

MEMORANDUM

Date: April 12, 2022

To: Conservation Commission
City of New Bedford

From: Civil & Environmental Consultants, Inc.
Steven D. Gioiosa, P.E. and Daniel S. Gioiosa

Subject: Request for Amended Order of Conditions
Panagakos Development
DEP File # SE049-0870

Location: West Side of Phillips Road
Assessor's Map 136, Lot 468

CEC Project: 304-118



On behalf of the Applicant for the above referenced project, we are hereby submitting the attached revised plan and supporting drainage calculations as a request to amend the Order of Conditions issued for this site on July 21, 2021. The Order of Conditions for this project resulted in the approval of a commercial development consisting of a 3,500 SF building and 31 space parking lot. We have included the Fee Calculation Worksheet and the required Filing Fee, Certified Abutters List, and Abutter Notification Form.

The Order of Conditions was recorded in the Bristol County Registry of Deeds in Deed Book 13924, Page 142 on July 26, 2021.

The original, approved site plans included an extensive retaining wall system and subsurface stormwater mitigation system in order to accommodate the development and remain outside of the 25 foot buffer to the adjacent Bordering Vegetated Wetland (BVW). Due to the prohibitive cost associated with these site features, the Applicant has requested that we revise the plans to minimize the impervious surfaces and to eliminate these costly design features.

The revised design replaces the bulk of the subsurface detention system with a roof drain recharge system and a conventional detention basin. The retaining wall system has been replaced with a vegetated grass slope to create a stable transition from the elevated site to the adjacent buffer to the BVW.

In order to accommodate the detention basin, the parking facility has been reduced from a 31 space parking lot to the current 26 space configuration. This plan revision results in a decrease in total impervious surfaces proposed for this development.

The grading limits for this project have been revised to reflect the elimination of the walls and the addition of the detention basin. This change results in a modification of the 25 foot buffer strip. Based on the current design, the amount of the 25 foot buffer that will be altered is limited to approximately 8,500 SF. The remaining undisturbed area between the work limits and the BVW range from 5 feet to the full 25 feet with an average remaining width of undisturbed land of 15 to 18 feet. There are no activities proposed in the adjacent BVW.

With regard to the stormwater controls, all of the features proposed in the original filing relative to water quality will remain. The Stormceptor Unit has remained, unchanged in size and the total parking area draining to this structure has been reduced. The overflow from this structure is now directed into a sediment sump within the detention pond, which will provide an additional layer of stormwater buffering not contained in the original design.

The roof runoff will be directed into a recharge chamber system that has a designed overflow into the detention pond. The outlet from the pond will be controlled by an Outlet Control Structure that has a 4 inch diameter orifice, to control the rate of runoff discharge. Additionally, the bottom of the pond will have a 4" crushed stone base set on a filter fabric to promote supplemental recharge of the surface runoff.

The attached drainage calculations confirm that the mitigation provided will meet or exceed the previously approved mitigation rates. These rates are as follows:

Storm Frequency	Existing Peak Rate	Approved Peak Rate	Revised Peak Rate
2 Year	0.1 CFS	0.1 CFS	0.1 CFS
10 Year	0.6 CFS	0.6 CFS	0.6 CFS
100 Year	2.2 CFS	2.1 CFS	1.8 CFS

At this time we respectfully request the Commission's consideration of this request to amend the Order of Conditions for this project. It is our opinion that the project, as designed, meets all applicable provisions of the Wetlands Protection Act. The design reflects the minimum amount of work that is needed to allow this project to proceed in an economically viable way.

Thank you in advance for your consideration of this request and we look forward to meeting with you to discuss this project in more detail.

CC: DEP – Southeast Regional Office
Panagakos Development



MAYOR
JON MITCHELL

**City of New Bedford Conservation Commission •
Department of Environmental Stewardship**

133 William Street · Room 304 · New Bedford, Massachusetts 02740

Telephone: (508) 991.6188

Conservation • Environmental Stewardship • Resilience

**CITY OF NEW BEDFORD, MASSACHUSETTS
CONSERVATION COMMISSION
2022 FILING FEE CALCULATION WORKSHEET***

PROJECT LOCATION: West Side of Phillips Road

MAP(S) 136 **LOT(S)** 468

APPLICANT: Michael Panagakos, Panagakos Development

CONSERVATION COMMISSION APPLICATION TYPE:

- REQUEST FOR DETERMINATION OF APPLICABILITY
- NOTICE OF INTENT
- AMENDED ORDER OF CONDITIONS
- EXTENSION PERMIT
- CERTIFICATE OF COMPLIANCE

(A) ALTERATION FEES:

Application and field review of a project proposed in a Wetland Resource Area or its Buffer Zone is \$200.00 plus the applicable alteration fee as follows:

	AMOUNT DUE:
• Application and Field Review Fee (\$200.00)	<u>\$200.00</u>
• \$0.50 X _____ SF Wetland Resource Area Fee shall not exceed \$2000.00 per project	\$ _____
• \$0.05 X _____ SF of Isolated Land Subject to Flooding, Bordering Land Subject to Flooding or Land Subject to Coastal Storm Flowage Fee shall not exceed \$500.00	\$ _____
• \$0.50 X _____ SF of altered 25' Riverfront Area Fee shall not exceed \$1,500.00	\$ _____
• \$1.00 X _____ SF of undeveloped 25' Riverfront Area Fee shall not exceed \$2000.00	\$ _____
• \$5.00 X _____ LF of Coastal or Inland Bank Fee shall not exceed \$750.00	\$ _____



- \$0.10 X 34,000 SF of Buffer Zone altered \$ 3,400.00
Fee shall not exceed \$6,500.00
- \$10.00 X _____ LF of dock \$ _____
- \$10.00 X _____ acres of aquaculture \$ _____

(B) EXTENSION OF AN ORDER OF CONDITIONS:

- Single family dwelling, or minor project (house addition, in ground pool dock etc.) = \$200.00 \$ _____
- Subdivision, commercial or industrial project = \$400.00 \$ _____

(C) AMENDING A PERMIT

- Single family dwelling or minor project (house addition, in ground pool dock etc.) = \$200.00 + new alteration fee – refer to (A) above \$ _____
- Subdivision, commercial or industrial project = \$500.00 + new alteration fee – refer to (A) above \$ 500.00

(D) WETLAND DELINEATION VERIFICATION (with or without proposed alteration)

- ½ acre or less
- ½ acre to 2 acres = \$500.00 (\$100/acre thereafter) not to exceed \$3,500 \$ _____

(E) CERTIFICATES OF COMPLIANCE

- One new house = \$250.00 \$ _____
- One activity at an existing house = \$150.00 \$ _____
- Residential or Commercial docks = \$200.00 \$ _____
- Commercial & Industrial Facilities = \$1,500.00 \$ _____
- New Roadways & Associated Stormwater Mgt. Systems = \$1,500.00 \$ _____

Partial Certificates of Compliance have the same fee as a Certificate of Compliance, But you only pay the fee once (you do not pay double to obtain a full Certificate of Compliance).

(F) AFTER THE FACT FILING FEE

- Notice of Intent or Amended Order of Conditions = \$500.00 \$ _____
- Request for a Determination of Applicability = \$250.00 \$ _____

TOTAL AMOUNT DUE: \$ 4,100.00

Notes:

*Please refer to the Conservation Commission fee schedule – dated 02/2020

Please make check or Money Order payable to the City of New Bedford
Cash is not accepted.





City of New Bedford

REQUEST for a CERTIFIED ABUTTERS LIST

This information is needed so that an official abutters list as required by MA General Law may be created and used in notifying abutters. You, as applicant, are responsible for picking up and paying for the certified abutters list from the assessor's office (city hall, room #109).

SUBJECT PROPERTY			
MAP #	136	LOT(S)#	468
ADDRESS: WS Phillips Road			
OWNER INFORMATION			
NAME: Michael Panagakos			
MAILING ADDRESS: 133 Faunce Corner Road Dartmouth, MA 02767			
APPLICANT/CONTACT PERSON INFORMATION			
NAME (IF DIFFERENT): Alison Cesar for Civil & Environmental Consultants, INC			
MAILING ADDRESS (IF DIFFERENT): 31 Bellows Road Raynham, MA 02767			
TELEPHONE #	(774) 409-2664		
EMAIL ADDRESS:	ACesar@CECinc.com		
REASON FOR THIS REQUEST: <i>Check appropriate</i>			
<input type="checkbox"/>	ZONING BOARD OF APPEALS APPLICATION		
<input type="checkbox"/>	PLANNING BOARD APPLICATION		
<input checked="" type="checkbox"/>	CONSERVATION COMMISSION APPLICATION		
<input type="checkbox"/>	LICENSING BOARD APPLICATION		
<input type="checkbox"/>	OTHER (Please explain):		

Once obtained, the Certified List of Abutters must be attached to this Certification Letter. Submit this form to the Department of City Planning, Room 303 in City Hall, 133 William Street, or Email to Angela.Goncalves@newbedford-ma.gov. The applicant is responsible for picking up and paying for the certified abutters list from the Assessor's Office (city hall, room #109).

Official Use Only:

As Administrative Assistant to the City of New Bedford's Board of Assessors, I do hereby certify that the names and addresses as identified on the attached "abutters list" are duly recorded and appear on the most recent tax.

Michael J. Motta

Printed Name

Michael Motta

Signature

Digitally signed by Michael Motta
Date: 2022.03.15 14:23:33 -04'00'

3/15/2022

Date

Amount Due

\$ 5.00

Date Paid

3/15/2022

Confirmation Number

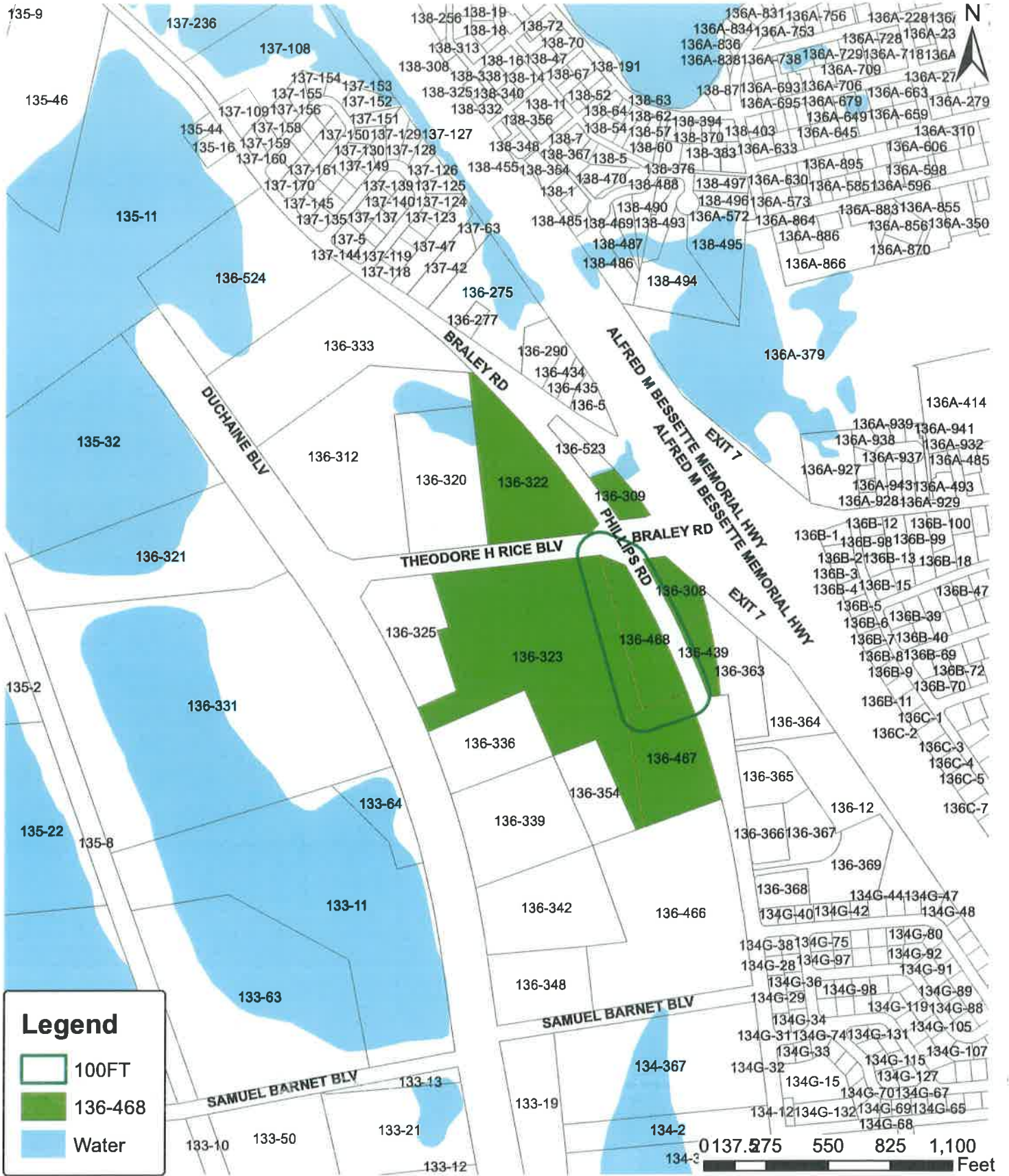
7581545

March 15, 2022
 Dear Applicant,

Please find below the List of Abutters within 100 feet of the property known as WS Phillips Road (Map: 136, Lot: 468). The current ownership listed herein must be checked and verified by the City of New Bedford Assessor's Office. Following said verification, the list shall be considered a Certified List of Abutters.

