

December 17, 2014

Town of Reading  
Engineering Division  
16 Lowell Street  
Reading, MA 01867

**Re: 186-190 Summer Avenue, Reading  
Drainage Design**

This drainage study is being conducted at the above property for a proposed addition, construction of a parking lot, concrete walkways, and site amenities.

Soil testing was conducted on-site on October 27, 2014 and was witnessed by the Town of Reading Engineering Department. The testholes results showed the site was highly suitable for drainage recharge (Class A soils) with a seasonal groundwater table approximately eight (8) below grade.. The Rawls rate method was used as a conservative approach to sizing the drainage BMP.

The subject property presently drains into two directions. A small portion of the front yard drains towards Summer Avenue. The majority of the site drains overland towards the rear of the property. An effort has been made to maintain this drainage pattern. A conventional drainage system is proposed consisting of deep sump hooded catchbasins, stormceptors, and two separate infiltration fields consisting of Cultec recharger units. The design meets DEP Stormwater Guidelines in providing a minimum 2-foot separation from the bottom of the crushed stone base material and the seasonal high groundwater table.

A HydroCAD model, using TR-20 methodology, was developed to evaluate the pre-development and post-development site conditions. The peak rates of stormwater runoff and volume of stormwater runoff directed towards Summer Avenue is equal in the predevelopment and postdevelopment scenario. The peak rate of stormwater runoff and volume of stormwater runoff was reduced for the 2 yr, 10 yr, 25 yr, and 100 yr storm event for the design point at the rear of the property. The following is a tabular summary of the peak rate of runoff for various storm events to the rear of the property.

	Predevelopment (cfs)	Postdevelopment (cfs)
2 Year	0.02	0.00
10 Year	0.44	0.11
25 Year	0.92	0.23
100 Year	1.69	0.54

Attached are the HydroCAD summaries for the Predevelopment and Postdevelopment scenario. For each analysis a watershed map has been provided to show the subcatchment area(s) evaluated.

Very Truly Yours,

John (Jack) D. Sullivan III, PE

## **Post-Construction Stormwater Maintenance Plan**

Beginning with the construction of the drainage system, and continuing in perpetuity thereafter, the owner(s) of the site shall maintain in accordance with the following schedule:

- a. Parking Lot sweeping and snow plowing – Pavement and walkways shall be swept in the early spring immediately after snow melt and at least twice other times annually. Snow shall be plowed onto the snow stockpile area shown on the design plans to encourage infiltration during subsequent thawing periods. Sediments shall be removed from snow storage areas in the early spring.
- b. Paving and curbing – Paving and curbing shall be maintained in good condition to channel surface runoff into the deep sump hooded catchbasins.
- c. Roof drain inlets, downspouts, and roof drain pipes - All components of the roof drain collection system shall be inspected at least 2 times per year. Sediments and debris shall be removed and disposed of in accordance with all applicable federal, state, and local laws. Any components that become damaged shall be repaired or replaced immediately upon discovery to assure proper conveyance of stormwater runoff into the subsurface infiltration system.
- d. Vegetation shall be maintained in healthy condition to prevent erosion and sedimentation in the drainage collection system.
- e. Infiltration chambers – The level of water in the infiltration chambers shall be monitored during and after heavy rain storms at least 2 times per year during the first year of operation and at least twice annually thereafter for evidence of clogging or other problems. If water does not leave the chambers within 72 hours after the storm, or if water breaks out on the surface above the system, or if the roof collection system begins to overflow frequently (for the 10 year storm intensity or less intense storms), the infiltration bed is likely clogged. The infiltration bed shall be cleaned and repaired or replaced as needed to maintain proper functioning.
- f. The catchbasin sumps shall be inspected at least 2 times per year. Sediments and debris shall be removed and disposed of in accordance with all applicable federal, state, and local laws.
- g. The stormceptors shall be inspected at least 2 times per year. Maintenance to the stormceptor unit shall be in accordance with the manufacturer's guidance.

Responsible Party:

Criterion Child Enrichment  
375 Fortune Blvd  
Milford, MA  
508-478-7752

***The Annual Stormwater Report (and repair information if performed) shall be submitted to the Town of Reading Engineering Department by January 15<sup>th</sup> of each calendar year.***

**INSTRUCTIONS:**

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

Version 1, Automated: Mar. 4, 2008

Location: 186 Summer Avenue

	B	C	D	E	F
	BMP <sup>1</sup>	TSS Removal Rate <sup>1</sup>	Starting TSS Load*	Amount Removed (C*D)	Remaining Load (D-E)
<b>TSS Removal Calculation Worksheet</b>	Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
	Subsurface Infiltration Structure	0.80	0.75	0.60	0.15
	Oil Grit Separator	0.25	0.15	0.04	0.11
		0.00	0.11	0.00	0.11
		0.00	0.11	0.00	0.11

**Total TSS Removal =** 89%

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

Project:   
 Prepared By: JDS  
 Date: 12/17/2014

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

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

# STORMWATER QUALITY WORKSHEET

## Stormwater Management Standard #3

<b>Project:</b> 186 Summer Avenue	<b>Calc By:</b> JDS
<b>Date:</b> 17-Dec-14	<b>Client:</b> Criterion

**SECTION 1: Water Quality Volume Calculation:**

REQUIRED:

Impervious Area:  

$$26,499 \text{ S.F.} = 0.61 \text{ Acres}$$

Volume Required:  

$$26,499 \text{ S.F.} \times 0.5 \text{ Inches} \times \frac{1 \text{ Ft}}{12 \text{ inches}} = 1,104 \text{ C.F.}$$

PROPOSED:

Field #2 (Infiltrators)  
 100 Year Storm  

$$= 1,729 \text{ C.F.}$$

SO	1,729 C.F.	>	1,104 C.F.
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**SECTION 2: Recharge Volume Calculations**

REQUIRED:

Total Impervious Area:  

$$26,499 \text{ S.F.} = 0.61 \text{ Acres}$$

		Vol To Recharge (x Imp. Area)
26,499 S.F. Over Soil Type "A" material	=	0.40 Inches of Runoff
S.F. Over Soil Type "B" material	=	0.25 Inches of Runoff
S.F. Over Soil Type "C" material	=	0.10 Inches of Runoff
S.F. Over Soil Type "D" material	=	0.00 Inches of Runoff

Recharge Voulume:

$$26,499 \text{ s.f.} \times 0.40 \times \frac{1 \text{ Ft}}{12 \text{ inches}} \text{ (Class A Soil)} = 883 \text{ C.F.}$$

Field #2	6,795 C.F.	>	883 C.F.
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**NOTES:**

1. THE TOPOGRAPHY, SITE DETAIL & SURFACE IMPROVEMENTS DEPICTED HEREON WERE OBTAINED FROM A PARTIAL FIELD SURVEY CONDUCTED ON JUNE 28, 2014 BY SULLIVAN ENGINEERING GROUP, LLC.
2. THE LOCUS PROPERTY DEPICTED IS LOCATED IN ZONING DISTRICT S15.
3. THE LOCUS PROPERTY IS DEPICTED AS LOT 294-296 ON THE TOWN OF READING ASSESSOR'S MAP 15.
4. THE LOCATION OF ALL UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE AND ARE BASED UPON A PARTIAL FIELD SURVEY AND COMPILATION OF PLANS OF RECORD. THE DESIGN ENGINEER DOES NOT WARRANT NOR GUARANTEE THE LOCATION OF ALL UTILITIES DEPICTED OR NOT DEPICTED. THE CONTRACTOR, PRIOR TO COMMENCEMENT OF CONSTRUCTION, SHALL VERIFY THE LOCATION OF ALL UTILITIES AND CONTACT DIG SAFE AT 1-888-344-7233.
5. THIS PLAN DOES NOT SHOW ANY UNRECORDED OR UNWRITTEN EASEMENTS WHICH MAY EXIST. A REASONABLE AND DILIGENT ATTEMPT HAS BEEN MADE TO OBSERVE ANY APPARENT, VISIBLE USES OF THE LAND; HOWEVER, THIS DOES NOT CONSTITUTE A GUARANTEE THAT NO SUCH EASEMENTS EXIST.
6. THE ELEVATIONS DEPICTED HEREON WERE BASED UPON AN ASSUMED DATUM.
7. THE LOCUS PROPERTY IS NOT LOCATED WITHIN A FLOOD ZONE AS DEPICTED ON THE LATEST FLOOD INSURANCE RATE MAP.

THE LOCATION OF ALL UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE AND ARE BASED UPON A PARTIAL FIELD SURVEY AND COMPILATION OF PLANS OF RECORD. THE DESIGN ENGINEER DOES NOT WARRANT NOR GUARANTEE THE LOCATION OF ALL UTILITIES DEPICTED OR NOT DEPICTED. THE CONTRACTOR, PRIOR TO COMMENCEMENT OF CONSTRUCTION, SHALL VERIFY THE LOCATION OF ALL UTILITIES AND CONTACT DIG SAFE AT 1-888-344-7233.

ALL UNDERGROUND UTILITY DATA REPRESENTS RECORD INFORMATION RECOVERED THROUGH RESEARCH WITHOUT SURFACE DEMARICATION NOR SUBSURFACE VERIFICATION.

**TEMPORARY BENCHMARK CHART:**

TBM #	DESCRIPTION	ELEV.
△	SEWER MANHOLE RIM	99.53'

**SOILS INFORMATION:**

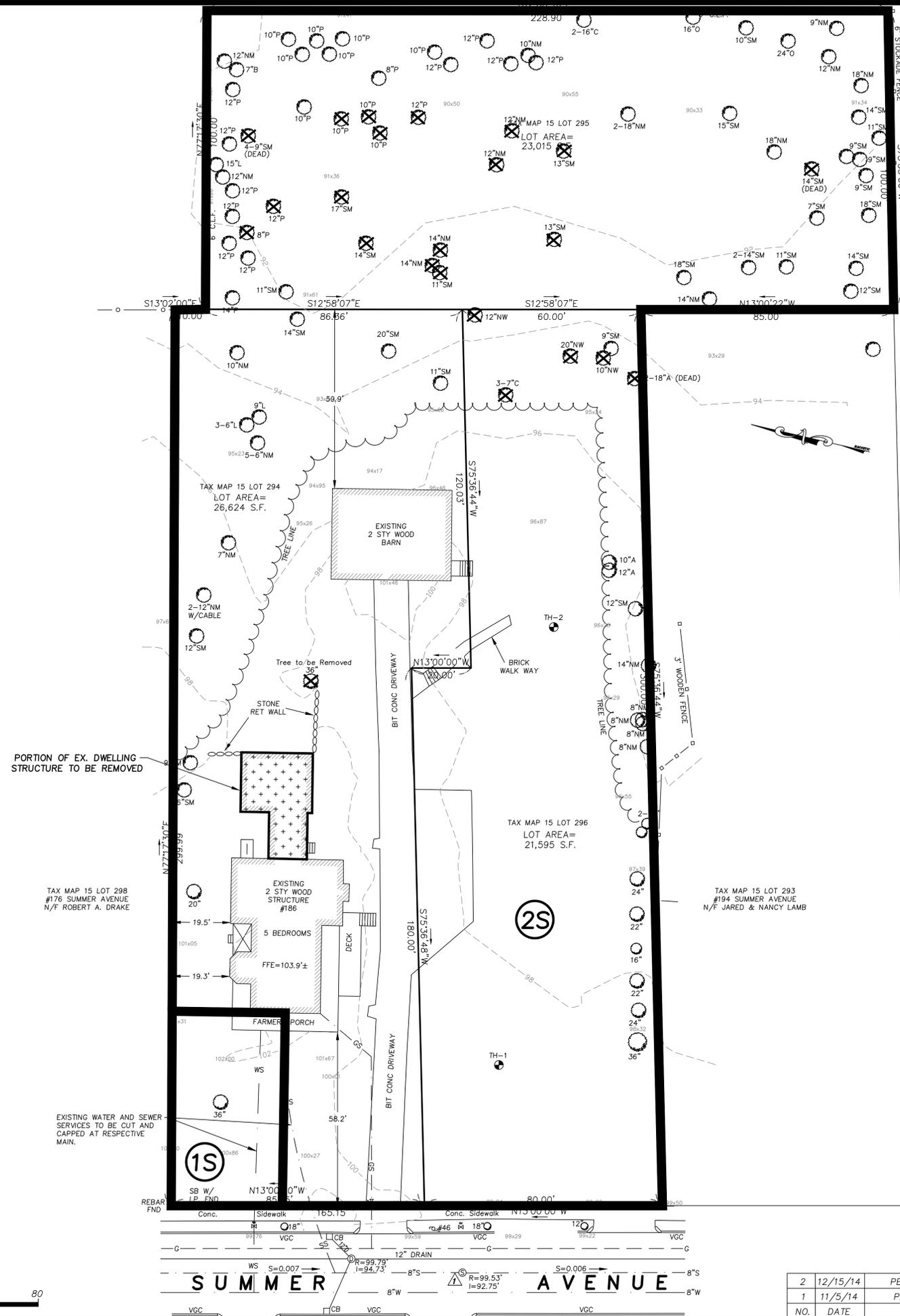
TEST PIT WAS PERFORMED BY JOHN D. SULLIVAN III, P.E. ON 10/27/14 & WITNESSED BY CHRIS COLE OF THE TOWN OF READING ENGINEERING DIVISION

TEST PIT: TH-1  
ELEV.=98.6'  
MOTTLING @ NONE  
0"-8" HORIZON A<sub>1</sub>: SANDY LOAM 10 YR 3/3  
8"-26" HORIZON B<sub>1</sub>: SANDY LOAM 10 YR 6/8  
26"-42" C1-LAYER: FINE SAND 2.5 Y 6/4  
42"-108" C2-LAYER: COARSE SAND 20% STONE, 2.5 Y 6/3  
SOIL DAMP @ 94" (ELEV=90.7')

**SOILS INFORMATION:**

TEST PIT WAS PERFORMED BY JOHN D. SULLIVAN III, P.E. ON 10/27/14 & WITNESSED BY CHRIS COLE OF THE TOWN OF READING ENGINEERING DIVISION

TEST PIT: TH-2  
ELEV.=97.0'  
MOTTLING @ NONE, NO GROUNDWATER OBSERVED  
0"-8" HORIZON A<sub>1</sub>: SANDY LOAM 10 YR 3/3  
8"-28" HORIZON B<sub>1</sub>: SANDY LOAM 10 YR 6/8  
28"-42" C1-LAYER: FINE SAND 2.5 Y 6/4  
42"-96" C2-LAYER: LOAMY SAND 10% STONE, 2 Y 6/6



**READING COMMUNITY PLANNING & DEVELOPMENT COMMISSION**

**LEGEND:**

- 248— TWO FOOT CONTOUR
- 92X00 EX. SPOT GRADE
- UP ○ UTILITY POLE
- ⊙ SEWER MANHOLE
- S— SEWER MAIN
- W— COMPILED WATER MAIN
- G— COMPILED GAS MAIN
- ⊙ DRAIN MANHOLE
- D— DRAIN LINE
- BIT. BITUMINOUS
- CONC. CONCRETE
- EOP EDGE OF PAVEMENT
- VGC VERTICAL GRANITE CURB
- FFE FIRST FLOOR
- TREE
- INV. INVERT
- CLF CHAIN LINK FENCE
- ⊗ TREE (TO BE REMOVED)

APPROVED \_\_\_\_\_, 20\_\_

**TREE LABELS:**

- NM NORWAY MAPLE
- SM SUGAR MAPLE
- L LINDEN
- A ASH
- P PINE
- C CHERRY
- O OAK

I, \_\_\_\_\_, TOWN CLERK OF THE TOWN OF READING, MASSACHUSETTS HEREBY CERTIFY THAT THE NOTICE OF APPROVAL OF THIS PLAN BY THE READING COMMUNITY PLANNING & DEVELOPMENT HAS BEEN RECEIVED AND RECORDED AT THIS OFFICE AND NO NOTICE OF APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER SUCH RECEIPT AND RECORDING OF SAID NOTICE.

TOWN CLERK DATE

I CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE AND BELIEF, THIS PLAN IS TRUE AND CORRECT TO THE ACCURACY REQUIRED BY THE SUBDIVISION REGULATIONS AND PROCEDURAL RULES OF THE PLANNING BOARD OF THE TOWN OF READING.

JOHN D. SULLIVAN III, P.E. DATE

**RECORD OWNER:** DEBRA A. STACKPOLE, 186 SUMMER AVENUE, READING, MA 01867, DEED BOOK 25168, PAGE No. 44  
**ZONING INFORMATION:** ZONING DISTRICT: S15, EXISTING USE: SINGLE FAMILY RESIDENTIAL, MIN. BUILDING SETBACKS: FRONT: 20 FEET, SIDE: 15 FEET, REAR: 20 FEET

**186-190 SUMMER AVENUE**

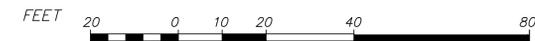
**PREDEVELOPMENT DRAINAGE PLAN**  
LOCATED IN  
**READING, MASSACHUSETTS**  
(MIDDLESEX COUNTY)

PREPARED FOR  
**CRITERION CHILD ENRICHMENT INC.**  
SCALE: 1" = 20' DATE: OCT. 9, 2014

PREPARED BY  
**SULLIVAN ENGINEERING GROUP, LLC**  
22 MOUNT VERNON ROAD  
BOXFORD, MA 01921  
(978) 352-7871

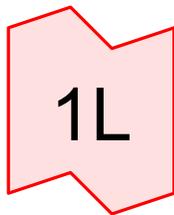
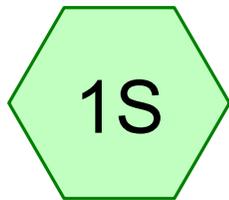
SHEET No. 2 OF 5

GRAPHIC SCALE  
SCALE: 1"=20'



**REVISIONS**

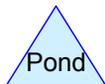
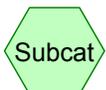
NO.	DATE	DESCRIPTION	BY	CHK'D
2	12/15/14	PER CPDC COMMENTS	JDS	JDS
1	11/5/14	PER DRT COMMENTS	JDS	JDS
		DESCRIPTION	BY	CHK'D



Off-Site (Towards  
Summer Avenue)



To Rear of Property



**Predevelopment**

*Type III 24-hr 2-Year Storm Rainfall=3.20"*

Prepared by Sullivan Engineering Group, LLC

Page 2

HydroCAD® 7.00 s/n 001433 © 1986-2003 Applied Microcomputer Systems

12/17/2014

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

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

**Subcatchment 1S:**

Runoff Area=2,442 sf Runoff Depth=0.12"  
Tc=6.0 min CN=51 Runoff=0.00 cfs 0.001 af

**Subcatchment 2S:**

Runoff Area=68,781 sf Runoff Depth=0.07"  
Tc=6.0 min CN=48 Runoff=0.02 cfs 0.009 af

**Link 1L: Off-Site (Towards Summer Avenue)**

Inflow=0.00 cfs 0.001 af  
Primary=0.00 cfs 0.001 af

**Link 2L: To Rear of Property**

Inflow=0.02 cfs 0.009 af  
Primary=0.02 cfs 0.009 af

**Total Runoff Area = 1.635 ac Runoff Volume = 0.010 af Average Runoff Depth = 0.07"**

# Predevelopment

Prepared by Sullivan Engineering Group, LLC  
HydroCAD® 7.00 s/n 001433 © 1986-2003 Applied Microcomputer Systems

Type III 24-hr 2-Year Storm Rainfall=3.20"

Page 3  
12/17/2014

## Subcatchment 1S:

Runoff = 0.00 cfs @ 12.44 hrs, Volume= 0.001 af, Depth= 0.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-Year Storm Rainfall=3.20"

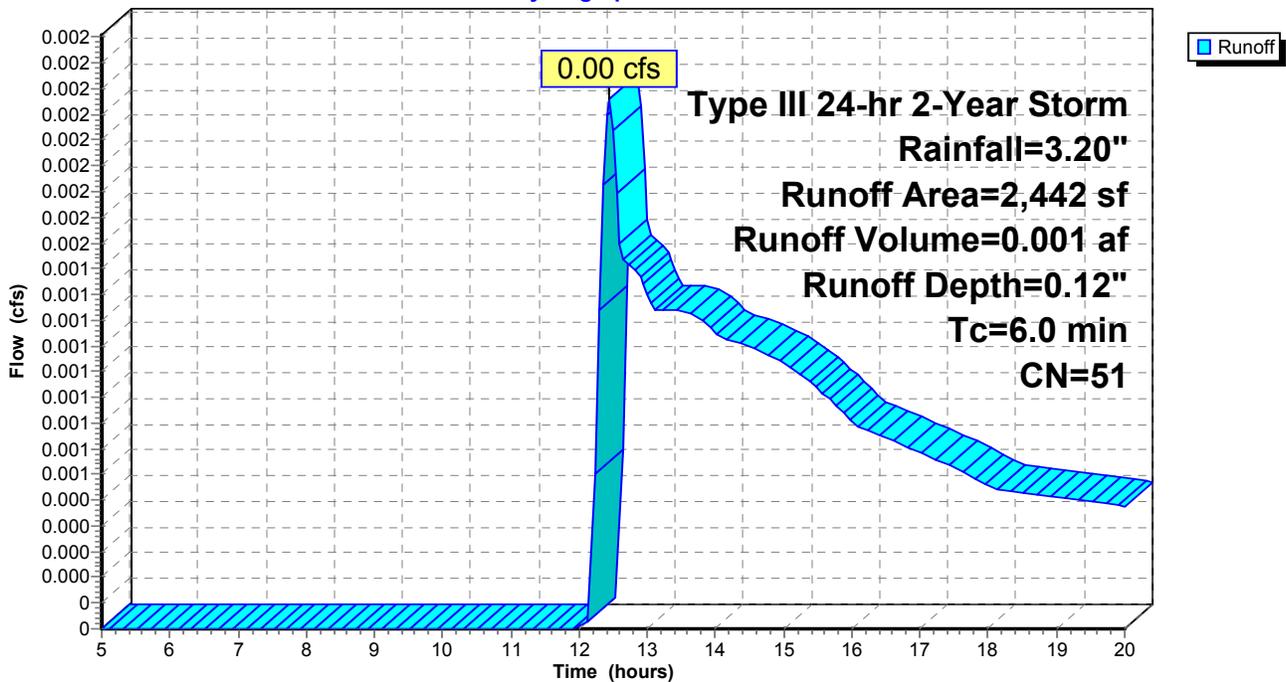
Area (sf)	CN	Description
107	98	Portion of Front Porch Roof
2,335	49	50-75% Grass cover, Fair, HSG A
2,442	51	Weighted Average

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

## Subcatchment 1S:

Hydrograph



**Predevelopment**

Prepared by Sullivan Engineering Group, LLC  
 HydroCAD® 7.00 s/n 001433 © 1986-2003 Applied Microcomputer Systems

Type III 24-hr 2-Year Storm Rainfall=3.20"

Page 4  
 12/17/2014

**Subcatchment 2S:**

Runoff = 0.02 cfs @ 14.56 hrs, Volume= 0.009 af, Depth= 0.07"

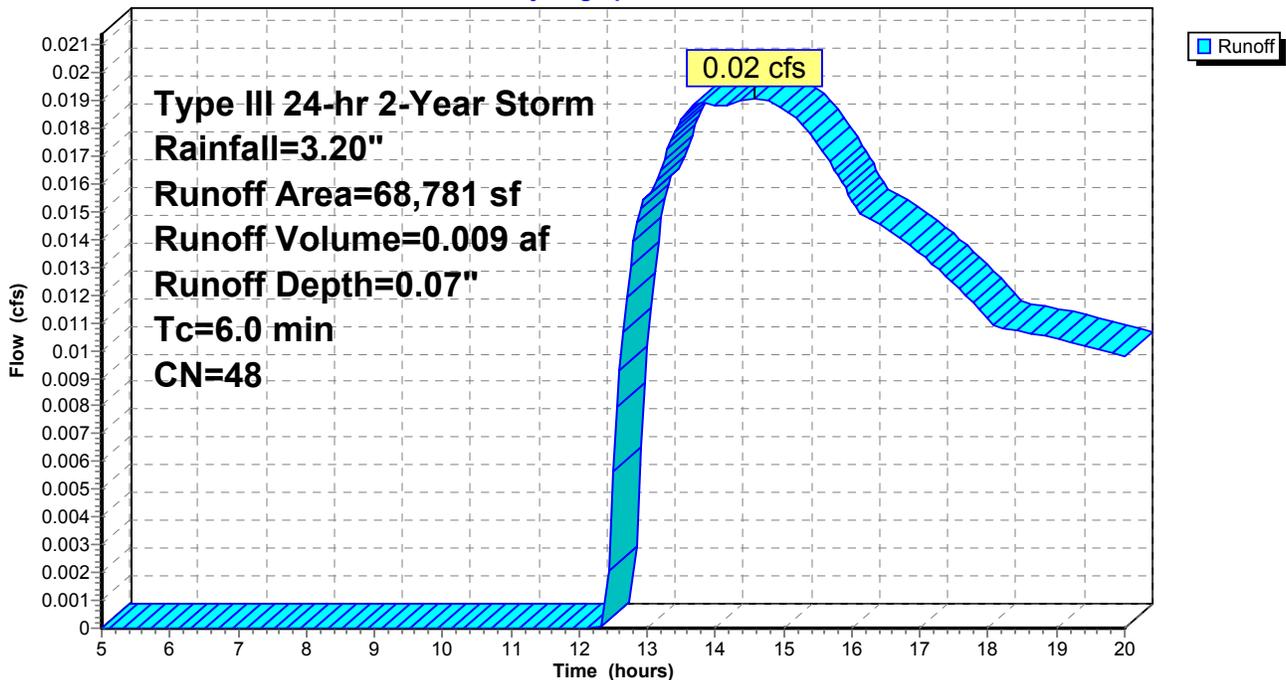
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2-Year Storm Rainfall=3.20"

Area (sf)	CN	Description
2,287	98	Roof Area of House
399	98	Porch Roof Areas
1,223	98	Barn Roof
3,500	98	Bit. Conc. Driveway
25,625	49	50-75% Grass cover, Fair, HSG A
35,747	36	Woods, Fair, HSG A
68,781	48	Weighted Average

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

**Subcatchment 2S:**

Hydrograph



**Predevelopment**

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Type III 24-hr 2-Year Storm Rainfall=3.20"

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12/17/2014

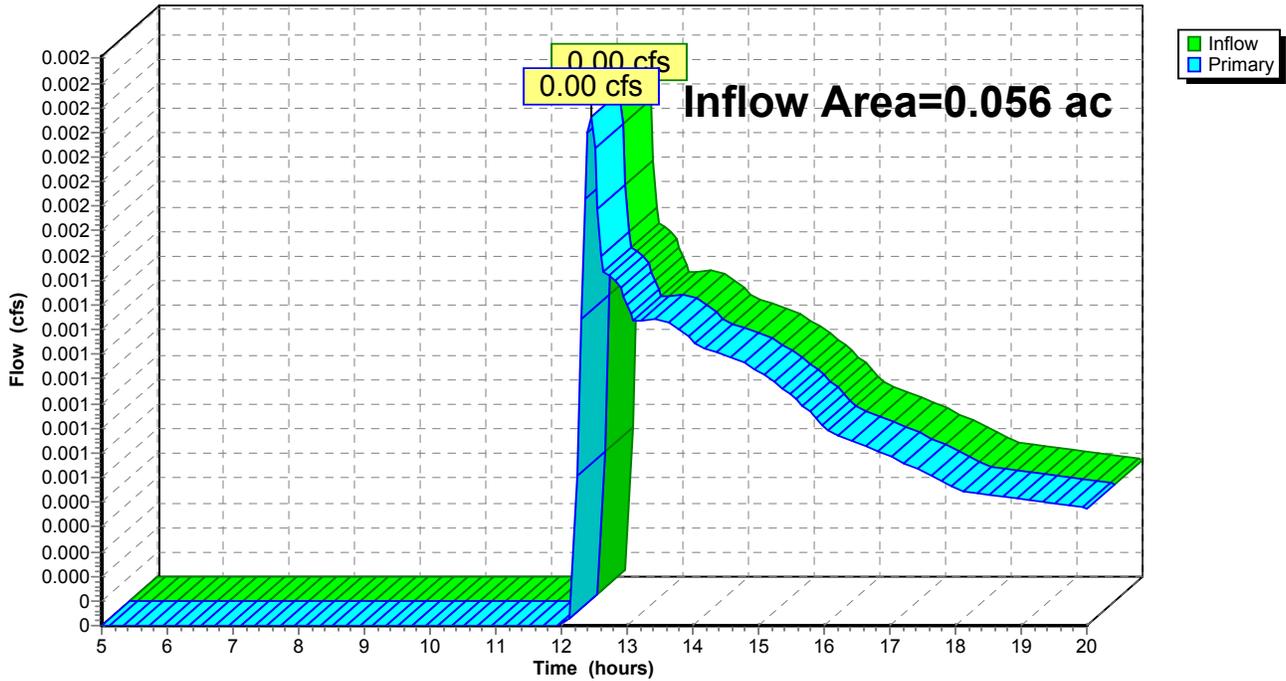
**Link 1L: Off-Site (Towards Summer Avenue)**

Inflow Area = 0.056 ac, Inflow Depth = 0.12" for 2-Year Storm event  
Inflow = 0.00 cfs @ 12.44 hrs, Volume= 0.001 af  
Primary = 0.00 cfs @ 12.44 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Link 1L: Off-Site (Towards Summer Avenue)**

Hydrograph



# Predevelopment

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Type III 24-hr 2-Year Storm Rainfall=3.20"

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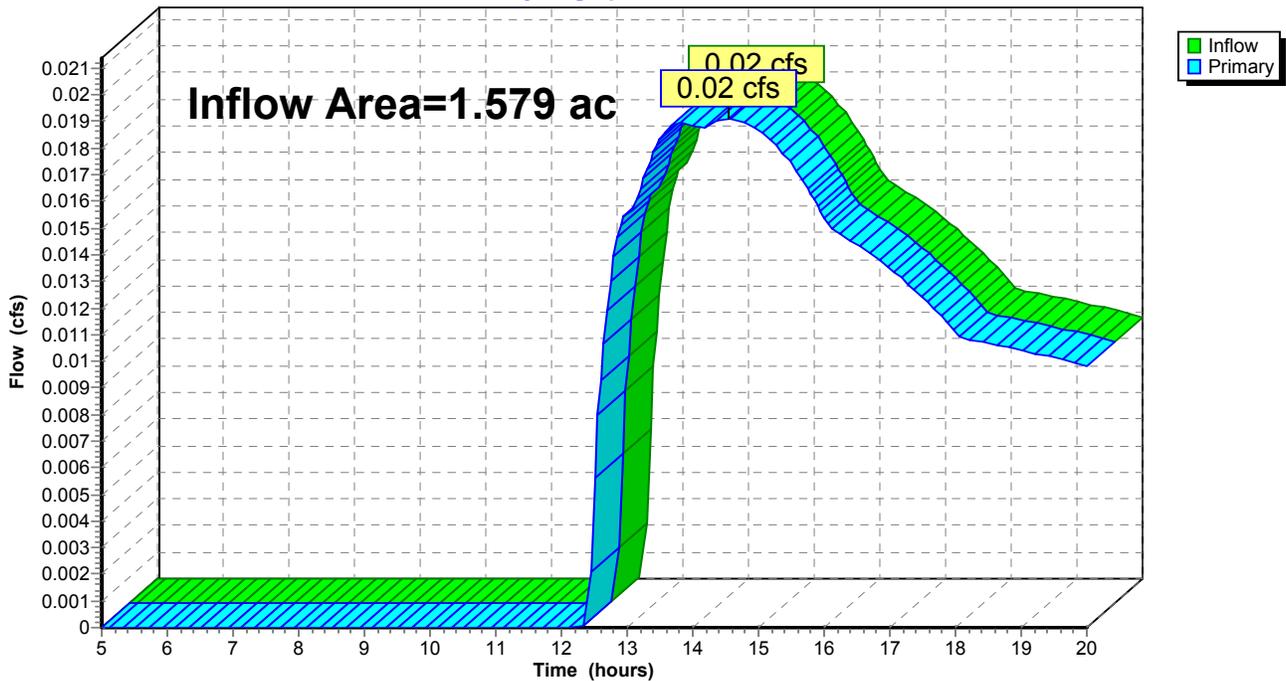
## Link 2L: To Rear of Property

Inflow Area = 1.579 ac, Inflow Depth = 0.07" for 2-Year Storm event  
Inflow = 0.02 cfs @ 14.56 hrs, Volume= 0.009 af  
Primary = 0.02 cfs @ 14.56 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

## Link 2L: To Rear of Property

Hydrograph



**Predevelopment**

*Type III 24-hr 10-Year Storm Rainfall=4.80"*

Prepared by Sullivan Engineering Group, LLC

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12/17/2014

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

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

**Subcatchment 1S:**

Runoff Area=2,442 sf Runoff Depth=0.58"  
Tc=6.0 min CN=51 Runoff=0.03 cfs 0.003 af

**Subcatchment 2S:**

Runoff Area=68,781 sf Runoff Depth=0.44"  
Tc=6.0 min CN=48 Runoff=0.44 cfs 0.058 af

**Link 1L: Off-Site (Towards Summer Avenue)**

Inflow=0.03 cfs 0.003 af  
Primary=0.03 cfs 0.003 af

**Link 2L: To Rear of Property**

Inflow=0.44 cfs 0.058 af  
Primary=0.44 cfs 0.058 af

**Total Runoff Area = 1.635 ac Runoff Volume = 0.061 af Average Runoff Depth = 0.45"**

# Predevelopment

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Type III 24-hr 10-Year Storm Rainfall=4.80"

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12/17/2014

## Subcatchment 1S:

Runoff = 0.03 cfs @ 12.13 hrs, Volume= 0.003 af, Depth= 0.58"

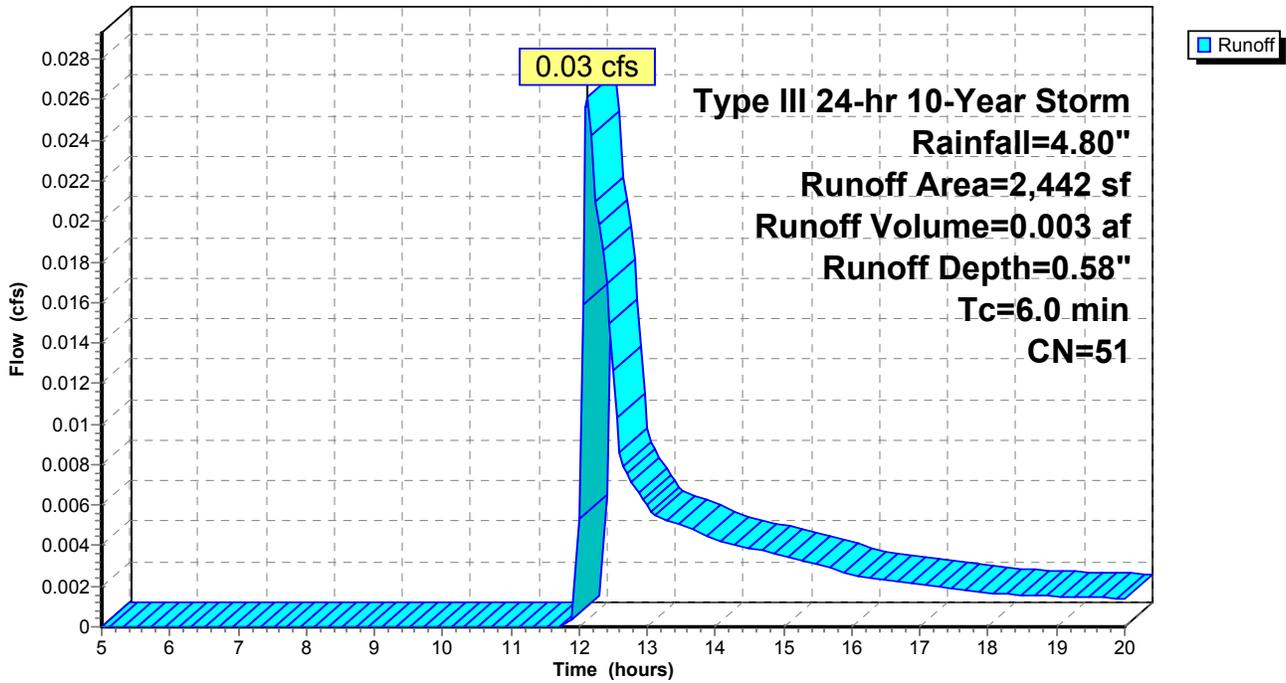
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-Year Storm Rainfall=4.80"

Area (sf)	CN	Description
107	98	Portion of Front Porch Roof
2,335	49	50-75% Grass cover, Fair, HSG A
2,442	51	Weighted Average

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

## Subcatchment 1S:

Hydrograph



**Predevelopment**

Type III 24-hr 10-Year Storm Rainfall=4.80"

Prepared by Sullivan Engineering Group, LLC

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HydroCAD® 7.00 s/n 001433 © 1986-2003 Applied Microcomputer Systems

12/17/2014

**Subcatchment 2S:**

Runoff = 0.44 cfs @ 12.16 hrs, Volume= 0.058 af, Depth= 0.44"

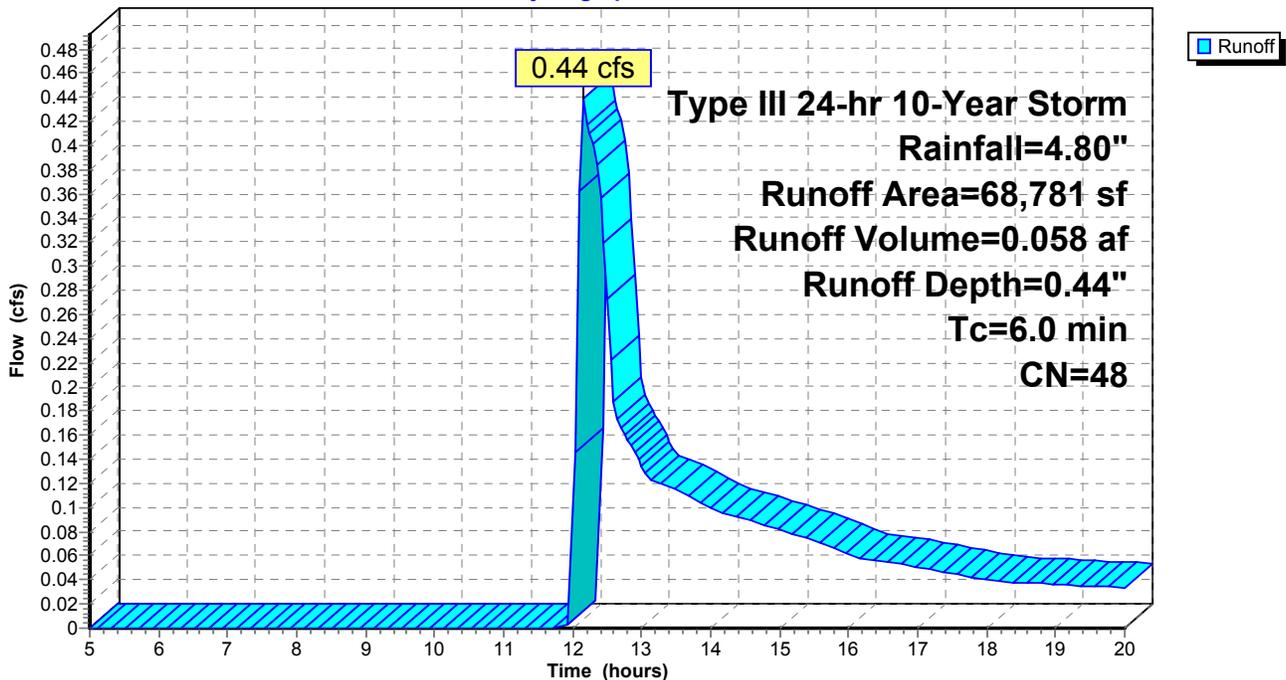
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-Year Storm Rainfall=4.80"

Area (sf)	CN	Description
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

**Subcatchment 2S:**

Hydrograph



**Predevelopment**

Prepared by Sullivan Engineering Group, LLC

HydroCAD® 7.00 s/n 001433 © 1986-2003 Applied Microcomputer Systems

Type III 24-hr 10-Year Storm Rainfall=4.80"

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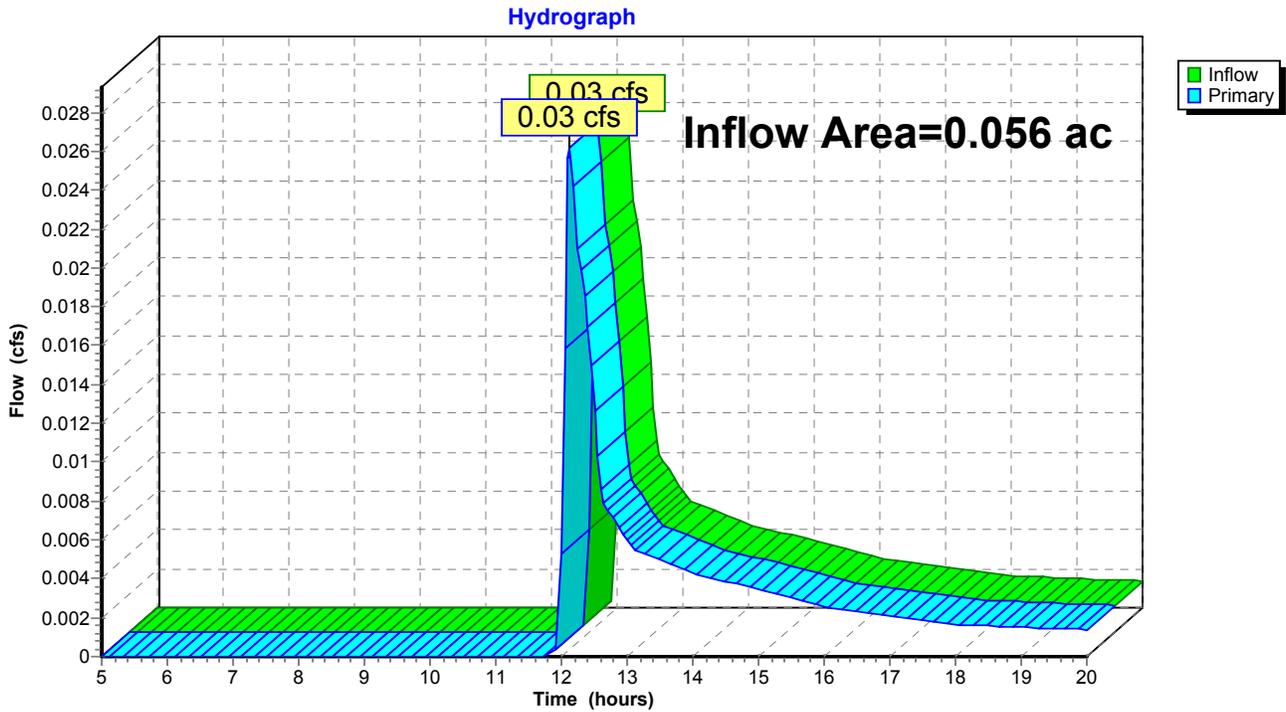
12/17/2014

