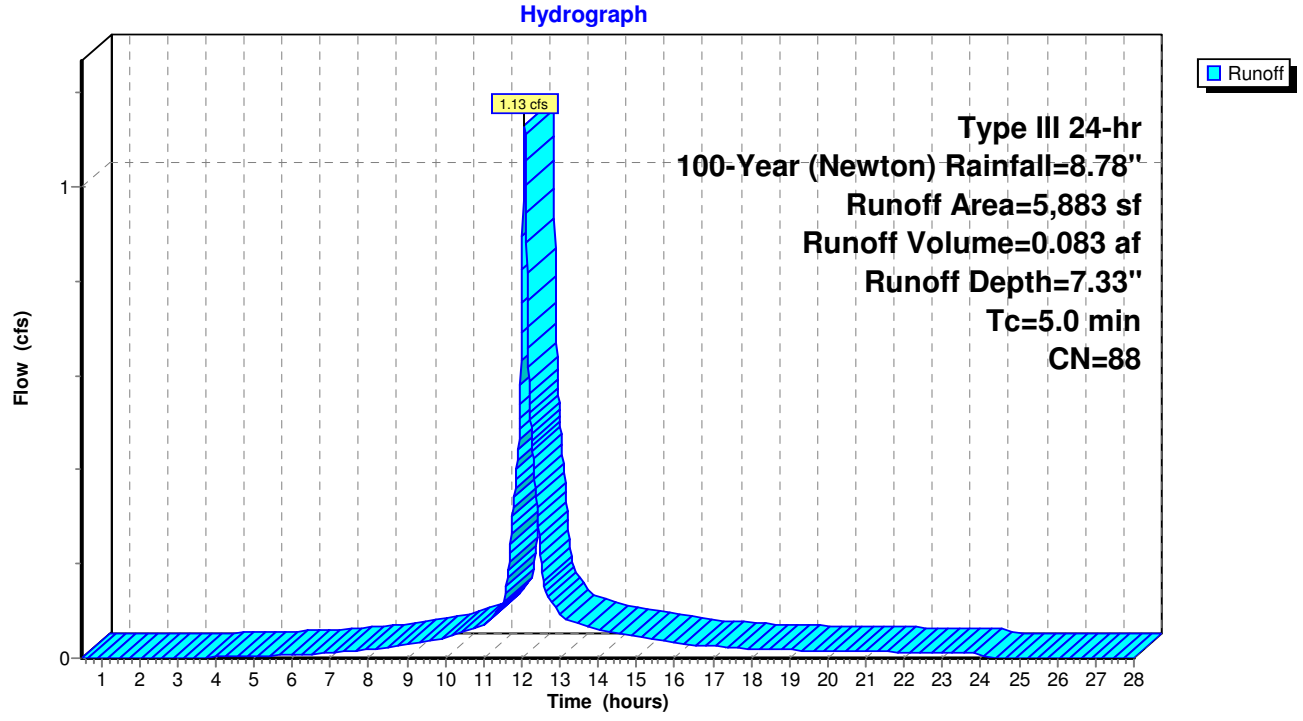
Runoff = 1.13 cfs @ 12.07 hrs, Volume= 0.083 af, Depth= 7.33"

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
*	4,289	98	Prop. Driveway (portion)
*	588	98	Walk
	1,006	39	>75% Grass cover, Good, HSG A
	5,883	88	Weighted Average
	1,006		17.10% Pervious Area
	4,877		82.90% Impervious Area