Please note that multiple listed properties with identical owner name and mailing address shall be considered duplicates and shall require only 1 mailing. Additionally, City of New Bedford-Owned properties shall not require mailed notice.

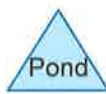
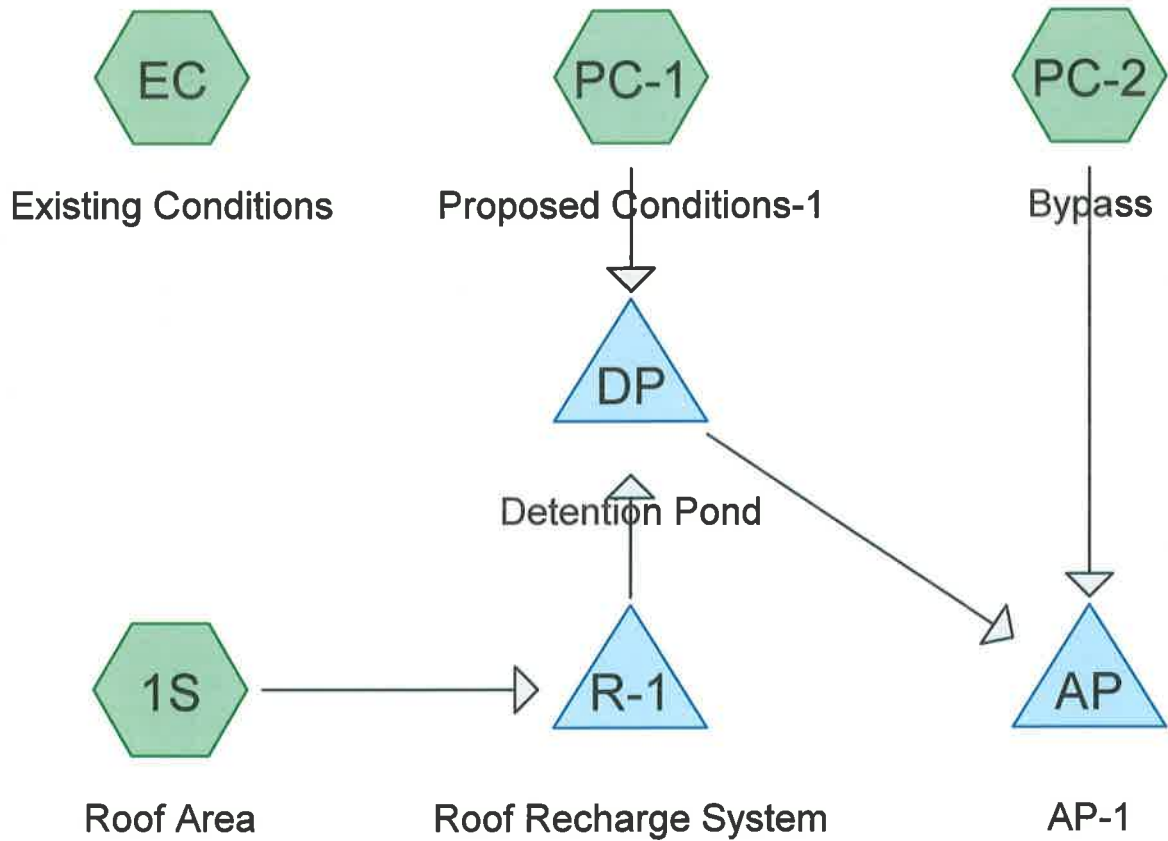
<u>Parcel</u>	<u>Location</u>	<u>Owner and Mailing Address</u>
136-439	ES PHILLIPS RD	ADAMOWSKI MICHAEL F "TRUSTEE", BRALEY NORTH REALTY TRUST (THE) 70 LAMBETH STREET NEW BEDFORD, MA 02745
136-308	1230 BRALEY RD	COMPASS BANK FOR SAVINGS, C/O TRAMMELL CROW SOVEREIGN BANK P O BOX 14115 READING, PA 19612-4115
136-323	200/214 THEODORE RICE BLVD	HIGHLAND NEW BEDFORD ASSOCIATES LIMITED, PARTNERSHIP 333 ELM STREET STE 235 DEDHAM, MA 02026
136-468	WS PHILLIPS RD	PANAGAKOS MICHAEL, 133 FAUNCE CORNER ROAD DARTMOUTH, MA 02747
136-467	PHILLIPS RD	PHILLIPS RD. SOUTH LLC, 128 BRALEY ROAD E FREETOWN, MA 02717
136-309	BRALEY RD	ADAMOWSKI MICHAEL F "TRUSTEE", BRALEY NORTH REALTY TRUST (THE) 70 LAMBETH STREET NEW BEDFORD, MA 02745
136-322	NS THEODORE RICE BLVD	BETA REALTY LLC 280 AYER ROAD HARVARD, MA 01451



City of New Bedford, Massachusetts
Department of City Planning

Parcel within 100FT





Summary for Subcatchment 1S: Roof Area

Runoff = 0.25 cfs @ 12.11 hrs, Volume= 0.021 af, Depth> 3.11"
 Routed to Pond R-1 : Roof Recharge System

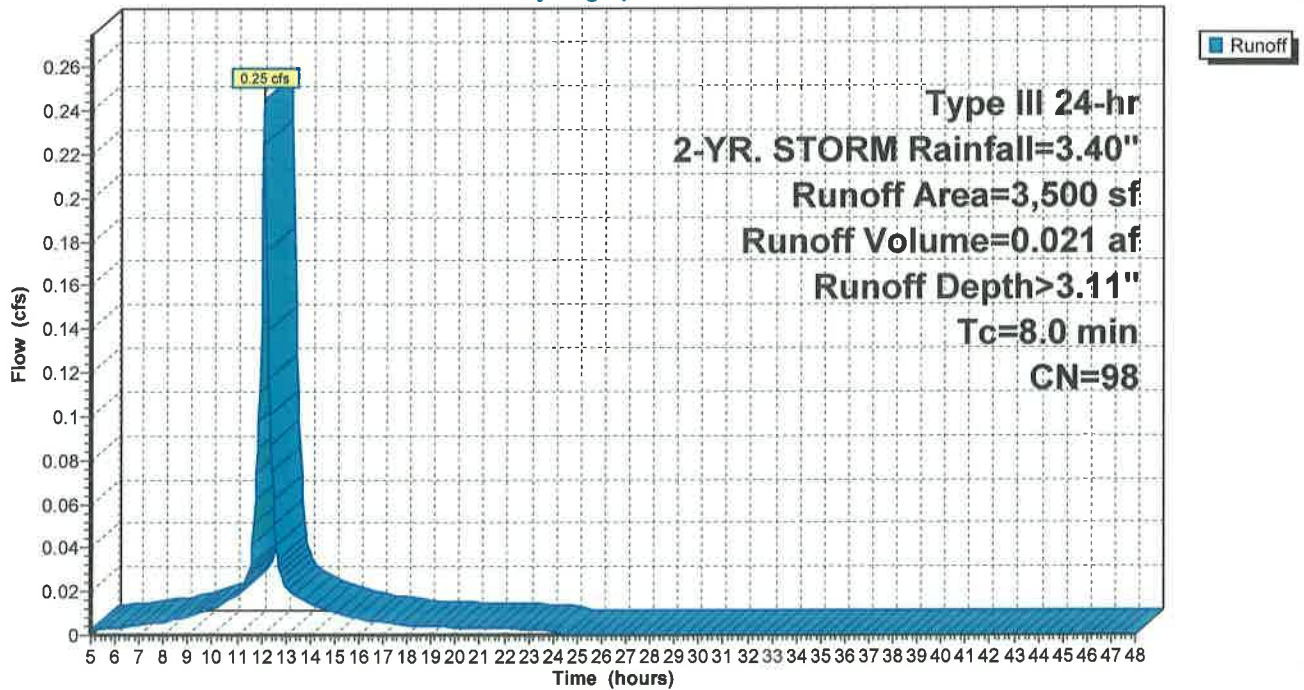
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-YR. STORM Rainfall=3.40"

Area (sf)	CN	Description
* 3,500	98	Roof Area
3,500		100.00% Impervious Area

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

Subcatchment 1S: Roof Area

Hydrograph



Summary for Subcatchment EC: Existing Conditions

Runoff = 0.06 cfs @ 12.45 hrs, Volume= 0.020 af, Depth= 0.17"

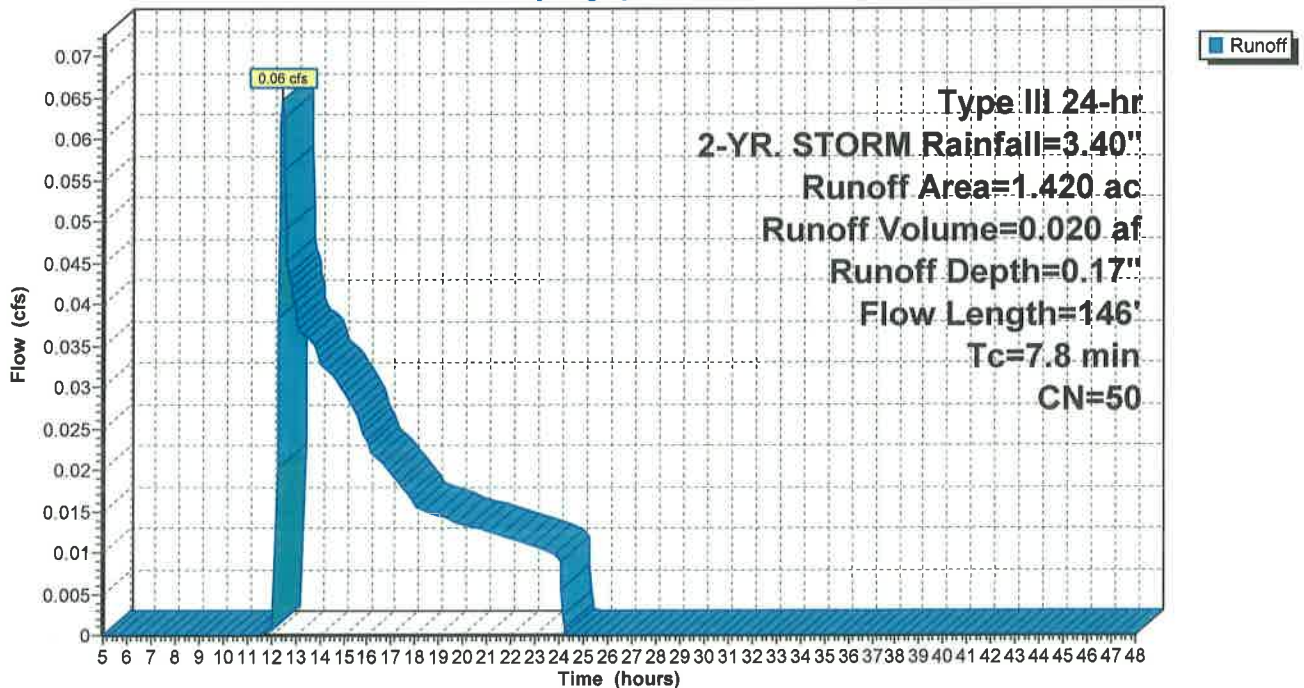
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-YR. STORM Rainfall=3.40"

Area (ac)	CN	Description
0.600	36	Woods, Fair, HSG A
0.820	60	Woods, Fair, HSG B
1.420	50	Weighted Average
1.420		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1080	0.14		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.40"
1.7	96	0.0360	0.95		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
7.8	146	Total			

