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PRELIMINARY STORMWATER MANAGEMENT PLAN

FOR

AMERICAN BLVD STORAGE

BLOOMINGTON, MN

PREPARED BY:

JOSH BALZER & BRADY BUSSELMAN

12/01/2017

PROJECT INTRODUCTION

The proposed project consists of a newly constructed 3-story building with an approximately 38,289 sf footprint, located at 101 American Boulevard West in Bloomington, MN. The project proposes to demolish an existing building and parking lot and construct a storage building and a new parking lot space around the building. Utilities to the site will also be constructed. The redevelopment is located within the Nine Mile Creek Watershed District (NMCWD). Stormwater management for the project has been designed in compliance with the City of Bloomington, NMCWD, and MPCA NPDES general permit.

EXISTING CONDITIONS

The existing site contains an approximately 0.64 acre building and 1.4 acres of parking lot and drive aisles. The site drains to the northwest and northeast corners of the site where stormwater runoff is discharged into the city storm sewer system.

PROPOSED CONDITIONS

The proposed project will largely convert an existing building with parking lot into a new building with parking lot. The proposed project will decrease the amount of impervious area that the site currently holds. The first 1 inch of runoff from the new impervious surface is required to be infiltrated. The proposed site will drain stormwater runoff into one of four infiltration basins located along the corners of the property. Stormwater runoff will then be routed to the north where it will be conveyed into the city storm sewer system.

RATE CONTROL

The City of Bloomington and NMCWD require post development runoff rates not exceed existing development rates for the 1-, 2-, 10-, and 100-year Atlas 14 rainfall events. Rate control onsite was designed to ensure that proposed discharge rates not exceed existing discharge rates to the city storm sewer system. Rate control calculations were performed in HydroCAD using the rainfall distributions provided by the City of Bloomington and the results are summarized in the tables below.

Maximum Rate of Runoff (cfs)
To the NW Connection

Storm Event	Total Existing	Total Proposed
1-year	2.49	0.09
2-year	3.06	0.29
10-year	4.82	1.59
100-year	8.80	6.51

Maximum Rate of Runoff (cfs)
To the NE Connection

Storm Event	Total Existing	Total Proposed
1-year	3.34	0.32
2-year	4.10	0.57
10-year	6.46	1.89
100-year	11.79	4.56

Maximum Rate of Runoff (cfs)
(off-site runoff)

Storm Event	Total Existing	Total Proposed
1-year	0.15	0.01
2-year	0.25	0.03
10-year	0.60	0.13
100-year	1.55	0.45

WATER QUALITY

Per the NMCWD, the redeveloped site must provide for at least 60 percent annual removal efficiency for total phosphorus and at least 90 percent annual removal efficiency for total suspended solids from site runoff. Water quality is provided through pre-treatment consisting of rain guardians at curb cuts. The amount of phosphorus and TSS being removed by the infiltration was generated by the MIDs model. A summary is provided in the table below and further detail may be found in the appendices.

BMP	TSS Removal (%)	TP Removal (%)
Infiltration Basin	90	90

VOLUME REDUCTION

Per the NMCWD, the first 1 inch of runoff from the reconstructed impervious surface is required to be infiltrated on site. Four infiltration basins have been provided in the corners of the site to provide onsite retention. Stormwater runoff will be pre-treated by rain guardians at curb cuts. An infiltration rate of 0.45 inches per hour was used for the HSG type B soils largely found on the site. A geotechnical report was completed by PSI, Inc. and gives further detail on soil types on site. Infiltration calculations were performed in HydroCAD and MIDS, the results are summarized in the tables below.

$$Required\ Infiltration\ Volume(ft^3) = V_{inf} = 1(in) * \frac{1\ ft}{12\ in} * New\ Impervious\ Area\ (ft^2)$$

$$V_{inf}(ft^3) = 1(in) * \frac{1\ ft}{12\ in} * 81{,}245(\ ft^2) = 6{,}770\ ft^3$$

Volume Control Analysis		
Reconstructed Impervious Surface	81,245	sf
Design Infiltration/Filtration Rainfall Event	1.0	in
Required Infiltration/Filtration Volume	**6,770**	**cf**
Maximum Allowable Infiltration Rate	0.45	in/hr
Required Drawdown Time	48	hrs
Maximum Live Storage Depth	**1.80**	**ft**
Provided Volume Below Outlet	**7,082**	**cf**

EMERGENCY OVERFLOW

In the event of a clog in the system or a rainfall event larger than the 100 year rainfall event, the onsite infiltration basin will overflow northeast into the existing street right of way.

STORMWATER SYSTEM OPERATIONS & MAINTENANCE

If required by the City of Bloomington or NMCWD an operations and maintenance agreement will be prepared for the project.

Erosion & Sediment Control

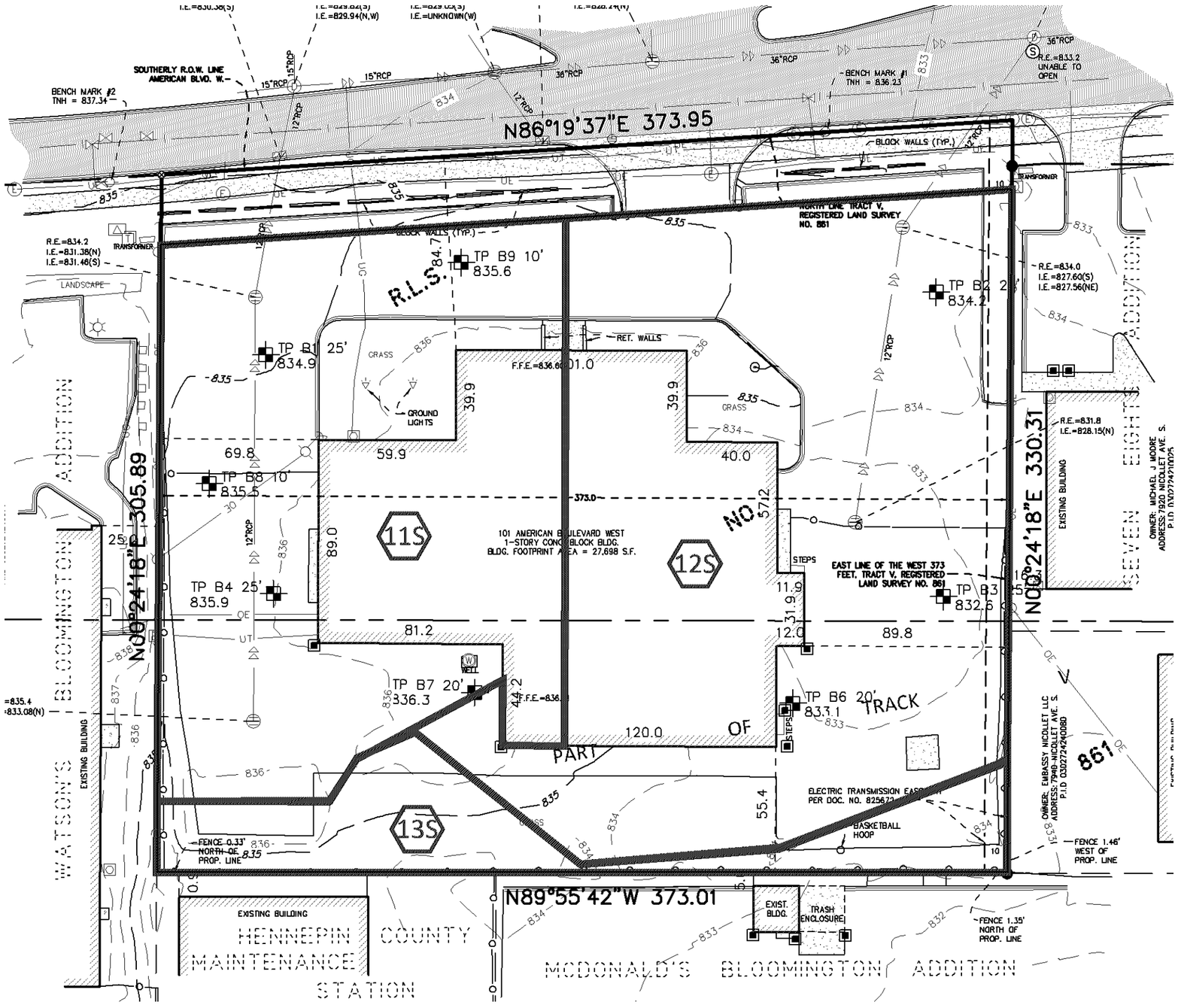
A comprehensive Stormwater Pollution Prevention Plan (SWPPP) meeting the requirements of the 2013 MPCA NPDES permit will be developed as part of the proposed project.

Summary

The proposed American Blvd Storage project will meet the requirements of the City of Bloomington, NMCWD, and MPCA through construction of infiltration basins. These BMPs will provide the required rate control, water quality, and volume reduction improvements prior to discharging stormwater runoff from the site to downstream receiving waters.

If you have any questions, comments, or additional information regarding this report, please contact me at bbusselman@sambatek.com or 763-476-6010.

APPENDIX A – DRAINAGE MAPS



LEGEND

- XX — LINK
- XX — POND
- XX — REACH
- XX — SUB-CATCHMENT

NORTH

0 1

SCALE IN FEET

Sambatek
www.sambatek.com
12800 Whitewater Drive, Suite 300
Minnetonka, MN 55343
763.476.6010 telephone
763.476.8532 facsimile
Engineering | Surveying | Planning | Environmental

Client

PAMLICO INVESTMENTS

Project

AMERICAN BLVD STORAGE

Location

BLOOMINGTON, MN

Certification

Summary

Approved: BDB Drawn: JEB

Revision History

No.	Date	By	Submittal / Rev.

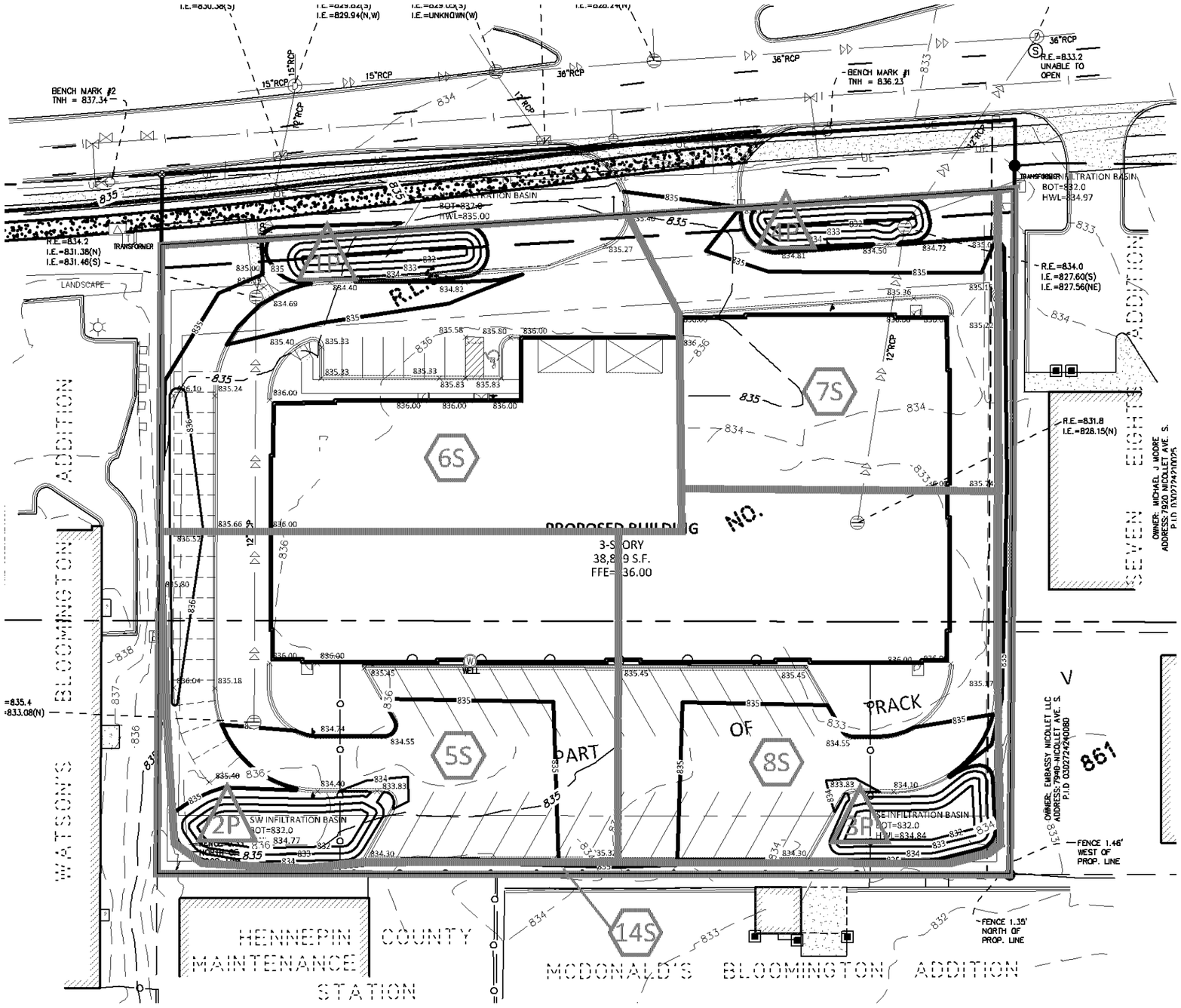
Sheet Title

EXISTING DRAINAGE MAP

Sheet No. Revision

1/2

Project No. 21012



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Revision History

No.	Date	By	Submittal / Rev.

Sheet Title

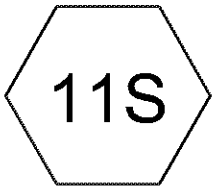
PROPOSED DRAINAGE MAP

Sheet No. Revision

2/2

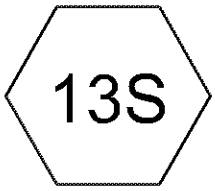
Project No. 21012

APPENDIX B – HYDROCAD CALCULATIONS

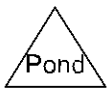


Existing NW Connection

Existing NE Connection



Existing Runoff



Routing Diagram for 21012-American Blvd Storage
Prepared by {enter your company name here}, Printed 11/30/2017

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.438	61	>75% Grass cover, Good, HSG B (11S, 12S, 13S)
2.023	98	Paved parking, HSG B (11S, 12S, 13S)
2.461	**91**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
2.461	HSG B	11S, 12S, 13S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
2.461		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.438	0.000	0.000	0.000	0.438	>75% Grass cover, Good	11S, 12S, 13S
0.000	2.023	0.000	0.000	0.000	2.023	Paved parking	11S, 12S, 13S
0.000	**2.461**	**0.000**	**0.000**	**0.000**	**2.461**	**TOTAL AREA**	

Time span=0.00-84.00 hrs, dt=0.01 hrs, 8401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment11S: Existing NW Runoff Area=41,397 sf 87.90% Impervious Runoff Depth=1.77"
Tc=10.0 min CN=94 Runoff=2.49 cfs 0.140 af

Subcatchment12S: Existing NE Runoff Area=55,477 sf 87.85% Impervious Runoff Depth=1.77"
Tc=10.0 min CN=94 Runoff=3.34 cfs 0.188 af

Subcatchment13S: Existing Runoff Runoff Area=10,342 sf 29.20% Impervious Runoff Depth=0.48"
Tc=10.0 min CN=72 Runoff=0.15 cfs 0.009 af

Total Runoff Area = 2.461 ac Runoff Volume = 0.338 af Average Runoff Depth = 1.65"
17.79% Pervious = 0.438 ac 82.21% Impervious = 2.023 ac

Summary for Subcatchment 11S: Existing NW Connection

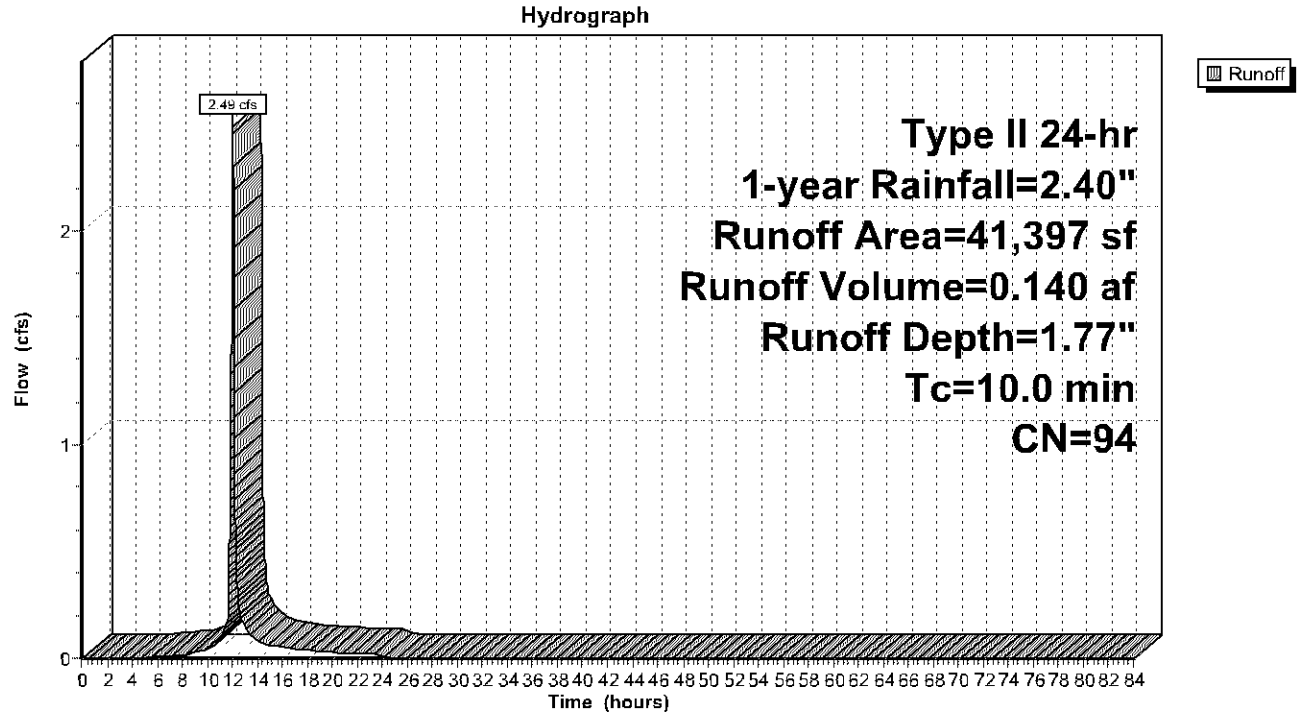
Runoff = 2.49 cfs @ 12.01 hrs, Volume= 0.140 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-year Rainfall=2.40"

Area (sf)	CN	Description
36,386	98	Paved parking, HSG B
5,011	61	>75% Grass cover, Good, HSG B
41,397	94	Weighted Average
5,011		12.10% Pervious Area
36,386		87.90% Impervious Area

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

Subcatchment 11S: Existing NW Connection



Summary for Subcatchment 12S: Existing NE Connection

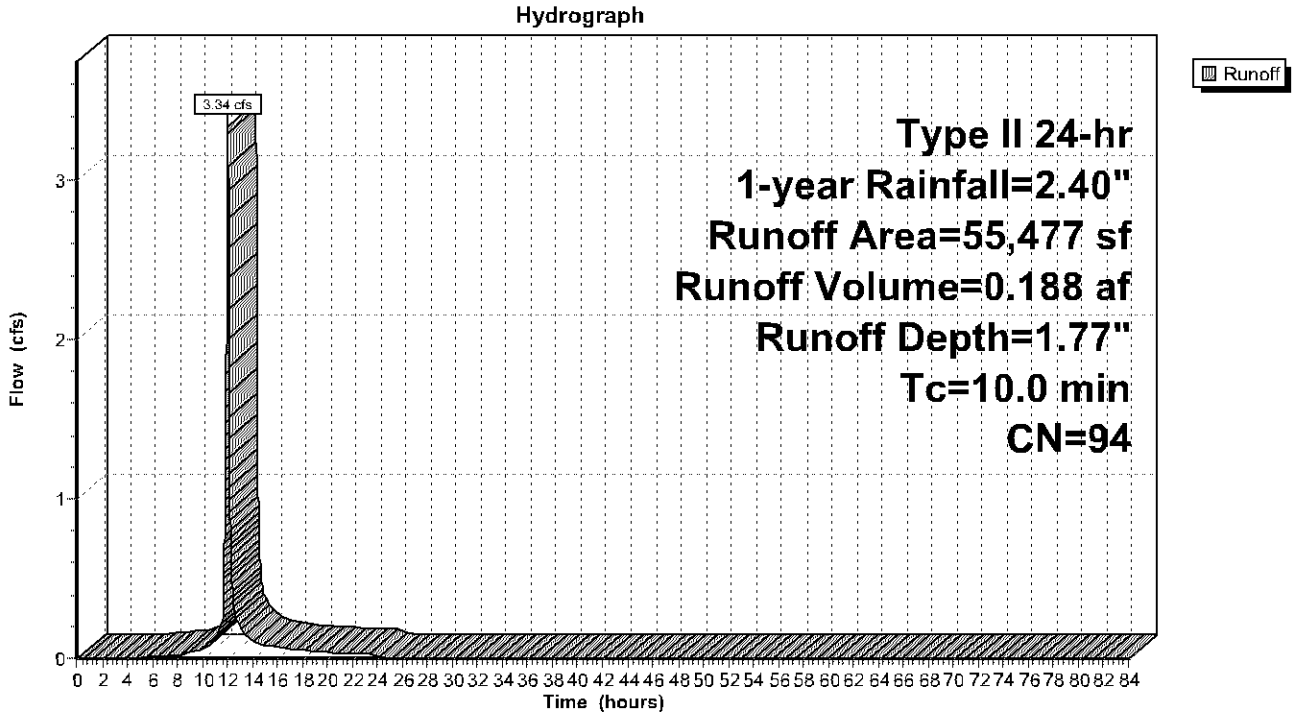
Runoff = 3.34 cfs @ 12.01 hrs, Volume= 0.188 af, Depth= 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-year Rainfall=2.40"

Area (sf)	CN	Description
48,735	98	Paved parking, HSG B
6,742	61	>75% Grass cover, Good, HSG B
55,477	94	Weighted Average
6,742		12.15% Pervious Area
48,735		87.85% Impervious Area

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

Subcatchment 12S: Existing NE Connection



Summary for Subcatchment 13S: Existing Runoff

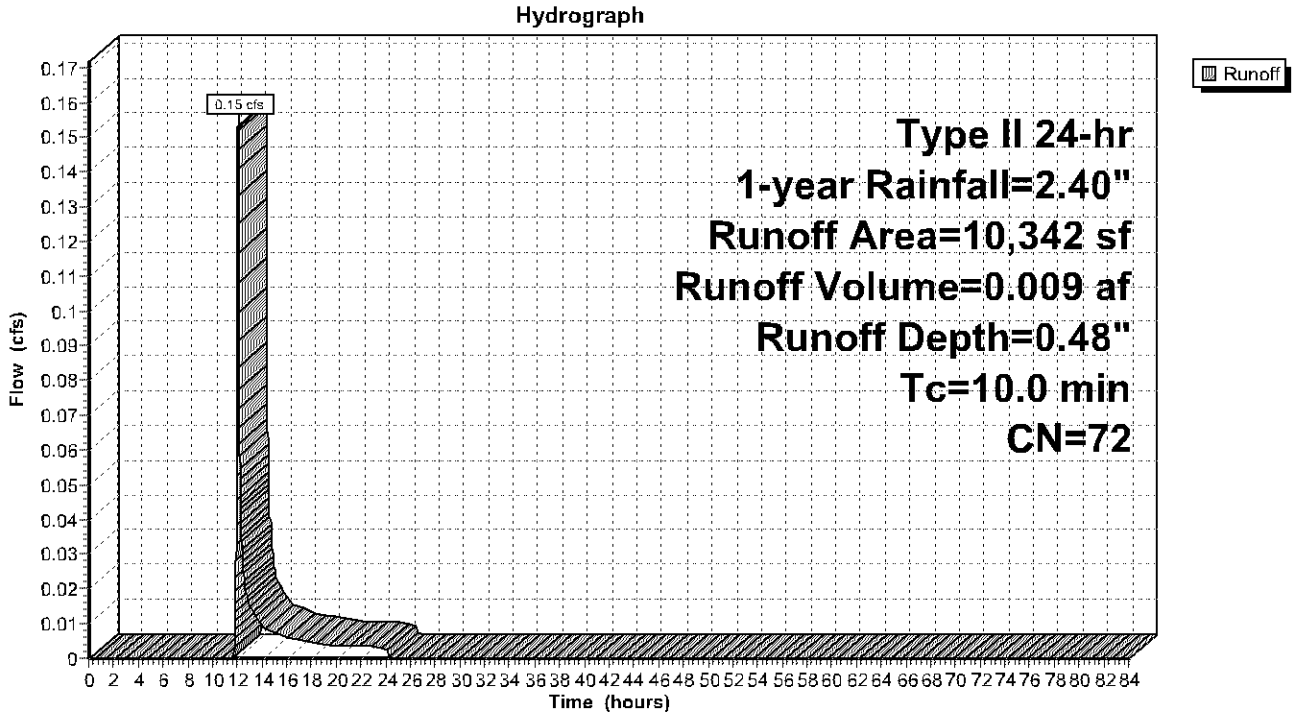
Runoff = 0.15 cfs @ 12.03 hrs, Volume= 0.009 af, Depth= 0.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-year Rainfall=2.40"

Area (sf)	CN	Description
3,020	98	Paved parking, HSG B
7,322	61	>75% Grass cover, Good, HSG B
10,342	72	Weighted Average
7,322		70.80% Pervious Area
3,020		29.20% Impervious Area

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

Subcatchment 13S: Existing Runoff



Time span=0.00-84.00 hrs, dt=0.01 hrs, 8401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment11S: Existing NW Runoff Area=41,397 sf 87.90% Impervious Runoff Depth=2.21"
Tc=10.0 min CN=94 Runoff=3.06 cfs 0.175 af

Subcatchment12S: Existing NE Runoff Area=55,477 sf 87.85% Impervious Runoff Depth=2.21"
Tc=10.0 min CN=94 Runoff=4.10 cfs 0.234 af

Subcatchment13S: Existing Runoff Runoff Area=10,342 sf 29.20% Impervious Runoff Depth=0.72"
Tc=10.0 min CN=72 Runoff=0.25 cfs 0.014 af

Total Runoff Area = 2.461 ac Runoff Volume = 0.423 af Average Runoff Depth = 2.06"
17.79% Pervious = 0.438 ac 82.21% Impervious = 2.023 ac

Summary for Subcatchment 11S: Existing NW Connection

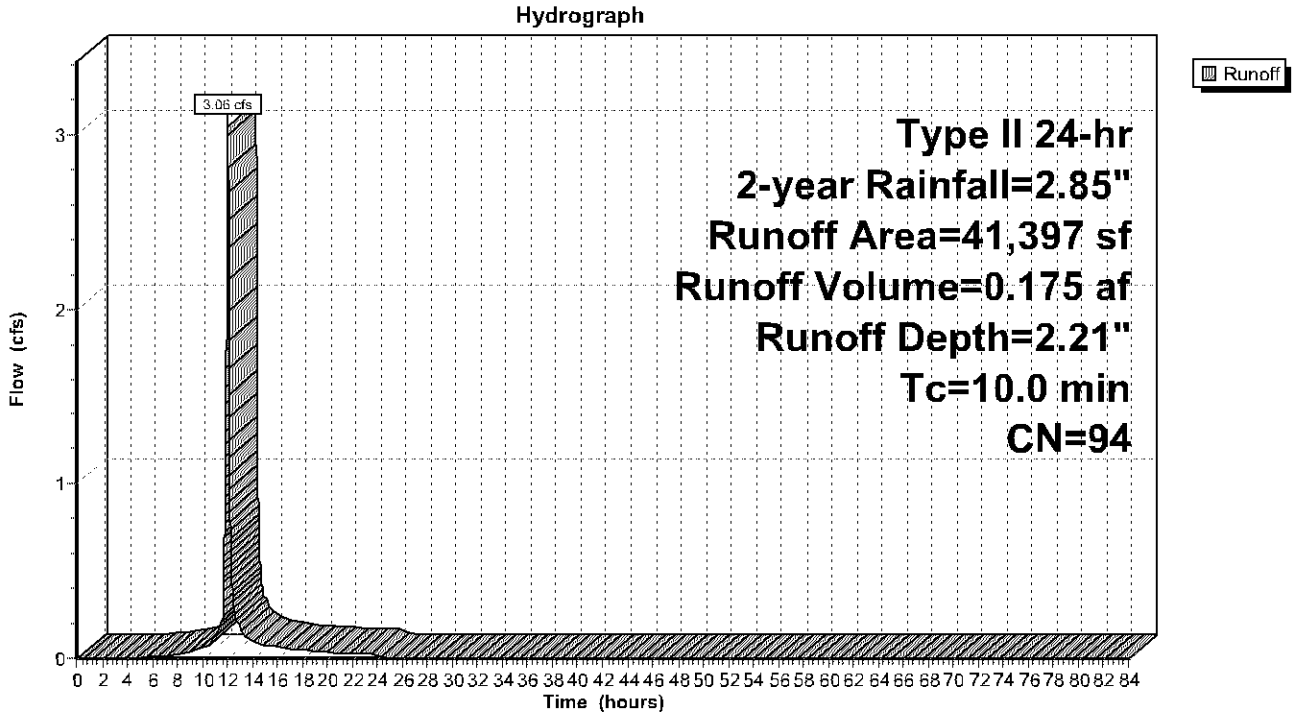
Runoff = 3.06 cfs @ 12.01 hrs, Volume= 0.175 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-year Rainfall=2.85"

Area (sf)	CN	Description
36,386	98	Paved parking, HSG B
5,011	61	>75% Grass cover, Good, HSG B
41,397	94	Weighted Average
5,011		12.10% Pervious Area
36,386		87.90% Impervious Area

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

Subcatchment 11S: Existing NW Connection



Summary for Subcatchment 12S: Existing NE Connection

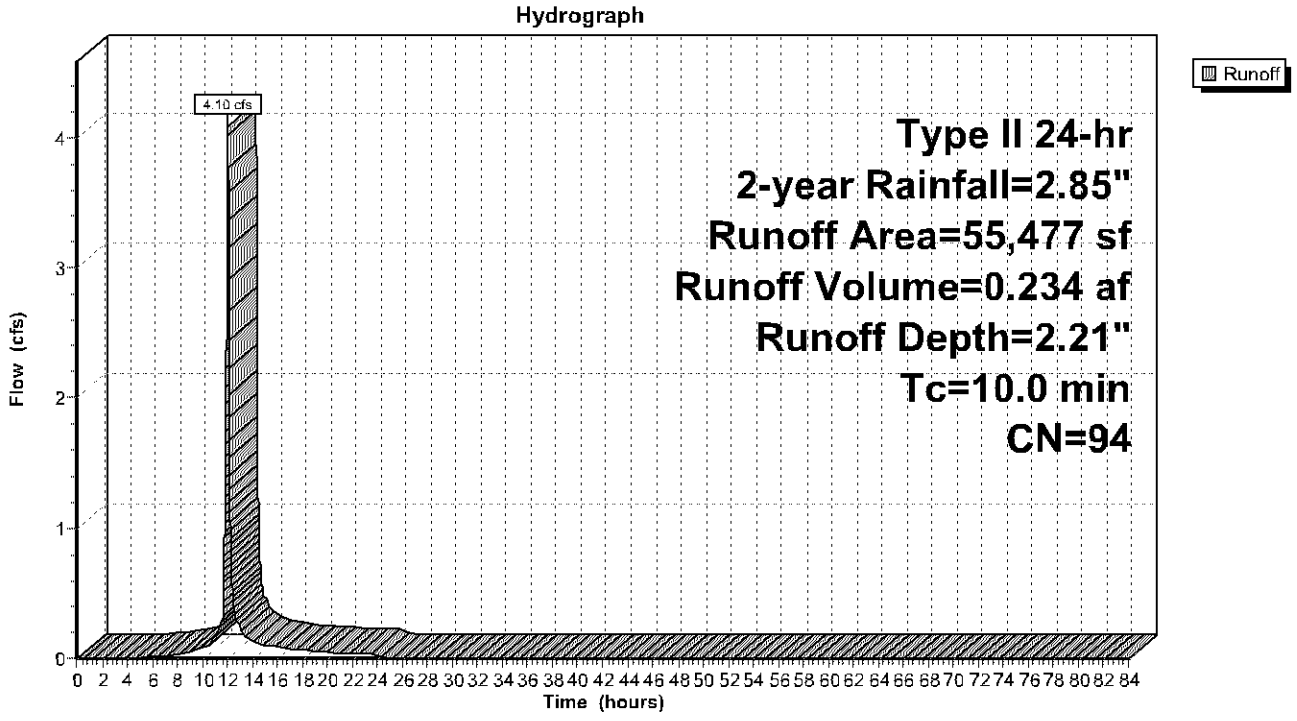
Runoff = 4.10 cfs @ 12.01 hrs, Volume= 0.234 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-year Rainfall=2.85"

Area (sf)	CN	Description
48,735	98	Paved parking, HSG B
6,742	61	>75% Grass cover, Good, HSG B
55,477	94	Weighted Average
6,742		12.15% Pervious Area
48,735		87.85% Impervious Area

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

Subcatchment 12S: Existing NE Connection



Summary for Subcatchment 13S: Existing Runoff

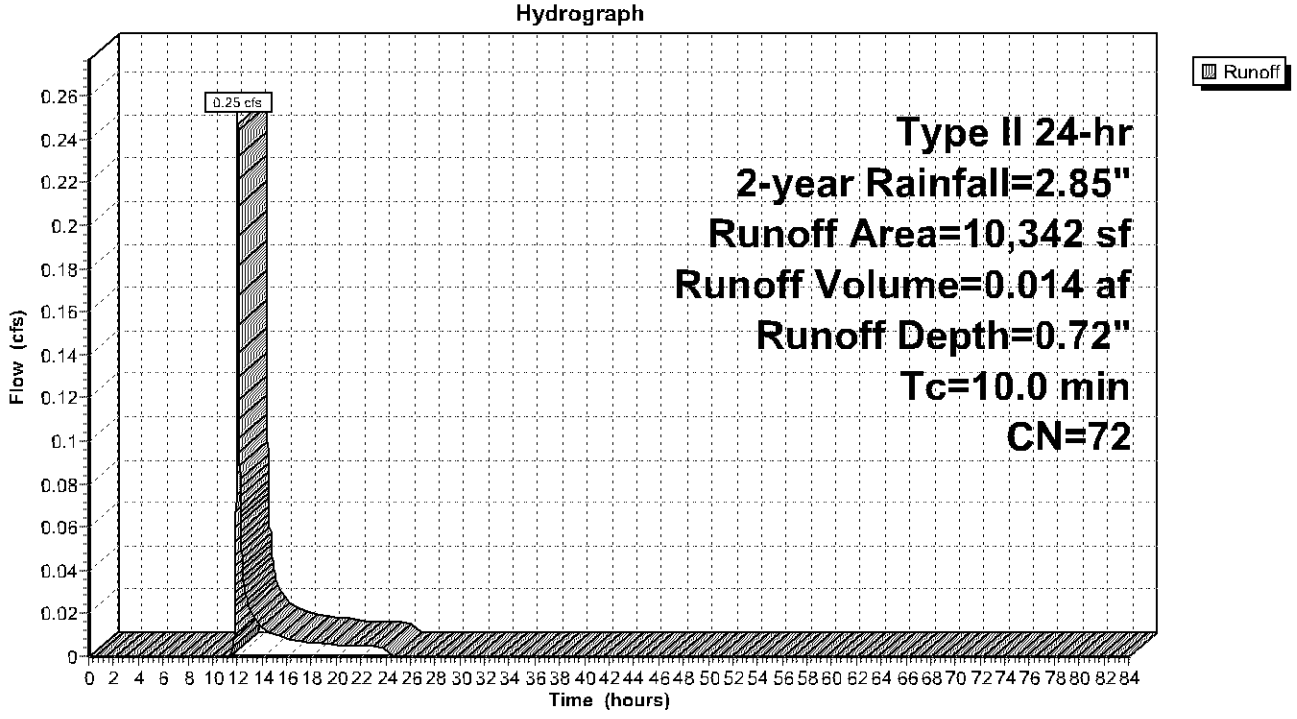
Runoff = 0.25 cfs @ 12.03 hrs, Volume= 0.014 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-year Rainfall=2.85"