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

Subcatchment PD2: Driveway-2



Summary for Subcatchment PD3: Driveway-3

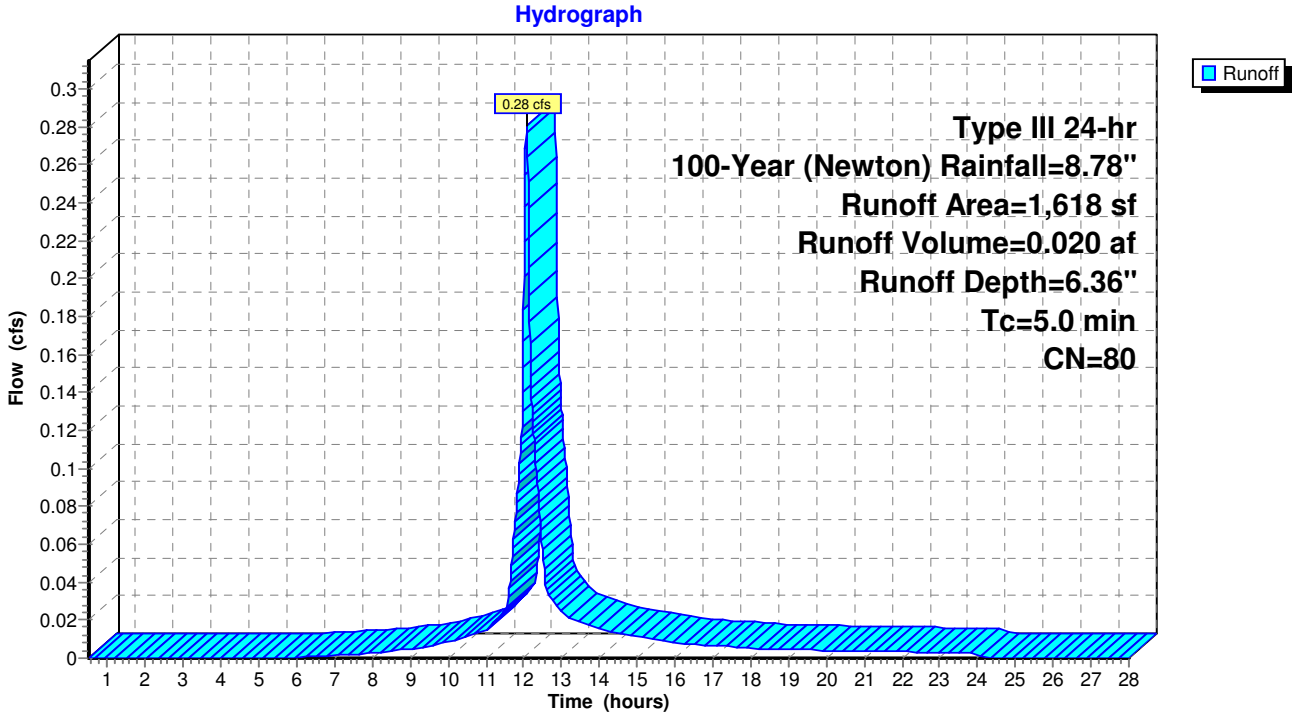
Runoff = 0.28 cfs @ 12.07 hrs, Volume= 0.020 af, Depth= 6.36"

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
*	448	98	Prop. Driveway (portion)
*	687	98	Walk
	483	39	>75% Grass cover, Good, HSG A
	1,618	80	Weighted Average
	483		29.85% Pervious Area
	1,135		70.15% Impervious Area