Subcatchment EC: Existing Conditions

Hydrograph



Summary for Subcatchment PC-1: Proposed Conditions-1

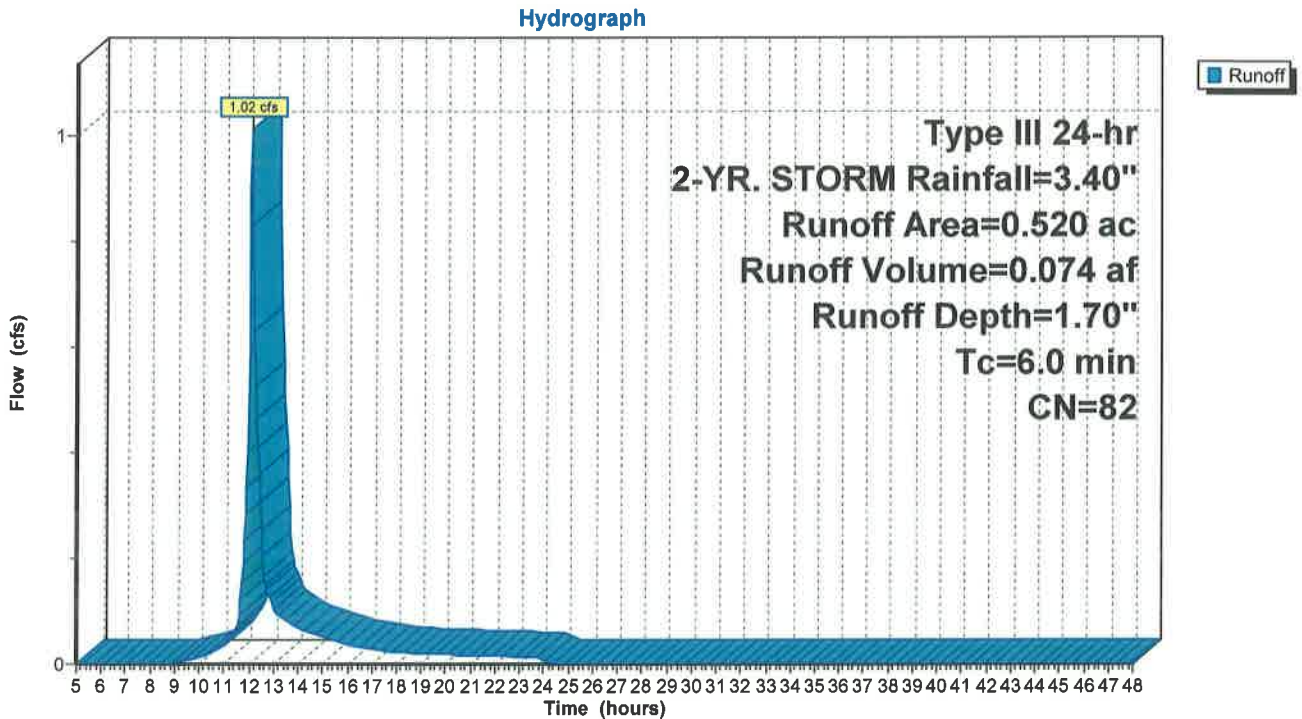
Runoff = 1.02 cfs @ 12.09 hrs, Volume= 0.074 af, Depth= 1.70"
 Routed to Pond DP : Detention Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-YR. STORM Rainfall=3.40"

Area (ac)	CN	Description
0.040	39	>75% Grass cover, Good, HSG A
0.160	61	>75% Grass cover, Good, HSG B
* 0.320	98	Impervious
0.520	82	Weighted Average
0.200		38.46% Pervious Area
0.320		61.54% Impervious Area

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

Subcatchment PC-1: Proposed Conditions-1



Summary for Subcatchment PC-2: Bypass

Runoff = 0.12 cfs @ 12.32 hrs, Volume= 0.021 af, Depth= 0.31"
 Routed to Pond AP : AP-1

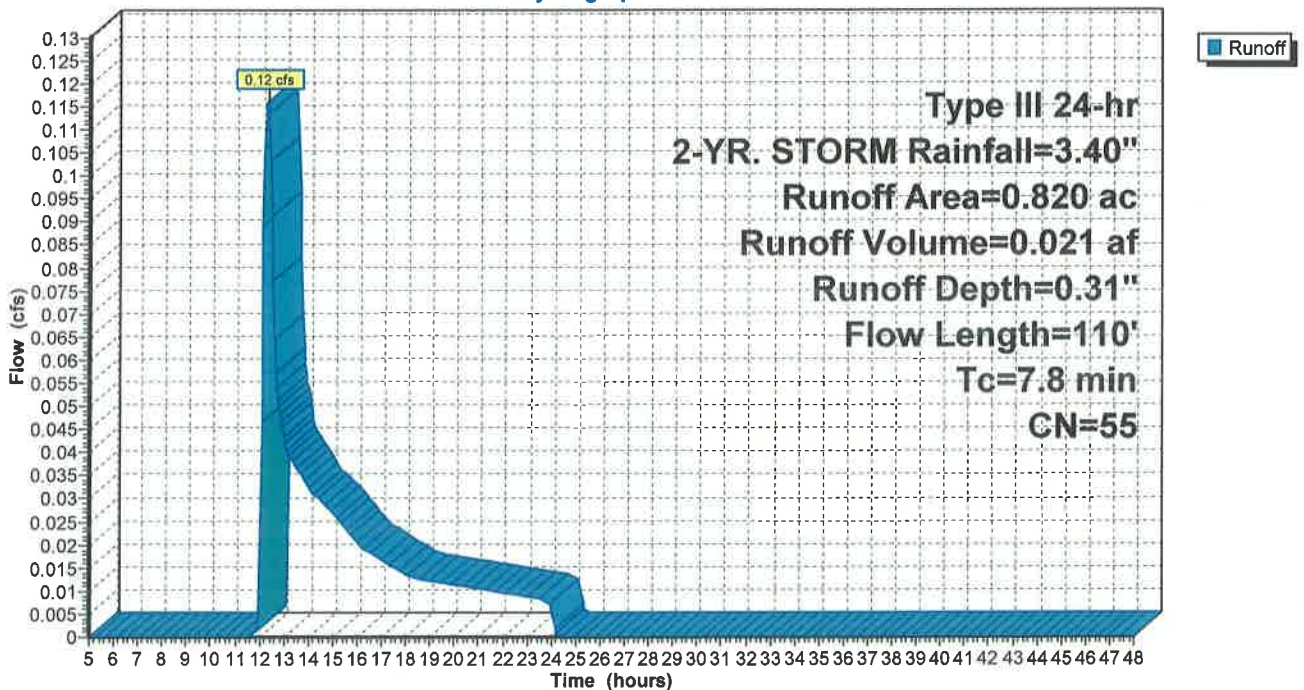
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2-YR. STORM Rainfall=3.40"

Area (ac)	CN	Description
0.220	36	Woods, Fair, HSG A
0.300	60	Woods, Fair, HSG B
0.050	98	Paved parking, HSG A
0.050	39	>75% Grass cover, Good, HSG A
0.200	61	>75% Grass cover, Good, HSG B
0.820	55	Weighted Average
0.770		93.90% Pervious Area
0.050		6.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0740	0.12		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.40"
0.7	60	0.0920	1.52		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
7.8	110	Total			

Subcatchment PC-2: Bypass

Hydrograph



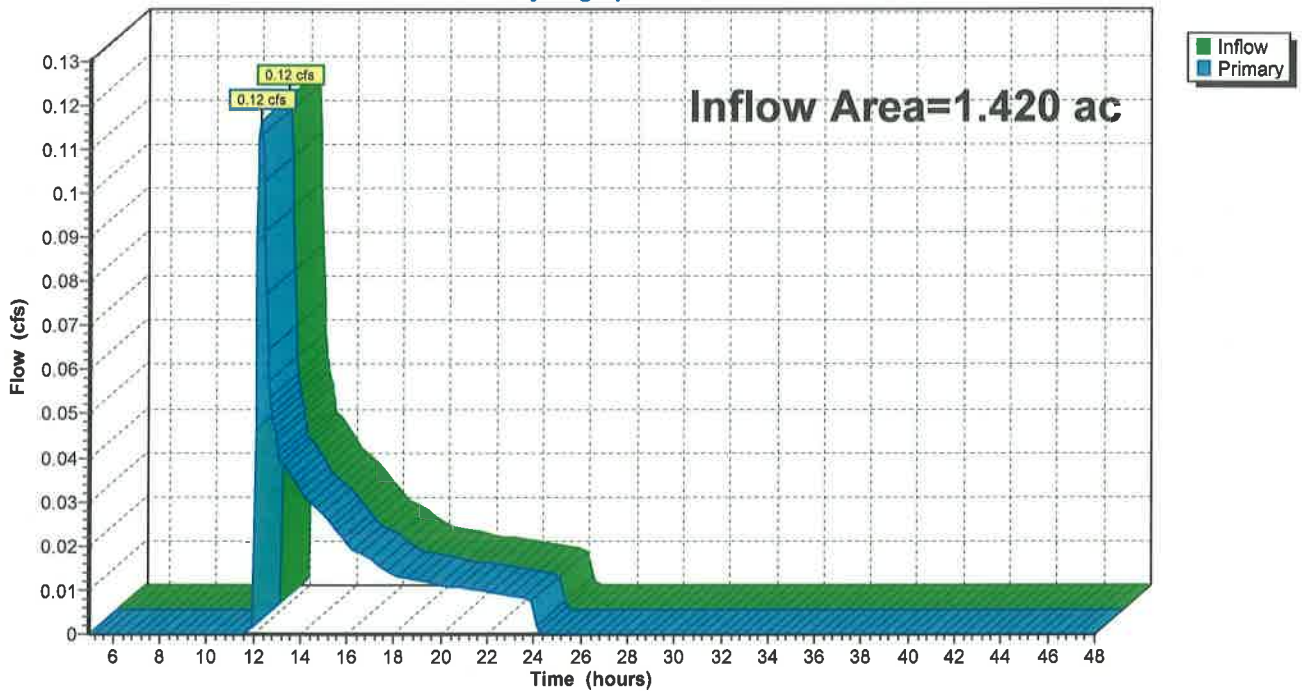
Summary for Pond AP: AP-1

Inflow Area = 1.420 ac, 31.71% Impervious, Inflow Depth = 0.18" for 2-YR. STORM event
Inflow = 0.12 cfs @ 12.32 hrs, Volume= 0.021 af
Primary = 0.12 cfs @ 12.32 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs / 2

Pond AP: AP-1

Hydrograph



Summary for Pond DP: Detention Pond

Inflow Area = 0.600 ac, 66.69% Impervious, Inflow Depth = 1.69" for 2-YR. STORM event
 Inflow = 1.23 cfs @ 12.10 hrs, Volume= 0.085 af
 Outflow = 0.01 cfs @ 11.05 hrs, Volume= 0.032 af, Atten= 99%, Lag= 0.0 min
 Discarded = 0.01 cfs @ 11.05 hrs, Volume= 0.032 af
 Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
 Routed to Pond AP : AP-1

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 89.23' @ 24.04 hrs Surf.Area= 2,806 sf Storage= 3,146 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 897.7 min (1,718.2 - 820.4)

Volume	Invert	Avail.Storage	Storage Description
#1	88.00'	8,900 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.00	2,300	0	0
88.50	2,500	1,200	1,200
89.00	2,700	1,300	2,500
90.00	3,150	2,925	5,425
91.00	3,800	3,475	8,900