**Link 1L: Off-Site (Towards Summer Avenue)**

Inflow Area = 0.056 ac, Inflow Depth = 0.58" for 10-Year Storm event  
Inflow = 0.03 cfs @ 12.13 hrs, Volume= 0.003 af  
Primary = 0.03 cfs @ 12.13 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Link 1L: Off-Site (Towards Summer Avenue)**



**Predevelopment**

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Type III 24-hr 10-Year Storm Rainfall=4.80"

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12/17/2014

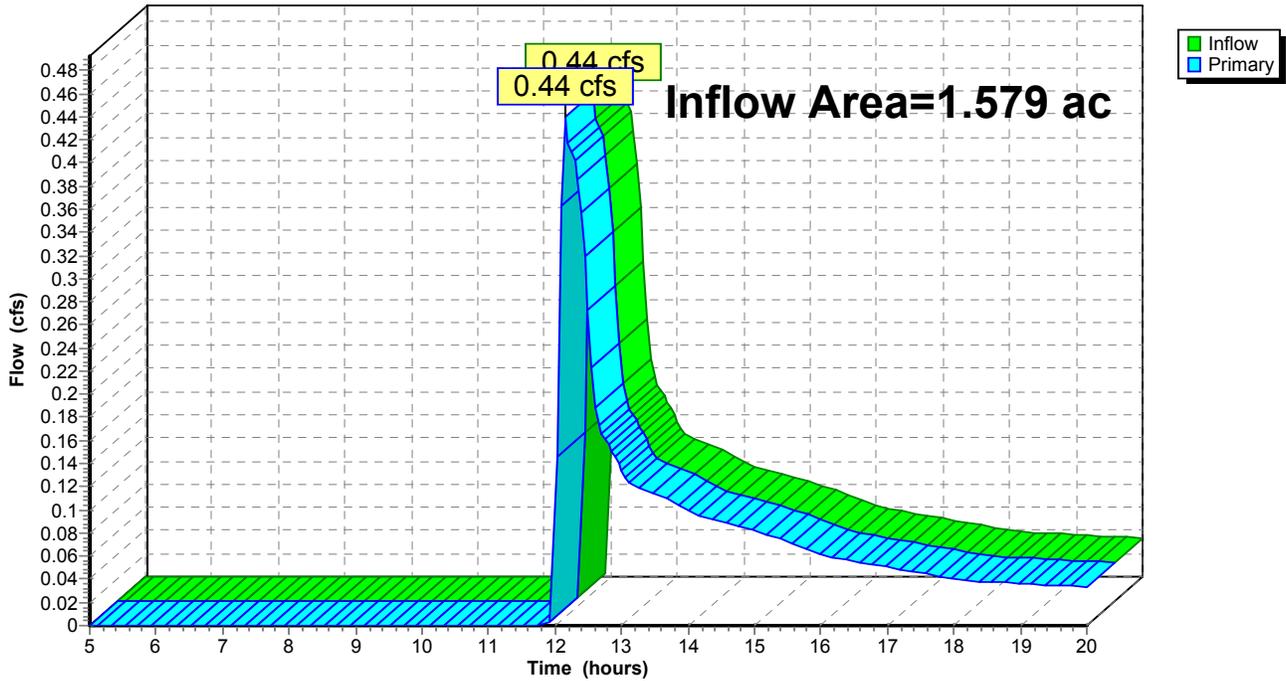
**Link 2L: To Rear of Property**

Inflow Area = 1.579 ac, Inflow Depth = 0.44" for 10-Year Storm event  
Inflow = 0.44 cfs @ 12.16 hrs, Volume= 0.058 af  
Primary = 0.44 cfs @ 12.16 hrs, Volume= 0.058 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Link 2L: To Rear of Property**

Hydrograph



**Predevelopment**

*Type III 24-hr 25-Year Storm Rainfall=5.50"*

Prepared by Sullivan Engineering Group, LLC

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12/17/2014

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

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

**Subcatchment 1S:**

Runoff Area=2,442 sf Runoff Depth=0.86"  
Tc=6.0 min CN=51 Runoff=0.05 cfs 0.004 af

**Subcatchment 2S:**

Runoff Area=68,781 sf Runoff Depth=0.69"  
Tc=6.0 min CN=48 Runoff=0.92 cfs 0.090 af

**Link 1L: Off-Site (Towards Summer Avenue)**

Inflow=0.05 cfs 0.004 af  
Primary=0.05 cfs 0.004 af

**Link 2L: To Rear of Property**

Inflow=0.92 cfs 0.090 af  
Primary=0.92 cfs 0.090 af

**Total Runoff Area = 1.635 ac Runoff Volume = 0.094 af Average Runoff Depth = 0.69"**

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Type III 24-hr 25-Year Storm Rainfall=5.50"

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## Subcatchment 1S:

Runoff = 0.05 cfs @ 12.11 hrs, Volume= 0.004 af, Depth= 0.86"

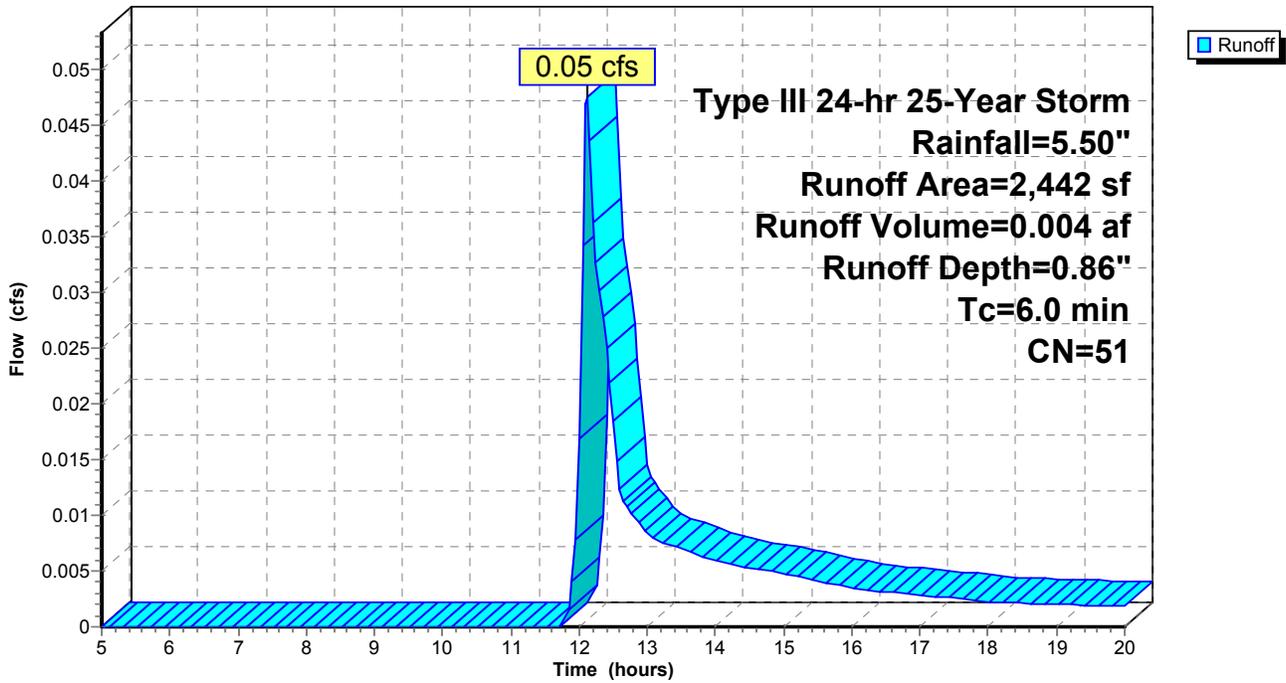
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
107	98	Portion of Front Porch Roof
2,335	49	50-75% Grass cover, Fair, HSG A
2,442	51	Weighted Average

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

## Subcatchment 1S:

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

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## Subcatchment 2S:

Runoff = 0.92 cfs @ 12.12 hrs, Volume= 0.090 af, Depth= 0.69"

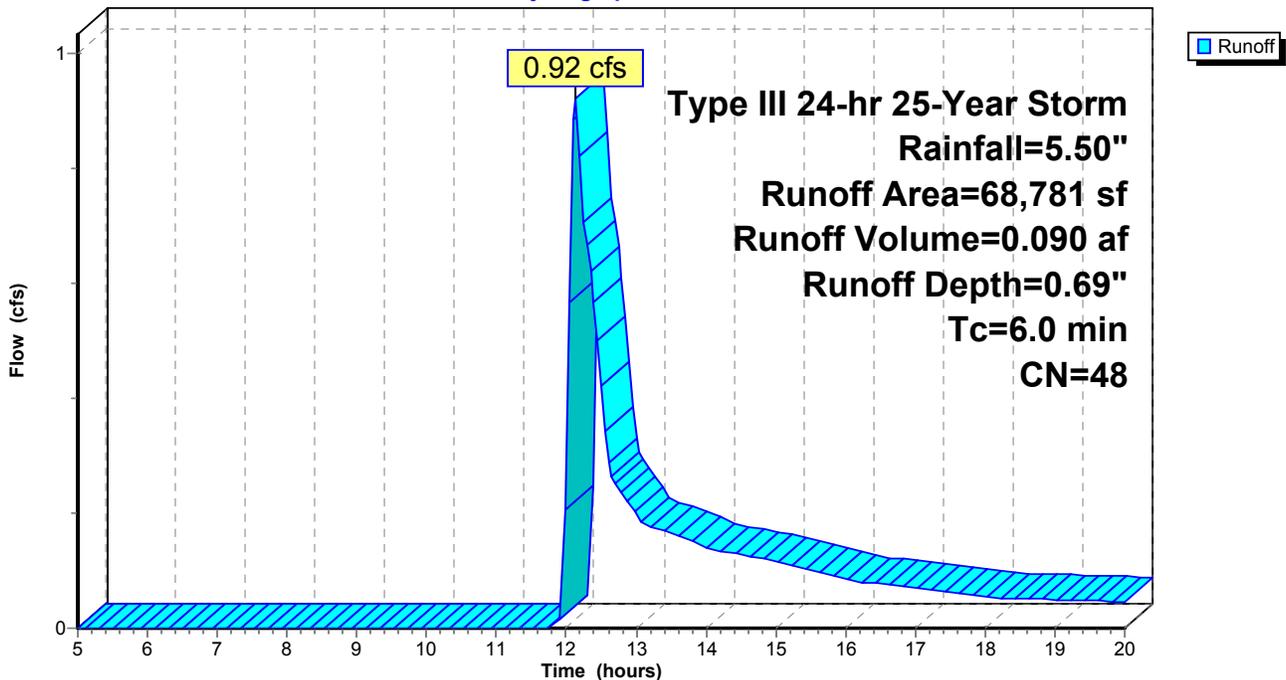
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-Year Storm Rainfall=5.50"

Area (sf)	CN	Description
2,287	98	Roof Area of House
399	98	Porch Roof Areas
1,223	98	Barn Roof
3,500	98	Bit. Conc. Driveway
25,625	49	50-75% Grass cover, Fair, HSG A
35,747	36	Woods, Fair, HSG A
68,781	48	Weighted Average

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

## Subcatchment 2S:

Hydrograph



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Type III 24-hr 25-Year Storm Rainfall=5.50"

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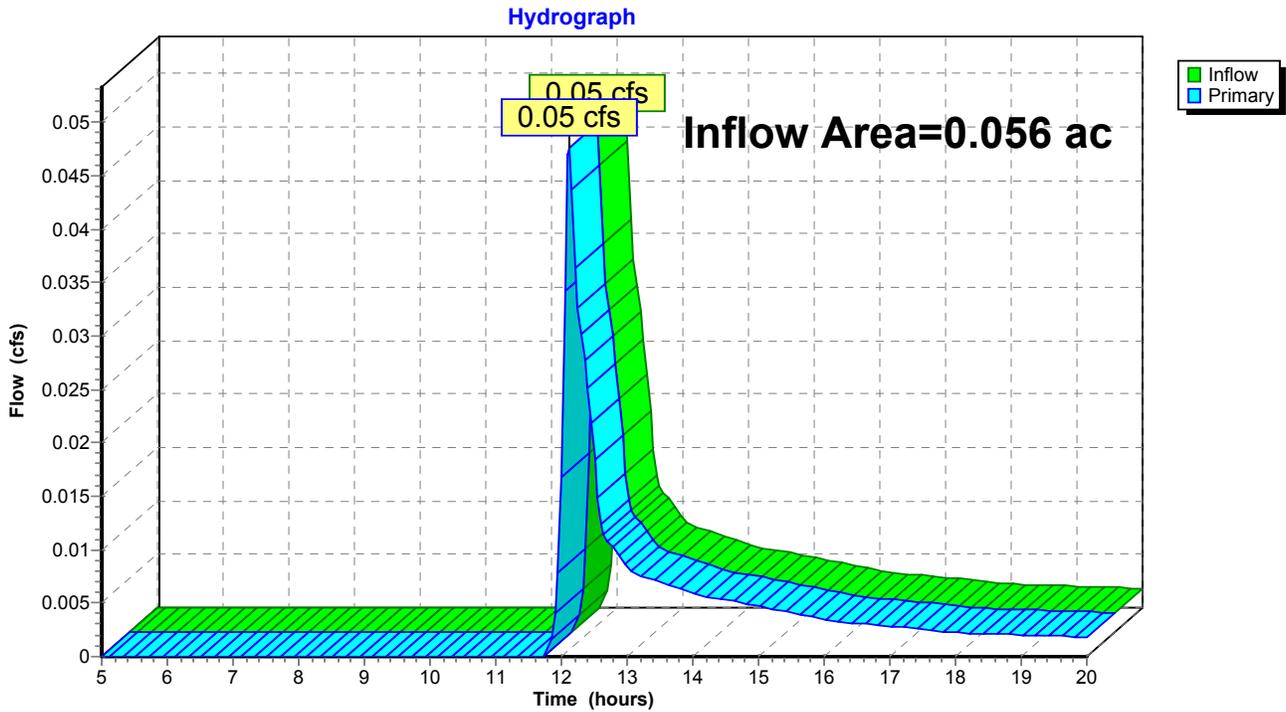
12/17/2014

**Link 1L: Off-Site (Towards Summer Avenue)**

Inflow Area = 0.056 ac, Inflow Depth = 0.86" for 25-Year Storm event  
Inflow = 0.05 cfs @ 12.11 hrs, Volume= 0.004 af  
Primary = 0.05 cfs @ 12.11 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Link 1L: Off-Site (Towards Summer Avenue)**



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Type III 24-hr 25-Year Storm Rainfall=5.50"

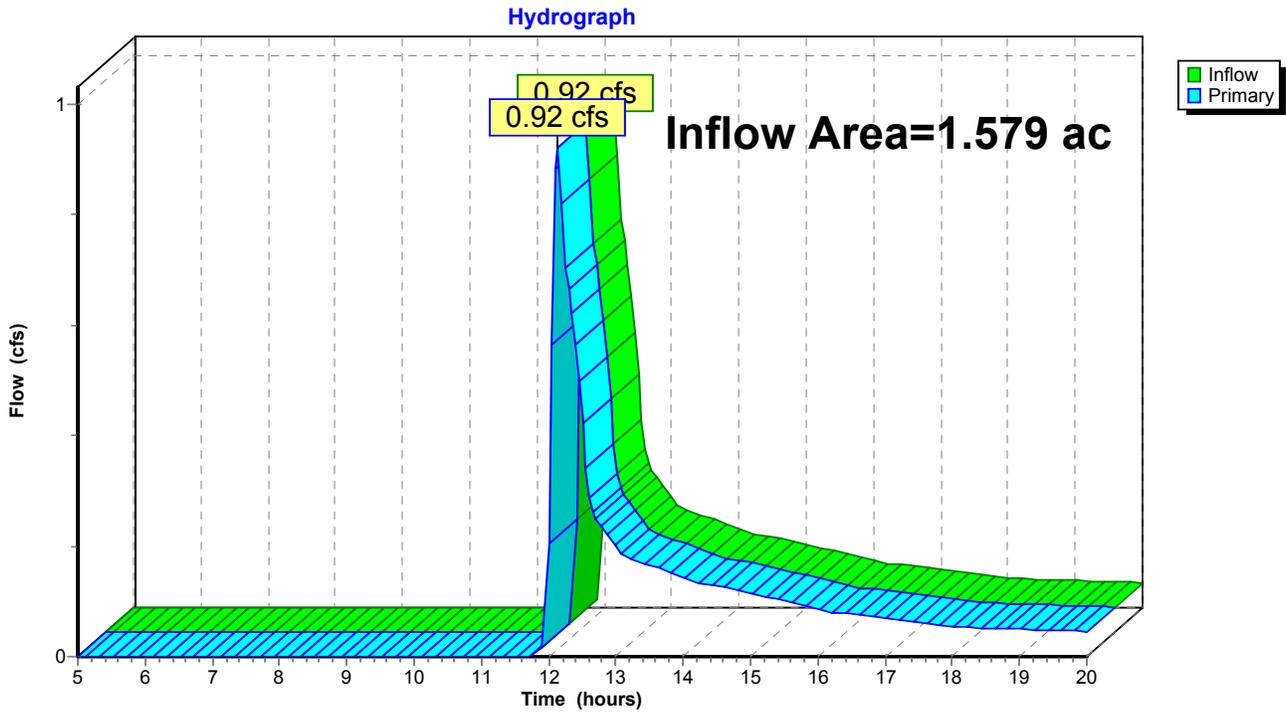
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**Link 2L: To Rear of Property**

Inflow Area = 1.579 ac, Inflow Depth = 0.69" for 25-Year Storm event  
Inflow = 0.92 cfs @ 12.12 hrs, Volume= 0.090 af  
Primary = 0.92 cfs @ 12.12 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Link 2L: To Rear of Property**



**Predevelopment**

*Type III 24-hr 100-Year Storm Rainfall=6.40"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

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

**Subcatchment 1S:**

Runoff Area=2,442 sf Runoff Depth=1.28"  
Tc=6.0 min CN=51 Runoff=0.08 cfs 0.006 af

**Subcatchment 2S:**

Runoff Area=68,781 sf Runoff Depth=1.06"  
Tc=6.0 min CN=48 Runoff=1.69 cfs 0.139 af

**Link 1L: Off-Site (Towards Summer Avenue)**

Inflow=0.08 cfs 0.006 af  
Primary=0.08 cfs 0.006 af

**Link 2L: To Rear of Property**

Inflow=1.69 cfs 0.139 af  
Primary=1.69 cfs 0.139 af

**Total Runoff Area = 1.635 ac Runoff Volume = 0.145 af Average Runoff Depth = 1.06"**

# Predevelopment

Type III 24-hr 100-Year Storm Rainfall=6.40"

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## Subcatchment 1S:

Runoff = 0.08 cfs @ 12.11 hrs, Volume= 0.006 af, Depth= 1.28"

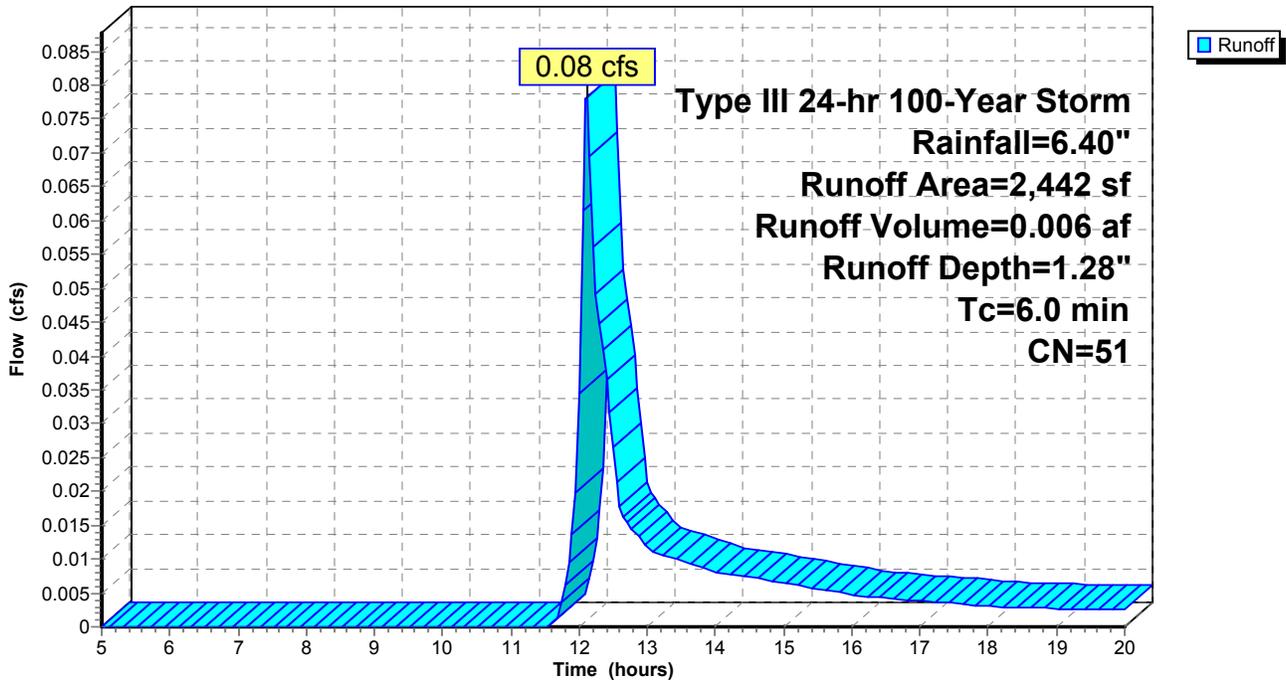
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-Year Storm Rainfall=6.40"

Area (sf)	CN	Description
107	98	Portion of Front Porch Roof
2,335	49	50-75% Grass cover, Fair, HSG A
2,442	51	Weighted Average

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

## Subcatchment 1S:

Hydrograph



**Predevelopment**

Type III 24-hr 100-Year Storm Rainfall=6.40"

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**Subcatchment 2S:**

Runoff = 1.69 cfs @ 12.11 hrs, Volume= 0.139 af, Depth= 1.06"

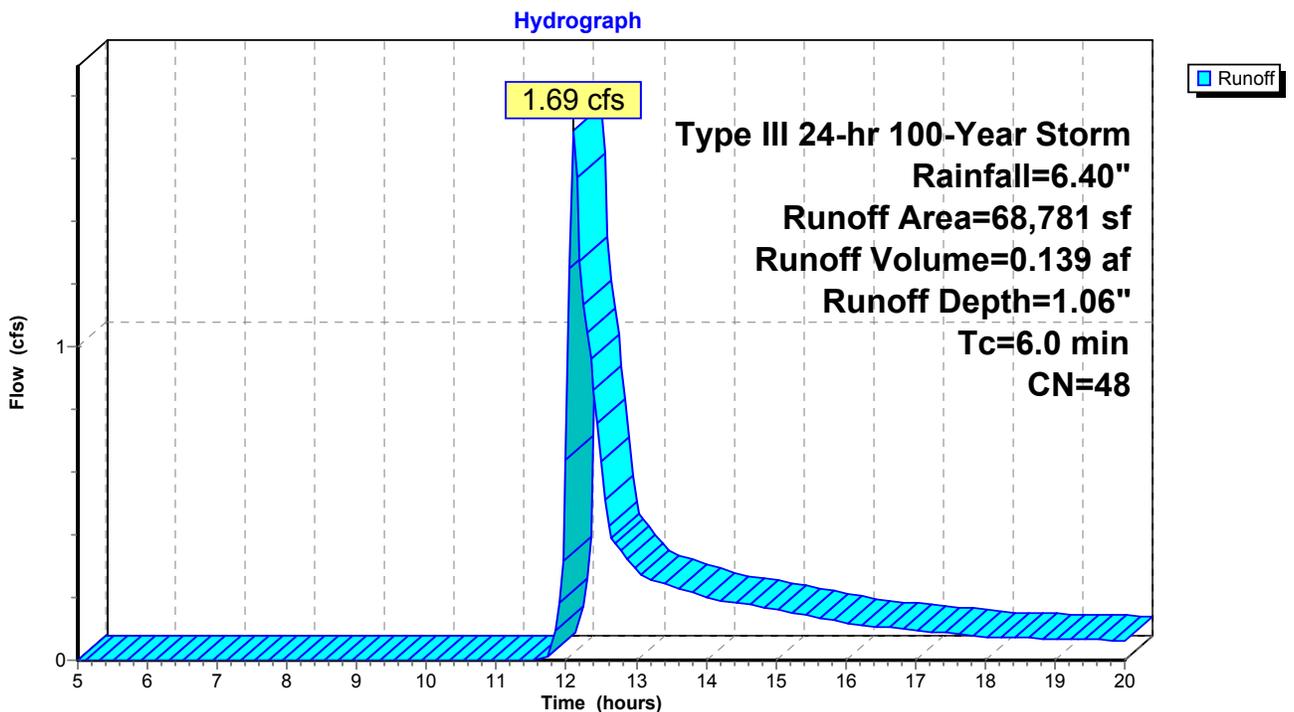
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Type III 24-hr 100-Year Storm Rainfall=6.40"

Area (sf)	CN	Description
2,287	98	Roof Area of House
399	98	Porch Roof Areas
1,223	98	Barn Roof
3,500	98	Bit. Conc. Driveway
25,625	49	50-75% Grass cover, Fair, HSG A
35,747	36	Woods, Fair, HSG A
68,781	48	Weighted Average

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

**Subcatchment 2S:**



**Predevelopment**

Type III 24-hr 100-Year Storm Rainfall=6.40"

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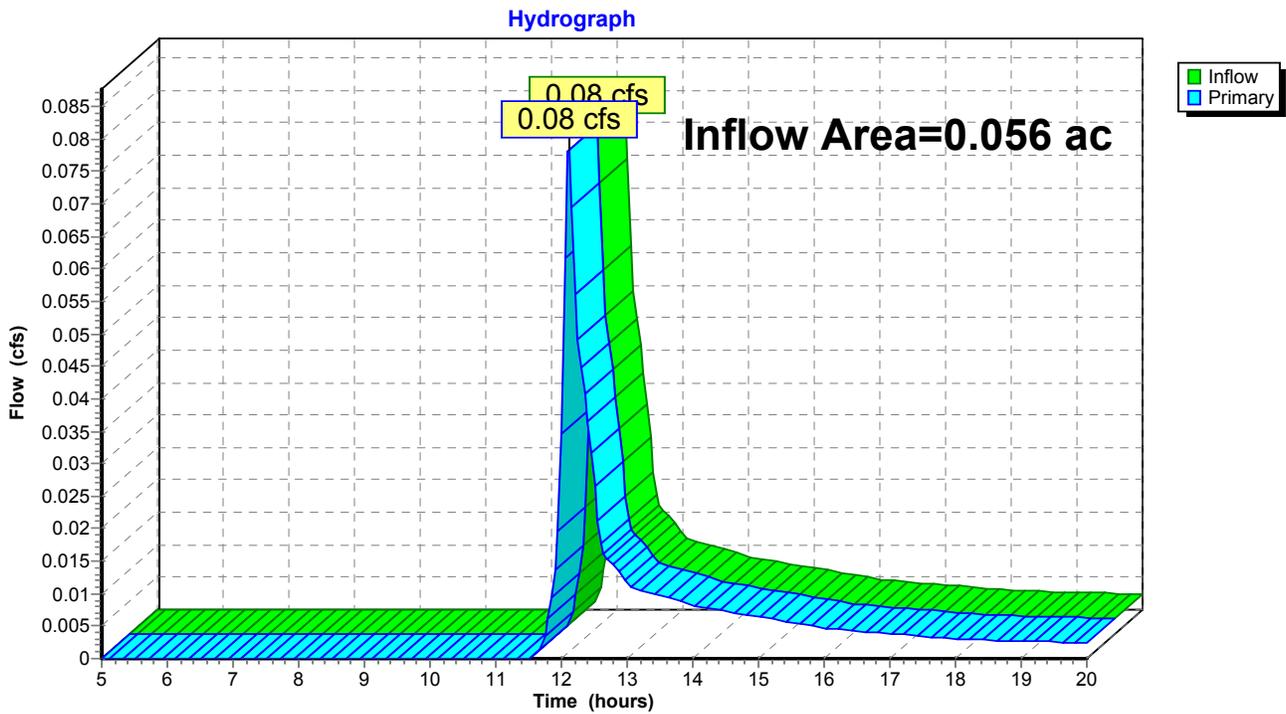
12/17/2014

**Link 1L: Off-Site (Towards Summer Avenue)**

Inflow Area = 0.056 ac, Inflow Depth = 1.28" for 100-Year Storm event  
Inflow = 0.08 cfs @ 12.11 hrs, Volume= 0.006 af  
Primary = 0.08 cfs @ 12.11 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Link 1L: Off-Site (Towards Summer Avenue)**



**Predevelopment**

Type III 24-hr 100-Year Storm Rainfall=6.40"

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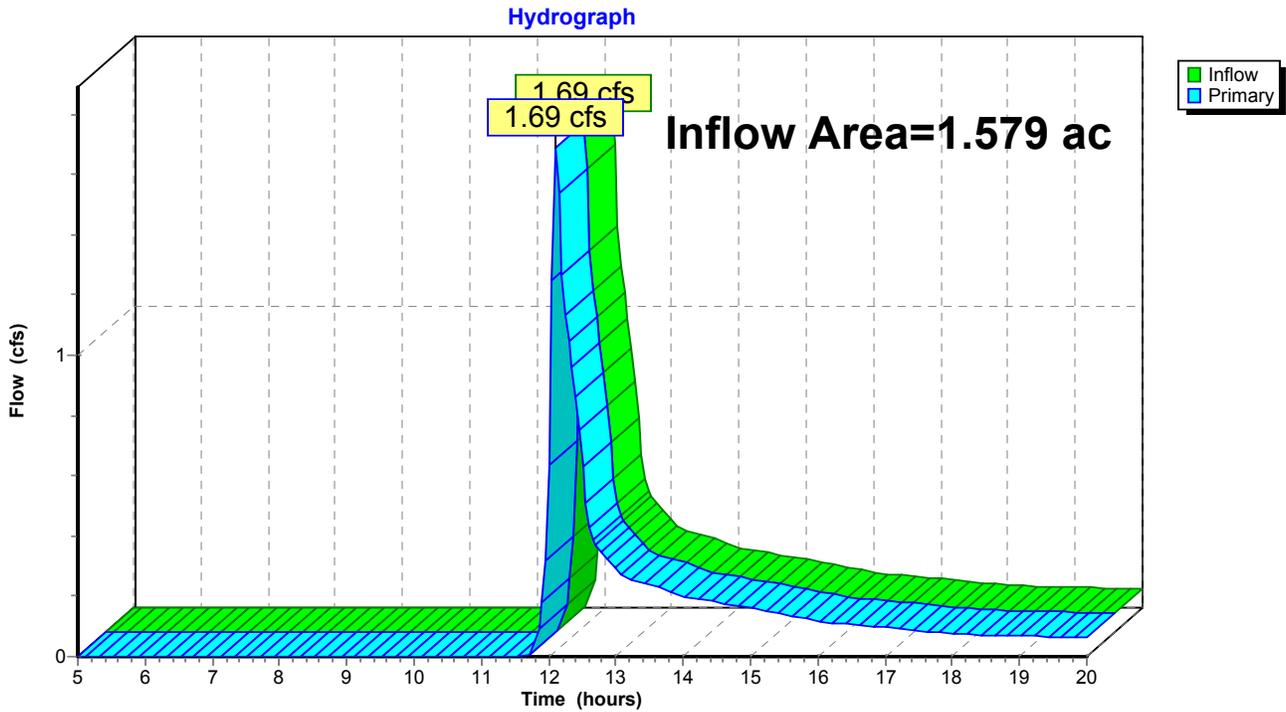
12/17/2014

**Link 2L: To Rear of Property**

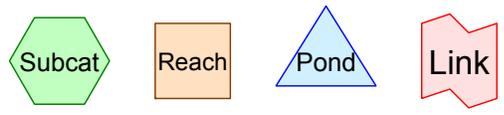
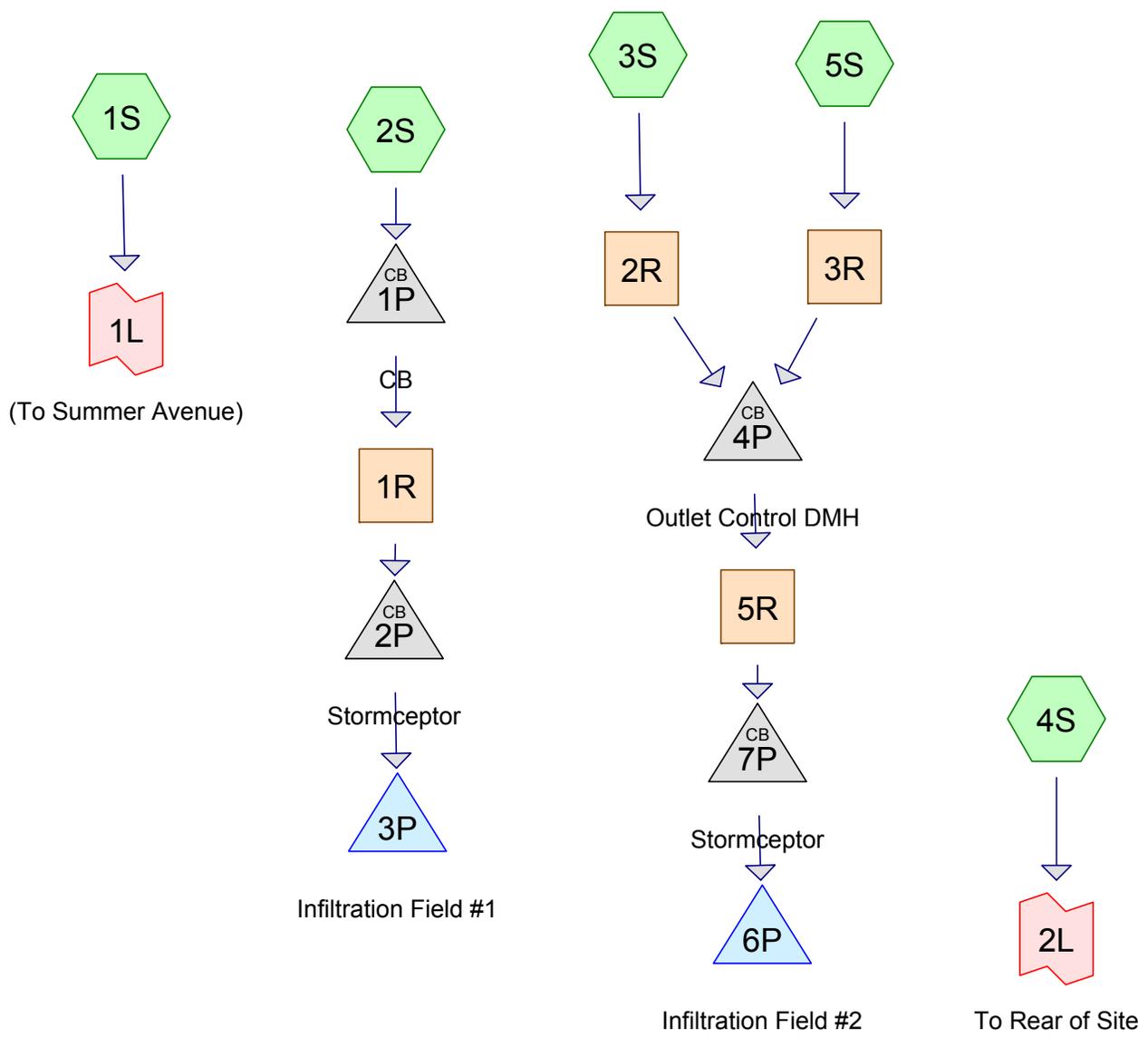
Inflow Area = 1.579 ac, Inflow Depth = 1.06" for 100-Year Storm event  
Inflow = 1.69 cfs @ 12.11 hrs, Volume= 0.139 af  
Primary = 1.69 cfs @ 12.11 hrs, Volume= 0.139 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Link 2L: To Rear of Property**







**Drainage Diagram for Postdevelopment**  
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**Postdevelopment**

Type III 24-hr 2 Year Storm Rainfall=3.20"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

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

**Subcatchment 1S:** Runoff Area=2,442 sf Runoff Depth=0.12"  
Tc=6.0 min CN=51 Runoff=0.00 cfs 0.001 af

**Subcatchment 2S:** Runoff Area=16,486 sf Runoff Depth=1.11"  
Tc=6.0 min CN=77 Runoff=0.51 cfs 0.035 af

**Subcatchment 3S:** Runoff Area=8,610 sf Runoff Depth=1.95"  
Tc=6.0 min CN=89 Runoff=0.47 cfs 0.032 af

**Subcatchment 4S:** Runoff Area=36,718 sf Runoff Depth=0.02"  
Tc=6.0 min CN=44 Runoff=0.00 cfs 0.001 af

**Subcatchment 5S:** Runoff Area=6,978 sf Runoff Depth=2.77"  
Tc=6.0 min CN=98 Runoff=0.49 cfs 0.037 af

**Reach 1R:** Peak Depth=0.23' Max Vel=3.9 fps Inflow=0.51 cfs 0.035 af  
D=12.0" n=0.011 L=2.5' S=0.0120 '/' Capacity=4.61 cfs Outflow=0.51 cfs 0.035 af

**Reach 2R:** Peak Depth=0.27' Max Vel=2.8 fps Inflow=0.47 cfs 0.032 af  
D=12.0" n=0.011 L=90.0' S=0.0050 '/' Capacity=2.98 cfs Outflow=0.46 cfs 0.032 af

**Reach 3R:** Peak Depth=0.20' Max Vel=4.3 fps Inflow=0.49 cfs 0.037 af  
D=12.0" n=0.011 L=27.0' S=0.0167 '/' Capacity=5.44 cfs Outflow=0.48 cfs 0.037 af

**Reach 5R:** Peak Depth=0.24' Max Vel=6.5 fps Inflow=0.94 cfs 0.069 af  
D=12.0" n=0.011 L=5.0' S=0.0320 '/' Capacity=7.53 cfs Outflow=0.94 cfs 0.069 af

**Pond 1P: CB** Peak Elev=97.95' Inflow=0.51 cfs 0.035 af  
Outflow=0.51 cfs 0.035 af

**Pond 2P: Stormceptor** Peak Elev=97.91' Inflow=0.51 cfs 0.035 af  
Outflow=0.51 cfs 0.035 af

**Pond 3P: Infiltration Field #1** Peak Elev=93.34' Storage=95 cf Inflow=0.51 cfs 0.035 af  
Outflow=0.32 cfs 0.035 af

**Pond 4P: Outlet Control DMH** Peak Elev=93.38' Inflow=0.94 cfs 0.069 af  
12.0" x 5.0' Culvert Outflow=0.94 cfs 0.069 af

**Pond 6P: Infiltration Field #2** Peak Elev=91.88' Storage=328 cf Inflow=0.94 cfs 0.069 af  
Discarded=0.42 cfs 0.069 af Primary=0.00 cfs 0.000 af Outflow=0.42 cfs 0.069 af

**Pond 7P: Stormceptor** Peak Elev=97.63' Inflow=0.94 cfs 0.069 af  
Outflow=0.94 cfs 0.069 af

**Postdevelopment**

*Type III 24-hr 2 Year Storm Rainfall=3.20"*

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**Link 1L: (To Summer Avenue)**

Inflow=0.00 cfs 0.001 af  
Primary=0.00 cfs 0.001 af

**Link 2L: To Rear of Site**

Inflow=0.00 cfs 0.001 af  
Primary=0.00 cfs 0.001 af

**Total Runoff Area = 1.635 ac Runoff Volume = 0.106 af Average Runoff Depth = 0.78"**

# Postdevelopment

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Type III 24-hr 2 Year Storm Rainfall=3.20"

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## Subcatchment 1S:

Runoff = 0.00 cfs @ 12.44 hrs, Volume= 0.001 af, Depth= 0.12"