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

Subcatchment PD3: Driveway-3



Summary for Subcatchment PR: Prop. Roof

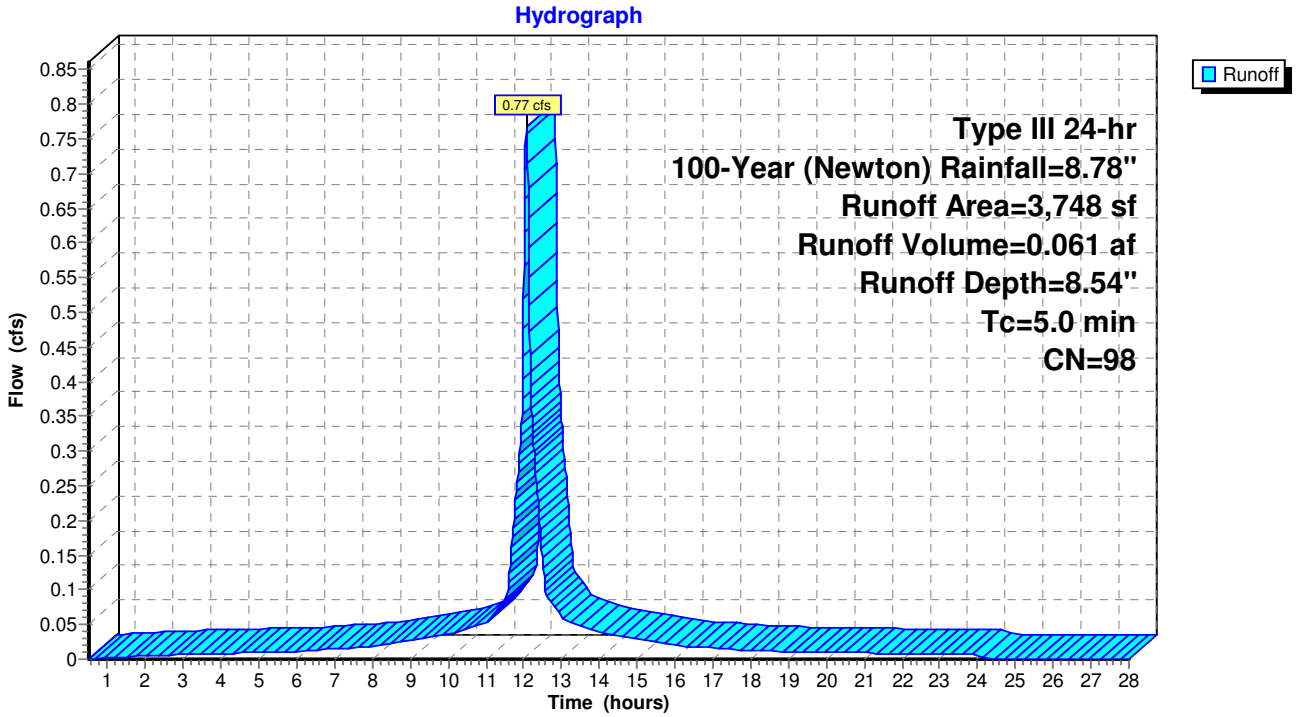
Runoff = 0.77 cfs @ 12.07 hrs, Volume= 0.061 af, Depth= 8.54"

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
*	3,748	98	Prop. Roof (Addition)
	3,748		100.00% Impervious Area