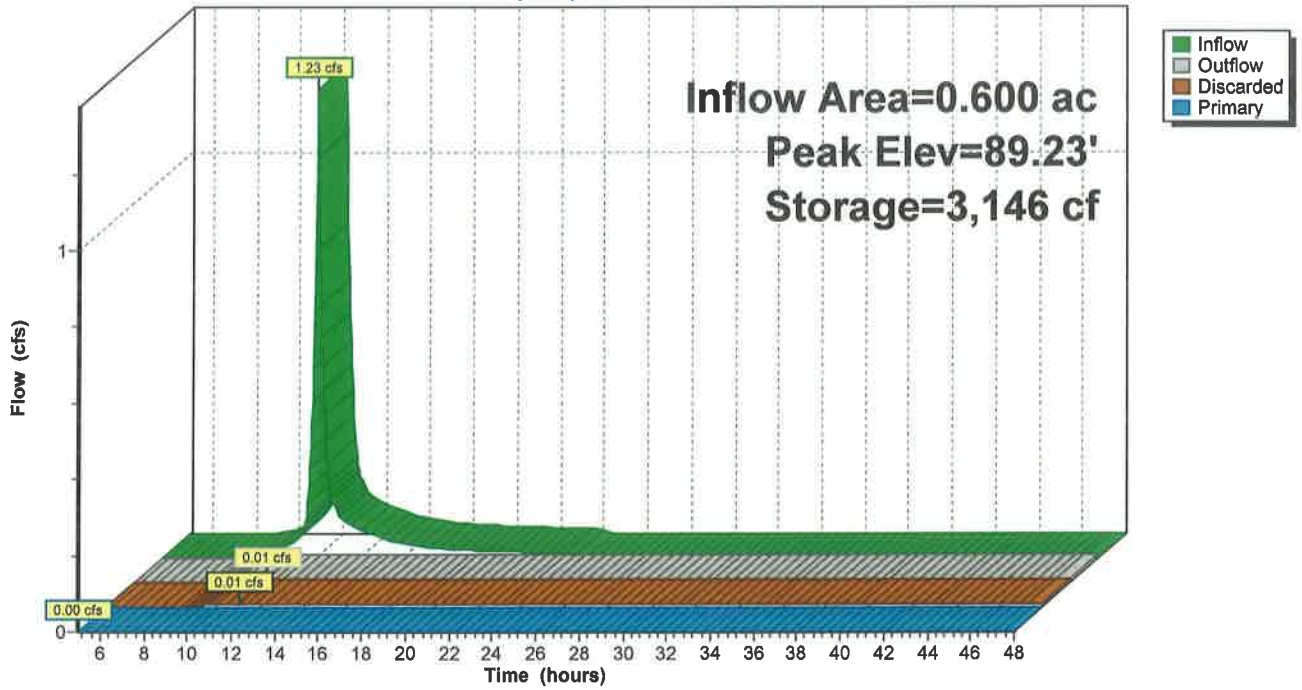
Device	Routing	Invert	Outlet Devices
#1	Discarded	88.00'	0.01 cfs Exfiltration at all elevations
#2	Primary	90.00'	4.0" Vert. 89.4 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 11.05 hrs HW=88.03' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=88.00' TW=0.00' (Dynamic Tailwater)
 ↑2=89.4 (Controls 0.00 cfs)

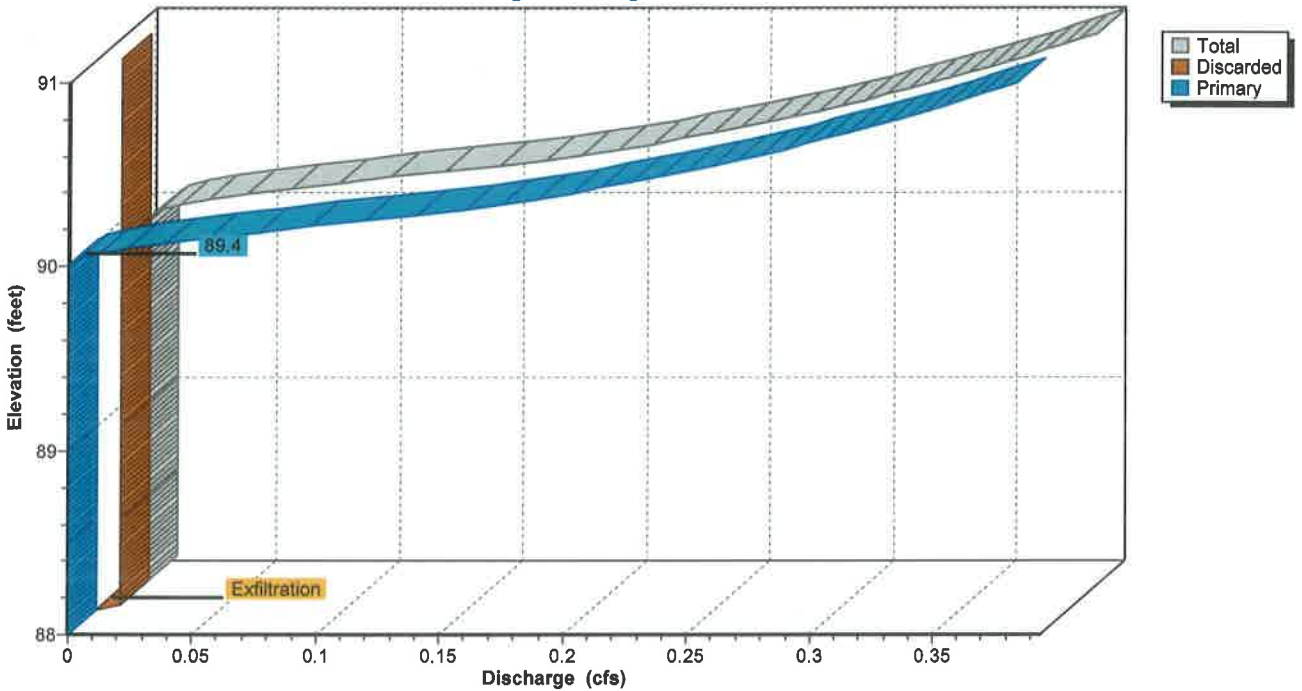
Pond DP: Detention Pond

Hydrograph



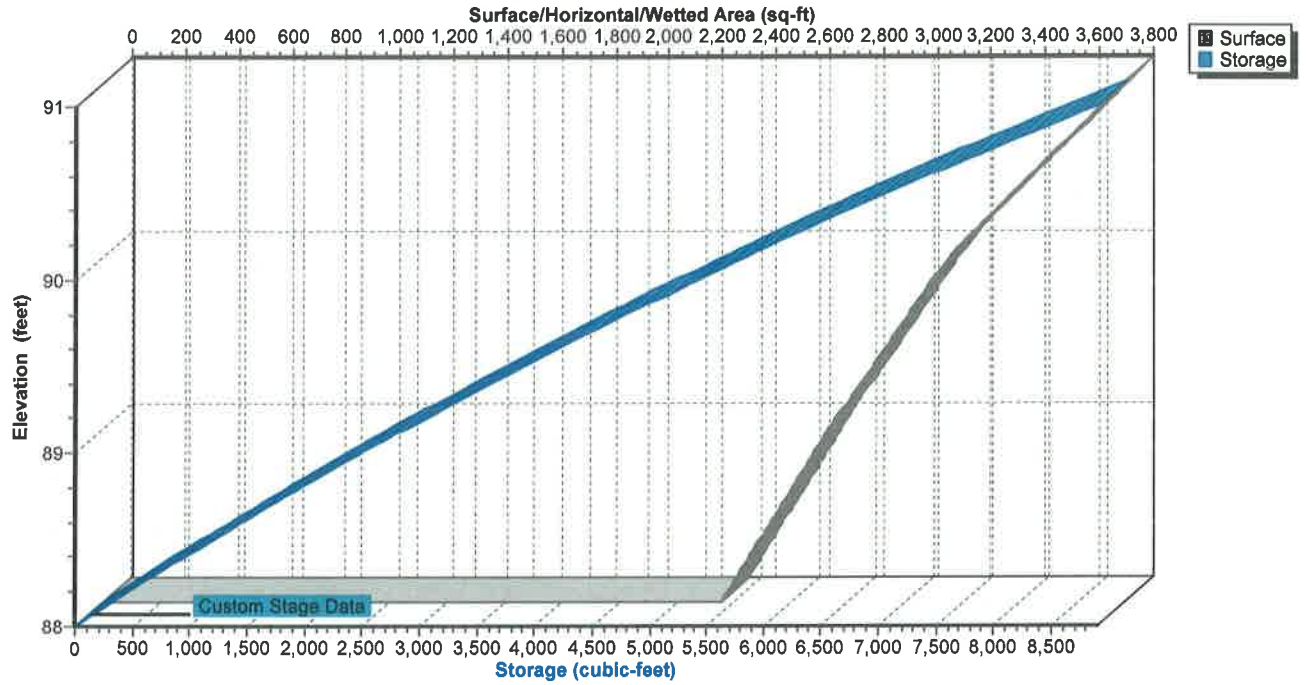
Pond DP: Detention Pond

Stage-Discharge



Pond DP: Detention Pond

Stage-Area-Storage



Summary for Pond R-1: Roof Recharge System

Inflow Area = 0.080 ac, 100.00% Impervious, Inflow Depth > 3.11" for 2-YR. STORM event
 Inflow = 0.25 cfs @ 12.11 hrs, Volume= 0.021 af
 Outflow = 0.24 cfs @ 12.13 hrs, Volume= 0.021 af, Atten= 3%, Lag= 1.3 min
 Discarded = 0.01 cfs @ 9.85 hrs, Volume= 0.010 af
 Primary = 0.23 cfs @ 12.13 hrs, Volume= 0.011 af
 Routed to Pond DP : Detention Pond

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 91.75' @ 12.13 hrs Surf.Area= 0.002 ac Storage= 0.001 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 2.1 min (769.4 - 767.3)

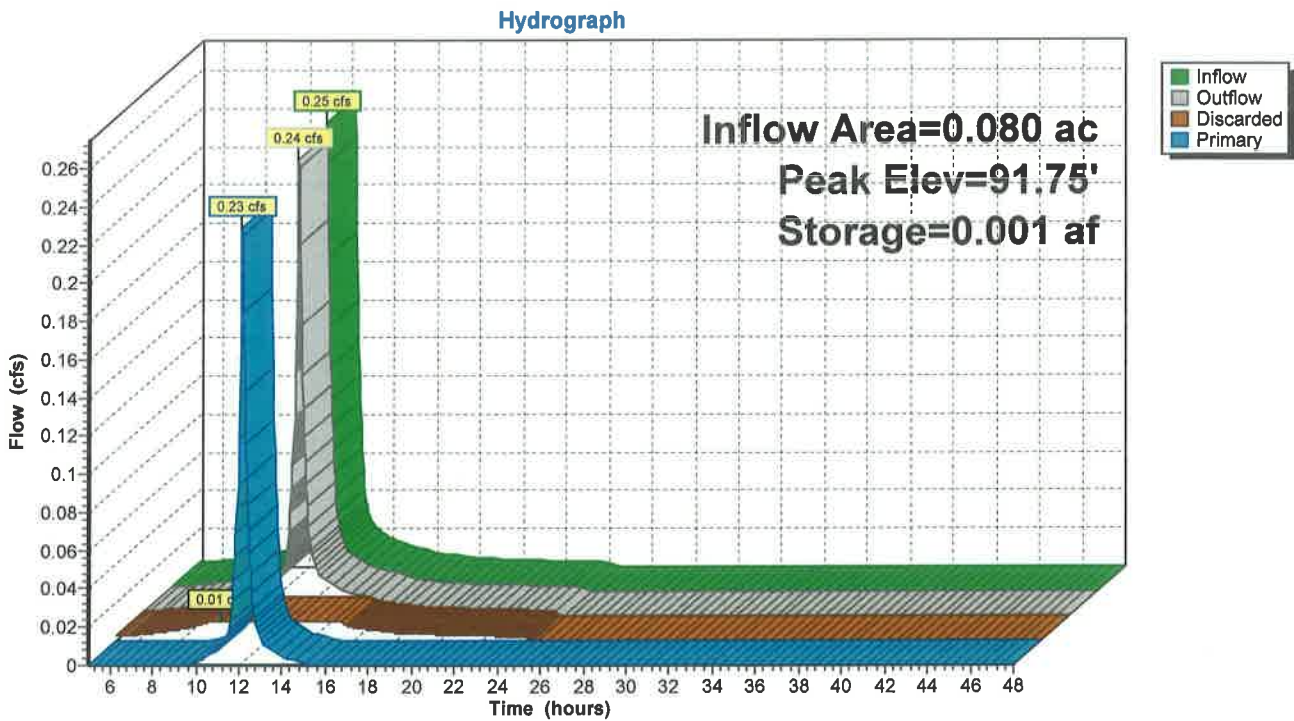
Volume	Invert	Avail.Storage	Storage Description
#1	91.40'	0.002 af	Cultec R-180 x 4 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 1 rows

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.40'	0.01 cfs Exfiltration at all elevations
#2	Primary	91.40'	6.0" Round Culvert L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.40' / 90.50' S= 0.0150 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf