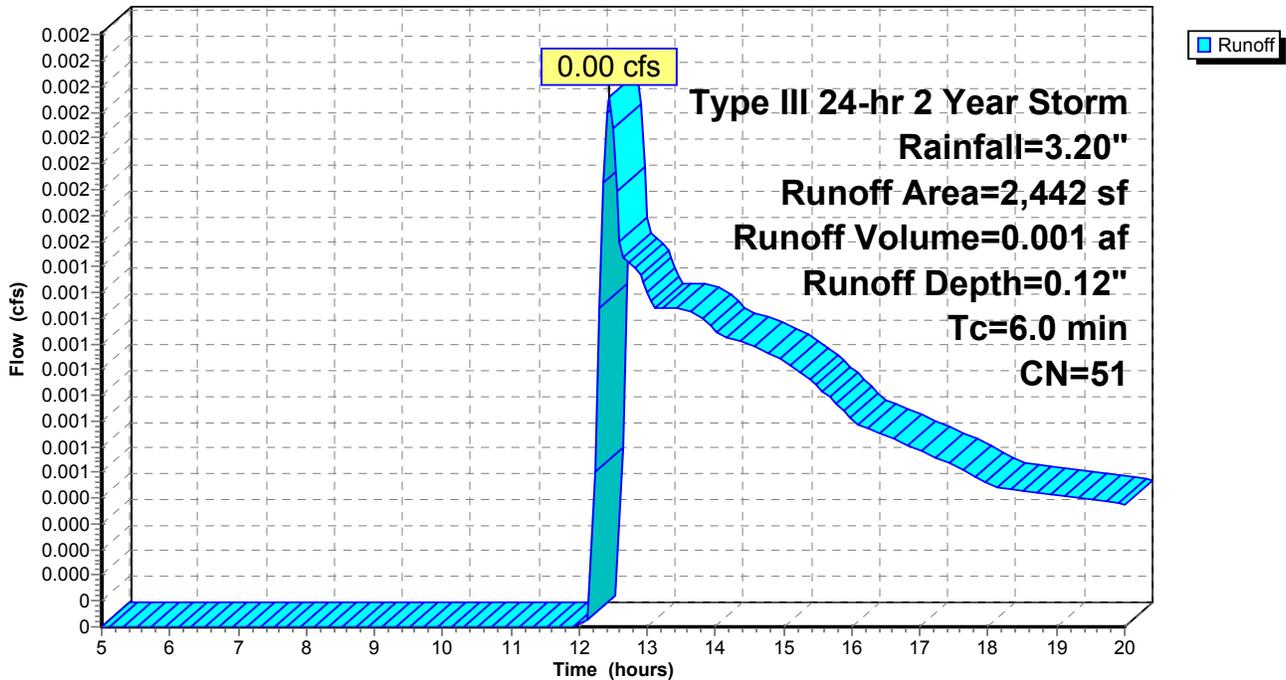
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2 Year Storm Rainfall=3.20"

Area (sf)	CN	Description
107	98	Portion of Front Porch
2,335	49	50-75% Grass cover, Fair, HSG A
2,442	51	Weighted Average

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

## Subcatchment 1S:

Hydrograph



**Postdevelopment**

Type III 24-hr 2 Year Storm Rainfall=3.20"

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**Subcatchment 2S:**

Runoff = 0.51 cfs @ 12.10 hrs, Volume= 0.035 af, Depth= 1.11"

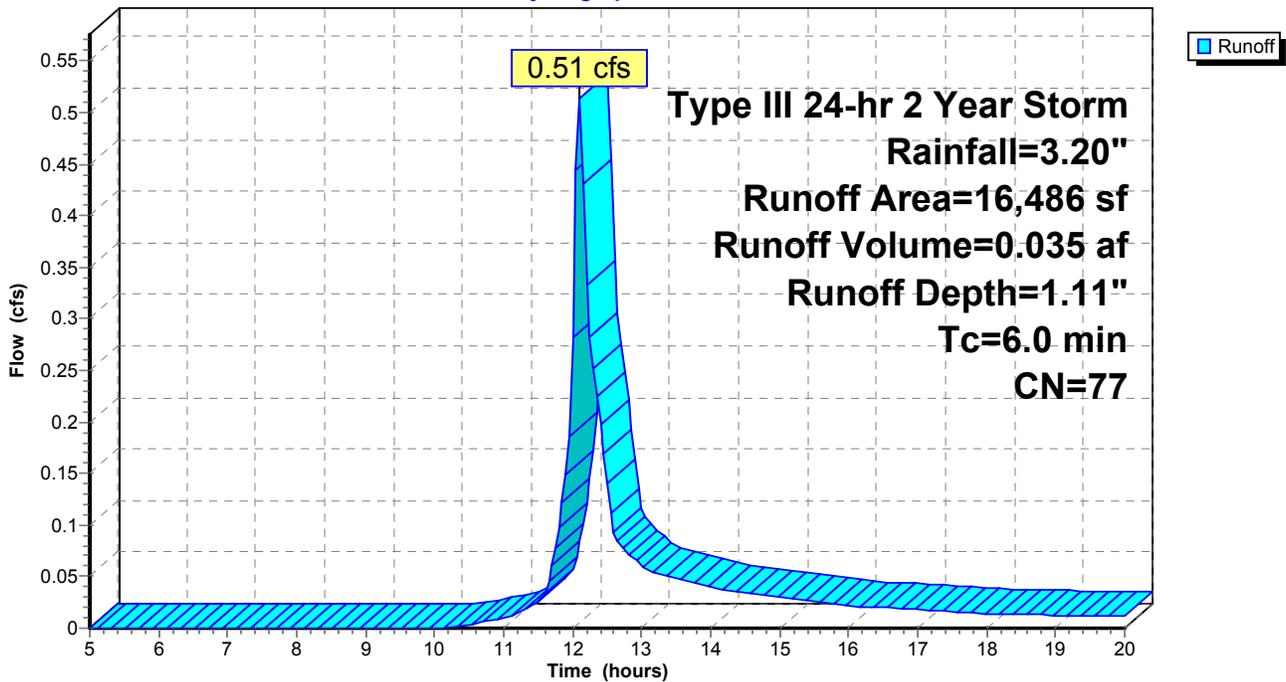
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2 Year Storm Rainfall=3.20"

Area (sf)	CN	Description
1,545	98	Portion of Building Roof
283	98	Roof Area of Porch
1,228	98	Cement Conc. Walkways
6,171	98	Porous Pavement Area
184	98	Vertical Granite Curb
7,075	49	50-75% Grass cover, Fair, HSG A
16,486	77	Weighted Average

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

**Subcatchment 2S:**

Hydrograph



# Postdevelopment

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Type III 24-hr 2 Year Storm Rainfall=3.20"

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## Subcatchment 3S:

Runoff = 0.47 cfs @ 12.09 hrs, Volume= 0.032 af, Depth= 1.95"

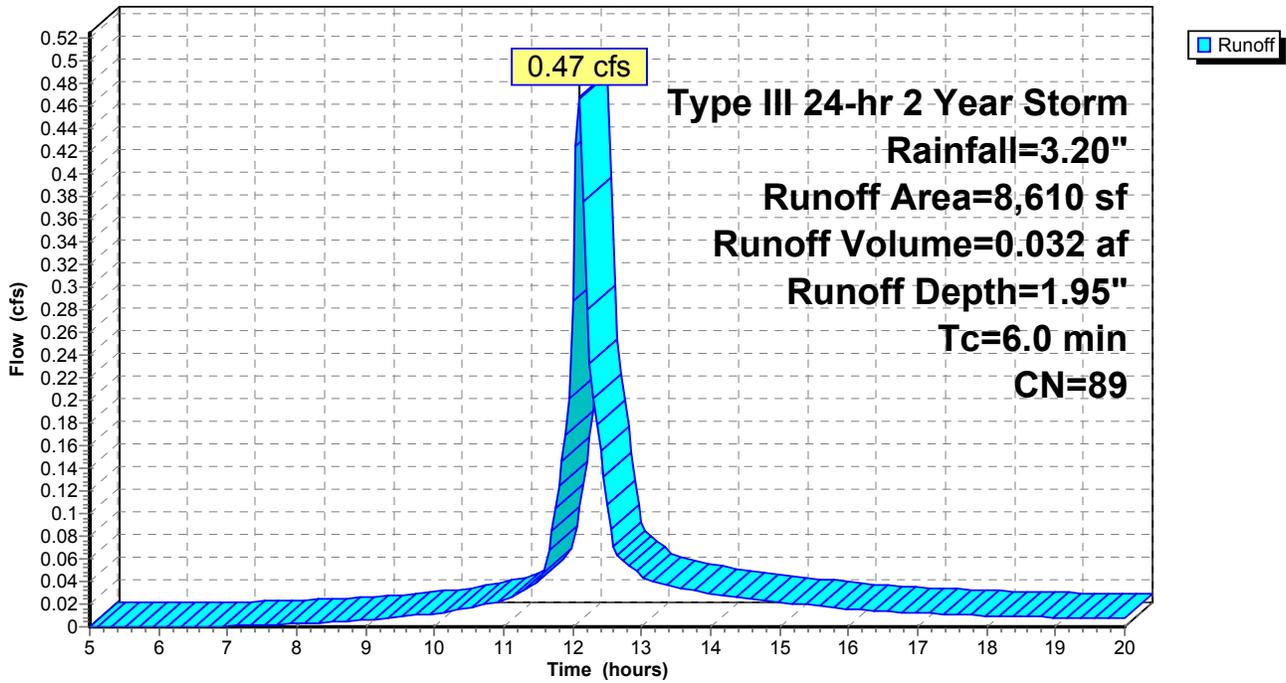
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2 Year Storm Rainfall=3.20"

Area (sf)	CN	Description
1,336	39	>75% Grass cover, Good, HSG A
7,274	98	Pavement, Curb, Walks, Dumpster Pad
8,610	89	Weighted Average

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

## Subcatchment 3S:

Hydrograph



**Postdevelopment**

Type III 24-hr 2 Year Storm Rainfall=3.20"

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**Subcatchment 4S:**

Runoff = 0.00 cfs @ 15.69 hrs, Volume= 0.001 af, Depth= 0.02"

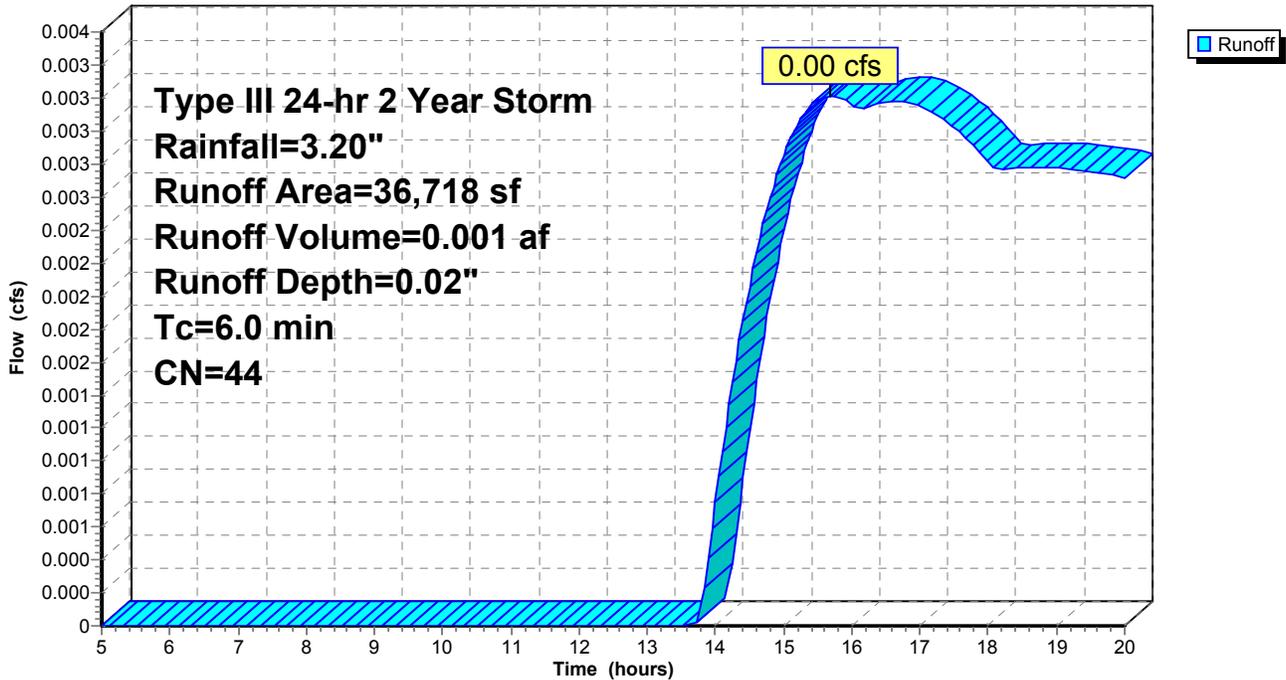
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 2 Year Storm Rainfall=3.20"

Area (sf)	CN	Description
612	98	1/2 of Barn Roof Area
2,274	98	Portion of Building Roof
4,455	49	50-75% Grass cover, Fair, HSG A
1,200	77	Woodchipped Play Area
28,177	36	Woods, Fair, HSG A
36,718	44	Weighted Average

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

**Subcatchment 4S:**

Hydrograph



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Type III 24-hr 2 Year Storm Rainfall=3.20"

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## Subcatchment 5S:

Runoff = 0.49 cfs @ 12.09 hrs, Volume= 0.037 af, Depth= 2.77"

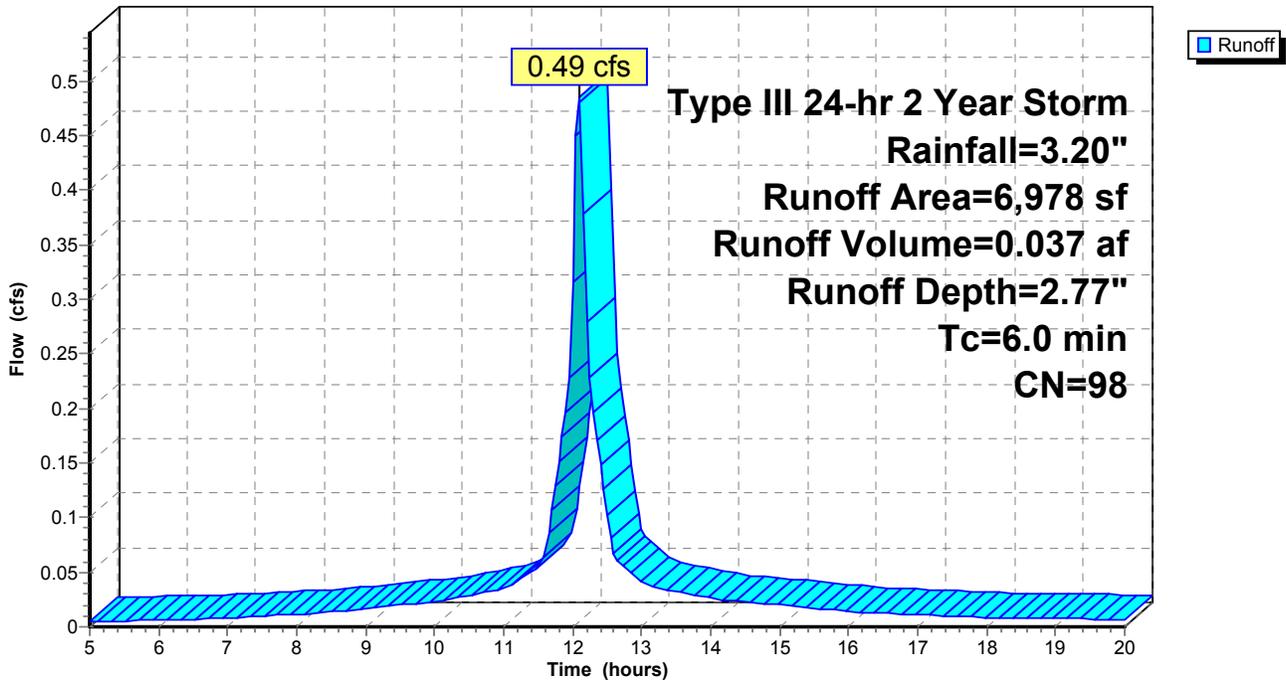
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2 Year Storm Rainfall=3.20"

Area (sf)	CN	Description
50	39	>75% Grass cover, Good, HSG A
6,928	98	Pavement, Curb, Walks
6,978	98	Weighted Average

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

## Subcatchment 5S:

Hydrograph



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Type III 24-hr 2 Year Storm Rainfall=3.20"

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## Reach 1R:

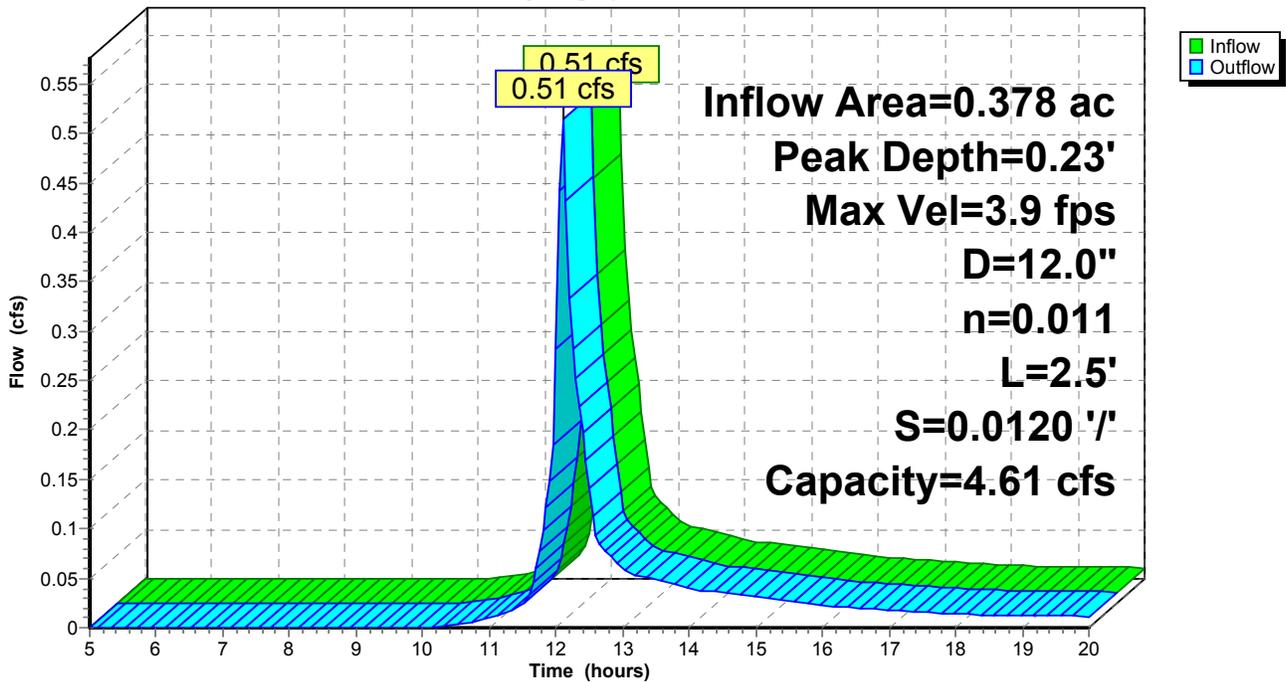
Inflow Area = 0.378 ac, Inflow Depth = 1.11" for 2 Year Storm event  
Inflow = 0.51 cfs @ 12.10 hrs, Volume= 0.035 af  
Outflow = 0.51 cfs @ 12.10 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 3.9 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 1.6 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.23' @ 12.10 hrs  
Capacity at bank full= 4.61 cfs  
Inlet Invert= 94.53', Outlet Invert= 94.50'  
12.0" Diameter Pipe n= 0.011 Length= 2.5' Slope= 0.0120 '/'

## Reach 1R:

Hydrograph



# Postdevelopment

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Type III 24-hr 2 Year Storm Rainfall=3.20"

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## Reach 2R:

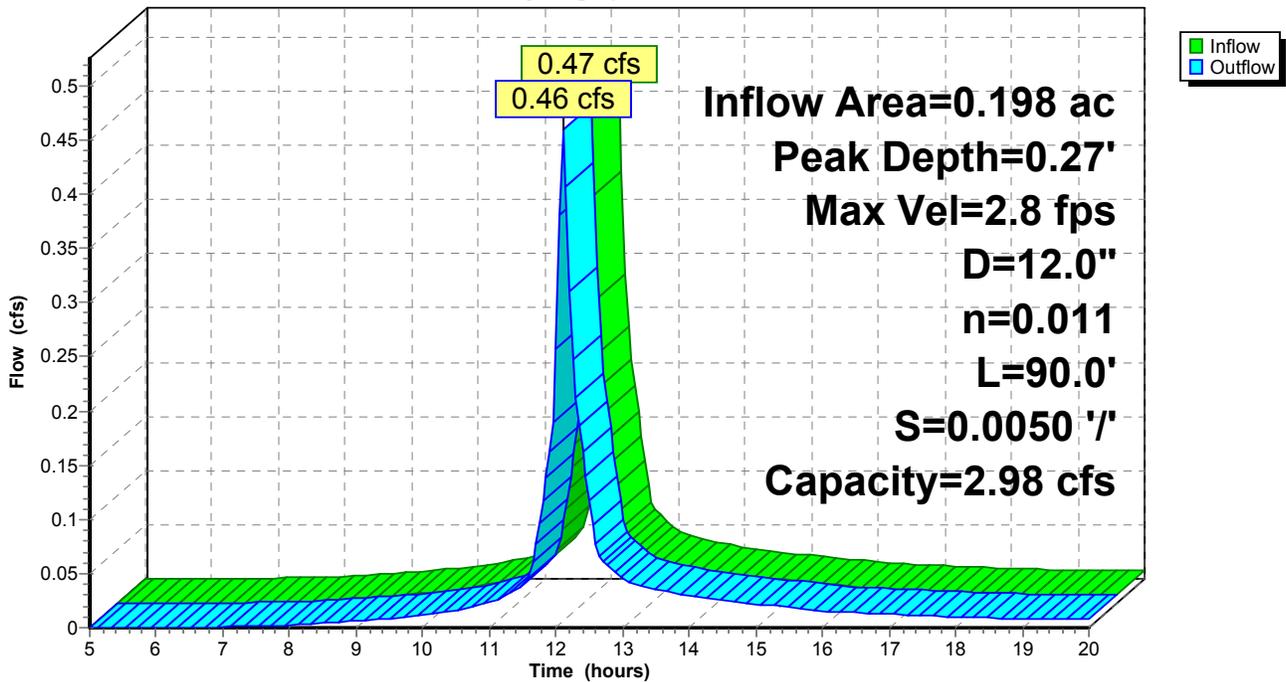
Inflow Area = 0.198 ac, Inflow Depth = 1.95" for 2 Year Storm event  
Inflow = 0.47 cfs @ 12.09 hrs, Volume= 0.032 af  
Outflow = 0.46 cfs @ 12.11 hrs, Volume= 0.032 af, Atten= 2%, Lag= 0.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 2.8 fps, Min. Travel Time= 0.5 min  
Avg. Velocity = 1.0 fps, Avg. Travel Time= 1.5 min

Peak Depth= 0.27' @ 12.10 hrs  
Capacity at bank full= 2.98 cfs  
Inlet Invert= 91.00', Outlet Invert= 90.55'  
12.0" Diameter Pipe n= 0.011 Length= 90.0' Slope= 0.0050 '/'

## Reach 2R:

Hydrograph



# Postdevelopment

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Type III 24-hr 2 Year Storm Rainfall=3.20"

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## Reach 3R:

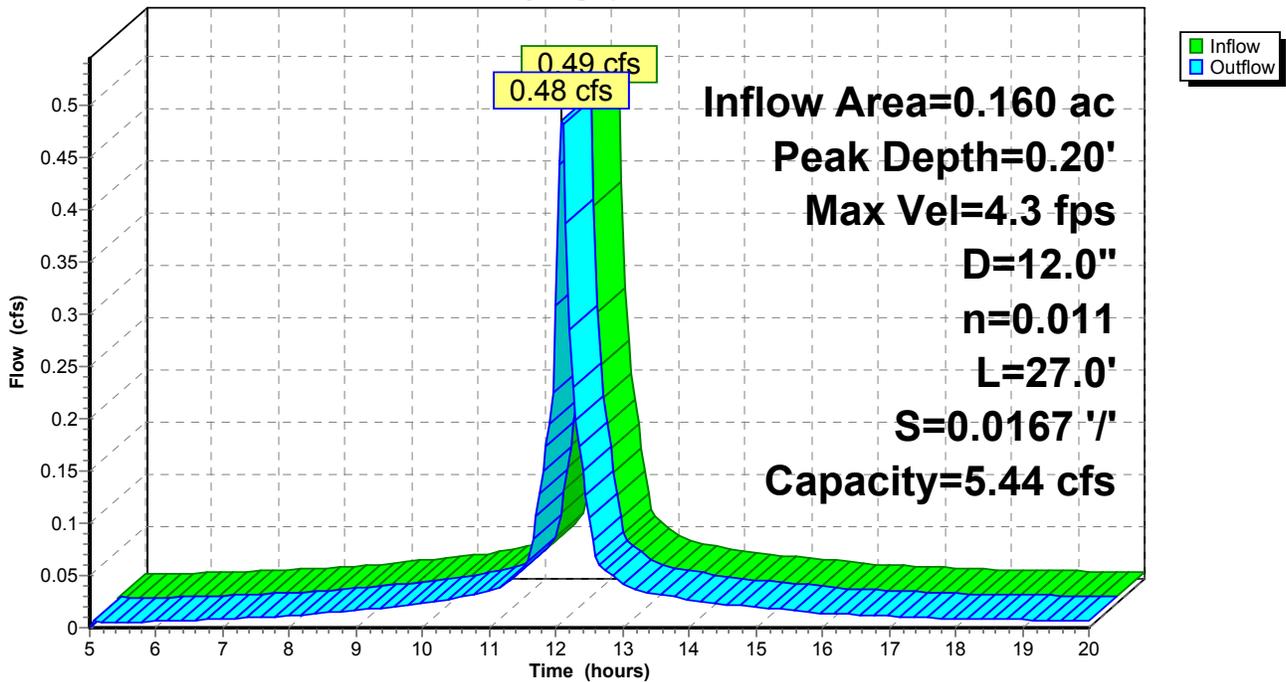
Inflow Area = 0.160 ac, Inflow Depth = 2.77" for 2 Year Storm event  
Inflow = 0.49 cfs @ 12.09 hrs, Volume= 0.037 af  
Outflow = 0.48 cfs @ 12.09 hrs, Volume= 0.037 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 4.3 fps, Min. Travel Time= 0.1 min  
Avg. Velocity = 1.6 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.20' @ 12.09 hrs  
Capacity at bank full= 5.44 cfs  
Inlet Invert= 91.00', Outlet Invert= 90.55'  
12.0" Diameter Pipe n= 0.011 Length= 27.0' Slope= 0.0167 '/'

## Reach 3R:

Hydrograph



# Postdevelopment

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Type III 24-hr 2 Year Storm Rainfall=3.20"

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## Reach 5R:

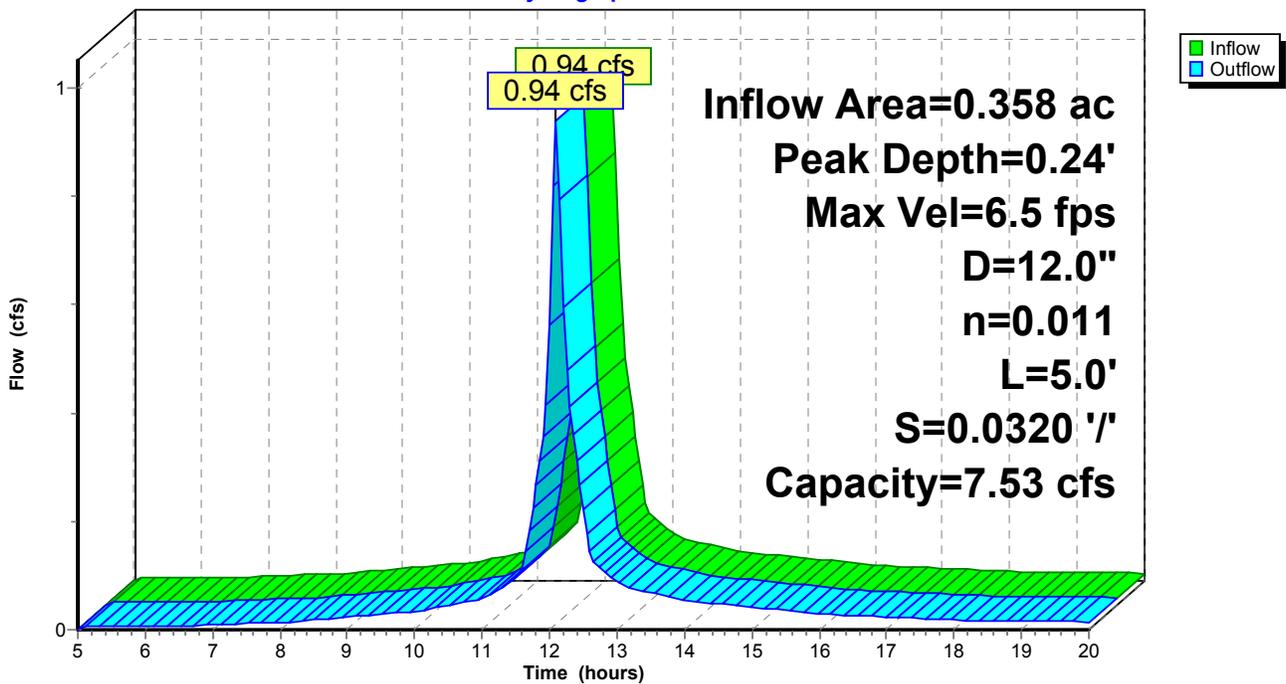
Inflow Area = 0.358 ac, Inflow Depth = 2.32" for 2 Year Storm event  
Inflow = 0.94 cfs @ 12.10 hrs, Volume= 0.069 af  
Outflow = 0.94 cfs @ 12.10 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 6.5 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 2.4 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.24' @ 12.10 hrs  
Capacity at bank full= 7.53 cfs  
Inlet Invert= 92.81', Outlet Invert= 92.65'  
12.0" Diameter Pipe n= 0.011 Length= 5.0' Slope= 0.0320 '/'

## Reach 5R:

Hydrograph



# Postdevelopment

Type III 24-hr 2 Year Storm Rainfall=3.20"

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## Pond 1P: CB

Inflow Area = 0.378 ac, Inflow Depth = 1.11" for 2 Year Storm event  
Inflow = 0.51 cfs @ 12.10 hrs, Volume= 0.035 af  
Outflow = 0.51 cfs @ 12.10 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min  
Primary = 0.51 cfs @ 12.10 hrs, Volume= 0.035 af

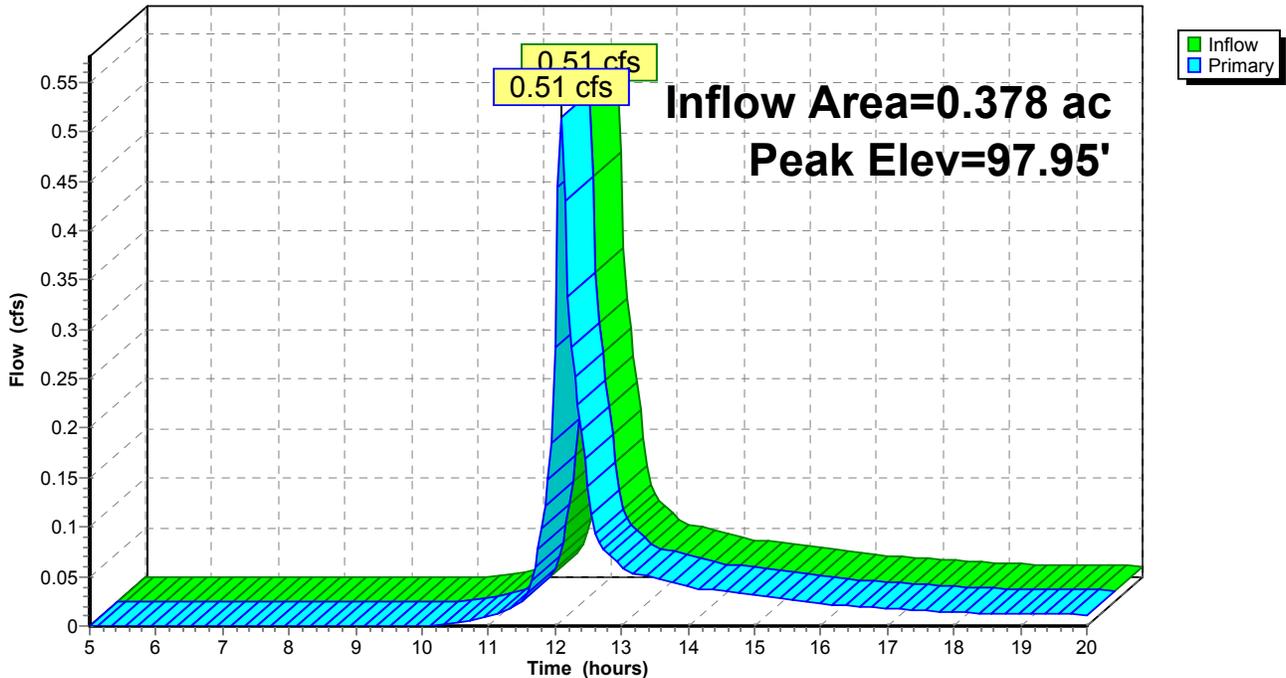
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 97.95' @ 12.10 hrs  
Plug-Flow detention time= 0.0 min calculated for 0.035 af (100% of inflow)  
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

#	Routing	Invert	Outlet Devices
1	Primary	97.66'	24.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.51 cfs @ 12.10 hrs HW=97.95' (Free Discharge)  
↑1=Orifice/Grate (Orifice Controls 0.51 cfs @ 1.8 fps)

## Pond 1P: CB

Hydrograph



# Postdevelopment

Type III 24-hr 2 Year Storm Rainfall=3.20"

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## Pond 2P: Stormceptor

Inflow Area = 0.378 ac, Inflow Depth = 1.11" for 2 Year Storm event  
Inflow = 0.51 cfs @ 12.10 hrs, Volume= 0.035 af  
Outflow = 0.51 cfs @ 12.10 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min  
Primary = 0.51 cfs @ 12.10 hrs, Volume= 0.035 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 97.91' @ 12.10 hrs

Plug-Flow detention time= (not calculated)

Center-of-Mass det. time= (not calculated)

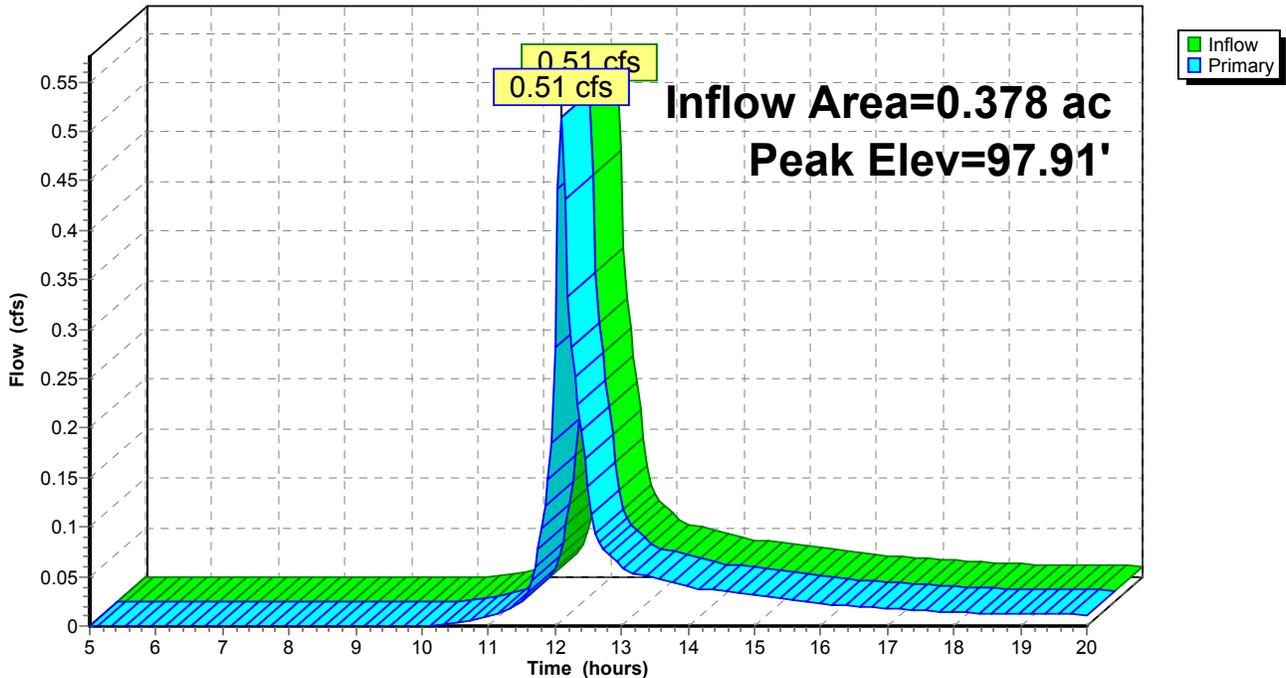
#	Routing	Invert	Outlet Devices
1	Primary	97.82'	24.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600

Primary OutFlow Max=0.51 cfs @ 12.10 hrs HW=97.91' (Free Discharge)

1=Orifice/Grate (Weir Controls 0.51 cfs @ 1.0 fps)

## Pond 2P: Stormceptor

Hydrograph



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Type III 24-hr 2 Year Storm Rainfall=3.20"

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 12/17/2014

**Pond 3P: Infiltration Field #1**

Exfiltration based on Class A soil with Design Infiltration Rate of 8.27 in/hr

Inflow Area = 0.378 ac, Inflow Depth = 1.11" for 2 Year Storm event  
 Inflow = 0.51 cfs @ 12.10 hrs, Volume= 0.035 af  
 Outflow = 0.32 cfs @ 12.05 hrs, Volume= 0.035 af, Atten= 38%, Lag= 0.0 min  
 Discarded = 0.32 cfs @ 12.05 hrs, Volume= 0.035 af

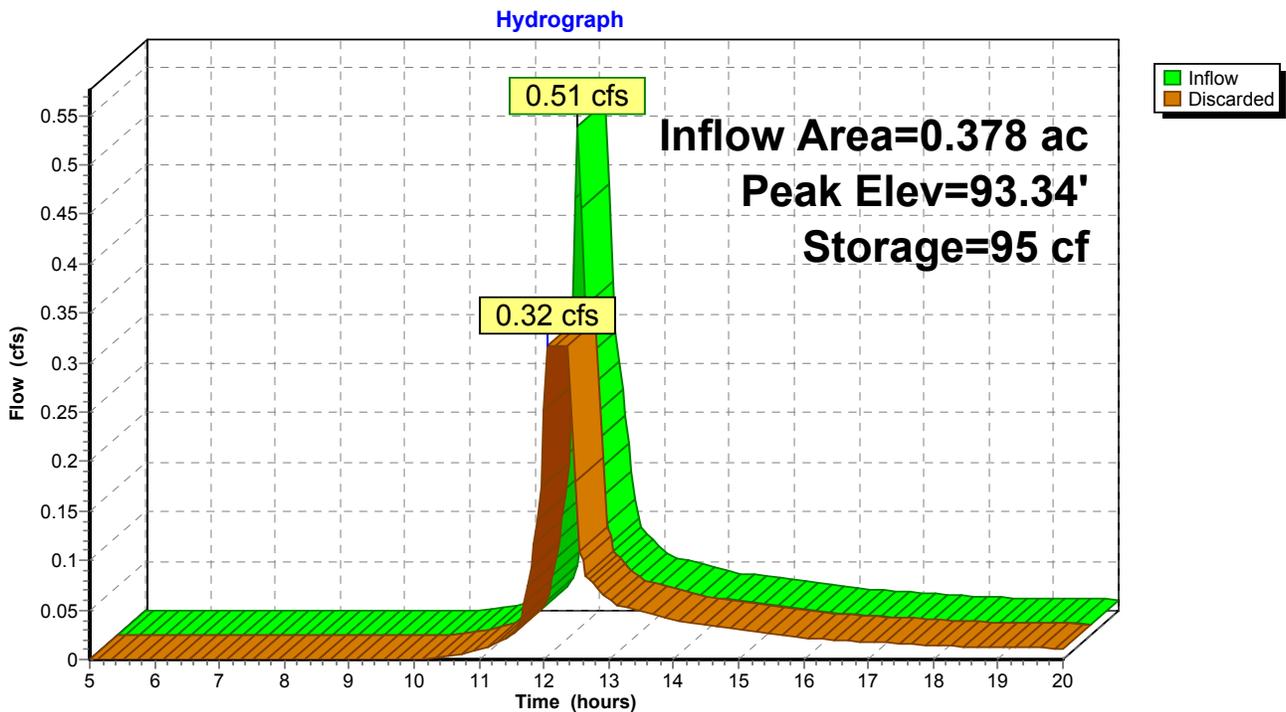
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 93.34' @ 12.22 hrs Surf.Area= 1,660 sf Storage= 95 cf  
 Plug-Flow detention time= 1.6 min calculated for 0.035 af (100% of inflow)  
 Center-of-Mass det. time= 1.5 min ( 812.6 - 811.1 )

#	Invert	Avail.Storage	Storage Description
1	93.20'	1,415 cf	<b>20.00'W x 83.00'L x 2.20'H Prismatic</b> 3,652 cf Overall - 114 cf Embedded = 3,538 cf x 40.0% Voids
2	93.70'	114 cf	<b>2.7"W x 18.5"H x 10.25'L Cultec 150XLHDx 48 Inside #1</b>
		1,529 cf	Total Available Storage

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	<b>0.011486 fpm Exfiltration over entire Surface area</b>

**Discarded OutFlow** Max=0.32 cfs @ 12.05 hrs HW=93.24' (Free Discharge)  
 ↑=Exfiltration (Exfiltration Controls 0.32 cfs)