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

Subcatchment PR: Prop. Roof

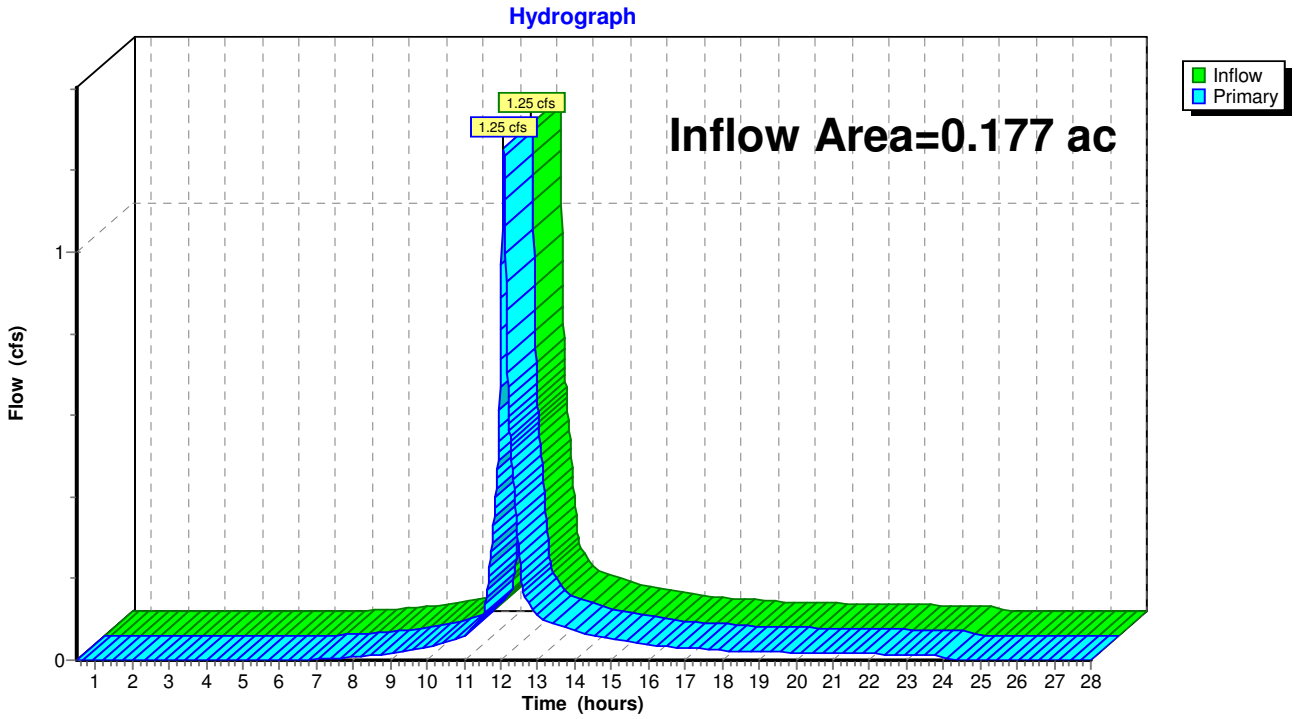


Summary for Pond ECB: Ex. CB-1 & 2

Inflow Area = 0.177 ac, 62.99% Impervious, Inflow Depth = 5.87" for 100-Year (Newton) event
Inflow = 1.25 cfs @ 12.07 hrs, Volume= 0.087 af
Primary = 1.25 cfs @ 12.07 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs

Pond ECB: Ex. CB-1 & 2

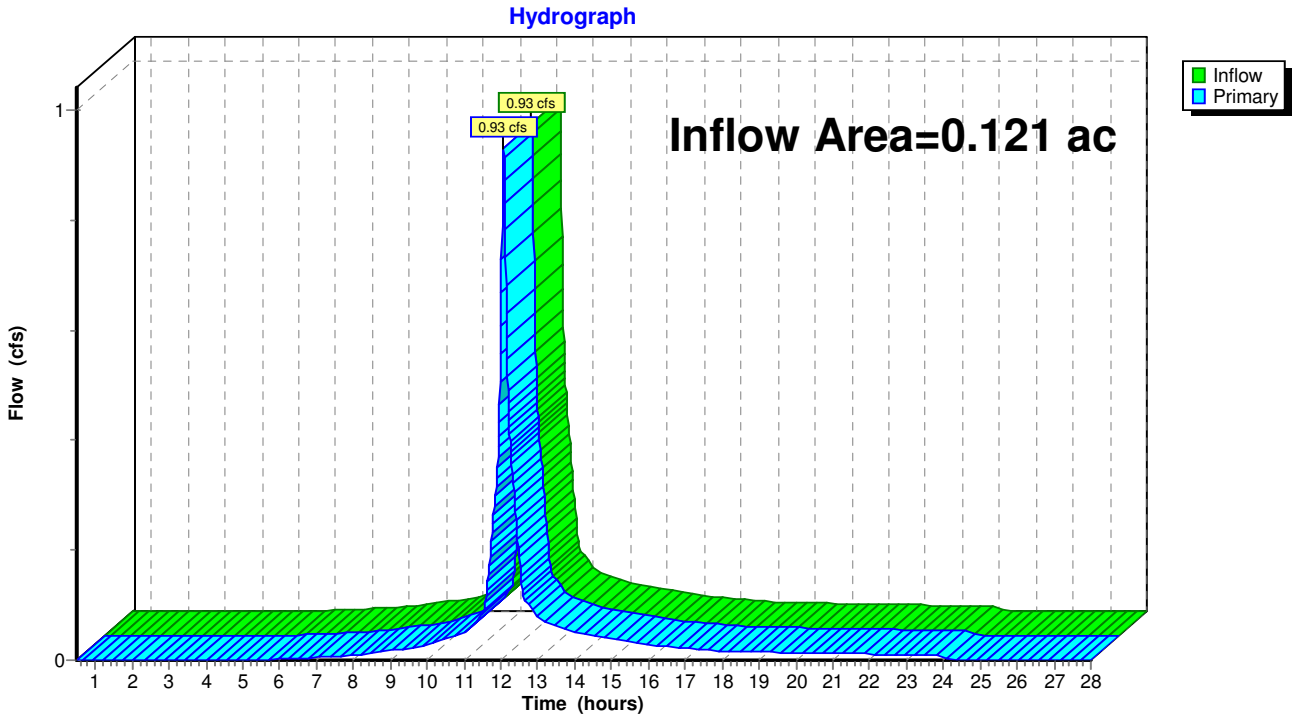


Summary for Pond ECB.: Ex. CB-3

Inflow Area = 0.121 ac, 71.86% Impervious, Inflow Depth = 6.48" for 100-Year (Newton) event
Inflow = 0.93 cfs @ 12.07 hrs, Volume= 0.065 af
Primary = 0.93 cfs @ 12.07 hrs, Volume= 0.065 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs

Pond ECB.: Ex. CB-3



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

Inflow Area = 0.043 ac, 83.58% Impervious, Inflow Depth = 7.33" for 100-Year (Newton) event
Inflow = 0.36 cfs @ 12.07 hrs, Volume= 0.027 af
Outflow = 0.03 cfs @ 11.28 hrs, Volume= 0.027 af, Atten= 92%, Lag= 0.0 min
Discarded = 0.03 cfs @ 11.28 hrs, Volume= 0.027 af

Routing by Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 67.20' @ 13.05 hrs Surf.Area= 0.005 ac Storage= 0.010 af

Plug-Flow detention time= 120.2 min calculated for 0.027 af (100% of inflow)
Center-of-Mass det. time= 120.1 min (898.4 - 778.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	62.75'	0.006 af	**8.50'W x 24.00'L x 5.25'H Field A** 0.025 af Overall - 0.007 af Embedded = 0.017 af x 35.0% Voids
#2A	63.75'	0.005 af	**Galley 4x4x4.25** x 5 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
		0.011 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	62.75'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.03 cfs @ 11.28 hrs HW=62.80' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

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

Chamber Model = 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

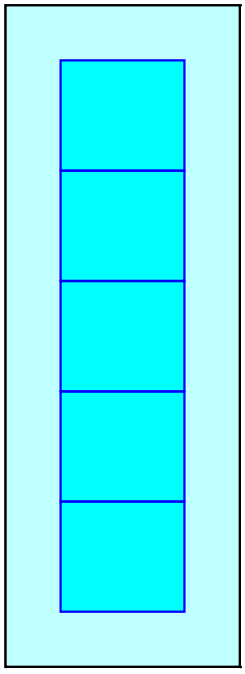
5 Chambers/Row x 4.00' Long = 20.00' Row Length +24.0" End Stone x 2 = 24.00' Base Length
1 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 8.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

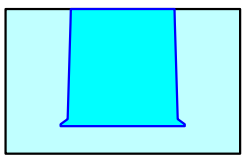
5 Chambers x 46.4 cf = 231.9 cf Chamber Storage
5 Chambers x 62.3 cf = 311.7 cf Displacement

1,071.0 cf Field - 311.7 cf Chambers = 759.3 cf Stone x 35.0% Voids = 265.8 cf Stone Storage