Area (sf)	CN	Description
3,020	98	Paved parking, HSG B
7,322	61	>75% Grass cover, Good, HSG B
10,342	72	Weighted Average
7,322		70.80% Pervious Area
3,020		29.20% Impervious Area

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

Subcatchment 13S: Existing Runoff



Time span=0.00-84.00 hrs, dt=0.01 hrs, 8401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment11S: Existing NW Runoff Area=41,397 sf 87.90% Impervious Runoff Depth=3.58"
Tc=10.0 min CN=94 Runoff=4.82 cfs 0.283 af

Subcatchment12S: Existing NE Runoff Area=55,477 sf 87.85% Impervious Runoff Depth=3.58"
Tc=10.0 min CN=94 Runoff=6.46 cfs 0.380 af

Subcatchment13S: Existing Runoff Runoff Area=10,342 sf 29.20% Impervious Runoff Depth=1.65"
Tc=10.0 min CN=72 Runoff=0.60 cfs 0.033 af

Total Runoff Area = 2.461 ac Runoff Volume = 0.696 af Average Runoff Depth = 3.39"
17.79% Pervious = 0.438 ac 82.21% Impervious = 2.023 ac

Summary for Subcatchment 11S: Existing NW Connection

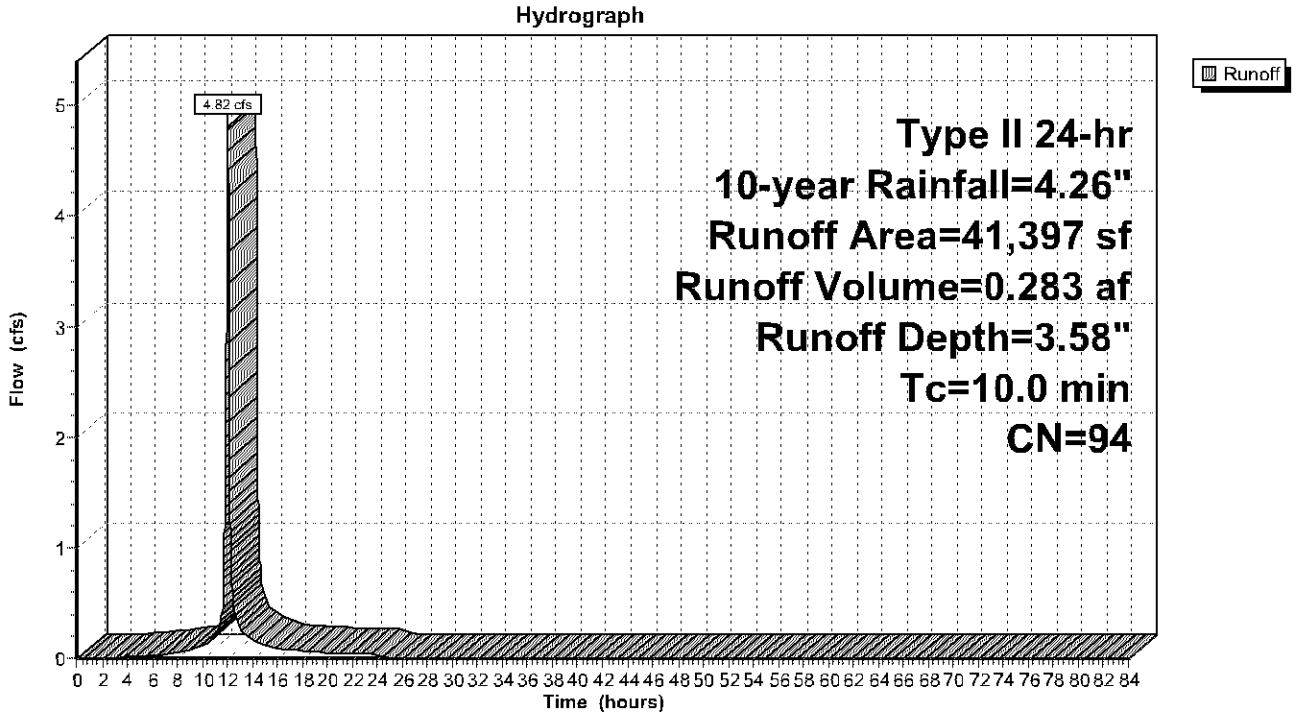
Runoff = 4.82 cfs @ 12.01 hrs, Volume= 0.283 af, Depth= 3.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-year Rainfall=4.26"

Area (sf)	CN	Description
36,386	98	Paved parking, HSG B
5,011	61	>75% Grass cover, Good, HSG B
41,397	94	Weighted Average
5,011		12.10% Pervious Area
36,386		87.90% Impervious Area

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

Subcatchment 11S: Existing NW Connection



Summary for Subcatchment 12S: Existing NE Connection

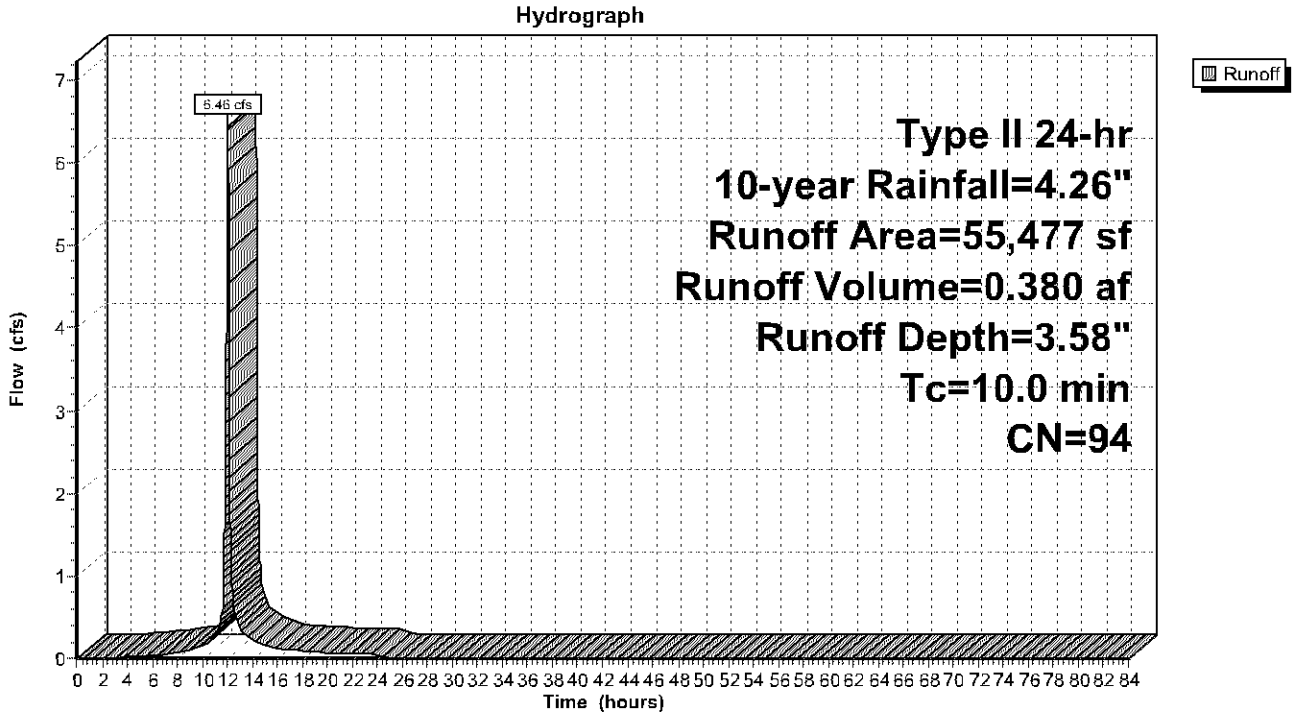
Runoff = 6.46 cfs @ 12.01 hrs, Volume= 0.380 af, Depth= 3.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-year Rainfall=4.26"

Area (sf)	CN	Description
48,735	98	Paved parking, HSG B
6,742	61	>75% Grass cover, Good, HSG B
55,477	94	Weighted Average
6,742		12.15% Pervious Area
48,735		87.85% Impervious Area

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

Subcatchment 12S: Existing NE Connection



Summary for Subcatchment 13S: Existing Runoff

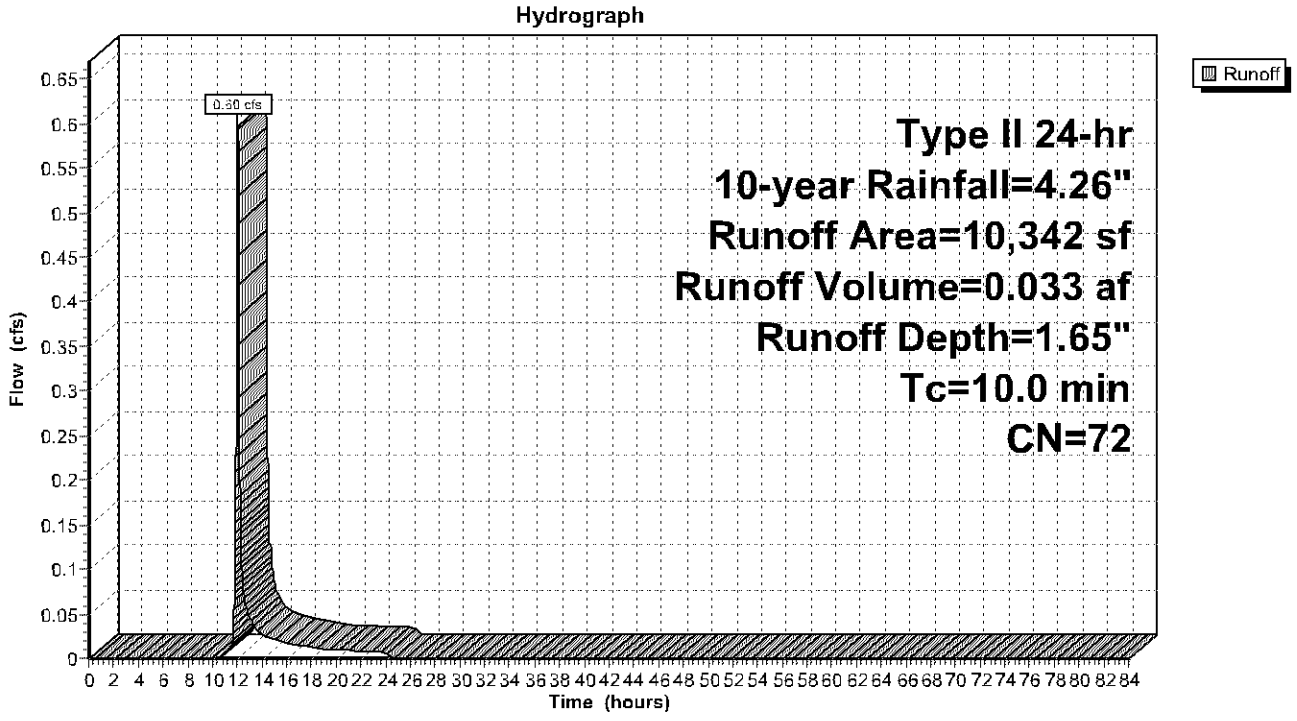
Runoff = 0.60 cfs @ 12.02 hrs, Volume= 0.033 af, Depth= 1.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-year Rainfall=4.26"

Area (sf)	CN	Description
3,020	98	Paved parking, HSG B
7,322	61	>75% Grass cover, Good, HSG B
10,342	72	Weighted Average
7,322		70.80% Pervious Area
3,020		29.20% Impervious Area

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

Subcatchment 13S: Existing Runoff



Time span=0.00-84.00 hrs, dt=0.01 hrs, 8401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment11S: Existing NW Runoff Area=41,397 sf 87.90% Impervious Runoff Depth=6.78"
Tc=10.0 min CN=94 Runoff=8.80 cfs 0.537 af

Subcatchment12S: Existing NE Runoff Area=55,477 sf 87.85% Impervious Runoff Depth=6.78"
Tc=10.0 min CN=94 Runoff=11.79 cfs 0.720 af

Subcatchment13S: Existing Runoff Runoff Area=10,342 sf 29.20% Impervious Runoff Depth=4.26"
Tc=10.0 min CN=72 Runoff=1.55 cfs 0.084 af

Total Runoff Area = 2.461 ac Runoff Volume = 1.342 af Average Runoff Depth = 6.54"
17.79% Pervious = 0.438 ac 82.21% Impervious = 2.023 ac

Summary for Subcatchment 11S: Existing NW Connection

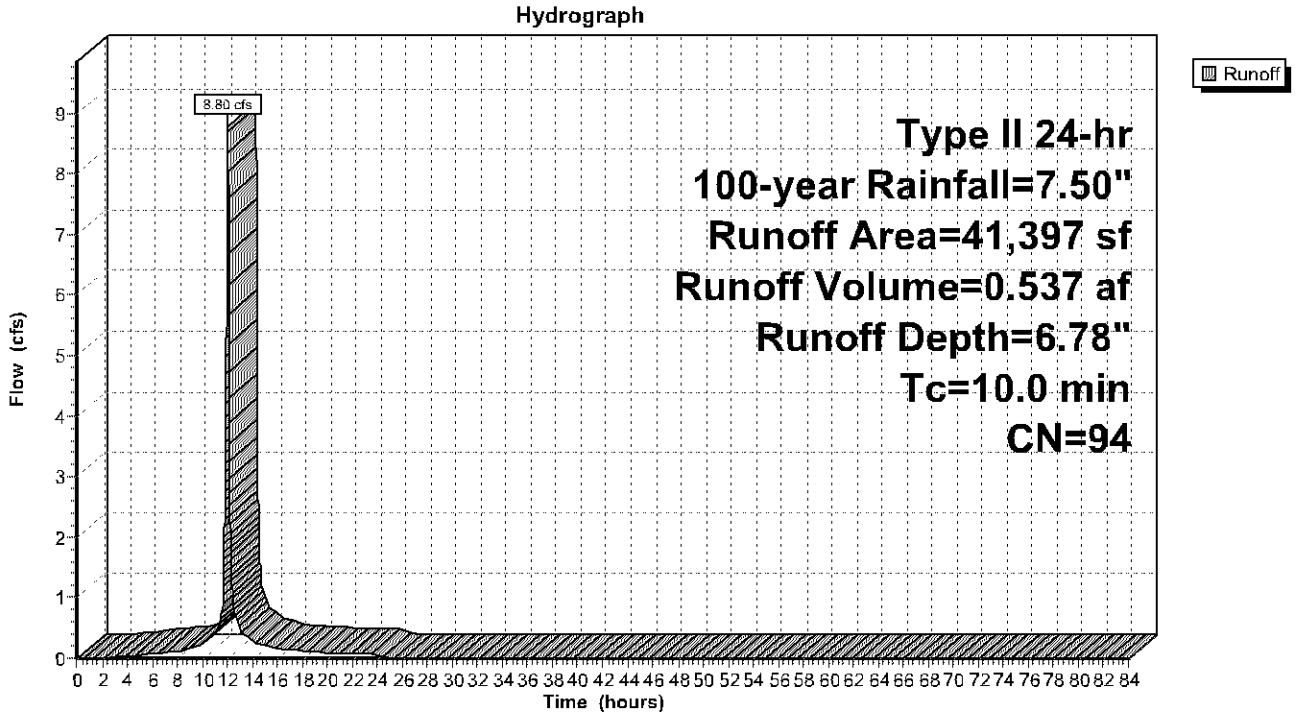
Runoff = 8.80 cfs @ 12.01 hrs, Volume= 0.537 af, Depth= 6.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-year Rainfall=7.50"

Area (sf)	CN	Description
36,386	98	Paved parking, HSG B
5,011	61	>75% Grass cover, Good, HSG B
41,397	94	Weighted Average
5,011		12.10% Pervious Area
36,386		87.90% Impervious Area

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

Subcatchment 11S: Existing NW Connection



Summary for Subcatchment 12S: Existing NE Connection

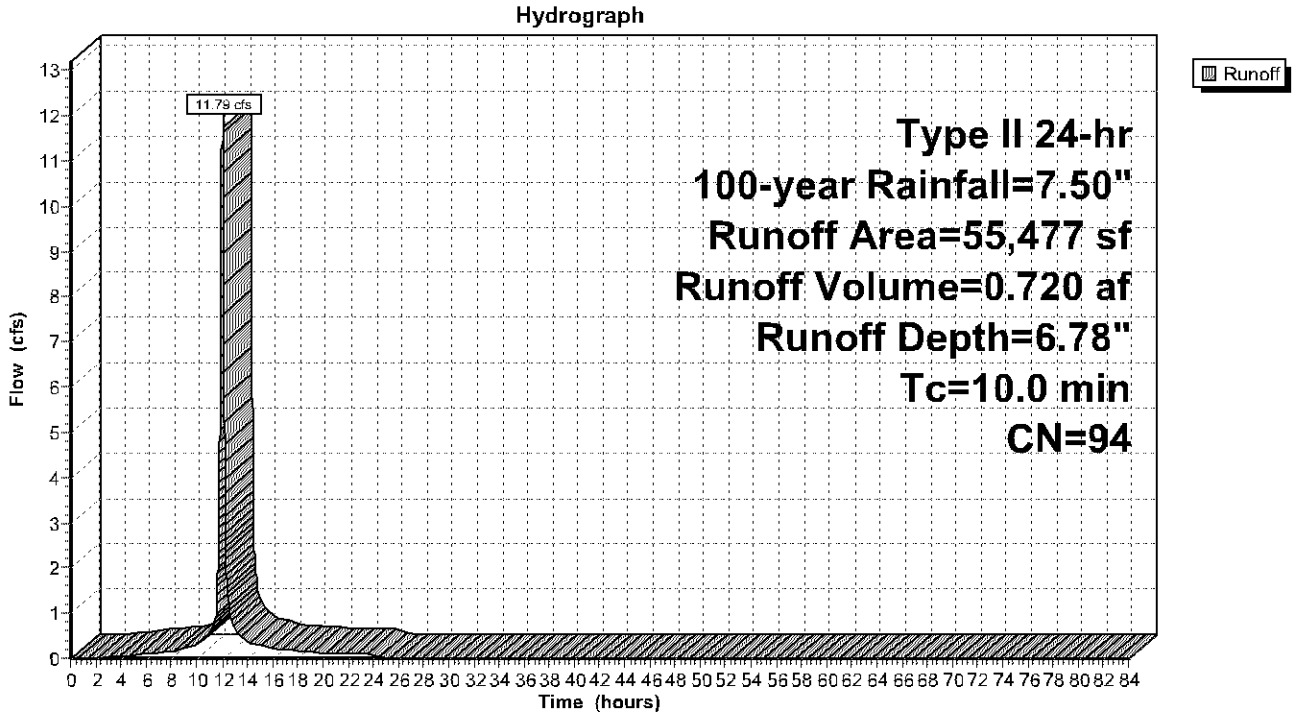
Runoff = 11.79 cfs @ 12.01 hrs, Volume= 0.720 af, Depth= 6.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-year Rainfall=7.50"

Area (sf)	CN	Description
48,735	98	Paved parking, HSG B
6,742	61	>75% Grass cover, Good, HSG B
55,477	94	Weighted Average
6,742		12.15% Pervious Area
48,735		87.85% Impervious Area

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

Subcatchment 12S: Existing NE Connection



Summary for Subcatchment 13S: Existing Runoff

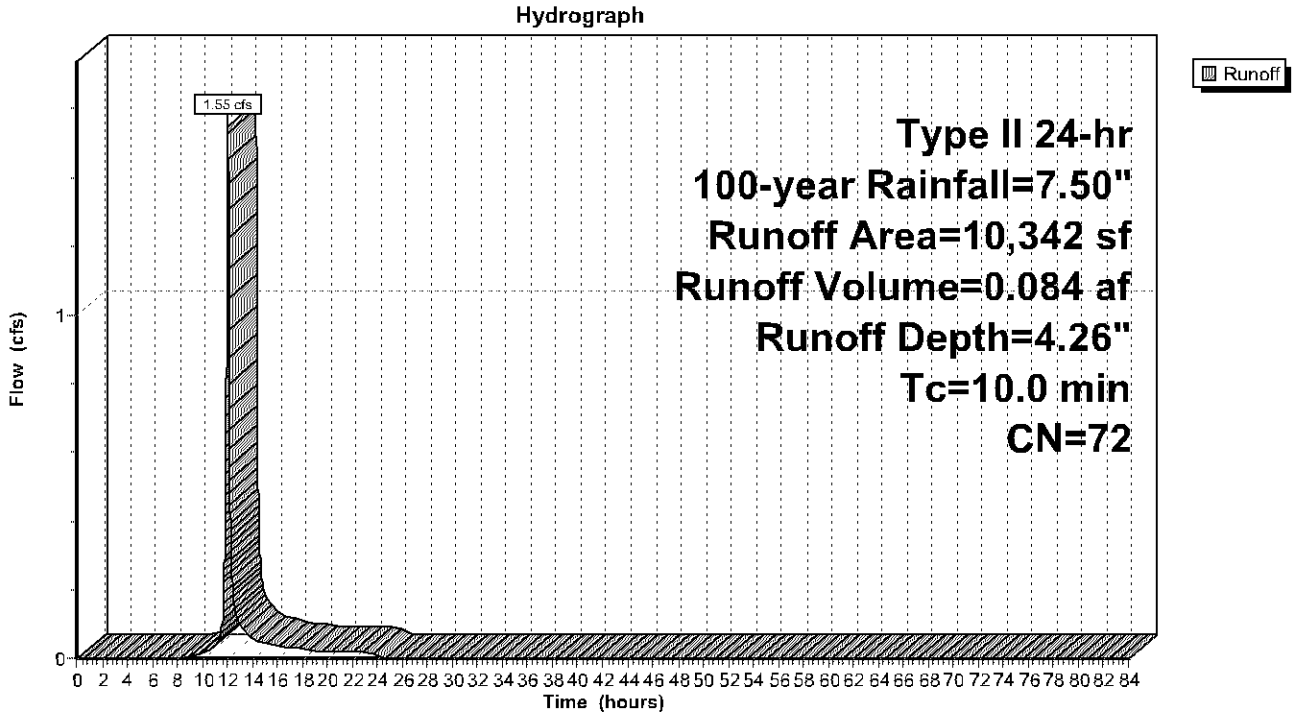
Runoff = 1.55 cfs @ 12.02 hrs, Volume= 0.084 af, Depth= 4.26"

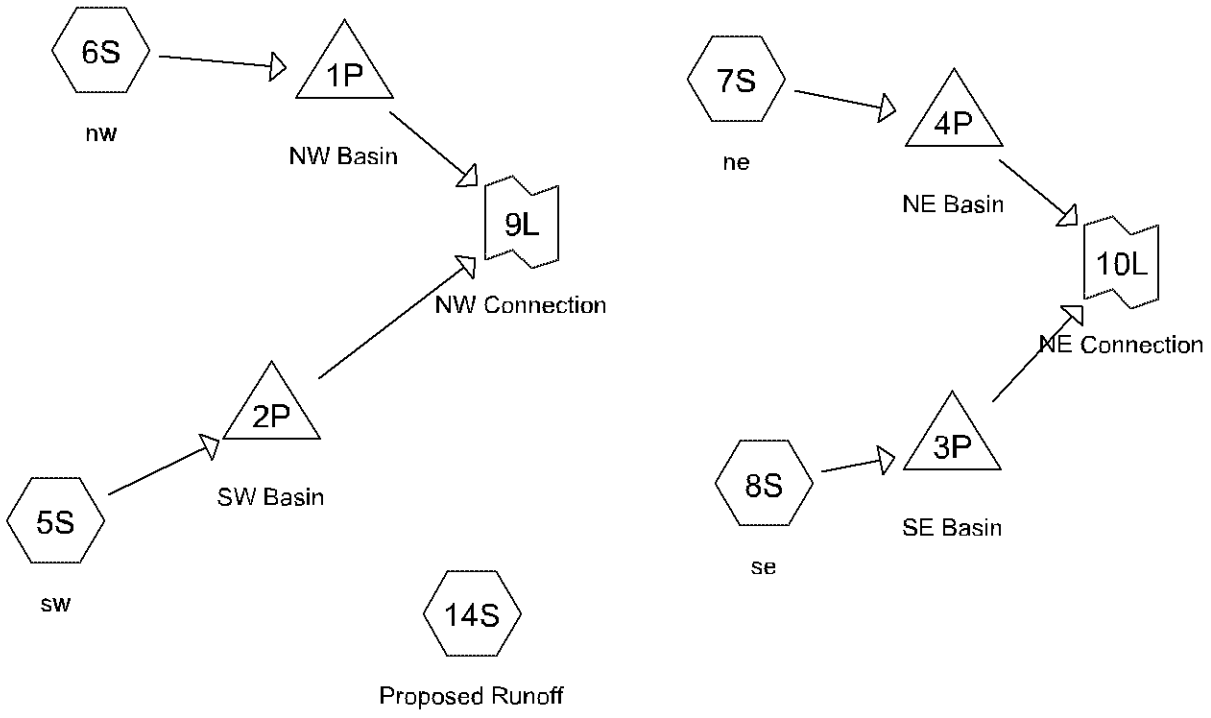
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-year Rainfall=7.50"

Area (sf)	CN	Description
3,020	98	Paved parking, HSG B
7,322	61	>75% Grass cover, Good, HSG B
10,342	72	Weighted Average
7,322		70.80% Pervious Area
3,020		29.20% Impervious Area

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

Subcatchment 13S: Existing Runoff





Subcat Reach Pond Link

Routing Diagram for 21012-American Blvd Storage
Prepared by {enter your company name here}, Printed 11/30/2017

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.593	61	>75% Grass cover, Good, HSG B (5S, 6S, 7S, 8S, 14S)
1.867	98	Paved parking, HSG B (5S, 6S, 7S, 8S)
2.461	**89**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
2.461	HSG B	5S, 6S, 7S, 8S, 14S
0.000	HSG C	
0.000	HSG D	
0.000	Other	
2.461		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.593	0.000	0.000	0.000	0.593	>75% Grass cover, Good	5S, 6S, 7S, 8S, 14S
0.000	1.867	0.000	0.000	0.000	1.867	Paved parking	5S, 6S, 7S, 8S
0.000	**2.461**	**0.000**	**0.000**	**0.000**	**2.461**	**TOTAL AREA**	

Pipe Listing (selected nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	830.95	830.38	35.0	0.0163	0.013	12.0	0.0	0.0
2	1P	833.80	833.80	13.0	0.0000	0.010	10.0	0.0	0.0
3	2P	833.00	830.95	250.0	0.0082	0.013	12.0	0.0	0.0
4	2P	833.80	833.80	6.0	0.0000	0.010	10.0	0.0	0.0
5	3P	831.50	828.79	232.0	0.0117	0.013	12.0	0.0	0.0
6	3P	833.80	833.80	14.0	0.0000	0.013	12.0	0.0	0.0
7	4P	827.35	826.36	85.0	0.0116	0.013	12.0	0.0	0.0
8	4P	833.80	833.80	5.0	0.0000	0.010	10.0	0.0	0.0

Time span=0.00-84.00 hrs, dt=0.01 hrs, 8401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment5S: sw Runoff Area=30,480 sf 75.89% Impervious Runoff Depth=1.37"
Tc=10.0 min CN=89 Runoff=1.47 cfs 0.080 af

Subcatchment6S: nw Runoff Area=27,914 sf 73.03% Impervious Runoff Depth=1.30"
Tc=10.0 min CN=88 Runoff=1.28 cfs 0.069 af

Subcatchment7S: ne Runoff Area=17,619 sf 85.37% Impervious Runoff Depth=1.69"
Tc=10.0 min CN=93 Runoff=1.02 cfs 0.057 af

Subcatchment8S: se Runoff Area=26,967 sf 84.50% Impervious Runoff Depth=1.60"
Tc=10.0 min CN=92 Runoff=1.50 cfs 0.083 af

Subcatchment14S: Proposed Runoff Runoff Area=4,200 sf 0.00% Impervious Runoff Depth=0.17"
Tc=10.0 min CN=61 Runoff=0.01 cfs 0.001 af

Pond 1P: NW Basin Peak Elev=834.01' Storage=1,643 cf Inflow=1.28 cfs 0.069 af
Discarded=0.01 cfs 0.047 af Primary=0.09 cfs 0.022 af Outflow=0.10 cfs 0.069 af

Pond 2P: SW Basin Peak Elev=833.67' Storage=2,503 cf Inflow=1.47 cfs 0.080 af
Discarded=0.02 cfs 0.080 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.080 af

Pond 3P: SE Basin Peak Elev=833.93' Storage=2,371 cf Inflow=1.50 cfs 0.083 af
Discarded=0.02 cfs 0.072 af Primary=0.03 cfs 0.011 af Outflow=0.05 cfs 0.083 af

Pond 4P: NE Basin Peak Elev=834.18' Storage=1,169 cf Inflow=1.02 cfs 0.057 af
Discarded=0.01 cfs 0.029 af Primary=0.32 cfs 0.028 af Outflow=0.33 cfs 0.057 af

Link 9L: NW Connection Inflow=0.09 cfs 0.022 af
Primary=0.09 cfs 0.022 af

Link 10L: NE Connection Inflow=0.32 cfs 0.038 af
Primary=0.32 cfs 0.038 af

Total Runoff Area = 2.461 ac Runoff Volume = 0.290 af Average Runoff Depth = 1.41"
24.11% Pervious = 0.593 ac 75.89% Impervious = 1.867 ac

Summary for Subcatchment 5S: sw

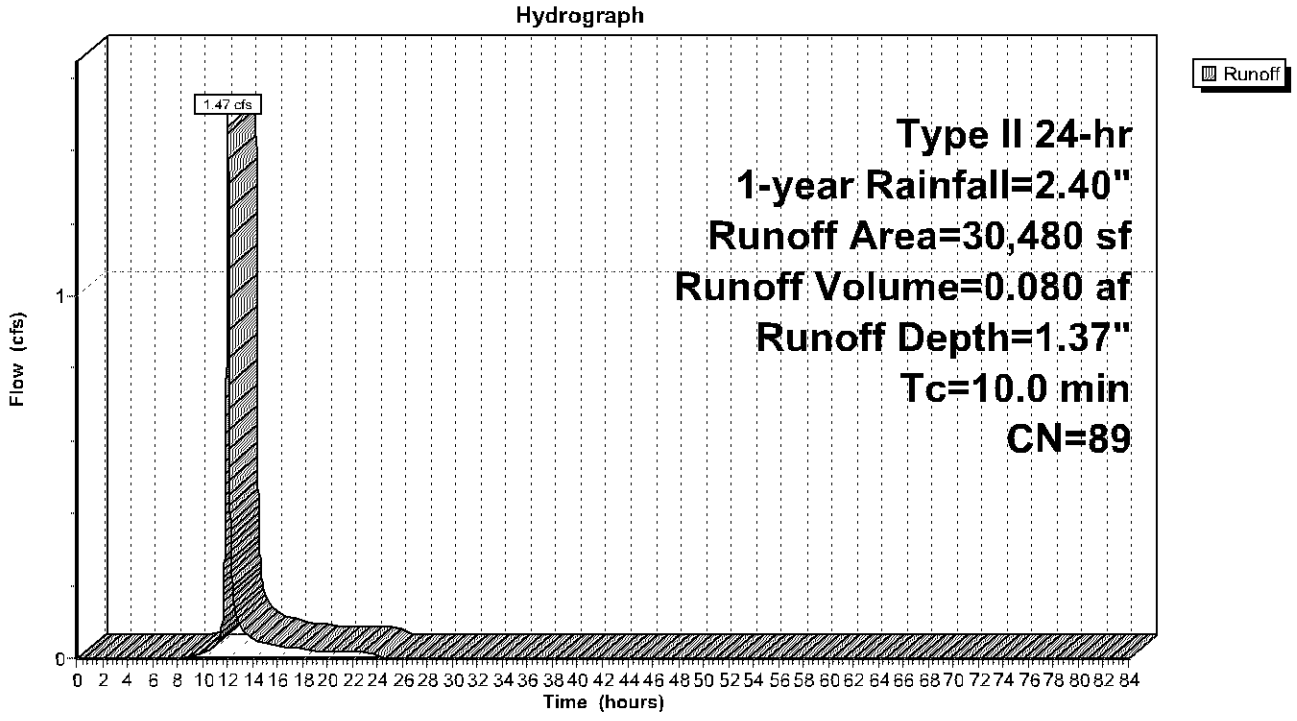
Runoff = 1.47 cfs @ 12.02 hrs, Volume= 0.080 af, Depth= 1.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-year Rainfall=2.40"

Area (sf)	CN	Description
23,130	98	Paved parking, HSG B
7,350	61	>75% Grass cover, Good, HSG B
30,480	89	Weighted Average
7,350		24.11% Pervious Area
23,130		75.89% Impervious Area

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

Subcatchment 5S: sw



Summary for Subcatchment 6S: nw

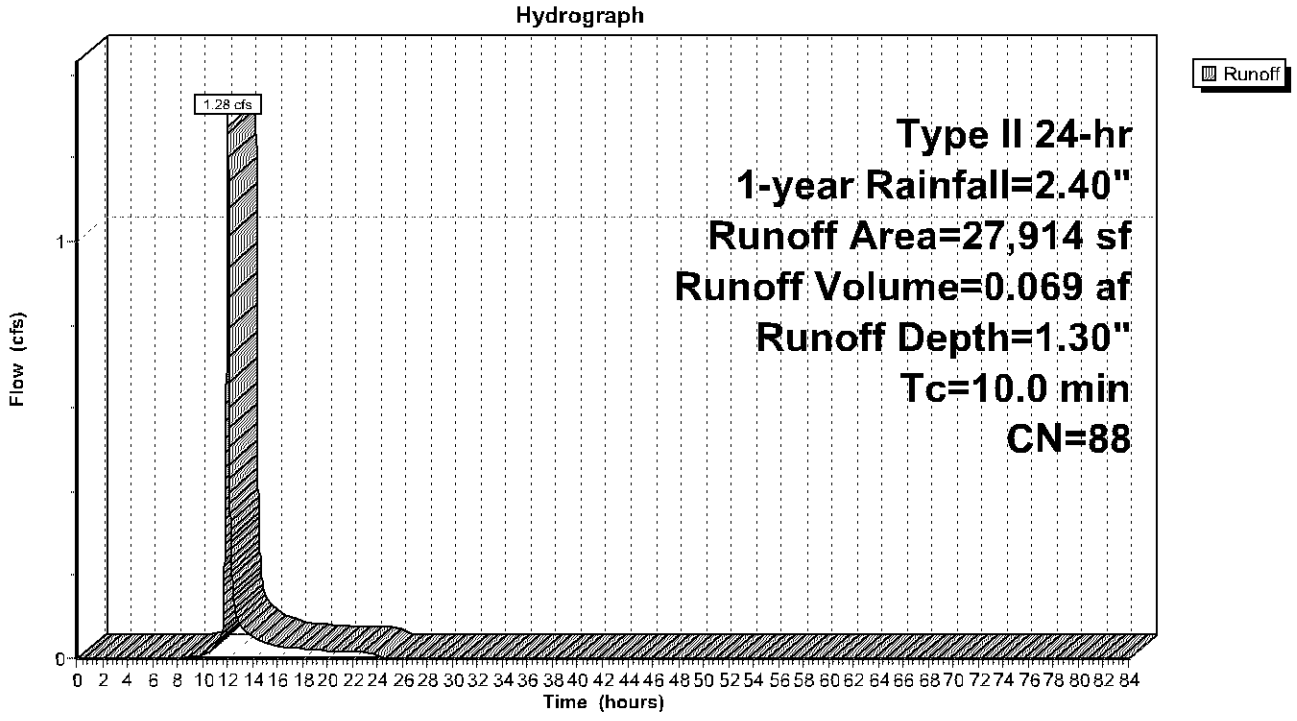
Runoff = 1.28 cfs @ 12.02 hrs, Volume= 0.069 af, Depth= 1.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-year Rainfall=2.40"