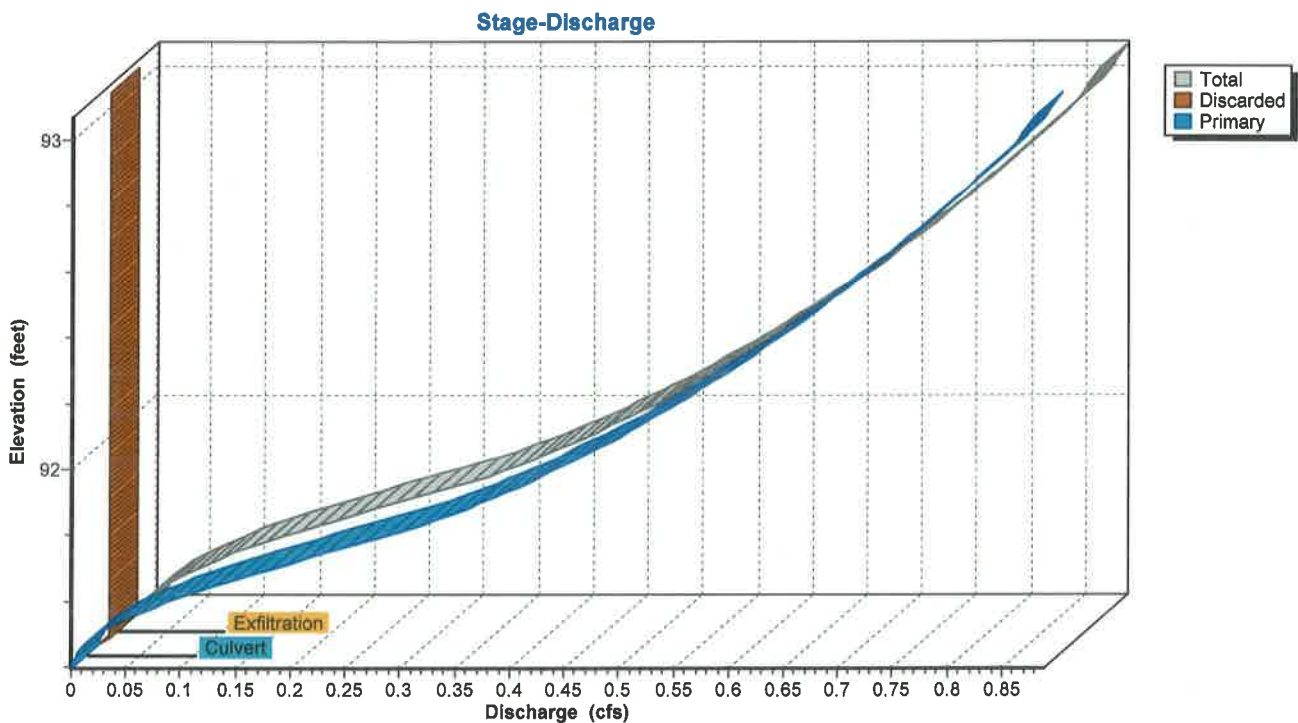
Discarded OutFlow Max=0.01 cfs @ 9.85 hrs HW=91.42' (Free Discharge)
 ↕ **1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.22 cfs @ 12.13 hrs HW=91.74' TW=88.47' (Dynamic Tailwater)
 ↕ **2=Culvert** (Inlet Controls 0.22 cfs @ 1.57 fps)

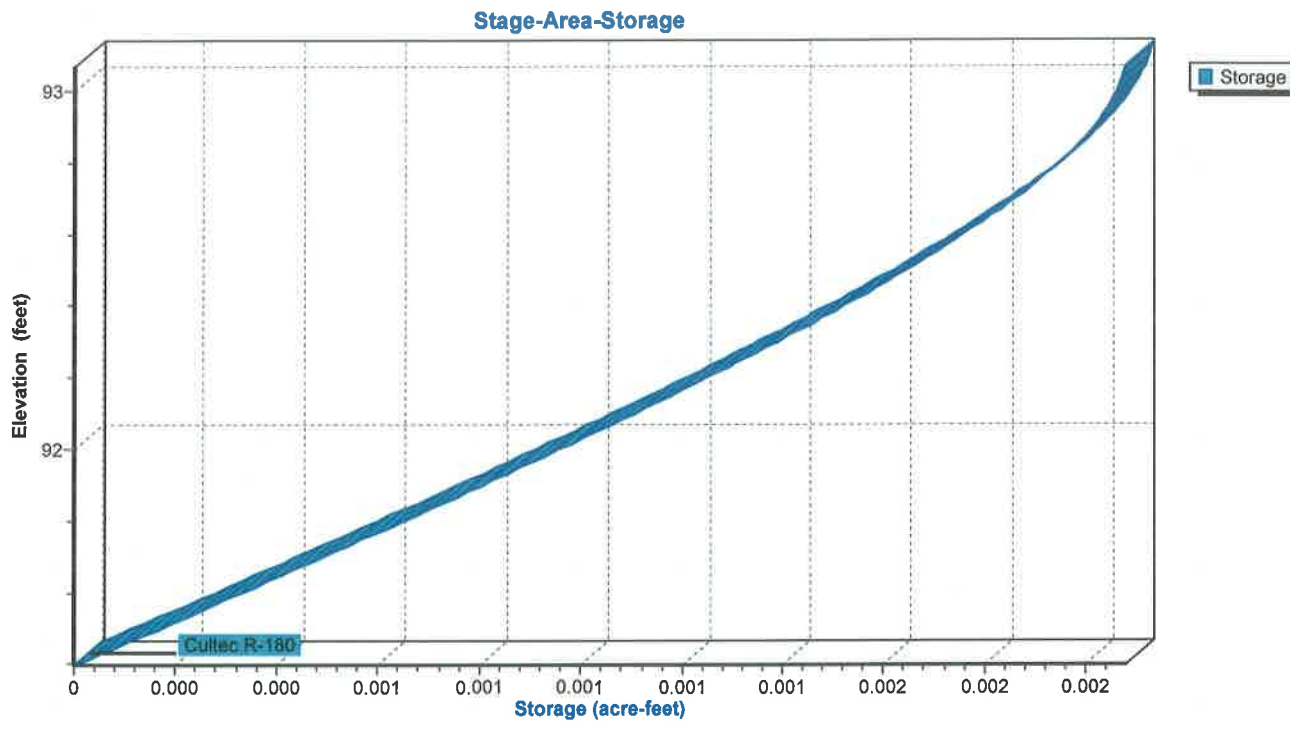
Pond R-1: Roof Recharge System



Pond R-1: Roof Recharge System



Pond R-1: Roof Recharge System



Summary for Subcatchment 1S: Roof Area

Runoff = 0.35 cfs @ 12.11 hrs, Volume= 0.030 af, Depth> 4.45"
 Routed to Pond R-1 : Roof Recharge System

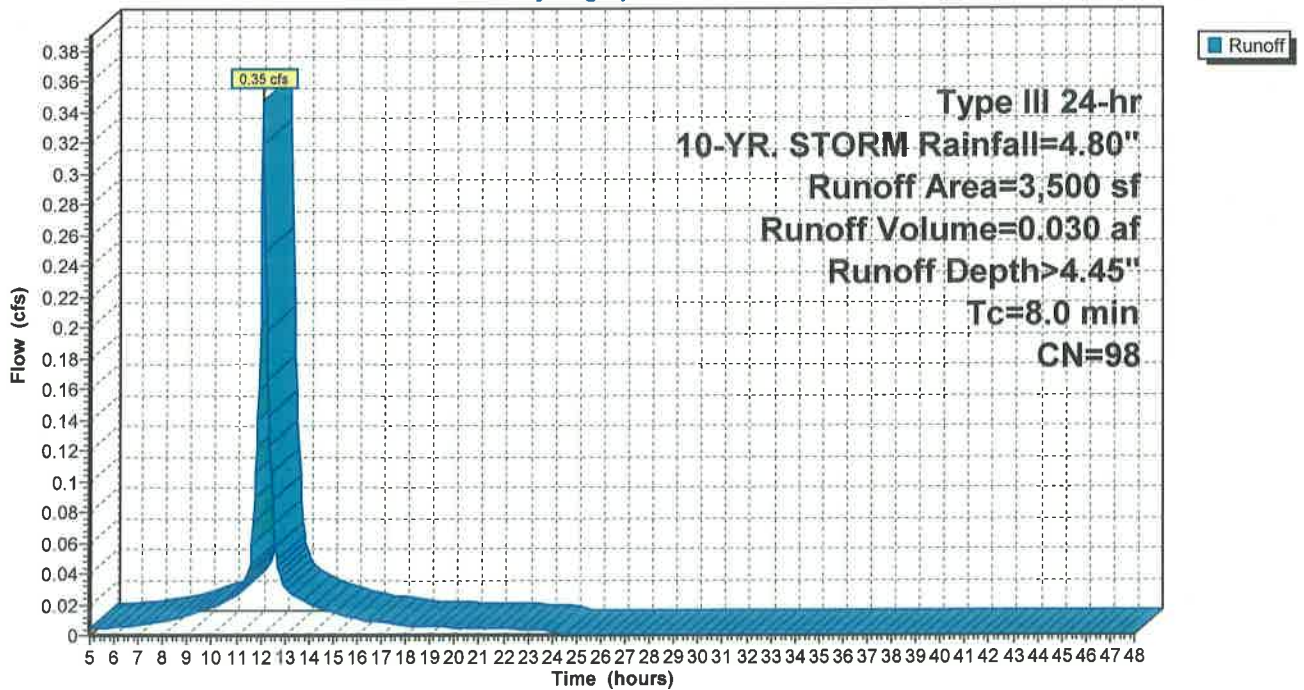
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR. STORM Rainfall=4.80"

	Area (sf)	CN	Description
*	3,500	98	Roof Area
	3,500		100.00% Impervious Area

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

Subcatchment 1S: Roof Area

Hydrograph



Summary for Subcatchment EC: Existing Conditions

Runoff = 0.55 cfs @ 12.17 hrs, Volume= 0.072 af, Depth= 0.61"

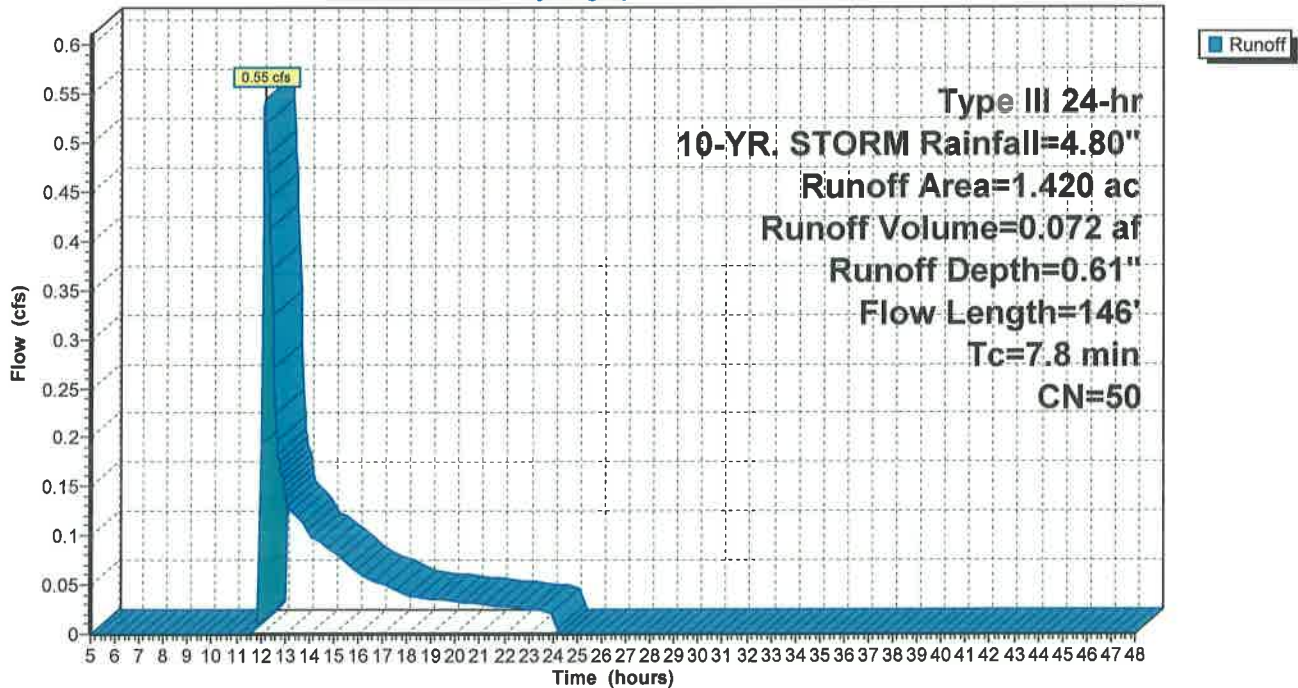
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR. STORM Rainfall=4.80"

Area (ac)	CN	Description
0.600	36	Woods, Fair, HSG A
0.820	60	Woods, Fair, HSG B
1.420	50	Weighted Average
1.420		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1080	0.14		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.40"
1.7	96	0.0360	0.95		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
7.8	146	Total			

