Sullivan Engineering Group, LLC
Civil Engineers & Land Development Consultants

November 5, 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 (porous pavement with crushed stone base). The field soil testing showed the site to be classified as Hydrologic Soil Group "A", as a conservative design approach an infiltration rate of 1.02 in/hr was used (Hydrologic Soil Group "B").

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 Low Impact drainage mitigation design is proposed for this project, involving porous pavement with a crushed stone base. This will allow storage and infiltration of stormwater runoff without the need for manufactured drainage infrastructure (catchbasins, manholes, stormceptors, etc…). 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, 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	1.05	0.03
10 Year	2.91	0.11
100 Year	5.11	0.23

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

COMMONWEALTH OF MASSACHUSETTS
JOHN D. SULLIVAN III
CIVIL
No. 41586
REGISTERED PROFESSIONAL ENGINEER

22 Mount Vernon Road ~ Boxford, Massachusetts 01921 ~ (978) 352-7871-Phone ~ 978 352-7871 - Fax

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 WARRANTY 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.

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

TEMPORARY BENCHMARK CHART:

TBM #	DESCRIPTION	ELEV.
△1	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 Ap: SANDY LOAM 10 YR 3/3
8"–26"	HORIZON Bw: 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

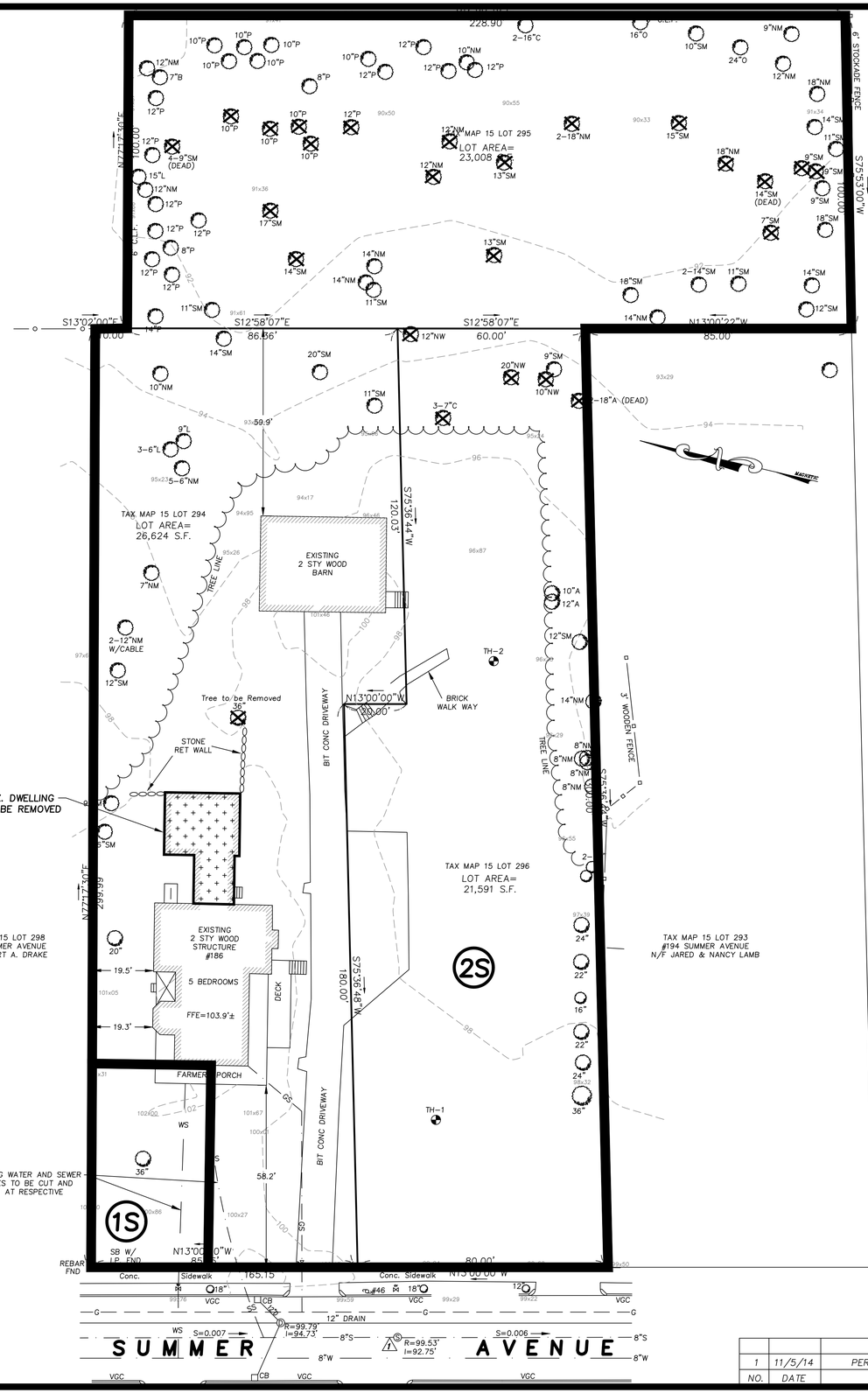
SOIL DAMP @ 94" (ELEV=90.7')

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 Ap: SANDY LOAM 10 YR 3/3
8"–28"	HORIZON Bw: 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



GRAPHIC SCALE
SCALE: 1"=20'
FEET 20 0 10 20 40 80

READING COMMUNITY PLANNING & DEVELOPMENT COMMISSION

APPROVED _____, 20__

LEGEND:

248	TWO FOOT CONTOUR
92X00	EX. SPOT GRADE
UP	UTILITY POLE
S	SEWER MANHOLE
S	SEWER MAIN
W	COMPILED WATER MAIN
G	COMPILED GAS MAIN
D	DRAIN MANHOLE
CB	CATCHBASIN
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)

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:

ASSESSOR'S MAP 15 LOT 294
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)

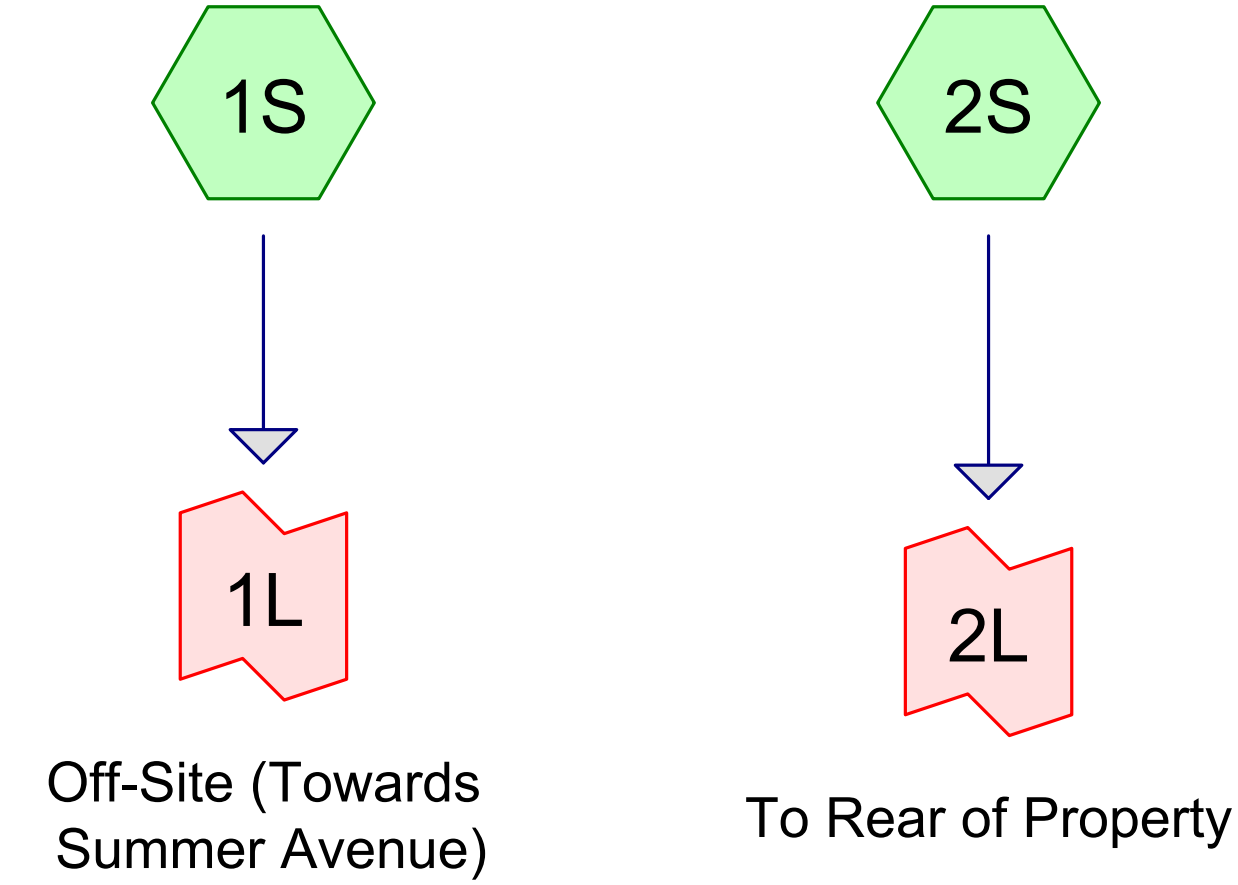
PREPARED FOR
CRITERION CHILD ENRICHMENT INC.
SCALE: 1"= 20' DATE: OCT. 9, 2014

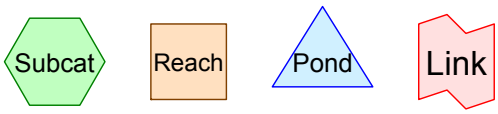
PREPARED BY
SULLIVAN ENGINEERING GROUP, LLC
22 MOUNT VERNON ROAD
BOXFORD, MA 01921
(978) 352–7871

SHEET No. 2 OF 5

REVISIONS

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





Drainage Diagram for Predevelopment
Prepared by Sullivan Engineering Group, LLC 11/5/2014
HydroCAD® 7.00 s/n 001433 © 1986-2003 Applied Microcomputer Systems

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=0.75"
Tc=6.0 min CN=70 Runoff=0.05 cfs 0.003 af

Subcatchment 2S: Runoff Area=68,781 sf Runoff Depth=0.61"
Tc=6.0 min CN=67 Runoff=1.05 cfs 0.081 af

Link 1L: Off-Site (Towards Summer Avenue) Inflow=0.05 cfs 0.003 af
Primary=0.05 cfs 0.003 af

Link 2L: To Rear of Property Inflow=1.05 cfs 0.081 af
Primary=1.05 cfs 0.081 af

Total Runoff Area = 1.635 ac Runoff Volume = 0.084 af Average Runoff Depth = 0.62"

Subcatchment 1S:

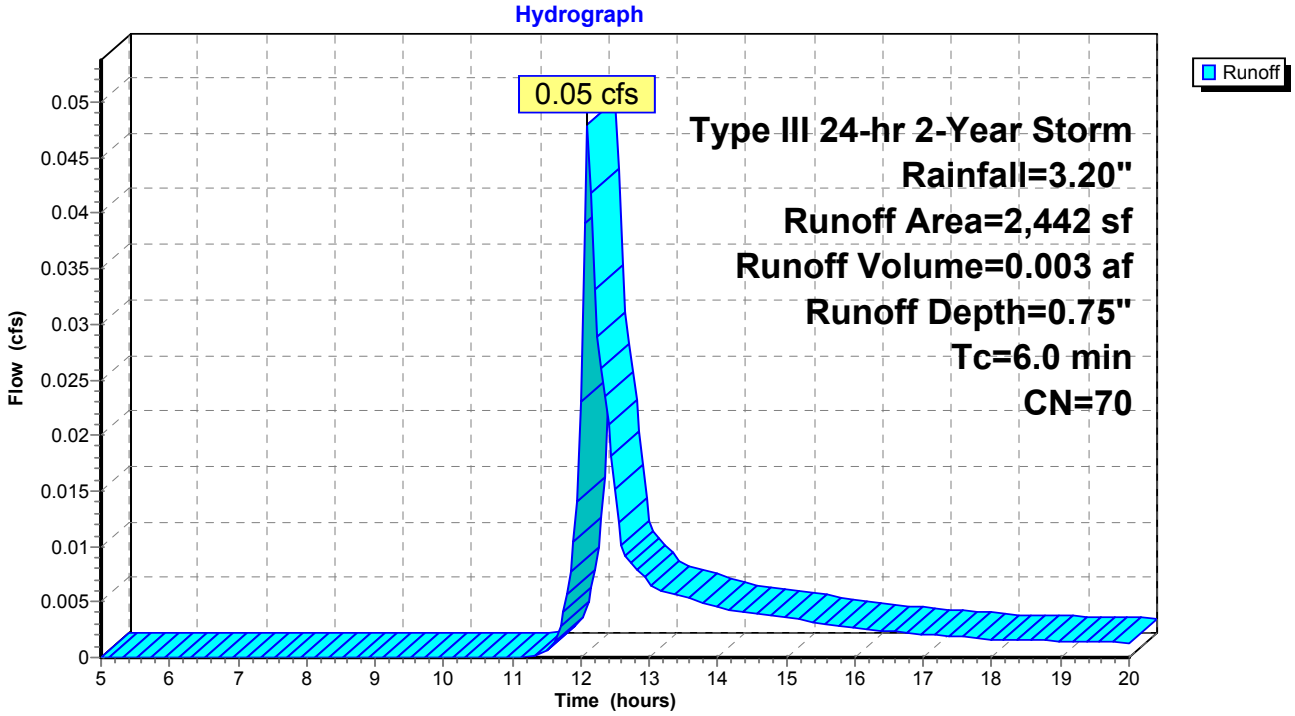
Runoff = 0.05 cfs @ 12.10 hrs, Volume= 0.003 af, Depth= 0.75"

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	69	50-75% Grass cover, Fair, HSG B
2,442	70	Weighted Average

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

Subcatchment 1S:



Subcatchment 2S:

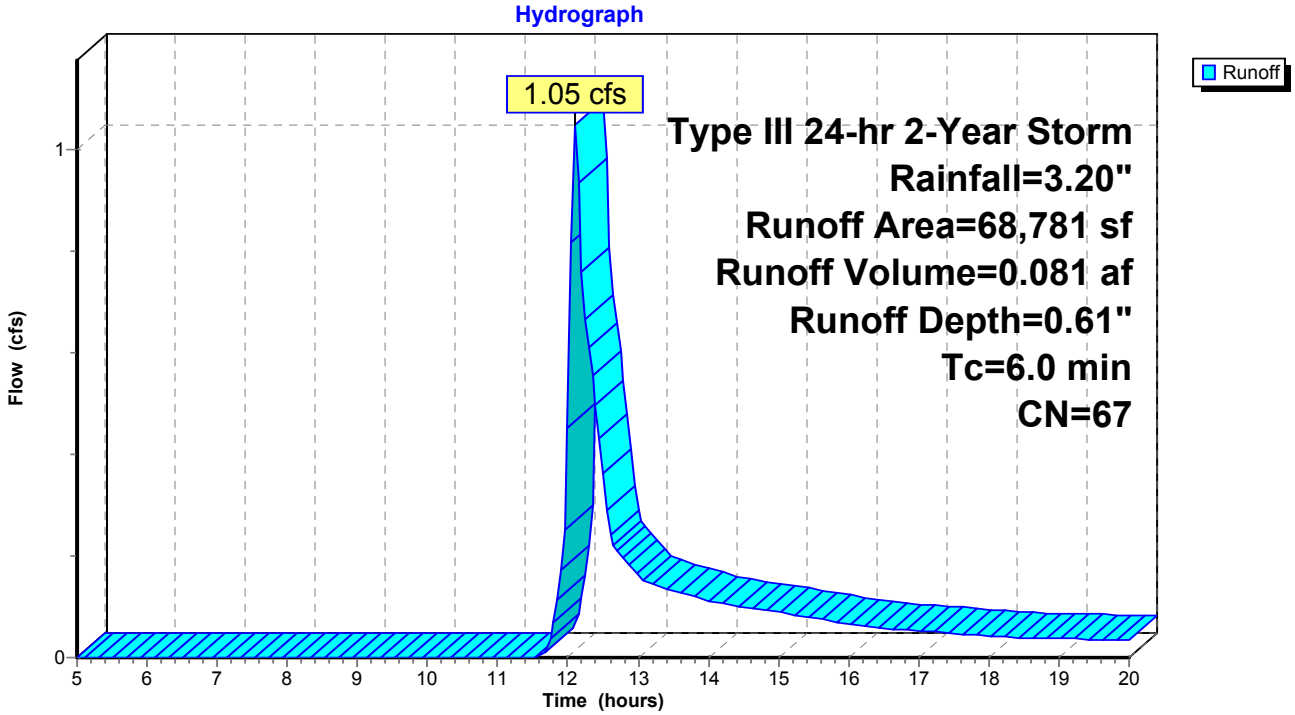
Runoff = 1.05 cfs @ 12.11 hrs, Volume= 0.081 af, Depth= 0.61"

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	69	50-75% Grass cover, Fair, HSG B
35,747	60	Woods, Fair, HSG B
68,781	67	Weighted Average

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

Subcatchment 2S:

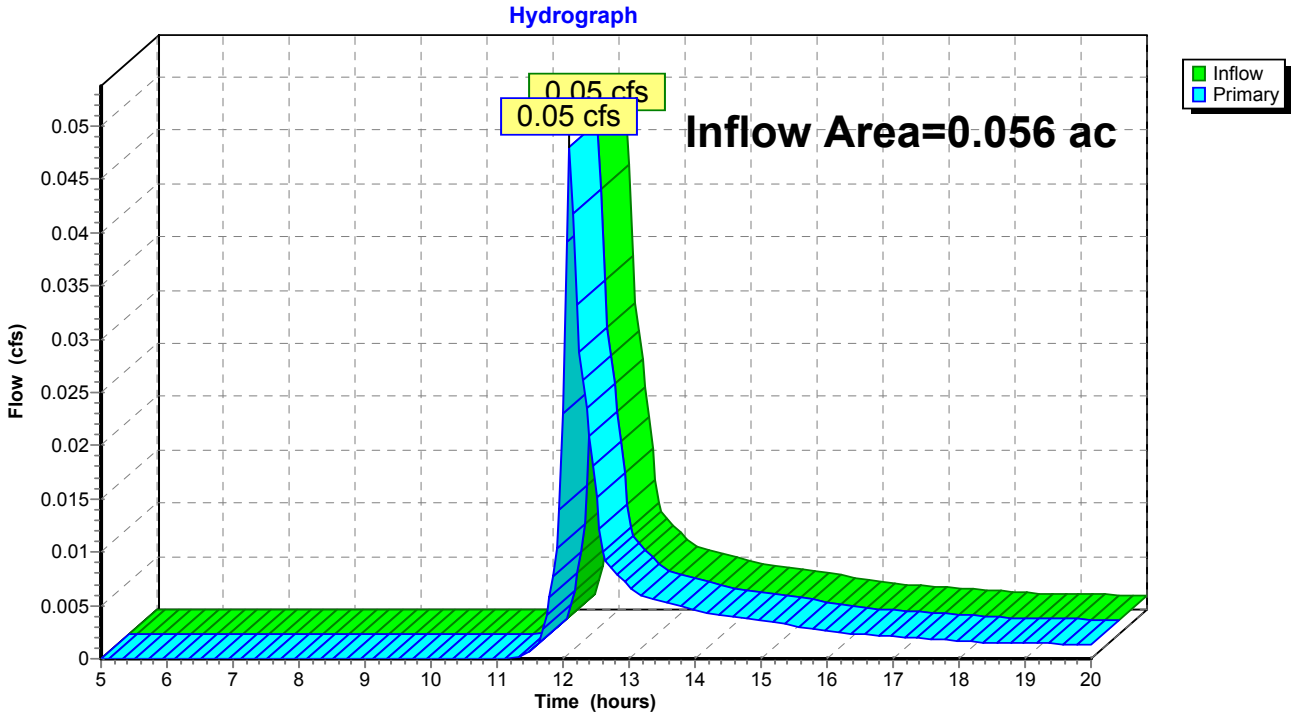


Link 1L: Off-Site (Towards Summer Avenue)

Inflow Area = 0.056 ac, Inflow Depth = 0.75" for 2-Year Storm event
Inflow = 0.05 cfs @ 12.10 hrs, Volume= 0.003 af
Primary = 0.05 cfs @ 12.10 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)