**Pond 3P: Infiltration Field #1**



**Postdevelopment**

**Pond 4P: Outlet Control DMH**

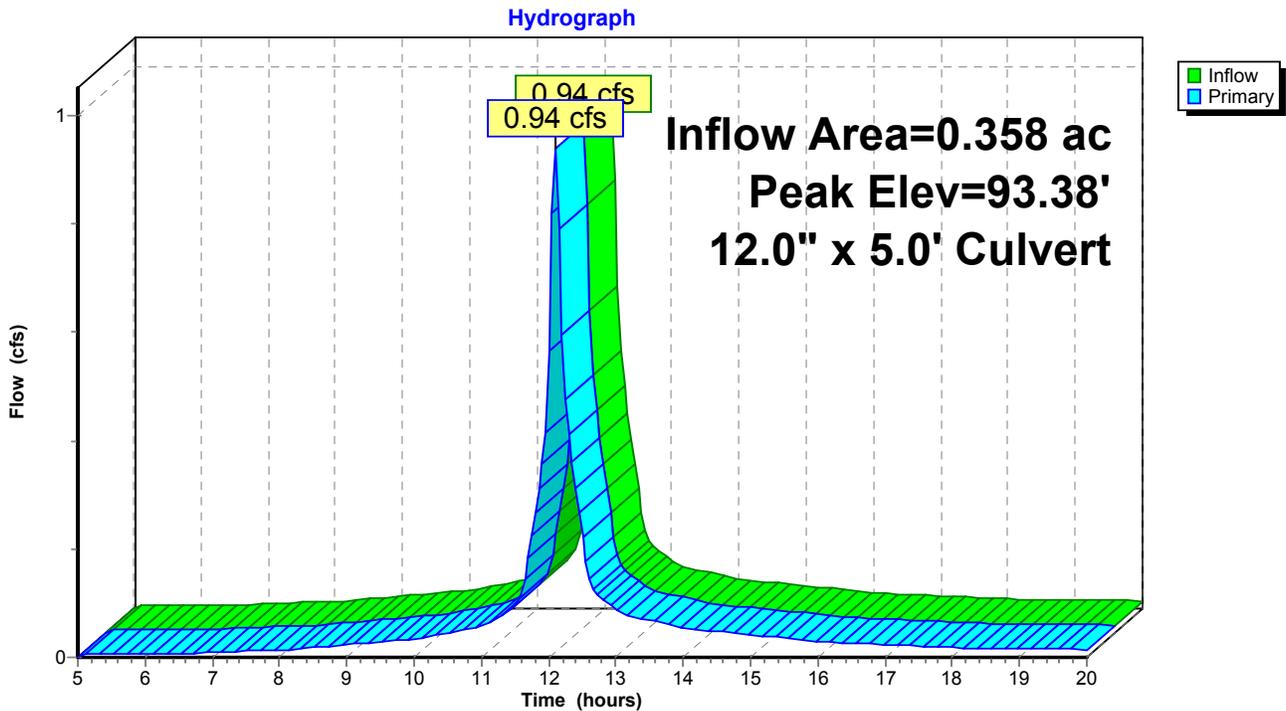
Inflow Area = 0.358 ac, Inflow Depth = 2.32" for 2 Year Storm event  
Inflow = 0.94 cfs @ 12.10 hrs, Volume= 0.069 af  
Outflow = 0.94 cfs @ 12.10 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.0 min  
Primary = 0.94 cfs @ 12.10 hrs, Volume= 0.069 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 93.38' @ 12.10 hrs  
Plug-Flow detention time= (not calculated: outflow precedes inflow)  
Center-of-Mass det. time= (not calculated)

#	Routing	Invert	Outlet Devices
1	Primary	90.55'	<b>12.0" x 5.0' long Culvert</b> CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 92.81' S= -0.4520 '/' n= 0.011 Cc= 0.900

**Primary OutFlow** Max=0.93 cfs @ 12.10 hrs HW=93.38' (Free Discharge)  
↑1=Culvert (Inlet Controls 0.93 cfs @ 2.0 fps)

**Pond 4P: Outlet Control DMH**



**Postdevelopment**

Type III 24-hr 2 Year Storm Rainfall=3.20"

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**Pond 6P: Infiltration Field #2**

Exfiltration based on Class A soil with Design Infiltration Rate of 8.27 in/hr

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Inflow Area =	0.358 ac,	Inflow Depth =	2.32"	for 2 Year Storm event
Inflow =	0.94 cfs @	12.10 hrs,	Volume=	0.069 af
Outflow =	0.42 cfs @	12.00 hrs,	Volume=	0.069 af, Atten= 56%, Lag= 0.0 min
Discarded =	0.42 cfs @	12.00 hrs,	Volume=	0.069 af
Primary =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 91.88' @ 12.30 hrs Surf.Area= 2,168 sf Storage= 328 cf  
 Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= (not calculated)

#	Invert	Avail.Storage	Storage Description
1	91.50'	1,848 cf	<b>23.25'W x 93.25'L x 2.20'H Prismatic</b> 4,770 cf Overall - 149 cf Embedded = 4,620 cf x 40.0% Voids
2	92.00'	149 cf	<b>2.7"W x 18.5"H x 10.25'L Cultec 150XLHD</b> x 63 Inside #1
		1,997 cf	Total Available Storage

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	<b>0.011486 fpm Exfiltration over entire Surface area</b>
2	Primary	94.00'	<b>24.0" Horiz. Orifice/Grate</b> Limited to weir flow C= 0.600

**Discarded OutFlow** Max=0.42 cfs @ 12.00 hrs HW=91.54' (Free Discharge)  
 ↑1=**Exfiltration** (Exfiltration Controls 0.42 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=91.50' (Free Discharge)  
 ↑2=**Orifice/Grate** ( Controls 0.00 cfs)

**Postdevelopment**

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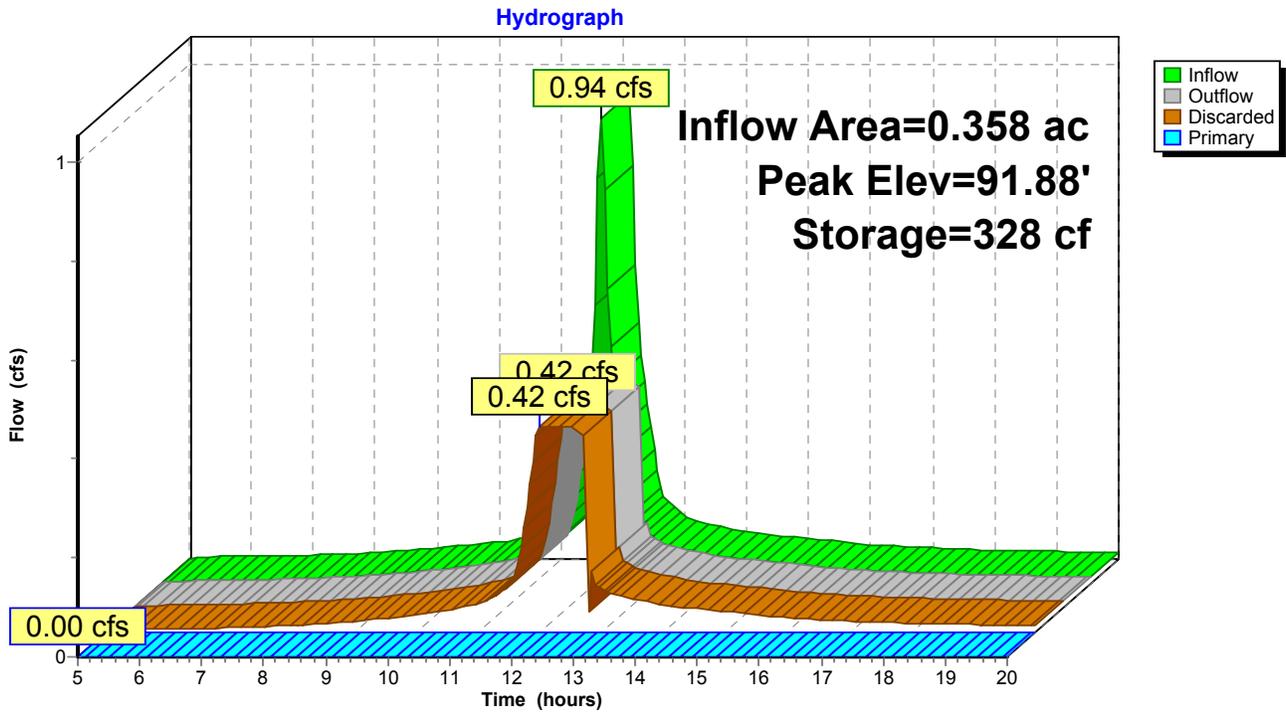
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Type III 24-hr 2 Year Storm Rainfall=3.20"

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**Pond 6P: Infiltration Field #2**



# Postdevelopment

Type III 24-hr 2 Year Storm Rainfall=3.20"

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## Pond 7P: Stormceptor

Inflow Area = 0.358 ac, Inflow Depth = 2.32" for 2 Year Storm event  
Inflow = 0.94 cfs @ 12.10 hrs, Volume= 0.069 af  
Outflow = 0.94 cfs @ 12.10 hrs, Volume= 0.069 af, Atten= 0%, Lag= 0.0 min  
Primary = 0.94 cfs @ 12.10 hrs, Volume= 0.069 af

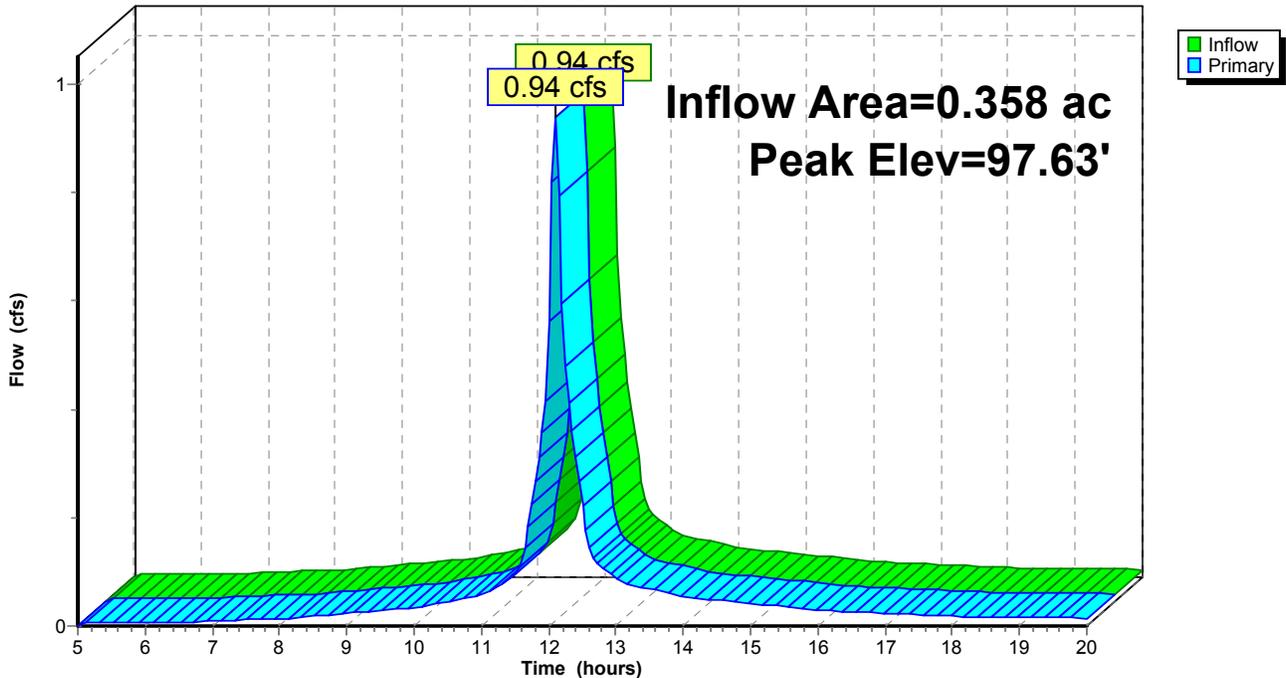
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Peak Elev= 97.63' @ 12.10 hrs  
Plug-Flow detention time= 0.0 min calculated for 0.069 af (100% of inflow)  
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

#	Routing	Invert	Outlet Devices
1	Primary	97.50'	24.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600

Primary OutFlow Max=0.93 cfs @ 12.10 hrs HW=97.63' (Free Discharge)  
↑1=Orifice/Grate (Weir Controls 0.93 cfs @ 1.2 fps)

## Pond 7P: Stormceptor

Hydrograph



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Type III 24-hr 2 Year Storm Rainfall=3.20"

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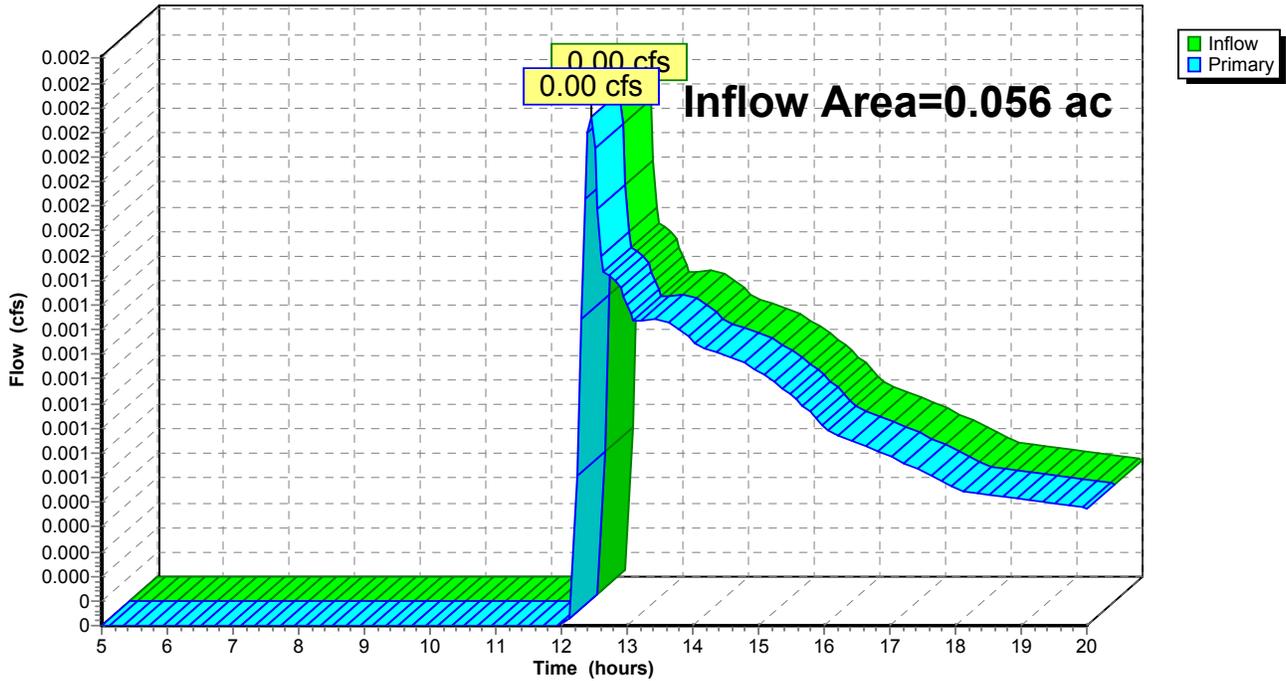
**Link 1L: (To Summer Avenue)**

Inflow Area = 0.056 ac, Inflow Depth = 0.12" for 2 Year Storm event  
Inflow = 0.00 cfs @ 12.44 hrs, Volume= 0.001 af  
Primary = 0.00 cfs @ 12.44 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Link 1L: (To Summer Avenue)**

Hydrograph



**Postdevelopment**

Type III 24-hr 2 Year Storm Rainfall=3.20"

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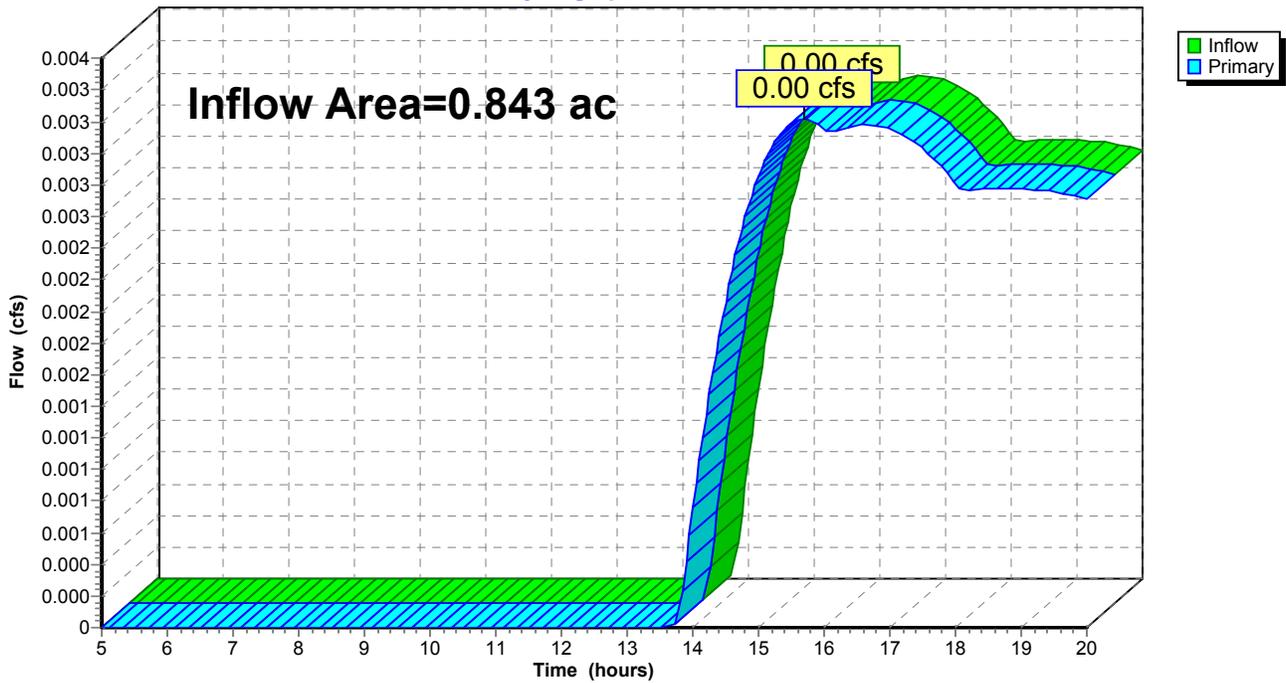
**Link 2L: To Rear of Site**

Inflow Area = 0.843 ac, Inflow Depth = 0.02" for 2 Year Storm event  
Inflow = 0.00 cfs @ 15.69 hrs, Volume= 0.001 af  
Primary = 0.00 cfs @ 15.69 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Link 2L: To Rear of Site**

Hydrograph



**Postdevelopment**

Type III 24-hr 10 Year Storm Rainfall=4.80"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

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

**Subcatchment 1S:** Runoff Area=2,442 sf Runoff Depth=0.58"  
Tc=6.0 min CN=51 Runoff=0.03 cfs 0.003 af

**Subcatchment 2S:** Runoff Area=16,486 sf Runoff Depth=2.28"  
Tc=6.0 min CN=77 Runoff=1.07 cfs 0.072 af

**Subcatchment 3S:** Runoff Area=8,610 sf Runoff Depth=3.38"  
Tc=6.0 min CN=89 Runoff=0.79 cfs 0.056 af

**Subcatchment 4S:** Runoff Area=36,718 sf Runoff Depth=0.28"  
Tc=6.0 min CN=44 Runoff=0.11 cfs 0.020 af

**Subcatchment 5S:** Runoff Area=6,978 sf Runoff Depth=4.24"  
Tc=6.0 min CN=98 Runoff=0.73 cfs 0.057 af

**Reach 1R:** Peak Depth=0.33' Max Vel=4.8 fps Inflow=1.07 cfs 0.072 af  
D=12.0" n=0.011 L=2.5' S=0.0120 '/ Capacity=4.61 cfs Outflow=1.07 cfs 0.072 af

**Reach 2R:** Peak Depth=0.35' Max Vel=3.2 fps Inflow=0.79 cfs 0.056 af  
D=12.0" n=0.011 L=90.0' S=0.0050 '/ Capacity=2.98 cfs Outflow=0.78 cfs 0.056 af

**Reach 3R:** Peak Depth=0.25' Max Vel=4.8 fps Inflow=0.73 cfs 0.057 af  
D=12.0" n=0.011 L=27.0' S=0.0167 '/ Capacity=5.44 cfs Outflow=0.73 cfs 0.057 af

**Reach 5R:** Peak Depth=0.30' Max Vel=7.5 fps Inflow=1.50 cfs 0.112 af  
D=12.0" n=0.011 L=5.0' S=0.0320 '/ Capacity=7.53 cfs Outflow=1.50 cfs 0.112 af

**Pond 1P: CB** Peak Elev=98.08' Inflow=1.07 cfs 0.072 af  
Outflow=1.07 cfs 0.072 af

**Pond 2P: Stormceptor** Peak Elev=97.96' Inflow=1.07 cfs 0.072 af  
Outflow=1.07 cfs 0.072 af

**Pond 3P: Infiltration Field #1** Peak Elev=94.08' Storage=609 cf Inflow=1.07 cfs 0.072 af  
Outflow=0.32 cfs 0.072 af

**Pond 4P: Outlet Control DMH** Peak Elev=93.57' Inflow=1.50 cfs 0.112 af  
12.0" x 5.0' Culvert Outflow=1.50 cfs 0.112 af

**Pond 6P: Infiltration Field #2** Peak Elev=92.55' Storage=958 cf Inflow=1.50 cfs 0.112 af  
Discarded=0.42 cfs 0.112 af Primary=0.00 cfs 0.000 af Outflow=0.42 cfs 0.112 af

**Pond 7P: Stormceptor** Peak Elev=97.67' Inflow=1.50 cfs 0.112 af  
Outflow=1.50 cfs 0.112 af

**Postdevelopment**

*Type III 24-hr 10 Year Storm Rainfall=4.80"*

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**Link 1L: (To Summer Avenue)**

Inflow=0.03 cfs 0.003 af  
Primary=0.03 cfs 0.003 af

**Link 2L: To Rear of Site**

Inflow=0.11 cfs 0.020 af  
Primary=0.11 cfs 0.020 af

**Total Runoff Area = 1.635 ac Runoff Volume = 0.207 af Average Runoff Depth = 1.52"**

# Postdevelopment

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Type III 24-hr 10 Year Storm Rainfall=4.80"

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## Subcatchment 1S:

Runoff = 0.03 cfs @ 12.13 hrs, Volume= 0.003 af, Depth= 0.58"

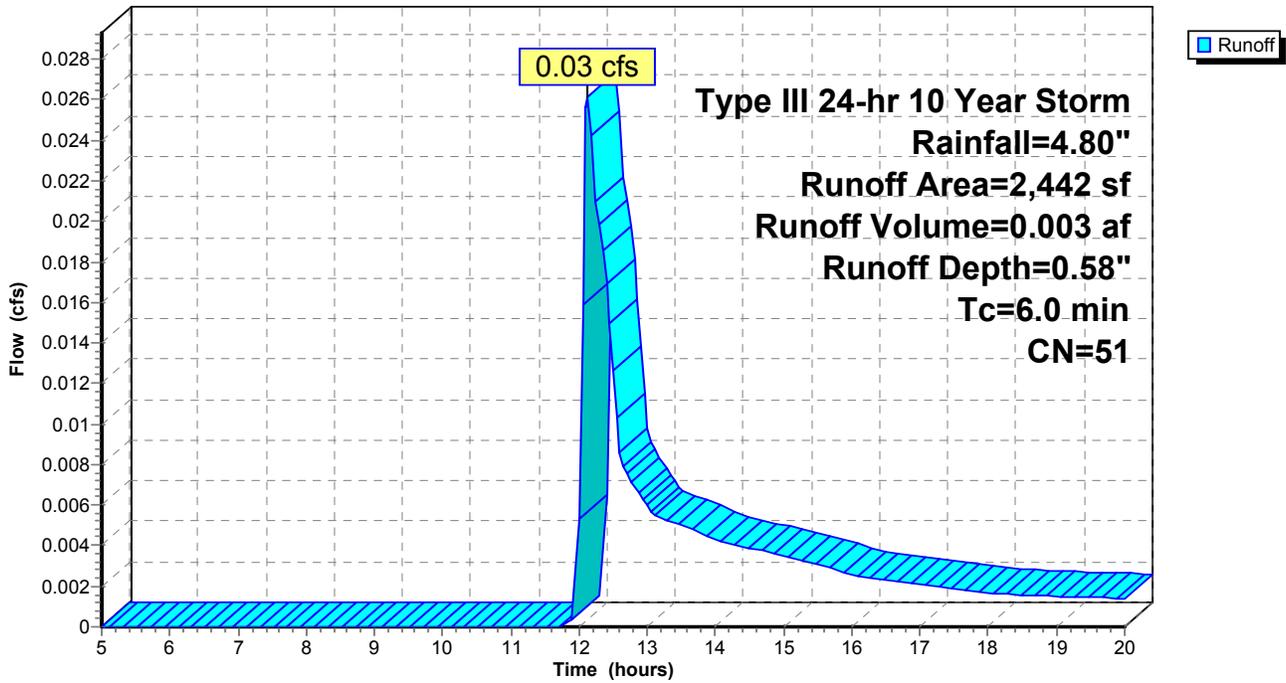
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10 Year Storm Rainfall=4.80"

Area (sf)	CN	Description
107	98	Portion of Front Porch
2,335	49	50-75% Grass cover, Fair, HSG A
2,442	51	Weighted Average

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

## Subcatchment 1S:

Hydrograph



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Type III 24-hr 10 Year Storm Rainfall=4.80"

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**Subcatchment 2S:**

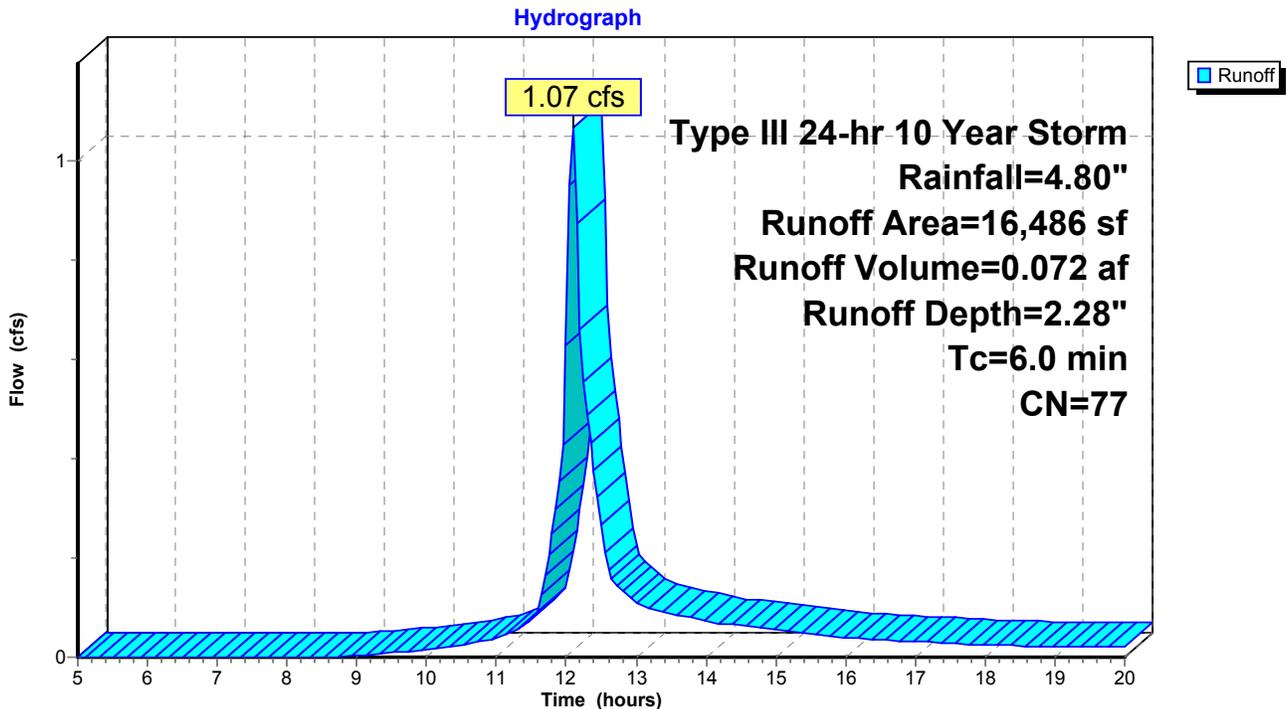
Runoff = 1.07 cfs @ 12.09 hrs, Volume= 0.072 af, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 10 Year Storm Rainfall=4.80"

Area (sf)	CN	Description
1,545	98	Portion of Building Roof
283	98	Roof Area of Porch
1,228	98	Cement Conc. Walkways
6,171	98	Porous Pavement Area
184	98	Vertical Granite Curb
7,075	49	50-75% Grass cover, Fair, HSG A
16,486	77	Weighted Average

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

**Subcatchment 2S:**



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Type III 24-hr 10 Year Storm Rainfall=4.80"

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## Subcatchment 3S:

Runoff = 0.79 cfs @ 12.09 hrs, Volume= 0.056 af, Depth= 3.38"

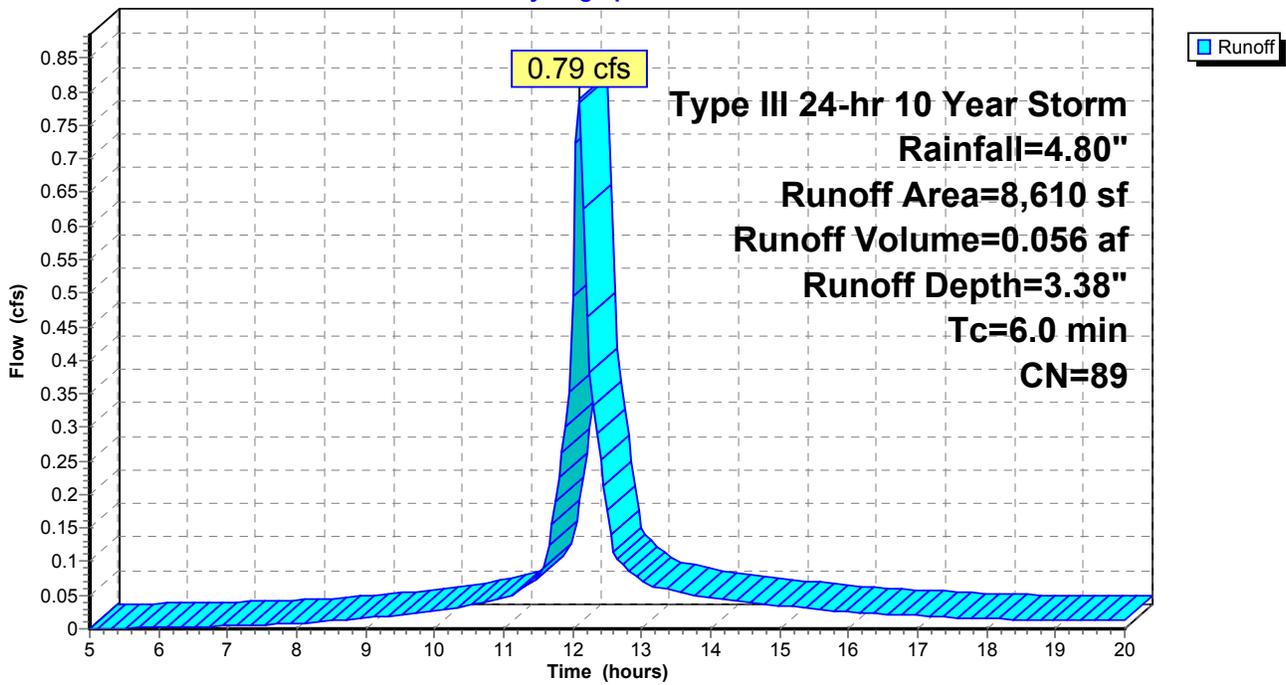
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10 Year Storm Rainfall=4.80"

Area (sf)	CN	Description
1,336	39	>75% Grass cover, Good, HSG A
7,274	98	Pavement, Curb, Walks, Dumpster Pad
8,610	89	Weighted Average

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

## Subcatchment 3S:

Hydrograph



**Postdevelopment**

Type III 24-hr 10 Year Storm Rainfall=4.80"

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**Subcatchment 4S:**

Runoff = 0.11 cfs @ 12.36 hrs, Volume= 0.020 af, Depth= 0.28"

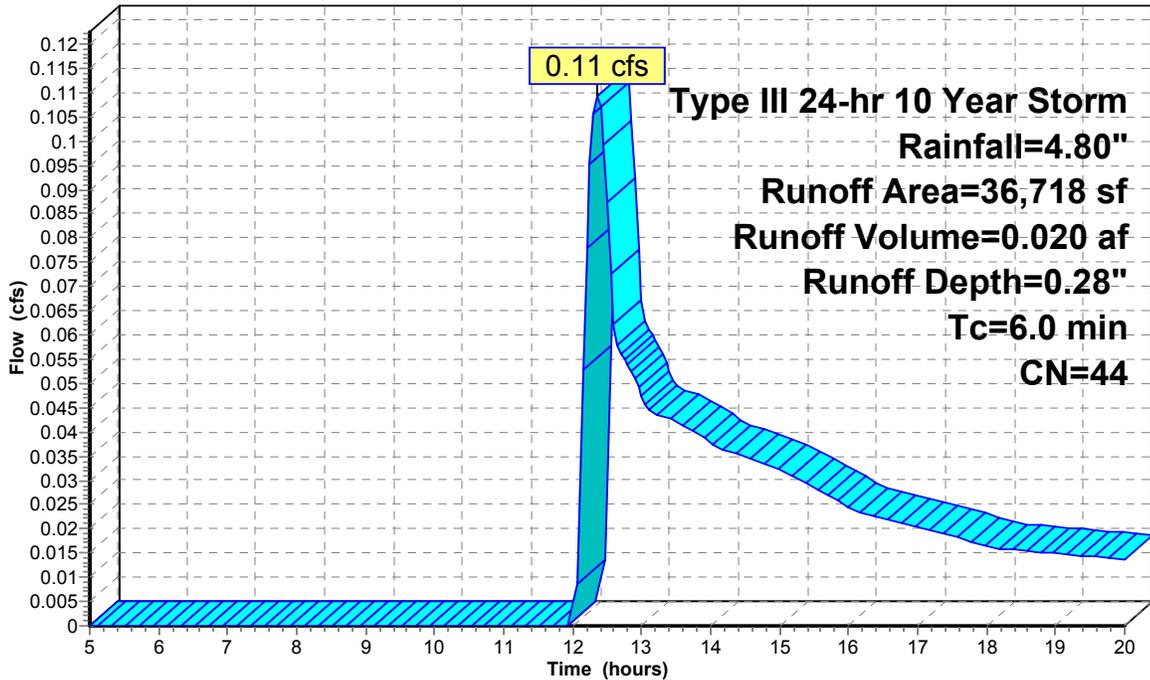
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 10 Year Storm Rainfall=4.80"

Area (sf)	CN	Description
612	98	1/2 of Barn Roof Area
2,274	98	Portion of Building Roof
4,455	49	50-75% Grass cover, Fair, HSG A
1,200	77	Woodchipped Play Area
28,177	36	Woods, Fair, HSG A
36,718	44	Weighted Average

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

**Subcatchment 4S:**

Hydrograph



**Type III 24-hr 10 Year Storm  
 Rainfall=4.80"  
 Runoff Area=36,718 sf  
 Runoff Volume=0.020 af  
 Runoff Depth=0.28"  
 Tc=6.0 min  
 CN=44**

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Type III 24-hr 10 Year Storm Rainfall=4.80"

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**Subcatchment 5S:**

Runoff = 0.73 cfs @ 12.09 hrs, Volume= 0.057 af, Depth= 4.24"

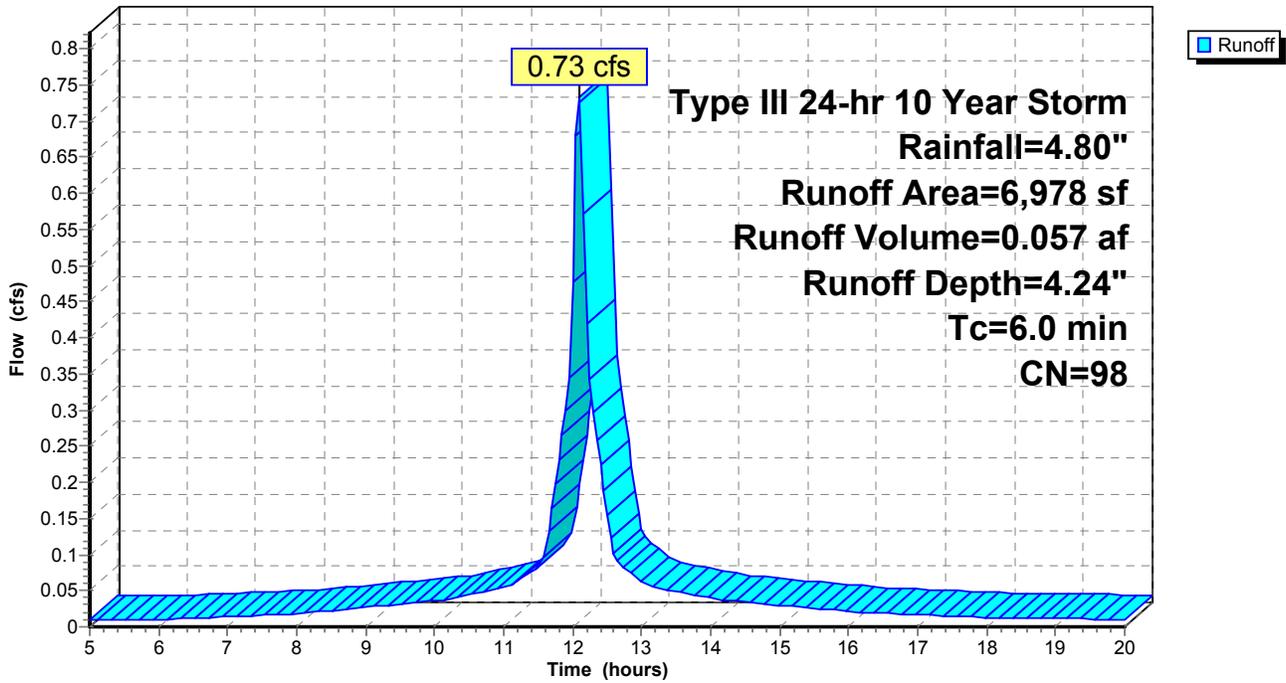
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10 Year Storm Rainfall=4.80"

Area (sf)	CN	Description
50	39	>75% Grass cover, Good, HSG A
6,928	98	Pavement, Curb, Walks
6,978	98	Weighted Average

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

**Subcatchment 5S:**

Hydrograph



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Type III 24-hr 10 Year Storm Rainfall=4.80"

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## Reach 1R:

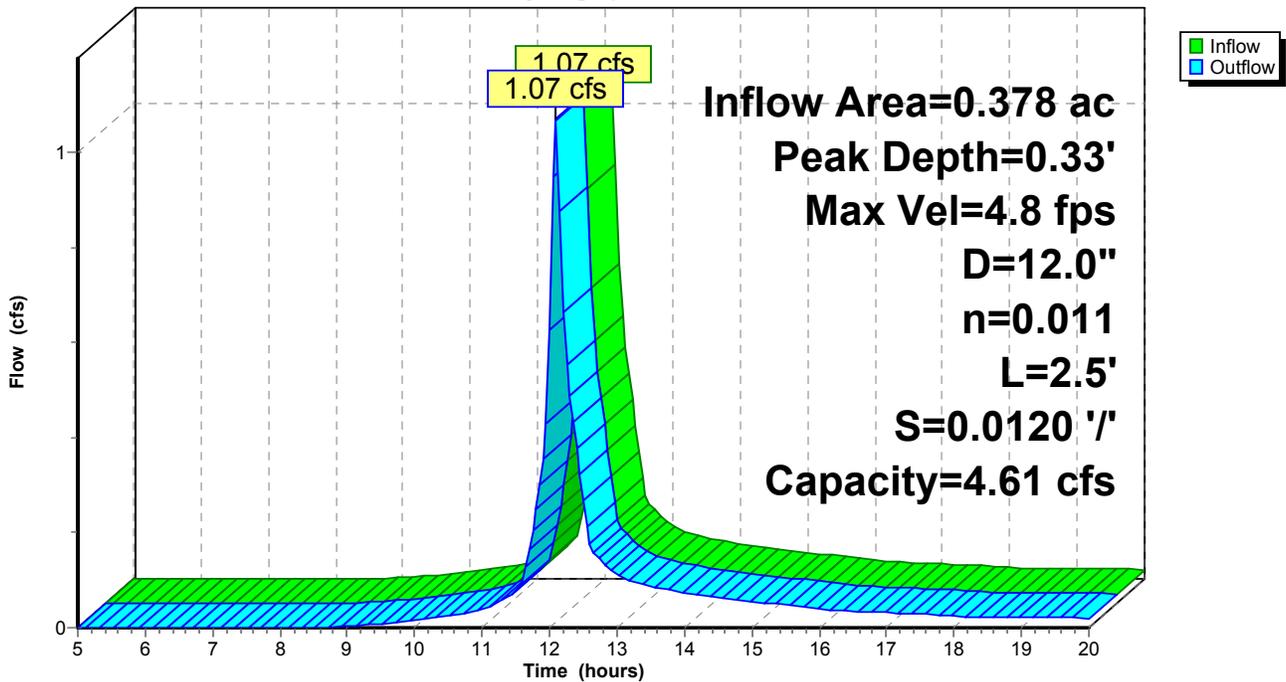
Inflow Area = 0.378 ac, Inflow Depth = 2.28" for 10 Year Storm event  
Inflow = 1.07 cfs @ 12.09 hrs, Volume= 0.072 af  
Outflow = 1.07 cfs @ 12.09 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 4.8 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 1.9 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.33' @ 12.09 hrs  
Capacity at bank full= 4.61 cfs  
Inlet Invert= 94.53', Outlet Invert= 94.50'  
12.0" Diameter Pipe n= 0.011 Length= 2.5' Slope= 0.0120 '/'

## Reach 1R:

Hydrograph



# Postdevelopment

Type III 24-hr 10 Year Storm Rainfall=4.80"

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## Reach 2R:

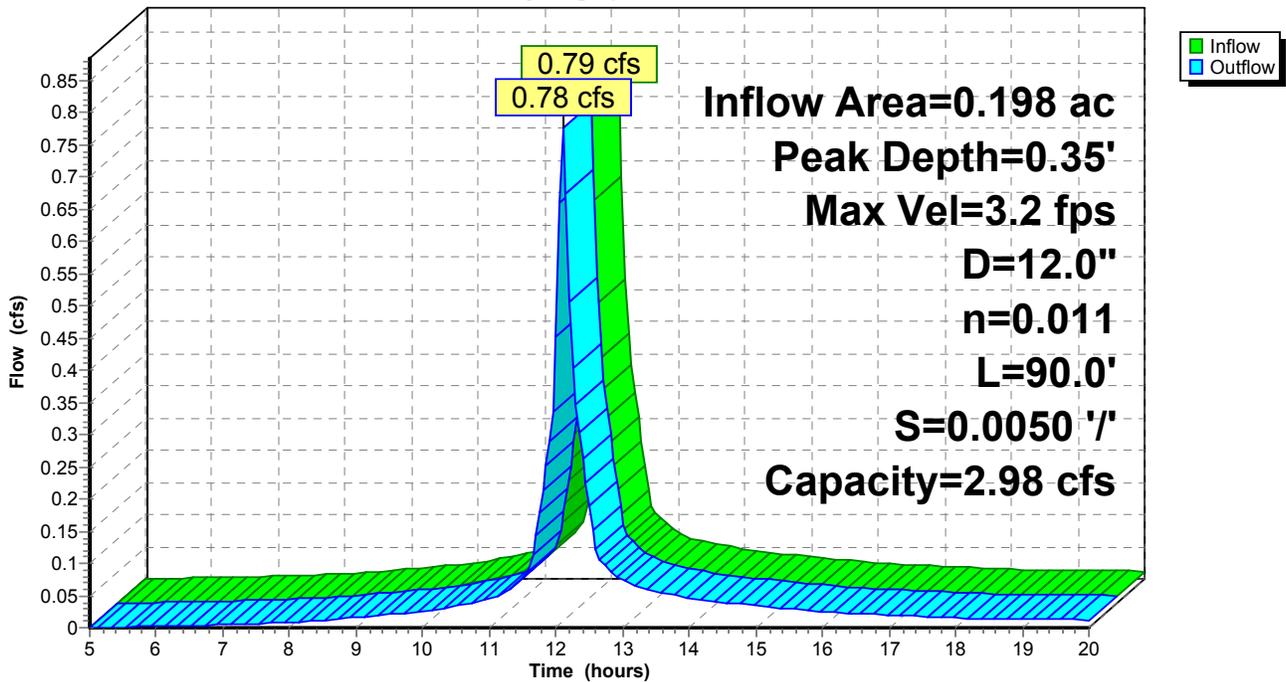
Inflow Area = 0.198 ac, Inflow Depth = 3.38" for 10 Year Storm event  
Inflow = 0.79 cfs @ 12.09 hrs, Volume= 0.056 af  
Outflow = 0.78 cfs @ 12.10 hrs, Volume= 0.056 af, Atten= 2%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 3.2 fps, Min. Travel Time= 0.5 min  
Avg. Velocity = 1.1 fps, Avg. Travel Time= 1.3 min

Peak Depth= 0.35' @ 12.10 hrs  
Capacity at bank full= 2.98 cfs  
Inlet Invert= 91.00', Outlet Invert= 90.55'  
12.0" Diameter Pipe n= 0.011 Length= 90.0' Slope= 0.0050 '/'

## Reach 2R:

Hydrograph



# Postdevelopment

Type III 24-hr 10 Year Storm Rainfall=4.80"

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## Reach 3R:

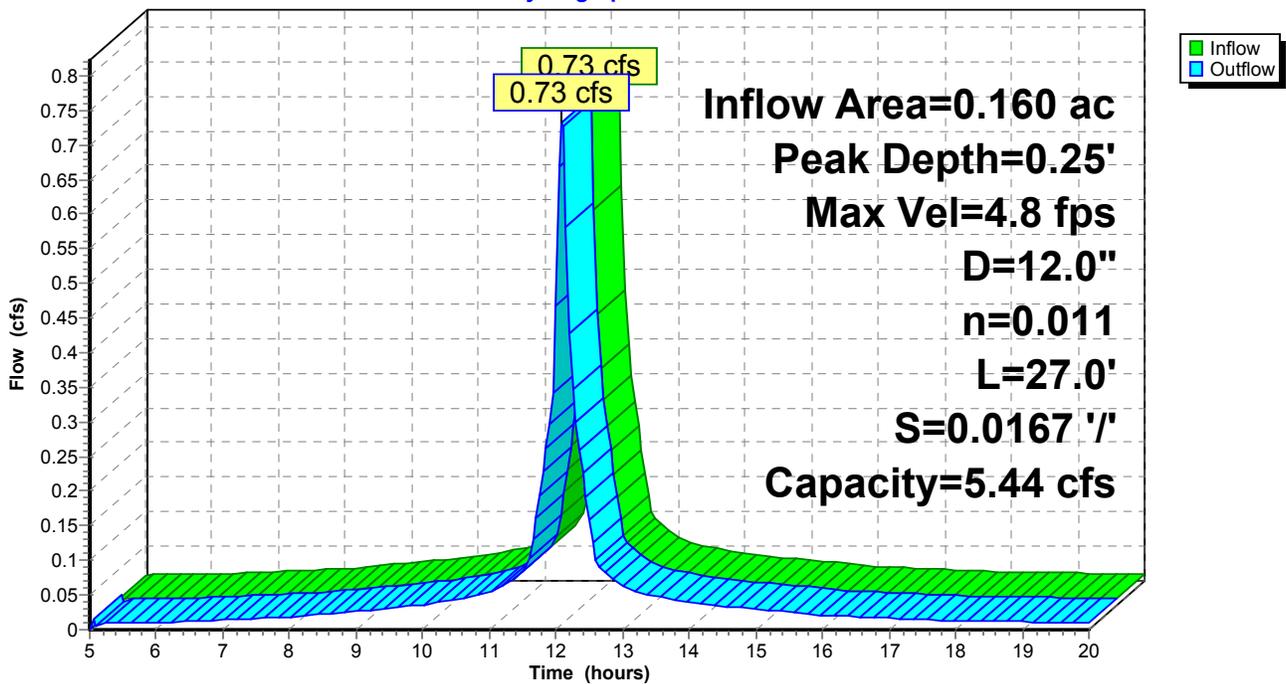
Inflow Area = 0.160 ac, Inflow Depth = 4.24" for 10 Year Storm event  
Inflow = 0.73 cfs @ 12.09 hrs, Volume= 0.057 af  
Outflow = 0.73 cfs @ 12.09 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 4.8 fps, Min. Travel Time= 0.1 min  
Avg. Velocity = 1.8 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.25' @ 12.09 hrs  
Capacity at bank full= 5.44 cfs  
Inlet Invert= 91.00', Outlet Invert= 90.55'  
12.0" Diameter Pipe n= 0.011 Length= 27.0' Slope= 0.0167 '/'

## Reach 3R:

Hydrograph



# Postdevelopment

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Type III 24-hr 10 Year Storm Rainfall=4.80"

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12/17/2014

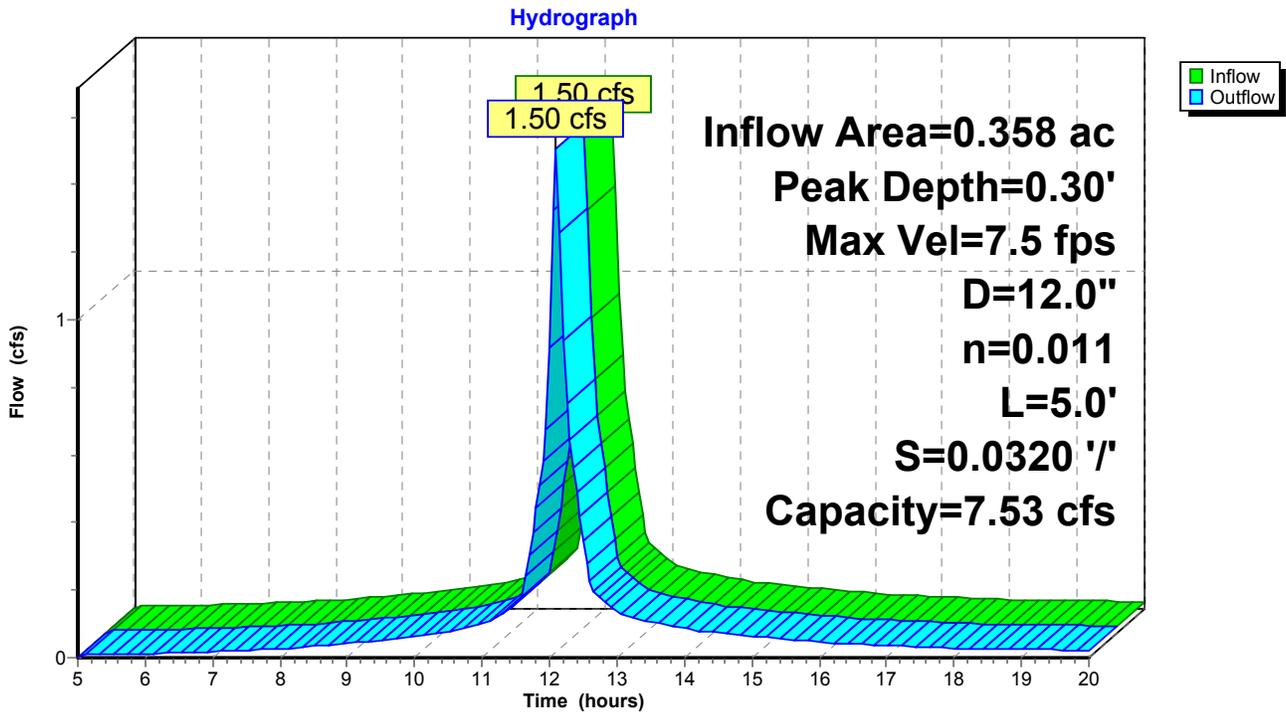
## Reach 5R:

Inflow Area = 0.358 ac, Inflow Depth = 3.76" for 10 Year Storm event  
Inflow = 1.50 cfs @ 12.10 hrs, Volume= 0.112 af  
Outflow = 1.50 cfs @ 12.10 hrs, Volume= 0.112 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 7.5 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 2.8 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.30' @ 12.10 hrs  
Capacity at bank full= 7.53 cfs  
Inlet Invert= 92.81', Outlet Invert= 92.65'  
12.0" Diameter Pipe n= 0.011 Length= 5.0' Slope= 0.0320 '/'

## Reach 5R:



# Postdevelopment

Type III 24-hr 10 Year Storm Rainfall=4.80"

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## Pond 1P: CB

Inflow Area = 0.378 ac, Inflow Depth = 2.28" for 10 Year Storm event  
Inflow = 1.07 cfs @ 12.09 hrs, Volume= 0.072 af  
Outflow = 1.07 cfs @ 12.09 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.07 cfs @ 12.09 hrs, Volume= 0.072 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 98.08' @ 12.09 hrs

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated)

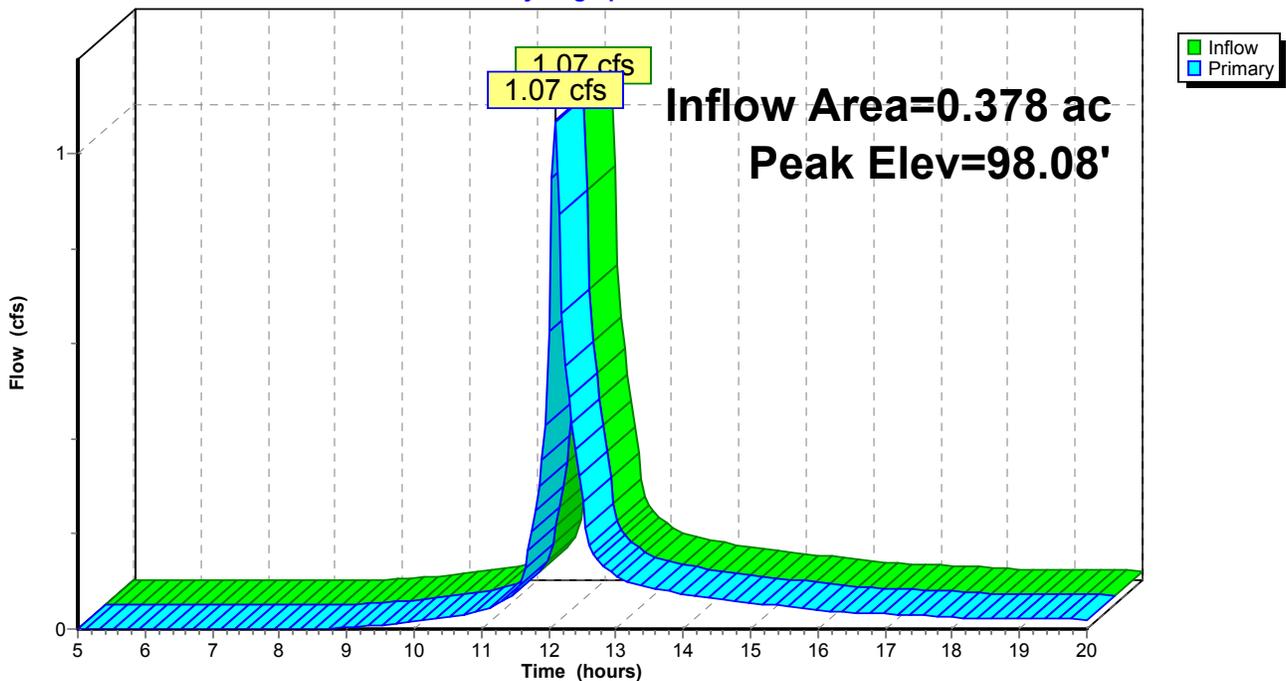
#	Routing	Invert	Outlet Devices
1	Primary	97.66'	24.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=1.05 cfs @ 12.09 hrs HW=98.08' (Free Discharge)

↑1=Orifice/Grate (Orifice Controls 1.05 cfs @ 2.2 fps)

## Pond 1P: CB

Hydrograph



# Postdevelopment

Type III 24-hr 10 Year Storm Rainfall=4.80"

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## Pond 2P: Stormceptor

Inflow Area = 0.378 ac, Inflow Depth = 2.28" for 10 Year Storm event  
Inflow = 1.07 cfs @ 12.09 hrs, Volume= 0.072 af  
Outflow = 1.07 cfs @ 12.09 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.07 cfs @ 12.09 hrs, Volume= 0.072 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 97.96' @ 12.09 hrs

Plug-Flow detention time= (not calculated)

Center-of-Mass det. time= (not calculated)

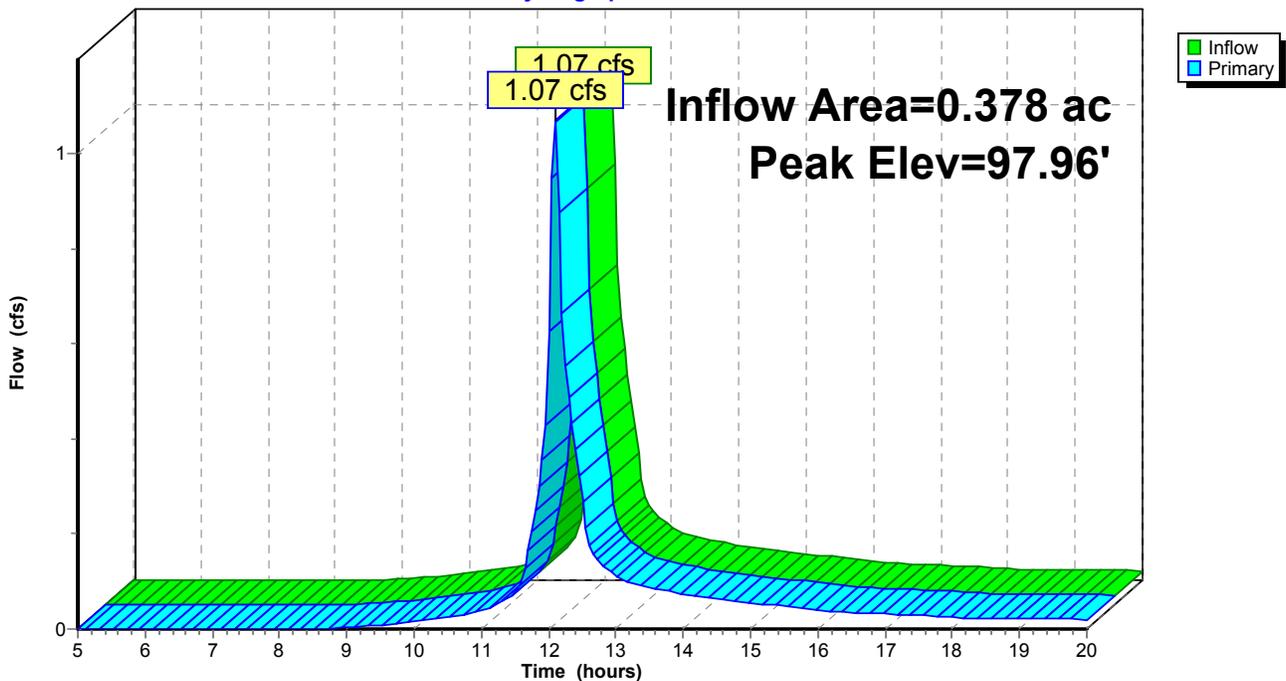
#	Routing	Invert	Outlet Devices
1	Primary	97.82'	24.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600

Primary OutFlow Max=1.05 cfs @ 12.09 hrs HW=97.96' (Free Discharge)

1=Orifice/Grate (Weir Controls 1.05 cfs @ 1.2 fps)

## Pond 2P: Stormceptor

Hydrograph



**Postdevelopment**

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Type III 24-hr 10 Year Storm Rainfall=4.80"

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**Pond 3P: Infiltration Field #1**

Exfiltration based on Class A soil with Design Infiltration Rate of 8.27 in/hr

Inflow Area = 0.378 ac, Inflow Depth = 2.28" for 10 Year Storm event  
 Inflow = 1.07 cfs @ 12.09 hrs, Volume= 0.072 af  
 Outflow = 0.32 cfs @ 11.90 hrs, Volume= 0.072 af, Atten= 70%, Lag= 0.0 min  
 Discarded = 0.32 cfs @ 11.90 hrs, Volume= 0.072 af

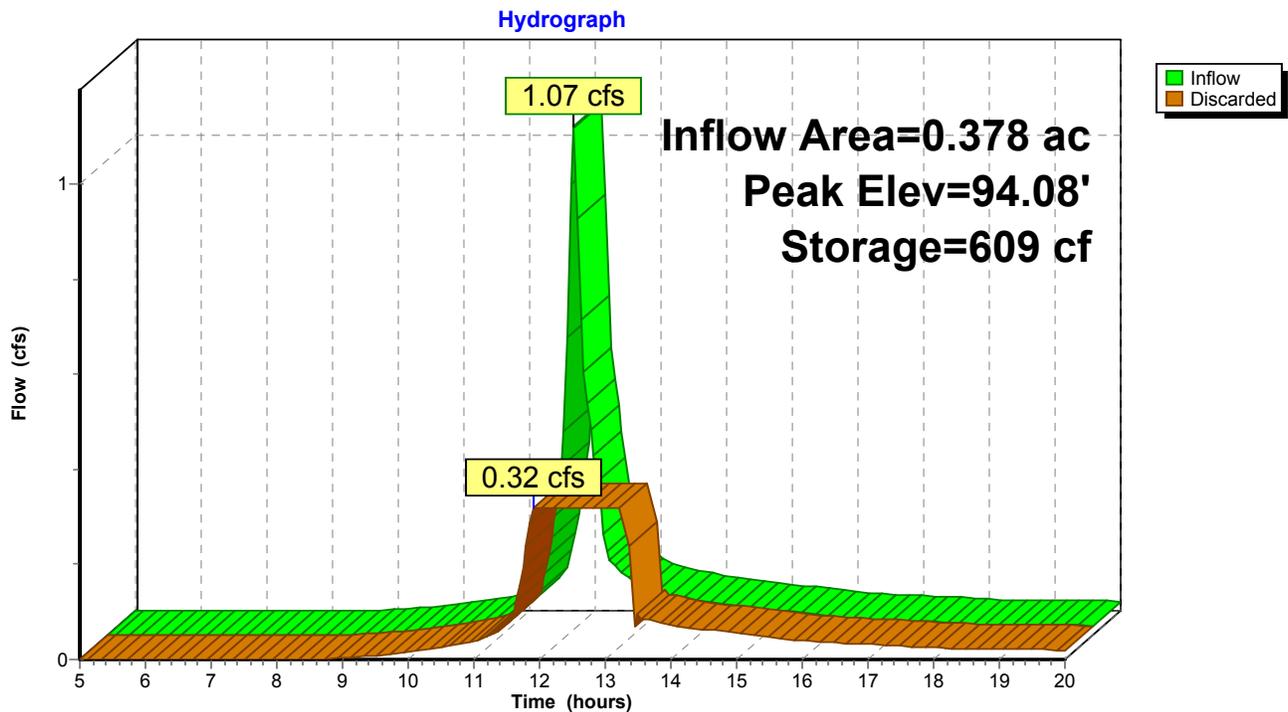
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 94.08' @ 12.45 hrs Surf.Area= 1,660 sf Storage= 609 cf  
 Plug-Flow detention time= 10.5 min calculated for 0.072 af (100% of inflow)  
 Center-of-Mass det. time= 10.3 min ( 805.3 - 795.0 )

#	Invert	Avail.Storage	Storage Description
1	93.20'	1,415 cf	<b>20.00'W x 83.00'L x 2.20'H Prismaoid</b> 3,652 cf Overall - 114 cf Embedded = 3,538 cf x 40.0% Voids
2	93.70'	114 cf	<b>2.7"W x 18.5"H x 10.25'L Cultec 150XLHDx 48 Inside #1</b>
		1,529 cf	Total Available Storage

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	<b>0.011486 fpm Exfiltration over entire Surface area</b>

**Discarded OutFlow** Max=0.32 cfs @ 11.90 hrs HW=93.23' (Free Discharge)  
 ↑=Exfiltration (Exfiltration Controls 0.32 cfs)

**Pond 3P: Infiltration Field #1**



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Type III 24-hr 10 Year Storm Rainfall=4.80"

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**Pond 4P: Outlet Control DMH**

Inflow Area = 0.358 ac, Inflow Depth = 3.76" for 10 Year Storm event  
Inflow = 1.50 cfs @ 12.10 hrs, Volume= 0.112 af  
Outflow = 1.50 cfs @ 12.10 hrs, Volume= 0.112 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.50 cfs @ 12.10 hrs, Volume= 0.112 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 93.57' @ 12.10 hrs

Plug-Flow detention time= (not calculated: outflow precedes inflow)

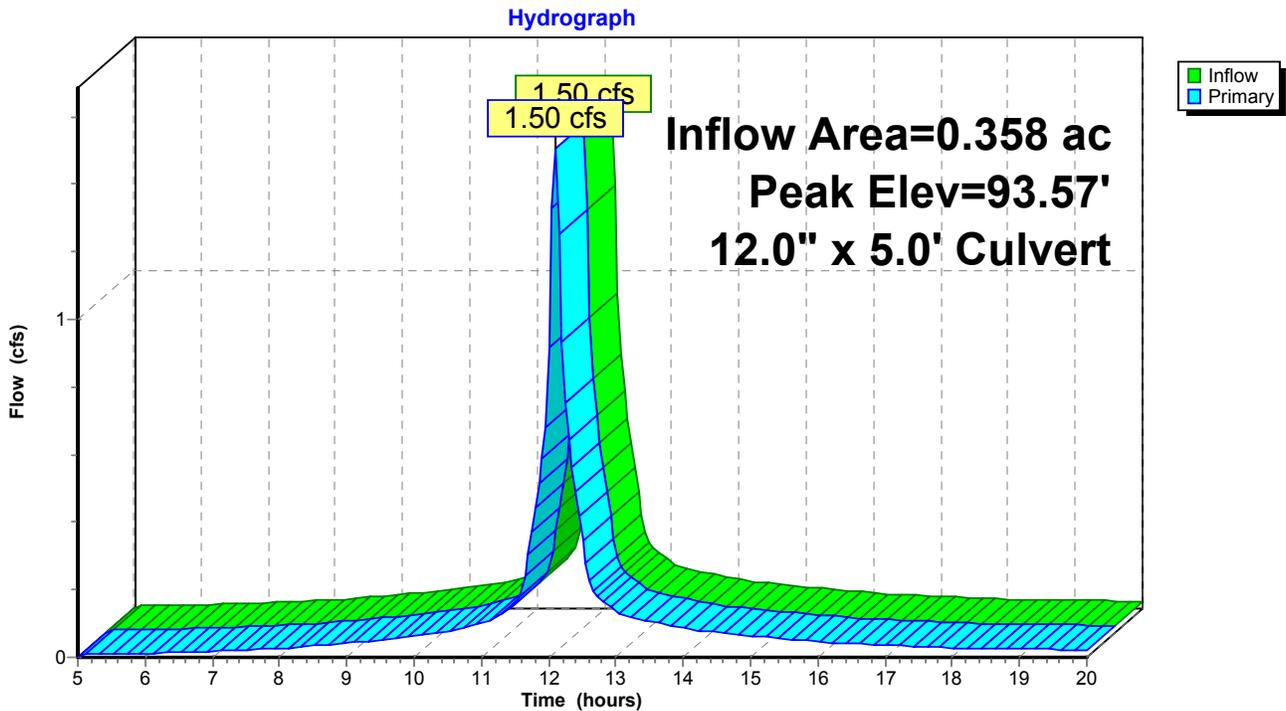
Center-of-Mass det. time= (not calculated)

#	Routing	Invert	Outlet Devices
1	Primary	90.55'	<b>12.0" x 5.0' long Culvert</b> CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 92.81' S= -0.4520 '/ n= 0.011 Cc= 0.900

**Primary OutFlow** Max=1.49 cfs @ 12.10 hrs HW=93.57' (Free Discharge)

↑1=Culvert (Inlet Controls 1.49 cfs @ 2.3 fps)

**Pond 4P: Outlet Control DMH**



**Postdevelopment**

Type III 24-hr 10 Year Storm Rainfall=4.80"

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**Pond 6P: Infiltration Field #2**

Exfiltration based on Class A soil with Design Infiltration Rate of 8.27 in/hr

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Inflow Area = 0.358 ac, Inflow Depth = 3.76" for 10 Year Storm event  
 Inflow = 1.50 cfs @ 12.10 hrs, Volume= 0.112 af  
 Outflow = 0.42 cfs @ 11.80 hrs, Volume= 0.112 af, Atten= 72%, Lag= 0.0 min  
 Discarded = 0.42 cfs @ 11.80 hrs, Volume= 0.112 af  
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 92.55' @ 12.45 hrs Surf.Area= 2,168 sf Storage= 958 cf  
 Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= (not calculated)

#	Invert	Avail.Storage	Storage Description
1	91.50'	1,848 cf	<b>23.25'W x 93.25'L x 2.20'H Prismatic</b> 4,770 cf Overall - 149 cf Embedded = 4,620 cf x 40.0% Voids
2	92.00'	149 cf	<b>2.7"W x 18.5"H x 10.25'L Cultec 150XLHD</b> x 63 Inside #1
		1,997 cf	Total Available Storage

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	<b>0.011486 fpm Exfiltration over entire Surface area</b>
2	Primary	94.00'	<b>24.0" Horiz. Orifice/Grate</b> Limited to weir flow C= 0.600

**Discarded OutFlow** Max=0.42 cfs @ 11.80 hrs HW=91.53' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.42 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=91.50' (Free Discharge)  
 ↑2=Orifice/Grate ( Controls 0.00 cfs)

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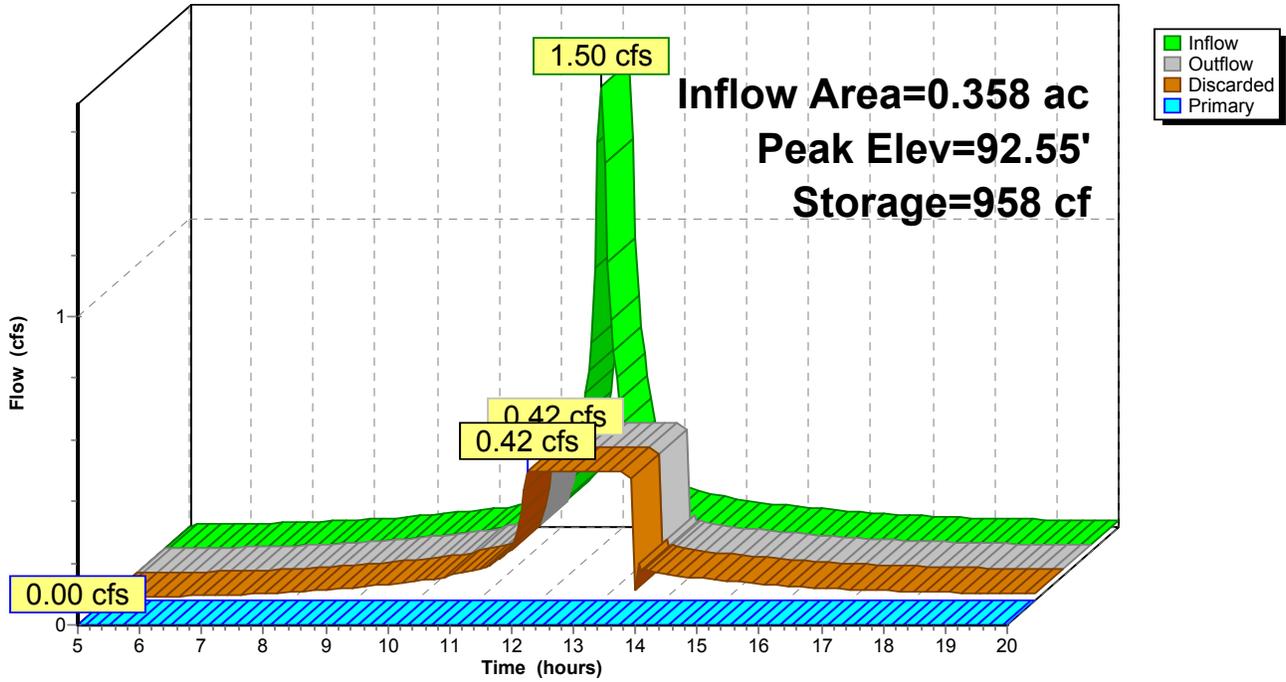
Type III 24-hr 10 Year Storm Rainfall=4.80"

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**Pond 6P: Infiltration Field #2**

Hydrograph



# Postdevelopment

Type III 24-hr 10 Year Storm Rainfall=4.80"

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## Pond 7P: Stormceptor

Inflow Area = 0.358 ac, Inflow Depth = 3.76" for 10 Year Storm event  
Inflow = 1.50 cfs @ 12.10 hrs, Volume= 0.112 af  
Outflow = 1.50 cfs @ 12.10 hrs, Volume= 0.112 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.50 cfs @ 12.10 hrs, Volume= 0.112 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 97.67' @ 12.10 hrs

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated)

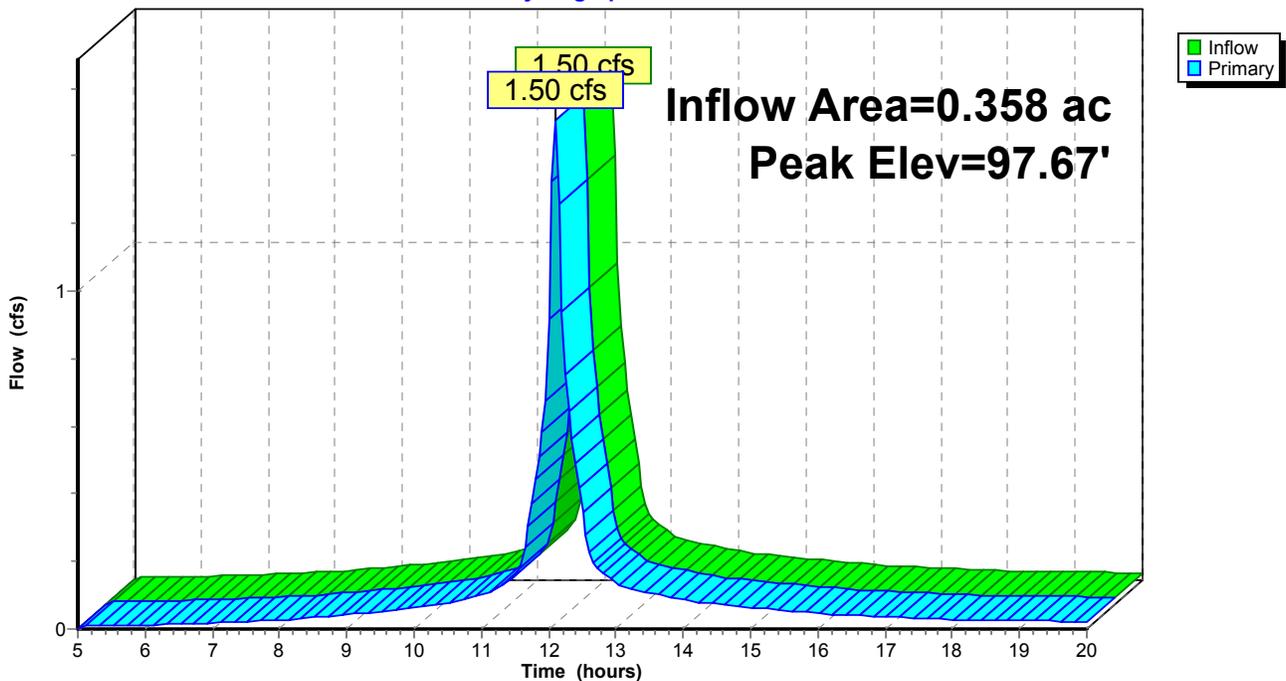
#	Routing	Invert	Outlet Devices
1	Primary	97.50'	24.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600

Primary OutFlow Max=1.49 cfs @ 12.10 hrs HW=97.67' (Free Discharge)

↑1=Orifice/Grate (Weir Controls 1.49 cfs @ 1.4 fps)

## Pond 7P: Stormceptor

Hydrograph



**Postdevelopment**

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Type III 24-hr 10 Year Storm Rainfall=4.80"

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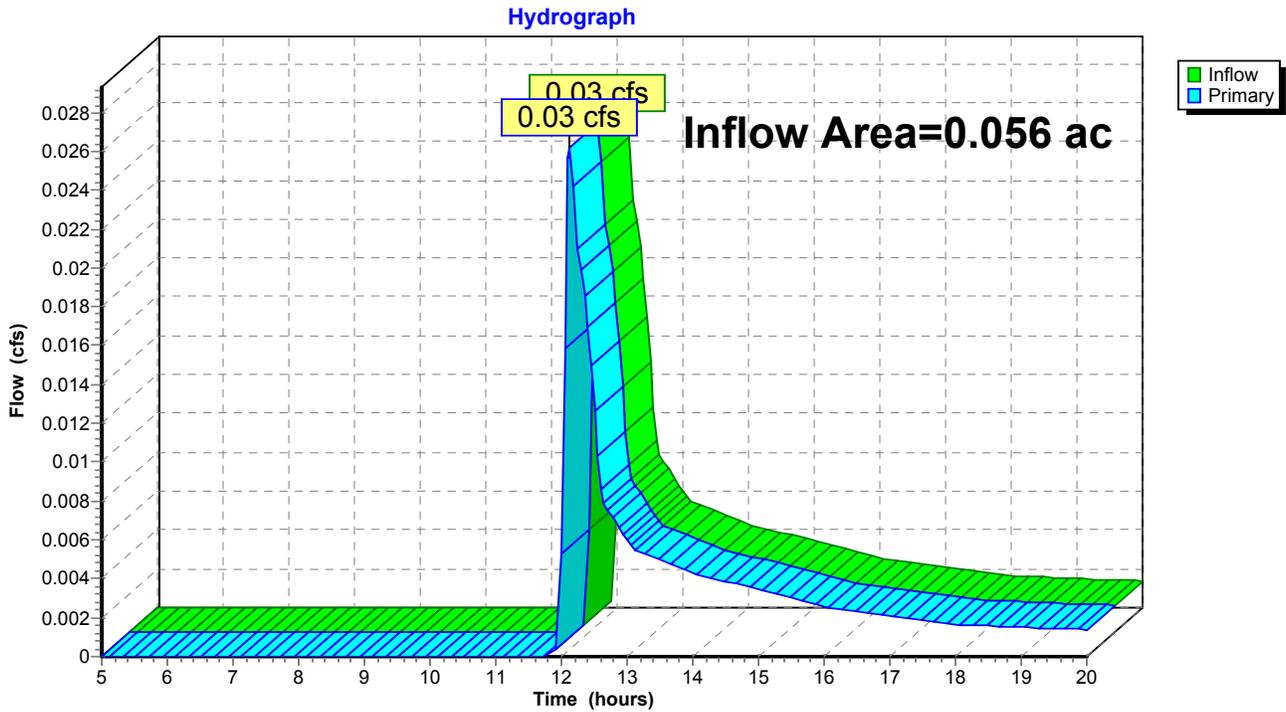
12/17/2014

**Link 1L: (To Summer Avenue)**

Inflow Area = 0.056 ac, Inflow Depth = 0.58" for 10 Year Storm event  
Inflow = 0.03 cfs @ 12.13 hrs, Volume= 0.003 af  
Primary = 0.03 cfs @ 12.13 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Link 1L: (To Summer Avenue)**



**Postdevelopment**

Type III 24-hr 10 Year Storm Rainfall=4.80"

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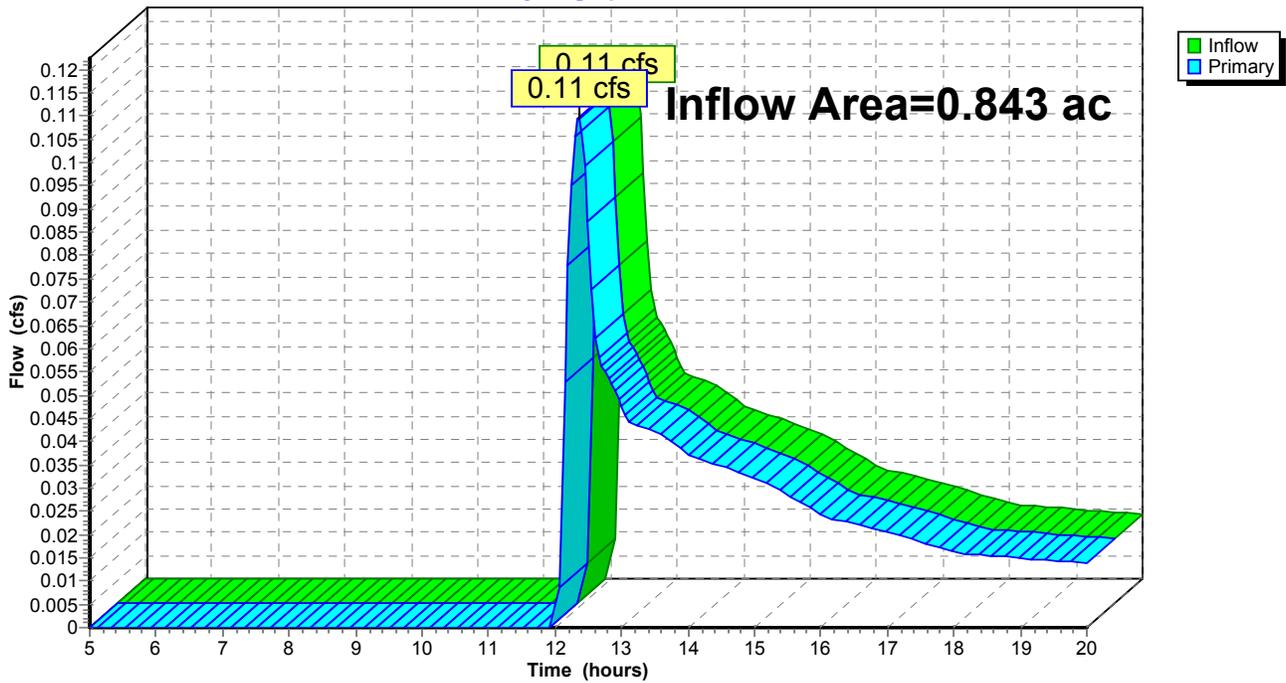
**Link 2L: To Rear of Site**

Inflow Area = 0.843 ac, Inflow Depth = 0.28" for 10 Year Storm event  
Inflow = 0.11 cfs @ 12.36 hrs, Volume= 0.020 af  
Primary = 0.11 cfs @ 12.36 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Link 2L: To Rear of Site**

Hydrograph



**Postdevelopment**

Type III 24-hr 25 Year Storm Rainfall=5.50"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

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

**Subcatchment 1S:** Runoff Area=2,442 sf Runoff Depth=0.86"  
Tc=6.0 min CN=51 Runoff=0.05 cfs 0.004 af

**Subcatchment 2S:** Runoff Area=16,486 sf Runoff Depth=2.84"  
Tc=6.0 min CN=77 Runoff=1.33 cfs 0.090 af

**Subcatchment 3S:** Runoff Area=8,610 sf Runoff Depth=4.02"  
Tc=6.0 min CN=89 Runoff=0.93 cfs 0.066 af

**Subcatchment 4S:** Runoff Area=36,718 sf Runoff Depth=0.48"  
Tc=6.0 min CN=44 Runoff=0.23 cfs 0.033 af

**Subcatchment 5S:** Runoff Area=6,978 sf Runoff Depth=4.87"  
Tc=6.0 min CN=98 Runoff=0.84 cfs 0.065 af

**Reach 1R:** Peak Depth=0.37' Max Vel=5.1 fps Inflow=1.33 cfs 0.090 af  
D=12.0" n=0.011 L=2.5' S=0.0120 '/ Capacity=4.61 cfs Outflow=1.33 cfs 0.090 af