Area (sf)	CN	Description
20,385	98	Paved parking, HSG B
7,529	61	>75% Grass cover, Good, HSG B
27,914	88	Weighted Average
7,529		26.97% Pervious Area
20,385		73.03% Impervious Area

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

Subcatchment 6S: nw



Summary for Subcatchment 7S: ne

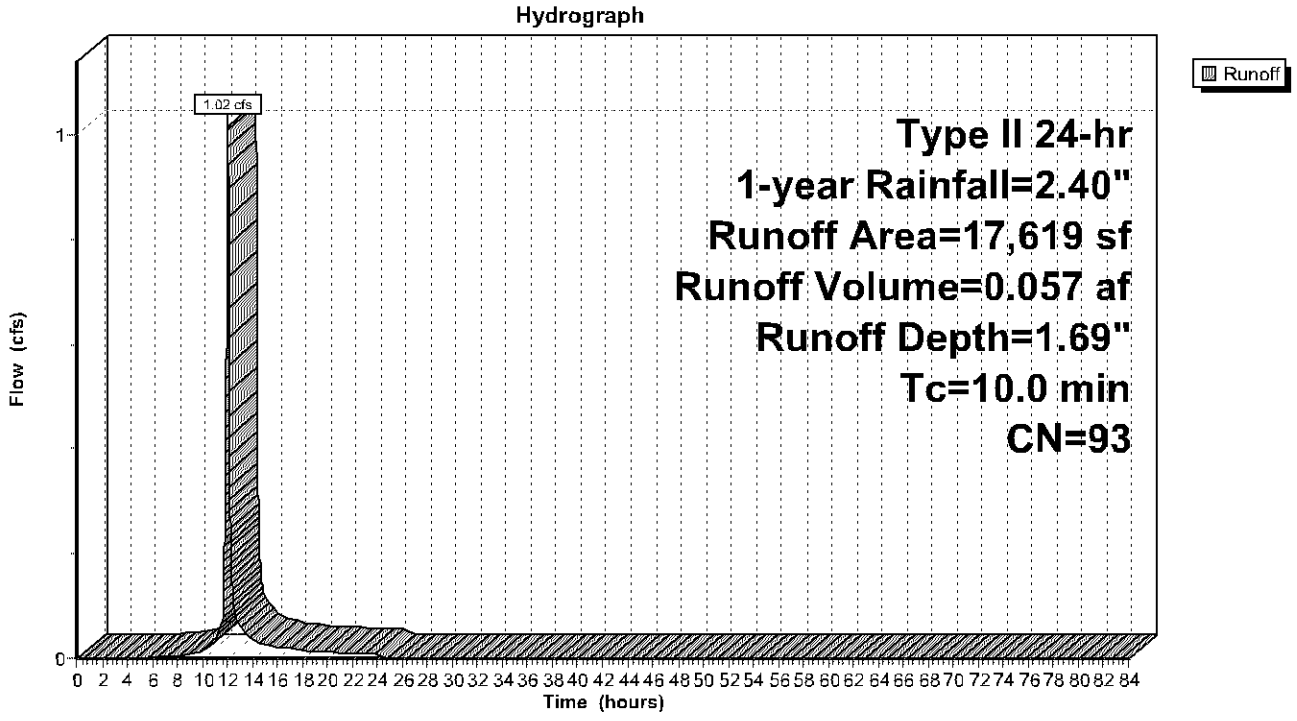
Runoff = 1.02 cfs @ 12.01 hrs, Volume= 0.057 af, Depth= 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-year Rainfall=2.40"

Area (sf)	CN	Description
15,041	98	Paved parking, HSG B
2,578	61	>75% Grass cover, Good, HSG B
17,619	93	Weighted Average
2,578		14.63% Pervious Area
15,041		85.37% Impervious Area

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

Subcatchment 7S: ne



Summary for Subcatchment 8S: se

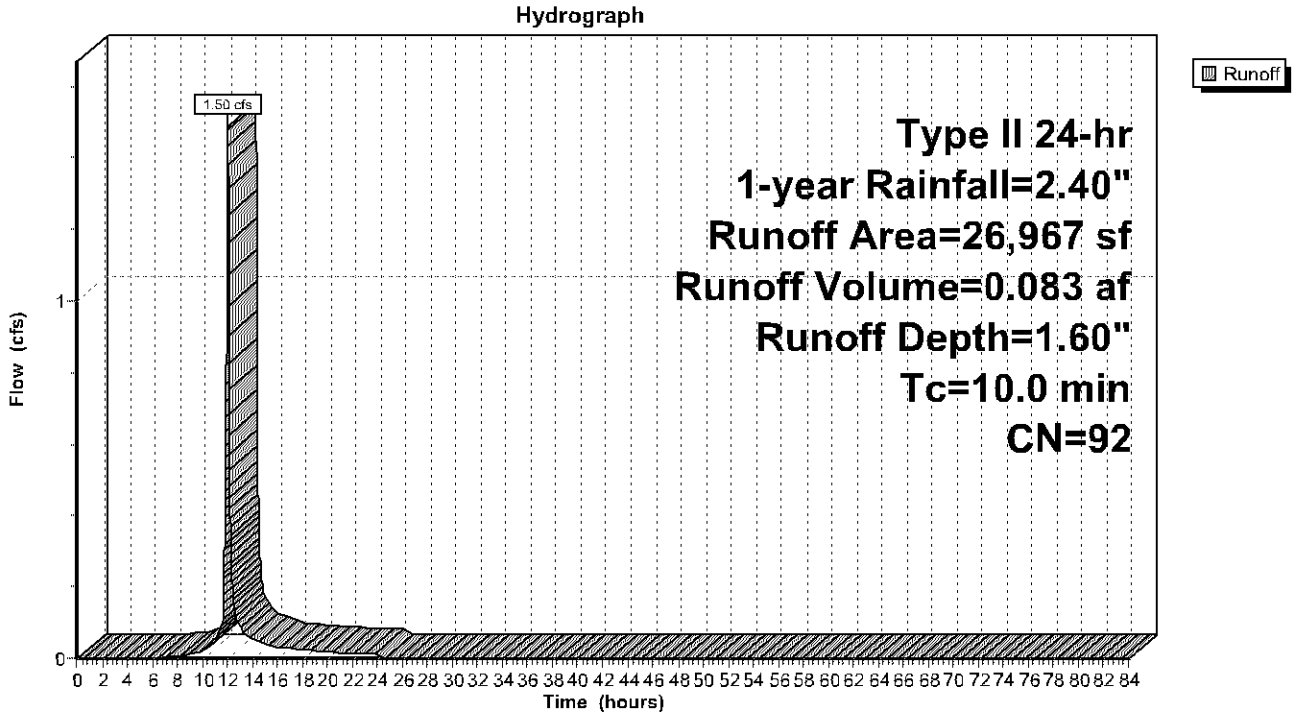
Runoff = 1.50 cfs @ 12.01 hrs, Volume= 0.083 af, Depth= 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-year Rainfall=2.40"

Area (sf)	CN	Description
22,786	98	Paved parking, HSG B
4,181	61	>75% Grass cover, Good, HSG B
26,967	92	Weighted Average
4,181		15.50% Pervious Area
22,786		84.50% Impervious Area

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

Subcatchment 8S: se



Summary for Subcatchment 14S: Proposed Runoff

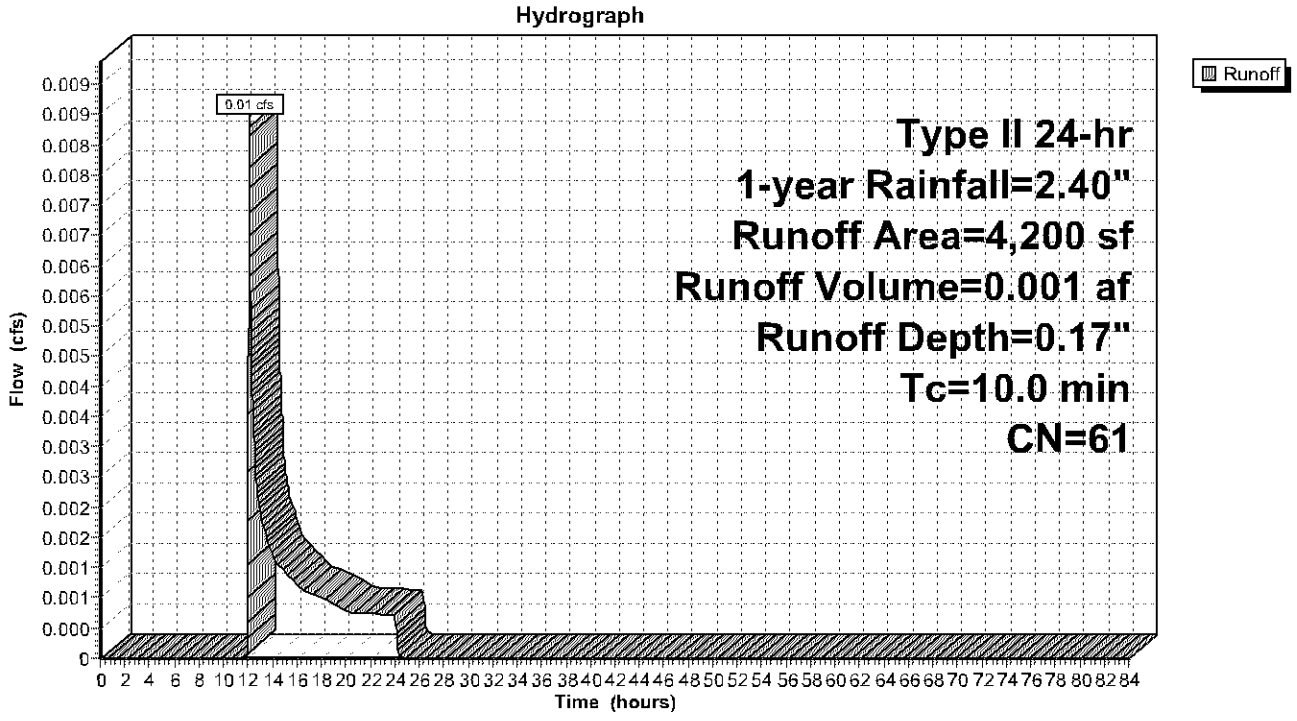
Runoff = 0.01 cfs @ 12.08 hrs, Volume= 0.001 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-year Rainfall=2.40"

Area (sf)	CN	Description
1,069	61	>75% Grass cover, Good, HSG B
1,380	61	>75% Grass cover, Good, HSG B
1,751	61	>75% Grass cover, Good, HSG B
4,200	61	Weighted Average
4,200		100.00% Pervious Area

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

Subcatchment 14S: Proposed Runoff



Summary for Pond 1P: NW Basin

Inflow Area = 0.641 ac, 73.03% Impervious, Inflow Depth = 1.30" for 1-year event
Inflow = 1.28 cfs @ 12.02 hrs, Volume= 0.069 af
Outflow = 0.10 cfs @ 12.76 hrs, Volume= 0.069 af, Atten= 92%, Lag= 44.6 min
Discarded = 0.01 cfs @ 12.76 hrs, Volume= 0.047 af
Primary = 0.09 cfs @ 12.76 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 834.01' @ 12.76 hrs Surf.Area= 1,357 sf Storage= 1,643 cf

Plug-Flow detention time= 926.5 min calculated for 0.069 af (100% of inflow)
Center-of-Mass det. time= 926.4 min (1,754.5 - 828.0)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	4,031 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

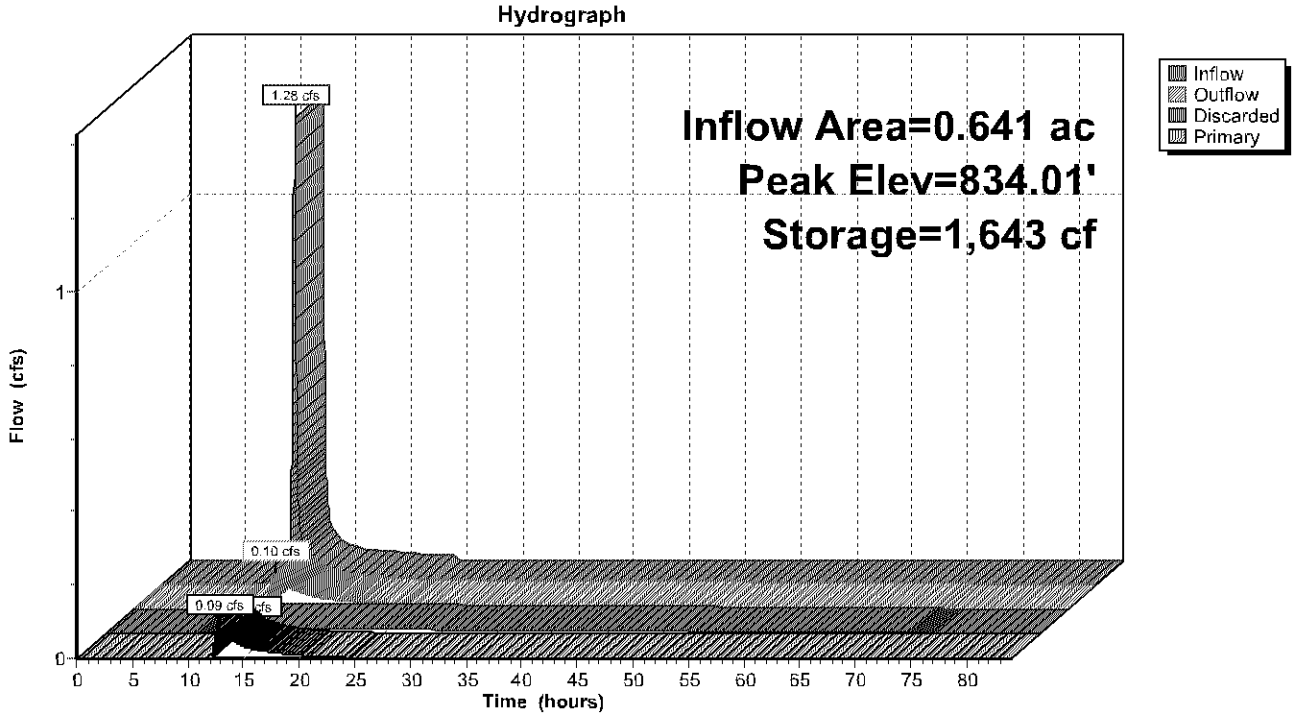
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	321	0	0
833.00	801	561	561
834.00	1,337	1,069	1,630
835.00	3,465	2,401	4,031

Device	Routing	Invert	Outlet Devices
#1	Primary	830.95'	**12.0" Round Culvert** L= 35.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 830.95' / 830.38' S= 0.0163 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**10.0" Round Culvert** L= 13.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.80'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 12.76 hrs HW=834.01' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.09 cfs @ 12.76 hrs HW=834.01' (Free Discharge)
└**1=Culvert** (Passes 0.09 cfs of 6.05 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 0.09 cfs @ 1.19 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: NW Basin



Summary for Pond 2P: SW Basin

Inflow Area = 0.700 ac, 75.89% Impervious, Inflow Depth = 1.37" for 1-year event
Inflow = 1.47 cfs @ 12.02 hrs, Volume= 0.080 af
Outflow = 0.02 cfs @ 19.40 hrs, Volume= 0.080 af, Atten= 99%, Lag= 442.9 min
Discarded = 0.02 cfs @ 19.40 hrs, Volume= 0.080 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 833.67' @ 19.40 hrs Surf.Area= 2,070 sf Storage= 2,503 cf

Plug-Flow detention time= 1,325.5 min calculated for 0.080 af (100% of inflow)
Center-of-Mass det. time= 1,325.5 min (2,149.2 - 823.7)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	9,206 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

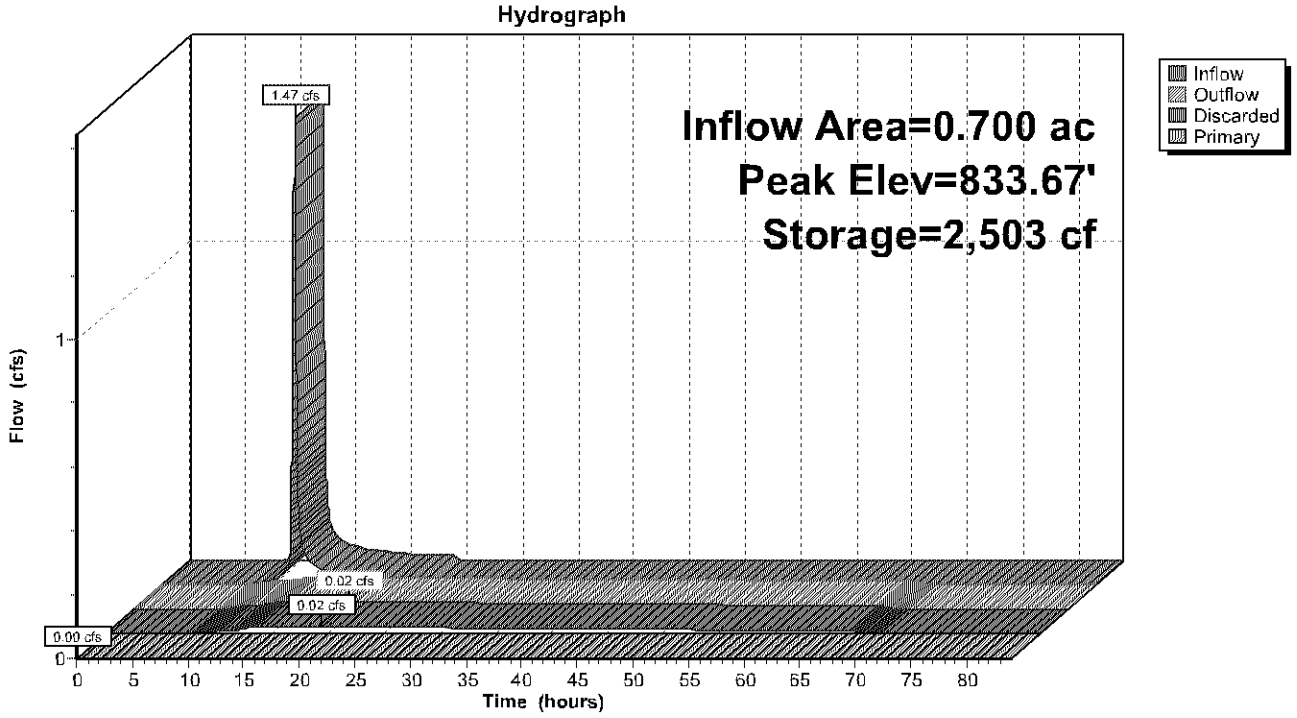
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	1,025	0	0
833.00	1,548	1,287	1,287
834.00	2,325	1,937	3,223
835.00	9,641	5,983	9,206

Device	Routing	Invert	Outlet Devices
#1	Primary	833.00'	**12.0" Round Culvert** L= 250.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.00' / 830.95' S= 0.0082 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**10.0" Round Culvert** L= 6.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.90'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 19.40 hrs HW=833.67' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=832.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  ├**2=Culvert** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: SW Basin



Summary for Pond 3P: SE Basin

Inflow Area = 0.619 ac, 84.50% Impervious, Inflow Depth = 1.60" for 1-year event
Inflow = 1.50 cfs @ 12.01 hrs, Volume= 0.083 af
Outflow = 0.05 cfs @ 14.48 hrs, Volume= 0.083 af, Atten= 97%, Lag= 148.0 min
Discarded = 0.02 cfs @ 14.48 hrs, Volume= 0.072 af
Primary = 0.03 cfs @ 14.48 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 833.93' @ 14.48 hrs Surf.Area= 1,827 sf Storage= 2,371 cf

Plug-Flow detention time= 1,231.5 min calculated for 0.083 af (100% of inflow)
Center-of-Mass det. time= 1,231.8 min (2,040.9 - 809.2)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	7,678 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

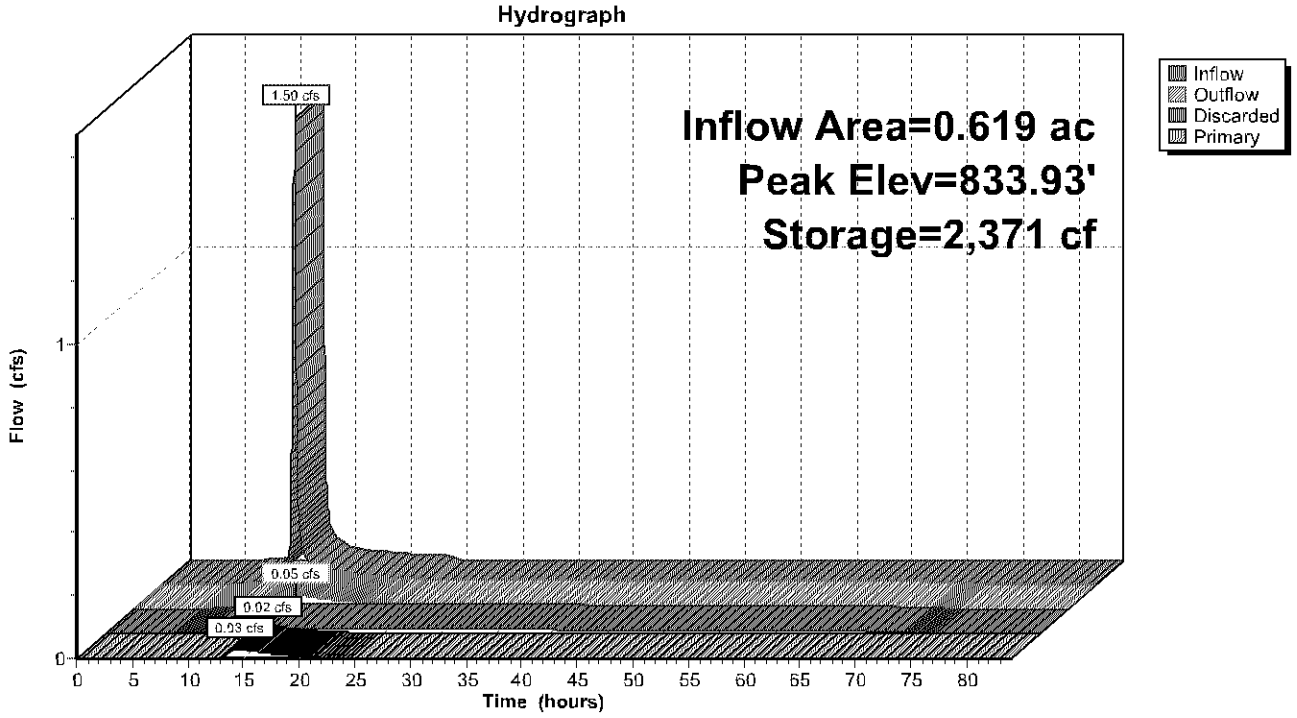
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	733	0	0
833.00	1,198	966	966
834.00	1,875	1,537	2,502
835.00	8,476	5,176	7,678

Device	Routing	Invert	Outlet Devices
#1	Primary	831.50'	**12.0" Round Culvert** L= 232.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 831.50' / 828.79' S= 0.0117 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**12.0" Round Culvert** L= 14.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.90'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 14.48 hrs HW=833.93' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.03 cfs @ 14.48 hrs HW=833.93' (Free Discharge)
└**1=Culvert** (Passes 0.03 cfs of 4.33 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 0.03 cfs @ 0.69 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: SE Basin



Summary for Pond 4P: NE Basin

Inflow Area = 0.404 ac, 85.37% Impervious, Inflow Depth = 1.69" for 1-year event
Inflow = 1.02 cfs @ 12.01 hrs, Volume= 0.057 af
Outflow = 0.33 cfs @ 12.18 hrs, Volume= 0.057 af, Atten= 67%, Lag= 10.0 min
Discarded = 0.01 cfs @ 12.18 hrs, Volume= 0.029 af
Primary = 0.32 cfs @ 12.18 hrs, Volume= 0.028 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 834.18' @ 12.18 hrs Surf.Area= 1,277 sf Storage= 1,169 cf

Plug-Flow detention time= 618.1 min calculated for 0.057 af (100% of inflow)
Center-of-Mass det. time= 618.0 min (1,421.7 - 803.6)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	2,869 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

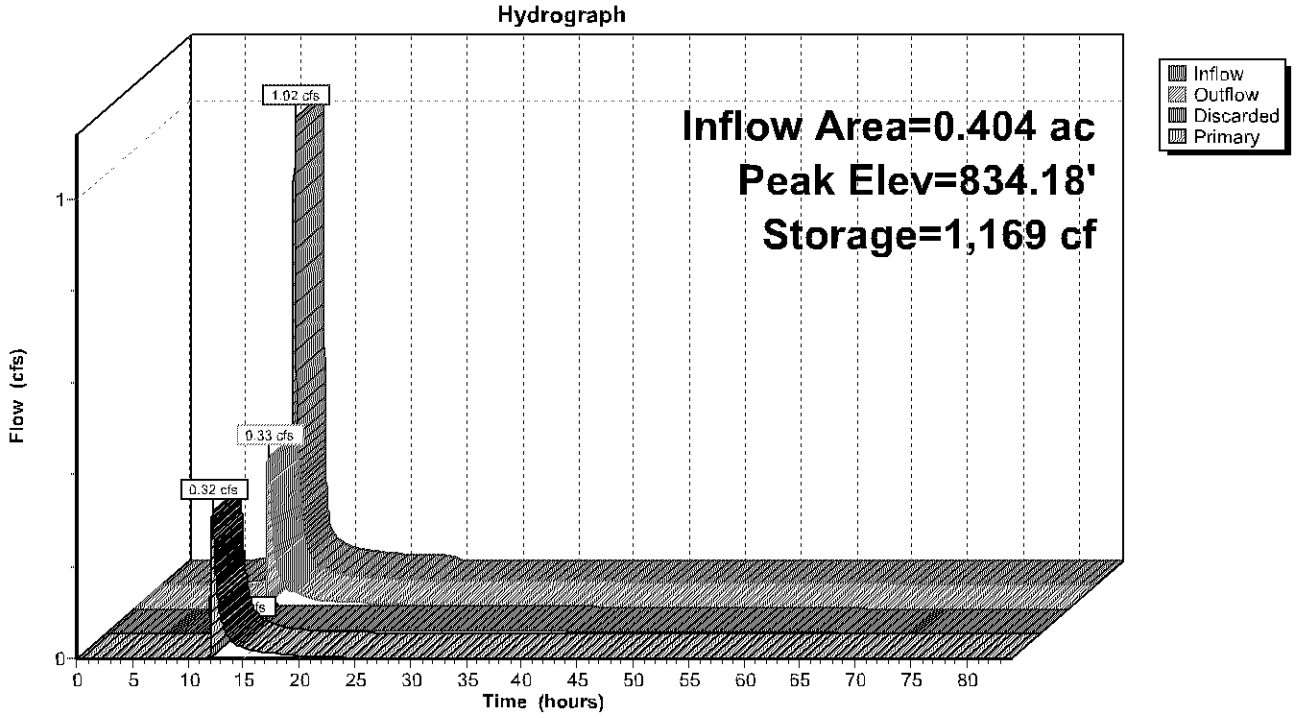
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	81	0	0
833.00	468	275	275
834.00	920	694	969
835.00	2,880	1,900	2,869

Device	Routing	Invert	Outlet Devices
#1	Primary	827.35'	**12.0" Round Culvert** L= 85.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 827.35' / 826.36' S= 0.0116 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**10.0" Round Culvert** L= 5.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.90'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 12.18 hrs HW=834.18' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.32 cfs @ 12.18 hrs HW=834.18' (Free Discharge)
└**1=Culvert** (Passes 0.32 cfs of 8.06 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 0.32 cfs @ 1.92 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 4P: NE Basin

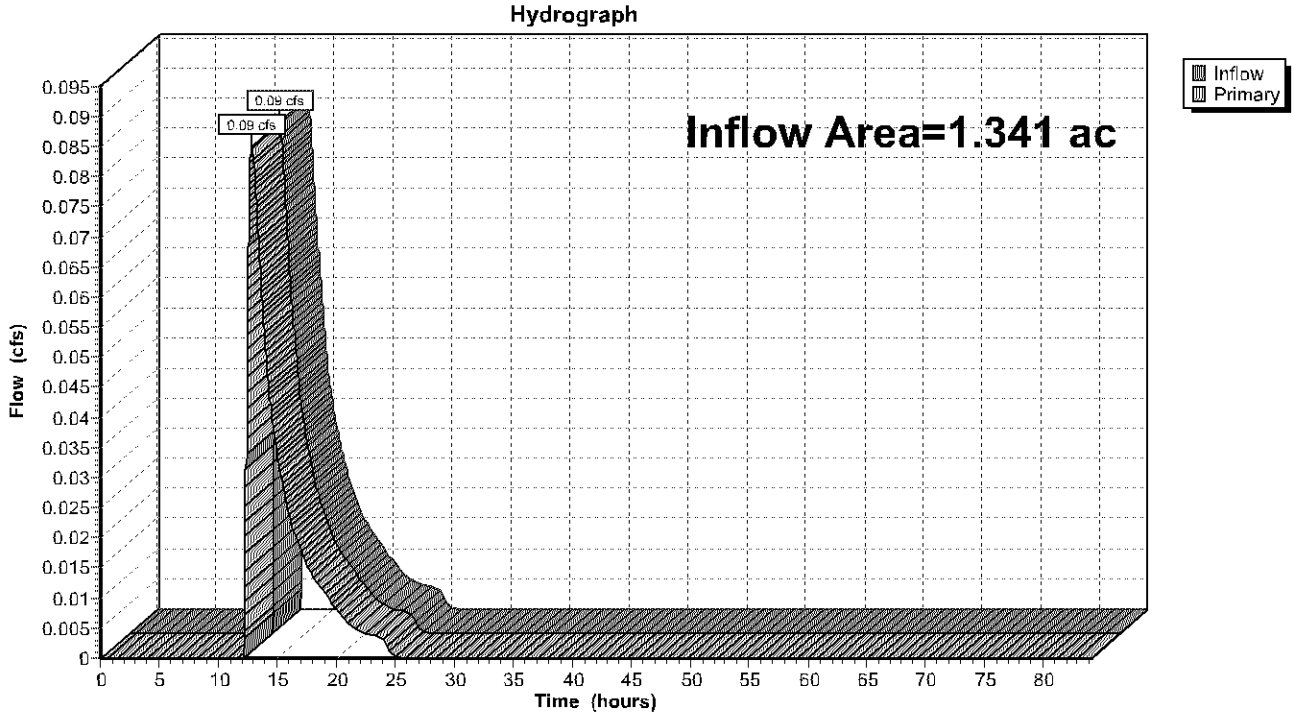


Summary for Link 9L: NW Connection

Inflow Area = 1.341 ac, 74.52% Impervious, Inflow Depth = 0.20" for 1-year event
Inflow = 0.09 cfs @ 12.76 hrs, Volume= 0.022 af
Primary = 0.09 cfs @ 12.76 hrs, Volume= 0.022 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs

Link 9L: NW Connection

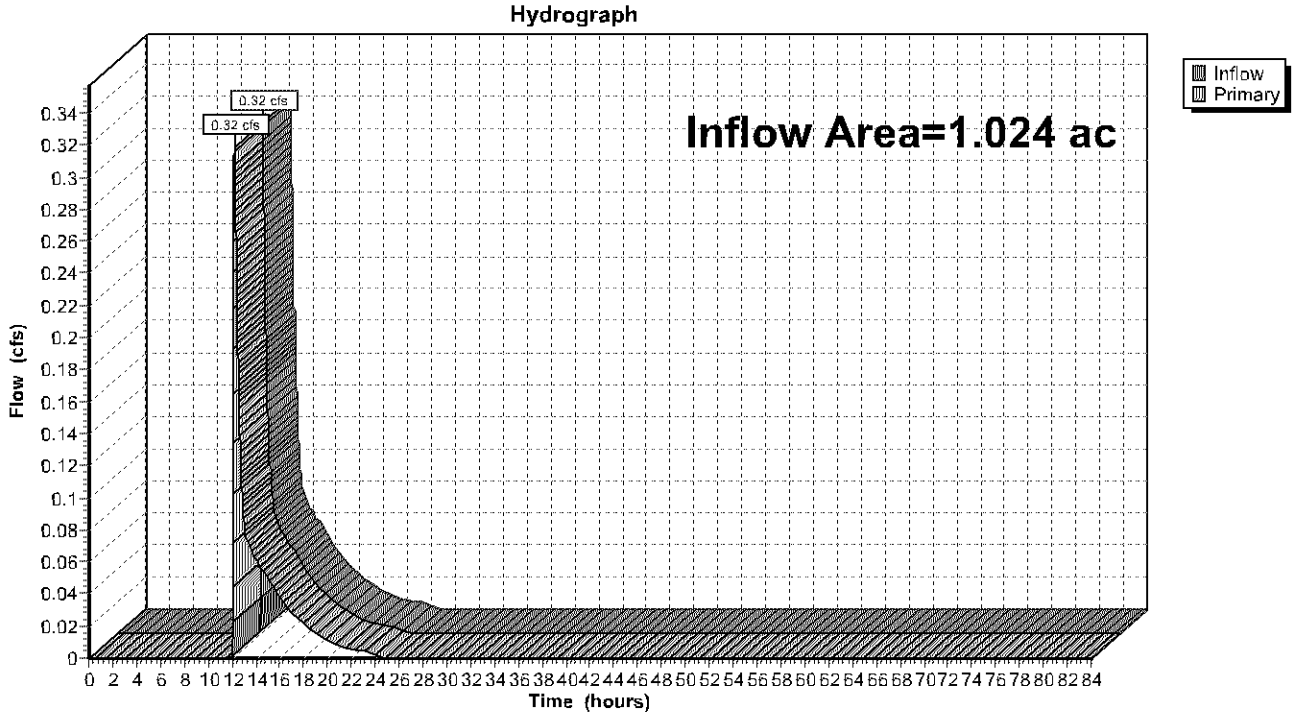


Summary for Link 10L: NE Connection

Inflow Area = 1.024 ac, 84.84% Impervious, Inflow Depth = 0.45" for 1-year event
Inflow = 0.32 cfs @ 12.18 hrs, Volume= 0.038 af
Primary = 0.32 cfs @ 12.18 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs

Link 10L: NE Connection



Time span=0.00-84.00 hrs, dt=0.01 hrs, 8401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment5S: sw Runoff Area=30,480 sf 75.89% Impervious Runoff Depth=1.76"
Tc=10.0 min CN=89 Runoff=1.88 cfs 0.103 af

Subcatchment6S: nw Runoff Area=27,914 sf 73.03% Impervious Runoff Depth=1.69"
Tc=10.0 min CN=88 Runoff=1.65 cfs 0.090 af

Subcatchment7S: ne Runoff Area=17,619 sf 85.37% Impervious Runoff Depth=2.11"
Tc=10.0 min CN=93 Runoff=1.26 cfs 0.071 af

Subcatchment8S: se Runoff Area=26,967 sf 84.50% Impervious Runoff Depth=2.02"
Tc=10.0 min CN=92 Runoff=1.87 cfs 0.104 af

Subcatchment14S: Proposed Runoff Runoff Area=4,200 sf 0.00% Impervious Runoff Depth=0.31"
Tc=10.0 min CN=61 Runoff=0.03 cfs 0.002 af

Pond 1P: NW Basin Peak Elev=834.18' Storage=1,899 cf Inflow=1.65 cfs 0.090 af
Discarded=0.02 cfs 0.048 af Primary=0.29 cfs 0.042 af Outflow=0.31 cfs 0.090 af

Pond 2P: SW Basin Peak Elev=833.91' Storage=3,028 cf Inflow=1.88 cfs 0.103 af
Discarded=0.02 cfs 0.092 af Primary=0.03 cfs 0.011 af Outflow=0.05 cfs 0.103 af

Pond 3P: SE Basin Peak Elev=834.05' Storage=2,602 cf Inflow=1.87 cfs 0.104 af
Discarded=0.02 cfs 0.074 af Primary=0.12 cfs 0.030 af Outflow=0.15 cfs 0.104 af

Pond 4P: NE Basin Peak Elev=834.32' Storage=1,357 cf Inflow=1.26 cfs 0.071 af
Discarded=0.02 cfs 0.030 af Primary=0.56 cfs 0.041 af Outflow=0.58 cfs 0.071 af

Link 9L: NW Connection Inflow=0.29 cfs 0.053 af
Primary=0.29 cfs 0.053 af

Link 10L: NE Connection Inflow=0.57 cfs 0.071 af
Primary=0.57 cfs 0.071 af

Total Runoff Area = 2.461 ac Runoff Volume = 0.371 af Average Runoff Depth = 1.81"
24.11% Pervious = 0.593 ac 75.89% Impervious = 1.867 ac

Summary for Subcatchment 5S: sw

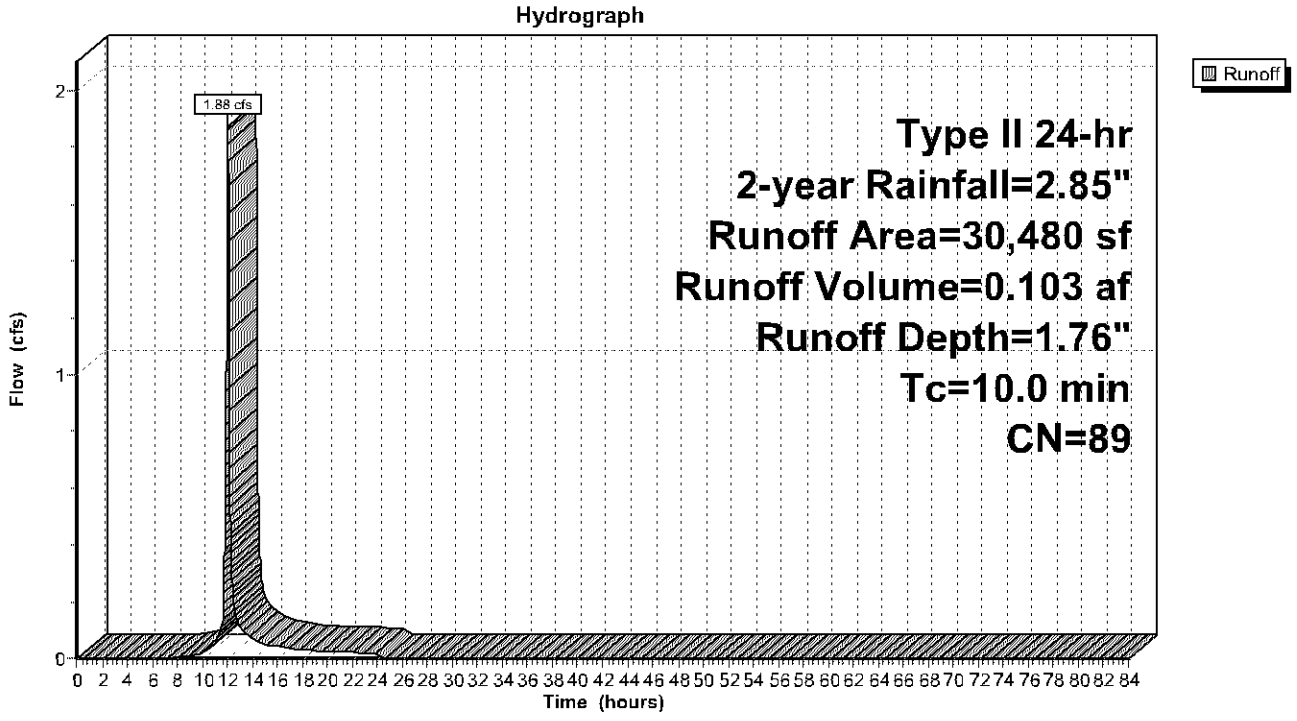
Runoff = 1.88 cfs @ 12.01 hrs, Volume= 0.103 af, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-year Rainfall=2.85"

Area (sf)	CN	Description
23,130	98	Paved parking, HSG B
7,350	61	>75% Grass cover, Good, HSG B
30,480	89	Weighted Average
7,350		24.11% Pervious Area
23,130		75.89% Impervious Area

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

Subcatchment 5S: sw



Summary for Subcatchment 6S: nw

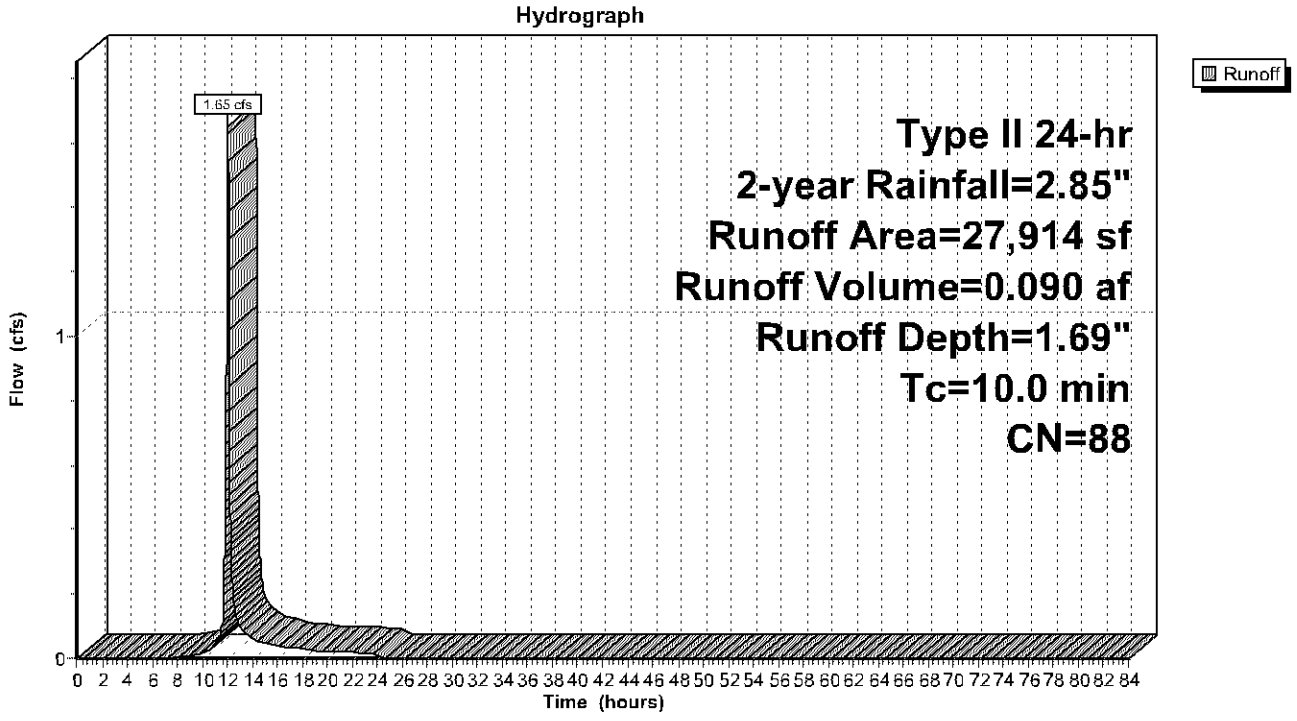
Runoff = 1.65 cfs @ 12.02 hrs, Volume= 0.090 af, Depth= 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-year Rainfall=2.85"

Area (sf)	CN	Description
20,385	98	Paved parking, HSG B
7,529	61	>75% Grass cover, Good, HSG B
27,914	88	Weighted Average
7,529		26.97% Pervious Area
20,385		73.03% Impervious Area

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

Subcatchment 6S: nw



Summary for Subcatchment 7S: ne

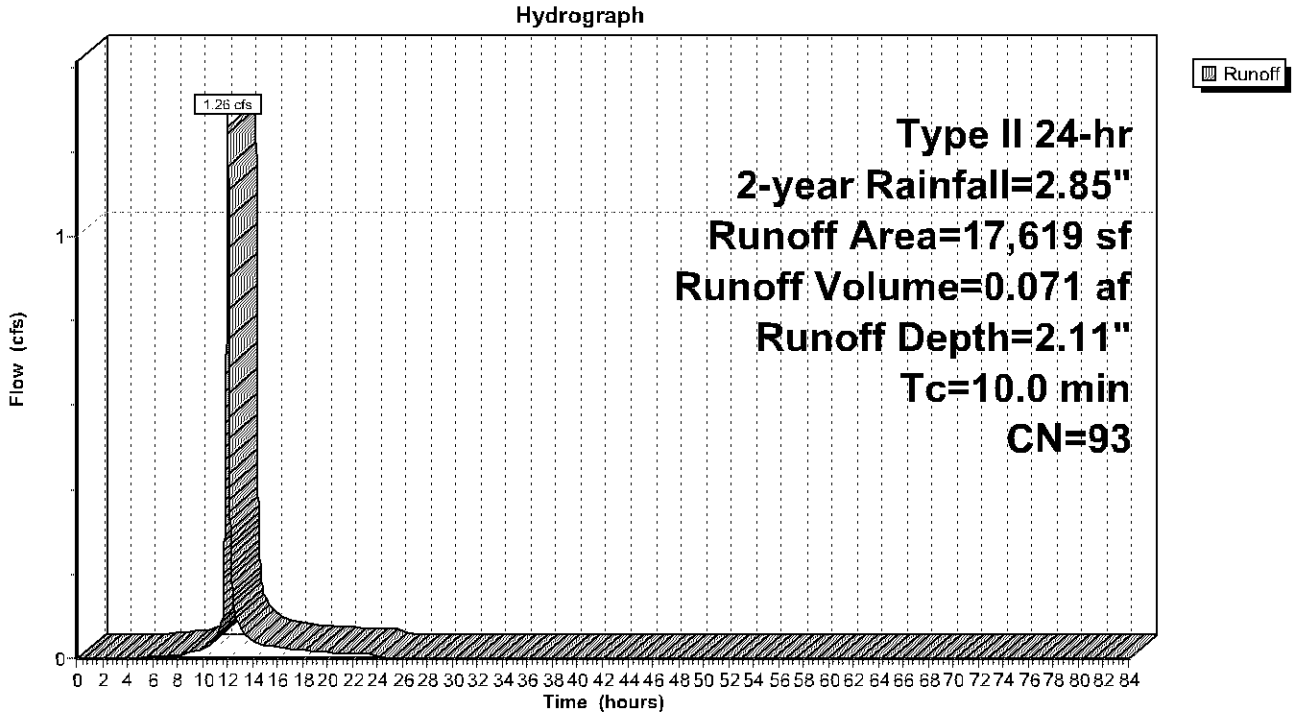
Runoff = 1.26 cfs @ 12.01 hrs, Volume= 0.071 af, Depth= 2.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-year Rainfall=2.85"

Area (sf)	CN	Description
15,041	98	Paved parking, HSG B
2,578	61	>75% Grass cover, Good, HSG B
17,619	93	Weighted Average
2,578		14.63% Pervious Area
15,041		85.37% Impervious Area

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

Subcatchment 7S: ne



Summary for Subcatchment 8S: se

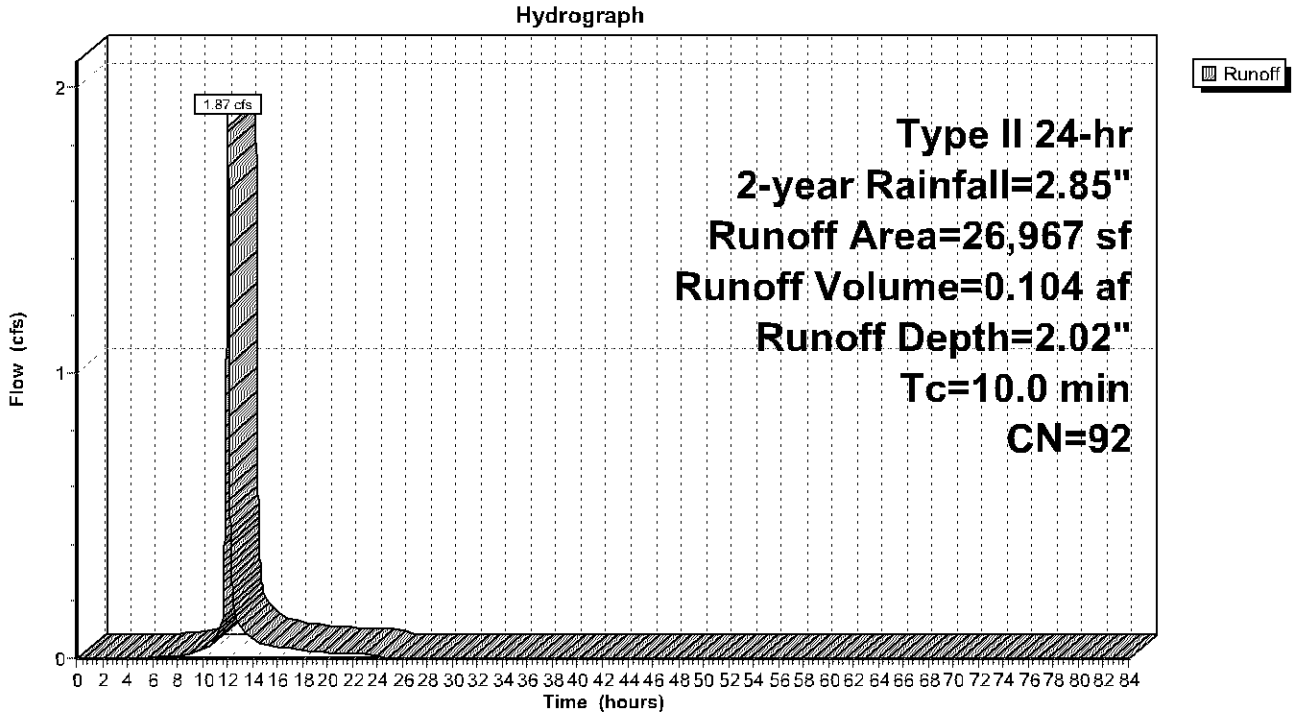
Runoff = 1.87 cfs @ 12.01 hrs, Volume= 0.104 af, Depth= 2.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-year Rainfall=2.85"

Area (sf)	CN	Description
22,786	98	Paved parking, HSG B
4,181	61	>75% Grass cover, Good, HSG B
26,967	92	Weighted Average
4,181		15.50% Pervious Area
22,786		84.50% Impervious Area

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

Subcatchment 8S: se



Summary for Subcatchment 14S: Proposed Runoff

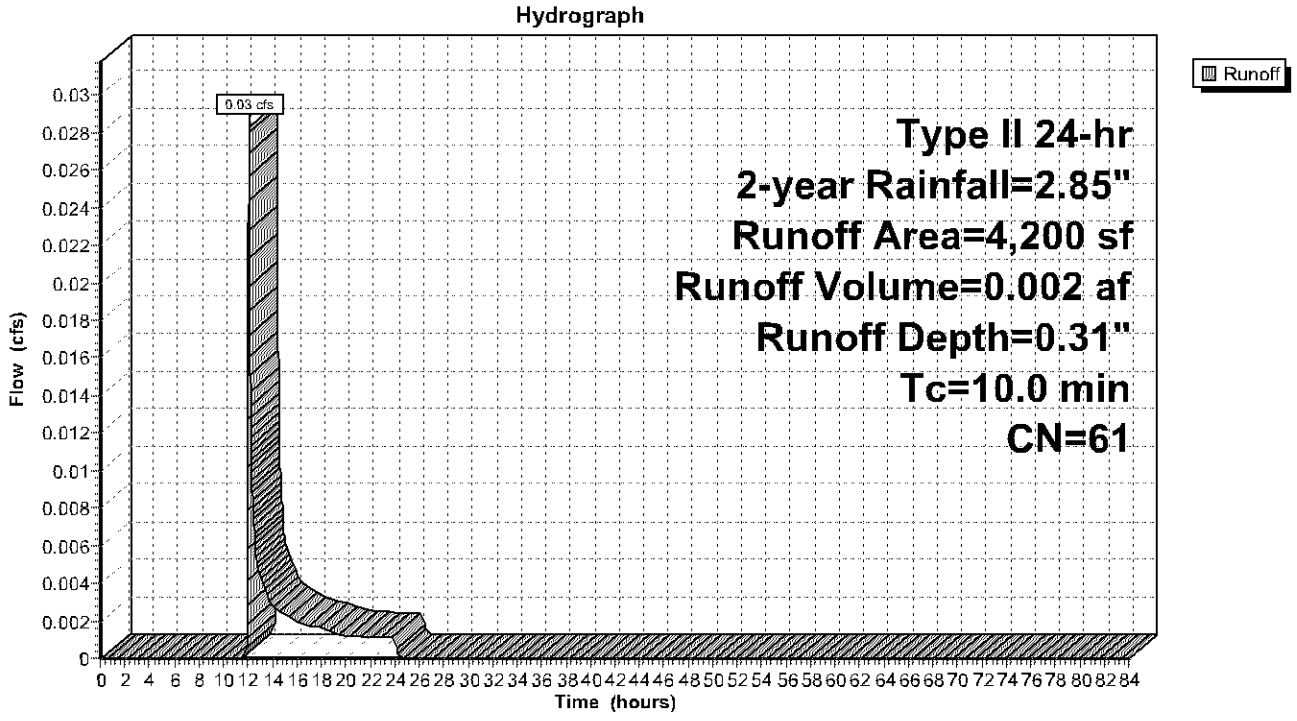
Runoff = 0.03 cfs @ 12.06 hrs, Volume= 0.002 af, Depth= 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-year Rainfall=2.85"

Area (sf)	CN	Description
1,069	61	>75% Grass cover, Good, HSG B
1,380	61	>75% Grass cover, Good, HSG B
1,751	61	>75% Grass cover, Good, HSG B
4,200	61	Weighted Average
4,200		100.00% Pervious Area

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

Subcatchment 14S: Proposed Runoff



Summary for Pond 1P: NW Basin

Inflow Area = 0.641 ac, 73.03% Impervious, Inflow Depth = 1.69" for 2-year event
Inflow = 1.65 cfs @ 12.02 hrs, Volume= 0.090 af
Outflow = 0.31 cfs @ 12.29 hrs, Volume= 0.090 af, Atten= 82%, Lag= 16.4 min
Discarded = 0.02 cfs @ 12.29 hrs, Volume= 0.048 af
Primary = 0.29 cfs @ 12.29 hrs, Volume= 0.042 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 834.18' @ 12.29 hrs Surf.Area= 1,713 sf Storage= 1,899 cf

Plug-Flow detention time= 730.6 min calculated for 0.090 af (100% of inflow)
Center-of-Mass det. time= 730.9 min (1,551.4 - 820.5)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	4,031 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

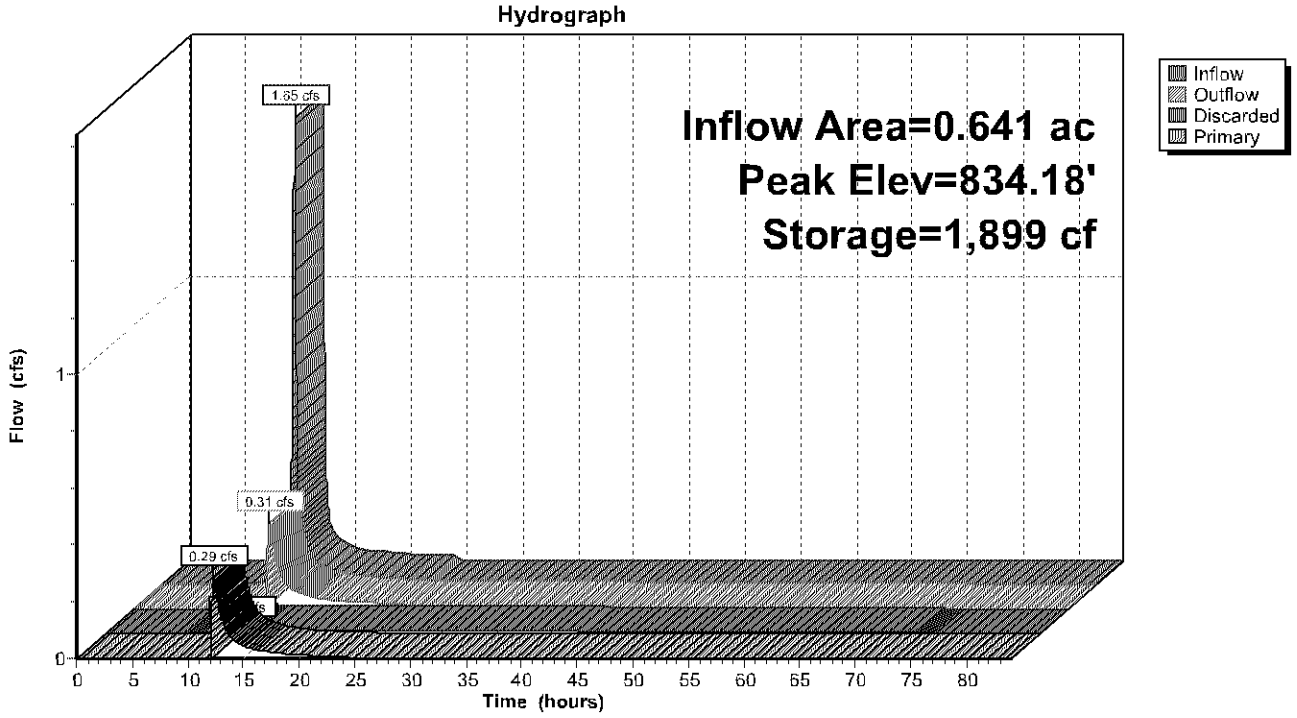
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	321	0	0
833.00	801	561	561
834.00	1,337	1,069	1,630
835.00	3,465	2,401	4,031

Device	Routing	Invert	Outlet Devices
#1	Primary	830.95'	**12.0" Round Culvert** L= 35.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 830.95' / 830.38' S= 0.0163 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**10.0" Round Culvert** L= 13.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.80'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 12.29 hrs HW=834.18' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.29 cfs @ 12.29 hrs HW=834.18' (Free Discharge)
└**1=Culvert** (Passes 0.29 cfs of 6.24 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 0.29 cfs @ 1.76 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: NW Basin



Summary for Pond 2P: SW Basin

Inflow Area = 0.700 ac, 75.89% Impervious, Inflow Depth = 1.76" for 2-year event
Inflow = 1.88 cfs @ 12.01 hrs, Volume= 0.103 af
Outflow = 0.05 cfs @ 15.34 hrs, Volume= 0.103 af, Atten= 97%, Lag= 199.4 min
Discarded = 0.02 cfs @ 15.34 hrs, Volume= 0.092 af
Primary = 0.03 cfs @ 15.34 hrs, Volume= 0.011 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 833.91' @ 15.34 hrs Surf.Area= 2,259 sf Storage= 3,028 cf

Plug-Flow detention time= 1,289.7 min calculated for 0.103 af (100% of inflow)
Center-of-Mass det. time= 1,289.6 min (2,106.0 - 816.4)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	9,206 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

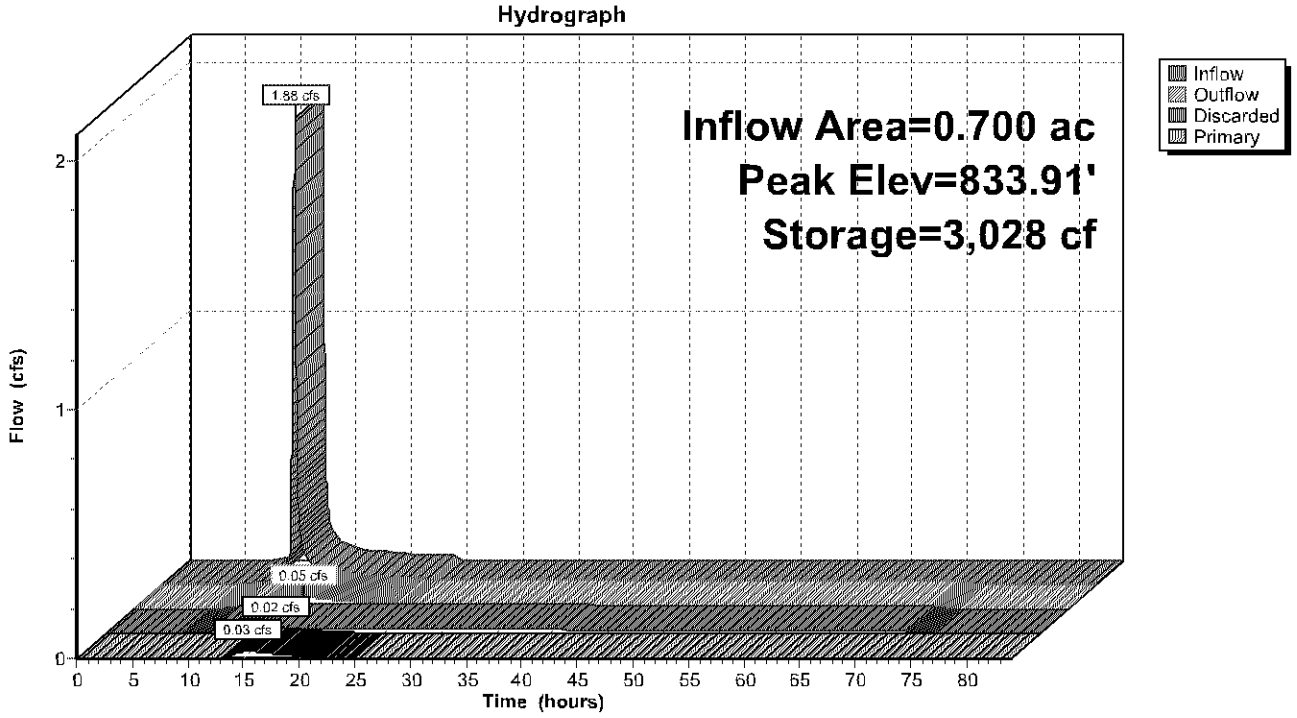
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	1,025	0	0
833.00	1,548	1,287	1,287
834.00	2,325	1,937	3,223
835.00	9,641	5,983	9,206

Device	Routing	Invert	Outlet Devices
#1	Primary	833.00'	**12.0" Round Culvert** L= 250.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.00' / 830.95' S= 0.0082 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**10.0" Round Culvert** L= 6.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.90'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 15.34 hrs HW=833.91' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.03 cfs @ 15.34 hrs HW=833.91' (Free Discharge)
└**1=Culvert** (Passes 0.03 cfs of 2.45 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 0.03 cfs @ 0.89 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: SW Basin



Summary for Pond 3P: SE Basin

Inflow Area = 0.619 ac, 84.50% Impervious, Inflow Depth = 2.02" for 2-year event
Inflow = 1.87 cfs @ 12.01 hrs, Volume= 0.104 af
Outflow = 0.15 cfs @ 12.67 hrs, Volume= 0.104 af, Atten= 92%, Lag= 39.2 min
Discarded = 0.02 cfs @ 12.67 hrs, Volume= 0.074 af
Primary = 0.12 cfs @ 12.67 hrs, Volume= 0.030 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 834.05' @ 12.67 hrs Surf.Area= 2,199 sf Storage= 2,602 cf

Plug-Flow detention time= 1,009.6 min calculated for 0.104 af (100% of inflow)
Center-of-Mass det. time= 1,009.6 min (1,812.2 - 802.6)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	7,678 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

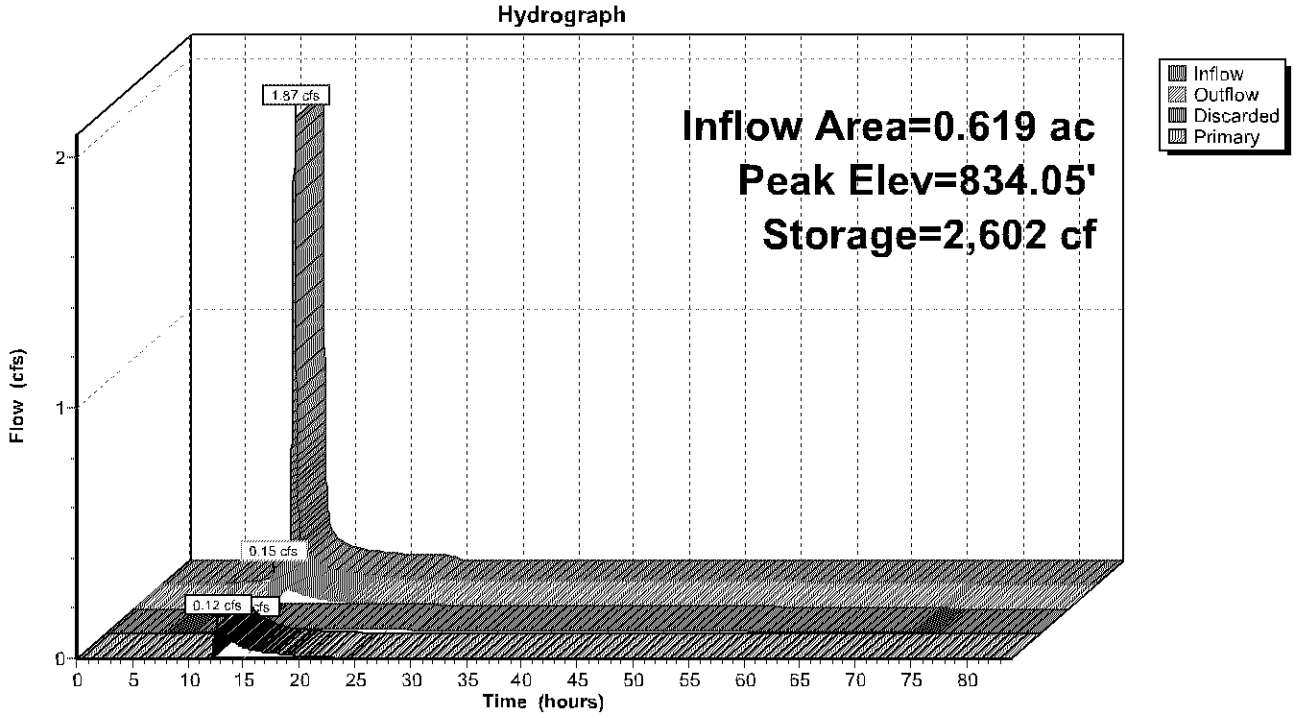
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	733	0	0
833.00	1,198	966	966
834.00	1,875	1,537	2,502
835.00	8,476	5,176	7,678

Device	Routing	Invert	Outlet Devices
#1	Primary	831.50'	**12.0" Round Culvert** L= 232.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 831.50' / 828.79' S= 0.0117 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**12.0" Round Culvert** L= 14.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.90'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 12.67 hrs HW=834.05' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.12 cfs @ 12.67 hrs HW=834.05' (Free Discharge)
└**1=Culvert** (Passes 0.12 cfs of 4.39 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 0.12 cfs @ 1.21 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: SE Basin



Summary for Pond 4P: NE Basin

Inflow Area = 0.404 ac, 85.37% Impervious, Inflow Depth = 2.11" for 2-year event
Inflow = 1.26 cfs @ 12.01 hrs, Volume= 0.071 af
Outflow = 0.58 cfs @ 12.14 hrs, Volume= 0.071 af, Atten= 54%, Lag= 7.7 min
Discarded = 0.02 cfs @ 12.14 hrs, Volume= 0.030 af
Primary = 0.56 cfs @ 12.14 hrs, Volume= 0.041 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 834.32' @ 12.14 hrs Surf.Area= 1,540 sf Storage= 1,357 cf

Plug-Flow detention time= 506.7 min calculated for 0.071 af (100% of inflow)
Center-of-Mass det. time= 506.6 min (1,303.9 - 797.3)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	2,869 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

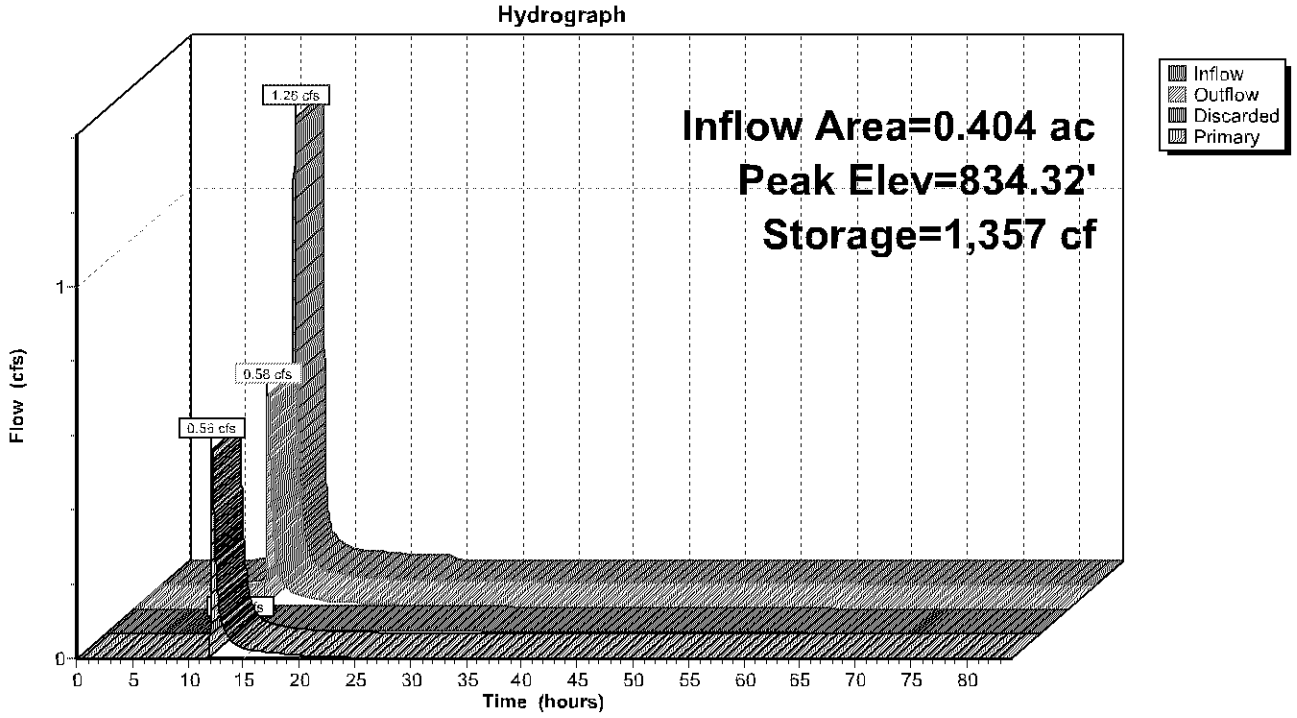
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	81	0	0
833.00	468	275	275
834.00	920	694	969
835.00	2,880	1,900	2,869