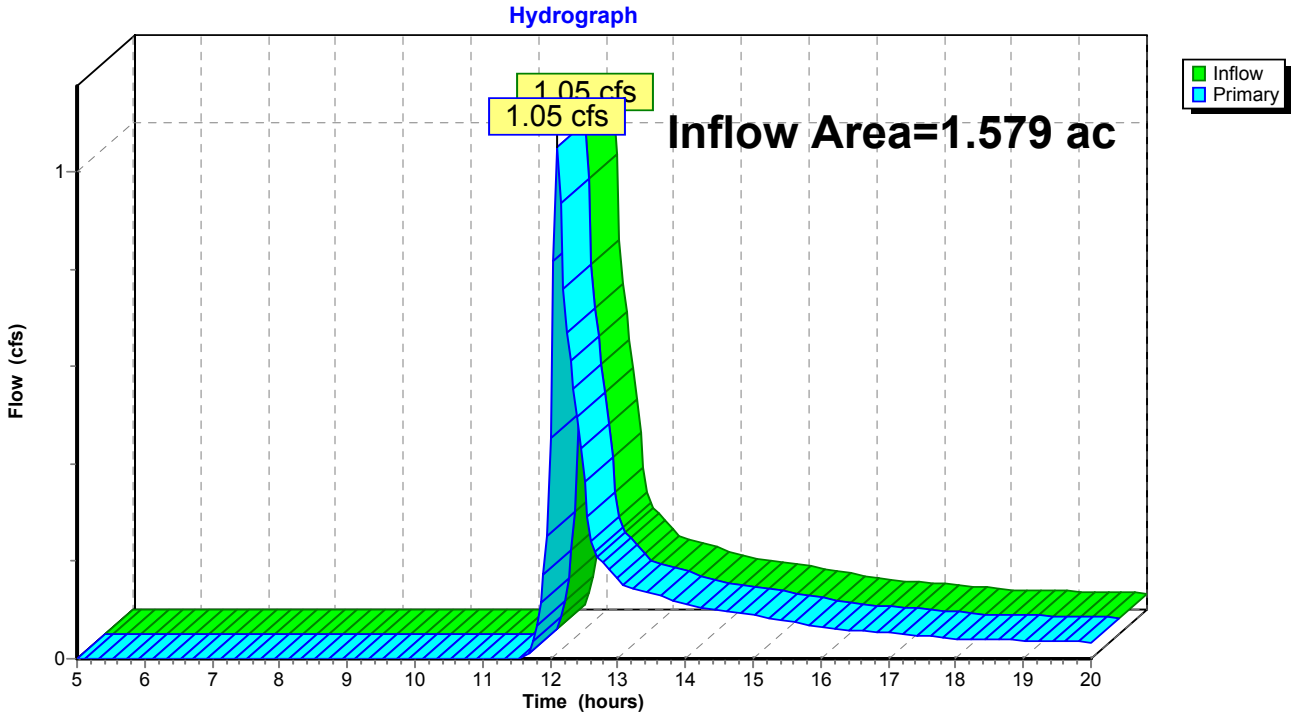


Link 2L: To Rear of Property

Inflow Area = 1.579 ac, Inflow Depth = 0.61" for 2-Year Storm event
Inflow = 1.05 cfs @ 12.11 hrs, Volume= 0.081 af
Primary = 1.05 cfs @ 12.11 hrs, Volume= 0.081 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



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=1.74"
Tc=6.0 min CN=70 Runoff=0.12 cfs 0.008 af

Subcatchment 2S: Runoff Area=68,781 sf Runoff Depth=1.52"
Tc=6.0 min CN=67 Runoff=2.91 cfs 0.200 af

Link 1L: Off-Site (Towards Summer Avenue) Inflow=0.12 cfs 0.008 af
Primary=0.12 cfs 0.008 af

Link 2L: To Rear of Property Inflow=2.91 cfs 0.200 af
Primary=2.91 cfs 0.200 af

Total Runoff Area = 1.635 ac Runoff Volume = 0.209 af Average Runoff Depth = 1.53"

Subcatchment 1S:

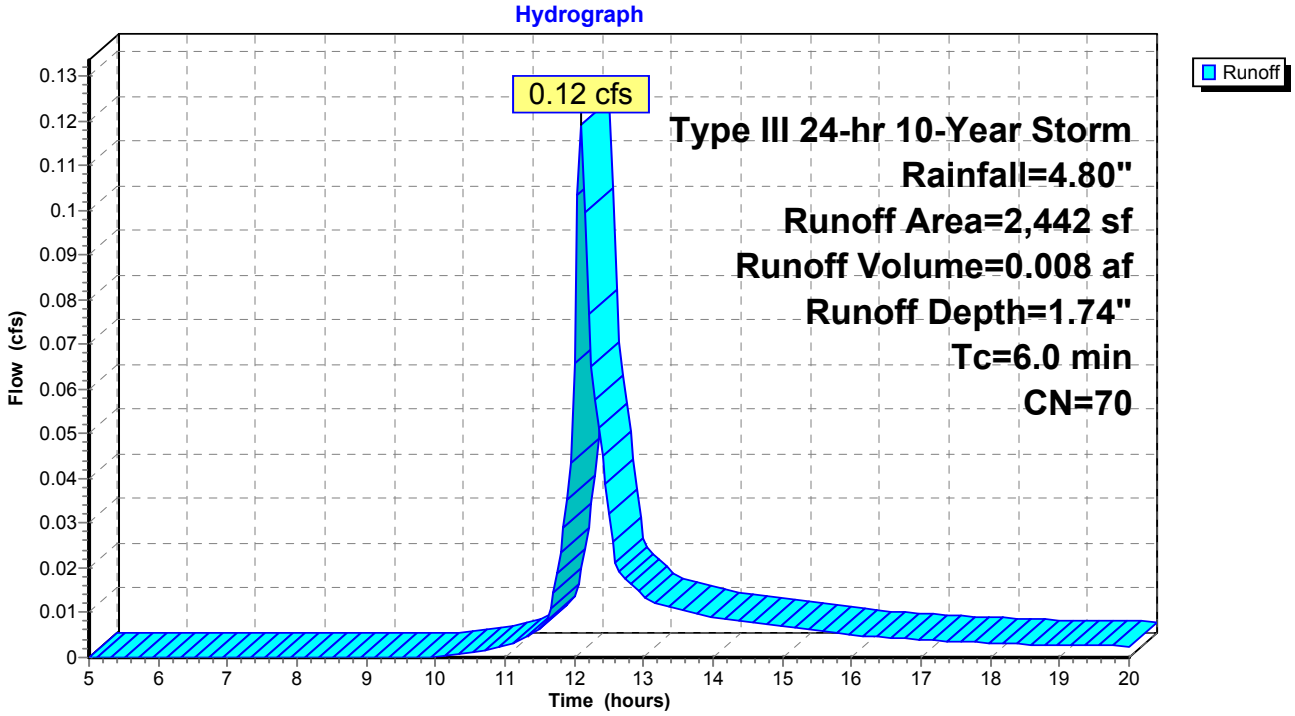
Runoff = 0.12 cfs @ 12.10 hrs, Volume= 0.008 af, Depth= 1.74"

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	69	50-75% Grass cover, Fair, HSG B
2,442	70	Weighted Average

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

Subcatchment 1S:



Subcatchment 2S:

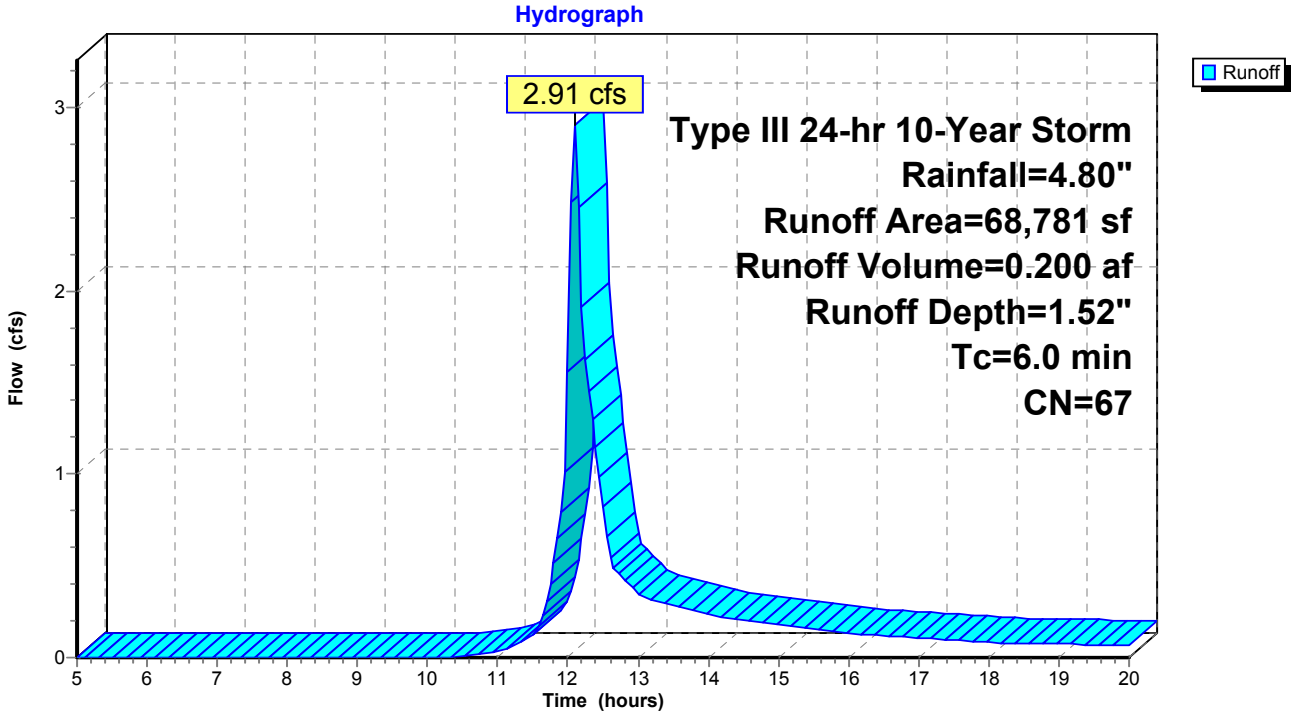
Runoff = 2.91 cfs @ 12.10 hrs, Volume= 0.200 af, Depth= 1.52"

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
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	69	50-75% Grass cover, Fair, HSG B
35,747	60	Woods, Fair, HSG B
68,781	67	Weighted Average

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

Subcatchment 2S:

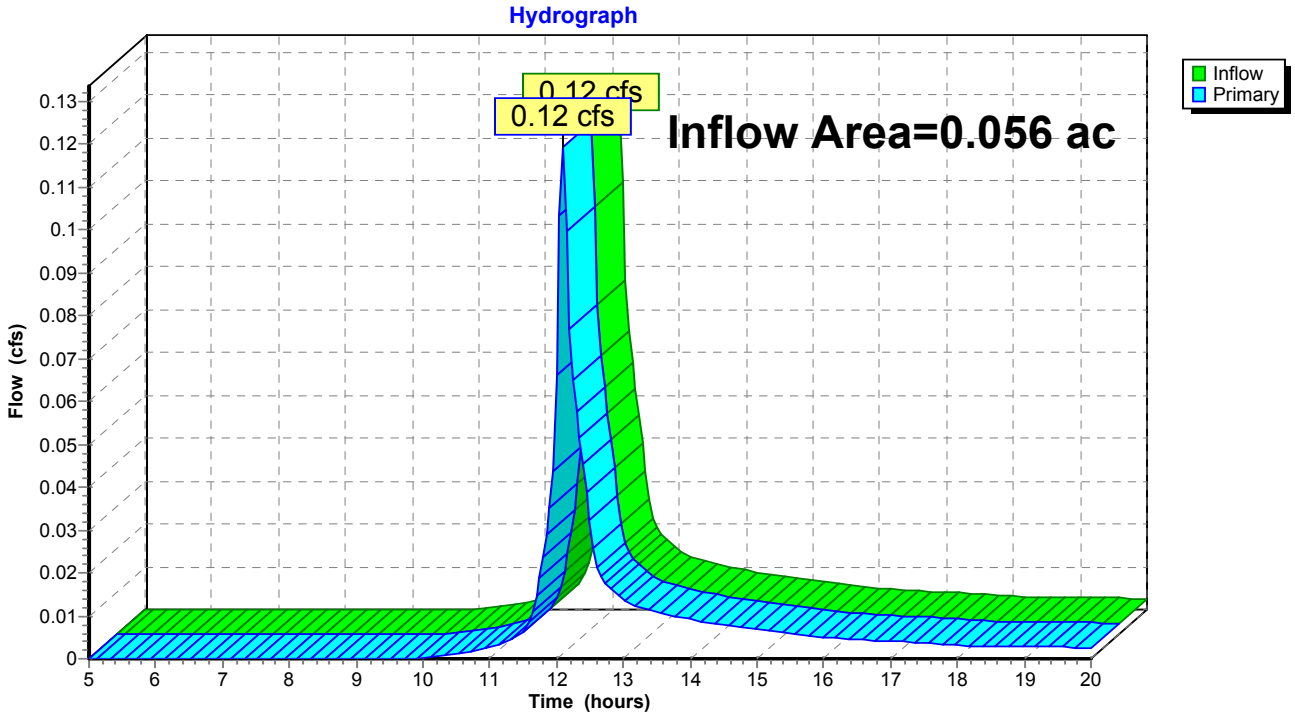


Link 1L: Off-Site (Towards Summer Avenue)

Inflow Area = 0.056 ac, Inflow Depth = 1.74" for 10-Year Storm event
Inflow = 0.12 cfs @ 12.10 hrs, Volume= 0.008 af
Primary = 0.12 cfs @ 12.10 hrs, Volume= 0.008 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)

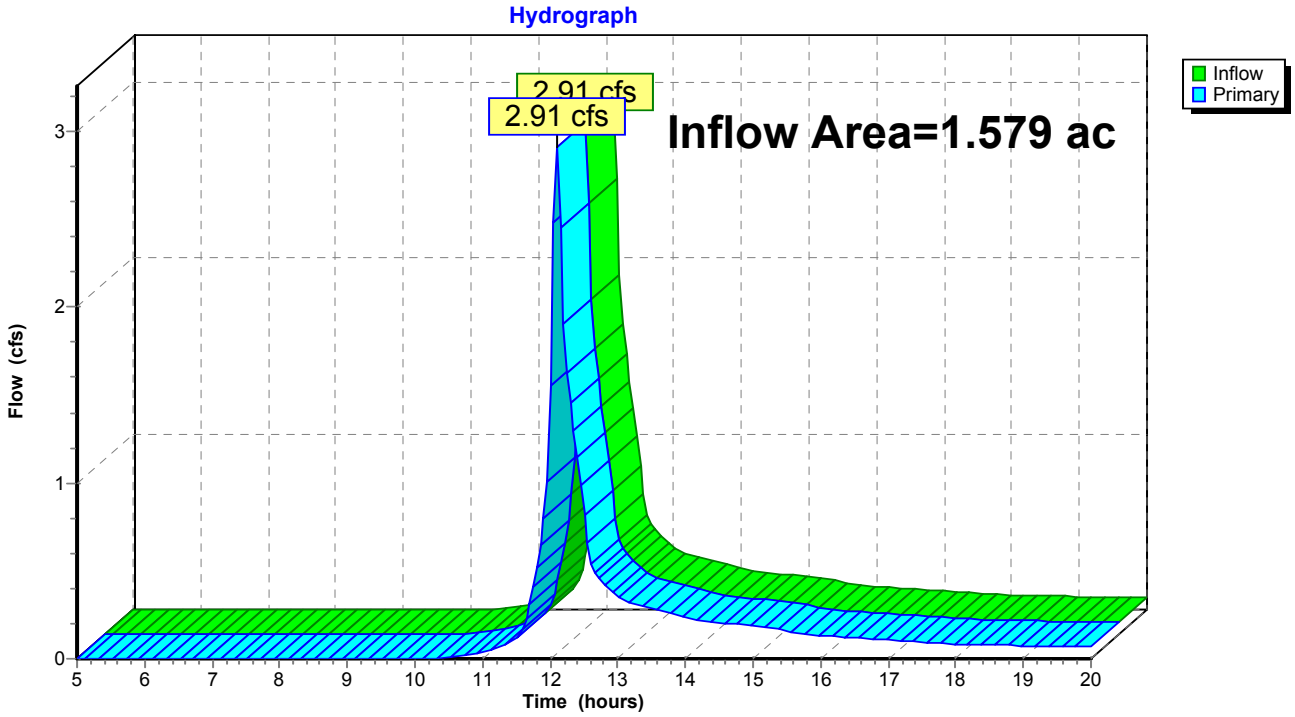


Link 2L: To Rear of Property

Inflow Area = 1.579 ac, Inflow Depth = 1.52" for 10-Year Storm event
Inflow = 2.91 cfs @ 12.10 hrs, Volume= 0.200 af
Primary = 2.91 cfs @ 12.10 hrs, Volume= 0.200 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



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=2.90"
Tc=6.0 min CN=70 Runoff=0.20 cfs 0.014 af

Subcatchment 2S: Runoff Area=68,781 sf Runoff Depth=2.62"
Tc=6.0 min CN=67 Runoff=5.11 cfs 0.345 af

Link 1L: Off-Site (Towards Summer Avenue) Inflow=0.20 cfs 0.014 af
Primary=0.20 cfs 0.014 af

Link 2L: To Rear of Property Inflow=5.11 cfs 0.345 af
Primary=5.11 cfs 0.345 af

Total Runoff Area = 1.635 ac Runoff Volume = 0.358 af Average Runoff Depth = 2.63"

Subcatchment 1S:

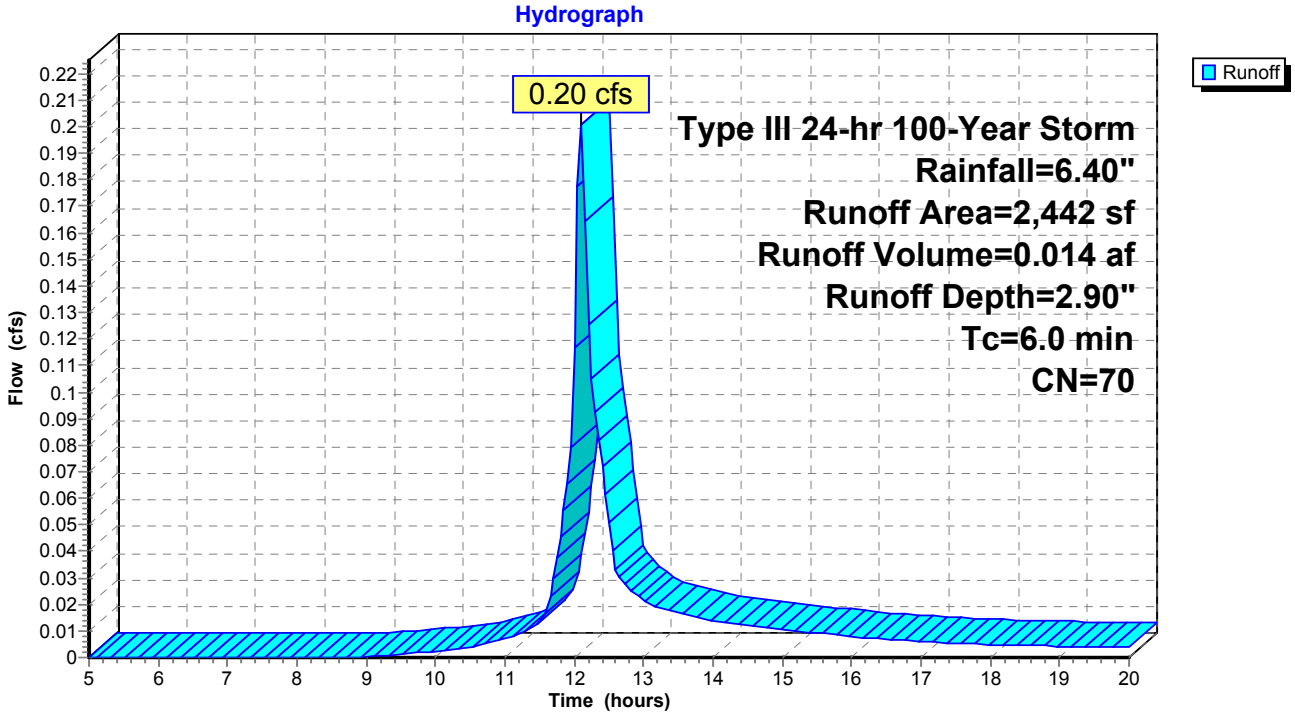
Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.014 af, Depth= 2.90"

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	69	50-75% Grass cover, Fair, HSG B
2,442	70	Weighted Average

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

Subcatchment 1S:



Subcatchment 2S:

Runoff = 5.11 cfs @ 12.10 hrs, Volume= 0.345 af, Depth= 2.62"