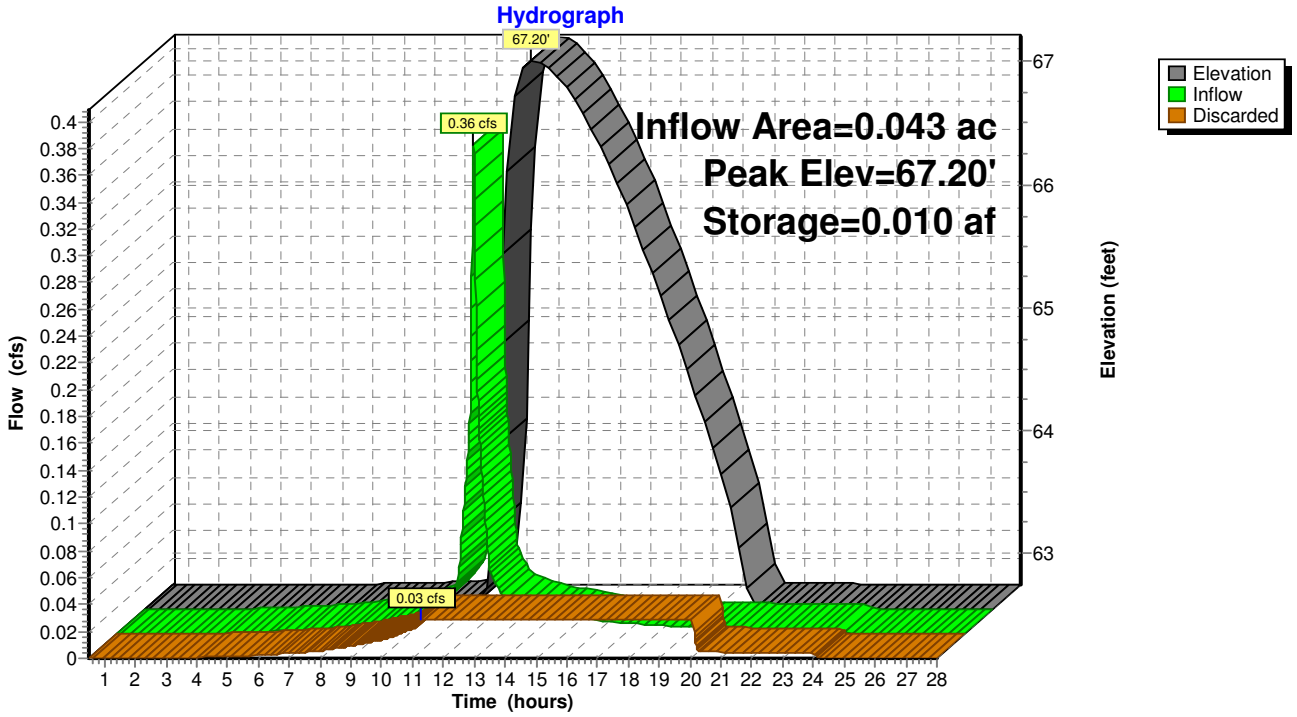
Chamber Storage + Stone Storage = 497.7 cf = 0.011 af
Overall Storage Efficiency = 46.5%
Overall System Size = 24.00' x 8.50' x 5.25'

5 Chambers
39.7 cy Field
28.1 cy Stone





Pond INF-1: Inf. System #1 Galleys



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

Inflow Area = 0.258 ac, 86.76% Impervious, Inflow Depth = 7.59" for 100-Year (Newton) event
Inflow = 2.18 cfs @ 12.07 hrs, Volume= 0.163 af
Outflow = 0.15 cfs @ 11.12 hrs, Volume= 0.163 af, Atten= 93%, Lag= 0.0 min
Discarded = 0.15 cfs @ 11.12 hrs, Volume= 0.163 af

Routing by Stor-Ind method, Time Span= 0.50-28.00 hrs, dt= 0.01 hrs
Peak Elev= 66.92' @ 13.39 hrs Surf.Area= 0.024 ac Storage= 0.065 af

Plug-Flow detention time= 152.0 min calculated for 0.163 af (100% of inflow)
Center-of-Mass det. time= 152.0 min (918.0 - 766.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	62.25'	0.023 af	**17.50'W x 60.00'L x 5.25'H Field A** 0.127 af Overall - 0.060 af Embedded = 0.066 af x 35.0% Voids
#2A	63.25'	0.045 af	**Galley 4x4x4.25** x 42 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 3 Rows of 14 Chambers
		0.068 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	62.25'	**6.000 in/hr Exfiltration over Surface area** Phase-In= 0.01'

Discarded OutFlow Max=0.15 cfs @ 11.12 hrs HW=62.30' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

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

Chamber Model = 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

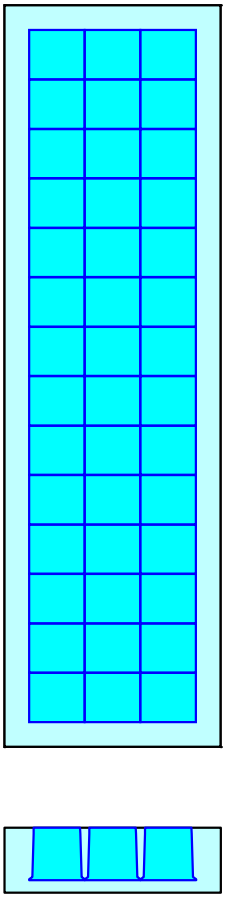
14 Chambers/Row x 4.00' Long = 56.00' Row Length +24.0" End Stone x 2 = 60.00' Base Length
3 Rows x 54.0" Wide + 24.0" Side Stone x 2 = 17.50' Base Width
12.0" Base + 51.0" Chamber Height = 5.25' Field Height