**Reach 2R:** Peak Depth=0.38' Max Vel=3.4 fps Inflow=0.93 cfs 0.066 af  
D=12.0" n=0.011 L=90.0' S=0.0050 '/ Capacity=2.98 cfs Outflow=0.91 cfs 0.066 af

**Reach 3R:** Peak Depth=0.27' Max Vel=5.0 fps Inflow=0.84 cfs 0.065 af  
D=12.0" n=0.011 L=27.0' S=0.0167 '/ Capacity=5.44 cfs Outflow=0.84 cfs 0.065 af

**Reach 5R:** Peak Depth=0.33' Max Vel=7.8 fps Inflow=1.75 cfs 0.131 af  
D=12.0" n=0.011 L=5.0' S=0.0320 '/ Capacity=7.53 cfs Outflow=1.75 cfs 0.131 af

**Pond 1P: CB** Peak Elev=98.13' Inflow=1.33 cfs 0.090 af  
Outflow=1.33 cfs 0.090 af

**Pond 2P: Stormceptor** Peak Elev=97.98' Inflow=1.33 cfs 0.090 af  
Outflow=1.33 cfs 0.090 af

**Pond 3P: Infiltration Field #1** Peak Elev=94.53' Storage=929 cf Inflow=1.33 cfs 0.090 af  
Outflow=0.32 cfs 0.090 af

**Pond 4P: Outlet Control DMH** Peak Elev=93.66' Inflow=1.75 cfs 0.131 af  
12.0" x 5.0' Culvert Outflow=1.75 cfs 0.131 af

**Pond 6P: Infiltration Field #2** Peak Elev=92.91' Storage=1,286 cf Inflow=1.75 cfs 0.131 af  
Discarded=0.42 cfs 0.131 af Primary=0.00 cfs 0.000 af Outflow=0.42 cfs 0.131 af

**Pond 7P: Stormceptor** Peak Elev=97.69' Inflow=1.75 cfs 0.131 af  
Outflow=1.75 cfs 0.131 af

**Postdevelopment**

*Type III 24-hr 25 Year Storm Rainfall=5.50"*

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**Link 1L: (To Summer Avenue)**

Inflow=0.05 cfs 0.004 af

Primary=0.05 cfs 0.004 af

**Link 2L: To Rear of Site**

Inflow=0.23 cfs 0.033 af

Primary=0.23 cfs 0.033 af

**Total Runoff Area = 1.635 ac Runoff Volume = 0.258 af Average Runoff Depth = 1.90"**

# Postdevelopment

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Type III 24-hr 25 Year Storm Rainfall=5.50"

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## Subcatchment 1S:

Runoff = 0.05 cfs @ 12.11 hrs, Volume= 0.004 af, Depth= 0.86"

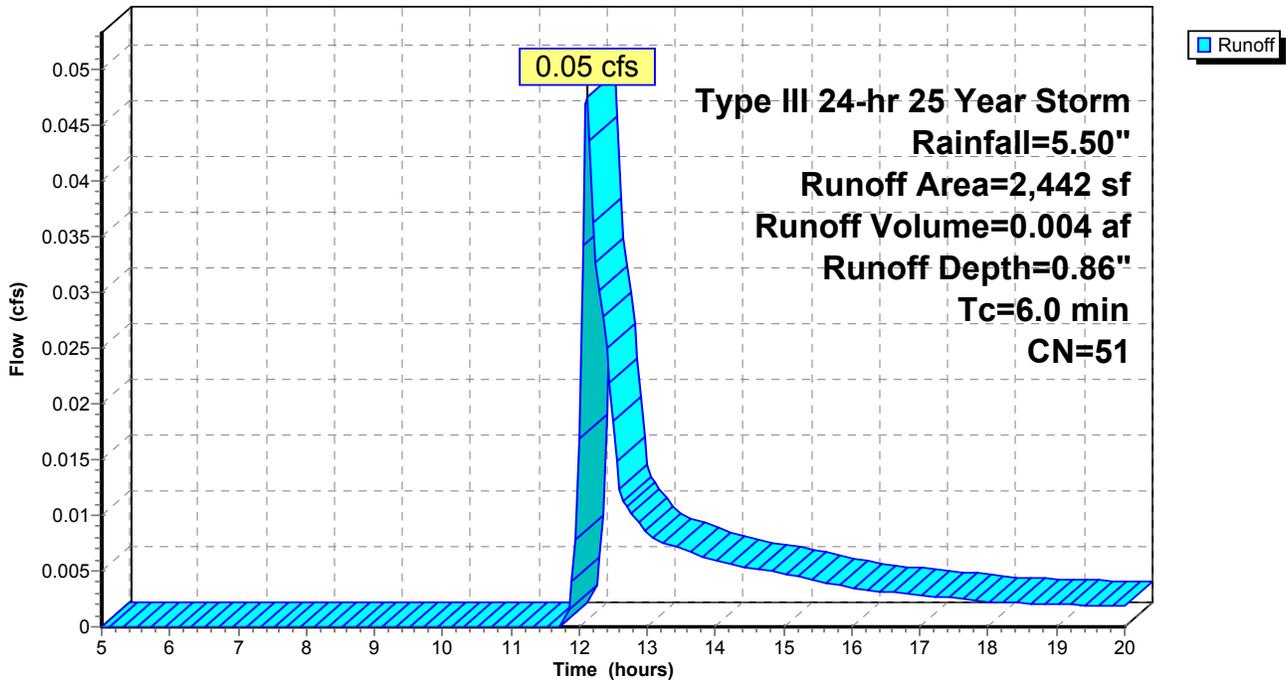
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 Year Storm Rainfall=5.50"

Area (sf)	CN	Description
107	98	Portion of Front Porch
2,335	49	50-75% Grass cover, Fair, HSG A
2,442	51	Weighted Average

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

## Subcatchment 1S:

Hydrograph



**Postdevelopment**

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Type III 24-hr 25 Year Storm Rainfall=5.50"

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**Subcatchment 2S:**

Runoff = 1.33 cfs @ 12.09 hrs, Volume= 0.090 af, Depth= 2.84"

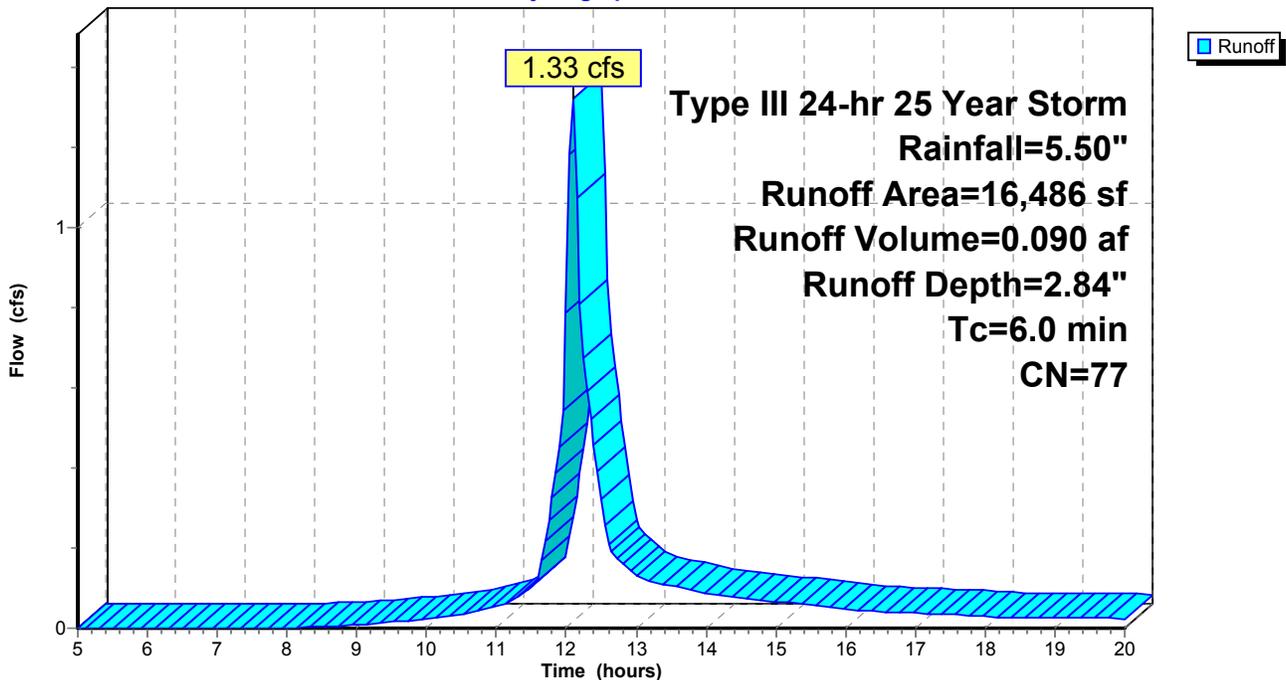
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25 Year Storm Rainfall=5.50"

Area (sf)	CN	Description
1,545	98	Portion of Building Roof
283	98	Roof Area of Porch
1,228	98	Cement Conc. Walkways
6,171	98	Porous Pavement Area
184	98	Vertical Granite Curb
7,075	49	50-75% Grass cover, Fair, HSG A
16,486	77	Weighted Average

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

**Subcatchment 2S:**

Hydrograph



**Postdevelopment**

Type III 24-hr 25 Year Storm Rainfall=5.50"

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**Subcatchment 3S:**

Runoff = 0.93 cfs @ 12.09 hrs, Volume= 0.066 af, Depth= 4.02"

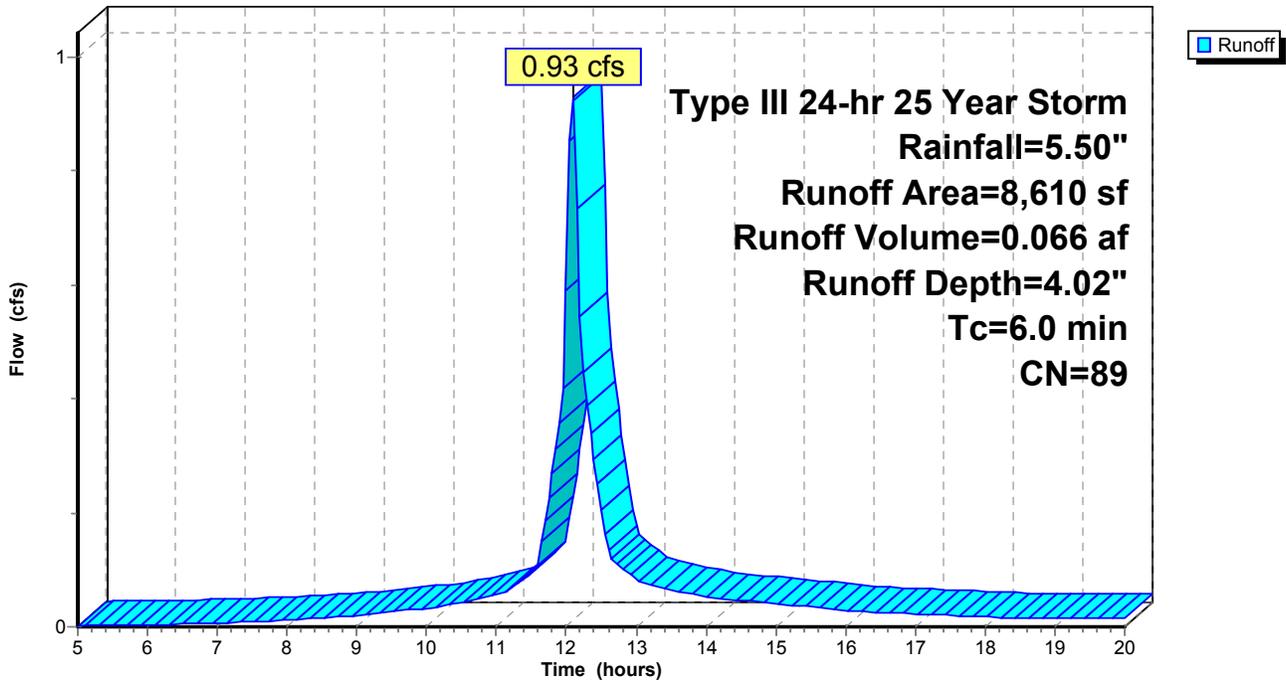
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 Year Storm Rainfall=5.50"

Area (sf)	CN	Description
1,336	39	>75% Grass cover, Good, HSG A
7,274	98	Pavement, Curb, Walks, Dumpster Pad
8,610	89	Weighted Average

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

**Subcatchment 3S:**

Hydrograph



**Postdevelopment**

Type III 24-hr 25 Year Storm Rainfall=5.50"

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**Subcatchment 4S:**

Runoff = 0.23 cfs @ 12.15 hrs, Volume= 0.033 af, Depth= 0.48"

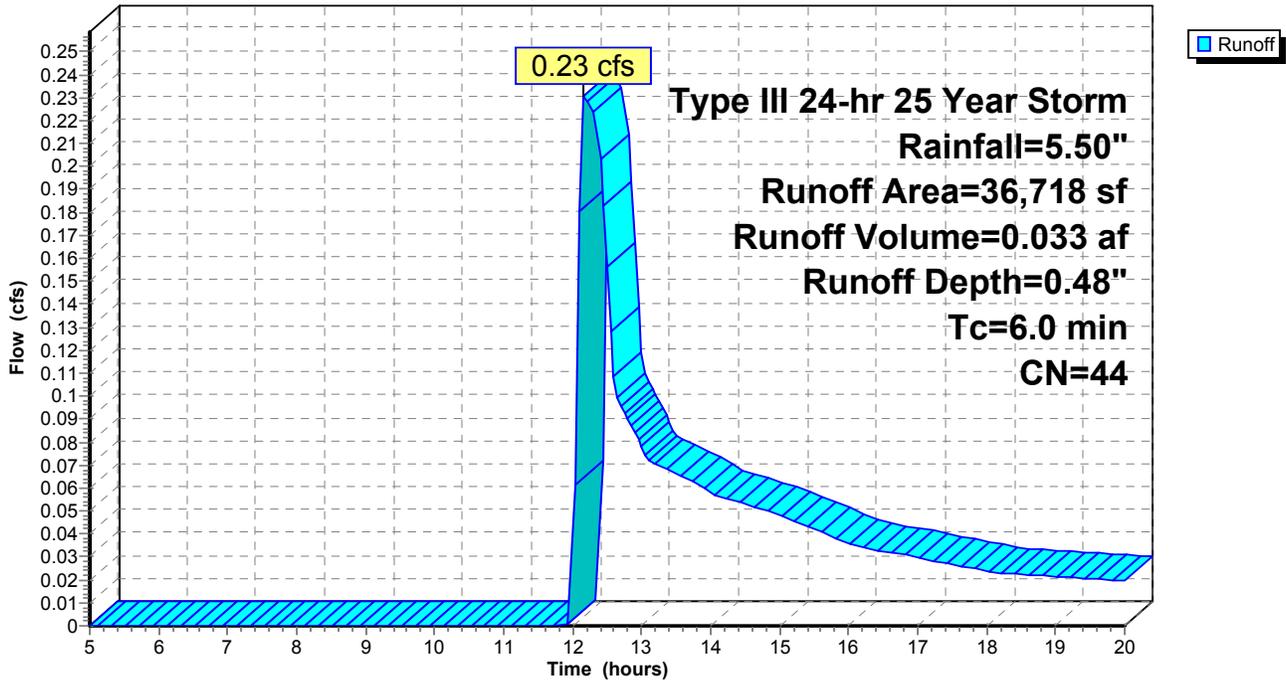
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25 Year Storm Rainfall=5.50"

Area (sf)	CN	Description
612	98	1/2 of Barn Roof Area
2,274	98	Portion of Building Roof
4,455	49	50-75% Grass cover, Fair, HSG A
1,200	77	Woodchipped Play Area
28,177	36	Woods, Fair, HSG A
36,718	44	Weighted Average

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

**Subcatchment 4S:**

Hydrograph



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Type III 24-hr 25 Year Storm Rainfall=5.50"

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**Subcatchment 5S:**

Runoff = 0.84 cfs @ 12.09 hrs, Volume= 0.065 af, Depth= 4.87"

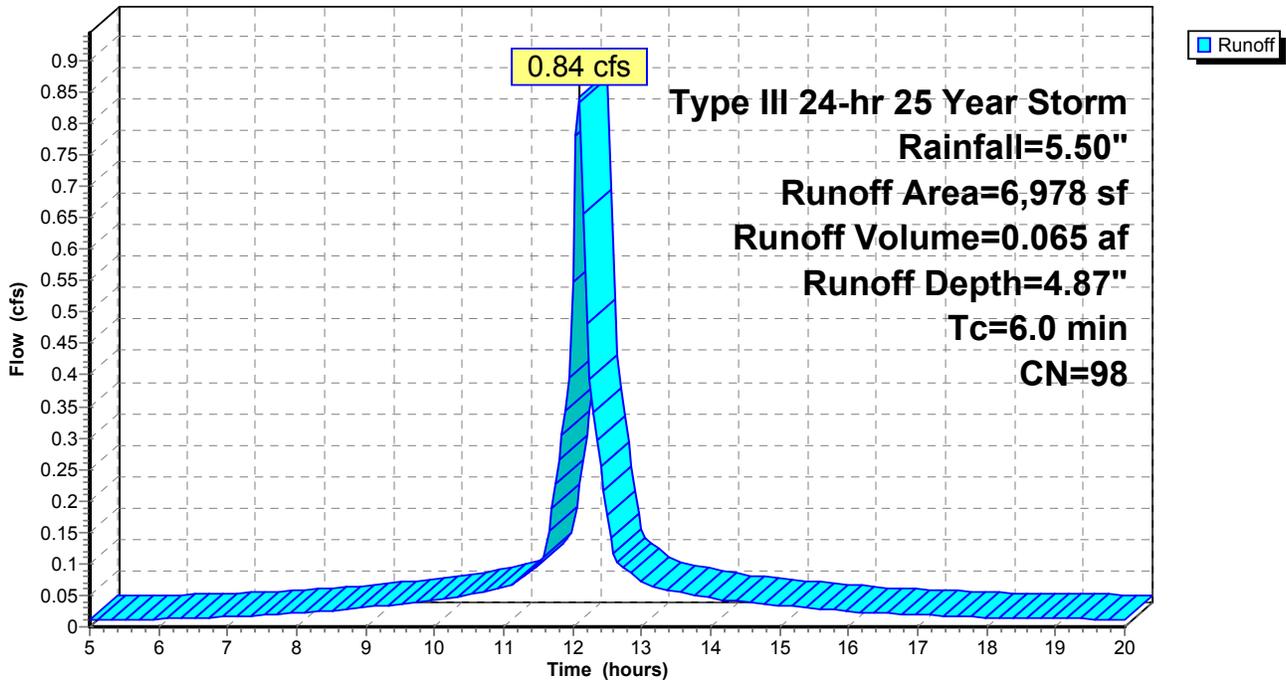
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 25 Year Storm Rainfall=5.50"

Area (sf)	CN	Description
50	39	>75% Grass cover, Good, HSG A
6,928	98	Pavement, Curb, Walks
6,978	98	Weighted Average

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

**Subcatchment 5S:**

Hydrograph



# Postdevelopment

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Type III 24-hr 25 Year Storm Rainfall=5.50"

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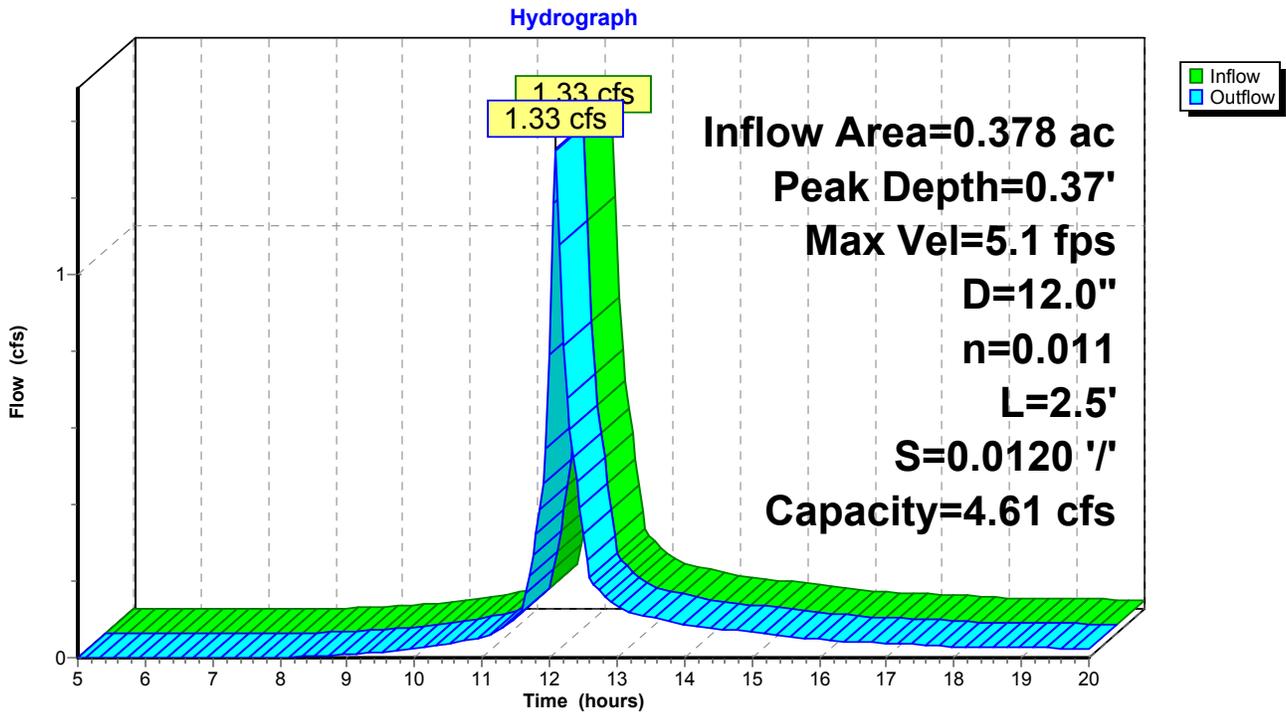
## Reach 1R:

Inflow Area = 0.378 ac, Inflow Depth = 2.84" for 25 Year Storm event  
Inflow = 1.33 cfs @ 12.09 hrs, Volume= 0.090 af  
Outflow = 1.33 cfs @ 12.09 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 5.1 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 1.9 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.37' @ 12.09 hrs  
Capacity at bank full= 4.61 cfs  
Inlet Invert= 94.53', Outlet Invert= 94.50'  
12.0" Diameter Pipe n= 0.011 Length= 2.5' Slope= 0.0120 '/'

## Reach 1R:



# Postdevelopment

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Type III 24-hr 25 Year Storm Rainfall=5.50"

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## Reach 2R:

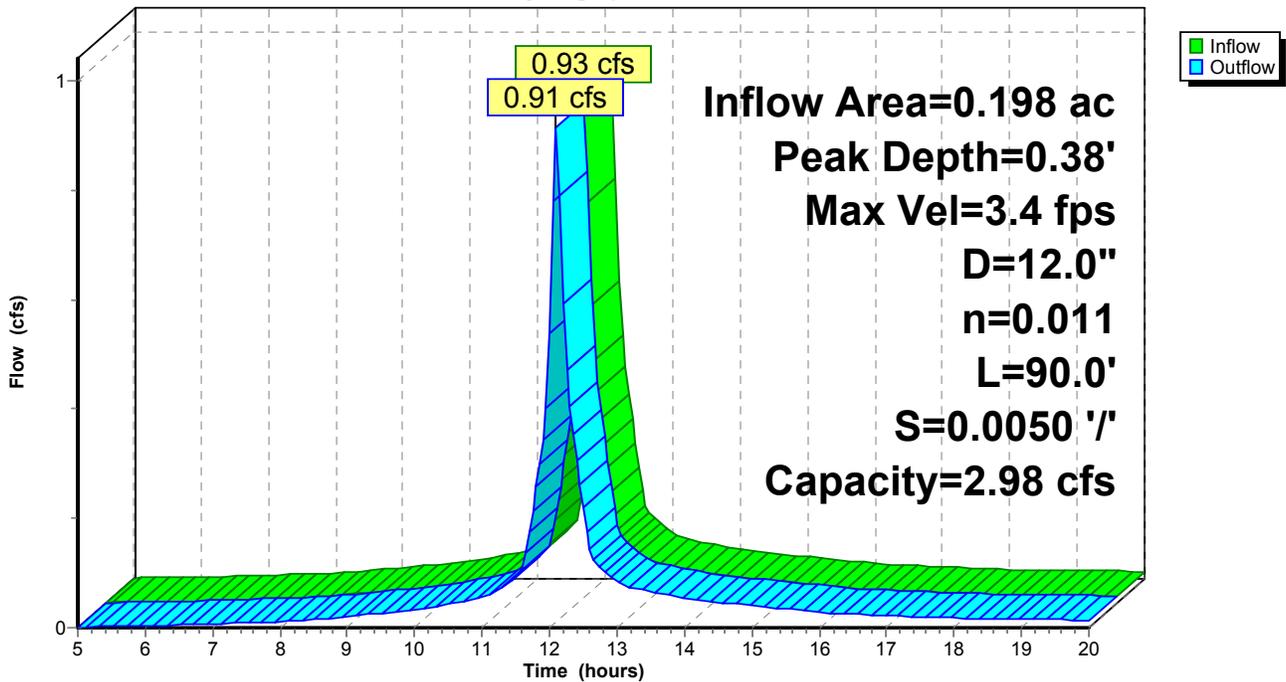
Inflow Area = 0.198 ac, Inflow Depth = 4.02" for 25 Year Storm event  
Inflow = 0.93 cfs @ 12.09 hrs, Volume= 0.066 af  
Outflow = 0.91 cfs @ 12.10 hrs, Volume= 0.066 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 3.4 fps, Min. Travel Time= 0.4 min  
Avg. Velocity = 1.2 fps, Avg. Travel Time= 1.2 min

Peak Depth= 0.38' @ 12.09 hrs  
Capacity at bank full= 2.98 cfs  
Inlet Invert= 91.00', Outlet Invert= 90.55'  
12.0" Diameter Pipe n= 0.011 Length= 90.0' Slope= 0.0050 '/'

## Reach 2R:

Hydrograph



# Postdevelopment

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Type III 24-hr 25 Year Storm Rainfall=5.50"

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## Reach 3R:

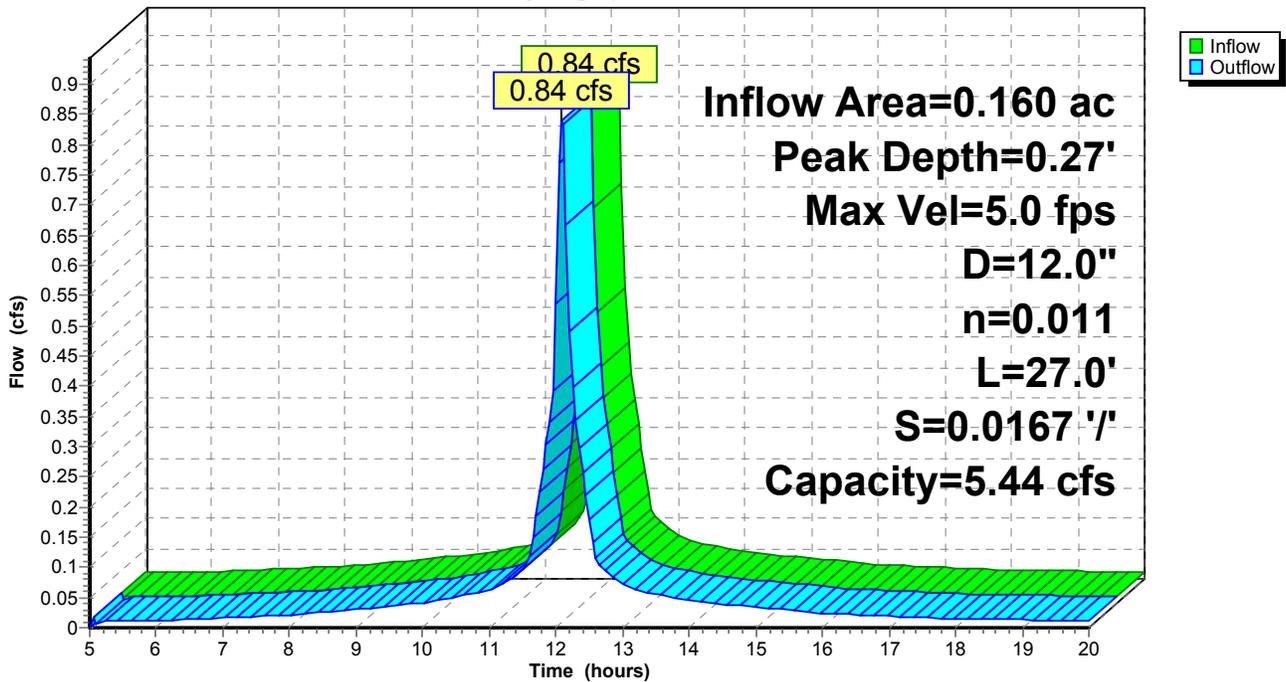
Inflow Area = 0.160 ac, Inflow Depth = 4.87" for 25 Year Storm event  
Inflow = 0.84 cfs @ 12.09 hrs, Volume= 0.065 af  
Outflow = 0.84 cfs @ 12.09 hrs, Volume= 0.065 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 5.0 fps, Min. Travel Time= 0.1 min  
Avg. Velocity = 1.9 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.27' @ 12.09 hrs  
Capacity at bank full= 5.44 cfs  
Inlet Invert= 91.00', Outlet Invert= 90.55'  
12.0" Diameter Pipe n= 0.011 Length= 27.0' Slope= 0.0167 '/'

## Reach 3R:

Hydrograph



# Postdevelopment

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Type III 24-hr 25 Year Storm Rainfall=5.50"

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## Reach 5R:

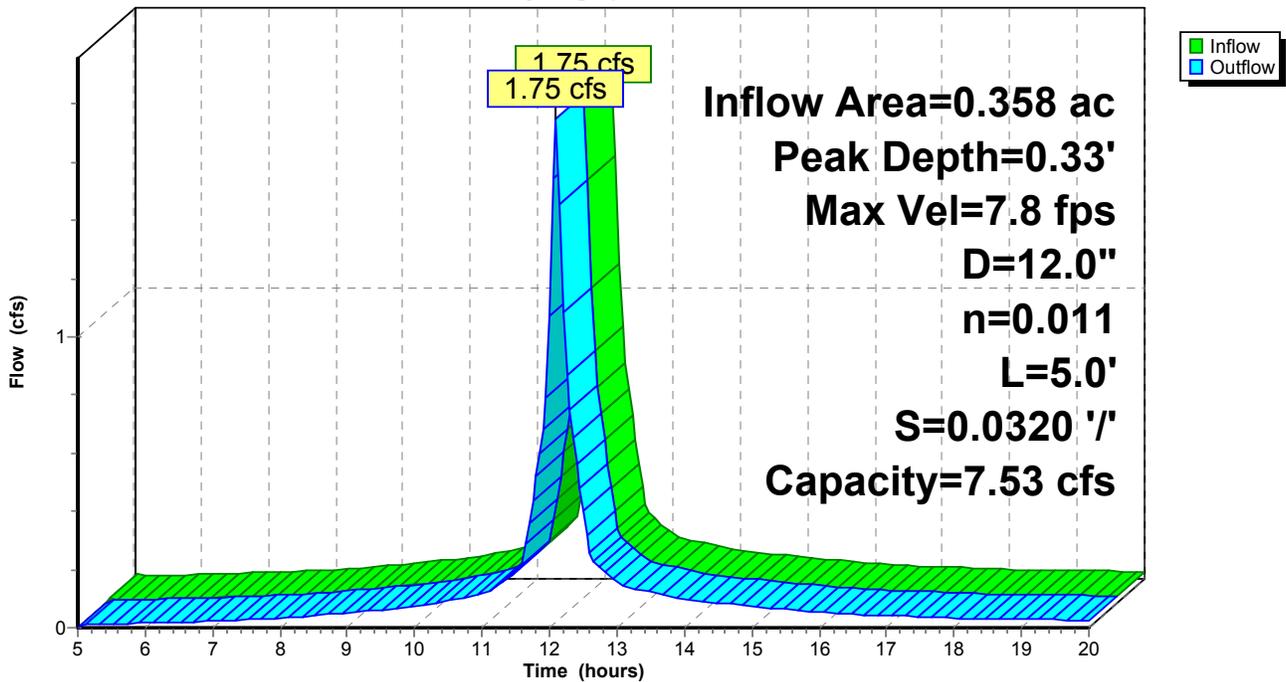
Inflow Area = 0.358 ac, Inflow Depth = 4.40" for 25 Year Storm event  
Inflow = 1.75 cfs @ 12.10 hrs, Volume= 0.131 af  
Outflow = 1.75 cfs @ 12.10 hrs, Volume= 0.131 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 7.8 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 2.9 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.33' @ 12.10 hrs  
Capacity at bank full= 7.53 cfs  
Inlet Invert= 92.81', Outlet Invert= 92.65'  
12.0" Diameter Pipe n= 0.011 Length= 5.0' Slope= 0.0320 '/'

## Reach 5R:

Hydrograph



# Postdevelopment

Type III 24-hr 25 Year Storm Rainfall=5.50"

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## Pond 1P: CB

Inflow Area = 0.378 ac, Inflow Depth = 2.84" for 25 Year Storm event  
Inflow = 1.33 cfs @ 12.09 hrs, Volume= 0.090 af  
Outflow = 1.33 cfs @ 12.09 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.33 cfs @ 12.09 hrs, Volume= 0.090 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 98.13' @ 12.09 hrs

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated)

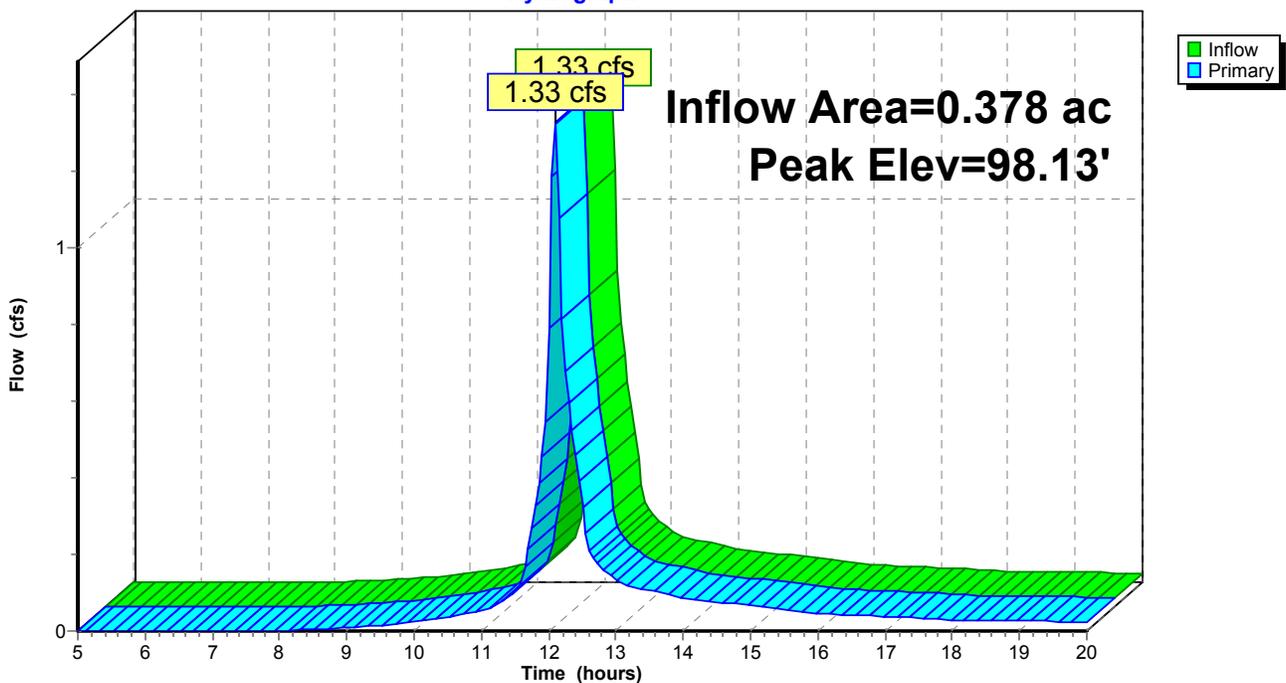
#	Routing	Invert	Outlet Devices
1	Primary	97.66'	24.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=1.30 cfs @ 12.09 hrs HW=98.13' (Free Discharge)

↑1=Orifice/Grate (Orifice Controls 1.30 cfs @ 2.3 fps)

## Pond 1P: CB

Hydrograph



# Postdevelopment

Type III 24-hr 25 Year Storm Rainfall=5.50"

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## Pond 2P: Stormceptor

Inflow Area = 0.378 ac, Inflow Depth = 2.84" for 25 Year Storm event  
Inflow = 1.33 cfs @ 12.09 hrs, Volume= 0.090 af  
Outflow = 1.33 cfs @ 12.09 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.33 cfs @ 12.09 hrs, Volume= 0.090 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 97.98' @ 12.09 hrs

Plug-Flow detention time= (not calculated)

Center-of-Mass det. time= (not calculated)

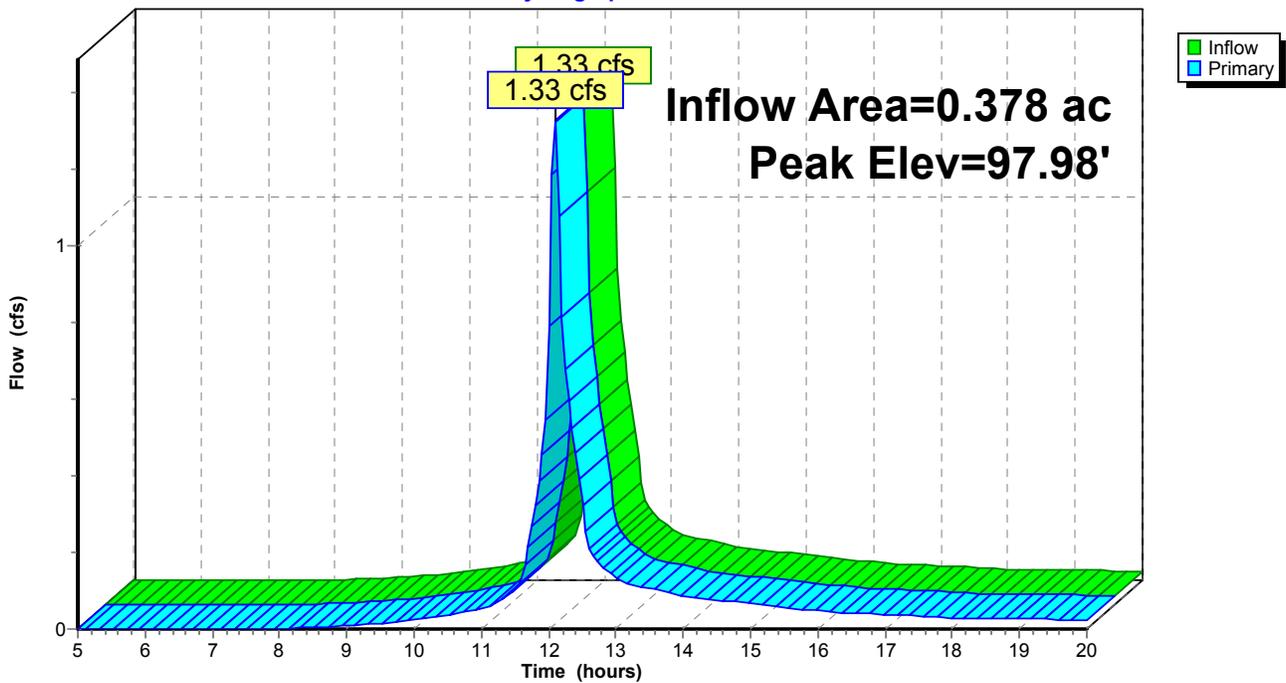
#	Routing	Invert	Outlet Devices
1	Primary	97.82'	24.0" Horiz. Orifice/Grate Limited to weir flow C= 0.600

Primary OutFlow Max=1.30 cfs @ 12.09 hrs HW=97.98' (Free Discharge)

↑1=Orifice/Grate (Weir Controls 1.30 cfs @ 1.3 fps)

## Pond 2P: Stormceptor

Hydrograph



**Postdevelopment**

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Type III 24-hr 25 Year Storm Rainfall=5.50"

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**Pond 3P: Infiltration Field #1**

Exfiltration based on Class A soil with Design Infiltration Rate of 8.27 in/hr

Inflow Area = 0.378 ac, Inflow Depth = 2.84" for 25 Year Storm event  
 Inflow = 1.33 cfs @ 12.09 hrs, Volume= 0.090 af  
 Outflow = 0.32 cfs @ 11.85 hrs, Volume= 0.090 af, Atten= 76%, Lag= 0.0 min  
 Discarded = 0.32 cfs @ 11.85 hrs, Volume= 0.090 af