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
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
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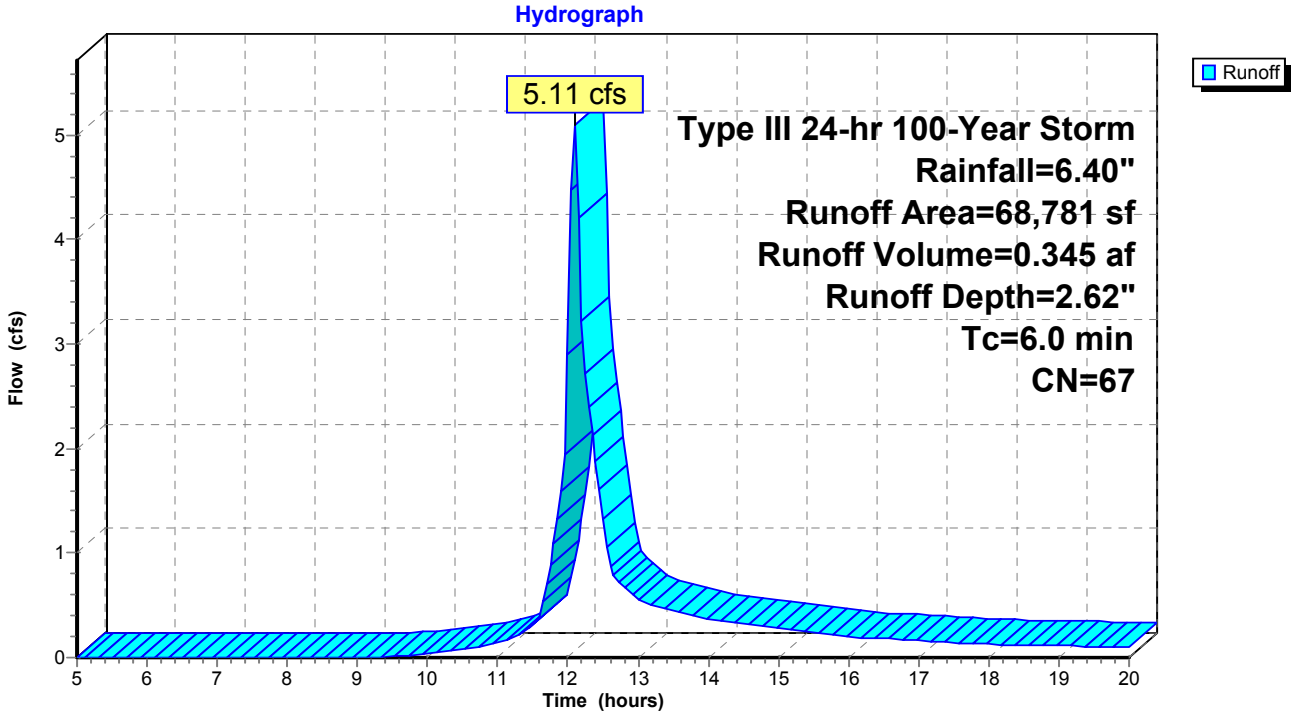
Subcatchment 2S:



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Inflow Area = 0.056 ac, Inflow Depth = 2.90" for 100-Year Storm event
Inflow = 0.20 cfs @ 12.09 hrs, Volume= 0.014 af
Primary = 0.20 cfs @ 12.09 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min

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

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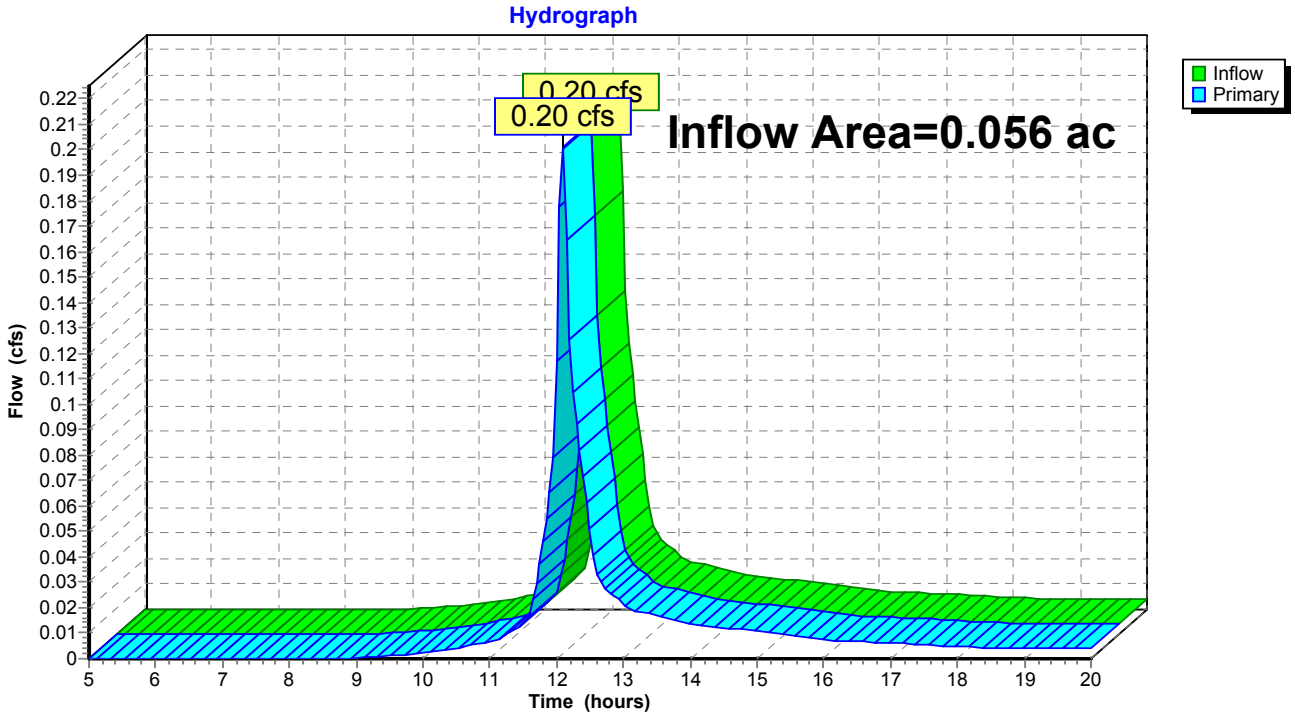

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Inflow Area = 1.579 ac, Inflow Depth = 2.62" for 100-Year Storm event
Inflow = 5.11 cfs @ 12.10 hrs, Volume= 0.345 af
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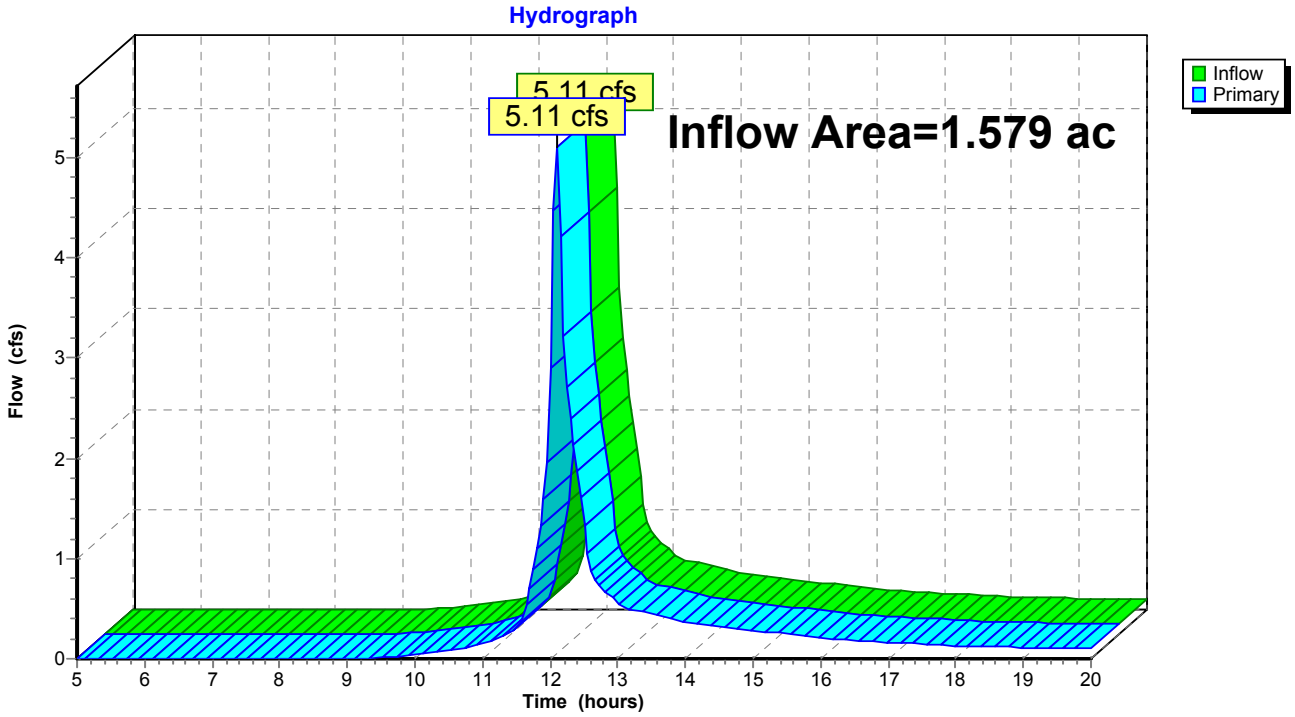
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 2L: To Rear of Property



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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.
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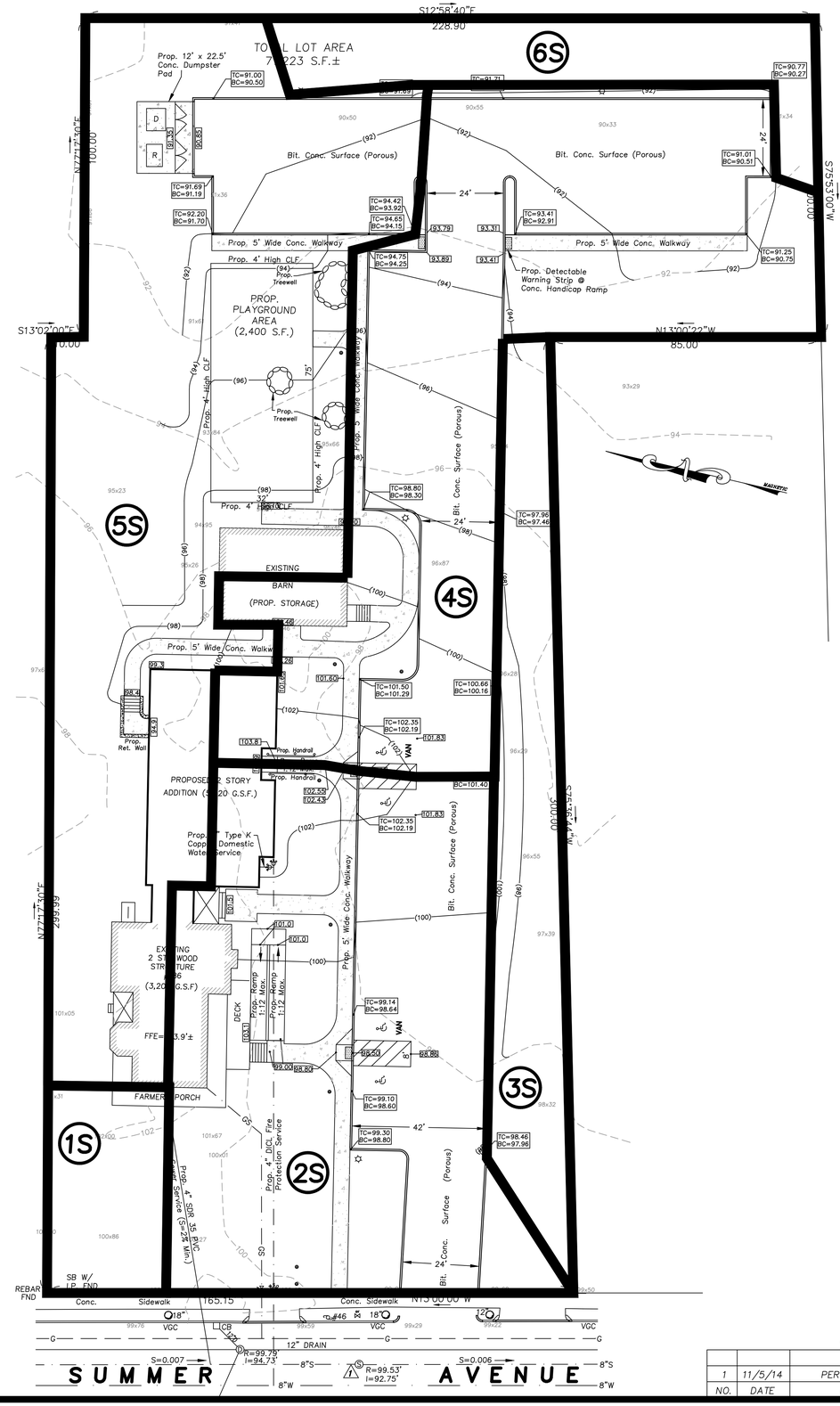
TEMPORARY BENCHMARK CHART:

TBM #	DESCRIPTION	ELEV.
△1	SEWER MANHOLE RIM	99.53'

SEWAGE FLOW CALCULATION:

5 GPD/PERSON = SEWAGE USE PER TITLE 5 CODE
32 CHILDREN X 5 GPD = 160 GALLONS
16 EMPLOYEES X 5 GPD = 90 GALLONS
TOTAL GALLONS PER DAY = 250

EX. FLOW = 5 BDRMS X 110 GPD/BDRM= 550 GPD
PROP. FLOW (250 GPD) < EX. FLOW (550 GPD)...OK



GRAPHIC SCALE
SCALE: 1"=20'
FEET 20 0 10 20 40 80

LEGEND:

248	TWO FOOT CONTOUR
92X00	EX. SPOT GRADE
UP	UTILITY POLE
S	SEWER MANHOLE
S	SEWER MAIN
W	COMPILED WATER MAIN
G	COMPILED GAS MAIN
D	DRAIN MANHOLE
CB	CATCHBASIN
D	DRAIN LINE
BIT.	BITUMINOUS
CONC.	CONCRETE
EOP	EDGE OF PAVEMENT
VGC	VERTICAL GRANITE CURB
FFE	FIRST FLOOR
TC	TOP OF CURB
BC	BOTTOM OF CURB
(100)	PROP. CONTOUR
98.25	PROP. SPOT GRADE

READING COMMUNITY PLANNING & DEVELOPMENT COMMISSION

APPROVED _____, 20__

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 _____

REVISIONS

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

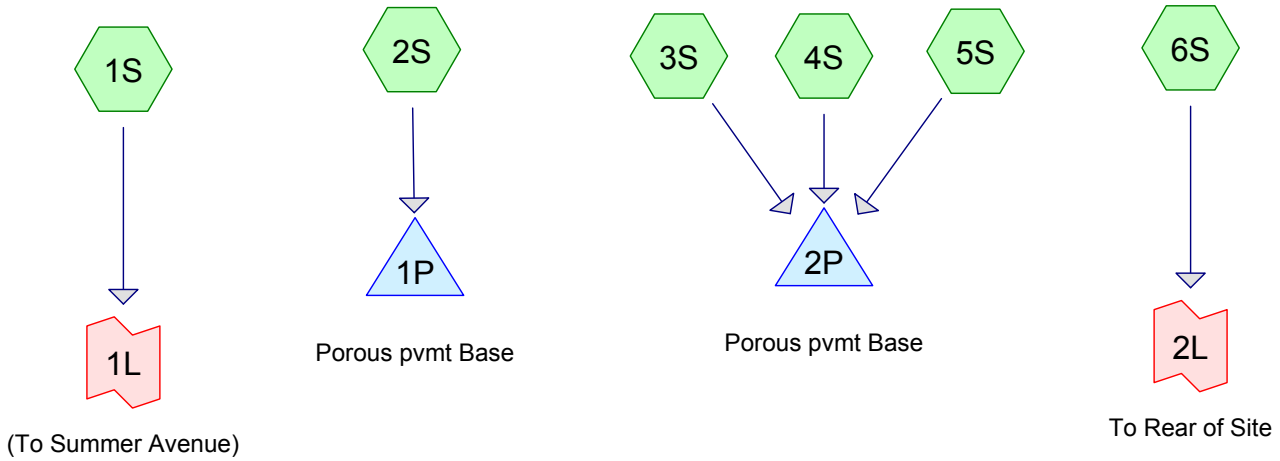
186–190 SUMMER AVENUE

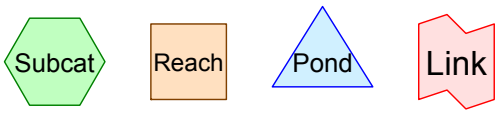
POSTDEVELOPMENT DRAINAGE PLAN
LOCATED IN
READING, MASSACHUSETTS
(MIDDLESEX COUNTY)

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. 1 OF 1





Drainage Diagram for Postdevelopment
Prepared by Sullivan Engineering Group, LLC 11/5/2014
HydroCAD® 7.00 s/n 001433 © 1986-2003 Applied Microcomputer Systems

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=0.75"
Tc=6.0 min CN=70 Runoff=0.05 cfs 0.003 af

Subcatchment 2S: Runoff Area=16,486 sf Runoff Depth=0.96"
Tc=462.0 min CN=86 Runoff=0.08 cfs 0.030 af

Subcatchment 3S: Runoff Area=5,671 sf Runoff Depth=0.50"
Tc=6.0 min CN=64 Runoff=0.06 cfs 0.005 af

Subcatchment 4S: Runoff Area=18,614 sf Runoff Depth=1.38"
Tc=462.0 min CN=93 Runoff=0.12 cfs 0.049 af

Subcatchment 5S: Runoff Area=23,894 sf Runoff Depth=0.51"
Tc=462.0 min CN=75 Runoff=0.06 cfs 0.023 af

Subcatchment 6S: Runoff Area=4,116 sf Runoff Depth=0.36"
Tc=6.0 min CN=60 Runoff=0.03 cfs 0.003 af

Pond 1P: Porous pvmt Base Peak Elev=98.01' Storage=30 cf Inflow=0.08 cfs 0.030 af
Outflow=0.08 cfs 0.030 af

Pond 2P: Porous pvmt Base Peak Elev=98.01' Storage=71 cf Inflow=0.18 cfs 0.078 af
Outflow=0.18 cfs 0.076 af

Link 1L: (To Summer Avenue) Inflow=0.05 cfs 0.003 af
Primary=0.05 cfs 0.003 af

Link 2L: To Rear of Site Inflow=0.03 cfs 0.003 af
Primary=0.03 cfs 0.003 af

Total Runoff Area = 1.635 ac Runoff Volume = 0.114 af Average Runoff Depth = 0.84"

Subcatchment 1S:

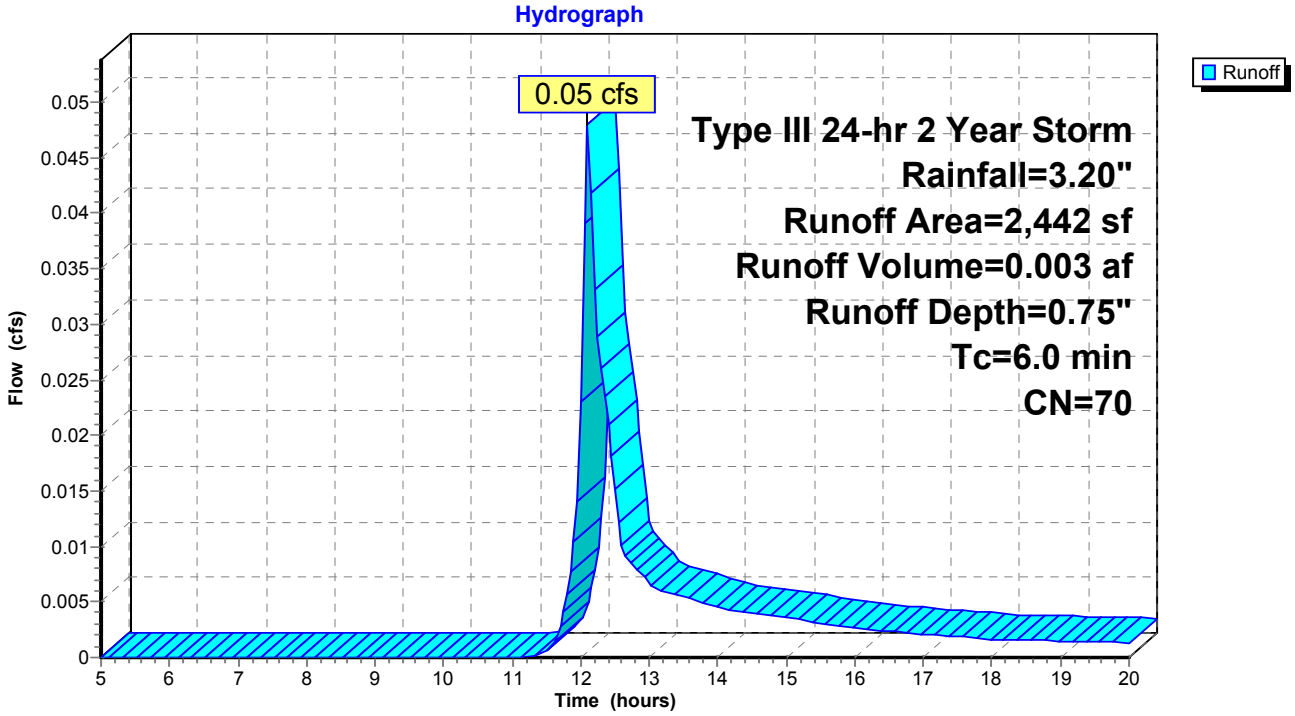
Runoff = 0.05 cfs @ 12.10 hrs, Volume= 0.003 af, Depth= 0.75"