Device	Routing	Invert	Outlet Devices
#1	Primary	827.35'	**12.0" Round Culvert** L= 85.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 827.35' / 826.36' S= 0.0116 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**10.0" Round Culvert** L= 5.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.90'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 12.14 hrs HW=834.32' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.56 cfs @ 12.14 hrs HW=834.32' (Free Discharge)
└**1=Culvert** (Passes 0.56 cfs of 8.14 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 0.56 cfs @ 2.26 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 4P: NE Basin

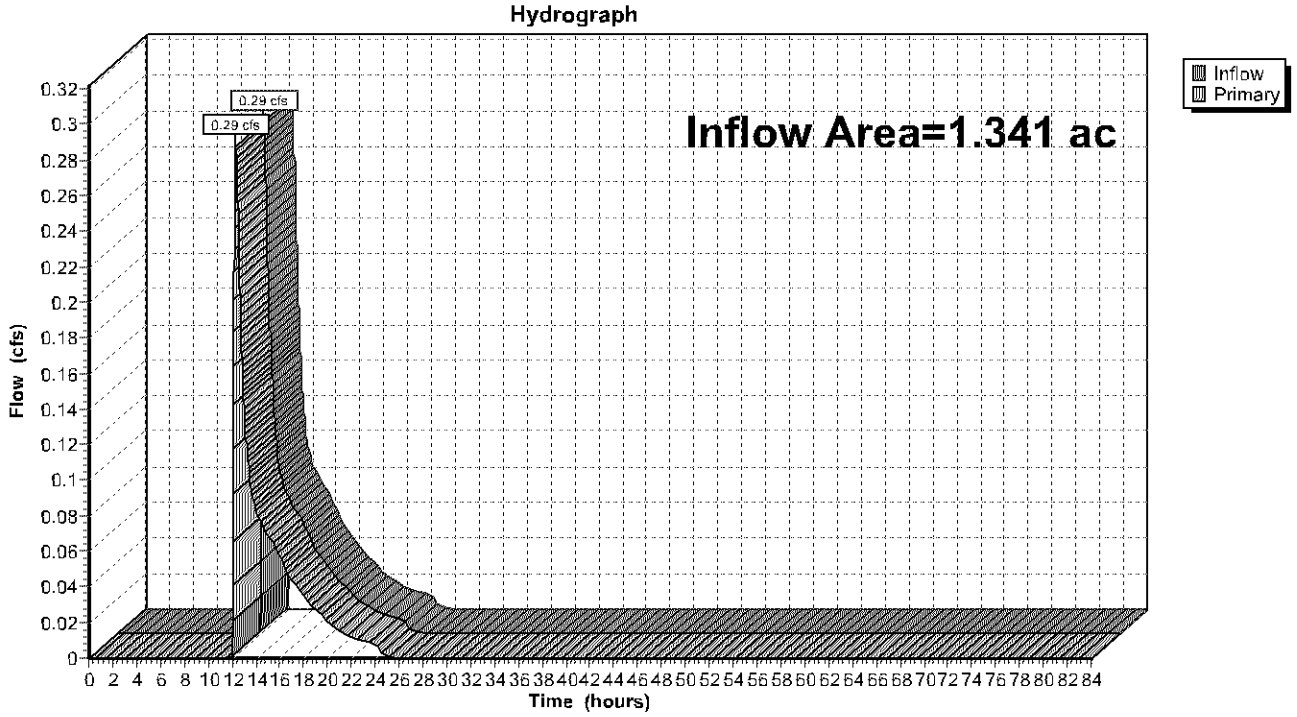


Summary for Link 9L: NW Connection

Inflow Area = 1.341 ac, 74.52% Impervious, Inflow Depth = 0.47" for 2-year event
Inflow = 0.29 cfs @ 12.29 hrs, Volume= 0.053 af
Primary = 0.29 cfs @ 12.29 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs

Link 9L: NW Connection

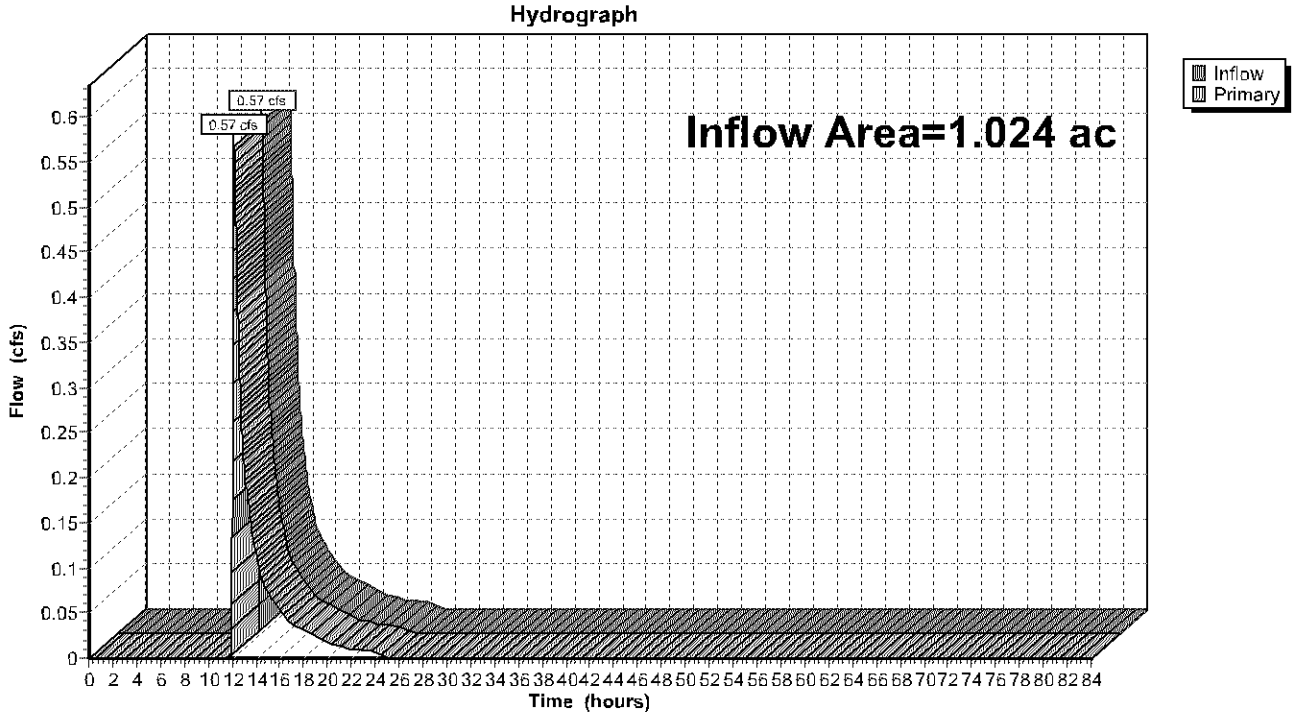


Summary for Link 10L: NE Connection

Inflow Area = 1.024 ac, 84.84% Impervious, Inflow Depth = 0.84" for 2-year event
Inflow = 0.57 cfs @ 12.16 hrs, Volume= 0.071 af
Primary = 0.57 cfs @ 12.16 hrs, Volume= 0.071 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs

Link 10L: NE Connection



Time span=0.00-84.00 hrs, dt=0.01 hrs, 8401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment5S: sw Runoff Area=30,480 sf 75.89% Impervious Runoff Depth=1.45"
Tc=10.0 min CN=89 Runoff=1.56 cfs 0.085 af

Subcatchment6S: nw Runoff Area=27,914 sf 73.03% Impervious Runoff Depth=1.38"
Tc=10.0 min CN=88 Runoff=1.36 cfs 0.074 af

Subcatchment7S: ne Runoff Area=17,619 sf 85.37% Impervious Runoff Depth=1.78"
Tc=10.0 min CN=93 Runoff=1.07 cfs 0.060 af

Subcatchment8S: se Runoff Area=26,967 sf 84.50% Impervious Runoff Depth=1.69"
Tc=10.0 min CN=92 Runoff=1.58 cfs 0.087 af

Subcatchment14S: Proposed Runoff Runoff Area=4,200 sf 0.00% Impervious Runoff Depth=0.20"
Tc=10.0 min CN=61 Runoff=0.01 cfs 0.002 af

Pond 1P: NW Basin Peak Elev=834.05' Storage=1,693 cf Inflow=1.36 cfs 0.074 af
Discarded=0.01 cfs 0.048 af Primary=0.12 cfs 0.026 af Outflow=0.13 cfs 0.074 af

Pond 2P: SW Basin Peak Elev=833.76' Storage=2,683 cf Inflow=1.56 cfs 0.085 af
Discarded=0.02 cfs 0.085 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.085 af

Pond 3P: SE Basin Peak Elev=833.96' Storage=2,421 cf Inflow=1.58 cfs 0.087 af
Discarded=0.02 cfs 0.072 af Primary=0.04 cfs 0.015 af Outflow=0.06 cfs 0.087 af

Pond 4P: NE Basin Peak Elev=834.21' Storage=1,211 cf Inflow=1.07 cfs 0.060 af
Discarded=0.01 cfs 0.029 af Primary=0.37 cfs 0.031 af Outflow=0.39 cfs 0.060 af

Link 9L: NW Connection Inflow=0.12 cfs 0.026 af
Primary=0.12 cfs 0.026 af

Link 10L: NE Connection Inflow=0.37 cfs 0.046 af
Primary=0.37 cfs 0.046 af

Total Runoff Area = 2.461 ac Runoff Volume = 0.307 af Average Runoff Depth = 1.50"
24.11% Pervious = 0.593 ac 75.89% Impervious = 1.867 ac

Summary for Subcatchment 5S: sw

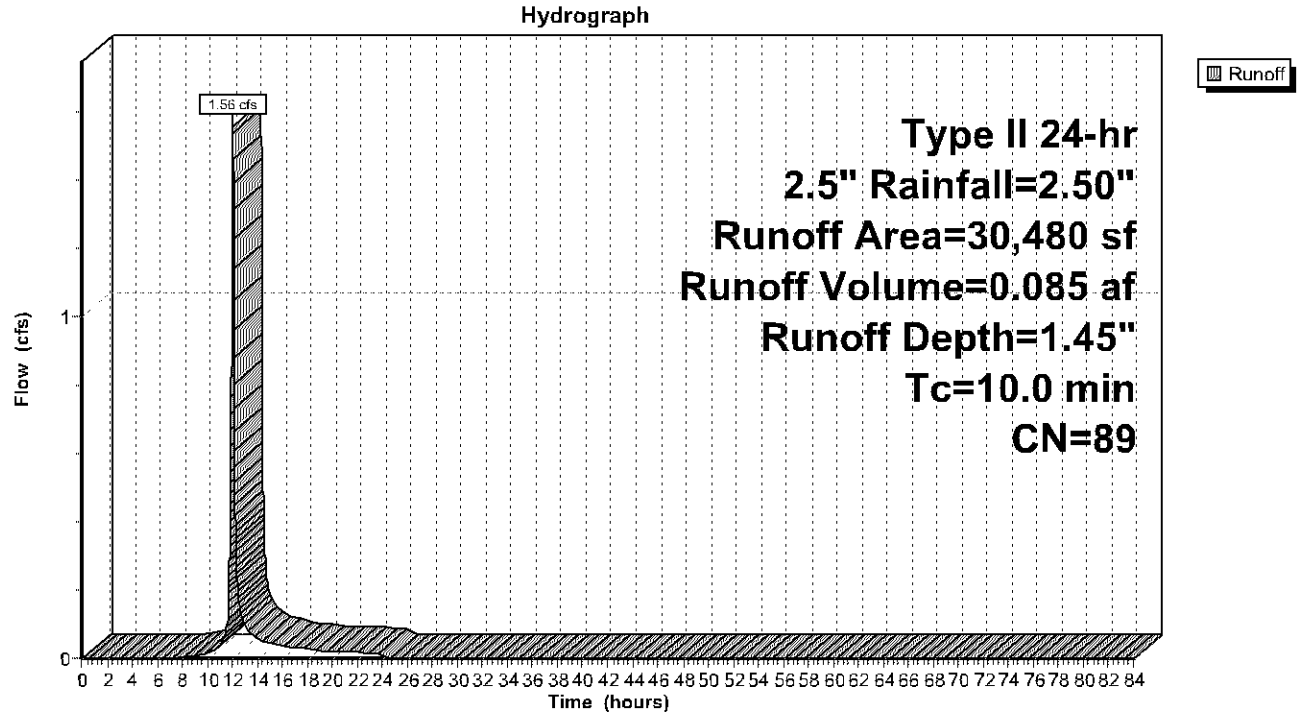
Runoff = 1.56 cfs @ 12.02 hrs, Volume= 0.085 af, Depth= 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 2.5" Rainfall=2.50"

Area (sf)	CN	Description
23,130	98	Paved parking, HSG B
7,350	61	>75% Grass cover, Good, HSG B
30,480	89	Weighted Average
7,350		24.11% Pervious Area
23,130		75.89% Impervious Area

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

Subcatchment 5S: sw



Summary for Subcatchment 6S: nw

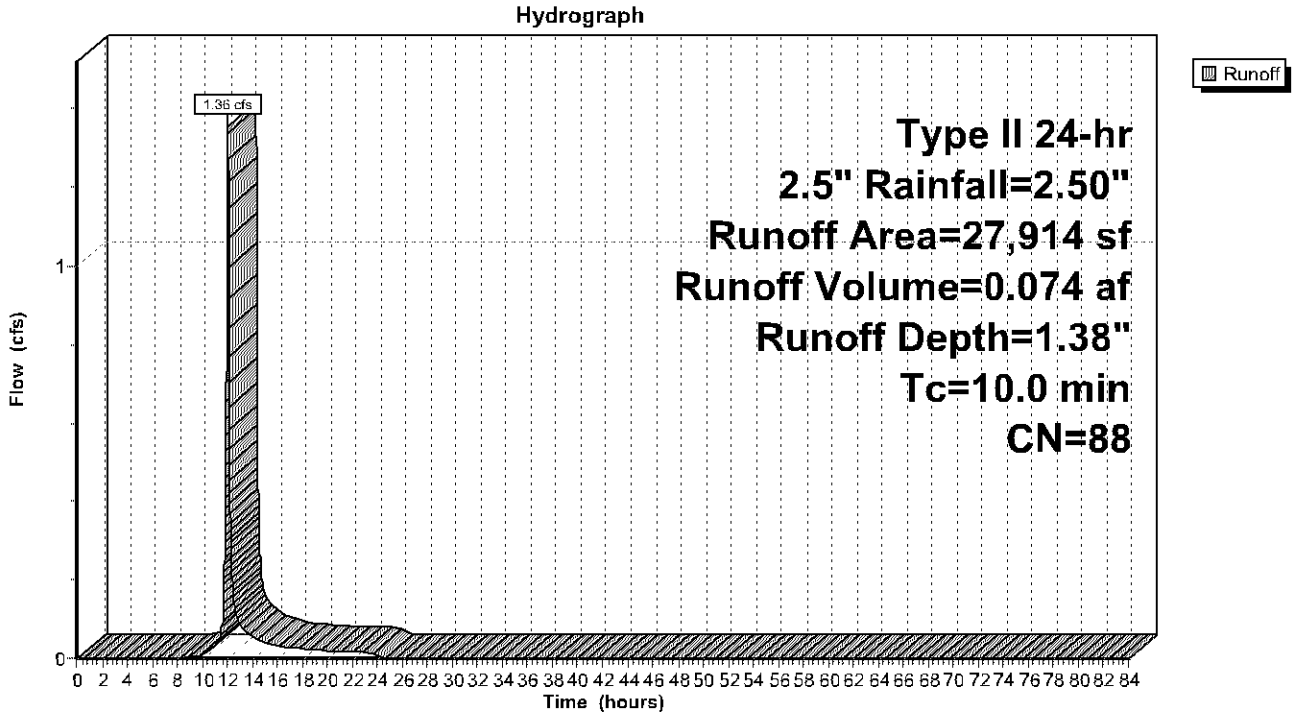
Runoff = 1.36 cfs @ 12.02 hrs, Volume= 0.074 af, Depth= 1.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 2.5" Rainfall=2.50"

Area (sf)	CN	Description
20,385	98	Paved parking, HSG B
7,529	61	>75% Grass cover, Good, HSG B
27,914	88	Weighted Average
7,529		26.97% Pervious Area
20,385		73.03% Impervious Area

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

Subcatchment 6S: nw



Summary for Subcatchment 7S: ne

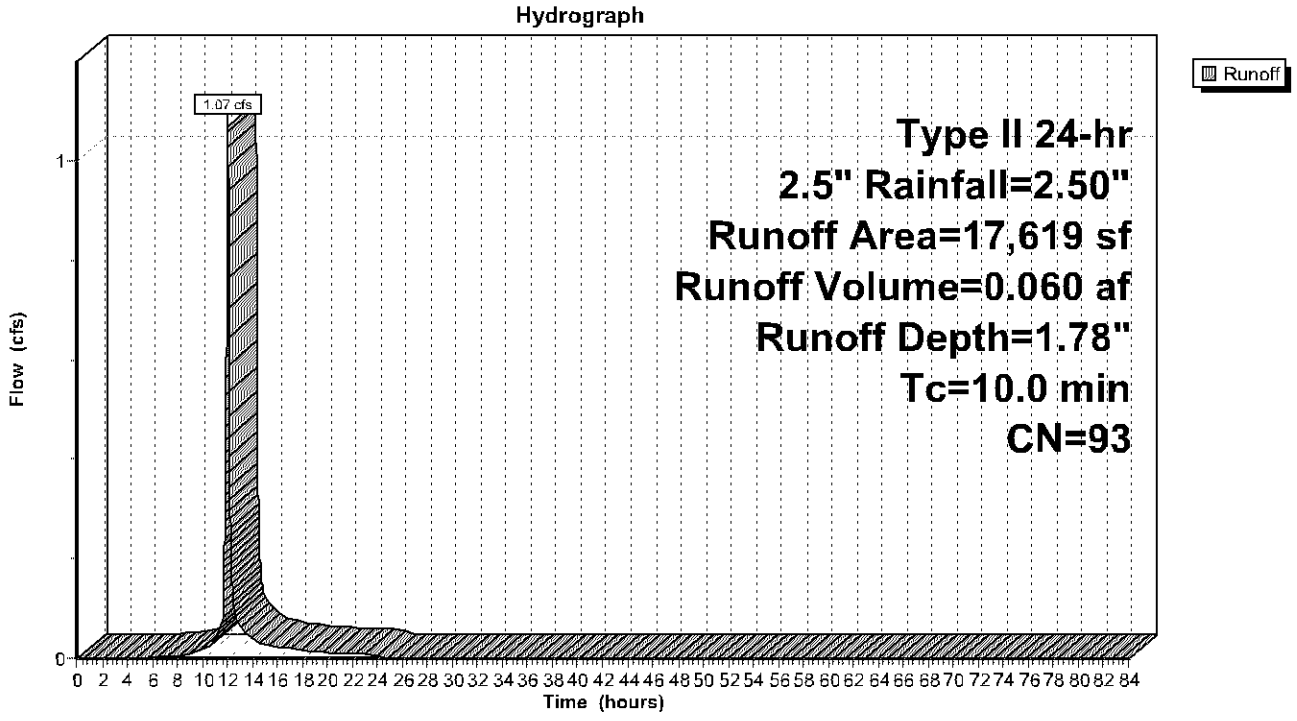
Runoff = 1.07 cfs @ 12.01 hrs, Volume= 0.060 af, Depth= 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 2.5" Rainfall=2.50"

Area (sf)	CN	Description
15,041	98	Paved parking, HSG B
2,578	61	>75% Grass cover, Good, HSG B
17,619	93	Weighted Average
2,578		14.63% Pervious Area
15,041		85.37% Impervious Area

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

Subcatchment 7S: ne



Summary for Subcatchment 8S: se

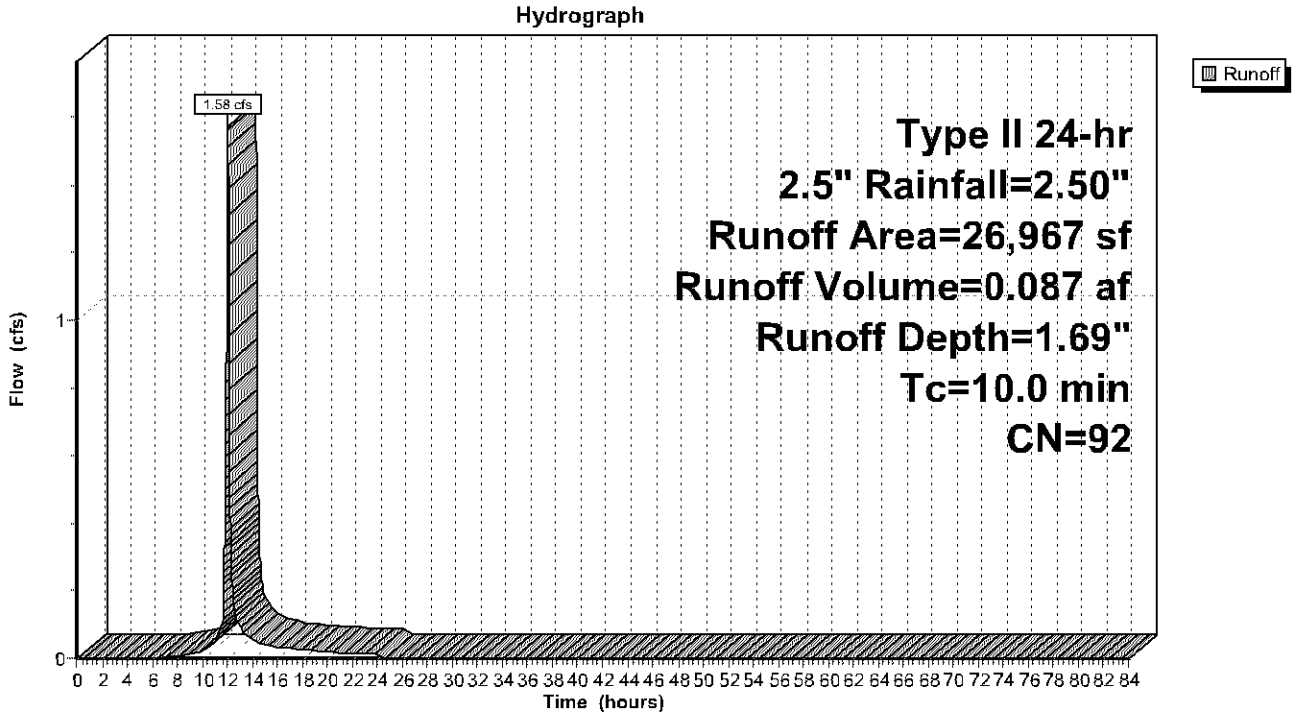
Runoff = 1.58 cfs @ 12.01 hrs, Volume= 0.087 af, Depth= 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 2.5" Rainfall=2.50"

Area (sf)	CN	Description
22,786	98	Paved parking, HSG B
4,181	61	>75% Grass cover, Good, HSG B
26,967	92	Weighted Average
4,181		15.50% Pervious Area
22,786		84.50% Impervious Area

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

Subcatchment 8S: se



Summary for Subcatchment 14S: Proposed Runoff

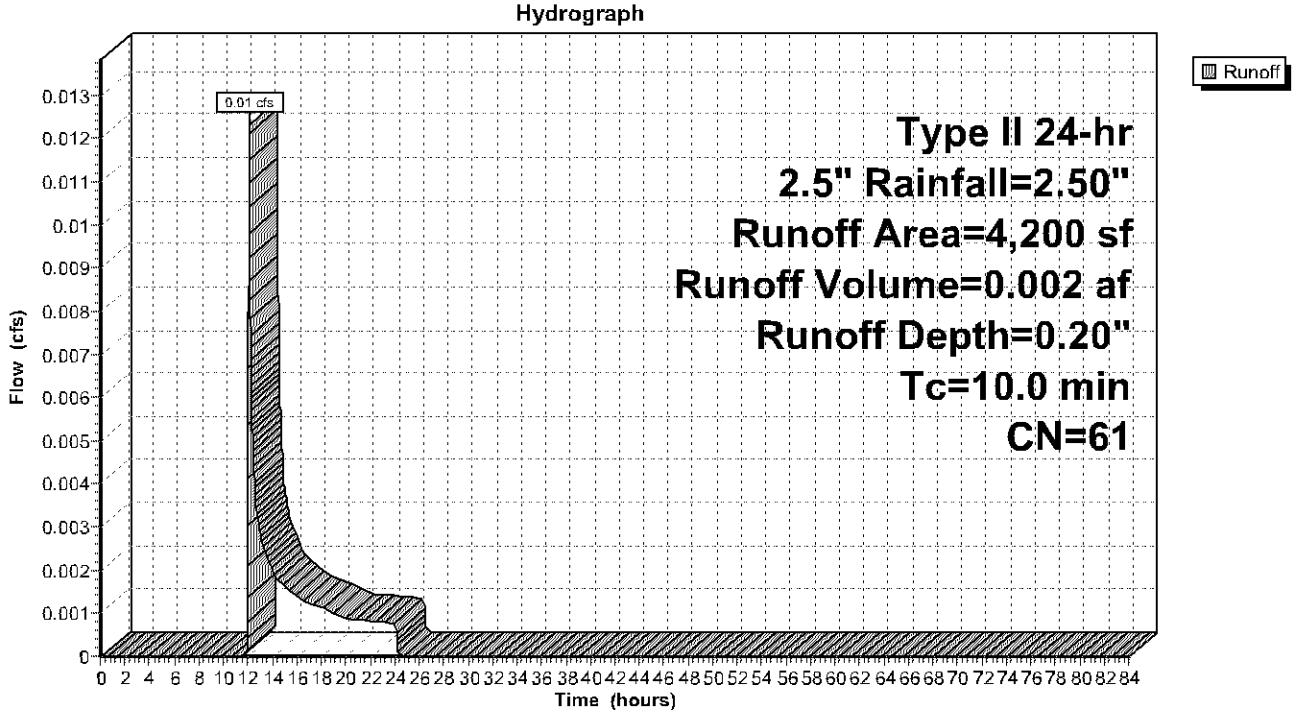
Runoff = 0.01 cfs @ 12.07 hrs, Volume= 0.002 af, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 2.5" Rainfall=2.50"

Area (sf)	CN	Description
1,069	61	>75% Grass cover, Good, HSG B
1,380	61	>75% Grass cover, Good, HSG B
1,751	61	>75% Grass cover, Good, HSG B
4,200	61	Weighted Average
4,200		100.00% Pervious Area

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

Subcatchment 14S: Proposed Runoff



Summary for Pond 1P: NW Basin

Inflow Area = 0.641 ac, 73.03% Impervious, Inflow Depth = 1.38" for 2.5" event
Inflow = 1.36 cfs @ 12.02 hrs, Volume= 0.074 af
Outflow = 0.13 cfs @ 12.57 hrs, Volume= 0.074 af, Atten= 90%, Lag= 33.2 min
Discarded = 0.01 cfs @ 12.57 hrs, Volume= 0.048 af
Primary = 0.12 cfs @ 12.57 hrs, Volume= 0.026 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 834.05' @ 12.57 hrs Surf.Area= 1,433 sf Storage= 1,693 cf

Plug-Flow detention time= 874.9 min calculated for 0.074 af (100% of inflow)
Center-of-Mass det. time= 875.2 min (1,701.4 - 826.2)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	4,031 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

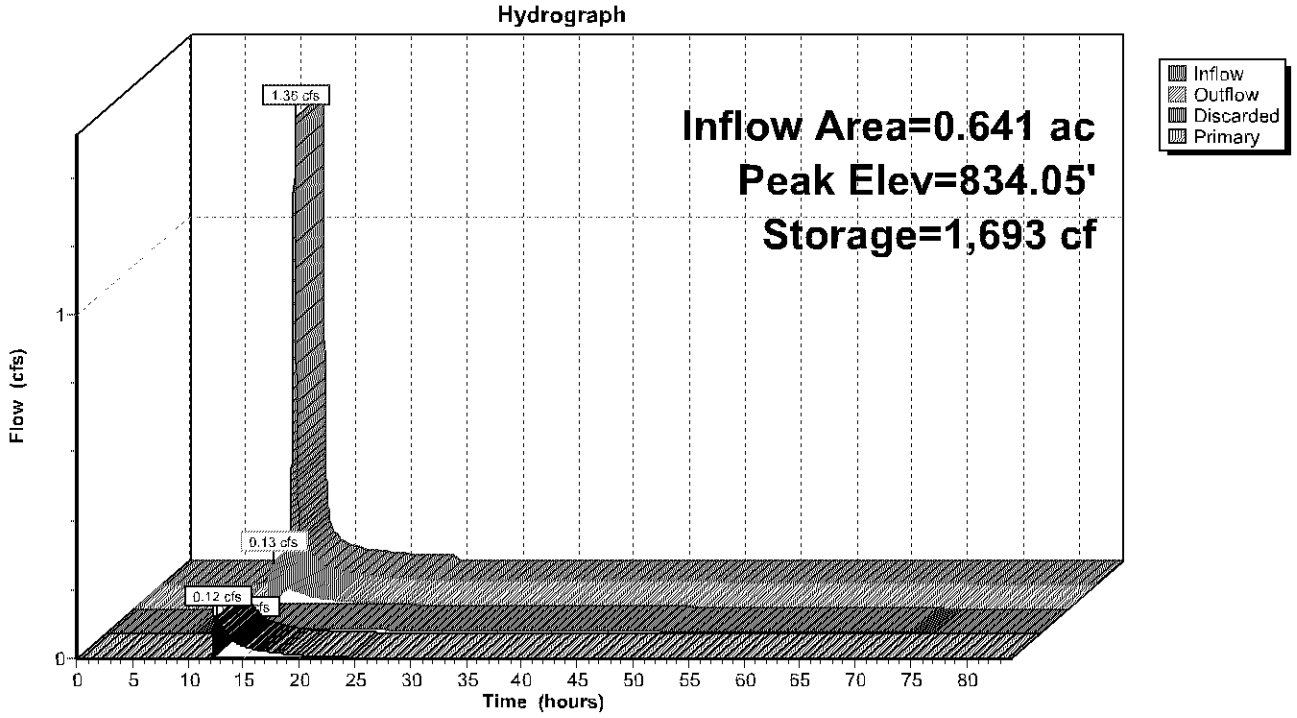
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	321	0	0
833.00	801	561	561
834.00	1,337	1,069	1,630
835.00	3,465	2,401	4,031

Device	Routing	Invert	Outlet Devices
#1	Primary	830.95'	**12.0" Round Culvert** L= 35.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 830.95' / 830.38' S= 0.0163 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**10.0" Round Culvert** L= 13.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.80'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 12.57 hrs HW=834.05' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.12 cfs @ 12.57 hrs HW=834.05' (Free Discharge)
└**1=Culvert** (Passes 0.12 cfs of 6.09 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 0.12 cfs @ 1.33 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: NW Basin



Summary for Pond 2P: SW Basin

Inflow Area = 0.700 ac, 75.89% Impervious, Inflow Depth = 1.45" for 2.5" event
Inflow = 1.56 cfs @ 12.02 hrs, Volume= 0.085 af
Outflow = 0.02 cfs @ 19.51 hrs, Volume= 0.085 af, Atten= 99%, Lag= 449.6 min
Discarded = 0.02 cfs @ 19.51 hrs, Volume= 0.085 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 833.76' @ 19.51 hrs Surf.Area= 2,137 sf Storage= 2,683 cf

Plug-Flow detention time= 1,377.4 min calculated for 0.085 af (100% of inflow)
Center-of-Mass det. time= 1,377.4 min (2,199.3 - 821.9)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	9,206 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

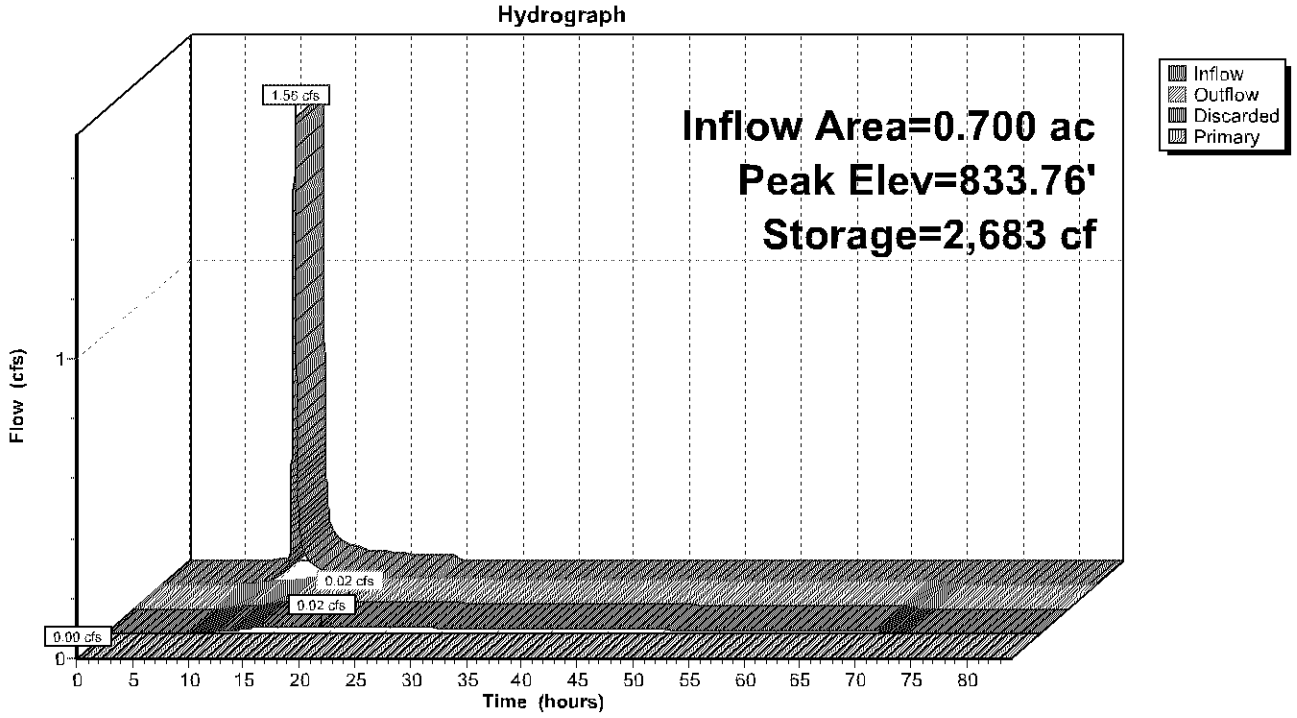
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	1,025	0	0
833.00	1,548	1,287	1,287
834.00	2,325	1,937	3,223
835.00	9,641	5,983	9,206