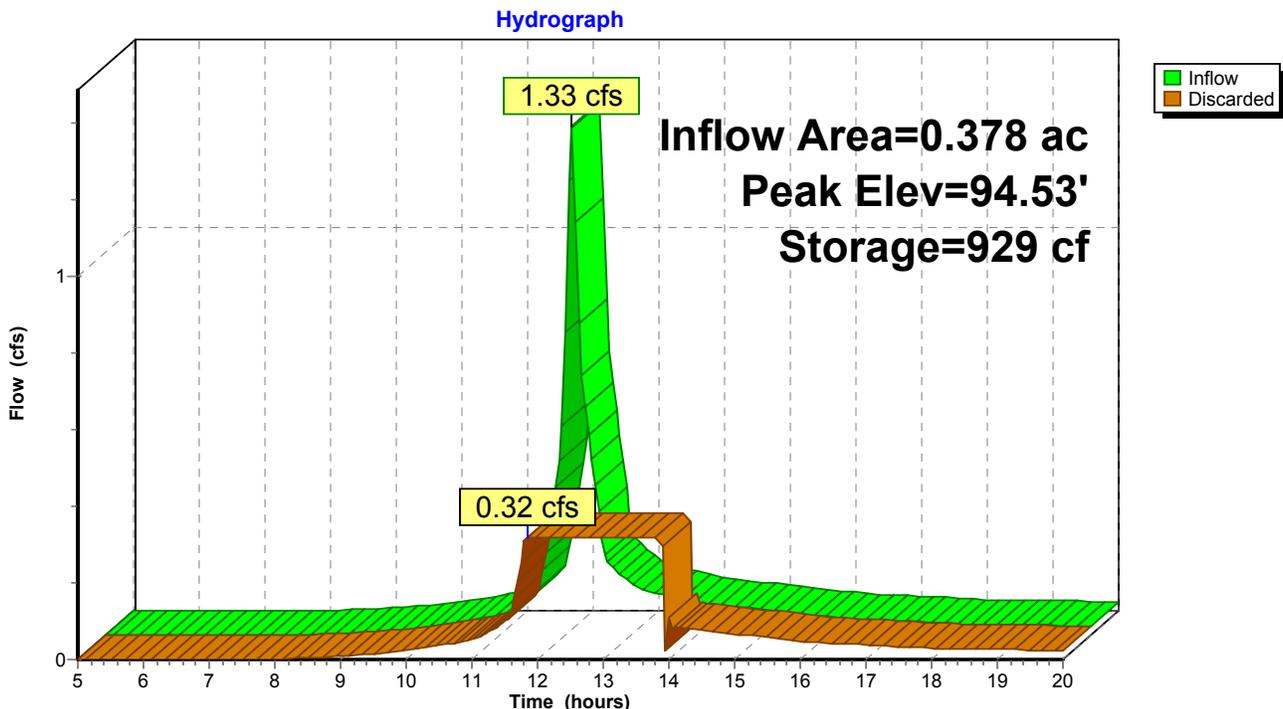
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 94.53' @ 12.50 hrs Surf.Area= 1,660 sf Storage= 929 cf  
 Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= (not calculated)

#	Invert	Avail.Storage	Storage Description
1	93.20'	1,415 cf	<b>20.00'W x 83.00'L x 2.20'H Prismatic</b> 3,652 cf Overall - 114 cf Embedded = 3,538 cf x 40.0% Voids
2	93.70'	114 cf	<b>2.7"W x 18.5"H x 10.25'L Cultec 150XLHDx 48 Inside #1</b>
		1,529 cf	Total Available Storage

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	<b>0.011486 fpm Exfiltration over entire Surface area</b>

**Discarded OutFlow** Max=0.32 cfs @ 11.85 hrs HW=93.23' (Free Discharge)  
 ↑=Exfiltration (Exfiltration Controls 0.32 cfs)

**Pond 3P: Infiltration Field #1**



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Type III 24-hr 25 Year Storm Rainfall=5.50"

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## Pond 4P: Outlet Control DMH

Inflow Area = 0.358 ac, Inflow Depth = 4.40" for 25 Year Storm event  
Inflow = 1.75 cfs @ 12.10 hrs, Volume= 0.131 af  
Outflow = 1.75 cfs @ 12.10 hrs, Volume= 0.131 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.75 cfs @ 12.10 hrs, Volume= 0.131 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 93.66' @ 12.10 hrs

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated)

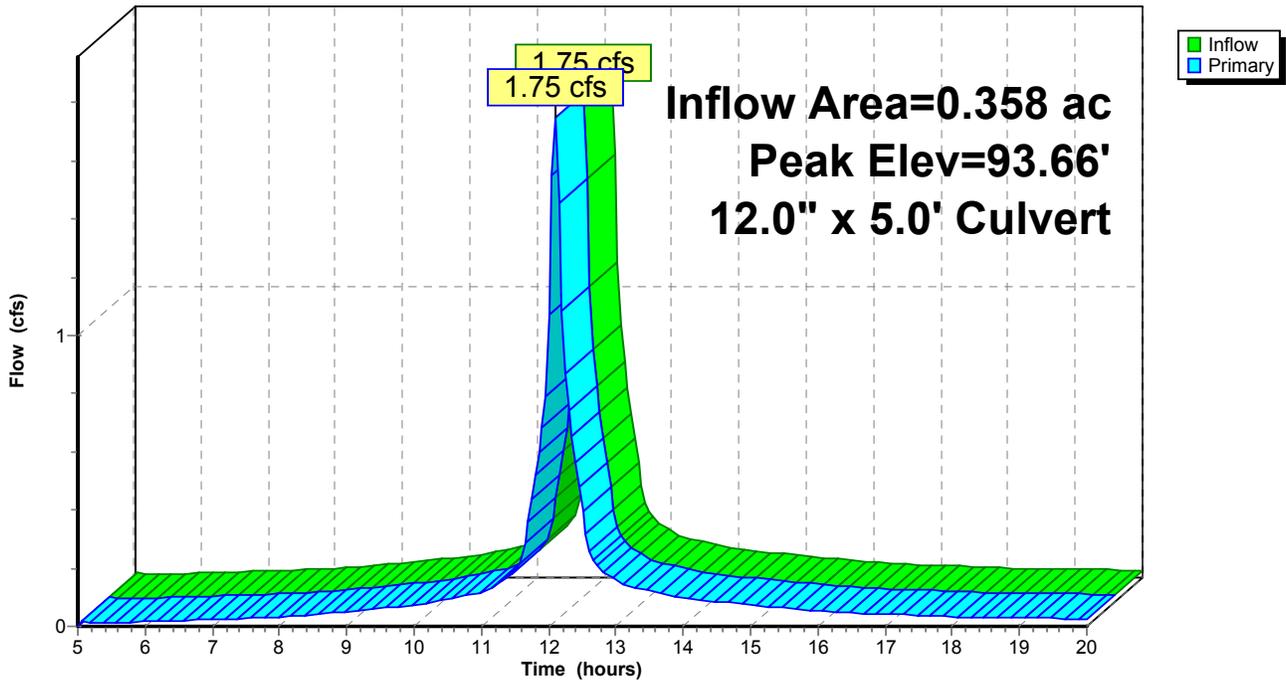
#	Routing	Invert	Outlet Devices
1	Primary	90.55'	<b>12.0" x 5.0' long Culvert</b> CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 92.81' S= -0.4520 '/ n= 0.011 Cc= 0.900

**Primary OutFlow** Max=1.73 cfs @ 12.10 hrs HW=93.65' (Free Discharge)

↑1=Culvert (Inlet Controls 1.73 cfs @ 2.5 fps)

## Pond 4P: Outlet Control DMH

Hydrograph



**Postdevelopment**

Type III 24-hr 25 Year Storm Rainfall=5.50"

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**Pond 6P: Infiltration Field #2**

Exfiltration based on Class A soil with Design Infiltration Rate of 8.27 in/hr

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Inflow Area =	0.358 ac,	Inflow Depth =	4.40"	for	25 Year Storm event
Inflow =	1.75 cfs @	12.10 hrs,	Volume=	0.131 af	
Outflow =	0.42 cfs @	11.75 hrs,	Volume=	0.131 af,	Atten= 76%, Lag= 0.0 min
Discarded =	0.42 cfs @	11.75 hrs,	Volume=	0.131 af	
Primary =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 92.91' @ 12.49 hrs Surf.Area= 2,168 sf Storage= 1,286 cf  
 Plug-Flow detention time= 16.3 min calculated for 0.131 af (100% of inflow)  
 Center-of-Mass det. time= 16.2 min ( 764.9 - 748.7 )

#	Invert	Avail.Storage	Storage Description
1	91.50'	1,848 cf	<b>23.25'W x 93.25'L x 2.20'H Prismatic</b> 4,770 cf Overall - 149 cf Embedded = 4,620 cf x 40.0% Voids
2	92.00'	149 cf	<b>2.7"W x 18.5"H x 10.25'L Cultec 150XLHD</b> x 63 Inside #1
		1,997 cf	Total Available Storage

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	<b>0.011486 fpm Exfiltration over entire Surface area</b>
2	Primary	94.00'	<b>24.0" Horiz. Orifice/Grate</b> Limited to weir flow C= 0.600

**Discarded OutFlow** Max=0.42 cfs @ 11.75 hrs HW=91.53' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.42 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=91.50' (Free Discharge)  
 ↑2=Orifice/Grate ( Controls 0.00 cfs)

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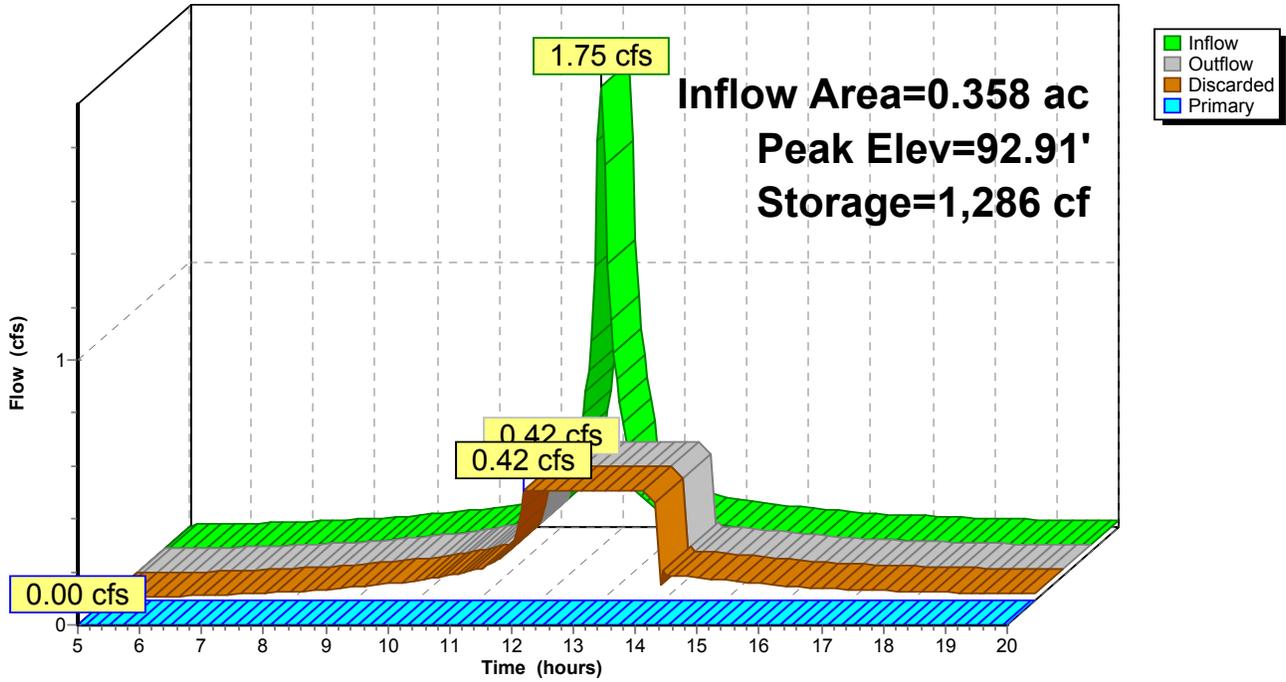
Type III 24-hr 25 Year Storm Rainfall=5.50"

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**Pond 6P: Infiltration Field #2**

Hydrograph



# Postdevelopment

Type III 24-hr 25 Year Storm Rainfall=5.50"

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## Pond 7P: Stormceptor

Inflow Area = 0.358 ac, Inflow Depth = 4.40" for 25 Year Storm event  
Inflow = 1.75 cfs @ 12.10 hrs, Volume= 0.131 af  
Outflow = 1.75 cfs @ 12.10 hrs, Volume= 0.131 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.75 cfs @ 12.10 hrs, Volume= 0.131 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 97.69' @ 12.10 hrs

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated)

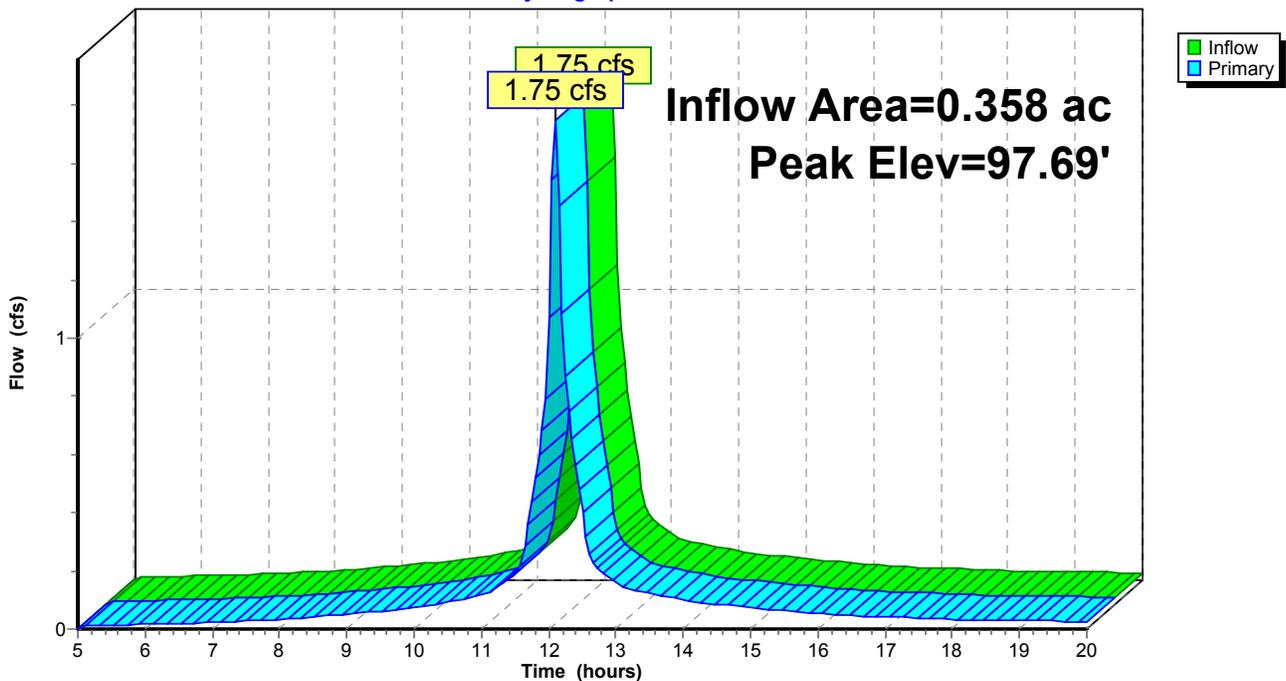
#	Routing	Invert	Outlet Devices
1	Primary	97.50'	<b>24.0" Horiz. Orifice/Grate</b> Limited to weir flow C= 0.600

**Primary OutFlow** Max=1.73 cfs @ 12.10 hrs HW=97.69' (Free Discharge)

↑1=Orifice/Grate (Weir Controls 1.73 cfs @ 1.4 fps)

## Pond 7P: Stormceptor

Hydrograph



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Type III 24-hr 25 Year Storm Rainfall=5.50"

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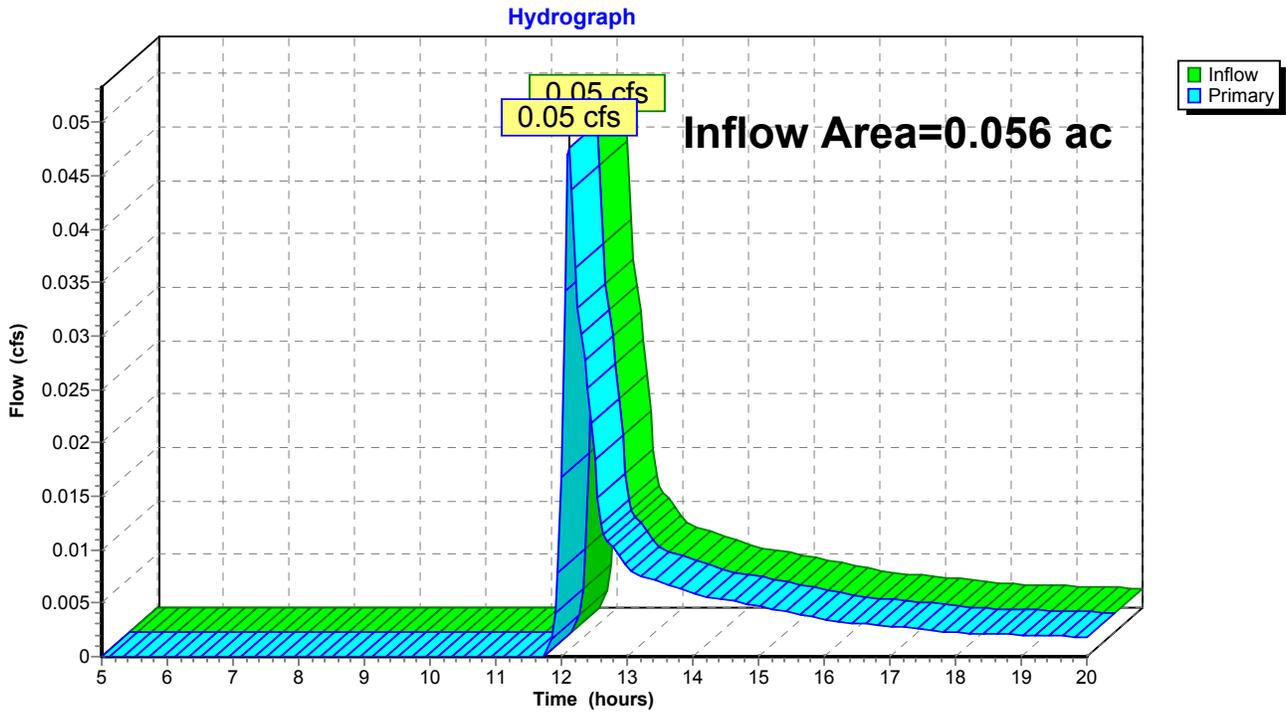
12/17/2014

**Link 1L: (To Summer Avenue)**

Inflow Area = 0.056 ac, Inflow Depth = 0.86" for 25 Year Storm event  
Inflow = 0.05 cfs @ 12.11 hrs, Volume= 0.004 af  
Primary = 0.05 cfs @ 12.11 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Link 1L: (To Summer Avenue)**



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Type III 24-hr 25 Year Storm Rainfall=5.50"

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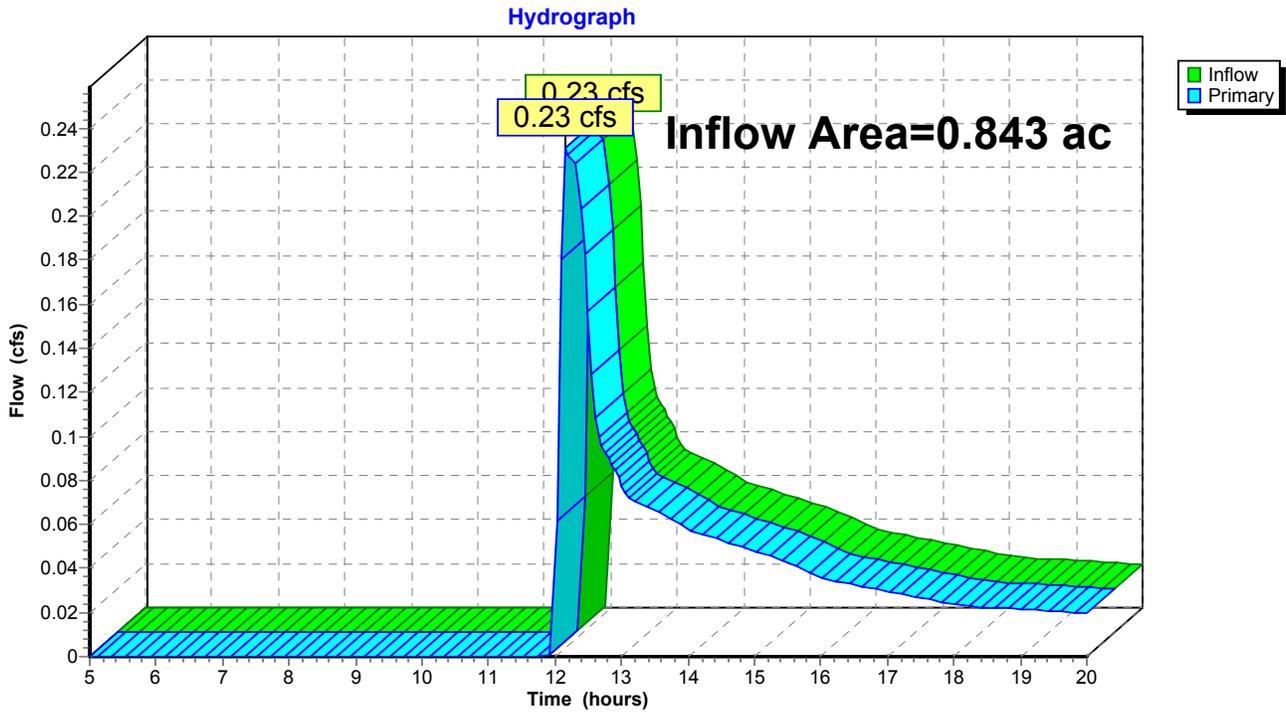
12/17/2014

**Link 2L: To Rear of Site**

Inflow Area = 0.843 ac, Inflow Depth = 0.48" for 25 Year Storm event  
Inflow = 0.23 cfs @ 12.15 hrs, Volume= 0.033 af  
Primary = 0.23 cfs @ 12.15 hrs, Volume= 0.033 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Link 2L: To Rear of Site**



**Postdevelopment**

Type III 24-hr 100 Year Storm Rainfall=6.40"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS

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

**Subcatchment 1S:** Runoff Area=2,442 sf Runoff Depth=1.28"  
Tc=6.0 min CN=51 Runoff=0.08 cfs 0.006 af

**Subcatchment 2S:** Runoff Area=16,486 sf Runoff Depth=3.58"  
Tc=6.0 min CN=77 Runoff=1.66 cfs 0.113 af

**Subcatchment 3S:** Runoff Area=8,610 sf Runoff Depth=4.84"  
Tc=6.0 min CN=89 Runoff=1.11 cfs 0.080 af

**Subcatchment 4S:** Runoff Area=36,718 sf Runoff Depth=0.78"  
Tc=6.0 min CN=44 Runoff=0.54 cfs 0.055 af

**Subcatchment 5S:** Runoff Area=6,978 sf Runoff Depth=5.69"  
Tc=6.0 min CN=98 Runoff=0.98 cfs 0.076 af

**Reach 1R:** Peak Depth=0.42' Max Vel=5.4 fps Inflow=1.66 cfs 0.113 af  
D=12.0" n=0.011 L=2.5' S=0.0120 '/ Capacity=4.61 cfs Outflow=1.66 cfs 0.113 af

**Reach 2R:** Peak Depth=0.42' Max Vel=3.5 fps Inflow=1.11 cfs 0.080 af  
D=12.0" n=0.011 L=90.0' S=0.0050 '/ Capacity=2.98 cfs Outflow=1.09 cfs 0.080 af

**Reach 3R:** Peak Depth=0.29' Max Vel=5.2 fps Inflow=0.98 cfs 0.076 af  
D=12.0" n=0.011 L=27.0' S=0.0167 '/ Capacity=5.44 cfs Outflow=0.98 cfs 0.076 af

**Reach 5R:** Peak Depth=0.36' Max Vel=8.2 fps Inflow=2.07 cfs 0.156 af  
D=12.0" n=0.011 L=5.0' S=0.0320 '/ Capacity=7.53 cfs Outflow=2.07 cfs 0.156 af

**Pond 1P: CB** Peak Elev=98.19' Inflow=1.66 cfs 0.113 af  
Outflow=1.66 cfs 0.113 af

**Pond 2P: Stormceptor** Peak Elev=98.01' Inflow=1.66 cfs 0.113 af  
Outflow=1.66 cfs 0.113 af

**Pond 3P: Infiltration Field #1** Peak Elev=95.19' Storage=1,386 cf Inflow=1.66 cfs 0.113 af  
Outflow=0.32 cfs 0.113 af

**Pond 4P: Outlet Control DMH** Peak Elev=93.78' Inflow=2.07 cfs 0.156 af  
12.0" x 5.0' Culvert Outflow=2.07 cfs 0.156 af

**Pond 6P: Infiltration Field #2** Peak Elev=93.39' Storage=1,729 cf Inflow=2.07 cfs 0.156 af  
Discarded=0.42 cfs 0.156 af Primary=0.00 cfs 0.000 af Outflow=0.42 cfs 0.156 af

**Pond 7P: Stormceptor** Peak Elev=97.72' Inflow=2.07 cfs 0.156 af  
Outflow=2.07 cfs 0.156 af

**Postdevelopment**

*Type III 24-hr 100 Year Storm Rainfall=6.40"*

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**Link 1L: (To Summer Avenue)**

Inflow=0.08 cfs 0.006 af  
Primary=0.08 cfs 0.006 af

**Link 2L: To Rear of Site**

Inflow=0.54 cfs 0.055 af  
Primary=0.54 cfs 0.055 af

**Total Runoff Area = 1.635 ac Runoff Volume = 0.330 af Average Runoff Depth = 2.42"**

# Postdevelopment

Type III 24-hr 100 Year Storm Rainfall=6.40"

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## Subcatchment 1S:

Runoff = 0.08 cfs @ 12.11 hrs, Volume= 0.006 af, Depth= 1.28"

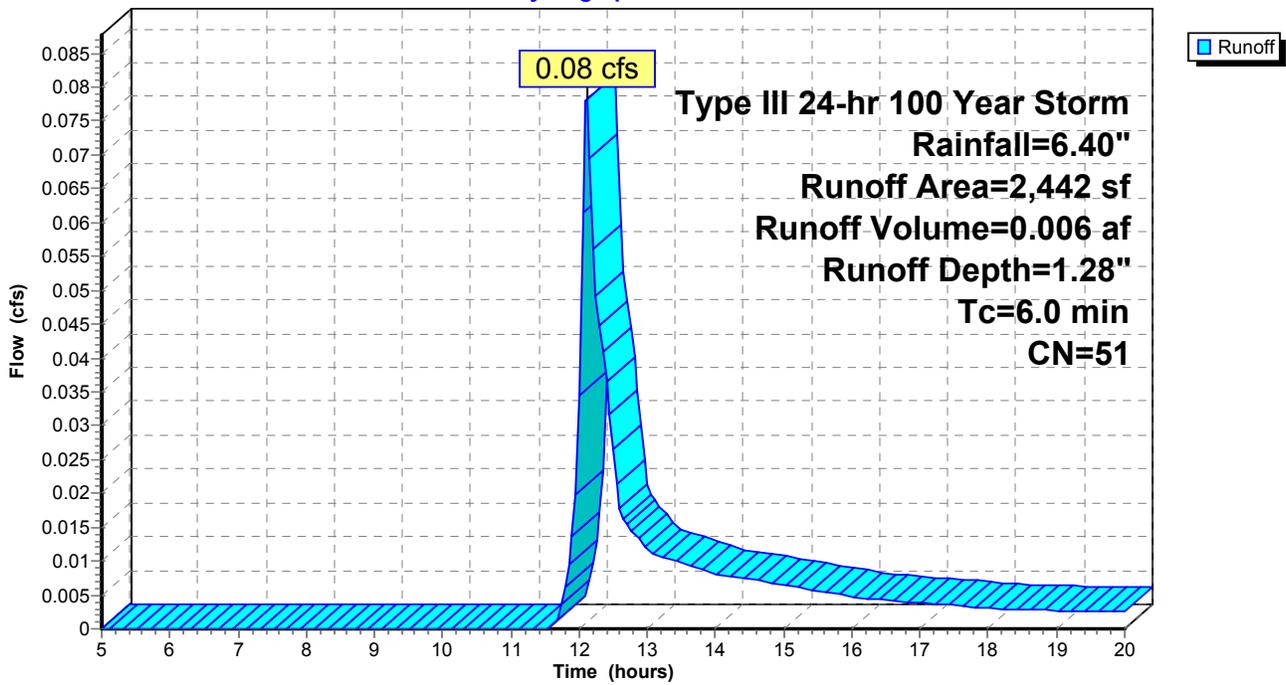
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100 Year Storm Rainfall=6.40"

Area (sf)	CN	Description
107	98	Portion of Front Porch
2,335	49	50-75% Grass cover, Fair, HSG A
2,442	51	Weighted Average

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

## Subcatchment 1S:

Hydrograph



**Postdevelopment**

Type III 24-hr 100 Year Storm Rainfall=6.40"

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**Subcatchment 2S:**

Runoff = 1.66 cfs @ 12.09 hrs, Volume= 0.113 af, Depth= 3.58"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

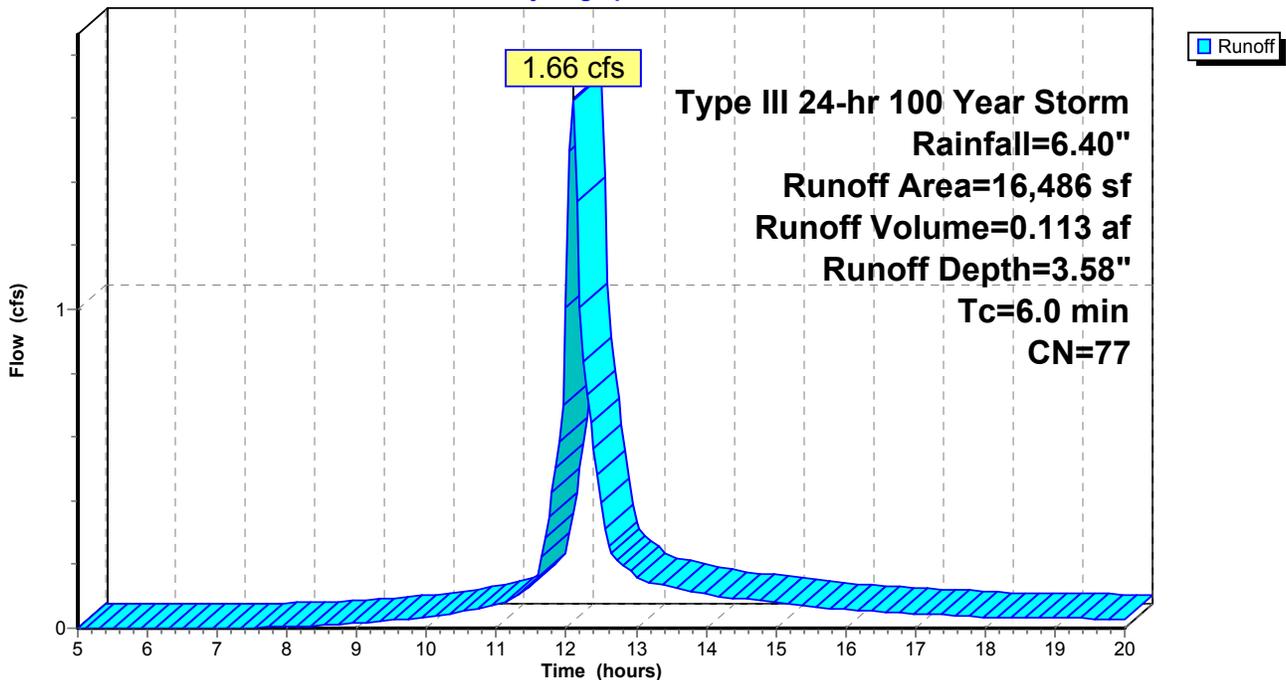
Type III 24-hr 100 Year Storm Rainfall=6.40"

Area (sf)	CN	Description
1,545	98	Portion of Building Roof
283	98	Roof Area of Porch
1,228	98	Cement Conc. Walkways
6,171	98	Porous Pavement Area
184	98	Vertical Granite Curb
7,075	49	50-75% Grass cover, Fair, HSG A
16,486	77	Weighted Average

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

**Subcatchment 2S:**

Hydrograph



**Postdevelopment**

Type III 24-hr 100 Year Storm Rainfall=6.40"

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**Subcatchment 3S:**

Runoff = 1.11 cfs @ 12.09 hrs, Volume= 0.080 af, Depth= 4.84"

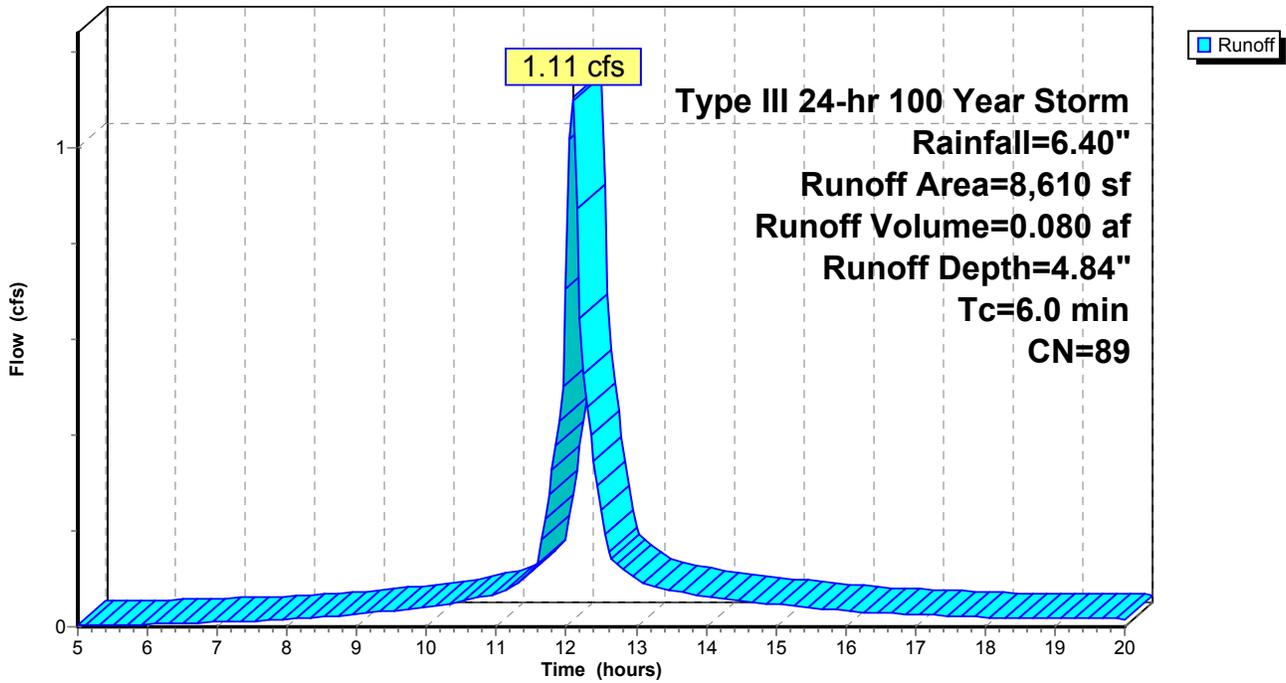
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 100 Year Storm Rainfall=6.40"

Area (sf)	CN	Description
1,336	39	>75% Grass cover, Good, HSG A
7,274	98	Pavement, Curb, Walks, Dumpster Pad
8,610	89	Weighted Average

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

**Subcatchment 3S:**

Hydrograph



**Postdevelopment**

Type III 24-hr 100 Year Storm Rainfall=6.40"

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**Subcatchment 4S:**

Runoff = 0.54 cfs @ 12.13 hrs, Volume= 0.055 af, Depth= 0.78"

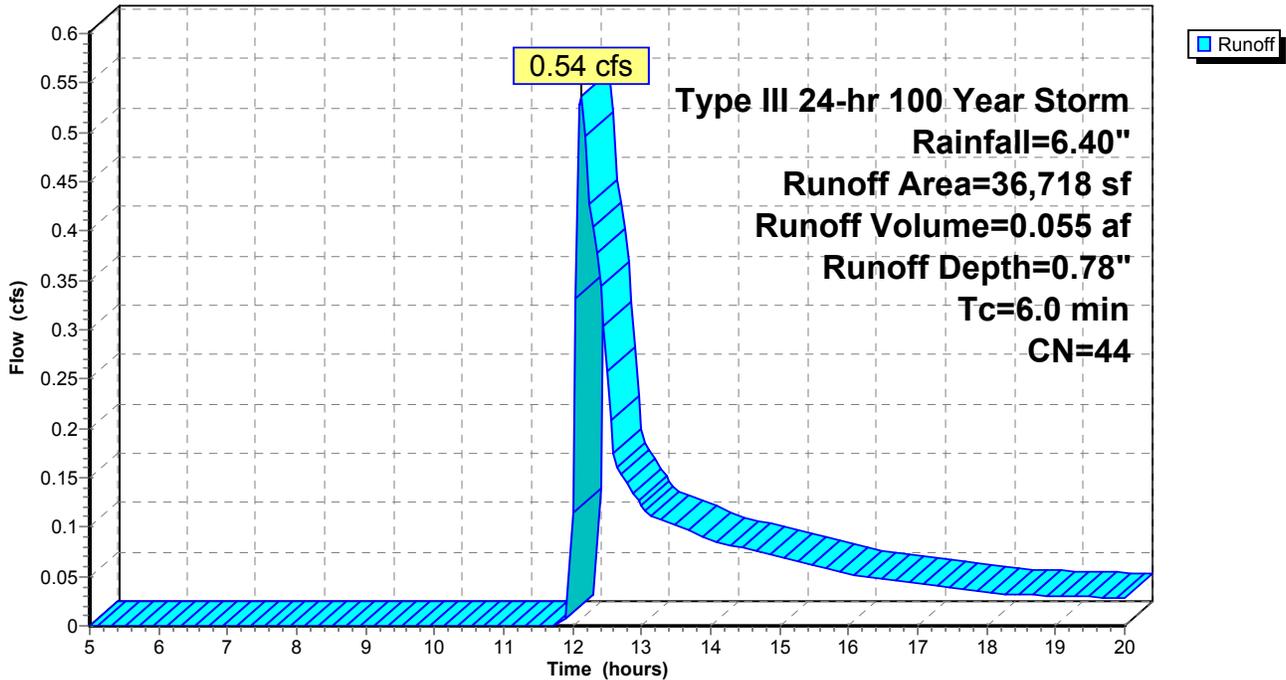
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type III 24-hr 100 Year Storm Rainfall=6.40"

Area (sf)	CN	Description
612	98	1/2 of Barn Roof Area
2,274	98	Portion of Building Roof
4,455	49	50-75% Grass cover, Fair, HSG A
1,200	77	Woodchipped Play Area
28,177	36	Woods, Fair, HSG A
36,718	44	Weighted Average

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

**Subcatchment 4S:**

Hydrograph



**Postdevelopment**

Type III 24-hr 100 Year Storm Rainfall=6.40"

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**Subcatchment 5S:**

Runoff = 0.98 cfs @ 12.09 hrs, Volume= 0.076 af, Depth= 5.69"

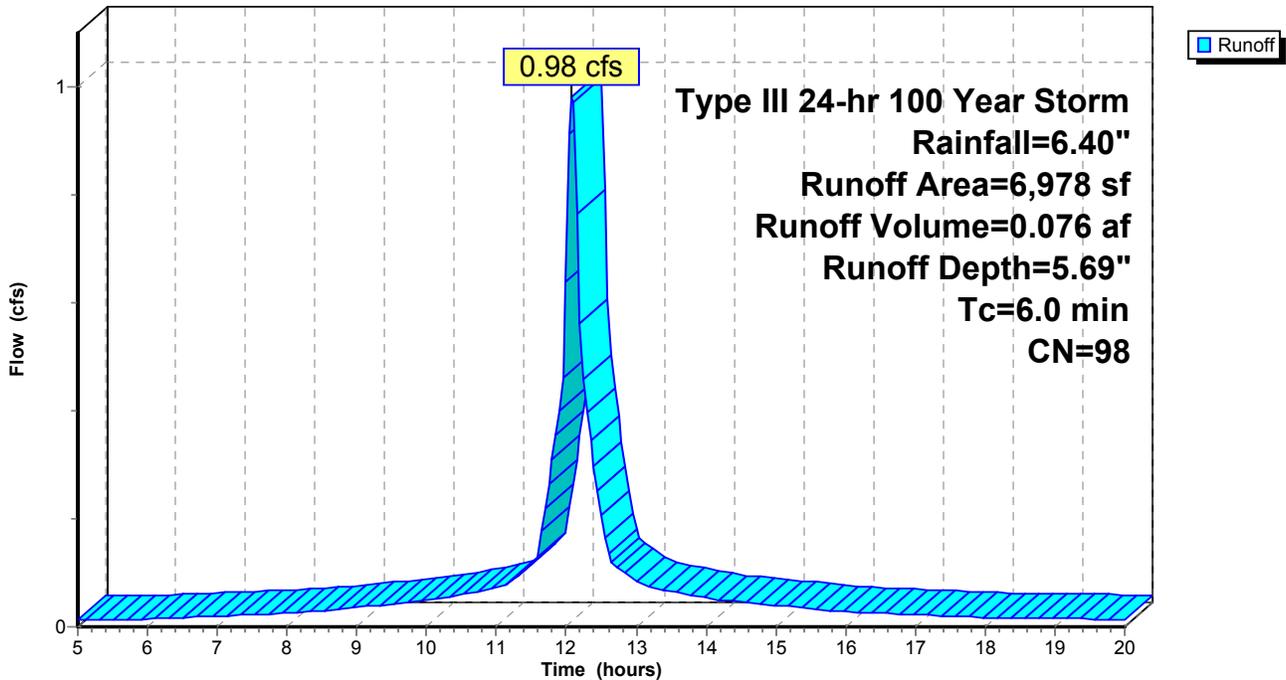
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100 Year Storm Rainfall=6.40"

Area (sf)	CN	Description
50	39	>75% Grass cover, Good, HSG A
6,928	98	Pavement, Curb, Walks
6,978	98	Weighted Average

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

**Subcatchment 5S:**

Hydrograph



# Postdevelopment

Type III 24-hr 100 Year Storm Rainfall=6.40"