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	69	50-75% Grass cover, Fair, HSG B
2,442	70	Weighted Average

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

Subcatchment 1S:



Subcatchment 2S:

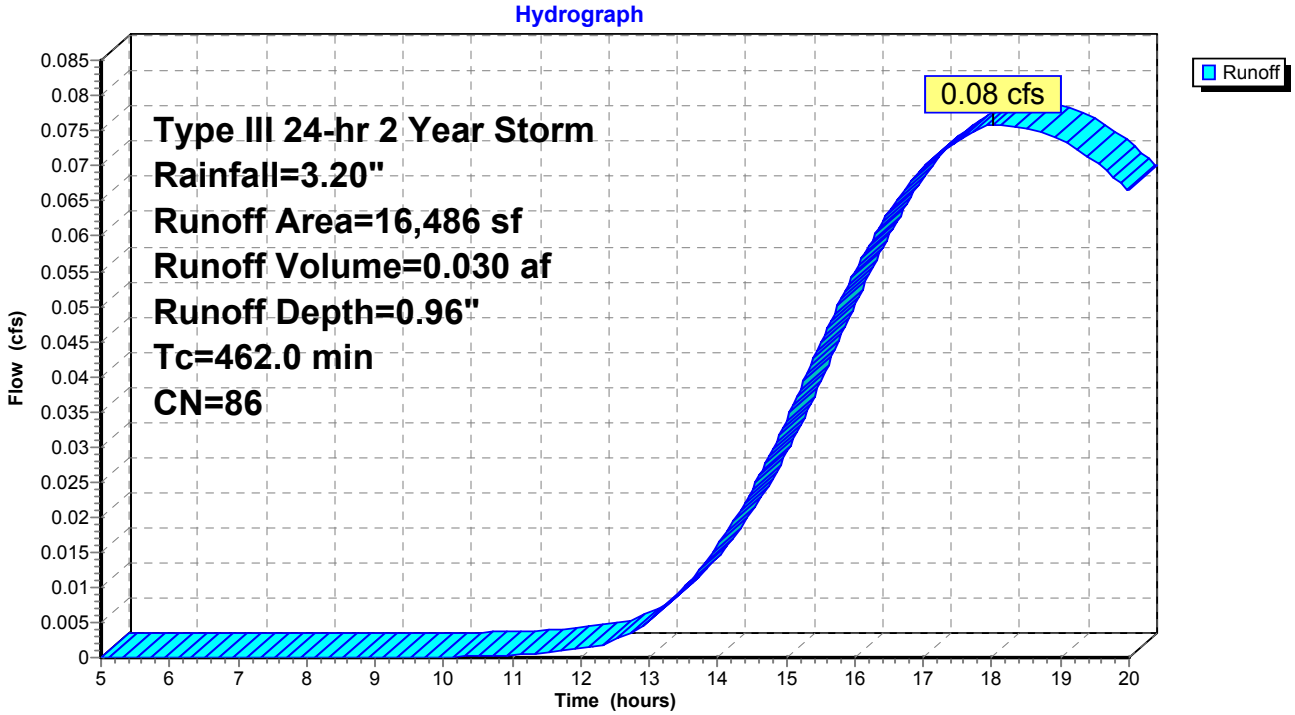
Runoff = 0.08 cfs @ 18.00 hrs, Volume= 0.030 af, Depth= 0.96"

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	69	50-75% Grass cover, Fair, HSG B
16,486	86	Weighted Average

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

Subcatchment 2S:



Subcatchment 3S:

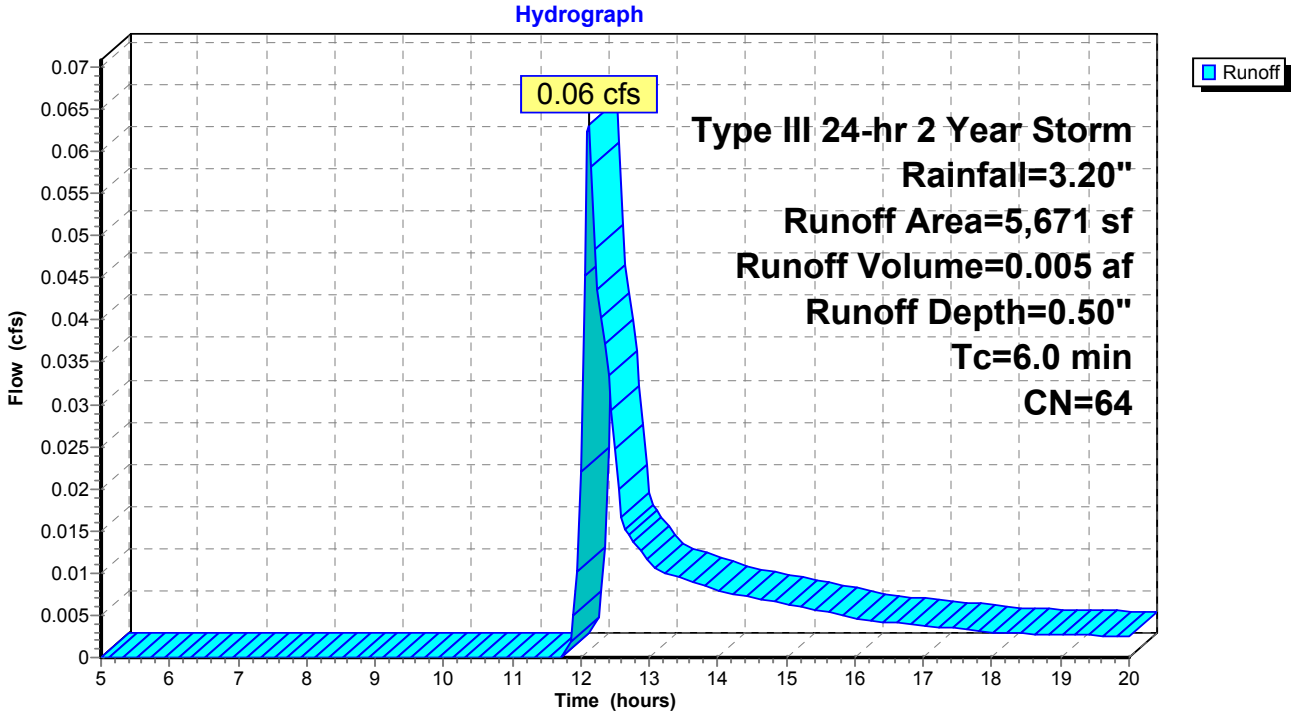
Runoff = 0.06 cfs @ 12.12 hrs, Volume= 0.005 af, Depth= 0.50"

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
2,300	69	50-75% Grass cover, Fair, HSG B
3,371	60	Woods, Fair, HSG B
5,671	64	Weighted Average

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

Subcatchment 3S:



Subcatchment 4S:

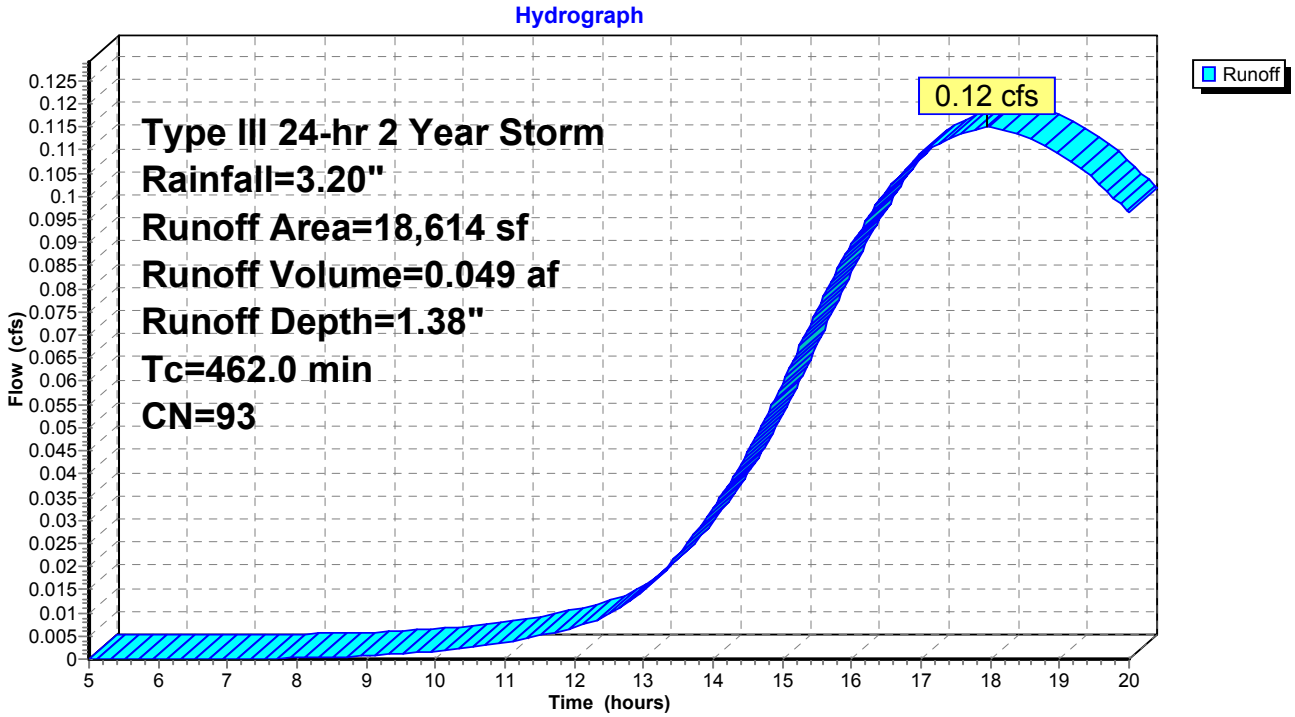
Runoff = 0.12 cfs @ 17.96 hrs, Volume= 0.049 af, Depth= 1.38"

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
558	98	Portion of Building Roof Area
612	98	1/2 of Barn Roof Area
1,397	60	Woods, Fair, HSG B
4,295	98	Cement Concrete Walkway
394	98	Vertical Granite Curb
1,290	69	50-75% Grass cover, Fair, HSG B
10,068	98	Porous Pavement
18,614	93	Weighted Average

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

Subcatchment 4S:



Subcatchment 5S:

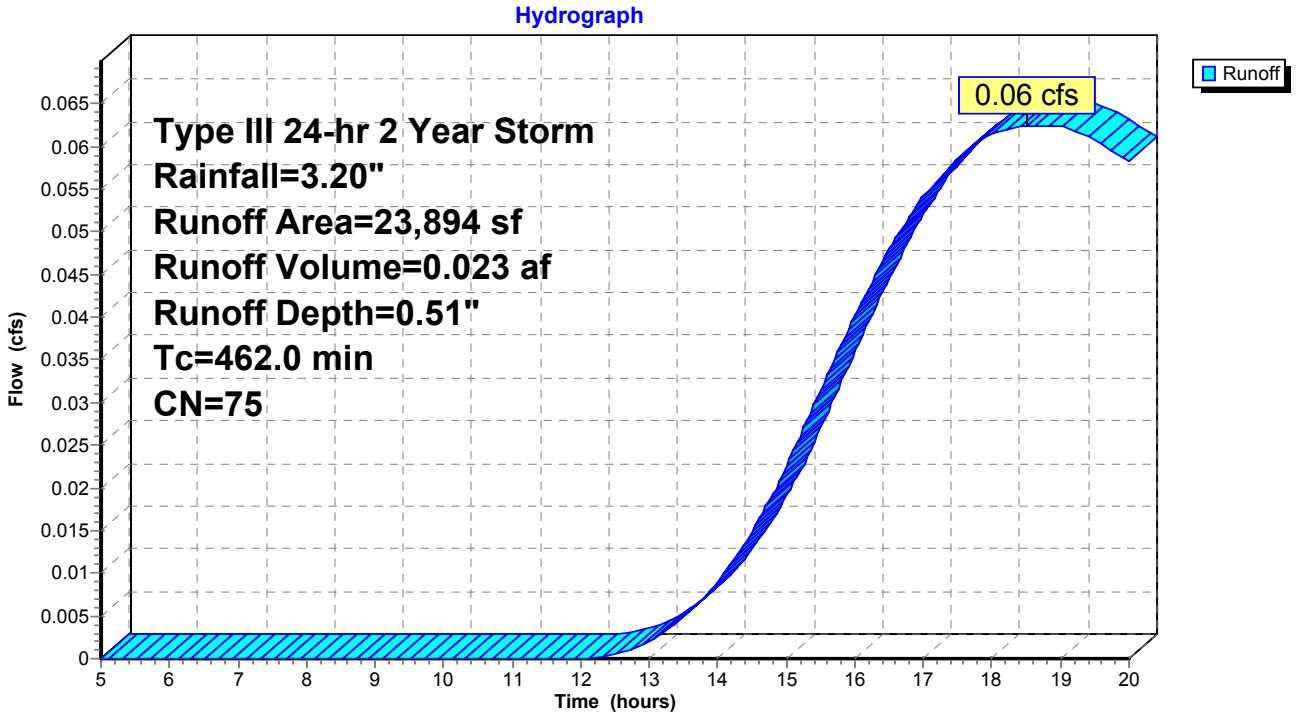
Runoff = 0.06 cfs @ 18.52 hrs, Volume= 0.023 af, Depth= 0.51"

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
2,274	98	Portion of Building Roof Area
85	98	Vertical Granite Curb
2,740	98	Porous Pavement
405	98	Conc. Dumpster Pad
210	98	Cement Conc. Walkways
5,646	60	Woods, Fair, HSG B
11,922	69	50-75% Grass cover, Fair, HSG B
23,894	75	Weighted Average

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

Subcatchment 5S:



Subcatchment 6S:

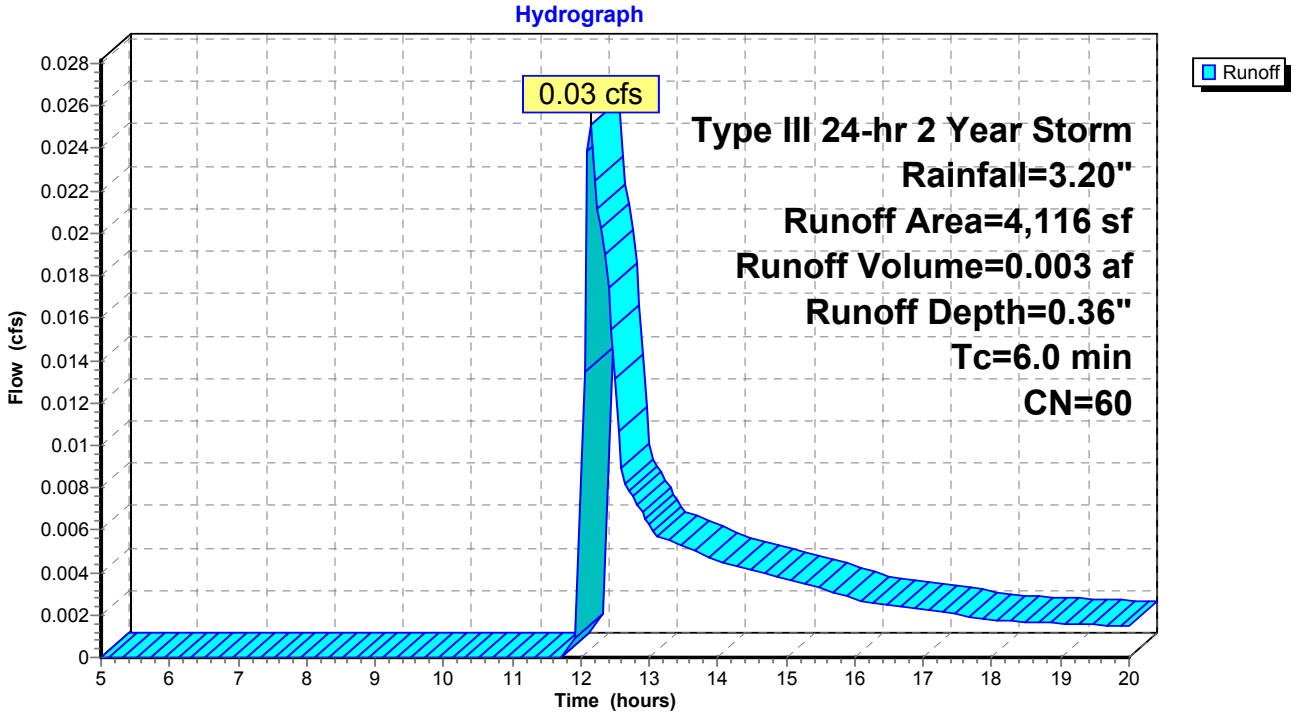
Runoff = 0.03 cfs @ 12.14 hrs, Volume= 0.003 af, Depth= 0.36"

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
4,116	60	Woods, Fair, HSG B

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

Subcatchment 6S:



Pond 1P: Porous pvmt Base

Loamy Sand - Class A Soil - 2.41 in/hr (Per Field Soil Test)
Sandy Loam - Class B Soil - 1.02 in/hr (Design Rate)

Inflow Area =	0.378 ac,	Inflow Depth =	0.96"	for	2 Year Storm event
Inflow =	0.08 cfs @	18.00 hrs,	Volume=	0.030 af	
Outflow =	0.08 cfs @	18.17 hrs,	Volume=	0.030 af,	Atten= 0%, Lag= 10.0 min
Discarded =	0.08 cfs @	18.17 hrs,	Volume=	0.030 af	

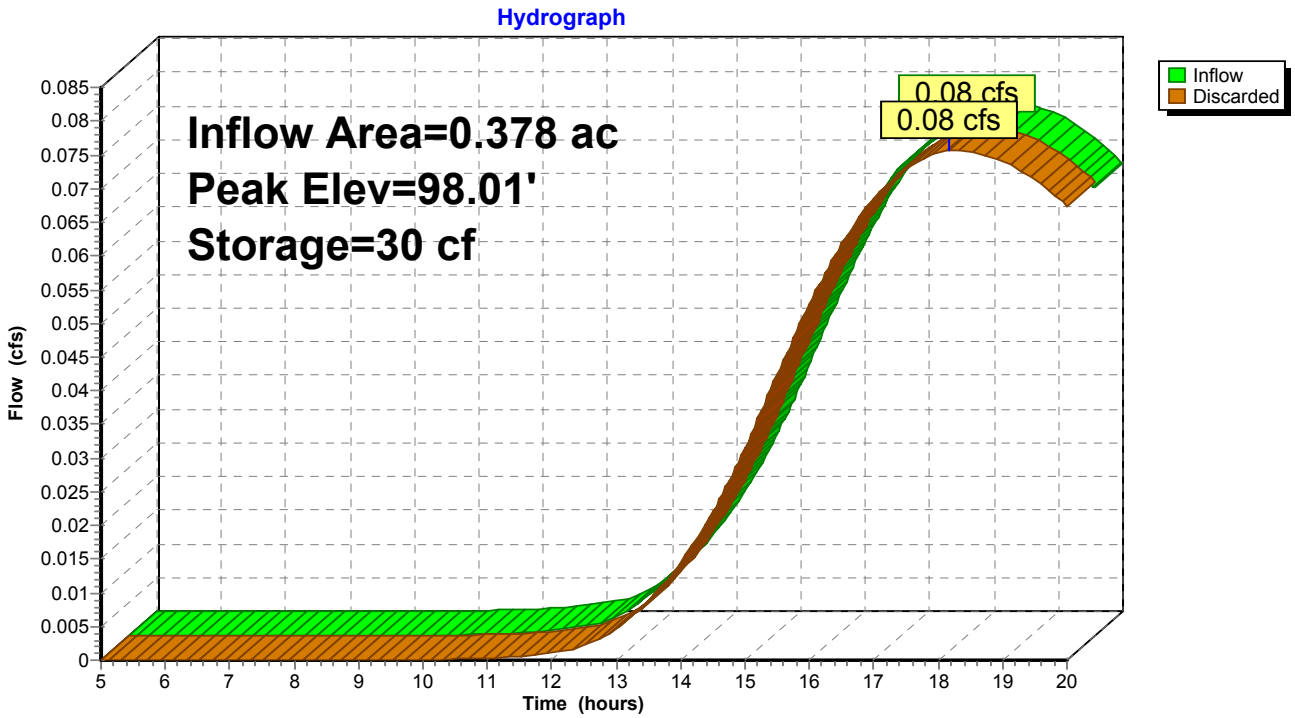
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 98.01' @ 18.17 hrs Surf.Area= 6,132 sf Storage= 30 cf
Plug-Flow detention time= 6.5 min calculated for 0.030 af (98% of inflow)
Center-of-Mass det. time= 3.3 min (1,043.5 - 1,040.2)

#	Invert	Avail.Storage	Storage Description
1	98.00'	5,715 cf	**42.00'W x 146.00'L x 2.33'H Prismatoid** 14,288 cf Overall x 40.0% Voids