Subcatchment EC: Existing Conditions

Hydrograph



Summary for Subcatchment PC-1: Proposed Conditions-1

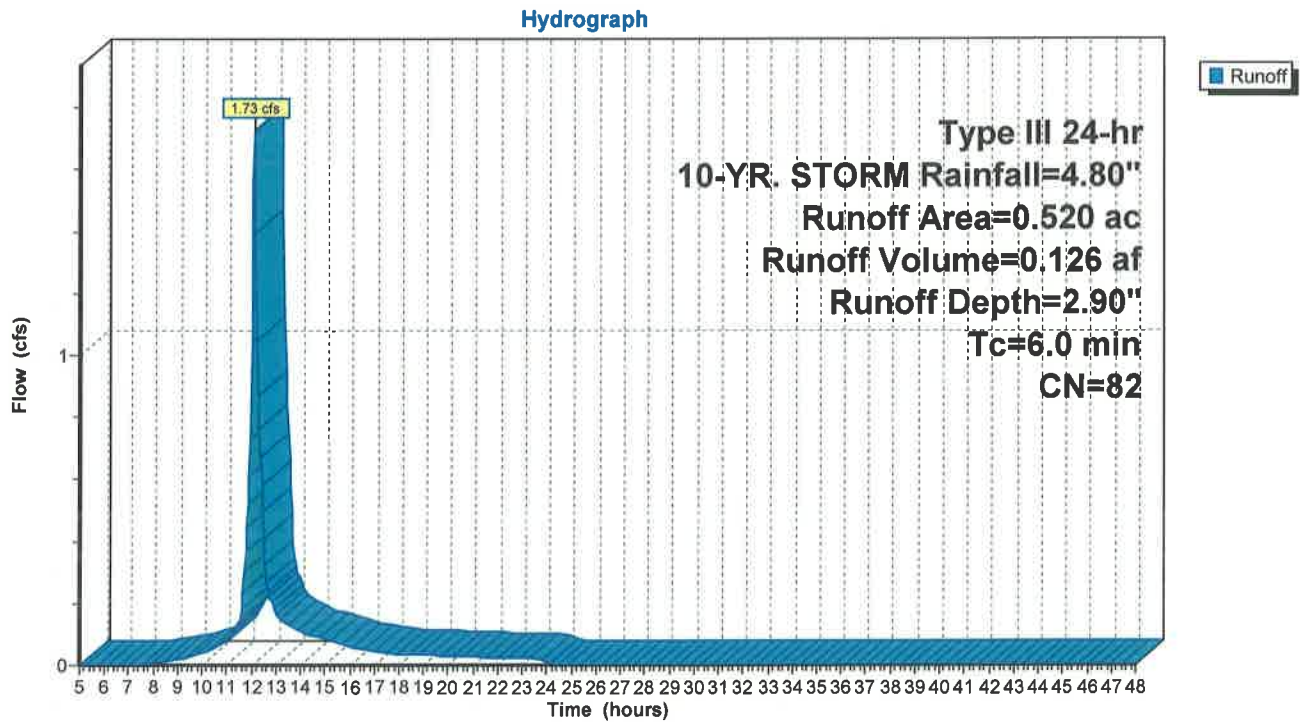
Runoff = 1.73 cfs @ 12.09 hrs, Volume= 0.126 af, Depth= 2.90"
 Routed to Pond DP : Detention Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR. STORM Rainfall=4.80"

Area (ac)	CN	Description
0.040	39	>75% Grass cover, Good, HSG A
0.160	61	>75% Grass cover, Good, HSG B
* 0.320	98	Impervious
0.520	82	Weighted Average
0.200		38.46% Pervious Area
0.320		61.54% Impervious Area

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

Subcatchment PC-1: Proposed Conditions-1



Summary for Subcatchment PC-2: Bypass

Runoff = 0.60 cfs @ 12.14 hrs, Volume= 0.060 af, Depth= 0.88"
 Routed to Pond AP : AP-1

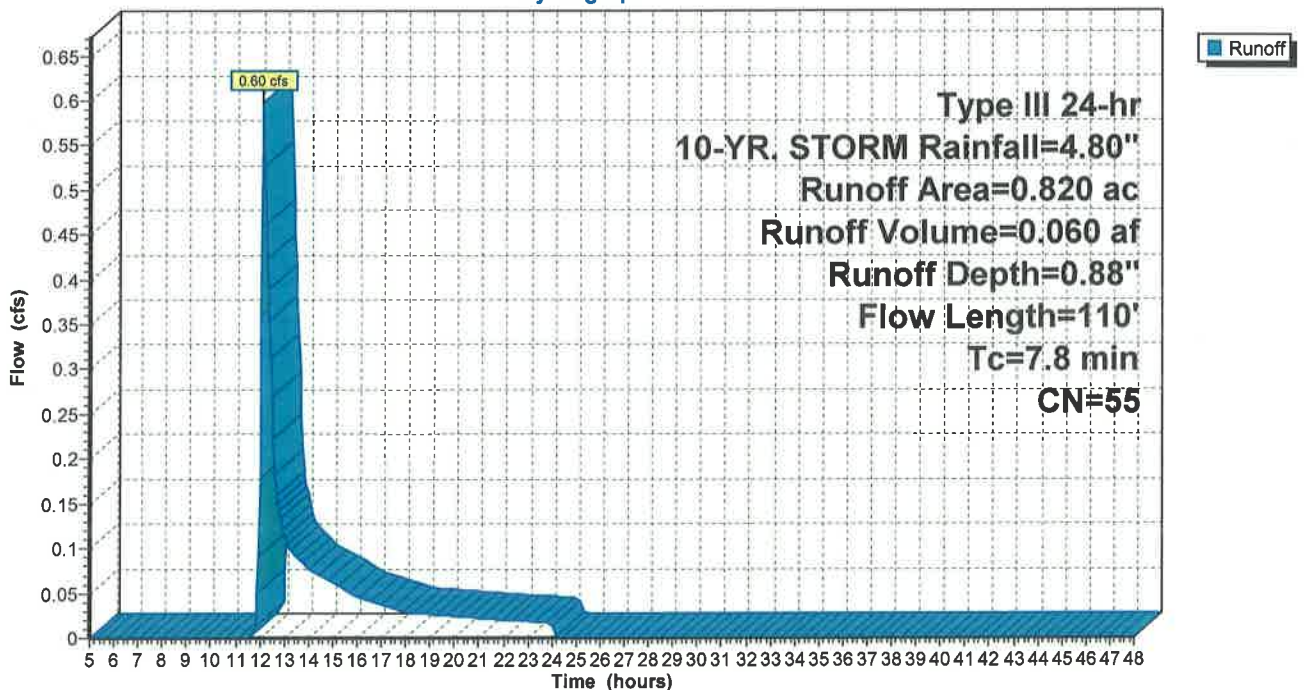
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 10-YR. STORM Rainfall=4.80"

Area (ac)	CN	Description
0.220	36	Woods, Fair, HSG A
0.300	60	Woods, Fair, HSG B
0.050	98	Paved parking, HSG A
0.050	39	>75% Grass cover, Good, HSG A
0.200	61	>75% Grass cover, Good, HSG B
0.820	55	Weighted Average
0.770		93.90% Pervious Area
0.050		6.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0740	0.12		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.40"
0.7	60	0.0920	1.52		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
7.8	110	Total			

Subcatchment PC-2: Bypass

Hydrograph



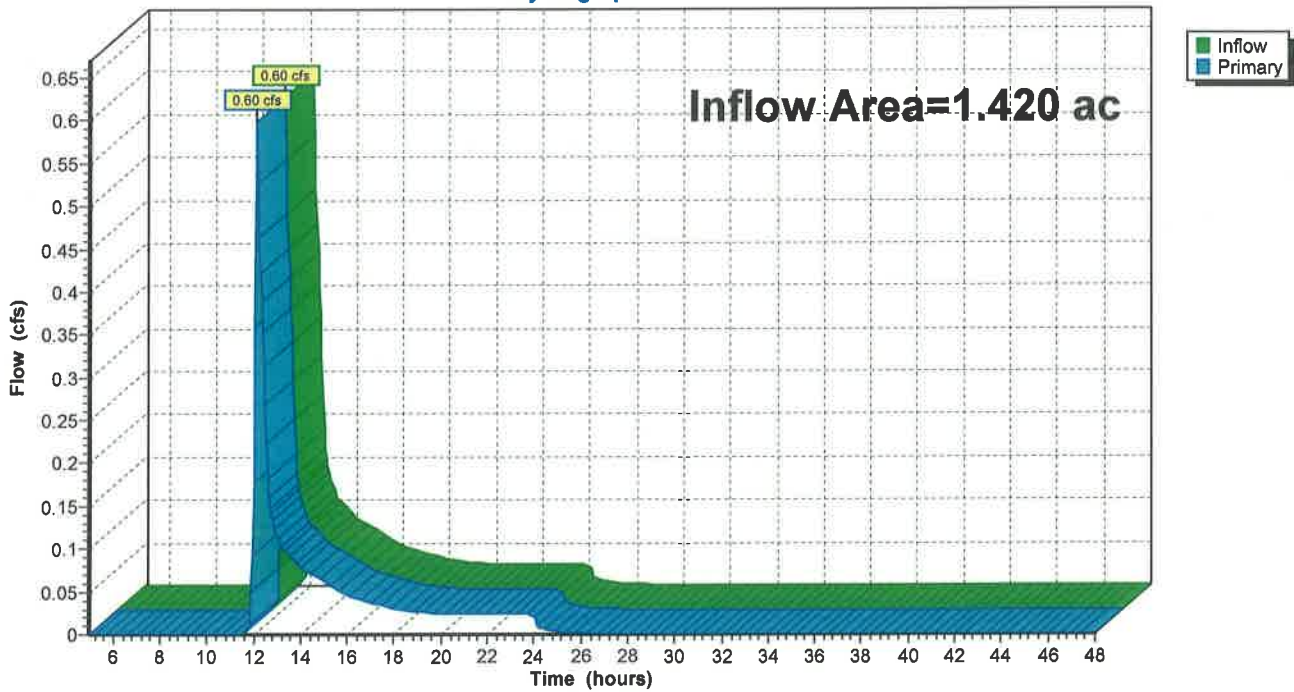
Summary for Pond AP: AP-1

Inflow Area = 1.420 ac, 31.71% Impervious, Inflow Depth = 0.53" for 10-YR. STORM event
Inflow = 0.60 cfs @ 12.14 hrs, Volume= 0.063 af
Primary = 0.60 cfs @ 12.14 hrs, Volume= 0.063 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs / 2

Pond AP: AP-1

Hydrograph



Summary for Pond DP: Detention Pond

Inflow Area = 0.600 ac, 66.69% Impervious, Inflow Depth = 2.87" for 10-YR. STORM event
 Inflow = 2.04 cfs @ 12.10 hrs, Volume= 0.144 af
 Outflow = 0.02 cfs @ 24.02 hrs, Volume= 0.035 af, Atten= 99%, Lag= 715.6 min
 Discarded = 0.01 cfs @ 9.85 hrs, Volume= 0.033 af
 Primary = 0.01 cfs @ 24.02 hrs, Volume= 0.002 af
 Routed to Pond AP : AP-1

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 90.06' @ 24.02 hrs Surf.Area= 3,186 sf Storage= 5,602 cf

Plug-Flow detention time= 983.2 min calculated for 0.035 af (25% of inflow)
 Center-of-Mass det. time= 852.5 min (1,659.9 - 807.3)

Volume	Invert	Avail.Storage	Storage Description
#1	88.00'	8,900 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.00	2,300	0	0
88.50	2,500	1,200	1,200
89.00	2,700	1,300	2,500
90.00	3,150	2,925	5,425
91.00	3,800	3,475	8,900