Device	Routing	Invert	Outlet Devices
#1	Primary	833.00'	**12.0" Round Culvert** L= 250.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.00' / 830.95' S= 0.0082 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**10.0" Round Culvert** L= 6.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.90'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 19.51 hrs HW=833.76' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=832.00' (Free Discharge)
└**1=Culvert** (Controls 0.00 cfs)
  ├**2=Culvert** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: SW Basin



Summary for Pond 3P: SE Basin

Inflow Area = 0.619 ac, 84.50% Impervious, Inflow Depth = 1.69" for 2.5" event
Inflow = 1.58 cfs @ 12.01 hrs, Volume= 0.087 af
Outflow = 0.06 cfs @ 13.79 hrs, Volume= 0.087 af, Atten= 96%, Lag= 106.5 min
Discarded = 0.02 cfs @ 13.79 hrs, Volume= 0.072 af
Primary = 0.04 cfs @ 13.79 hrs, Volume= 0.015 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 833.96' @ 13.79 hrs Surf.Area= 1,846 sf Storage= 2,421 cf

Plug-Flow detention time= 1,175.4 min calculated for 0.087 af (100% of inflow)
Center-of-Mass det. time= 1,175.4 min (1,983.0 - 807.6)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	7,678 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

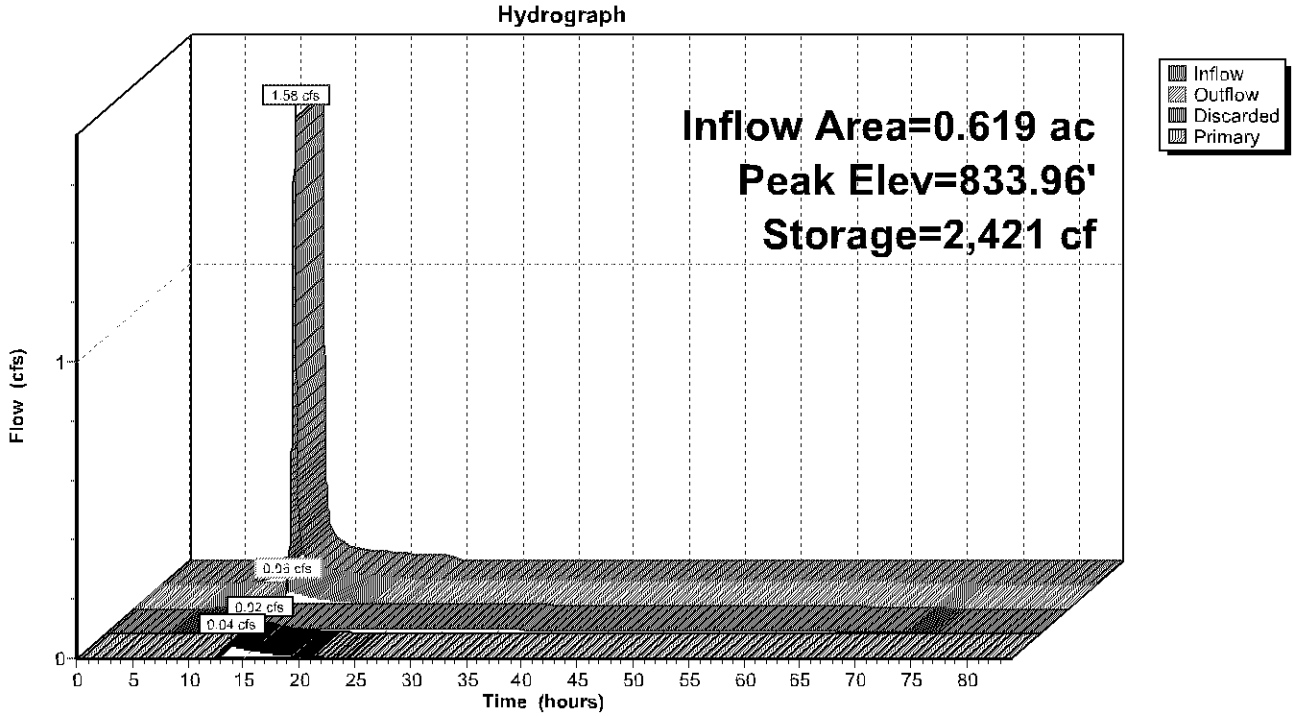
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	733	0	0
833.00	1,198	966	966
834.00	1,875	1,537	2,502
835.00	8,476	5,176	7,678

Device	Routing	Invert	Outlet Devices
#1	Primary	831.50'	**12.0" Round Culvert** L= 232.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 831.50' / 828.79' S= 0.0117 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**12.0" Round Culvert** L= 14.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.90'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 13.79 hrs HW=833.96' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.04 cfs @ 13.79 hrs HW=833.96' (Free Discharge)
└**1=Culvert** (Passes 0.04 cfs of 4.34 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 0.04 cfs @ 0.82 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: SE Basin



Summary for Pond 4P: NE Basin

Inflow Area = 0.404 ac, 85.37% Impervious, Inflow Depth = 1.78" for 2.5" event
Inflow = 1.07 cfs @ 12.01 hrs, Volume= 0.060 af
Outflow = 0.39 cfs @ 12.17 hrs, Volume= 0.060 af, Atten= 64%, Lag= 9.2 min
Discarded = 0.01 cfs @ 12.17 hrs, Volume= 0.029 af
Primary = 0.37 cfs @ 12.17 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 834.21' @ 12.17 hrs Surf.Area= 1,341 sf Storage= 1,211 cf

Plug-Flow detention time= 589.0 min calculated for 0.060 af (100% of inflow)
Center-of-Mass det. time= 588.9 min (1,391.0 - 802.1)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	2,869 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

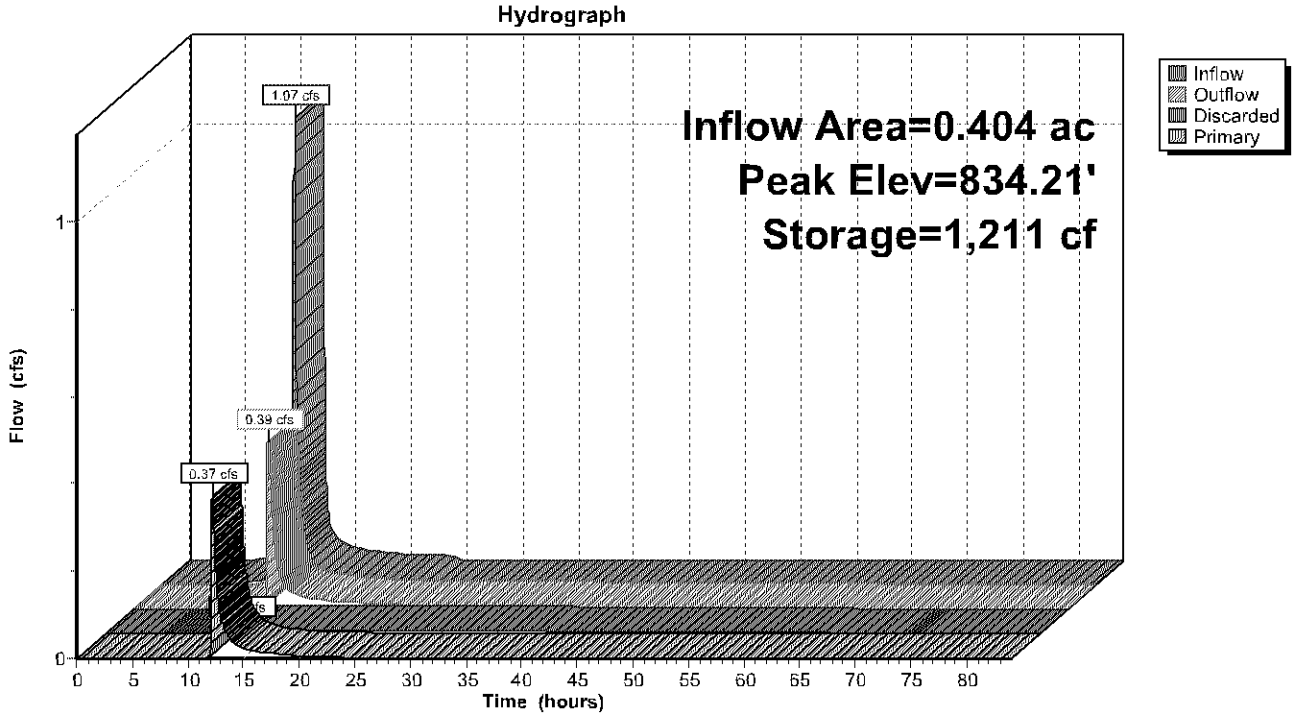
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	81	0	0
833.00	468	275	275
834.00	920	694	969
835.00	2,880	1,900	2,869

Device	Routing	Invert	Outlet Devices
#1	Primary	827.35'	**12.0" Round Culvert** L= 85.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 827.35' / 826.36' S= 0.0116 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**10.0" Round Culvert** L= 5.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.90'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 12.17 hrs HW=834.21' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.37 cfs @ 12.17 hrs HW=834.21' (Free Discharge)
└**1=Culvert** (Passes 0.37 cfs of 8.08 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 0.37 cfs @ 2.01 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 4P: NE Basin

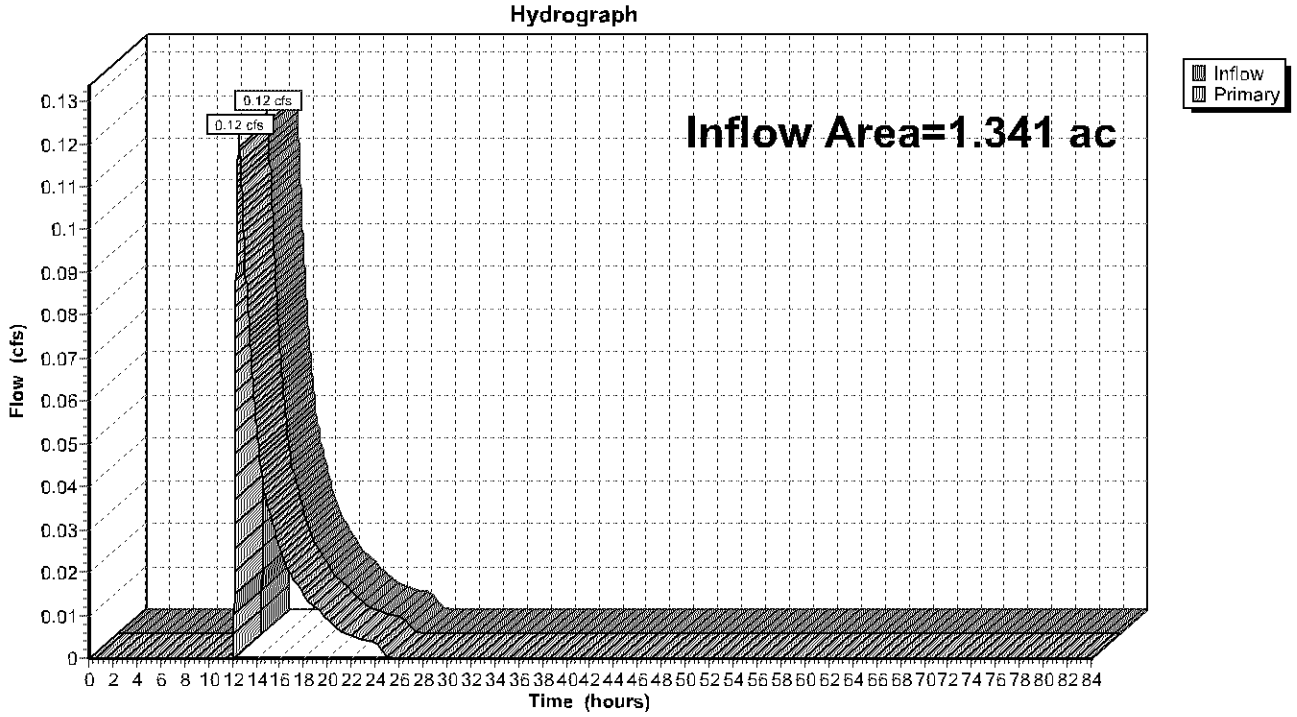


Summary for Link 9L: NW Connection

Inflow Area = 1.341 ac, 74.52% Impervious, Inflow Depth = 0.23" for 2.5" event
Inflow = 0.12 cfs @ 12.57 hrs, Volume= 0.026 af
Primary = 0.12 cfs @ 12.57 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs

Link 9L: NW Connection

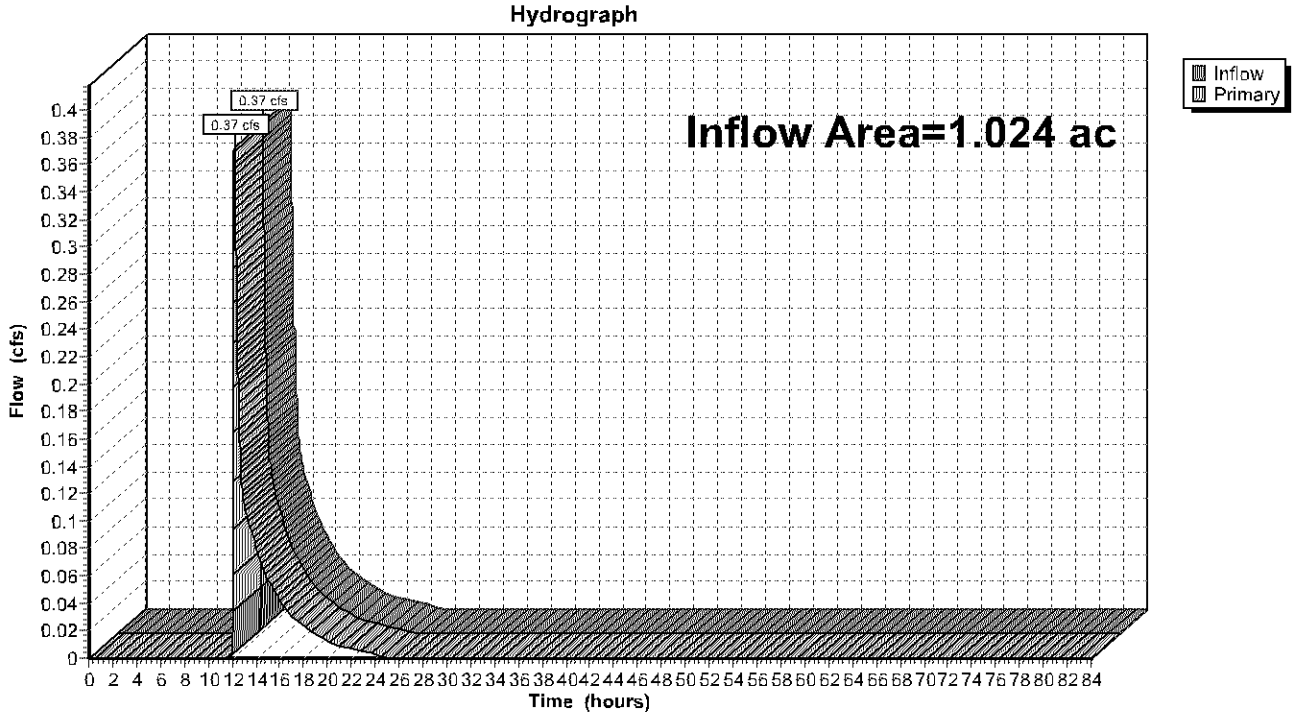


Summary for Link 10L: NE Connection

Inflow Area = 1.024 ac, 84.84% Impervious, Inflow Depth = 0.53" for 2.5" event
Inflow = 0.37 cfs @ 12.17 hrs, Volume= 0.046 af
Primary = 0.37 cfs @ 12.17 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs

Link 10L: NE Connection



Time span=0.00-84.00 hrs, dt=0.01 hrs, 8401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment5S: sw Runoff Area=30,480 sf 75.89% Impervious Runoff Depth=3.07"
Tc=10.0 min CN=89 Runoff=3.19 cfs 0.179 af

Subcatchment6S: nw Runoff Area=27,914 sf 73.03% Impervious Runoff Depth=2.97"
Tc=10.0 min CN=88 Runoff=2.85 cfs 0.159 af

Subcatchment7S: ne Runoff Area=17,619 sf 85.37% Impervious Runoff Depth=3.47"
Tc=10.0 min CN=93 Runoff=2.02 cfs 0.117 af

Subcatchment8S: se Runoff Area=26,967 sf 84.50% Impervious Runoff Depth=3.37"
Tc=10.0 min CN=92 Runoff=3.02 cfs 0.174 af

Subcatchment14S: Proposed Runoff Runoff Area=4,200 sf 0.00% Impervious Runoff Depth=0.95"
Tc=10.0 min CN=61 Runoff=0.13 cfs 0.008 af

Pond 1P: NW Basin Peak Elev=834.63' Storage=2,888 cf Inflow=2.85 cfs 0.159 af
Discarded=0.03 cfs 0.051 af Primary=1.21 cfs 0.108 af Outflow=1.23 cfs 0.159 af

Pond 2P: SW Basin Peak Elev=834.26' Storage=4,065 cf Inflow=3.19 cfs 0.179 af
Discarded=0.04 cfs 0.099 af Primary=0.45 cfs 0.080 af Outflow=0.49 cfs 0.179 af

Pond 3P: SE Basin Peak Elev=834.40' Storage=3,768 cf Inflow=3.02 cfs 0.174 af
Discarded=0.05 cfs 0.079 af Primary=0.75 cfs 0.094 af Outflow=0.80 cfs 0.174 af

Pond 4P: NE Basin Peak Elev=834.60' Storage=1,868 cf Inflow=2.02 cfs 0.117 af
Discarded=0.02 cfs 0.032 af Primary=1.19 cfs 0.085 af Outflow=1.21 cfs 0.117 af

Link 9L: NW Connection Inflow=1.59 cfs 0.188 af
Primary=1.59 cfs 0.188 af

Link 10L: NE Connection Inflow=1.89 cfs 0.180 af
Primary=1.89 cfs 0.180 af

Total Runoff Area = 2.461 ac Runoff Volume = 0.636 af Average Runoff Depth = 3.10"
24.11% Pervious = 0.593 ac 75.89% Impervious = 1.867 ac

Summary for Subcatchment 5S: sw

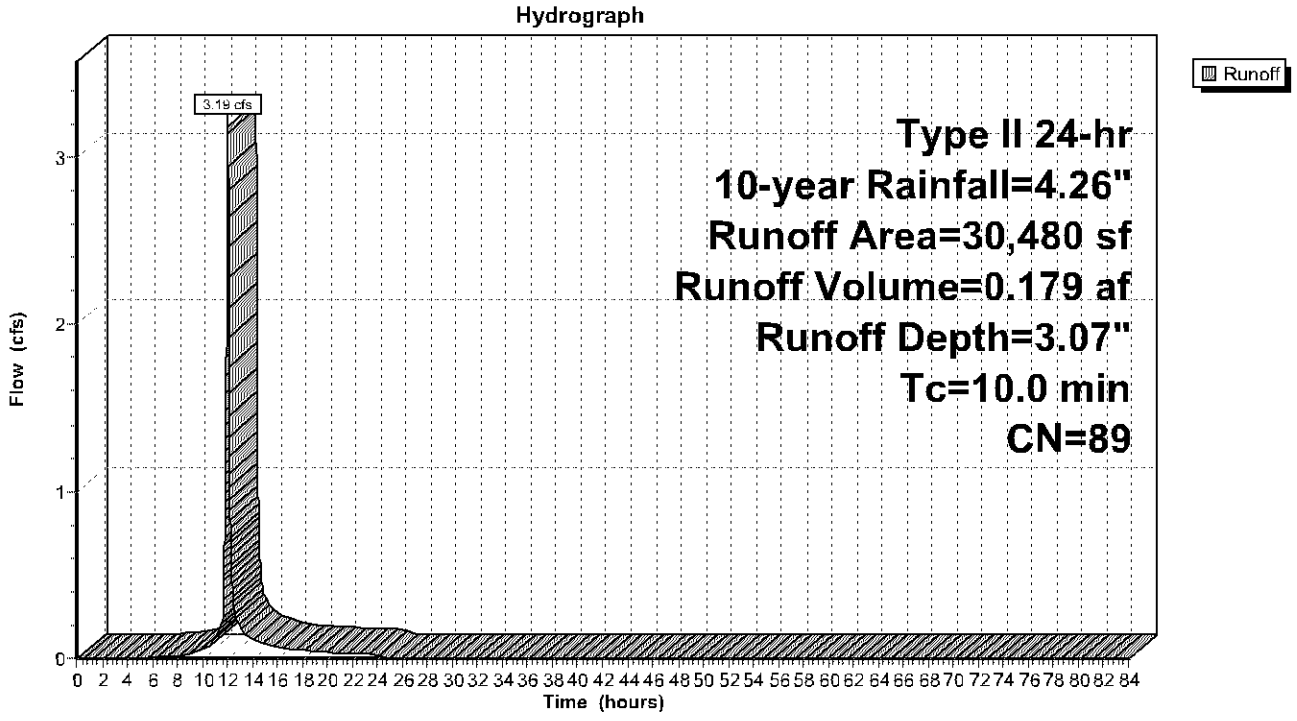
Runoff = 3.19 cfs @ 12.01 hrs, Volume= 0.179 af, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-year Rainfall=4.26"

Area (sf)	CN	Description
23,130	98	Paved parking, HSG B
7,350	61	>75% Grass cover, Good, HSG B
30,480	89	Weighted Average
7,350		24.11% Pervious Area
23,130		75.89% Impervious Area

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

Subcatchment 5S: sw



Summary for Subcatchment 6S: nw

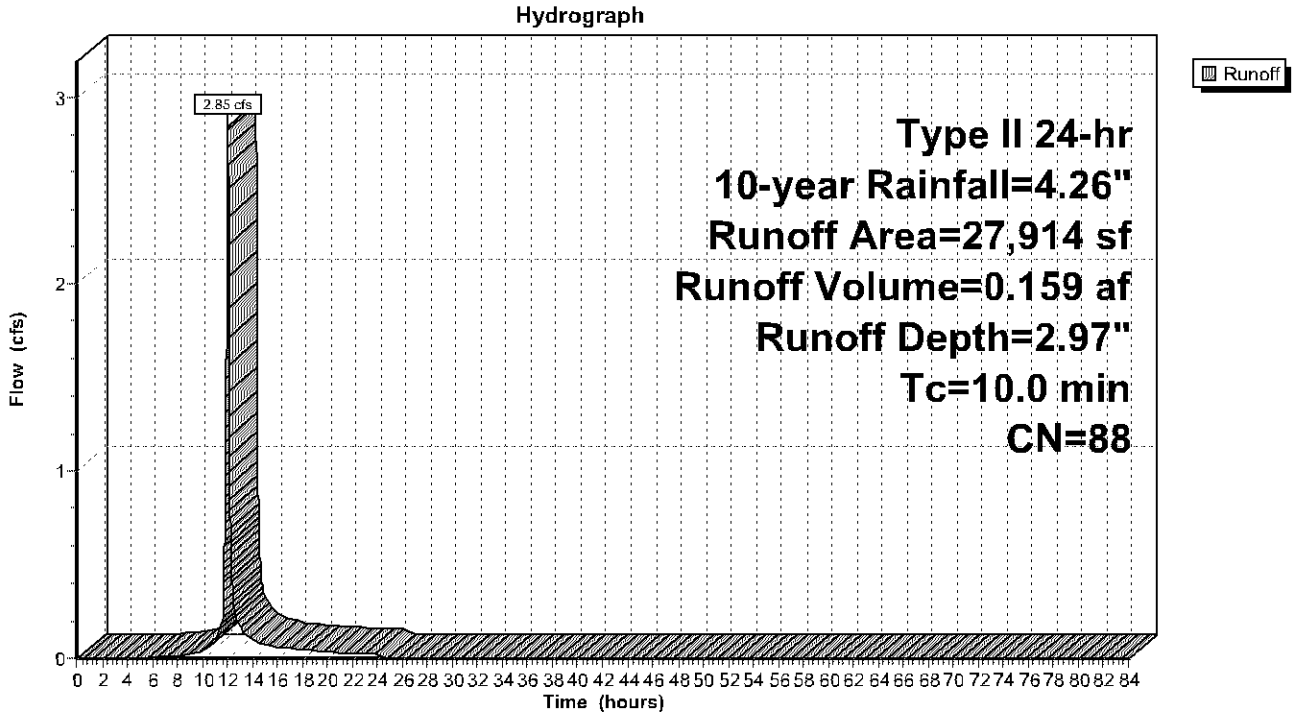
Runoff = 2.85 cfs @ 12.01 hrs, Volume= 0.159 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-year Rainfall=4.26"

Area (sf)	CN	Description
20,385	98	Paved parking, HSG B
7,529	61	>75% Grass cover, Good, HSG B
27,914	88	Weighted Average
7,529		26.97% Pervious Area
20,385		73.03% Impervious Area

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

Subcatchment 6S: nw



Summary for Subcatchment 7S: ne

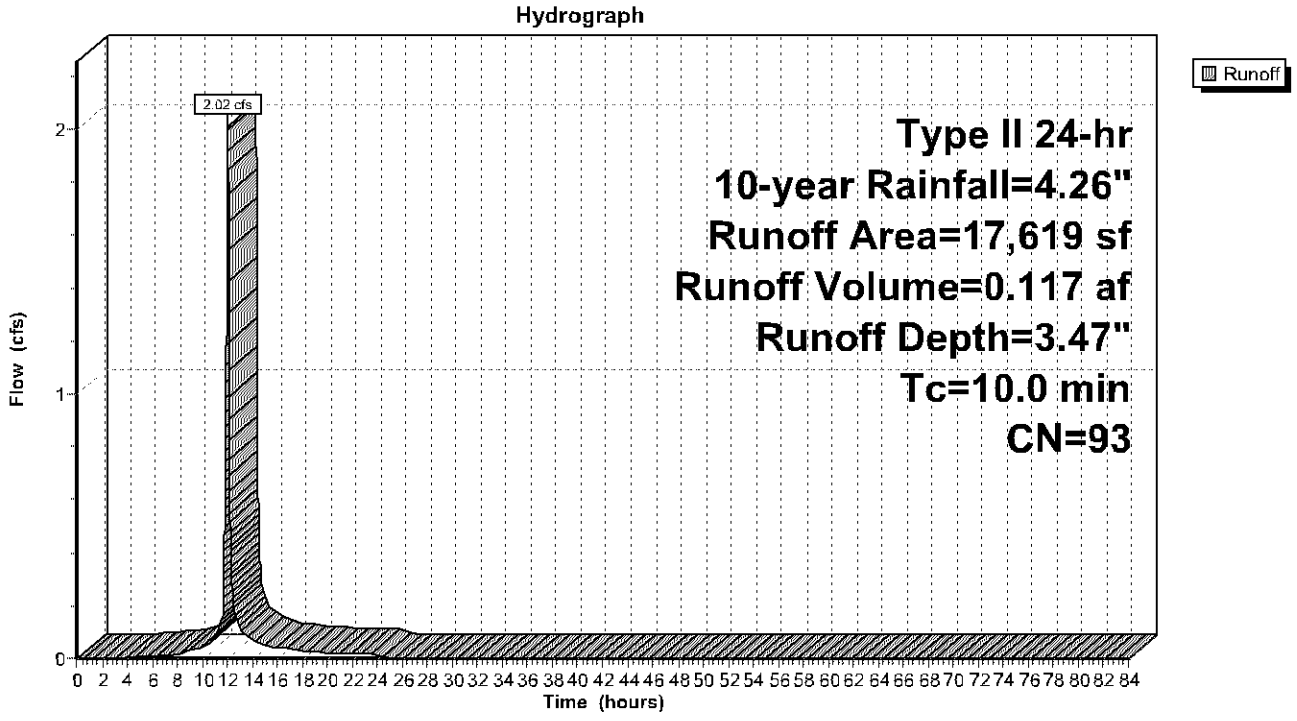
Runoff = 2.02 cfs @ 12.01 hrs, Volume= 0.117 af, Depth= 3.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-year Rainfall=4.26"

Area (sf)	CN	Description
15,041	98	Paved parking, HSG B
2,578	61	>75% Grass cover, Good, HSG B
17,619	93	Weighted Average
2,578		14.63% Pervious Area
15,041		85.37% Impervious Area

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

Subcatchment 7S: ne



Summary for Subcatchment 8S: se

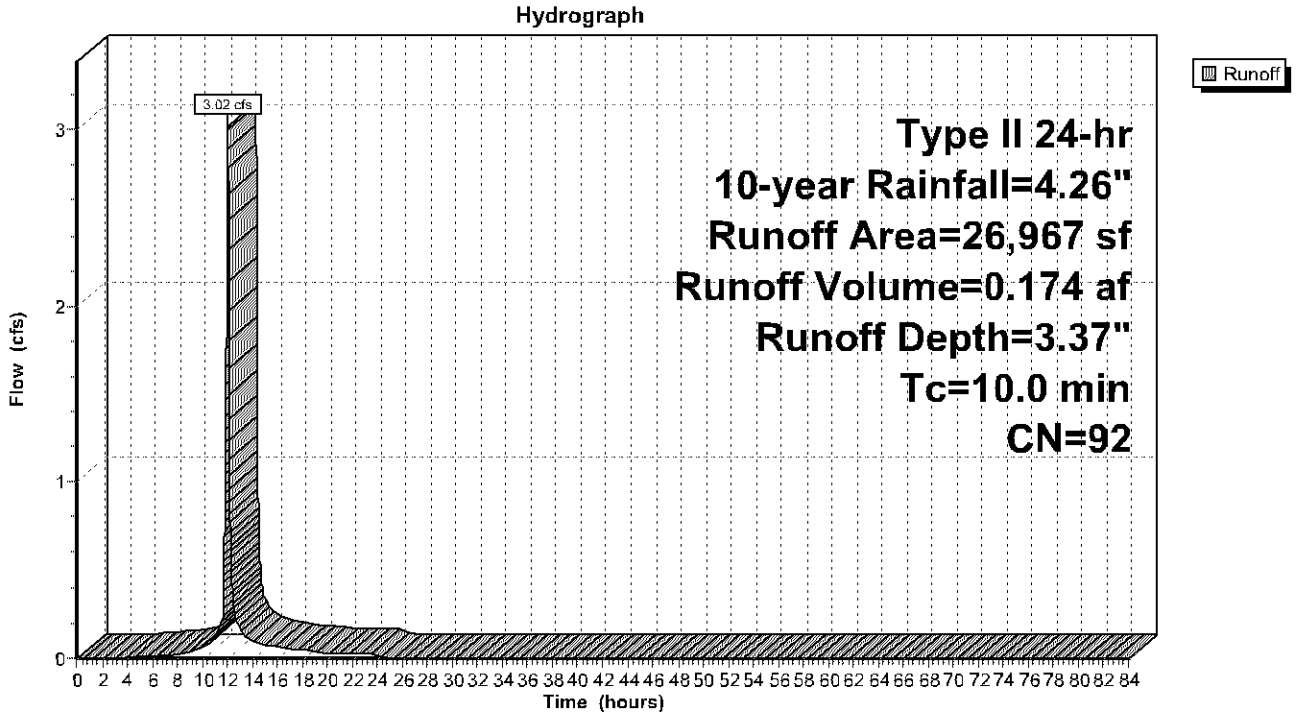
Runoff = 3.02 cfs @ 12.01 hrs, Volume= 0.174 af, Depth= 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-year Rainfall=4.26"

Area (sf)	CN	Description
22,786	98	Paved parking, HSG B
4,181	61	>75% Grass cover, Good, HSG B
26,967	92	Weighted Average
4,181		15.50% Pervious Area
22,786		84.50% Impervious Area

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

Subcatchment 8S: se



Summary for Subcatchment 14S: Proposed Runoff

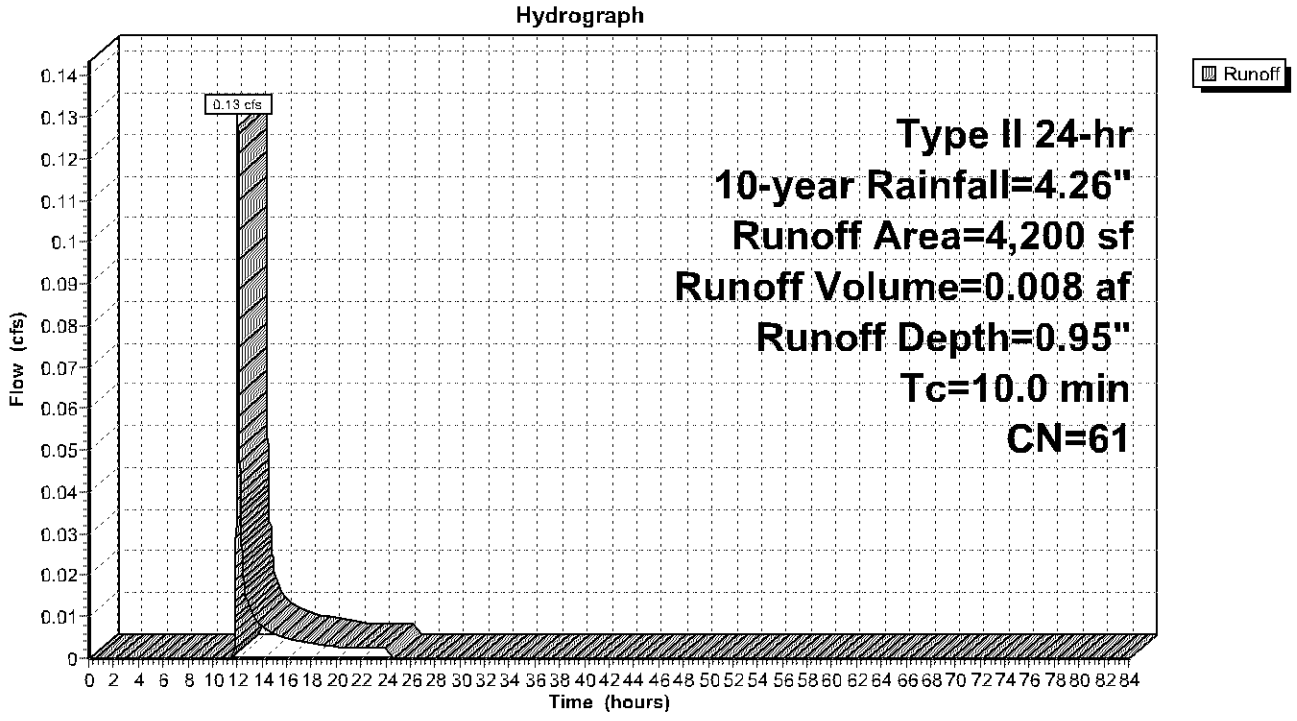
Runoff = 0.13 cfs @ 12.03 hrs, Volume= 0.008 af, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-year Rainfall=4.26"

Area (sf)	CN	Description
1,069	61	>75% Grass cover, Good, HSG B
1,380	61	>75% Grass cover, Good, HSG B
1,751	61	>75% Grass cover, Good, HSG B
4,200	61	Weighted Average
4,200		100.00% Pervious Area

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

Subcatchment 14S: Proposed Runoff



Summary for Pond 1P: NW Basin

Inflow Area = 0.641 ac, 73.03% Impervious, Inflow Depth = 2.97" for 10-year event
Inflow = 2.85 cfs @ 12.01 hrs, Volume= 0.159 af
Outflow = 1.23 cfs @ 12.15 hrs, Volume= 0.159 af, Atten= 57%, Lag= 8.0 min
Discarded = 0.03 cfs @ 12.15 hrs, Volume= 0.051 af
Primary = 1.21 cfs @ 12.15 hrs, Volume= 0.108 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 834.63' @ 12.15 hrs Surf.Area= 2,673 sf Storage= 2,888 cf