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	**0.001417 fpm Exfiltration over entire Surface area**

Discarded OutFlow Max=0.14 cfs @ 18.17 hrs HW=98.01' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Pond 1P: Porous pvmt Base



Pond 2P: Porous pvmt Base

Loamy Sand - Class A Soil - 2.41 in/hr (Per Soil Test)
Design for Sandy Loam - Class B Soil - 1.02 in/hr

Inflow Area =	1.106 ac,	Inflow Depth =	0.84"	for	2 Year Storm event
Inflow =	0.18 cfs @	17.99 hrs,	Volume=	0.078 af	
Outflow =	0.18 cfs @	18.13 hrs,	Volume=	0.076 af,	Atten= 0%, Lag= 8.4 min
Discarded =	0.18 cfs @	18.13 hrs,	Volume=	0.076 af	

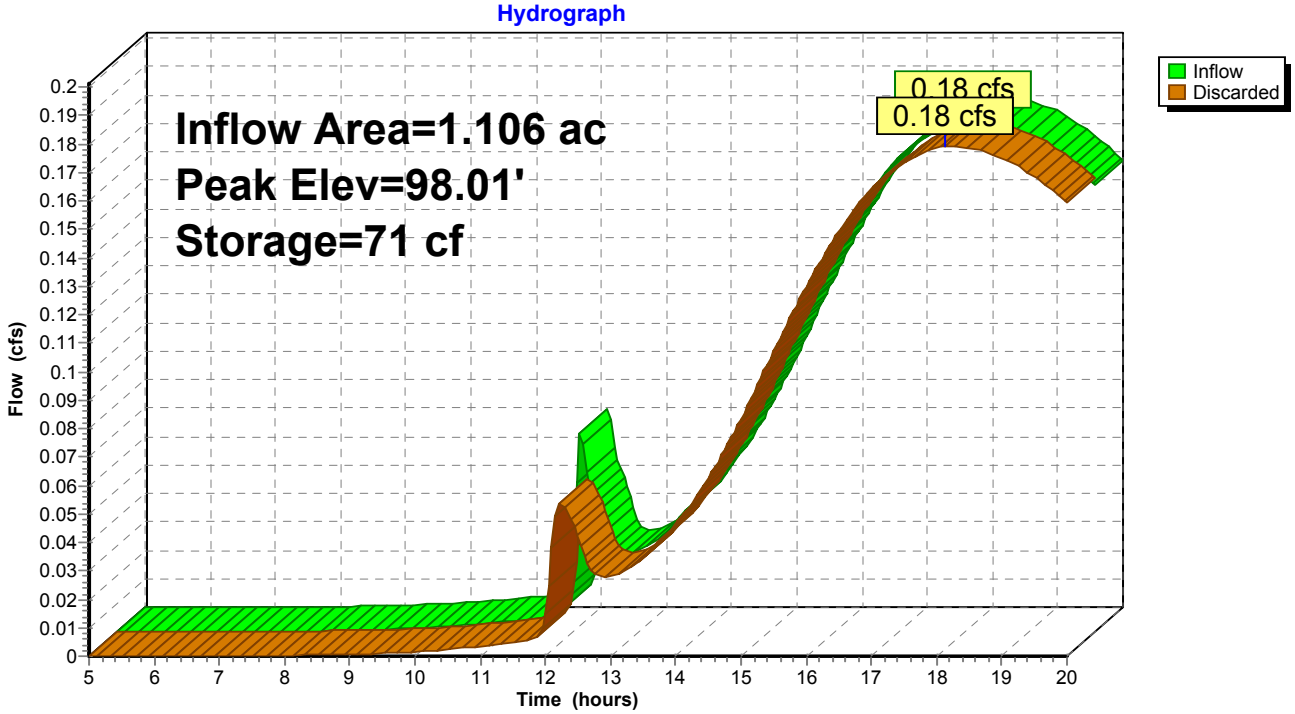
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 98.01' @ 18.13 hrs Surf.Area= 12,768 sf Storage= 71 cf
Plug-Flow detention time= 6.5 min calculated for 0.076 af (98% of inflow)
Center-of-Mass det. time= 3.2 min (1,023.3 - 1,020.1)

#	Invert	Avail.Storage	Storage Description
1	98.00'	11,900 cf	**42.00'W x 304.00'L x 2.33'H Prismatoid** 29,749 cf Overall x 40.0% Voids

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	**0.001417 fpm Exfiltration over entire Surface area**

Discarded OutFlow Max=0.30 cfs @ 18.13 hrs HW=98.01' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Pond 2P: Porous pvmt Base

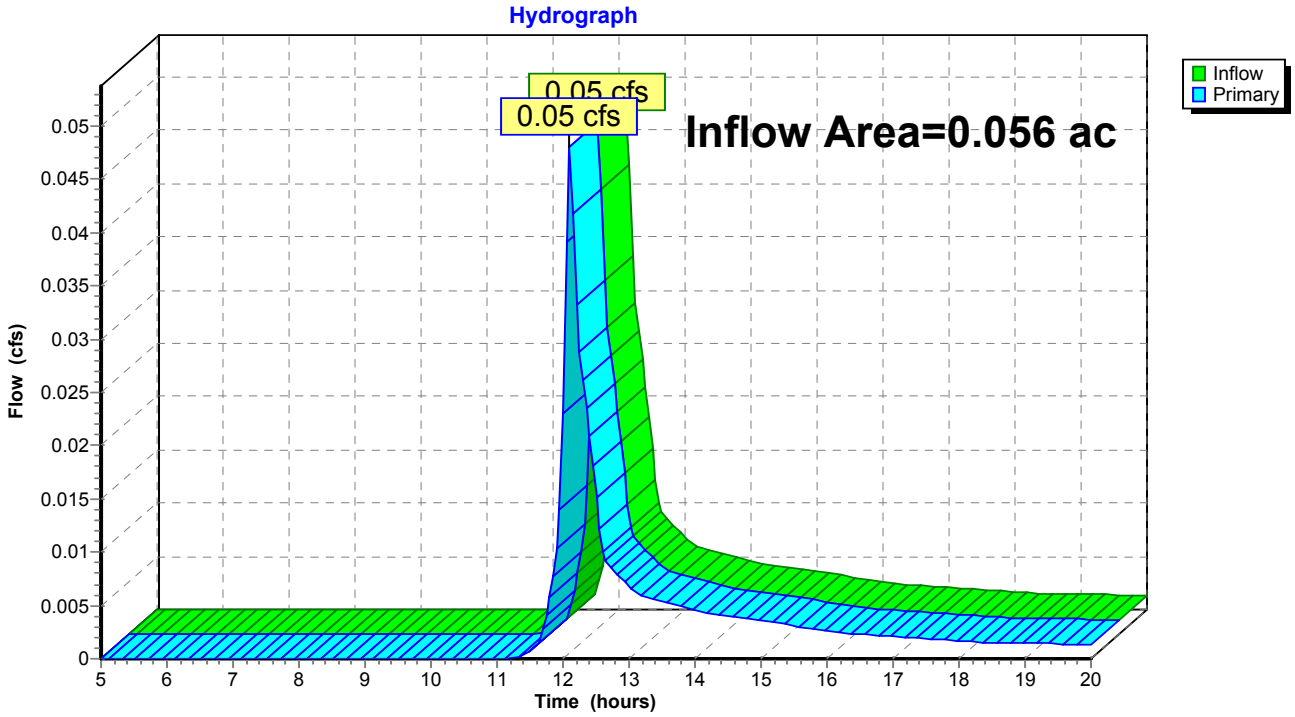


Link 1L: (To Summer Avenue)

Inflow Area = 0.056 ac, Inflow Depth = 0.75" for 2 Year Storm event
Inflow = 0.05 cfs @ 12.10 hrs, Volume= 0.003 af
Primary = 0.05 cfs @ 12.10 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)

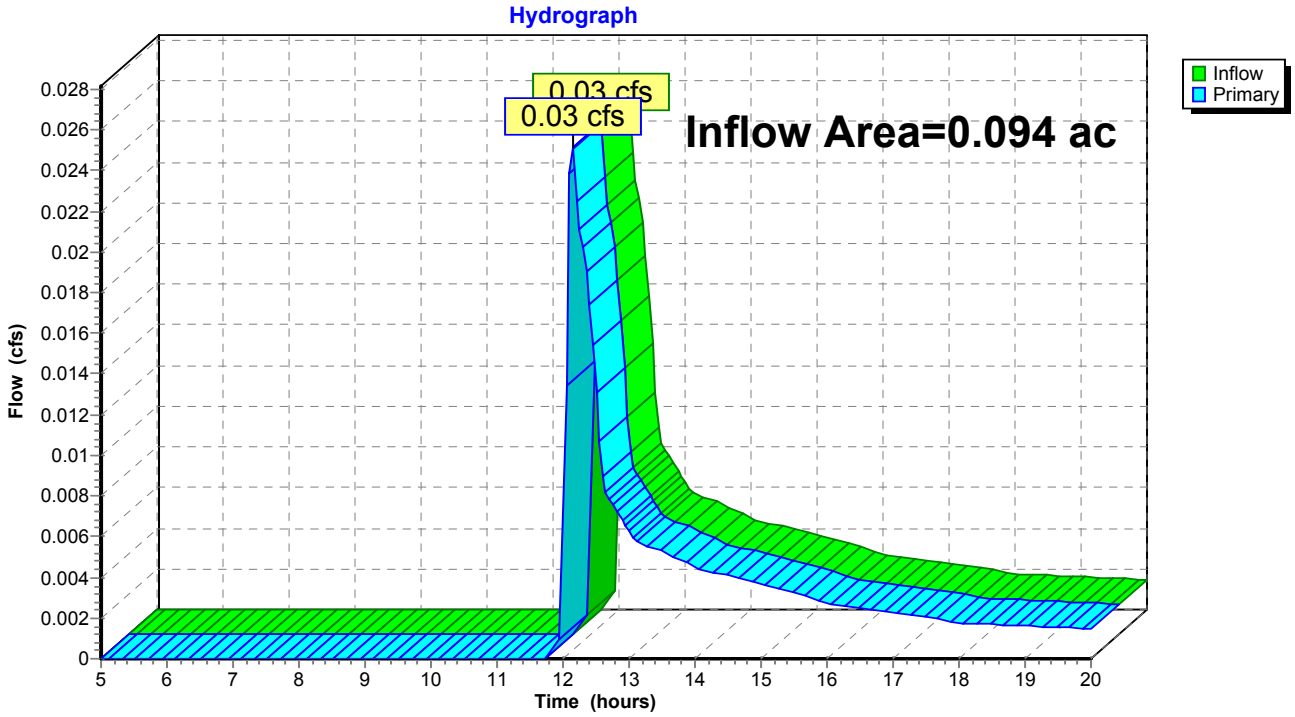


Link 2L: To Rear of Site

Inflow Area = 0.094 ac, Inflow Depth = 0.36" for 2 Year Storm event
Inflow = 0.03 cfs @ 12.14 hrs, Volume= 0.003 af
Primary = 0.03 cfs @ 12.14 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 2L: To Rear of Site



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=1.74"
Tc=6.0 min CN=70 Runoff=0.12 cfs 0.008 af

Subcatchment 2S: Runoff Area=16,486 sf Runoff Depth=1.79"
Tc=462.0 min CN=86 Runoff=0.14 cfs 0.057 af

Subcatchment 3S: Runoff Area=5,671 sf Runoff Depth=1.32"
Tc=6.0 min CN=64 Runoff=0.20 cfs 0.014 af

Subcatchment 4S: Runoff Area=18,614 sf Runoff Depth=2.32"
Tc=462.0 min CN=93 Runoff=0.19 cfs 0.083 af

Subcatchment 5S: Runoff Area=23,894 sf Runoff Depth=1.15"
Tc=462.0 min CN=75 Runoff=0.14 cfs 0.052 af

Subcatchment 6S: Runoff Area=4,116 sf Runoff Depth=1.07"
Tc=6.0 min CN=60 Runoff=0.11 cfs 0.008 af

Pond 1P: Porous pvmt Base Peak Elev=98.02' Storage=54 cf Inflow=0.14 cfs 0.057 af
Outflow=0.14 cfs 0.056 af

Pond 2P: Porous pvmt Base Peak Elev=98.05' Storage=275 cf Inflow=0.33 cfs 0.149 af
Outflow=0.30 cfs 0.144 af

Link 1L: (To Summer Avenue) Inflow=0.12 cfs 0.008 af
Primary=0.12 cfs 0.008 af

Link 2L: To Rear of Site Inflow=0.11 cfs 0.008 af
Primary=0.11 cfs 0.008 af

Total Runoff Area = 1.635 ac Runoff Volume = 0.223 af Average Runoff Depth = 1.63"

Subcatchment 1S:

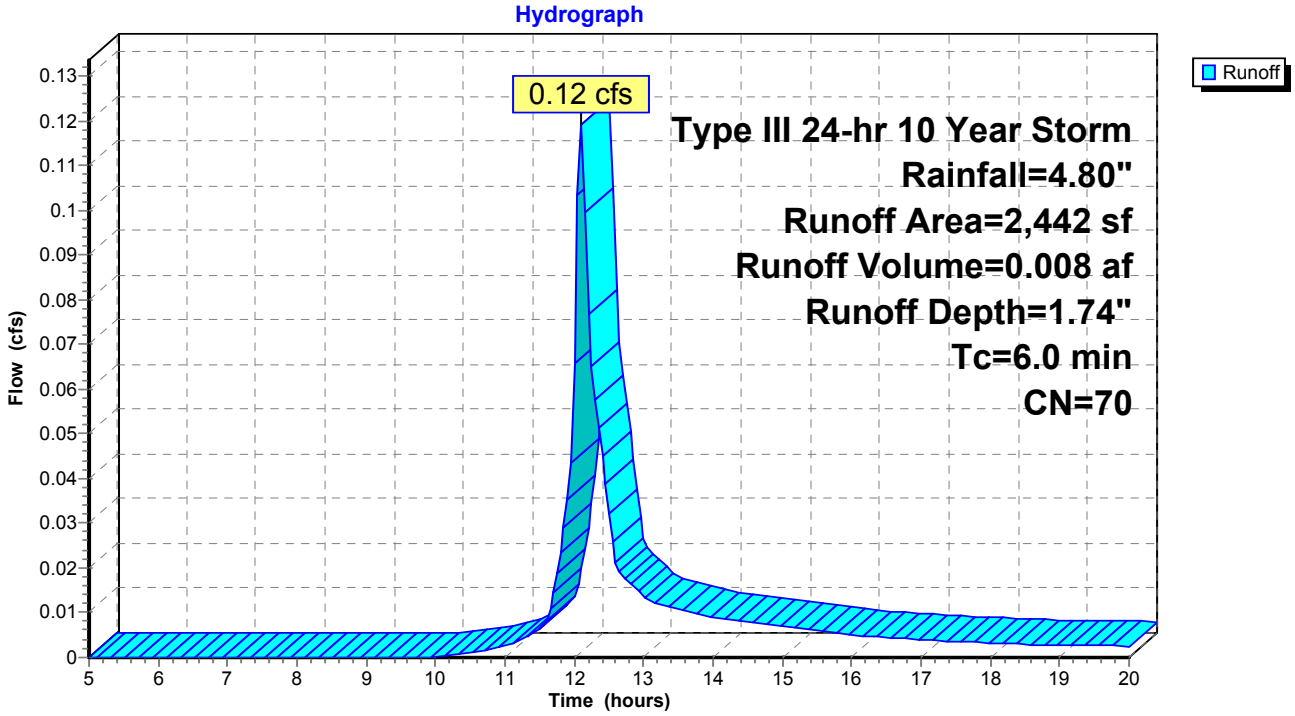
Runoff = 0.12 cfs @ 12.10 hrs, Volume= 0.008 af, Depth= 1.74"

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	69	50-75% Grass cover, Fair, HSG B
2,442	70	Weighted Average

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

Subcatchment 1S:



Subcatchment 2S:

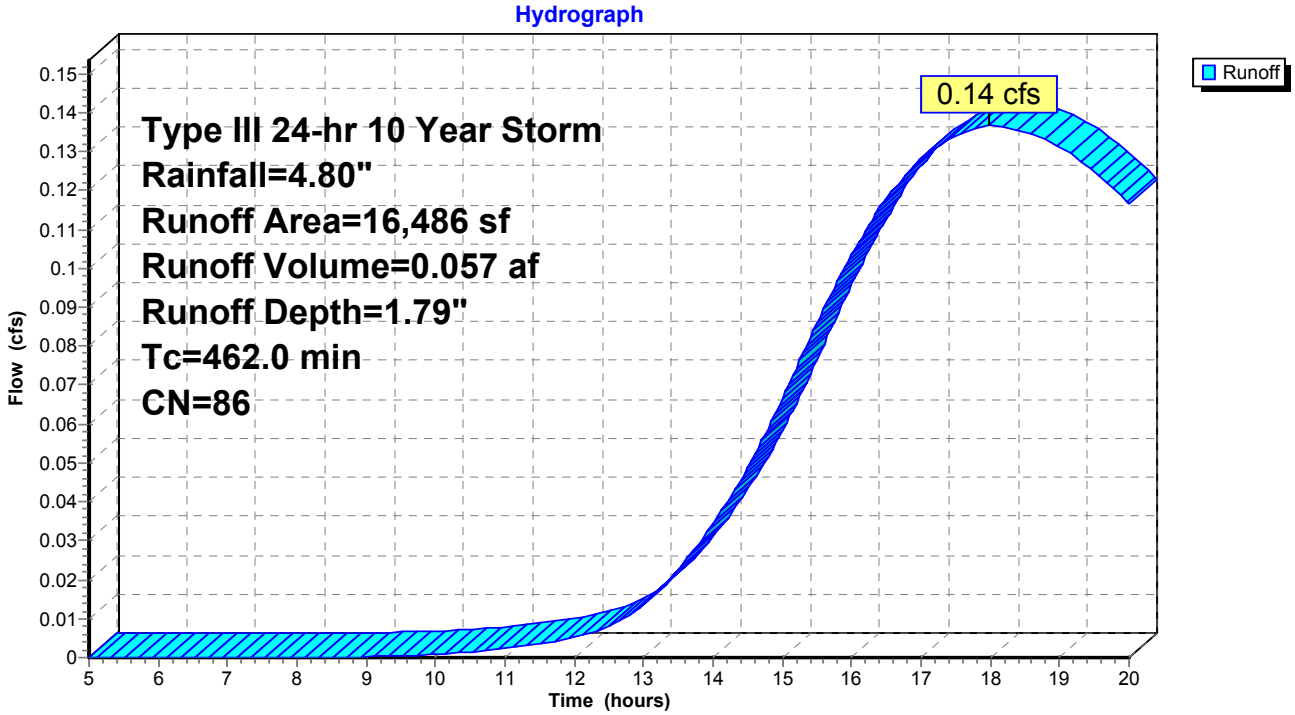
Runoff = 0.14 cfs @ 17.97 hrs, Volume= 0.057 af, Depth= 1.79"

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	69	50-75% Grass cover, Fair, HSG B
16,486	86	Weighted Average

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

Subcatchment 2S:



Subcatchment 3S:

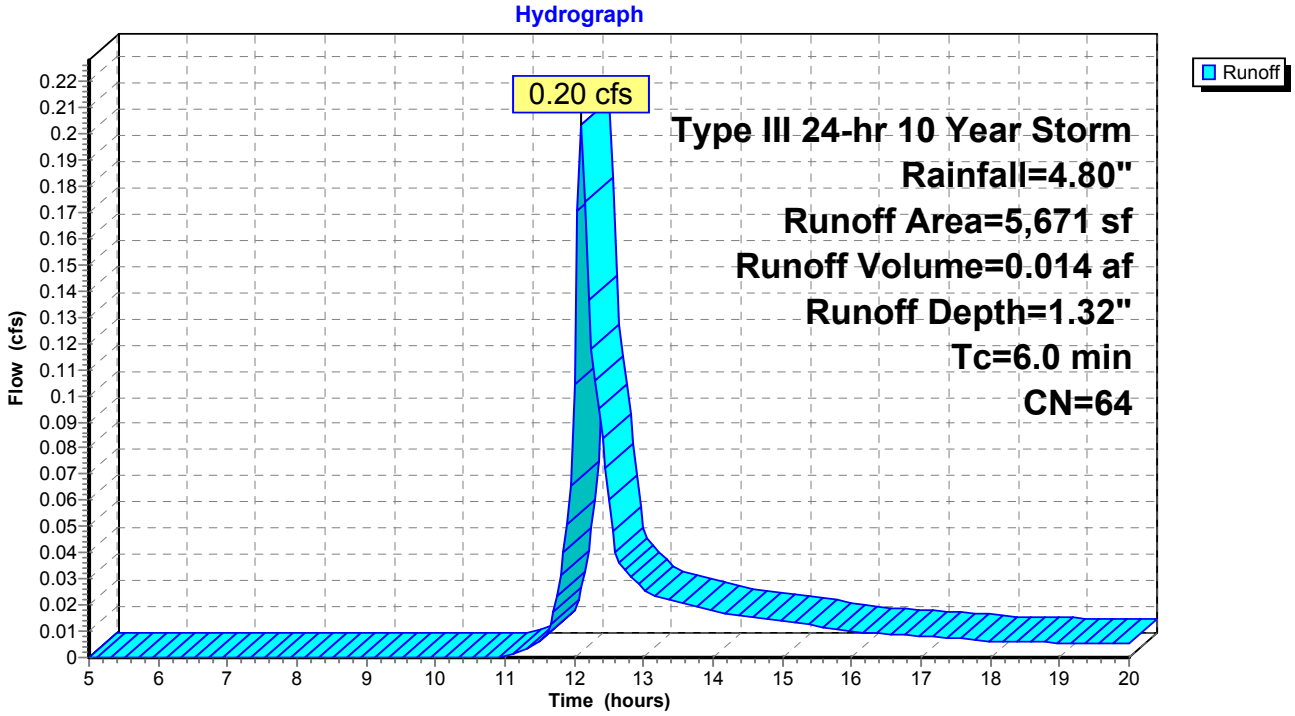
Runoff = 0.20 cfs @ 12.10 hrs, Volume= 0.014 af, Depth= 1.32"