42 Chambers x 46.4 cf = 1,948.0 cf Chamber Storage
42 Chambers x 62.3 cf = 2,617.9 cf Displacement

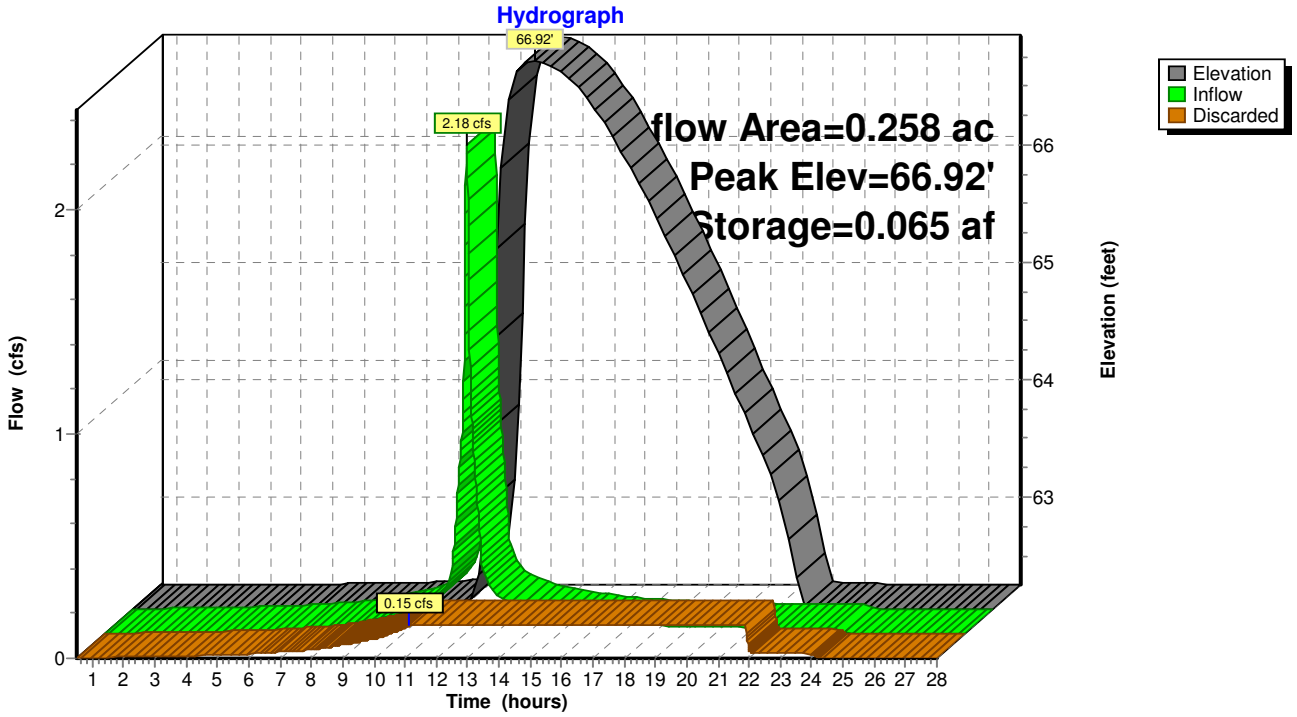
5,512.5 cf Field - 2,617.9 cf Chambers = 2,894.6 cf Stone x 35.0% Voids = 1,013.1 cf Stone Storage

Chamber Storage + Stone Storage = 2,961.1 cf = 0.068 af
Overall Storage Efficiency = 53.7%
Overall System Size = 60.00' x 17.50' x 5.25'