Plug-Flow detention time= 439.5 min calculated for 0.159 af (100% of inflow)
Center-of-Mass det. time= 439.8 min (1,244.2 - 804.4)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	4,031 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

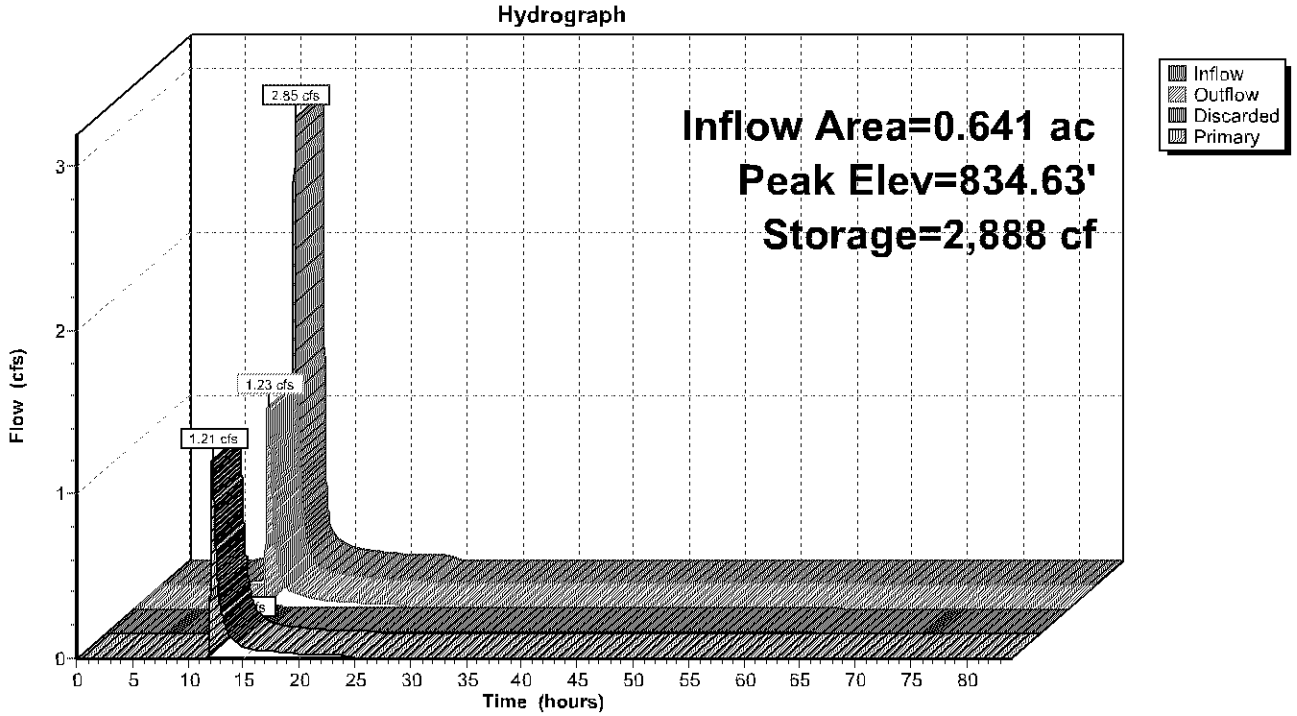
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	321	0	0
833.00	801	561	561
834.00	1,337	1,069	1,630
835.00	3,465	2,401	4,031

Device	Routing	Invert	Outlet Devices
#1	Primary	830.95'	**12.0" Round Culvert** L= 35.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 830.95' / 830.38' S= 0.0163 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**10.0" Round Culvert** L= 13.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.80'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 12.15 hrs HW=834.63' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=1.21 cfs @ 12.15 hrs HW=834.63' (Free Discharge)
└**1=Culvert** (Passes 1.21 cfs of 6.74 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 1.21 cfs @ 2.77 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: NW Basin



Summary for Pond 2P: SW Basin

Inflow Area = 0.700 ac, 75.89% Impervious, Inflow Depth = 3.07" for 10-year event
Inflow = 3.19 cfs @ 12.01 hrs, Volume= 0.179 af
Outflow = 0.49 cfs @ 12.33 hrs, Volume= 0.179 af, Atten= 85%, Lag= 19.1 min
Discarded = 0.04 cfs @ 12.33 hrs, Volume= 0.099 af
Primary = 0.45 cfs @ 12.33 hrs, Volume= 0.080 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 834.26' @ 12.33 hrs Surf.Area= 4,211 sf Storage= 4,065 cf

Plug-Flow detention time= 796.9 min calculated for 0.179 af (100% of inflow)
Center-of-Mass det. time= 797.2 min (1,597.9 - 800.7)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	9,206 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

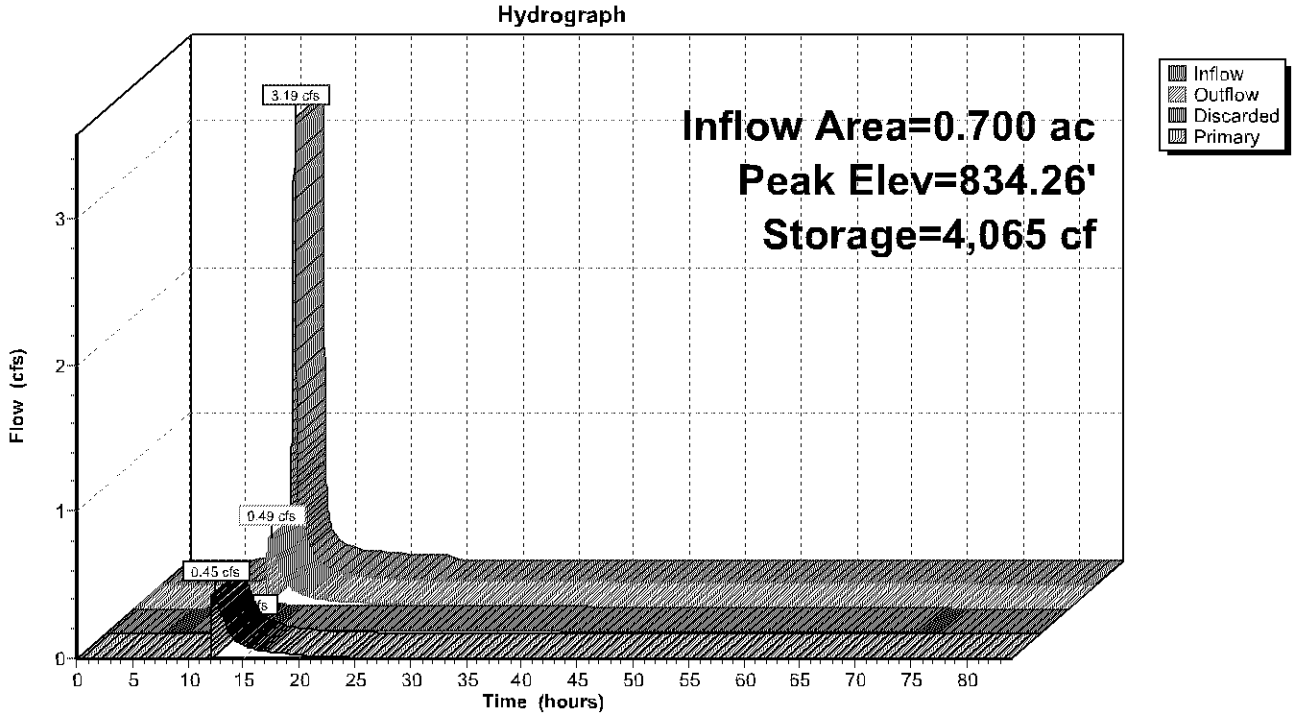
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	1,025	0	0
833.00	1,548	1,287	1,287
834.00	2,325	1,937	3,223
835.00	9,641	5,983	9,206

Device	Routing	Invert	Outlet Devices
#1	Primary	833.00'	**12.0" Round Culvert** L= 250.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.00' / 830.95' S= 0.0082 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**10.0" Round Culvert** L= 6.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.90'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 12.33 hrs HW=834.26' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.45 cfs @ 12.33 hrs HW=834.26' (Free Discharge)
└**1=Culvert** (Passes 0.45 cfs of 3.29 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 0.45 cfs @ 2.10 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: SW Basin



Summary for Pond 3P: SE Basin

Inflow Area = 0.619 ac, 84.50% Impervious, Inflow Depth = 3.37" for 10-year event
Inflow = 3.02 cfs @ 12.01 hrs, Volume= 0.174 af
Outflow = 0.80 cfs @ 12.21 hrs, Volume= 0.174 af, Atten= 74%, Lag= 11.7 min
Discarded = 0.05 cfs @ 12.21 hrs, Volume= 0.079 af
Primary = 0.75 cfs @ 12.21 hrs, Volume= 0.094 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 834.40' @ 12.21 hrs Surf.Area= 4,498 sf Storage= 3,768 cf

Plug-Flow detention time= 645.1 min calculated for 0.174 af (100% of inflow)
Center-of-Mass det. time= 645.1 min (1,433.4 - 788.3)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	7,678 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

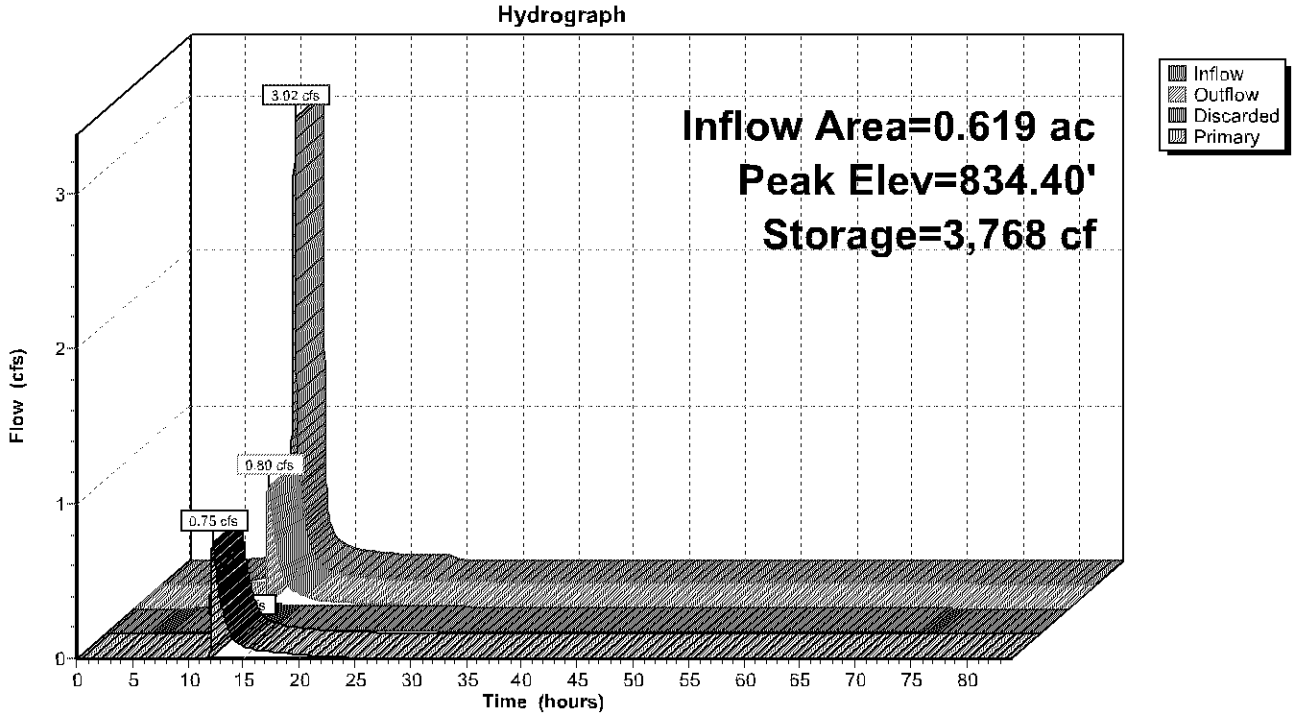
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	733	0	0
833.00	1,198	966	966
834.00	1,875	1,537	2,502
835.00	8,476	5,176	7,678

Device	Routing	Invert	Outlet Devices
#1	Primary	831.50'	**12.0" Round Culvert** L= 232.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 831.50' / 828.79' S= 0.0117 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**12.0" Round Culvert** L= 14.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.90'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.05 cfs @ 12.21 hrs HW=834.40' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.75 cfs @ 12.21 hrs HW=834.40' (Free Discharge)
└**1=Culvert** (Passes 0.75 cfs of 4.56 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 0.75 cfs @ 2.20 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: SE Basin



Summary for Pond 4P: NE Basin

Inflow Area = 0.404 ac, 85.37% Impervious, Inflow Depth = 3.47" for 10-year event
Inflow = 2.02 cfs @ 12.01 hrs, Volume= 0.117 af
Outflow = 1.21 cfs @ 12.11 hrs, Volume= 0.117 af, Atten= 40%, Lag= 5.9 min
Discarded = 0.02 cfs @ 12.11 hrs, Volume= 0.032 af
Primary = 1.19 cfs @ 12.11 hrs, Volume= 0.085 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 834.60' @ 12.11 hrs Surf.Area= 2,091 sf Storage= 1,868 cf

Plug-Flow detention time= 330.3 min calculated for 0.117 af (100% of inflow)
Center-of-Mass det. time= 330.3 min (1,113.9 - 783.6)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	2,869 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

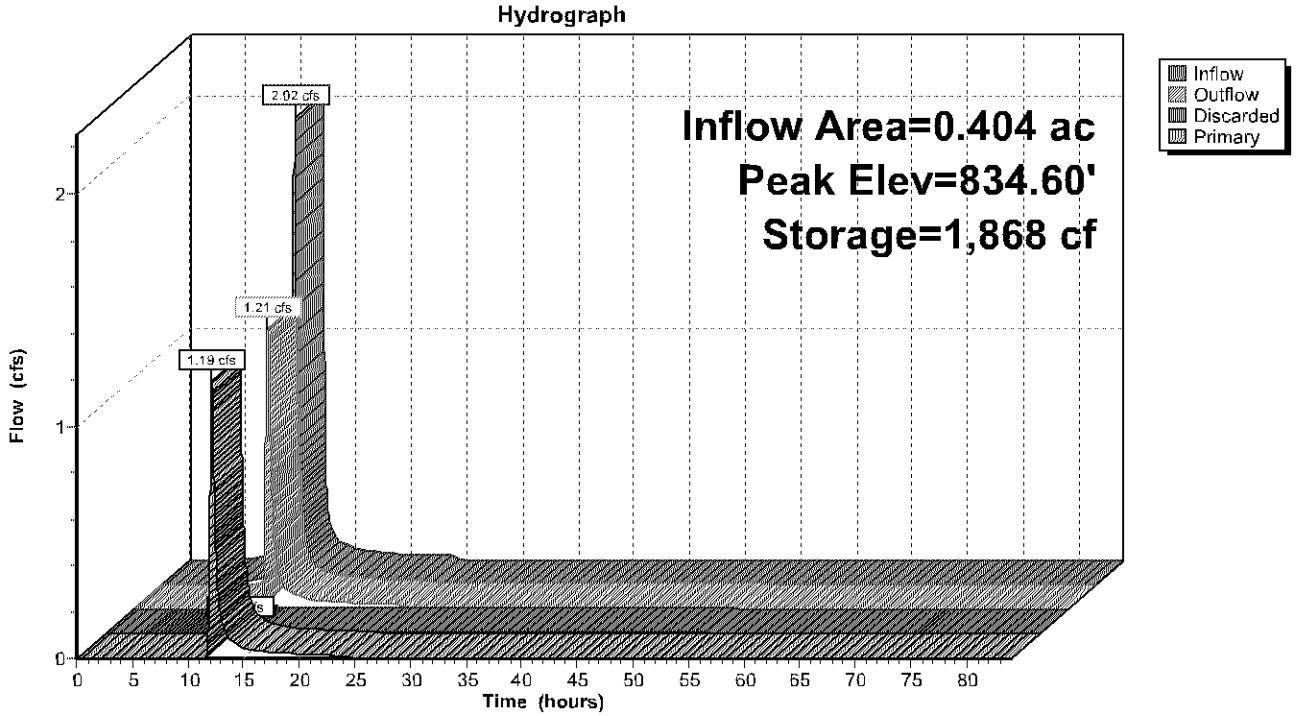
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	81	0	0
833.00	468	275	275
834.00	920	694	969
835.00	2,880	1,900	2,869

Device	Routing	Invert	Outlet Devices
#1	Primary	827.35'	**12.0" Round Culvert** L= 85.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 827.35' / 826.36' S= 0.0116 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**10.0" Round Culvert** L= 5.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.90'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 12.11 hrs HW=834.60' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.19 cfs @ 12.11 hrs HW=834.60' (Free Discharge)
└**1=Culvert** (Passes 1.19 cfs of 8.30 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 1.19 cfs @ 2.84 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 4P: NE Basin

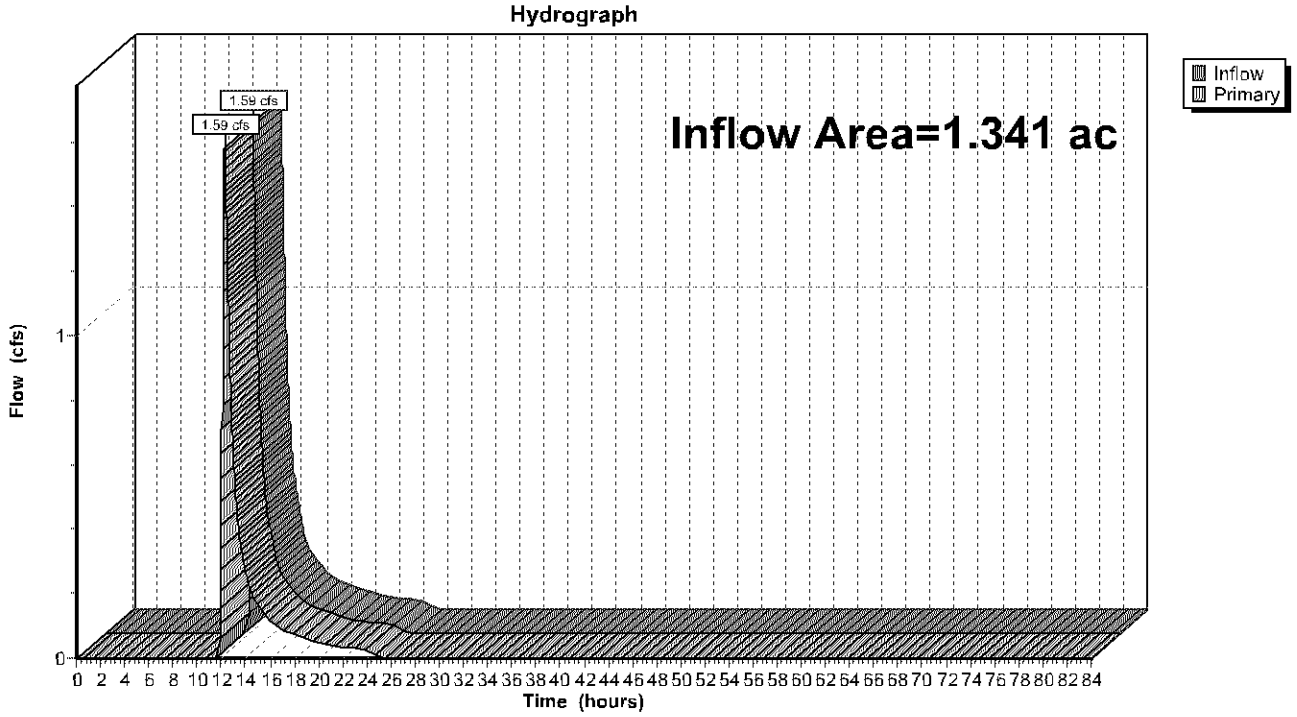


Summary for Link 9L: NW Connection

Inflow Area = 1.341 ac, 74.52% Impervious, Inflow Depth = 1.68" for 10-year event
Inflow = 1.59 cfs @ 12.18 hrs, Volume= 0.188 af
Primary = 1.59 cfs @ 12.18 hrs, Volume= 0.188 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs

Link 9L: NW Connection

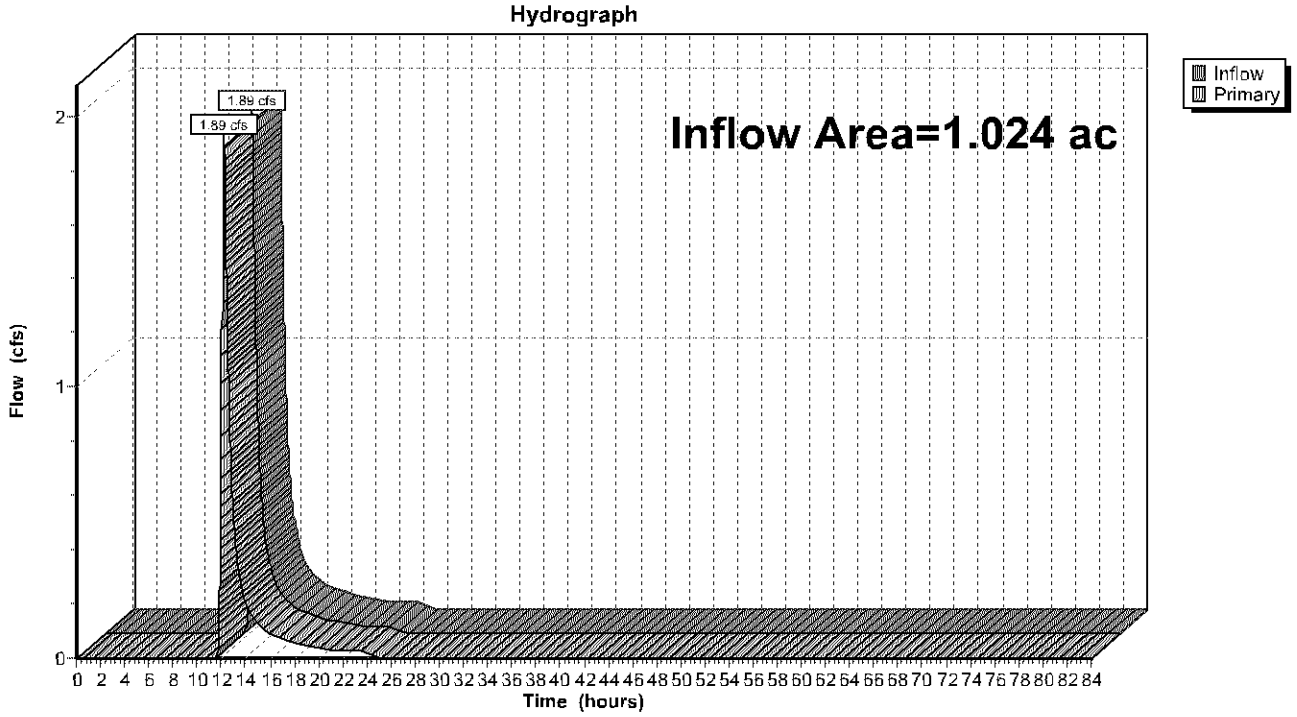


Summary for Link 10L: NE Connection

Inflow Area = 1.024 ac, 84.84% Impervious, Inflow Depth = 2.11" for 10-year event
Inflow = 1.89 cfs @ 12.14 hrs, Volume= 0.180 af
Primary = 1.89 cfs @ 12.14 hrs, Volume= 0.180 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs

Link 10L: NE Connection



Time span=0.00-84.00 hrs, dt=0.01 hrs, 8401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment5S: sw Runoff Area=30,480 sf 75.89% Impervious Runoff Depth=6.20"
Tc=10.0 min CN=89 Runoff=6.19 cfs 0.361 af

Subcatchment6S: nw Runoff Area=27,914 sf 73.03% Impervious Runoff Depth=6.08"
Tc=10.0 min CN=88 Runoff=5.60 cfs 0.325 af

Subcatchment7S: ne Runoff Area=17,619 sf 85.37% Impervious Runoff Depth=6.67"
Tc=10.0 min CN=93 Runoff=3.72 cfs 0.225 af

Subcatchment8S: se Runoff Area=26,967 sf 84.50% Impervious Runoff Depth=6.55"
Tc=10.0 min CN=92 Runoff=5.64 cfs 0.338 af

Subcatchment14S: Proposed Runoff Runoff Area=4,200 sf 0.00% Impervious Runoff Depth=3.07"
Tc=10.0 min CN=61 Runoff=0.45 cfs 0.025 af

Pond 1P: NW Basin Peak Elev=834.98' Storage=3,965 cf Inflow=5.60 cfs 0.325 af
Discarded=0.04 cfs 0.056 af Primary=5.08 cfs 0.269 af Outflow=5.12 cfs 0.325 af

Pond 2P: SW Basin Peak Elev=834.81' Storage=7,531 cf Inflow=6.19 cfs 0.361 af
Discarded=0.09 cfs 0.110 af Primary=1.66 cfs 0.251 af Outflow=1.74 cfs 0.361 af

Pond 3P: SE Basin Peak Elev=834.85' Storage=6,503 cf Inflow=5.64 cfs 0.338 af
Discarded=0.08 cfs 0.088 af Primary=2.02 cfs 0.250 af Outflow=2.10 cfs 0.338 af

Pond 4P: NE Basin Peak Elev=834.96' Storage=2,761 cf Inflow=3.72 cfs 0.225 af
Discarded=0.03 cfs 0.035 af Primary=2.62 cfs 0.190 af Outflow=2.65 cfs 0.225 af

Link 9L: NW Connection Inflow=6.51 cfs 0.520 af
Primary=6.51 cfs 0.520 af

Link 10L: NE Connection Inflow=4.56 cfs 0.439 af
Primary=4.56 cfs 0.439 af

Total Runoff Area = 2.461 ac Runoff Volume = 1.273 af Average Runoff Depth = 6.21"
24.11% Pervious = 0.593 ac 75.89% Impervious = 1.867 ac

Summary for Subcatchment 5S: sw

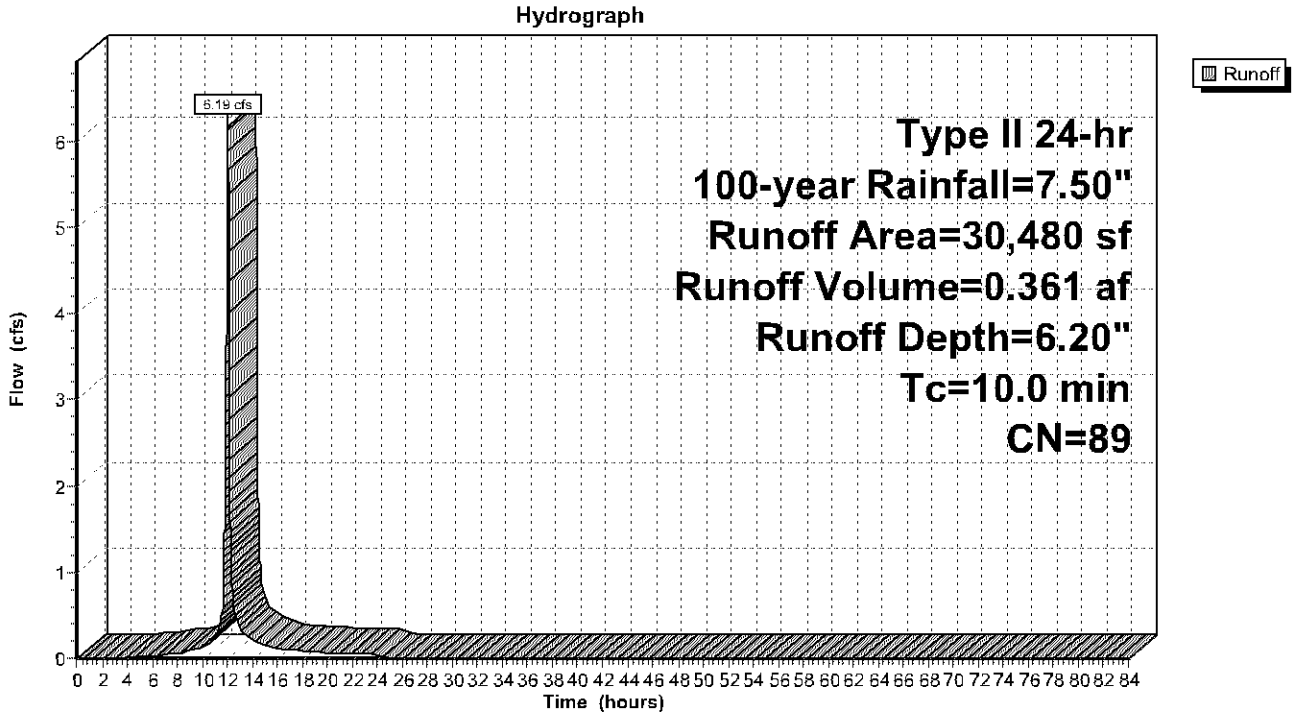
Runoff = 6.19 cfs @ 12.01 hrs, Volume= 0.361 af, Depth= 6.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-year Rainfall=7.50"

Area (sf)	CN	Description
23,130	98	Paved parking, HSG B
7,350	61	>75% Grass cover, Good, HSG B
30,480	89	Weighted Average
7,350		24.11% Pervious Area
23,130		75.89% Impervious Area

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

Subcatchment 5S: sw



Summary for Subcatchment 6S: nw

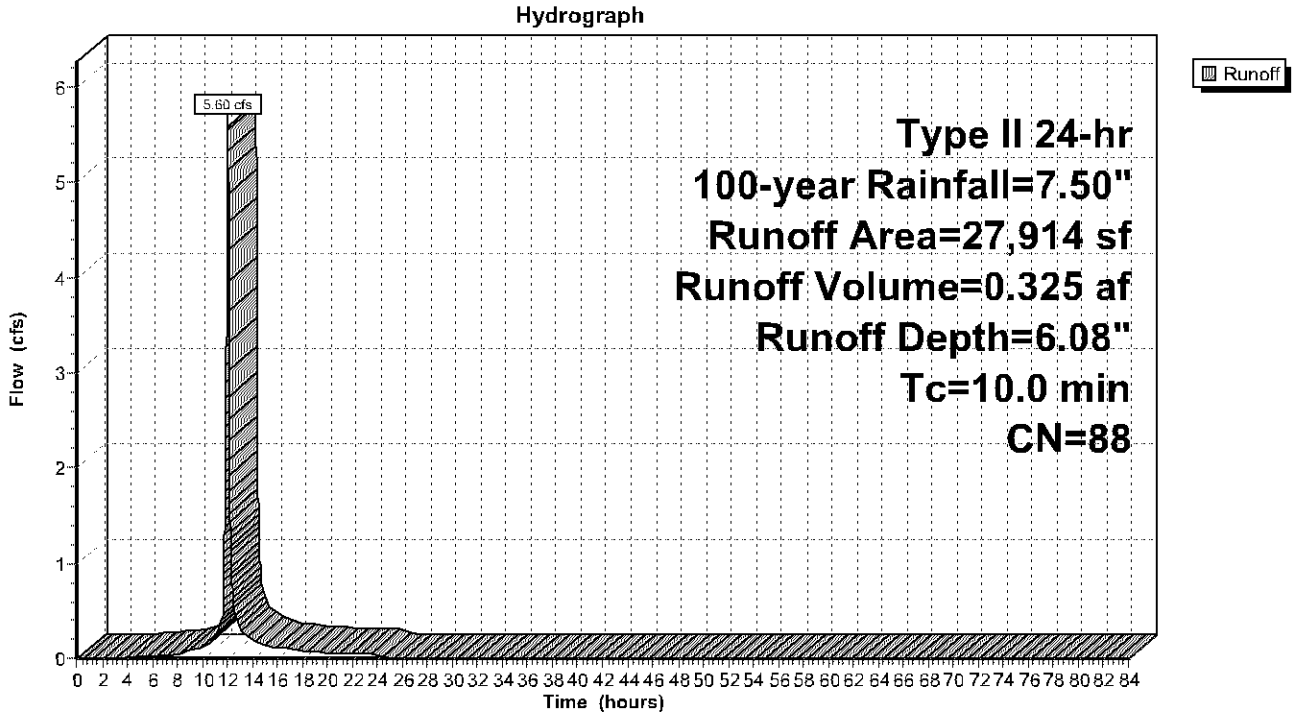
Runoff = 5.60 cfs @ 12.01 hrs, Volume= 0.325 af, Depth= 6.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-year Rainfall=7.50"

Area (sf)	CN	Description
20,385	98	Paved parking, HSG B
7,529	61	>75% Grass cover, Good, HSG B
27,914	88	Weighted Average
7,529		26.97% Pervious Area
20,385		73.03% Impervious Area

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

Subcatchment 6S: nw



Summary for Subcatchment 7S: ne

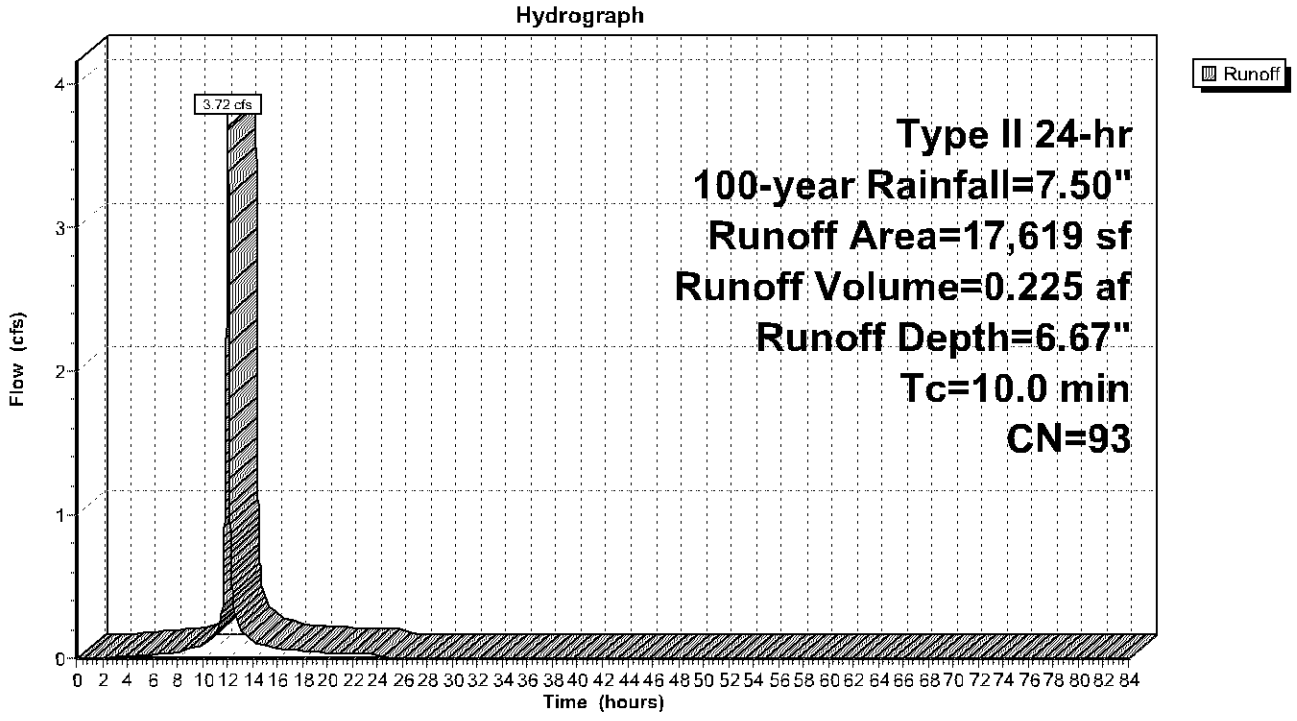
Runoff = 3.72 cfs @ 12.01 hrs, Volume= 0.225 af, Depth= 6.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-year Rainfall=7.50"