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
2,300	69	50-75% Grass cover, Fair, HSG B
3,371	60	Woods, Fair, HSG B
5,671	64	Weighted Average

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

Subcatchment 3S:



Subcatchment 4S:

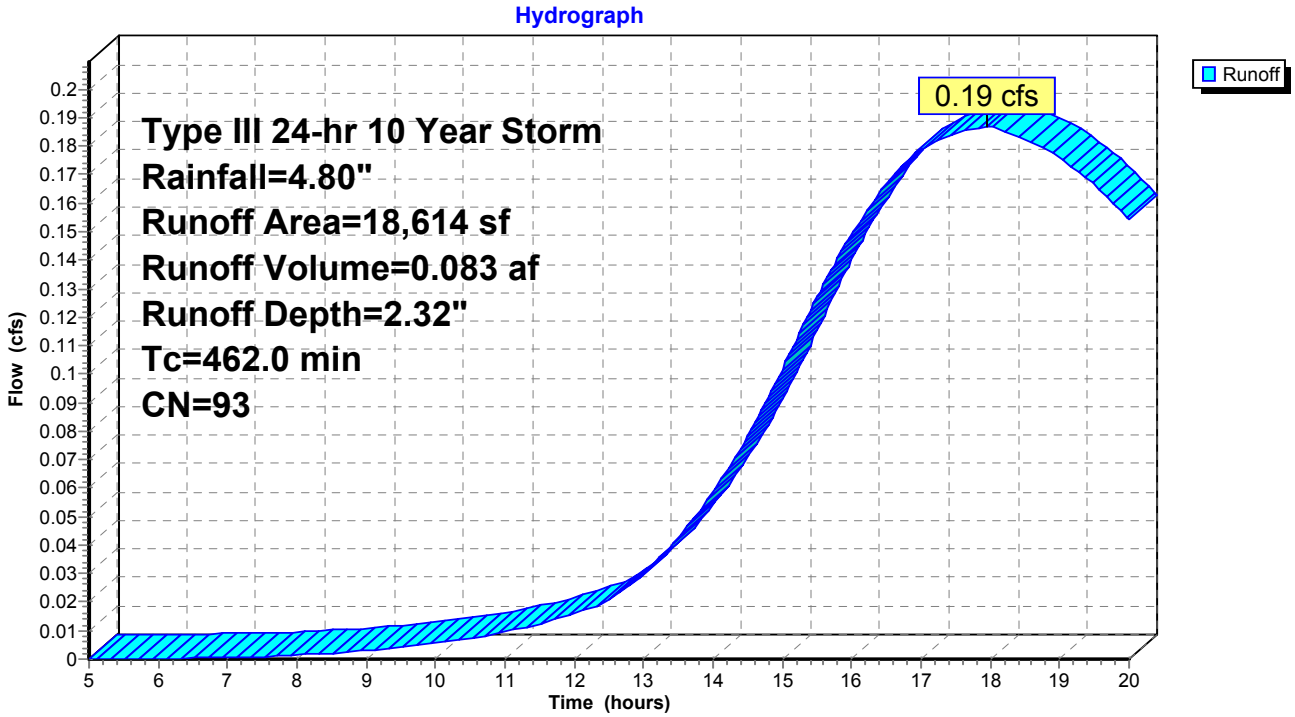
Runoff = 0.19 cfs @ 17.95 hrs, Volume= 0.083 af, Depth= 2.32"

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
558	98	Portion of Building Roof Area
612	98	1/2 of Barn Roof Area
1,397	60	Woods, Fair, HSG B
4,295	98	Cement Concrete Walkway
394	98	Vertical Granite Curb
1,290	69	50-75% Grass cover, Fair, HSG B
10,068	98	Porous Pavement
18,614	93	Weighted Average

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

Subcatchment 4S:



Subcatchment 5S:

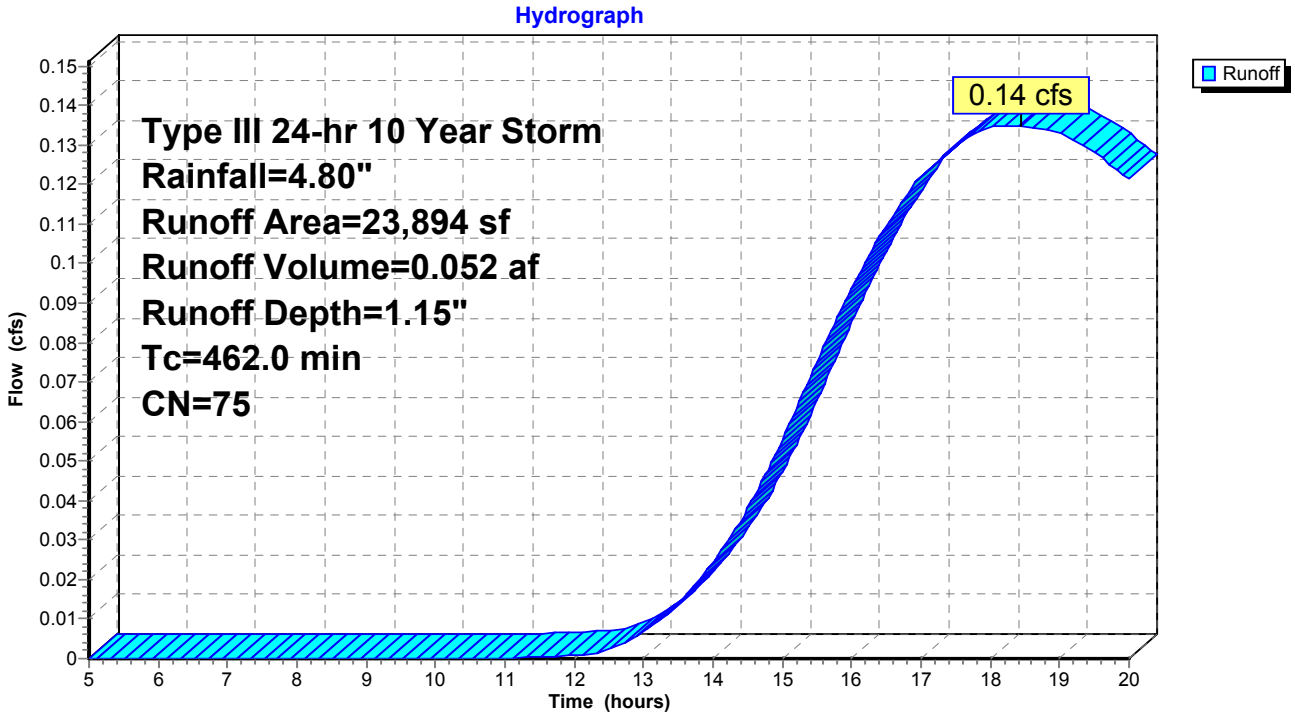
Runoff = 0.14 cfs @ 18.43 hrs, Volume= 0.052 af, Depth= 1.15"

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
2,274	98	Portion of Building Roof Area
85	98	Vertical Granite Curb
2,740	98	Porous Pavement
405	98	Conc. Dumpster Pad
210	98	Cement Conc. Walkways
5,646	60	Woods, Fair, HSG B
11,922	69	50-75% Grass cover, Fair, HSG B
23,894	75	Weighted Average

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

Subcatchment 5S:



Subcatchment 6S:

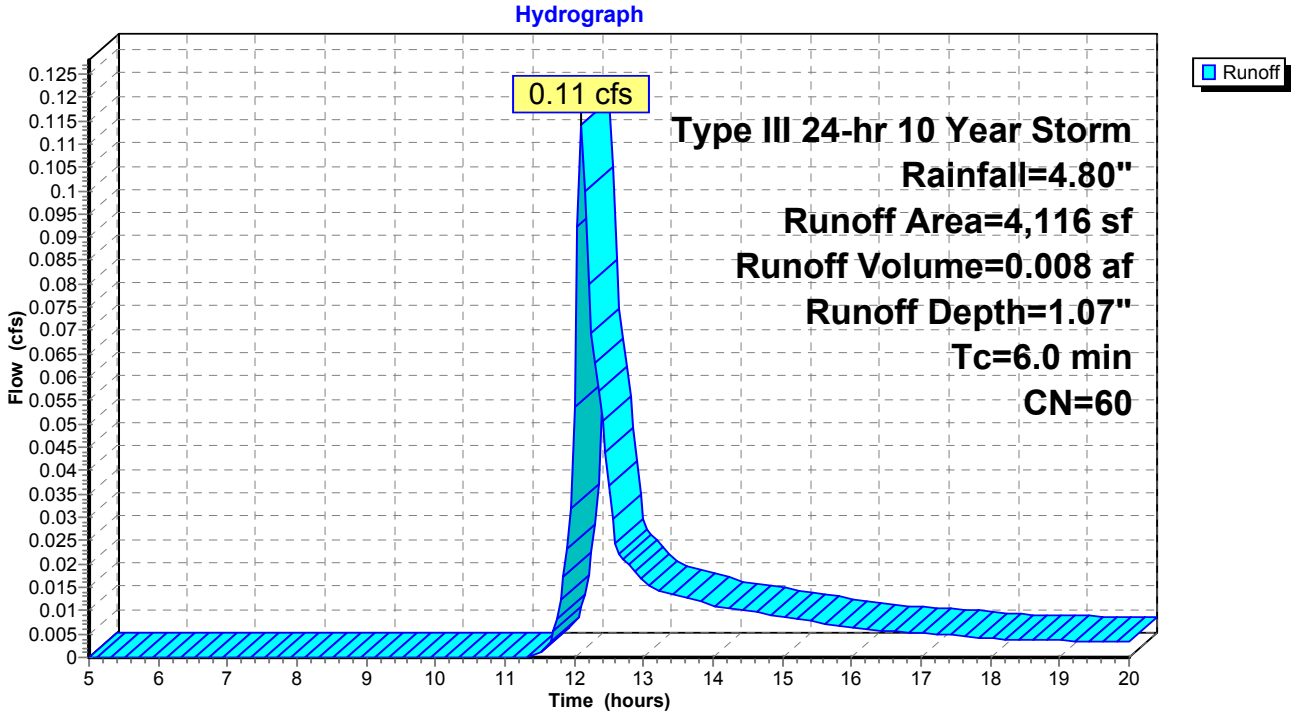
Runoff = 0.11 cfs @ 12.11 hrs, Volume= 0.008 af, Depth= 1.07"

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
4,116	60	Woods, Fair, HSG B

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

Subcatchment 6S:



Pond 1P: Porous pvmt Base

Loamy Sand - Class A Soil - 2.41 in/hr (Per Field Soil Test)
Sandy Loam - Class B Soil - 1.02 in/hr (Design Rate)

Inflow Area =	0.378 ac,	Inflow Depth =	1.79"	for	10 Year Storm event
Inflow =	0.14 cfs @	17.97 hrs,	Volume=	0.057 af	
Outflow =	0.14 cfs @	18.08 hrs,	Volume=	0.056 af,	Atten= 0%, Lag= 6.6 min
Discarded =	0.14 cfs @	18.08 hrs,	Volume=	0.056 af	

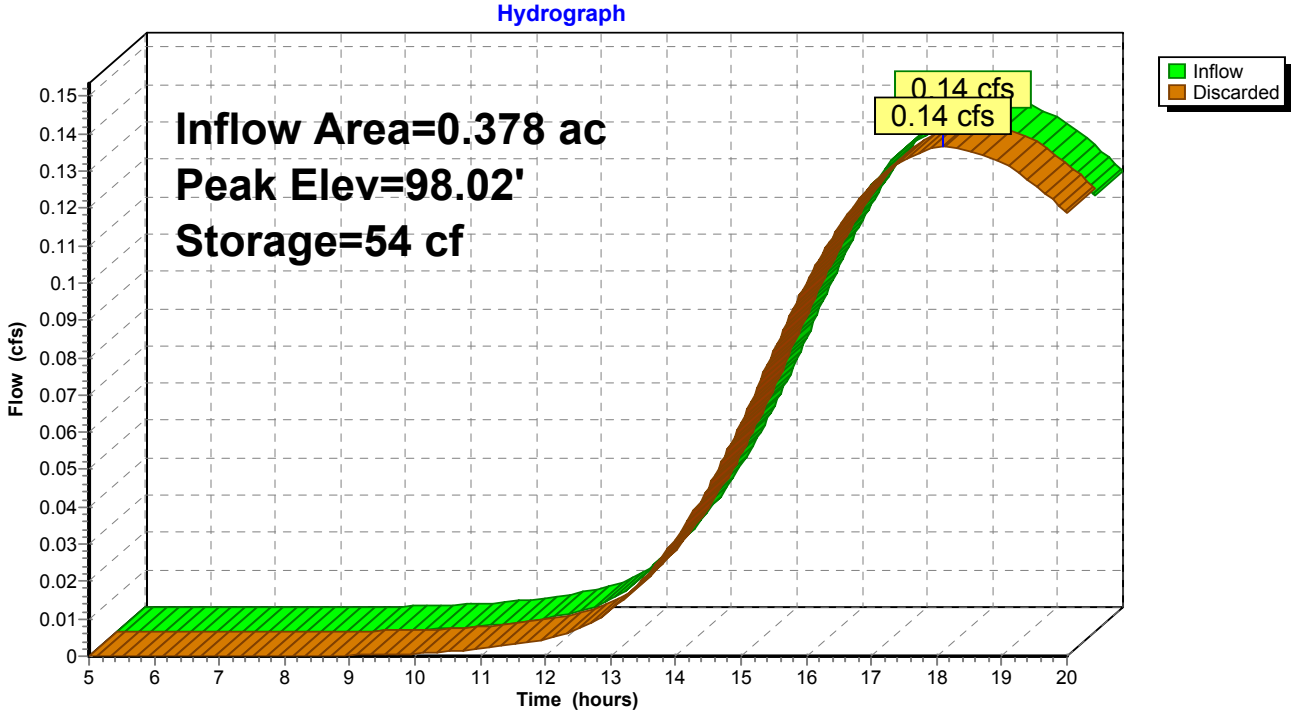
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 98.02' @ 18.08 hrs Surf.Area= 6,132 sf Storage= 54 cf
Plug-Flow detention time= 6.5 min calculated for 0.056 af (98% of inflow)
Center-of-Mass det. time= 3.3 min (1,035.2 - 1,031.9)

#	Invert	Avail.Storage	Storage Description
1	98.00'	5,715 cf	**42.00'W x 146.00'L x 2.33'H Prismatoid** 14,288 cf Overall x 40.0% Voids

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	**0.001417 fpm Exfiltration over entire Surface area**

Discarded OutFlow Max=0.14 cfs @ 18.08 hrs HW=98.02' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Pond 1P: Porous pvmt Base



Pond 2P: Porous pvmt Base

Loamy Sand - Class A Soil - 2.41 in/hr (Per Soil Test)
Design for Sandy Loam - Class B Soil - 1.02 in/hr

Inflow Area =	1.106 ac,	Inflow Depth =	1.62"	for	10 Year Storm event
Inflow =	0.33 cfs @	17.97 hrs,	Volume=	0.149 af	
Outflow =	0.30 cfs @	16.95 hrs,	Volume=	0.144 af,	Atten= 8%, Lag= 0.0 min
Discarded =	0.30 cfs @	16.95 hrs,	Volume=	0.144 af	

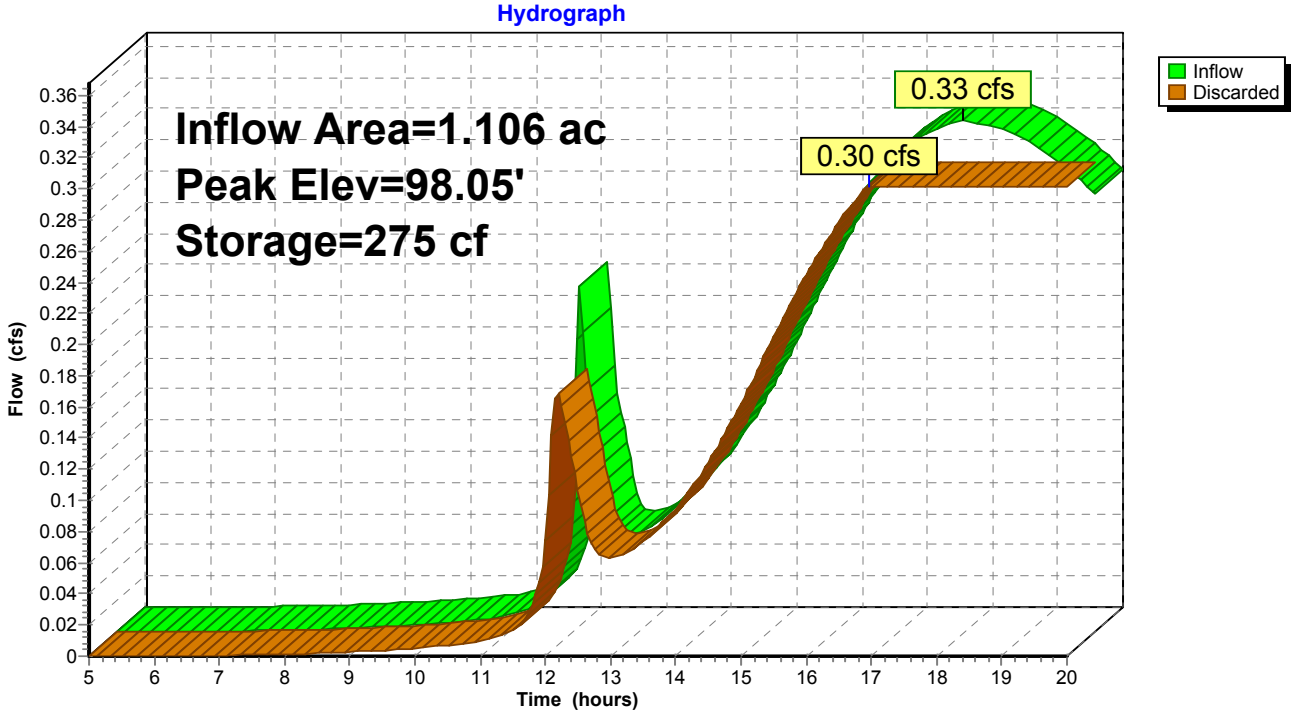
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 98.05' @ 19.46 hrs Surf.Area= 12,768 sf Storage= 275 cf
Plug-Flow detention time= 9.1 min calculated for 0.144 af (96% of inflow)
Center-of-Mass det. time= 1.5 min (1,008.5 - 1,007.0)

#	Invert	Avail.Storage	Storage Description
1	98.00'	11,900 cf	**42.00'W x 304.00'L x 2.33'H Prismatoid** 29,749 cf Overall x 40.0% Voids

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	**0.001417 fpm Exfiltration over entire Surface area**

Discarded OutFlow Max=0.30 cfs @ 16.95 hrs HW=98.02' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Pond 2P: Porous pvmt Base