42 Chambers
204.2 cy Field
107.2 cy Stone



Pond INF-2: Inf. System #2 Galleys



OPERATION & MAINTENANCE PLAN
#17-31 HERRICK ROAD
(PARCEL A)
NEWTON, MASSACHUSETTS

AUGUST 30, 2018

VTP Associates, Inc.
132 Adams Street
2nd Floor, Suite 3
Newton Massachusetts 02465
1-617-332-8271
Job # 201224

OPERATION & MAINTENANCE PLAN
#17-31 HERRICK ROAD
(PARCEL A)
NEWTON, MASSACHUSETTS

The proposed project includes stormwater runoff controls associated with the redevelopment of the existing site into a new residential development that will require continued maintenance by the property owner. The major components associated with maintenance needs are the catch basins, trench drain, drain manholes, and infiltration systems. These will need to be cleaned periodically as noted below. Cleaning of these structures shall be done by the developer & property owners via a specialty contractor with hydraulic cleaning ability. In addition to the facilities noted below, the property owner should maintain any roof gutters/drains on a regular basis to prevent clogging and carry over of debris into the driveway system. The property owner should also provide for the periodic cleaning of the driveway areas to remove large debris, grass cuttings and sand particles prior to discharge through the catch basin units. The following outlines the major maintenance issues associated with the project:

Catch basin/Drain Manhole with Sump Cleaning:

The catch basin/Drain Manhole structures should be inspected after completion of construction to assure that all debris was removed and no construction material will be cause the system to clog. This inspection should also include the drain manholes & drain lines within the system.

The catch basin sumps should be inspect quarterly; if depth of sediment in sumps exceeds 50% capacity, sediment must be removed. The catch basin should be cleaned with a hydraulic vacuum system two (2) times per year (spring and fall season) to remove accumulated solids and debris. At the same time, the drain lines should be inspected and cleaned if needed. Assuming the catch basin, drain manholes and drain lines are maintained and cleaning is in accordance with normal standards, the solids removal efficiency should be as required to prevent carry over of large solids to the infiltration systems.

Trench/Area Drain Cleaning:

The trench drain structure should be inspected after completion of construction to assure that all debris was removed and no construction material will be cause the system to clog. This inspection should also include the drain manholes & drain lines within the system.

The trench drain should be cleaned once per year to remove accumulated solids and debris. At the same time, the drain manholes & lines should be inspected and cleaned if needed. Assuming the trench drain and the drain manholes & lines are maintained and cleaning is in accordance with normal standards, the solids removal

efficiency should be as required to prevent carry over of large solids to the infiltration systems.

Storage / Infiltration System

The storage/infiltration system should be inspected after completion of construction to assure that all debris was removed and no construction material will be cause the system to clog.

The storage/infiltration system should be inspected over the first year of operation on a quarterly basis to determine the level of required maintenance. This inspection should be performed by the Owner's Engineer and a report issued to the City as to any cleaning / maintenance needs of that system. At the same time, the inspection of the catch basins and piping should be performed to determine any flushing / cleaning needs. As a preliminary schedule, the system piping should be cleaned once a year to remove accumulated sediments and sediments in the infiltration chambers should be removed when they reach two (2) inches in depth.

Maintenance Responsibilities

The maintenance of the Drainage System is the responsibility of the Property Owner(s), via their owners association. The actual work should be subcontracted to a company that specializes in the cleaning of storm drainage facilities. Inspections should be performed by independent individual such as the design engineer or other experienced individual in the field.

OPERATION & MAINTENANCE PLAN
#17-31 HERRICK ROAD
NEWTON, MASSACHUSETTS

INSPECTION REPORT:

Inspection Firm: _____

Inspectors Name: _____ Date: _____

Components Inspected: _____
_____

Signed: _____

SYSTEM MAINTENANCE:

Maintenance Firm: _____ Date: _____

Catch basins Cleaned: Yes ____ No ____ Comments _____
_____
_____

Drain lines & Manholes Inspected: Yes ____ No ____ Comments: _____
_____
_____

Trench Drain Cleaned: Yes ____ No ____ Comments _____
_____
_____

Infiltration System(s) Cleaned: Yes ____ No ____ Comments: _____
_____
_____

Estimate of Material Removed: _____

Other Comments: _____
_____

Signed: _____