Area (sf)	CN	Description
15,041	98	Paved parking, HSG B
2,578	61	>75% Grass cover, Good, HSG B
17,619	93	Weighted Average
2,578		14.63% Pervious Area
15,041		85.37% Impervious Area

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

Subcatchment 7S: ne



Summary for Subcatchment 8S: se

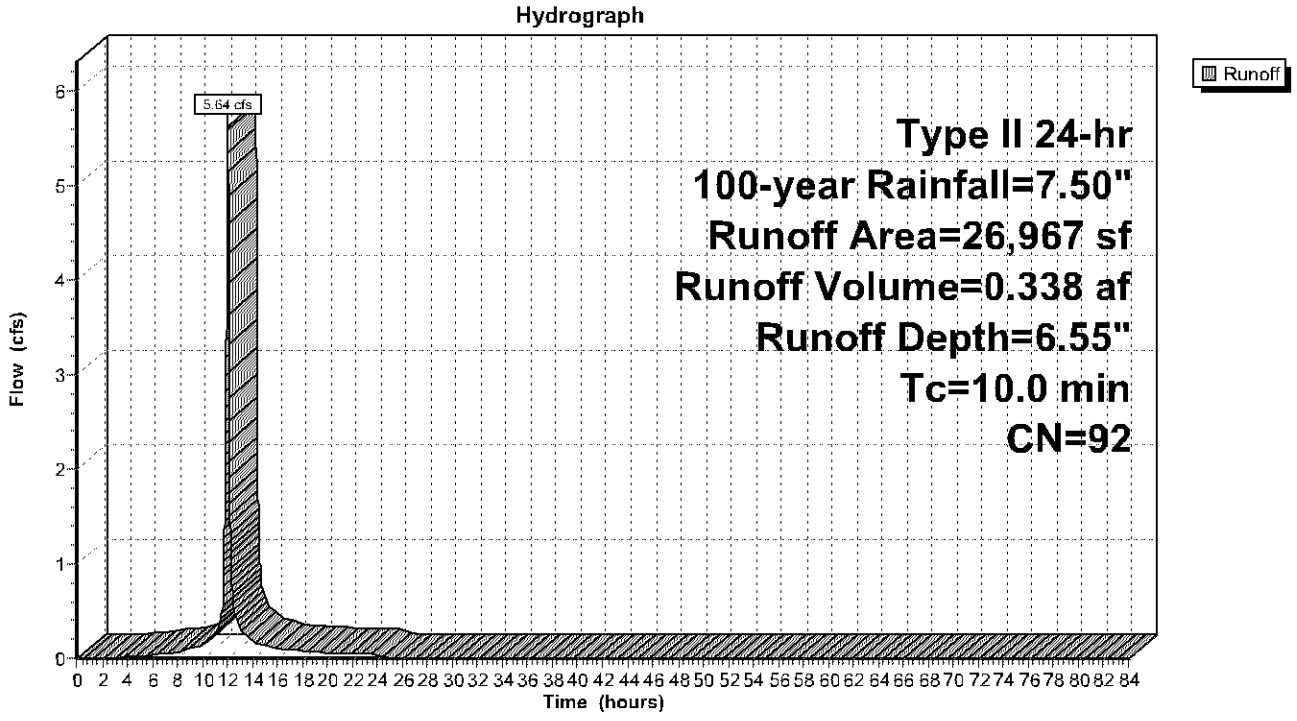
Runoff = 5.64 cfs @ 12.01 hrs, Volume= 0.338 af, Depth= 6.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-year Rainfall=7.50"

Area (sf)	CN	Description
22,786	98	Paved parking, HSG B
4,181	61	>75% Grass cover, Good, HSG B
26,967	92	Weighted Average
4,181		15.50% Pervious Area
22,786		84.50% Impervious Area

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

Subcatchment 8S: se



Summary for Subcatchment 14S: Proposed Runoff

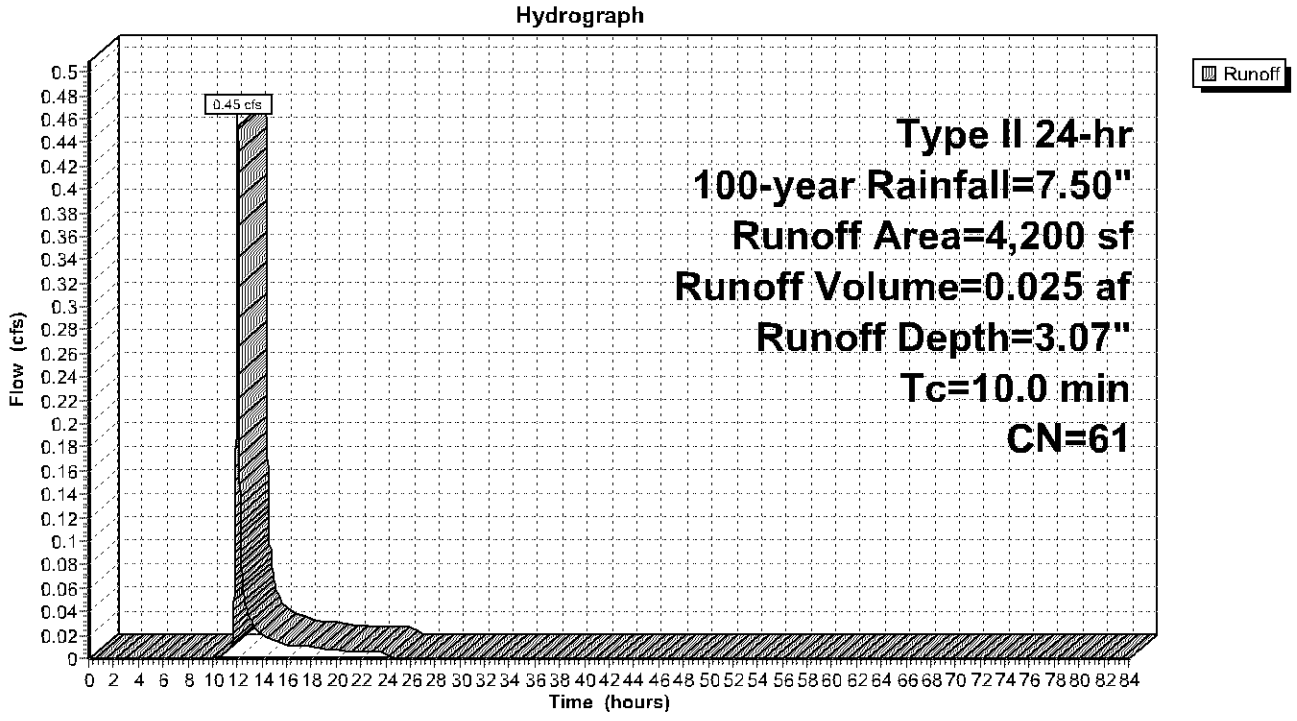
Runoff = 0.45 cfs @ 12.02 hrs, Volume= 0.025 af, Depth= 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-year Rainfall=7.50"

Area (sf)	CN	Description
1,069	61	>75% Grass cover, Good, HSG B
1,380	61	>75% Grass cover, Good, HSG B
1,751	61	>75% Grass cover, Good, HSG B
4,200	61	Weighted Average
4,200		100.00% Pervious Area

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

Subcatchment 14S: Proposed Runoff



Summary for Pond 1P: NW Basin

Inflow Area = 0.641 ac, 73.03% Impervious, Inflow Depth = 6.08" for 100-year event
Inflow = 5.60 cfs @ 12.01 hrs, Volume= 0.325 af
Outflow = 5.12 cfs @ 12.05 hrs, Volume= 0.325 af, Atten= 9%, Lag= 2.4 min
Discarded = 0.04 cfs @ 12.05 hrs, Volume= 0.056 af
Primary = 5.08 cfs @ 12.05 hrs, Volume= 0.269 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 834.98' @ 12.05 hrs Surf.Area= 3,424 sf Storage= 3,965 cf

Plug-Flow detention time= 239.1 min calculated for 0.325 af (100% of inflow)
Center-of-Mass det. time= 239.1 min (1,023.6 - 784.5)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	4,031 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

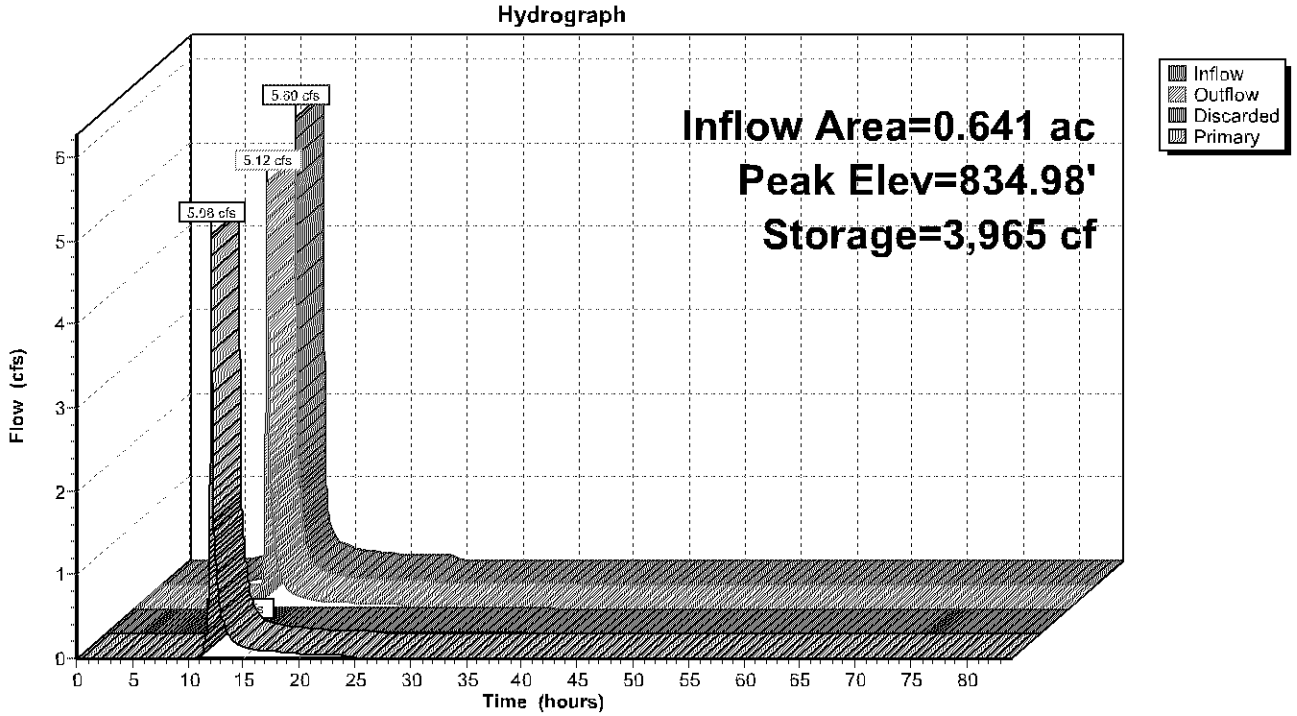
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	321	0	0
833.00	801	561	561
834.00	1,337	1,069	1,630
835.00	3,465	2,401	4,031

Device	Routing	Invert	Outlet Devices
#1	Primary	830.95'	**12.0" Round Culvert** L= 35.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 830.95' / 830.38' S= 0.0163 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**10.0" Round Culvert** L= 13.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.80'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 12.05 hrs HW=834.98' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=5.07 cfs @ 12.05 hrs HW=834.98' (Free Discharge)
└**1=Culvert** (Passes 5.07 cfs of 7.11 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 1.92 cfs @ 3.52 fps)
  └**4=Orifice/Grate** (Weir Controls 3.15 cfs @ 1.39 fps)

Pond 1P: NW Basin



Summary for Pond 2P: SW Basin

Inflow Area = 0.700 ac, 75.89% Impervious, Inflow Depth = 6.20" for 100-year event
Inflow = 6.19 cfs @ 12.01 hrs, Volume= 0.361 af
Outflow = 1.74 cfs @ 12.20 hrs, Volume= 0.361 af, Atten= 72%, Lag= 11.1 min
Discarded = 0.09 cfs @ 12.20 hrs, Volume= 0.110 af
Primary = 1.66 cfs @ 12.20 hrs, Volume= 0.251 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 834.81' @ 12.20 hrs Surf.Area= 8,273 sf Storage= 7,531 cf

Plug-Flow detention time= 439.6 min calculated for 0.361 af (100% of inflow)
Center-of-Mass det. time= 439.6 min (1,221.0 - 781.4)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	9,206 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

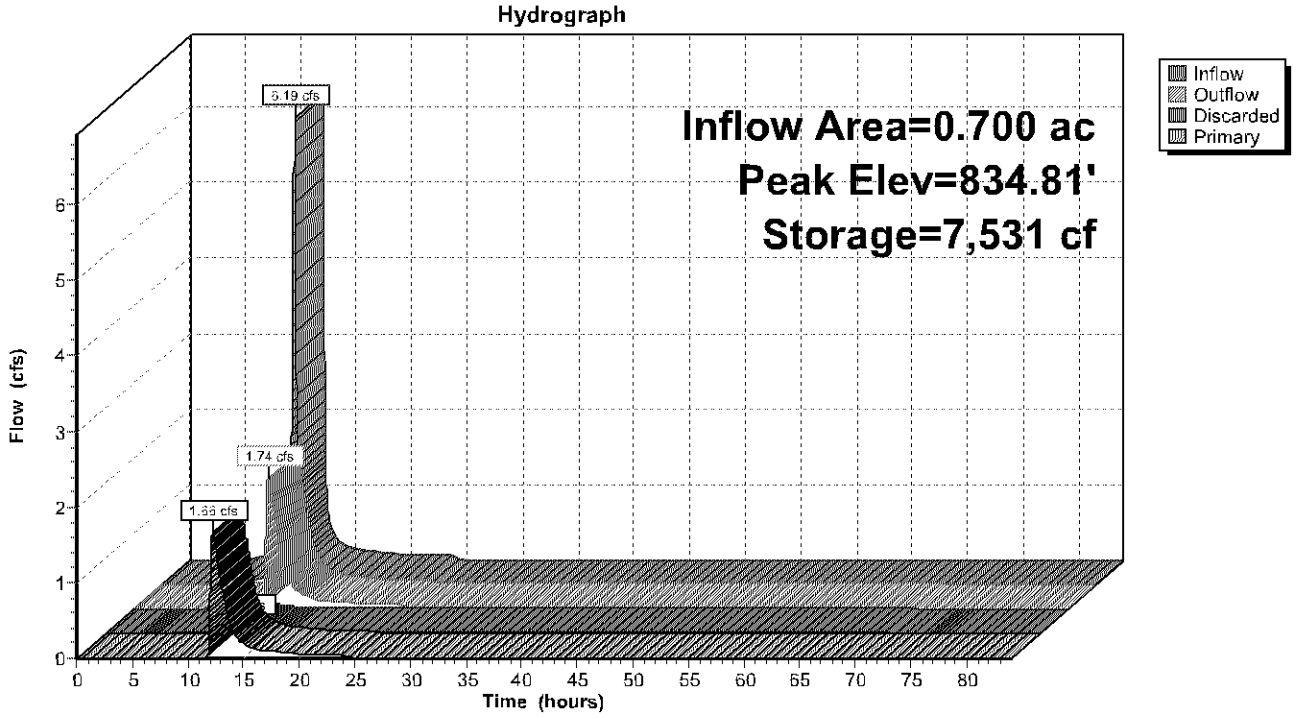
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	1,025	0	0
833.00	1,548	1,287	1,287
834.00	2,325	1,937	3,223
835.00	9,641	5,983	9,206

Device	Routing	Invert	Outlet Devices
#1	Primary	833.00'	**12.0" Round Culvert** L= 250.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.00' / 830.95' S= 0.0082 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**10.0" Round Culvert** L= 6.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.90'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.09 cfs @ 12.20 hrs HW=834.81' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=1.66 cfs @ 12.20 hrs HW=834.81' (Free Discharge)
└**1=Culvert** (Passes 1.66 cfs of 3.49 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 1.66 cfs @ 3.18 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 2P: SW Basin



Summary for Pond 3P: SE Basin

Inflow Area = 0.619 ac, 84.50% Impervious, Inflow Depth = 6.55" for 100-year event
Inflow = 5.64 cfs @ 12.01 hrs, Volume= 0.338 af
Outflow = 2.10 cfs @ 12.16 hrs, Volume= 0.338 af, Atten= 63%, Lag= 9.0 min
Discarded = 0.08 cfs @ 12.16 hrs, Volume= 0.088 af
Primary = 2.02 cfs @ 12.16 hrs, Volume= 0.250 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 834.85' @ 12.16 hrs Surf.Area= 7,506 sf Storage= 6,503 cf

Plug-Flow detention time= 371.4 min calculated for 0.338 af (100% of inflow)
Center-of-Mass det. time= 371.4 min (1,142.4 - 771.0)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	7,678 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

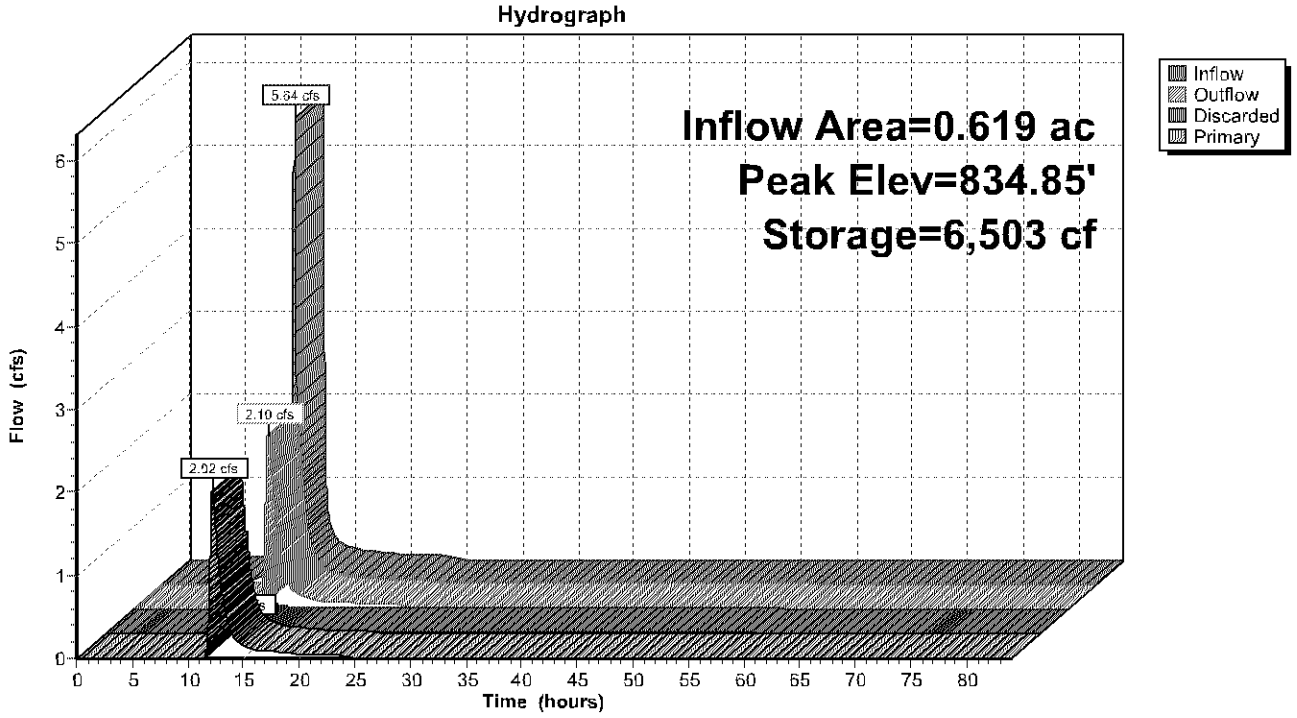
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	733	0	0
833.00	1,198	966	966
834.00	1,875	1,537	2,502
835.00	8,476	5,176	7,678

Device	Routing	Invert	Outlet Devices
#1	Primary	831.50'	**12.0" Round Culvert** L= 232.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 831.50' / 828.79' S= 0.0117 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**12.0" Round Culvert** L= 14.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.90'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.08 cfs @ 12.16 hrs HW=834.85' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=2.02 cfs @ 12.16 hrs HW=834.85' (Free Discharge)
└**1=Culvert** (Passes 2.02 cfs of 4.79 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 2.02 cfs @ 3.04 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 3P: SE Basin



Summary for Pond 4P: NE Basin

Inflow Area = 0.404 ac, 85.37% Impervious, Inflow Depth = 6.67" for 100-year event
Inflow = 3.72 cfs @ 12.01 hrs, Volume= 0.225 af
Outflow = 2.65 cfs @ 12.09 hrs, Volume= 0.225 af, Atten= 29%, Lag= 4.8 min
Discarded = 0.03 cfs @ 12.09 hrs, Volume= 0.035 af
Primary = 2.62 cfs @ 12.09 hrs, Volume= 0.190 af

Routing by Stor-Ind method, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs
Peak Elev= 834.96' @ 12.09 hrs Surf.Area= 2,806 sf Storage= 2,761 cf

Plug-Flow detention time= 194.8 min calculated for 0.225 af (100% of inflow)
Center-of-Mass det. time= 195.2 min (962.2 - 767.0)

Volume	Invert	Avail.Storage	Storage Description
#1	832.00'	2,869 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

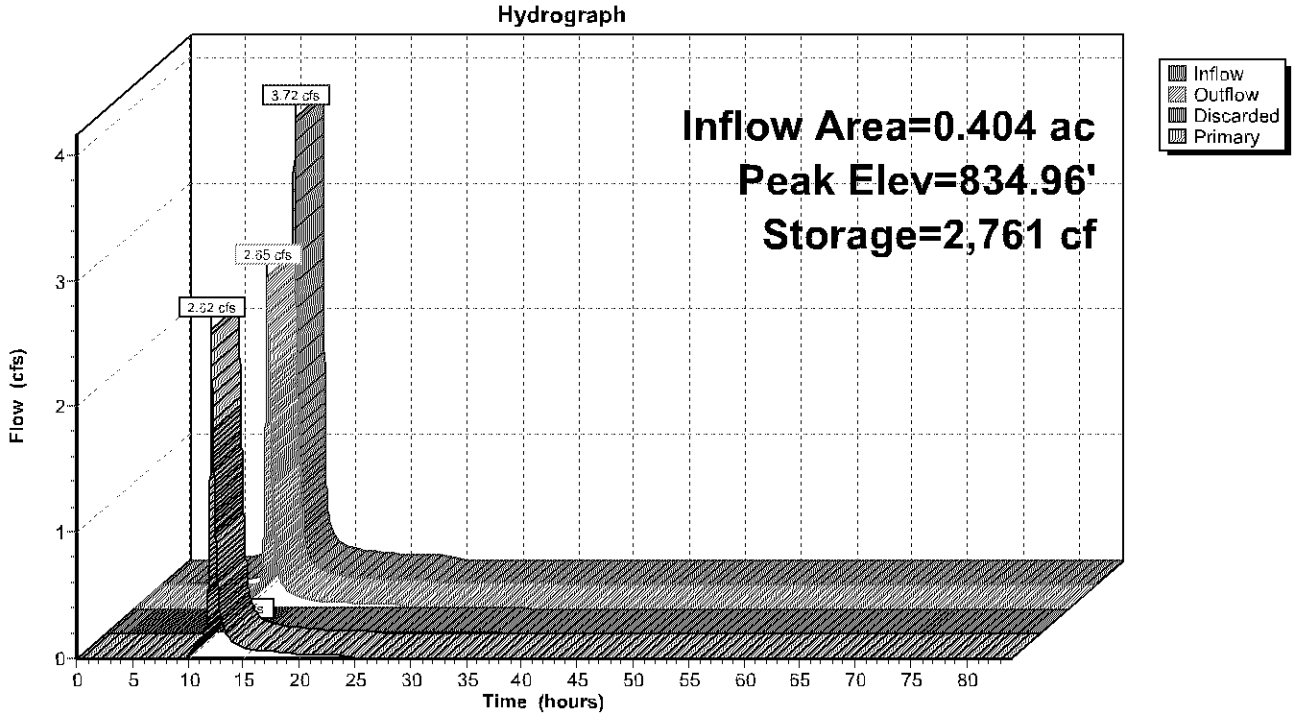
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
832.00	81	0	0
833.00	468	275	275
834.00	920	694	969
835.00	2,880	1,900	2,869

Device	Routing	Invert	Outlet Devices
#1	Primary	827.35'	**12.0" Round Culvert** L= 85.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 827.35' / 826.36' S= 0.0116 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	833.80'	**10.0" Round Culvert** L= 5.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 833.80' / 833.80' S= 0.0000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.55 sf
#3	Discarded	832.00'	**0.450 in/hr Exfiltration over Surface area**
#4	Device 1	834.90'	**48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 12.09 hrs HW=834.96' (Free Discharge)
└**3=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=2.61 cfs @ 12.09 hrs HW=834.96' (Free Discharge)
└**1=Culvert** (Passes 2.61 cfs of 8.51 cfs potential flow)
  ├**2=Culvert** (Barrel Controls 1.97 cfs @ 3.62 fps)
  └**4=Orifice/Grate** (Weir Controls 0.63 cfs @ 0.81 fps)

Pond 4P: NE Basin

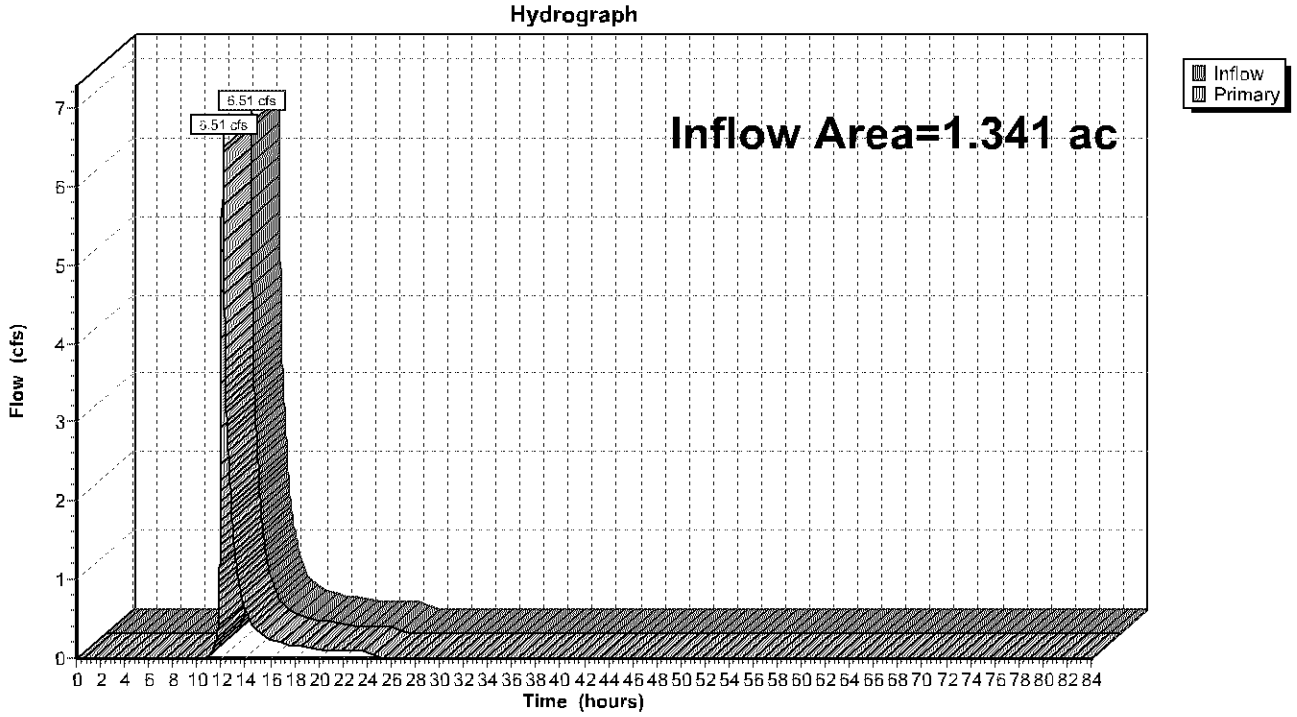


Summary for Link 9L: NW Connection

Inflow Area = 1.341 ac, 74.52% Impervious, Inflow Depth = 4.66" for 100-year event
Inflow = 6.51 cfs @ 12.06 hrs, Volume= 0.520 af
Primary = 6.51 cfs @ 12.06 hrs, Volume= 0.520 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs

Link 9L: NW Connection

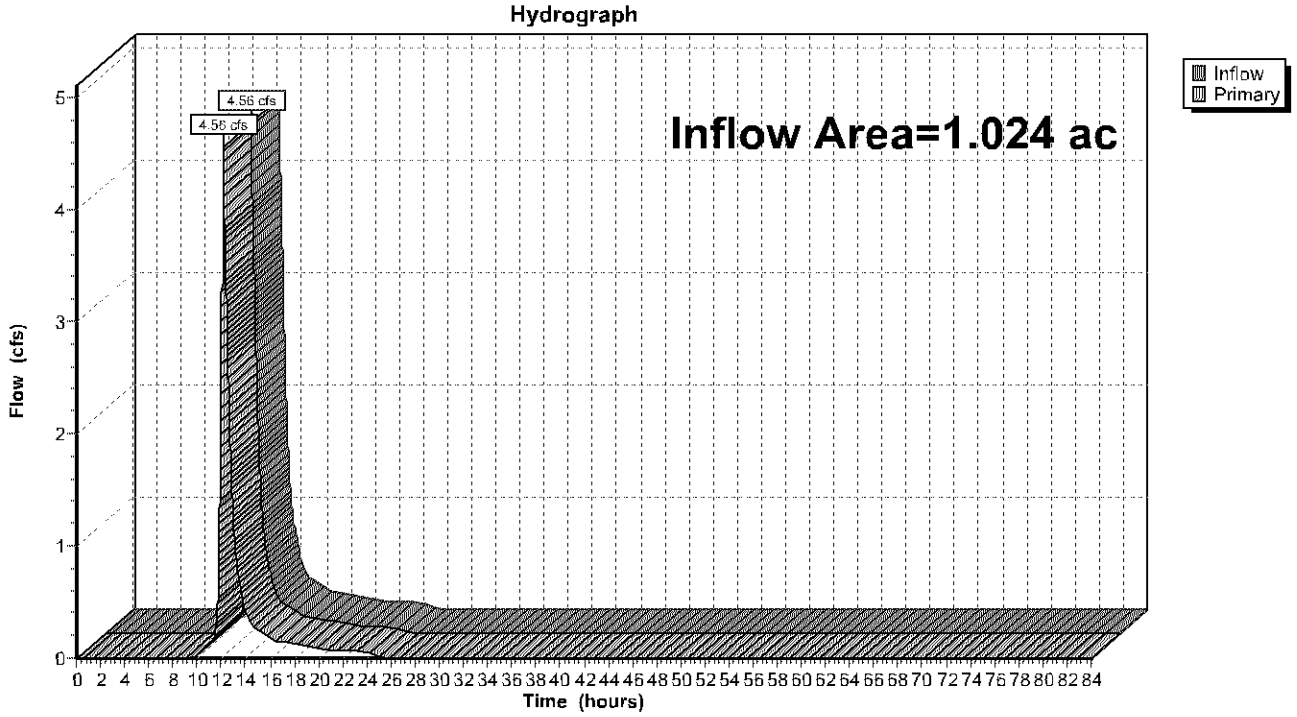


Summary for Link 10L: NE Connection

Inflow Area = 1.024 ac, 84.84% Impervious, Inflow Depth = 5.15" for 100-year event
Inflow = 4.56 cfs @ 12.09 hrs, Volume= 0.439 af
Primary = 4.56 cfs @ 12.09 hrs, Volume= 0.439 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-84.00 hrs, dt= 0.01 hrs

Link 10L: NE Connection



APPENDIX C – MIDS CALCULATIONS

Project Information

Calculator Version:	Version 2: June 2014
Project Name:	American Blvd Storage - Proposed
User Name / Company Name:	Sambatek
Date:	2017-12-01
Project Description:	

Site Information

Retention Requirement (inches):	1
Site's Zip Code:	55420
Annual Rainfall (inches):	31.5
Phosphorus EMC (mg/l):	0.3
TSS EMC (mg/l):	54.5

Total Site Area

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed		0.596			0.596
			Impervious Area (acres)		1.865
				Total Area (acres)	2.461

Site Areas Routed to BMPs

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed		0.497			0.497
			Impervious Area (acres)		1.865
				Total Area (acres)	2.362

Summary Information

Performance Goal Requirement

Performance goal volume retention requirement:	6770	ft3
Volume removed by BMPs towards performance goal:	6042	ft3
Percent volume removed towards performance goal	**89**	**%**

Annual Volume and Pollutant Load Reductions

Post development annual runoff volume	4.4674	acre-ft
Annual runoff volume removed by BMPs:	4.0009	acre-ft
Percent annual runoff volume removed:	**90**	**%**
Post development annual particulate P load:	2	lbs
Annual particulate P removed by BMPs:	1.81	lbs
Post development annual dissolved P load:	1.64	lbs
Annual dissolved P removed by BMPs:	1.46	lbs
Percent annual total phosphorus removed:	**90**	**%**
Post development annual TSS load:	662	lbs
Annual TSS removed by BMPs:	594	lbs
Percent annual TSS removed:	**90**	**%**

BMP Summary

Performance Goal Summary

BMP Name	BMP Volume Capacity (ft3)	Volume Recieved (ft3)	Volume Retained (ft3)	Volume Outflow (ft3)	Percent Retained (%)
1 - Infiltration basin NW	1396	1692	1396	296	83
2 - Infiltration basin SW	2876	1928	1928	0	100
3 - Infiltration basin SE	2226	1898	1898	0	100
4 - Infiltration basin NE	820	1252	820	432	65

Annual Volume Summary

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)
1 - Infiltration basin NW	1.1276	0	0.9651	0.1625	86
2 - Infiltration basin SW	1.2716	0	1.2293	0.0423	97
3 - Infiltration basin SE	1.2192	0	1.1483	0.0709	94
4 - Infiltration basin NE	0.8022	0	0.6582	0.144	82

Particulate Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Infiltration basin NW	0.51	0	0.44	0.07	86
2 - Infiltration basin SW	0.57	0	0.55	0.02	97
3 - Infiltration basin SE	0.55	0	0.52	0.03	94
4 - Infiltration basin NE	0.36	0	0.3	0.06	82

Dissolved Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Infiltration basin NW	0.41	0	0.35	0.06	86
2 - Infiltration basin SW	0.47	0	0.45	0.02	97
3 - Infiltration basin SE	0.45	0	0.42	0.03	94
4 - Infiltration basin NE	0.29	0	0.24	0.05	82

TSS Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Infiltration basin NW	167	0	143	24	86
2 - Infiltration basin SW	189	0	183	6	97
3 - Infiltration basin SE	181	0	170	11	94
4 - Infiltration basin NE	119	0	98	21	82

BMP Schematic

1 - Infiltration basin NW

4 - Infiltration basin NE

2 - Infiltration basin SW

3 - Infiltration basin SE