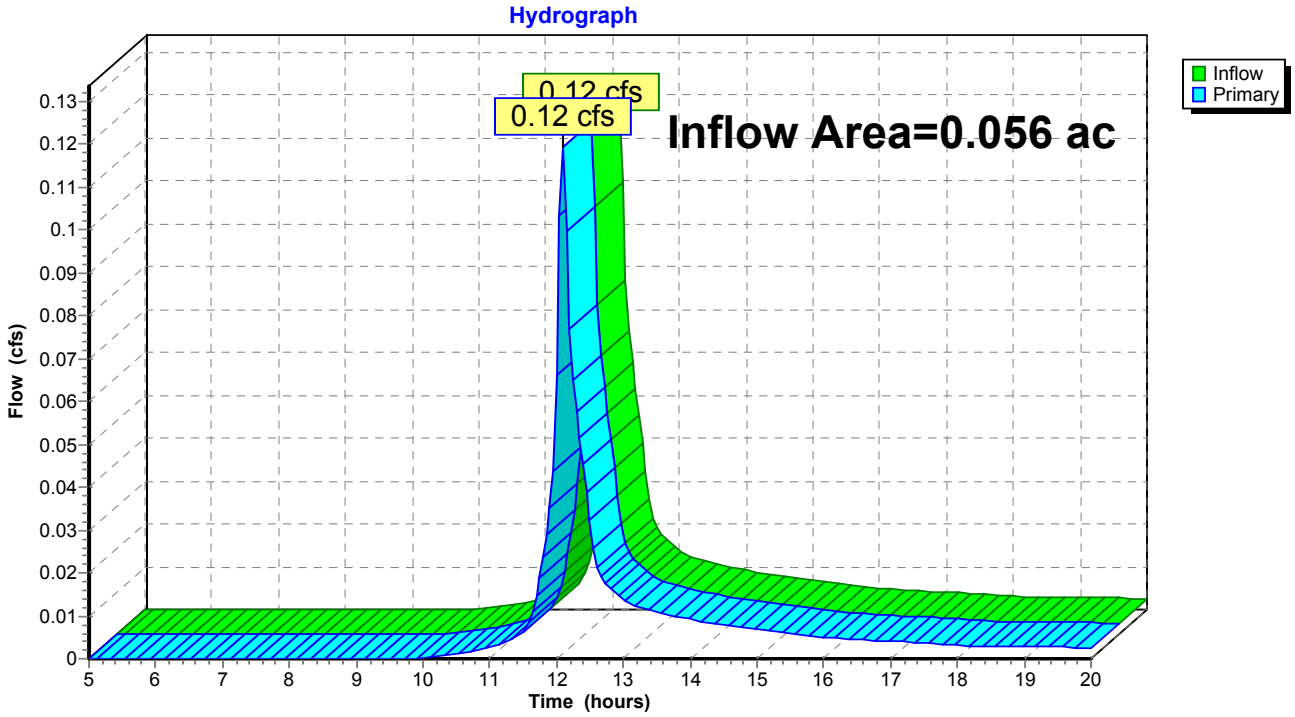


Link 1L: (To Summer Avenue)

Inflow Area = 0.056 ac, Inflow Depth = 1.74" for 10 Year Storm event
Inflow = 0.12 cfs @ 12.10 hrs, Volume= 0.008 af
Primary = 0.12 cfs @ 12.10 hrs, Volume= 0.008 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)

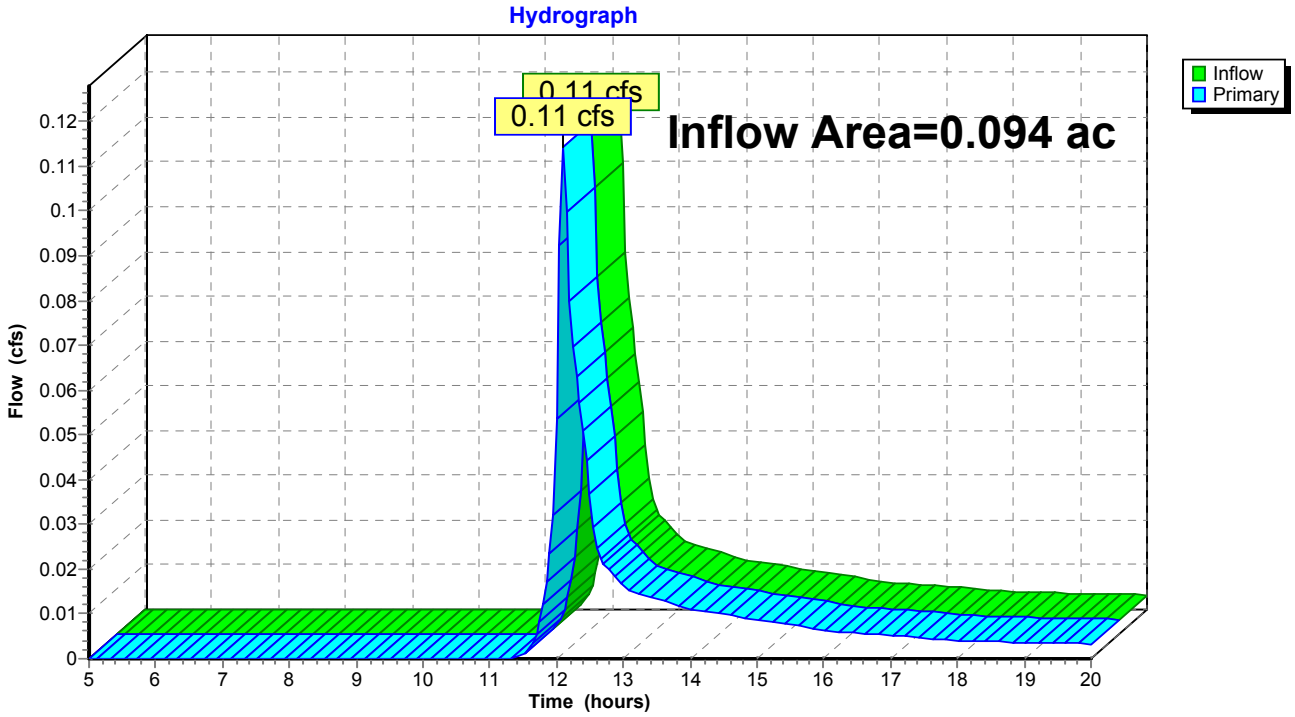


Link 2L: To Rear of Site

Inflow Area = 0.094 ac, Inflow Depth = 1.07" for 10 Year Storm event
Inflow = 0.11 cfs @ 12.11 hrs, Volume= 0.008 af
Primary = 0.11 cfs @ 12.11 hrs, Volume= 0.008 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



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=2.90"
Tc=6.0 min CN=70 Runoff=0.20 cfs 0.014 af

Subcatchment 2S: Runoff Area=16,486 sf Runoff Depth=2.69"
Tc=462.0 min CN=86 Runoff=0.20 cfs 0.085 af

Subcatchment 3S: Runoff Area=5,671 sf Runoff Depth=2.35"
Tc=6.0 min CN=64 Runoff=0.38 cfs 0.025 af

Subcatchment 4S: Runoff Area=18,614 sf Runoff Depth=3.28"
Tc=462.0 min CN=93 Runoff=0.26 cfs 0.117 af

Subcatchment 5S: Runoff Area=23,894 sf Runoff Depth=1.89"
Tc=462.0 min CN=75 Runoff=0.22 cfs 0.087 af

Subcatchment 6S: Runoff Area=4,116 sf Runoff Depth=2.00"
Tc=6.0 min CN=60 Runoff=0.23 cfs 0.016 af

Pond 1P: Porous pvmt Base Peak Elev=98.27' Storage=656 cf Inflow=0.20 cfs 0.085 af
Outflow=0.14 cfs 0.070 af

Pond 2P: Porous pvmt Base Peak Elev=98.47' Storage=2,419 cf Inflow=0.49 cfs 0.229 af
Outflow=0.31 cfs 0.173 af

Link 1L: (To Summer Avenue) Inflow=0.20 cfs 0.014 af
Primary=0.20 cfs 0.014 af

Link 2L: To Rear of Site Inflow=0.23 cfs 0.016 af
Primary=0.23 cfs 0.016 af

Total Runoff Area = 1.635 ac Runoff Volume = 0.343 af Average Runoff Depth = 2.52"

Subcatchment 1S:

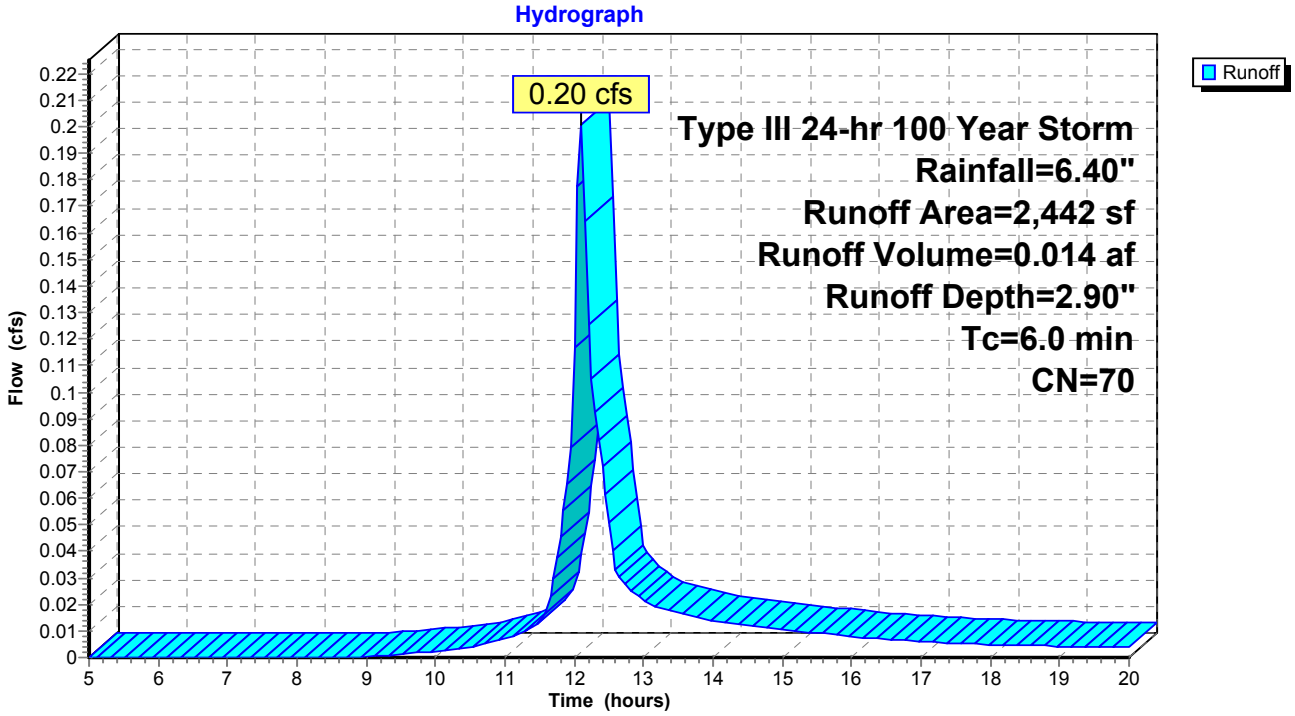
Runoff = 0.20 cfs @ 12.09 hrs, Volume= 0.014 af, Depth= 2.90"

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	69	50-75% Grass cover, Fair, HSG B
2,442	70	Weighted Average

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

Subcatchment 1S:



Subcatchment 2S:

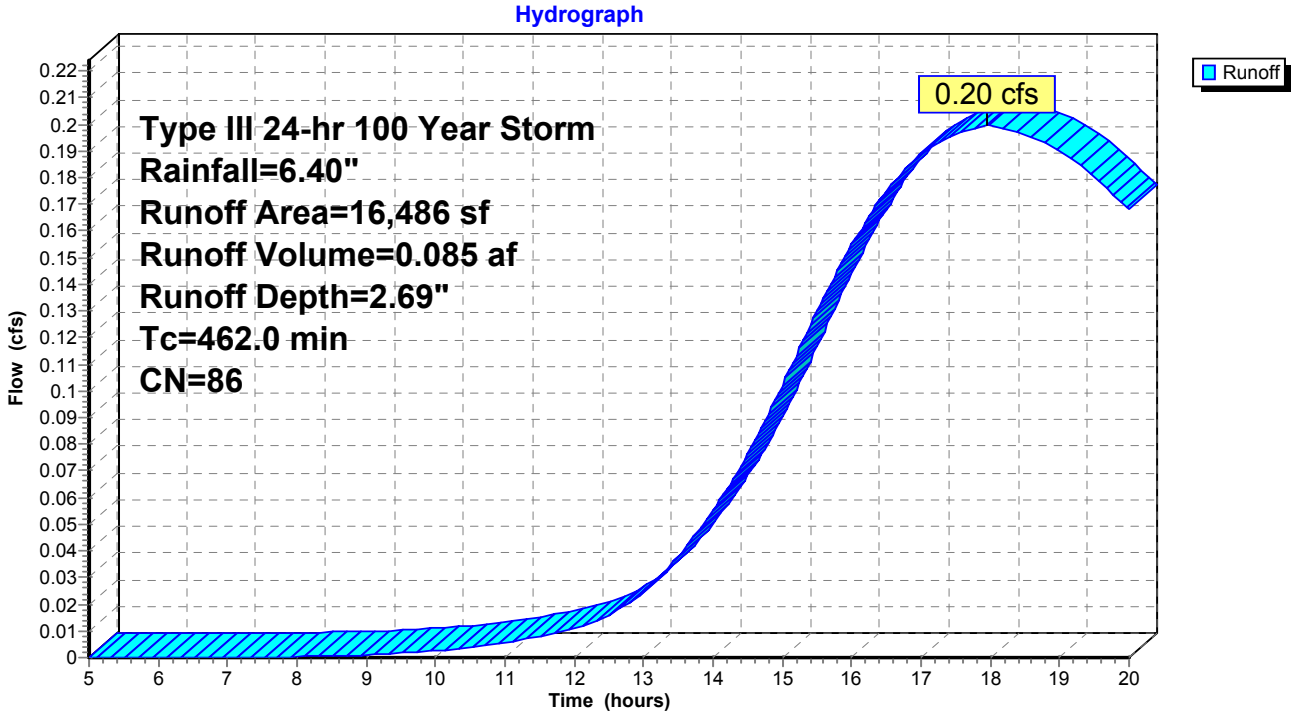
Runoff = 0.20 cfs @ 17.97 hrs, Volume= 0.085 af, Depth= 2.69"

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
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	69	50-75% Grass cover, Fair, HSG B
16,486	86	Weighted Average

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

Subcatchment 2S:



Subcatchment 3S:

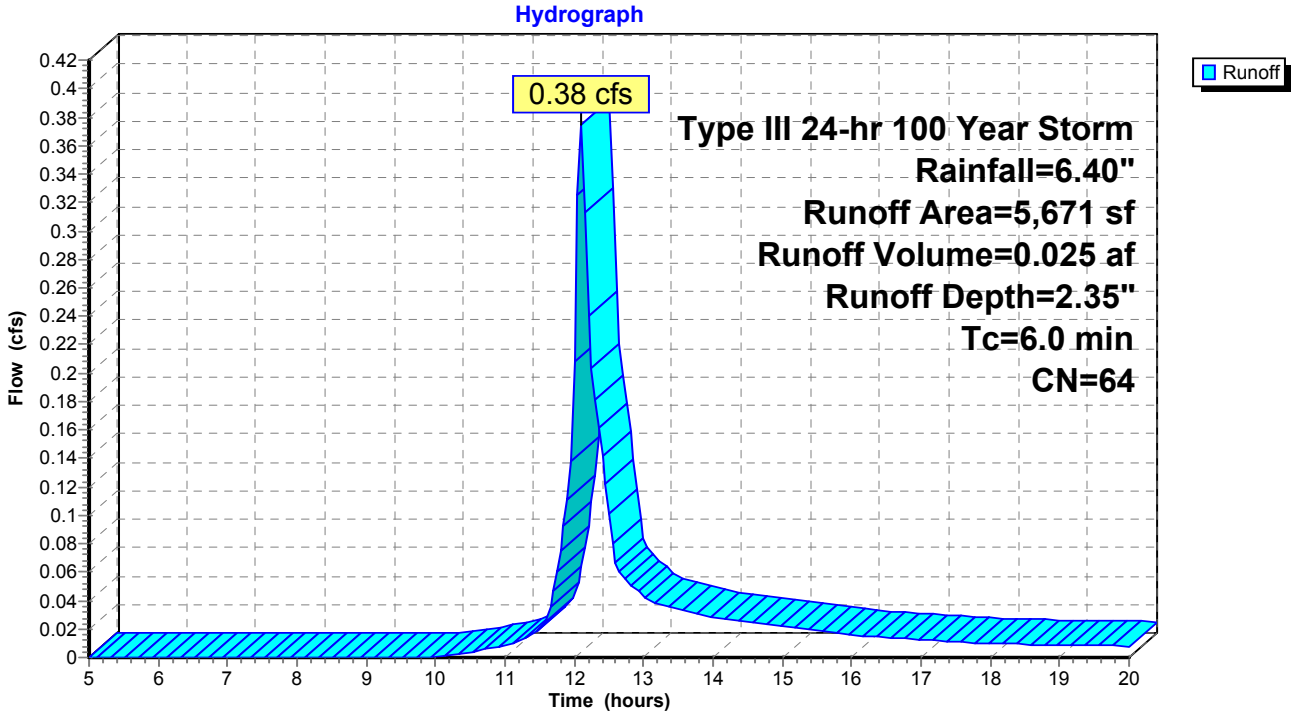
Runoff = 0.38 cfs @ 12.10 hrs, Volume= 0.025 af, Depth= 2.35"

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
2,300	69	50-75% Grass cover, Fair, HSG B
3,371	60	Woods, Fair, HSG B
5,671	64	Weighted Average

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

Subcatchment 3S:



Subcatchment 4S:

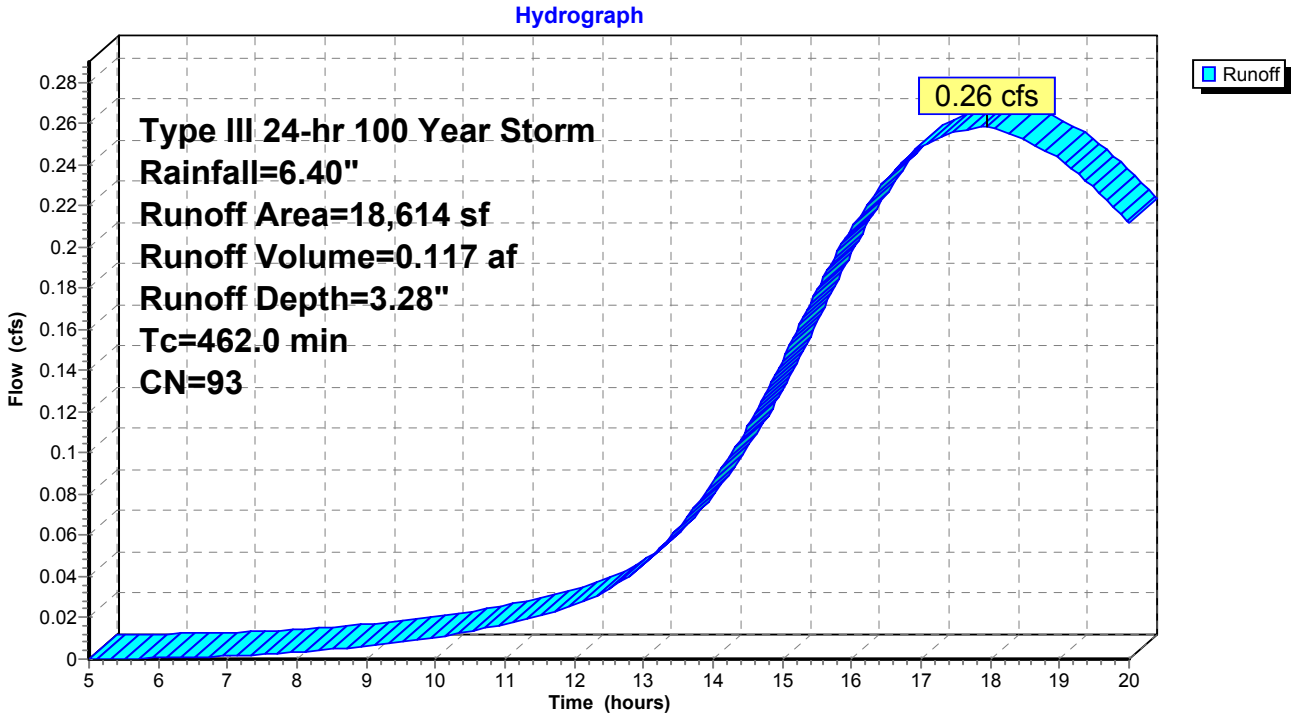
Runoff = 0.26 cfs @ 17.95 hrs, Volume= 0.117 af, Depth= 3.28"

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
558	98	Portion of Building Roof Area
612	98	1/2 of Barn Roof Area
1,397	60	Woods, Fair, HSG B
4,295	98	Cement Concrete Walkway
394	98	Vertical Granite Curb
1,290	69	50-75% Grass cover, Fair, HSG B
10,068	98	Porous Pavement
18,614	93	Weighted Average

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

Subcatchment 4S:



Subcatchment 5S:

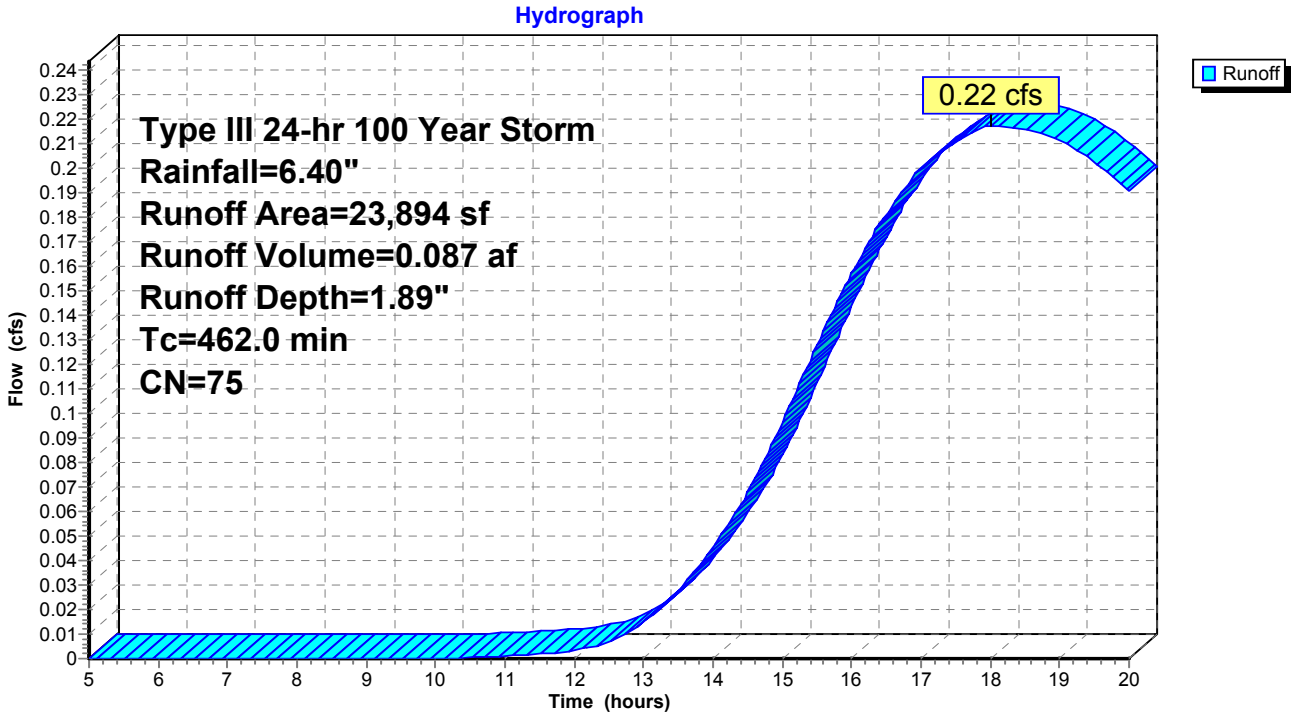
Runoff = 0.22 cfs @ 18.00 hrs, Volume= 0.087 af, Depth= 1.89"

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
2,274	98	Portion of Building Roof Area
85	98	Vertical Granite Curb
2,740	98	Porous Pavement
405	98	Conc. Dumpster Pad
210	98	Cement Conc. Walkways
5,646	60	Woods, Fair, HSG B
11,922	69	50-75% Grass cover, Fair, HSG B
23,894	75	Weighted Average

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

Subcatchment 5S:



Subcatchment 6S:

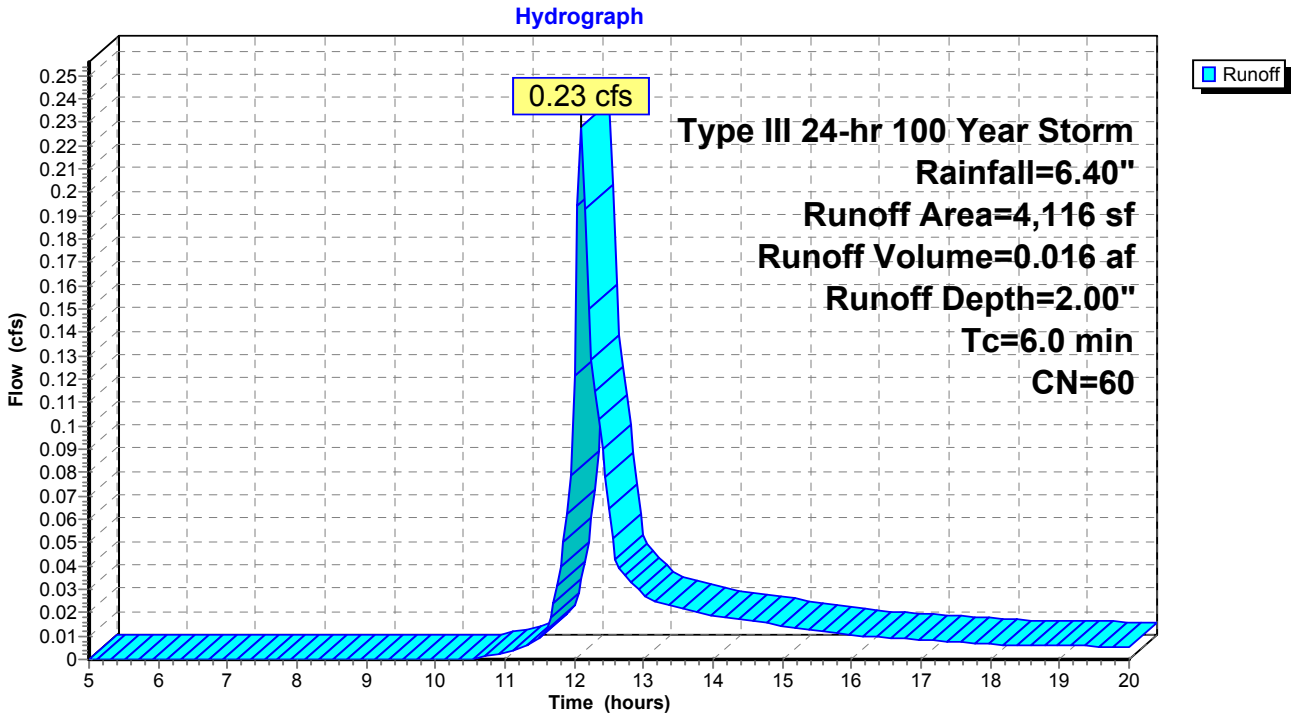
Runoff = 0.23 cfs @ 12.10 hrs, Volume= 0.016 af, Depth= 2.00"

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
4,116	60	Woods, Fair, HSG B

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

Subcatchment 6S:



Pond 1P: Porous pvmt Base

Loamy Sand - Class A Soil - 2.41 in/hr (Per Field Soil Test)
Sandy Loam - Class B Soil - 1.02 in/hr (Design Rate)

Inflow Area =	0.378 ac,	Inflow Depth =	2.69"	for	100 Year Storm event
Inflow =	0.20 cfs @	17.97 hrs,	Volume=	0.085 af	
Outflow =	0.14 cfs @	15.90 hrs,	Volume=	0.070 af,	Atten= 28%, Lag= 0.0 min
Discarded =	0.14 cfs @	15.90 hrs,	Volume=	0.070 af	

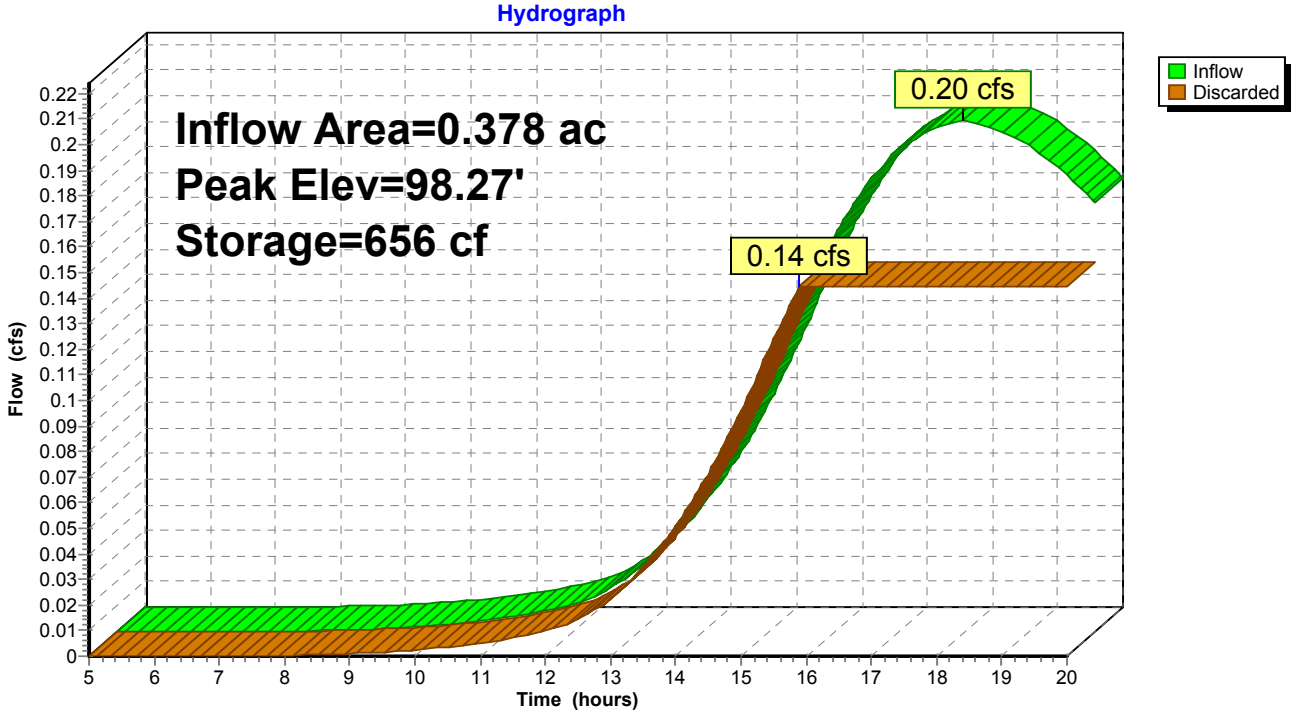
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 98.27' @ 20.00 hrs Surf.Area= 6,132 sf Storage= 656 cf
Plug-Flow detention time= 23.2 min calculated for 0.070 af (82% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

#	Invert	Avail.Storage	Storage Description
1	98.00'	5,715 cf	**42.00'W x 146.00'L x 2.33'H Prismatoid** 14,288 cf Overall x 40.0% Voids

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	**0.001417 fpm Exfiltration over entire Surface area**

Discarded OutFlow Max=0.14 cfs @ 15.90 hrs HW=98.02' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Pond 1P: Porous pvmt Base



Pond 2P: Porous pvmt Base

Loamy Sand - Class A Soil - 2.41 in/hr (Per Soil Test)
Design for Sandy Loam - Class B Soil - 1.02 in/hr

Inflow Area =	1.106 ac,	Inflow Depth =	2.48"	for	100 Year Storm event
Inflow =	0.49 cfs @	17.96 hrs,	Volume=	0.229 af	
Outflow =	0.31 cfs @	12.18 hrs,	Volume=	0.173 af,	Atten= 37%, Lag= 0.0 min
Discarded =	0.31 cfs @	12.18 hrs,	Volume=	0.173 af	

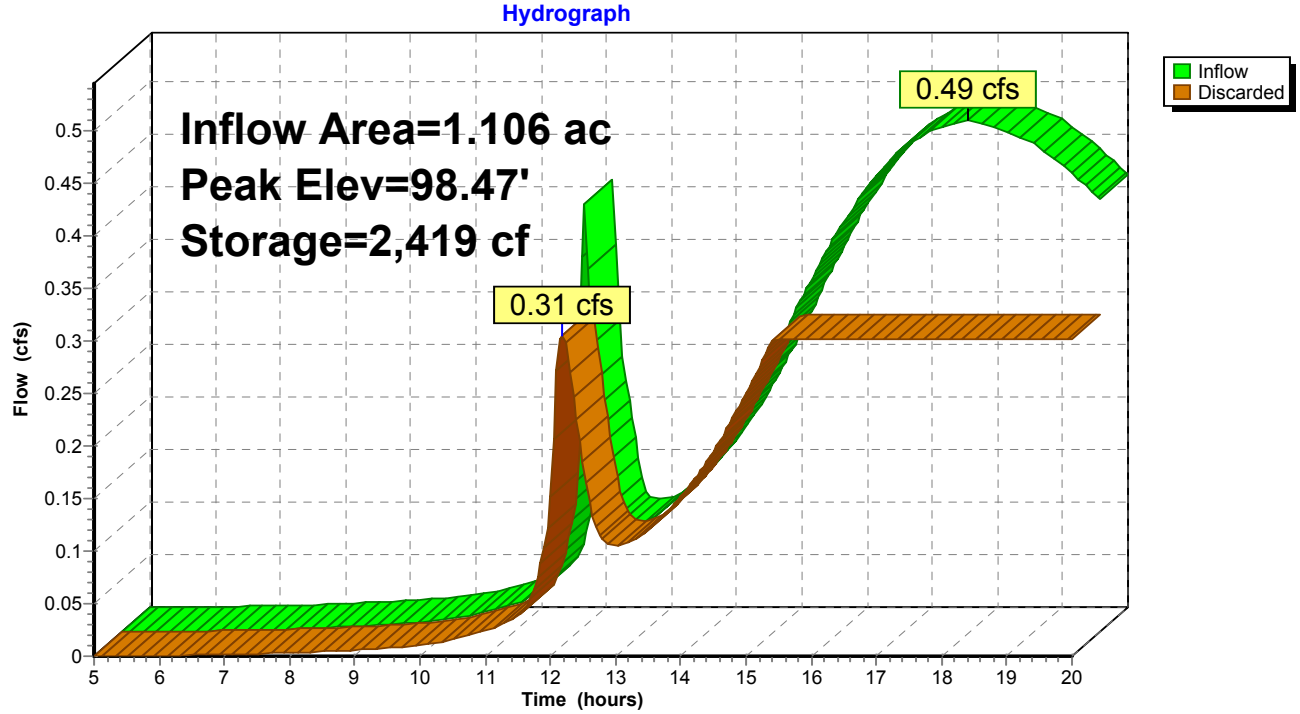
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 98.47' @ 20.00 hrs Surf.Area= 12,768 sf Storage= 2,419 cf
Plug-Flow detention time= 29.9 min calculated for 0.173 af (76% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

#	Invert	Avail.Storage	Storage Description
1	98.00'	11,900 cf	**42.00'W x 304.00'L x 2.33'H Prismatoid** 29,749 cf Overall x 40.0% Voids

#	Routing	Invert	Outlet Devices
1	Discarded	0.00'	**0.001417 fpm Exfiltration over entire Surface area**

Discarded OutFlow Max=0.30 cfs @ 12.18 hrs HW=98.02' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Pond 2P: Porous pvmt Base

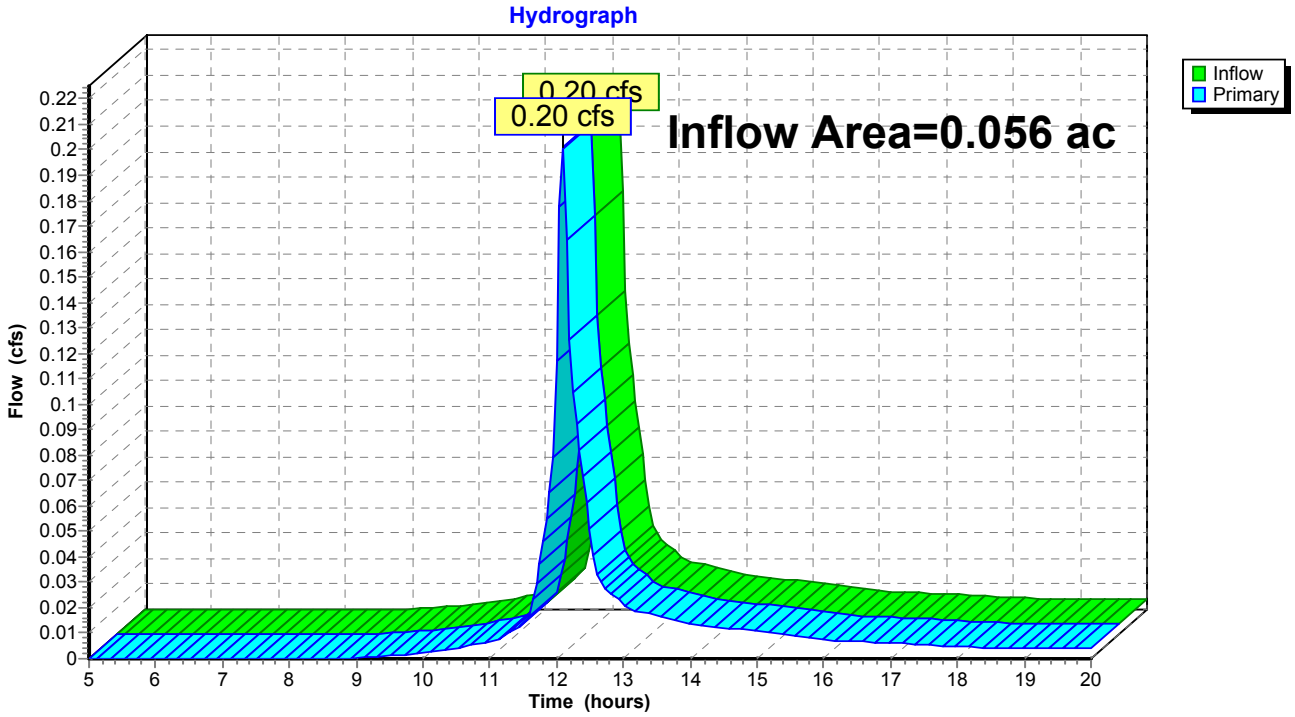


Link 1L: (To Summer Avenue)

Inflow Area = 0.056 ac, Inflow Depth = 2.90" for 100 Year Storm event
Inflow = 0.20 cfs @ 12.09 hrs, Volume= 0.014 af
Primary = 0.20 cfs @ 12.09 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min

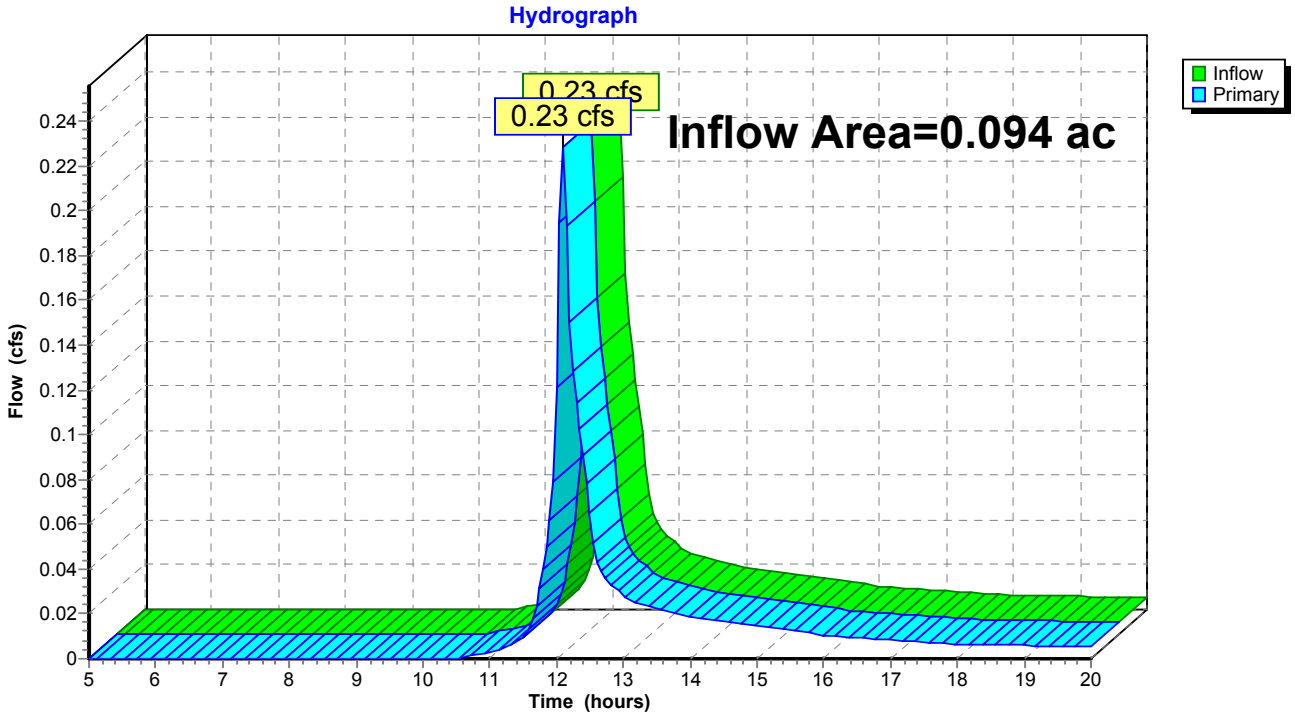
Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link 1L: (To Summer Avenue)



Link 2L: To Rear of Site

Inflow Area = 0.094 ac, Inflow Depth = 2.00" for 100 Year Storm event
Inflow = 0.23 cfs @ 12.10 hrs, Volume= 0.016 af
Primary = 0.23 cfs @ 12.10 hrs, Volume= 0.016 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