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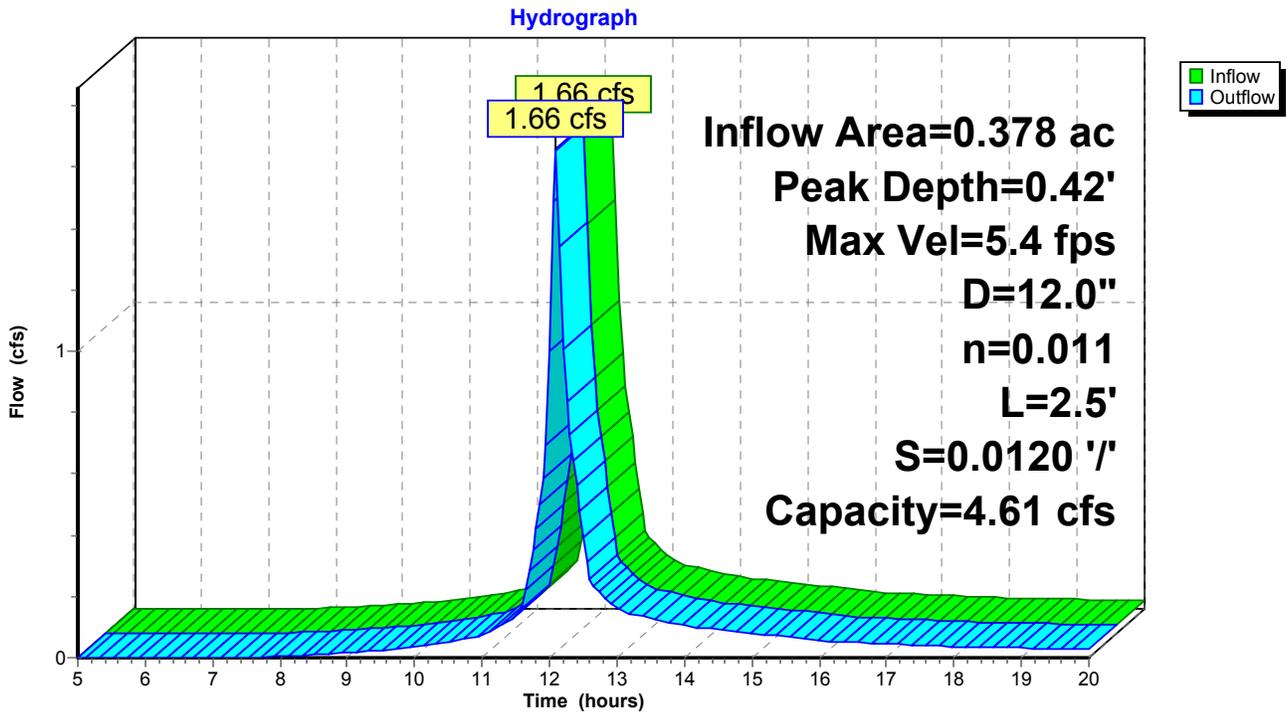
## Reach 1R:

Inflow Area = 0.378 ac, Inflow Depth = 3.58" for 100 Year Storm event  
Inflow = 1.66 cfs @ 12.09 hrs, Volume= 0.113 af  
Outflow = 1.66 cfs @ 12.09 hrs, Volume= 0.113 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 5.4 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 2.0 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.42' @ 12.09 hrs  
Capacity at bank full= 4.61 cfs  
Inlet Invert= 94.53', Outlet Invert= 94.50'  
12.0" Diameter Pipe n= 0.011 Length= 2.5' Slope= 0.0120 '/'

## Reach 1R:



# Postdevelopment

Type III 24-hr 100 Year Storm Rainfall=6.40"

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## Reach 2R:

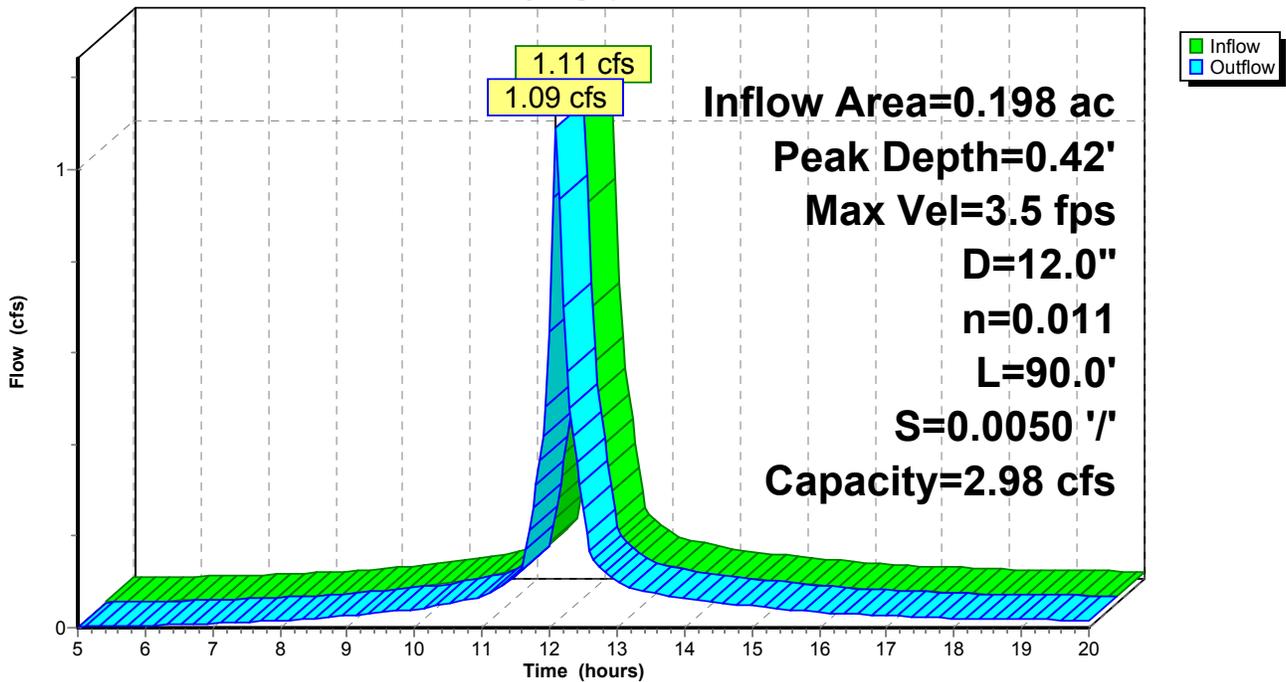
Inflow Area = 0.198 ac, Inflow Depth = 4.84" for 100 Year Storm event  
Inflow = 1.11 cfs @ 12.09 hrs, Volume= 0.080 af  
Outflow = 1.09 cfs @ 12.10 hrs, Volume= 0.080 af, Atten= 2%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 3.5 fps, Min. Travel Time= 0.4 min  
Avg. Velocity = 1.3 fps, Avg. Travel Time= 1.2 min

Peak Depth= 0.42' @ 12.09 hrs  
Capacity at bank full= 2.98 cfs  
Inlet Invert= 91.00', Outlet Invert= 90.55'  
12.0" Diameter Pipe n= 0.011 Length= 90.0' Slope= 0.0050 '/'

## Reach 2R:

Hydrograph



# Postdevelopment

Type III 24-hr 100 Year Storm Rainfall=6.40"

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## Reach 3R:

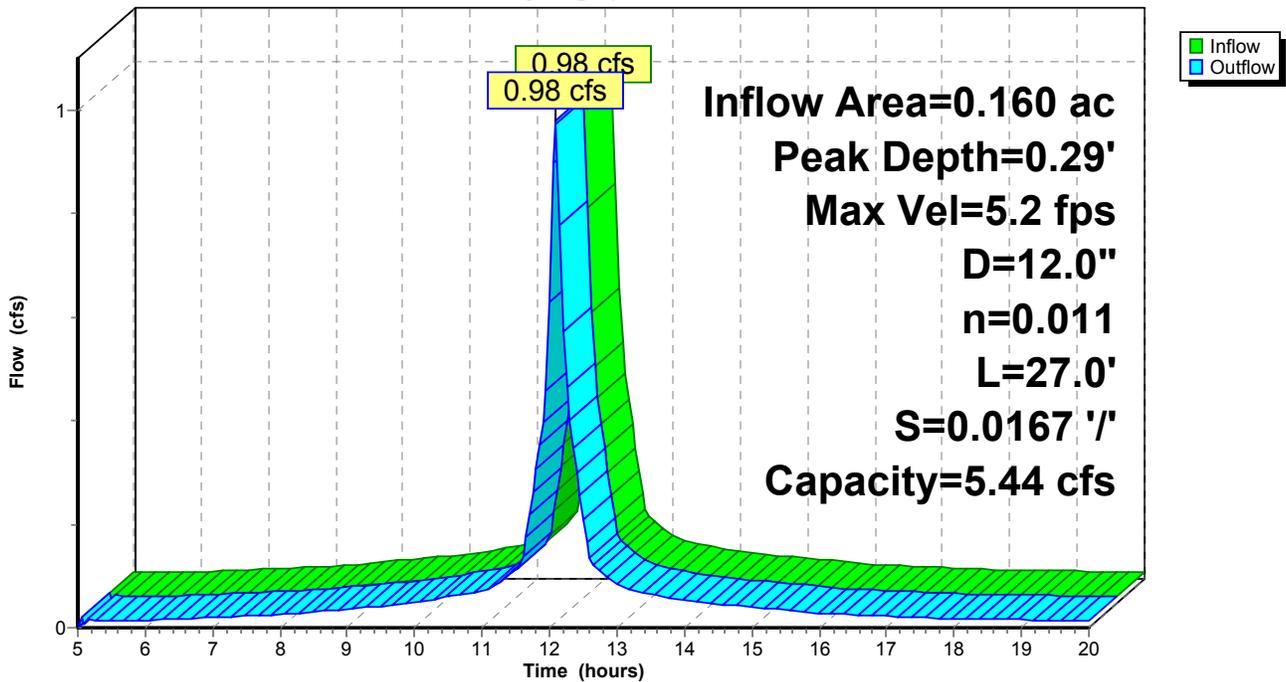
Inflow Area = 0.160 ac, Inflow Depth = 5.69" for 100 Year Storm event  
Inflow = 0.98 cfs @ 12.09 hrs, Volume= 0.076 af  
Outflow = 0.98 cfs @ 12.09 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 5.2 fps, Min. Travel Time= 0.1 min  
Avg. Velocity = 2.0 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.29' @ 12.09 hrs  
Capacity at bank full= 5.44 cfs  
Inlet Invert= 91.00', Outlet Invert= 90.55'  
12.0" Diameter Pipe n= 0.011 Length= 27.0' Slope= 0.0167 '/'

## Reach 3R:

Hydrograph



# Postdevelopment

Type III 24-hr 100 Year Storm Rainfall=6.40"

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## Reach 5R:

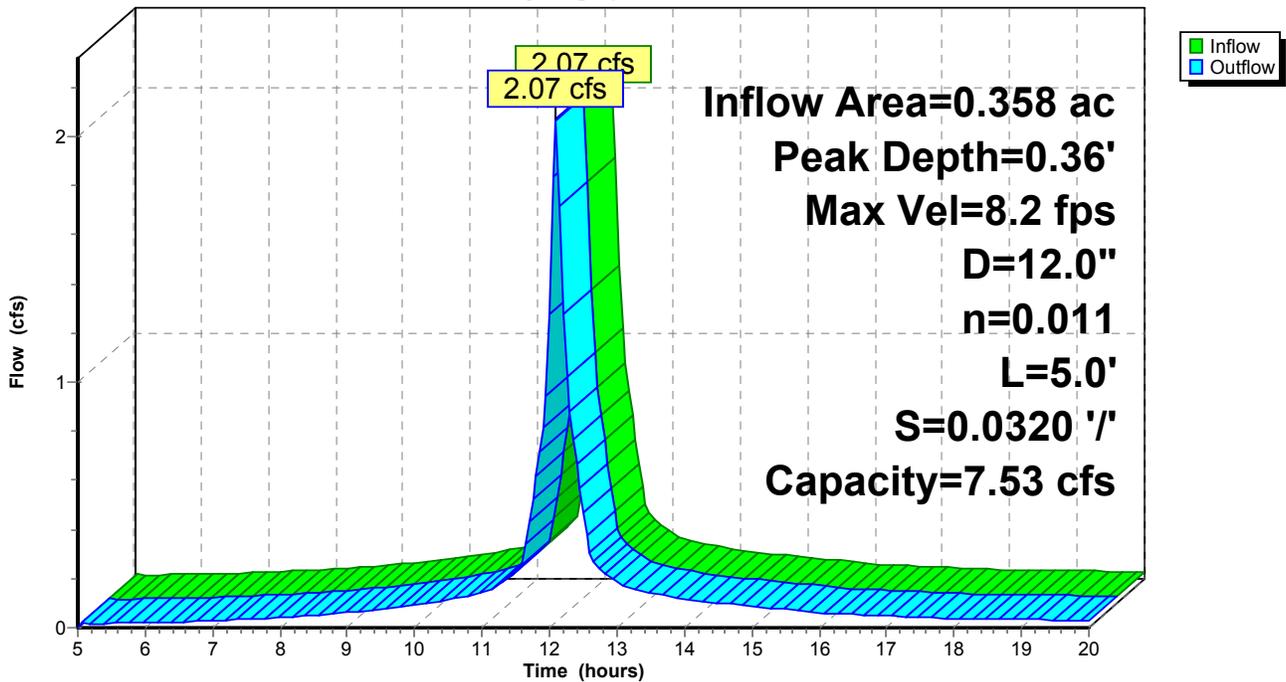
Inflow Area = 0.358 ac, Inflow Depth = 5.22" for 100 Year Storm event  
Inflow = 2.07 cfs @ 12.09 hrs, Volume= 0.156 af  
Outflow = 2.07 cfs @ 12.09 hrs, Volume= 0.156 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 8.2 fps, Min. Travel Time= 0.0 min  
Avg. Velocity = 3.1 fps, Avg. Travel Time= 0.0 min

Peak Depth= 0.36' @ 12.09 hrs  
Capacity at bank full= 7.53 cfs  
Inlet Invert= 92.81', Outlet Invert= 92.65'  
12.0" Diameter Pipe n= 0.011 Length= 5.0' Slope= 0.0320 '/'

## Reach 5R:

Hydrograph



**Postdevelopment**

Type III 24-hr 100 Year Storm Rainfall=6.40"

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**Pond 1P: CB**

Inflow Area = 0.378 ac, Inflow Depth = 3.58" for 100 Year Storm event  
Inflow = 1.66 cfs @ 12.09 hrs, Volume= 0.113 af  
Outflow = 1.66 cfs @ 12.09 hrs, Volume= 0.113 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.66 cfs @ 12.09 hrs, Volume= 0.113 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 98.19' @ 12.09 hrs

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated)

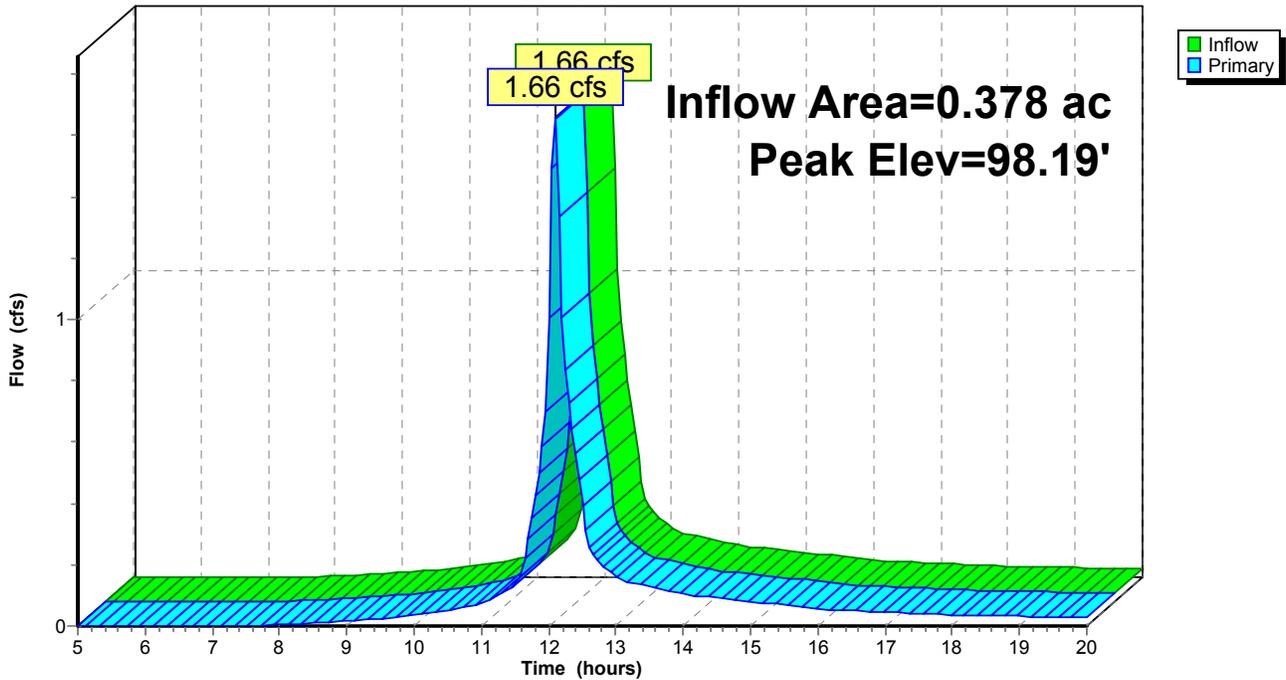
#	Routing	Invert	Outlet Devices
1	Primary	97.66'	24.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=1.63 cfs @ 12.09 hrs HW=98.19' (Free Discharge)

↑1=Orifice/Grate (Orifice Controls 1.63 cfs @ 2.5 fps)

**Pond 1P: CB**

Hydrograph



**Postdevelopment**

Type III 24-hr 100 Year Storm Rainfall=6.40"

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**Pond 2P: Stormceptor**

Inflow Area = 0.378 ac, Inflow Depth = 3.58" for 100 Year Storm event  
Inflow = 1.66 cfs @ 12.09 hrs, Volume= 0.113 af  
Outflow = 1.66 cfs @ 12.09 hrs, Volume= 0.113 af, Atten= 0%, Lag= 0.0 min  
Primary = 1.66 cfs @ 12.09 hrs, Volume= 0.113 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 98.01' @ 12.09 hrs

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated)

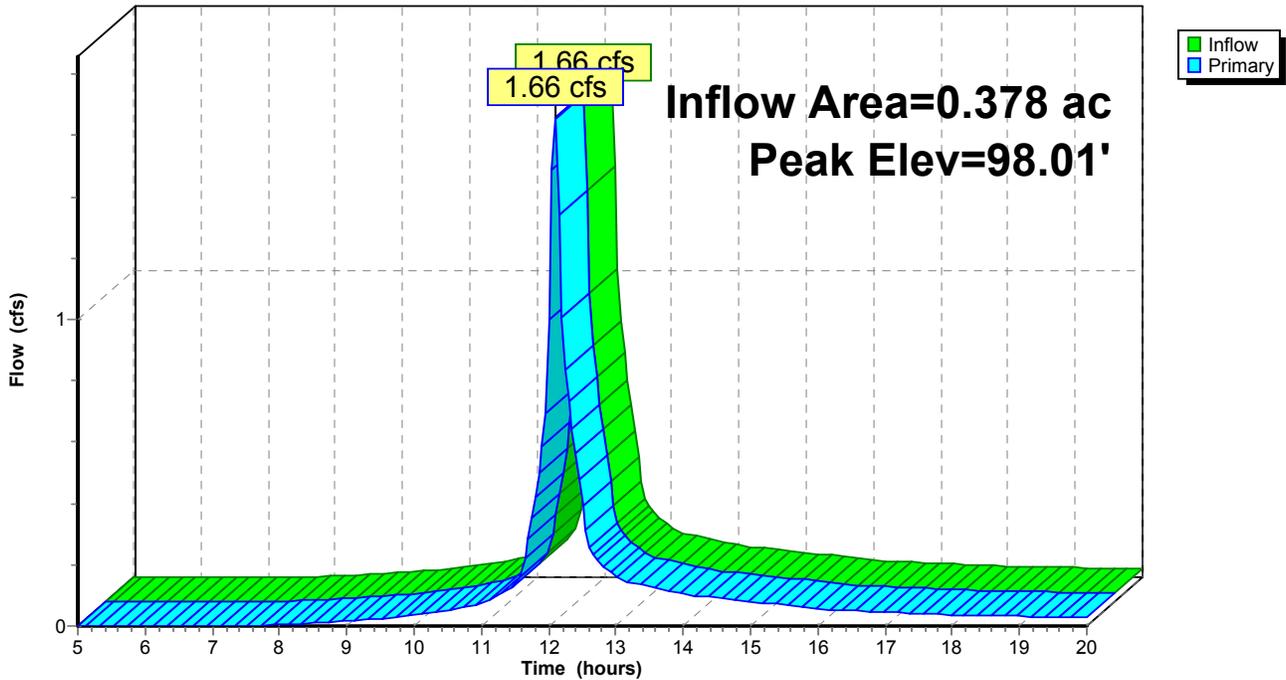
#	Routing	Invert	Outlet Devices
1	Primary	97.82'	<b>24.0" Horiz. Orifice/Grate</b> Limited to weir flow C= 0.600

**Primary OutFlow** Max=1.63 cfs @ 12.09 hrs HW=98.00' (Free Discharge)

↳ **1=Orifice/Grate** (Weir Controls 1.63 cfs @ 1.4 fps)

**Pond 2P: Stormceptor**

Hydrograph



**Postdevelopment**

Type III 24-hr 100 Year Storm Rainfall=6.40"

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**Pond 3P: Infiltration Field #1**

Exfiltration based on Class A soil with Design Infiltration Rate of 8.27 in/hr

Inflow Area = 0.378 ac, Inflow Depth = 3.58" for 100 Year Storm event  
 Inflow = 1.66 cfs @ 12.09 hrs, Volume= 0.113 af  
 Outflow = 0.32 cfs @ 11.75 hrs, Volume= 0.113 af, Atten= 81%, Lag= 0.0 min  
 Discarded = 0.32 cfs @ 11.75 hrs, Volume= 0.113 af

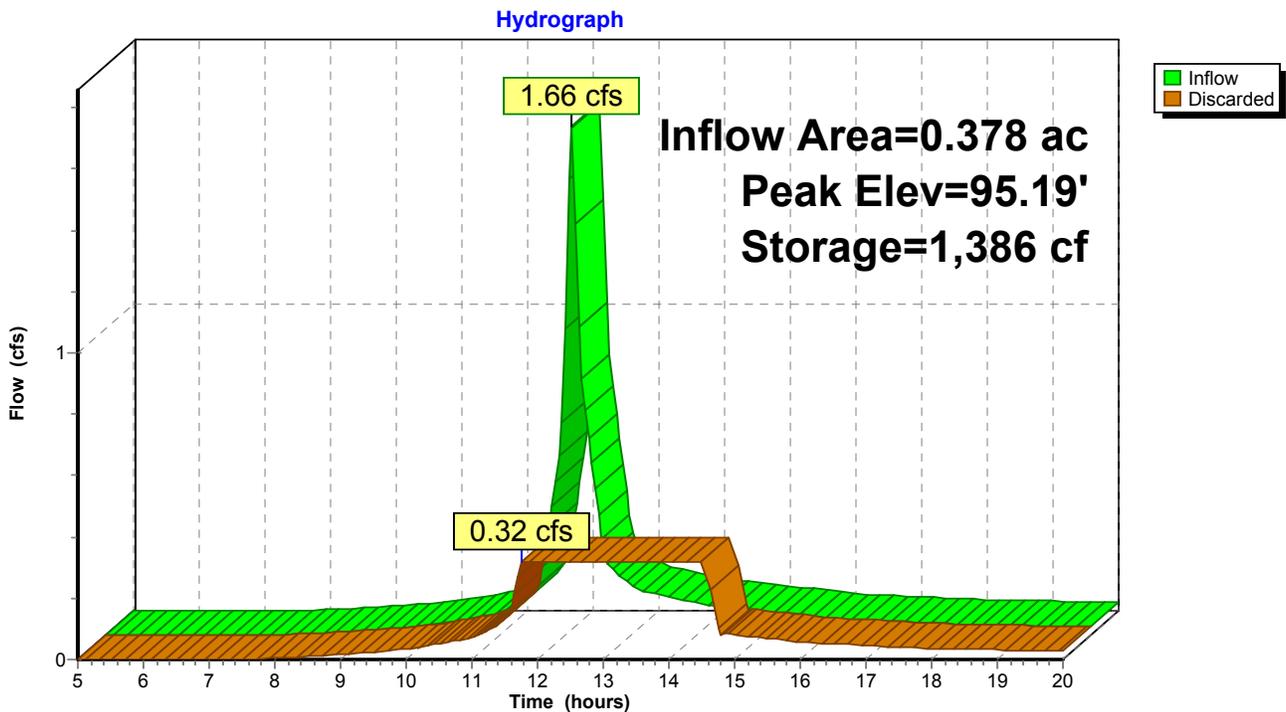
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 95.19' @ 12.55 hrs Surf.Area= 1,660 sf Storage= 1,386 cf  
 Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= (not calculated)

#	Invert	Avail.Storage	Storage Description
1	93.20'	1,415 cf	<b>20.00'W x 83.00'L x 2.20'H Prismaoid</b> 3,652 cf Overall - 114 cf Embedded = 3,538 cf x 40.0% Voids
2	93.70'	114 cf	<b>2.7"W x 18.5"H x 10.25'L Cultec 150XLHDx 48 Inside #1</b>
		1,529 cf	Total Available Storage

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	<b>0.011486 fpm Exfiltration over entire Surface area</b>

**Discarded OutFlow** Max=0.32 cfs @ 11.75 hrs HW=93.23' (Free Discharge)  
 ←1=Exfiltration (Exfiltration Controls 0.32 cfs)

**Pond 3P: Infiltration Field #1**



# Postdevelopment

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Type III 24-hr 100 Year Storm Rainfall=6.40"

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## Pond 4P: Outlet Control DMH

Inflow Area = 0.358 ac, Inflow Depth = 5.22" for 100 Year Storm event  
Inflow = 2.07 cfs @ 12.09 hrs, Volume= 0.156 af  
Outflow = 2.07 cfs @ 12.09 hrs, Volume= 0.156 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.07 cfs @ 12.09 hrs, Volume= 0.156 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 93.78' @ 12.10 hrs

Plug-Flow detention time= (not calculated: outflow precedes inflow)

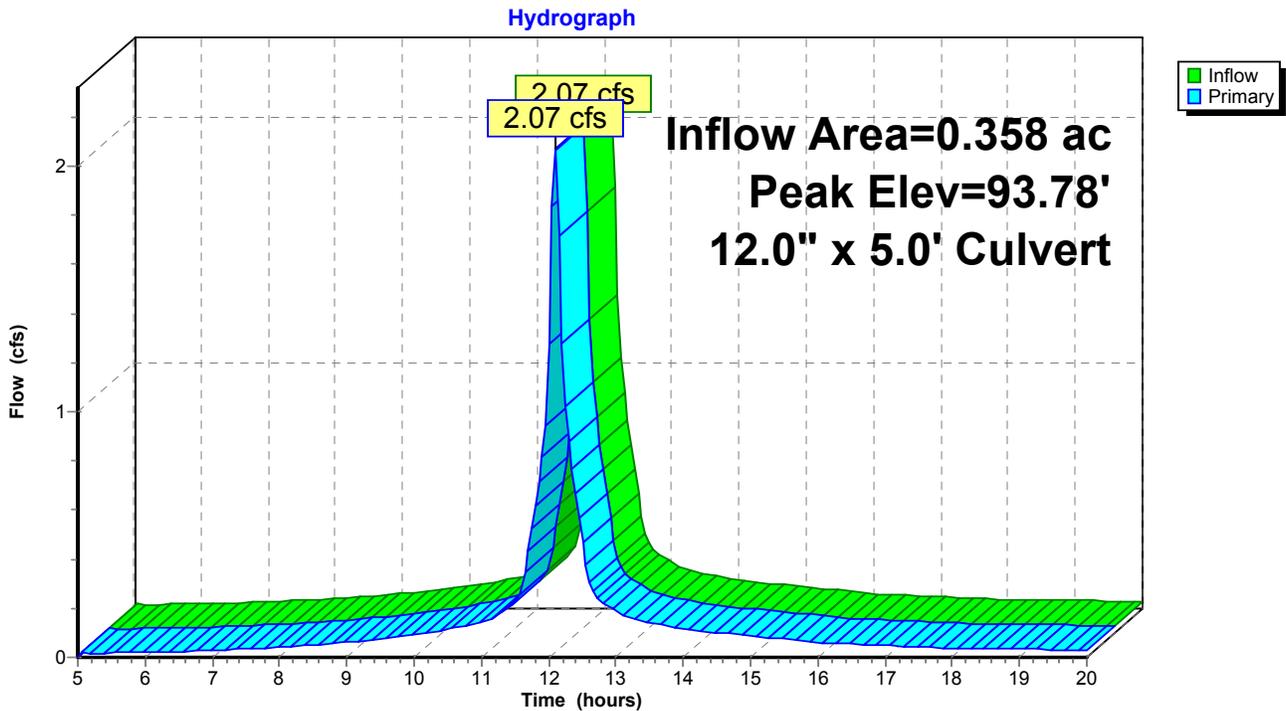
Center-of-Mass det. time= (not calculated)

#	Routing	Invert	Outlet Devices
1	Primary	90.55'	<b>12.0" x 5.0' long Culvert</b> CPP, projecting, no headwall, Ke= 0.900 Outlet Invert= 92.81' S= -0.4520 '/ n= 0.011 Cc= 0.900

**Primary OutFlow** Max=2.04 cfs @ 12.09 hrs HW=93.77' (Free Discharge)

↑1=Culvert (Inlet Controls 2.04 cfs @ 2.6 fps)

## Pond 4P: Outlet Control DMH



**Postdevelopment**

Type III 24-hr 100 Year Storm Rainfall=6.40"

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**Pond 6P: Infiltration Field #2**

Exfiltration based on Class A soil with Design Infiltration Rate of 8.27 in/hr

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Inflow Area =	0.358 ac,	Inflow Depth =	5.22"	for	100 Year Storm event
Inflow =	2.07 cfs @	12.09 hrs,	Volume=	0.156 af	
Outflow =	0.42 cfs @	11.75 hrs,	Volume=	0.156 af,	Atten= 80%, Lag= 0.0 min
Discarded =	0.42 cfs @	11.75 hrs,	Volume=	0.156 af	
Primary =	0.00 cfs @	5.00 hrs,	Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 93.39' @ 12.53 hrs Surf.Area= 2,168 sf Storage= 1,729 cf  
 Plug-Flow detention time= 23.2 min calculated for 0.156 af (100% of inflow)  
 Center-of-Mass det. time= 23.1 min ( 769.6 - 746.5 )

#	Invert	Avail.Storage	Storage Description
1	91.50'	1,848 cf	<b>23.25'W x 93.25'L x 2.20'H Prismatic</b> 4,770 cf Overall - 149 cf Embedded = 4,620 cf x 40.0% Voids
2	92.00'	149 cf	<b>2.7"W x 18.5"H x 10.25'L Cultec 150XLHD</b> x 63 Inside #1
		1,997 cf	Total Available Storage

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	<b>0.011486 fpm Exfiltration over entire Surface area</b>
2	Primary	94.00'	<b>24.0" Horiz. Orifice/Grate</b> Limited to weir flow C= 0.600

**Discarded OutFlow** Max=0.42 cfs @ 11.75 hrs HW=91.54' (Free Discharge)  
 ↑1=Exfiltration (Exfiltration Controls 0.42 cfs)

**Primary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=91.50' (Free Discharge)  
 ↑2=Orifice/Grate ( Controls 0.00 cfs)

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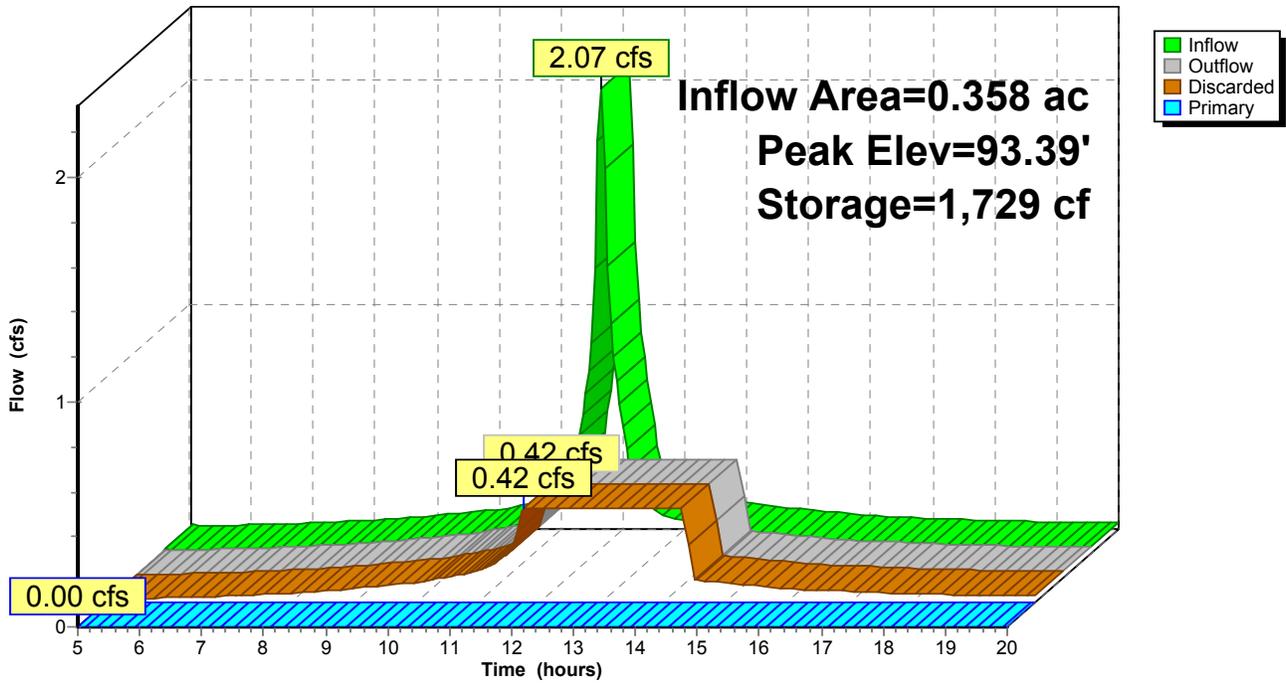
Type III 24-hr 100 Year Storm Rainfall=6.40"

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**Pond 6P: Infiltration Field #2**

Hydrograph



**Postdevelopment**

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**Pond 7P: Stormceptor**

Inflow Area = 0.358 ac, Inflow Depth = 5.22" for 100 Year Storm event  
Inflow = 2.07 cfs @ 12.09 hrs, Volume= 0.156 af  
Outflow = 2.07 cfs @ 12.09 hrs, Volume= 0.156 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.07 cfs @ 12.09 hrs, Volume= 0.156 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 97.72' @ 12.09 hrs

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= (not calculated)

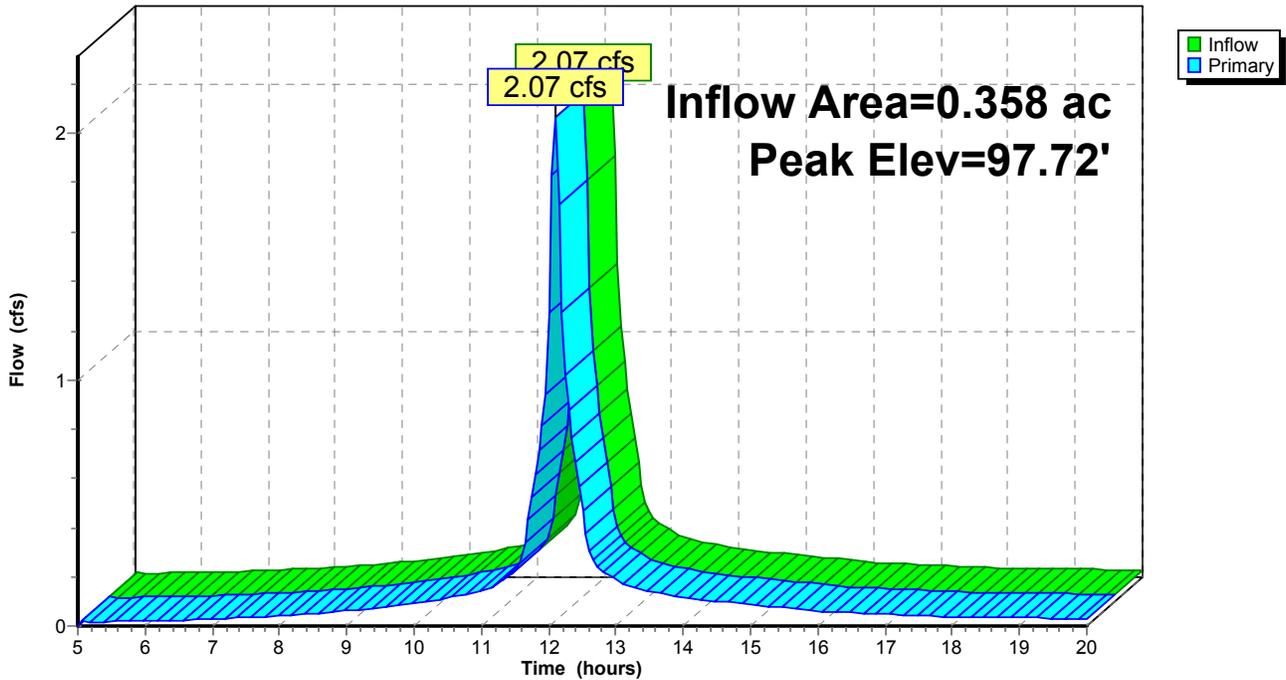
#	Routing	Invert	Outlet Devices
1	Primary	97.50'	<b>24.0" Horiz. Orifice/Grate</b> Limited to weir flow C= 0.600

**Primary OutFlow** Max=2.04 cfs @ 12.09 hrs HW=97.71' (Free Discharge)

↑1=Orifice/Grate (Weir Controls 2.04 cfs @ 1.5 fps)

**Pond 7P: Stormceptor**

Hydrograph



**Postdevelopment**

Type III 24-hr 100 Year Storm Rainfall=6.40"

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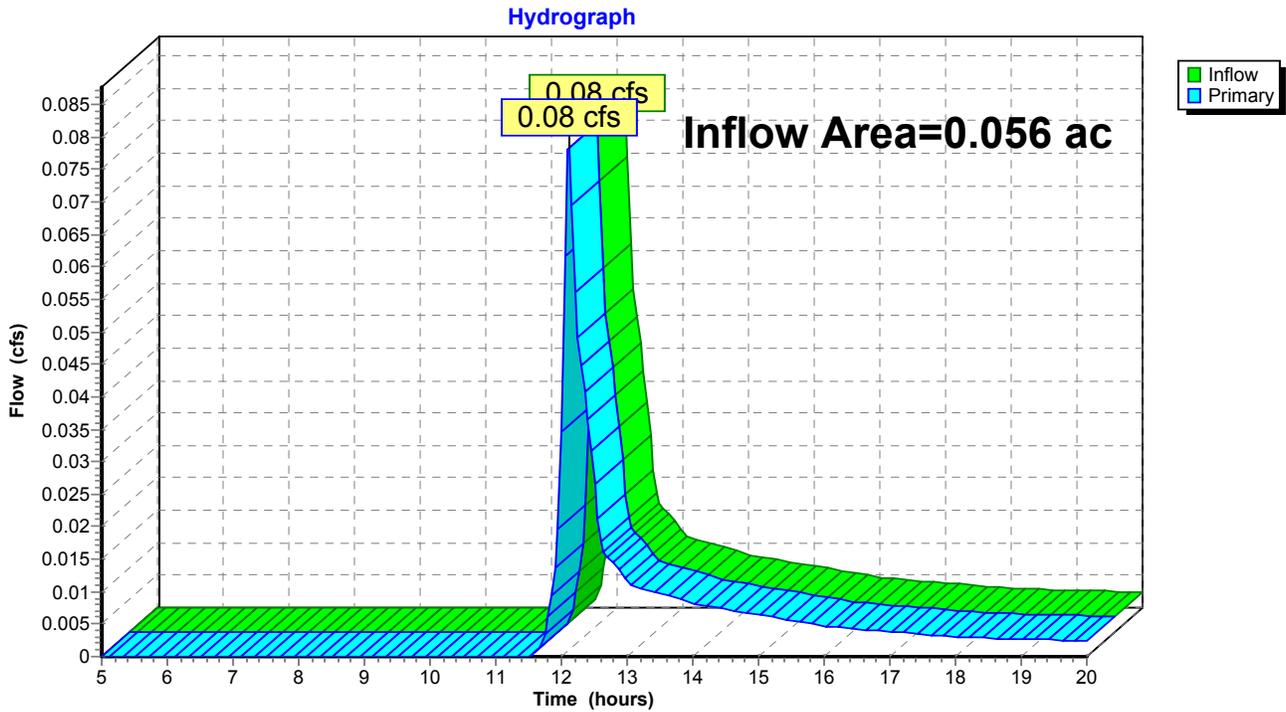
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**Link 1L: (To Summer Avenue)**

Inflow Area = 0.056 ac, Inflow Depth = 1.28" for 100 Year Storm event  
Inflow = 0.08 cfs @ 12.11 hrs, Volume= 0.006 af  
Primary = 0.08 cfs @ 12.11 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Link 1L: (To Summer Avenue)**



**Postdevelopment**

Type III 24-hr 100 Year Storm Rainfall=6.40"

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**Link 2L: To Rear of Site**

Inflow Area = 0.843 ac, Inflow Depth = 0.78" for 100 Year Storm event  
Inflow = 0.54 cfs @ 12.13 hrs, Volume= 0.055 af  
Primary = 0.54 cfs @ 12.13 hrs, Volume= 0.055 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Link 2L: To Rear of Site**

Hydrograph