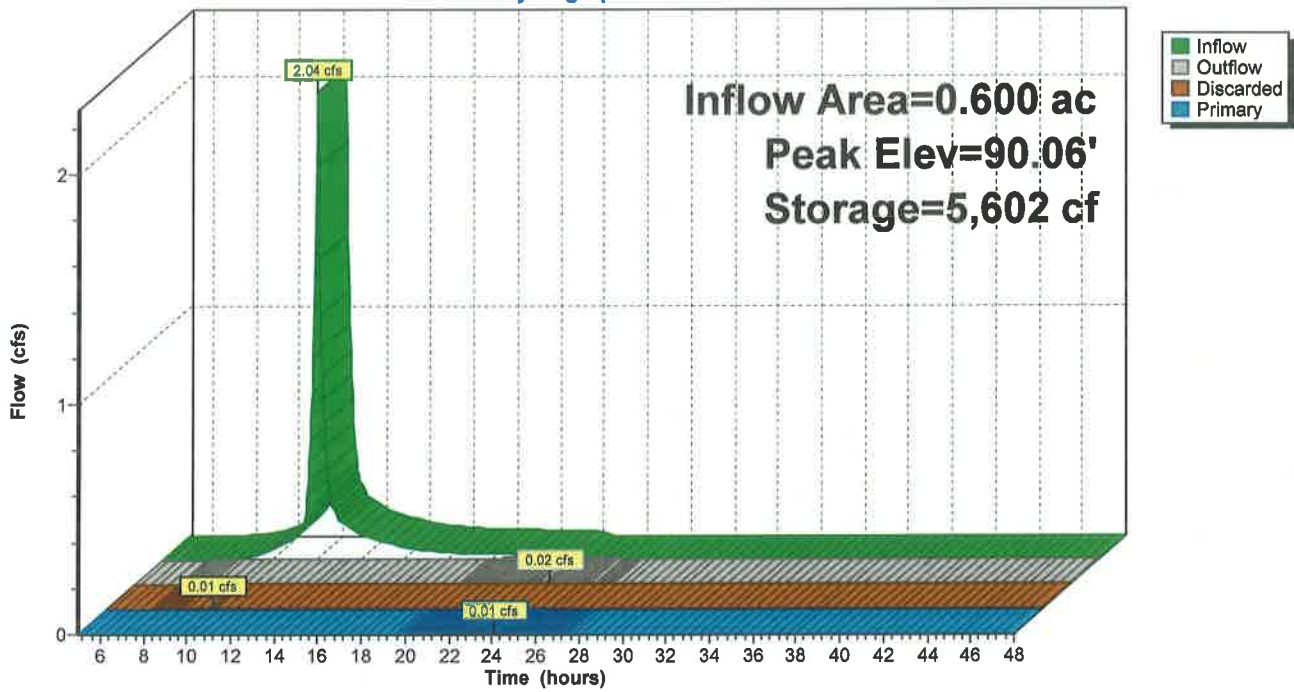
Device	Routing	Invert	Outlet Devices
#1	Discarded	88.00'	0.01 cfs Exfiltration at all elevations
#2	Primary	90.00'	4.0" Vert. 89.4 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 9.85 hrs HW=88.03' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.01 cfs @ 24.02 hrs HW=90.06' TW=0.00' (Dynamic Tailwater)
 ↑2=89.4 (Orifice Controls 0.01 cfs @ 0.80 fps)

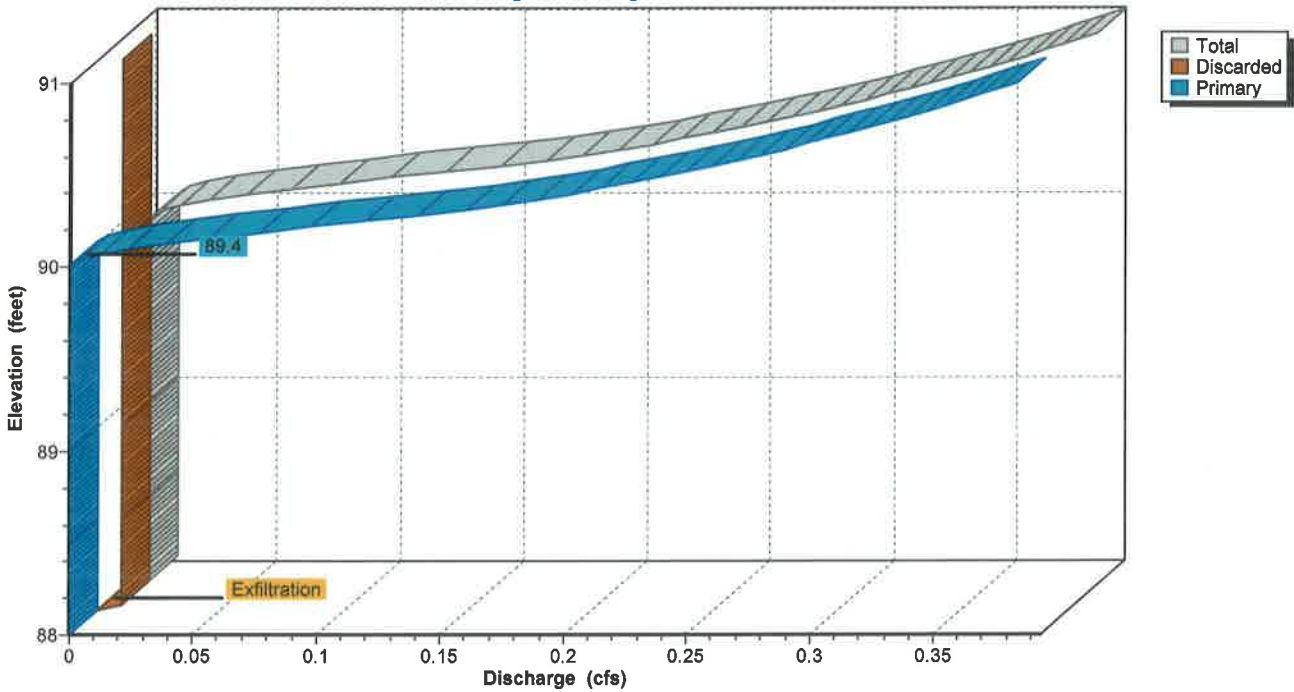
Pond DP: Detention Pond

Hydrograph



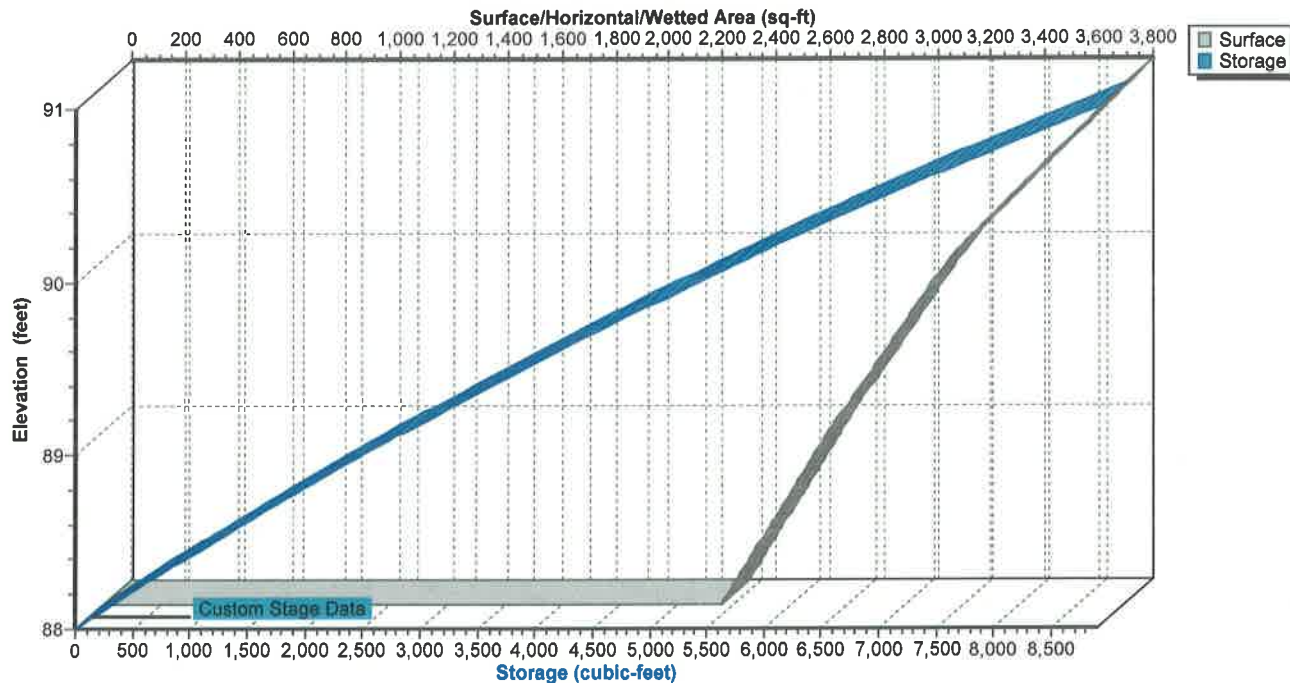
Pond DP: Detention Pond

Stage-Discharge



Pond DP: Detention Pond

Stage-Area-Storage



Summary for Pond R-1: Roof Recharge System

Inflow Area = 0.080 ac, 100.00% Impervious, Inflow Depth > 4.45" for 10-YR. STORM event
 Inflow = 0.35 cfs @ 12.11 hrs, Volume= 0.030 af
 Outflow = 0.34 cfs @ 12.13 hrs, Volume= 0.030 af, Atten= 3%, Lag= 1.3 min
 Discarded = 0.01 cfs @ 8.75 hrs, Volume= 0.012 af
 Primary = 0.33 cfs @ 12.13 hrs, Volume= 0.018 af
 Routed to Pond DP : Detention Pond

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 91.84' @ 12.13 hrs Surf.Area= 0.002 ac Storage= 0.001 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 2.2 min (766.7 - 764.5)

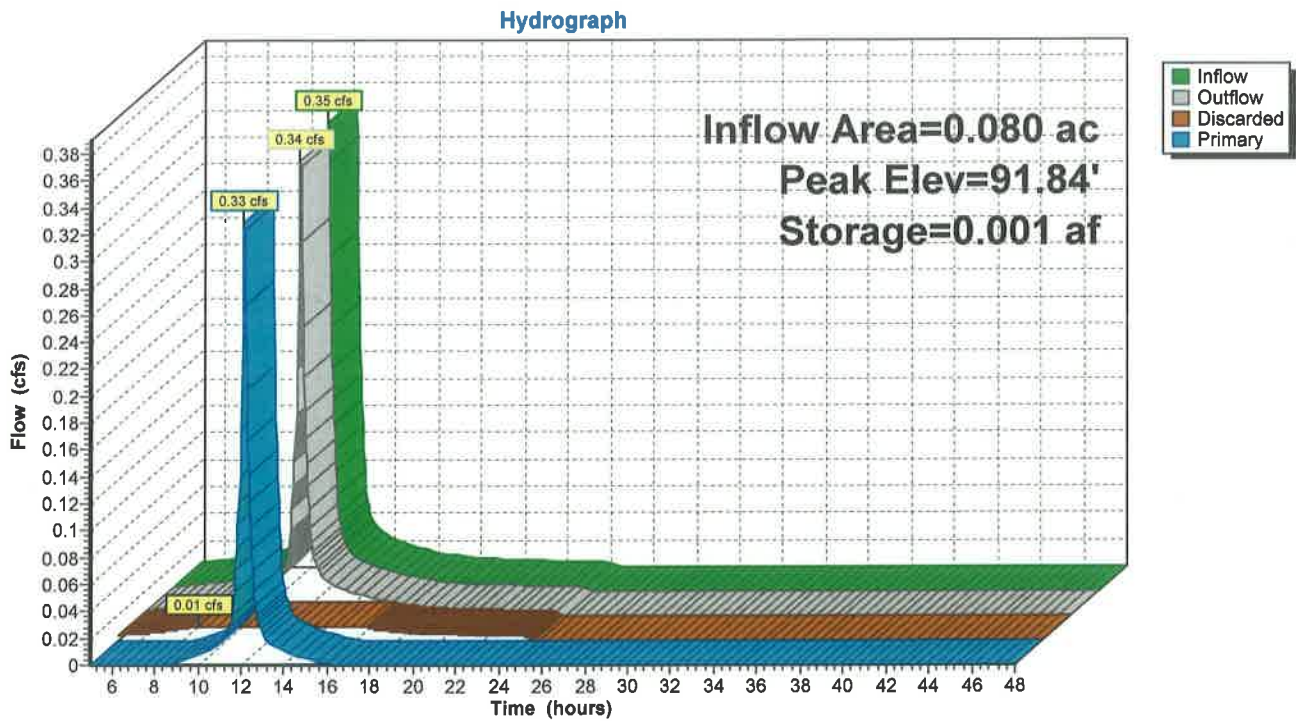
Volume	Invert	Avail.Storage	Storage Description
#1	91.40'	0.002 af	Cultec R-180 x 4 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 1 rows

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.40'	0.01 cfs Exfiltration at all elevations
#2	Primary	91.40'	6.0" Round Culvert L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.40' / 90.50' S= 0.0150 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf

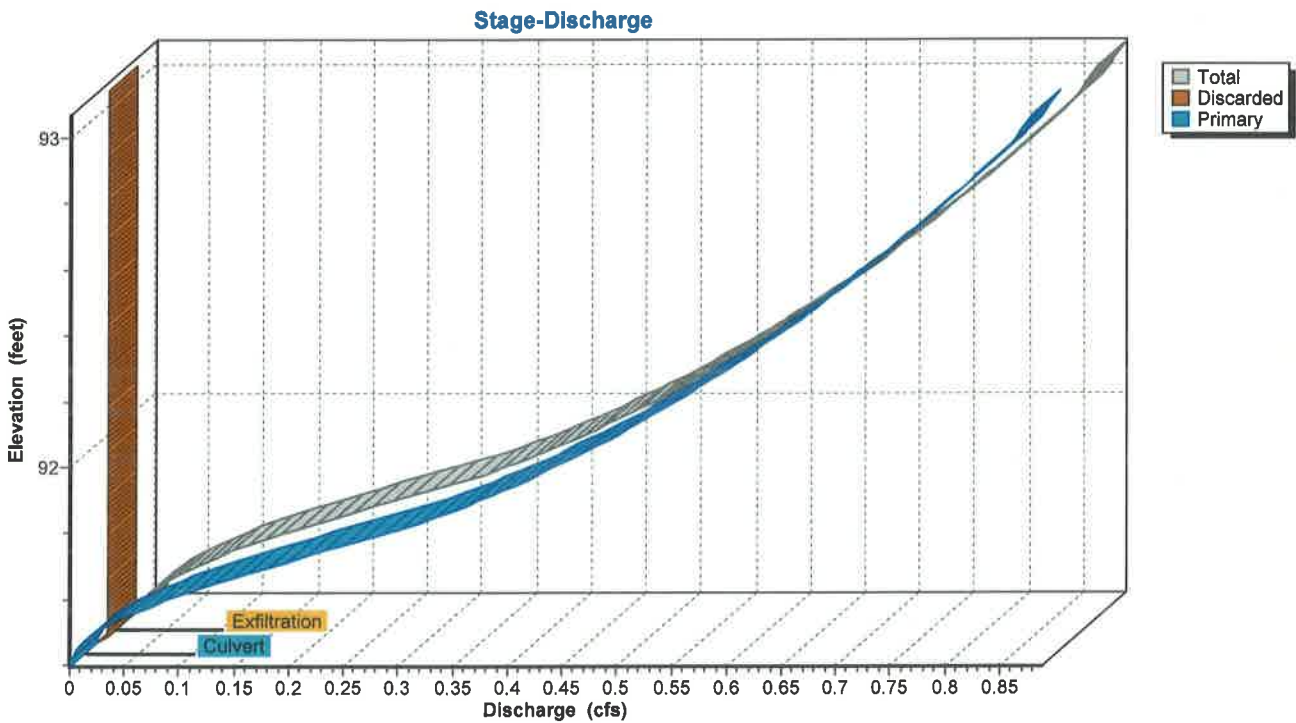
Discarded OutFlow Max=0.01 cfs @ 8.75 hrs HW=91.42' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.32 cfs @ 12.13 hrs HW=91.83' TW=88.89' (Dynamic Tailwater)
 ↑2=Culvert (Inlet Controls 0.32 cfs @ 1.77 fps)

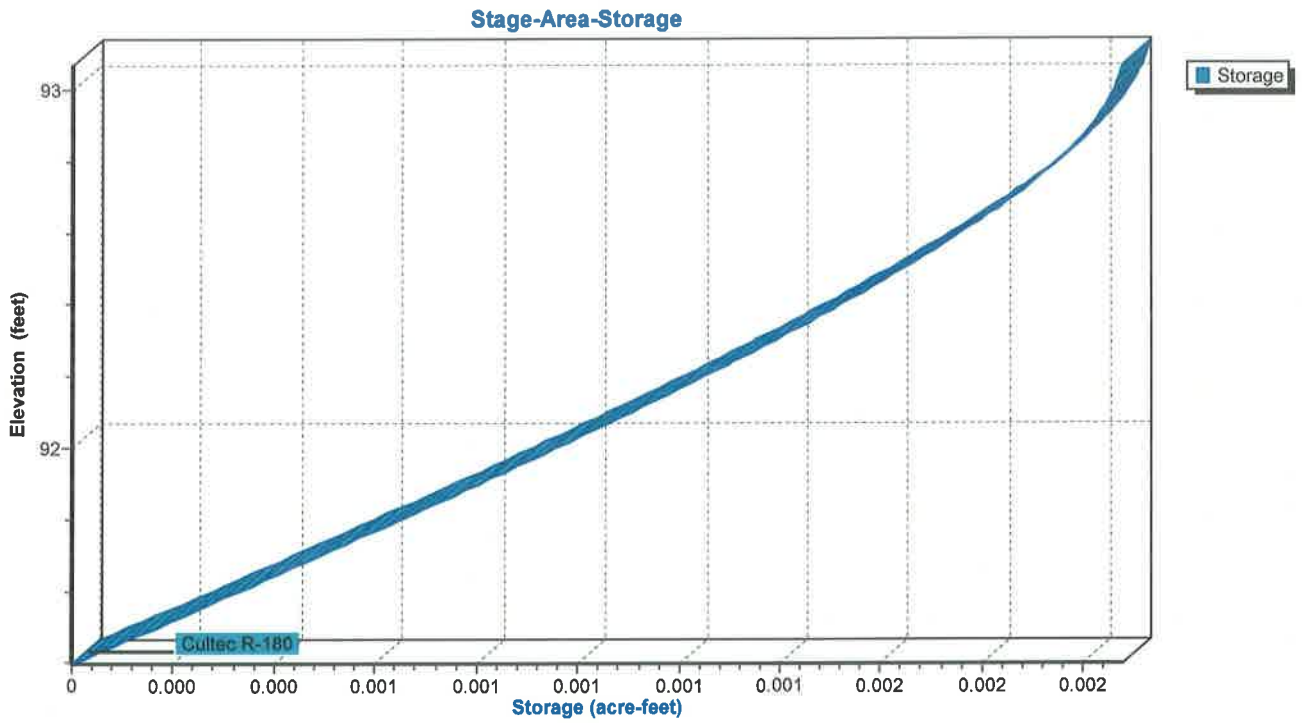
Pond R-1: Roof Recharge System



Pond R-1: Roof Recharge System



Pond R-1: Roof Recharge System



Summary for Subcatchment 1S: Roof Area

Runoff = 0.51 cfs @ 12.11 hrs, Volume= 0.044 af, Depth> 6.55"
 Routed to Pond R-1 : Roof Recharge System

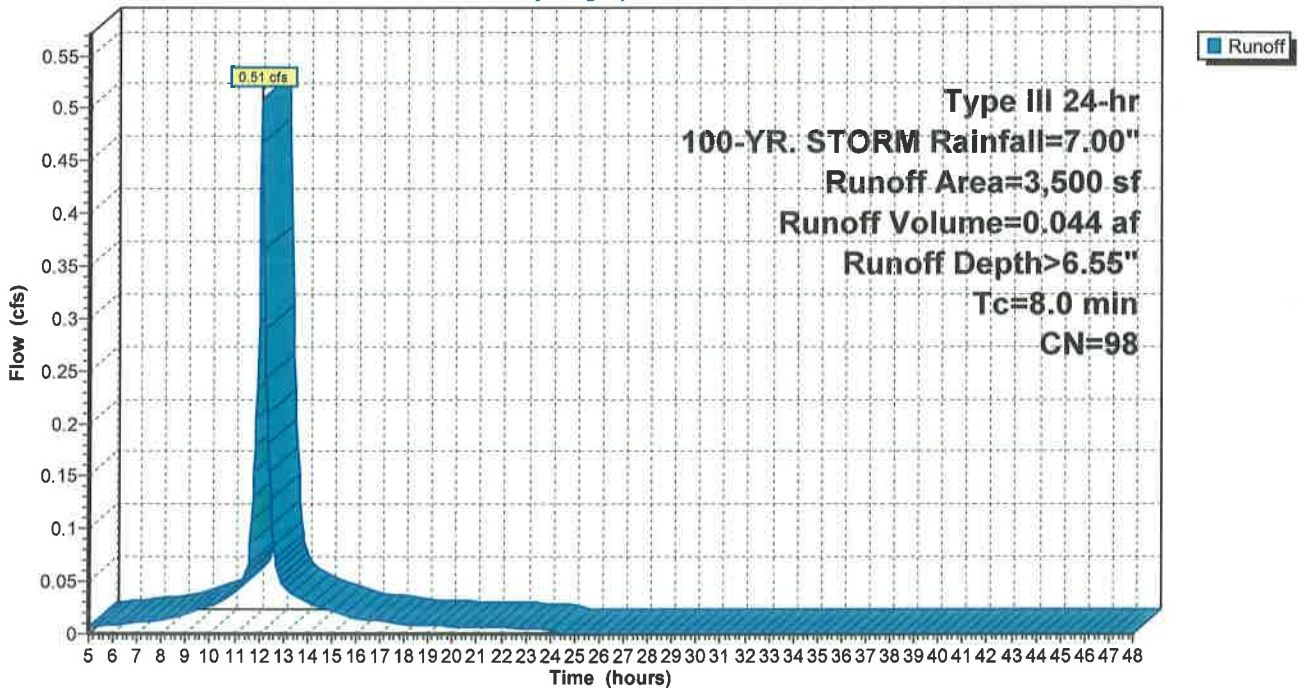
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-YR. STORM Rainfall=7.00"

Area (sf)	CN	Description
* 3,500	98	Roof Area
3,500		100.00% Impervious Area

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

Subcatchment 1S: Roof Area

Hydrograph



Summary for Subcatchment EC: Existing Conditions

Runoff = 2.20 cfs @ 12.13 hrs, Volume= 0.197 af, Depth= 1.67"

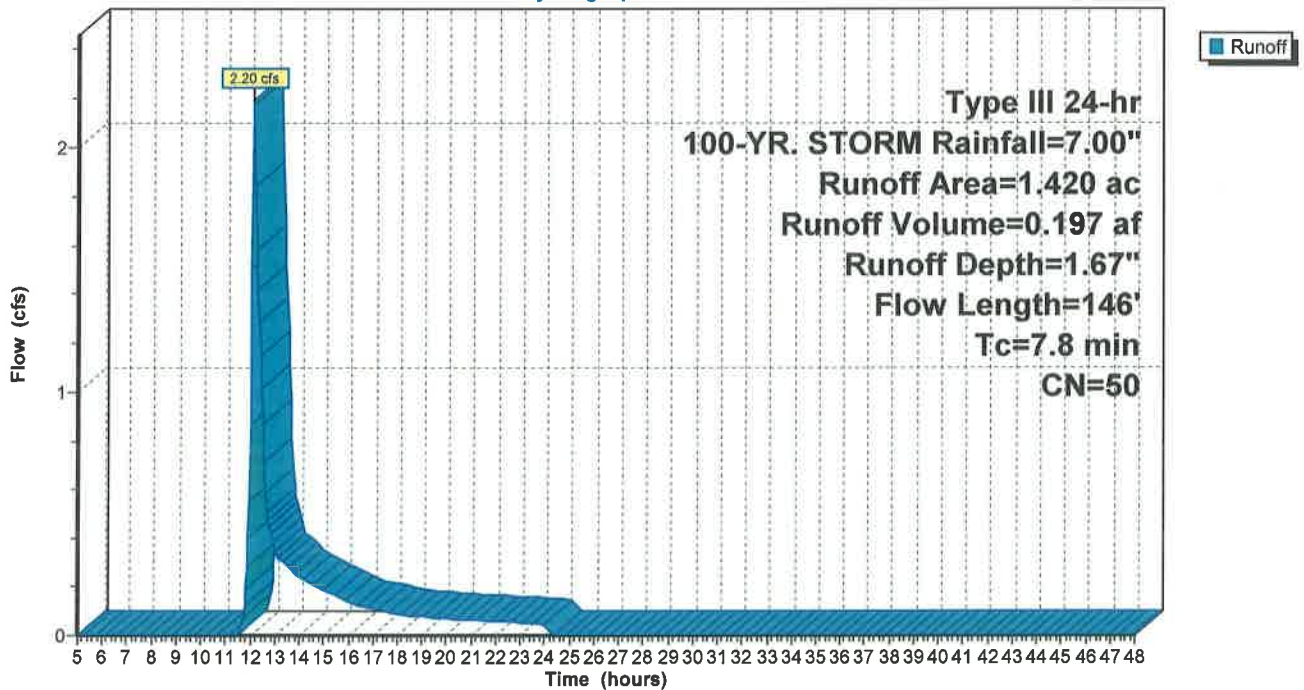
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-YR. STORM Rainfall=7.00"

Area (ac)	CN	Description
0.600	36	Woods, Fair, HSG A
0.820	60	Woods, Fair, HSG B
1.420	50	Weighted Average
1.420		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1080	0.14		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.40"
1.7	96	0.0360	0.95		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
7.8	146	Total			

Subcatchment EC: Existing Conditions

Hydrograph



Summary for Subcatchment PC-1: Proposed Conditions-1

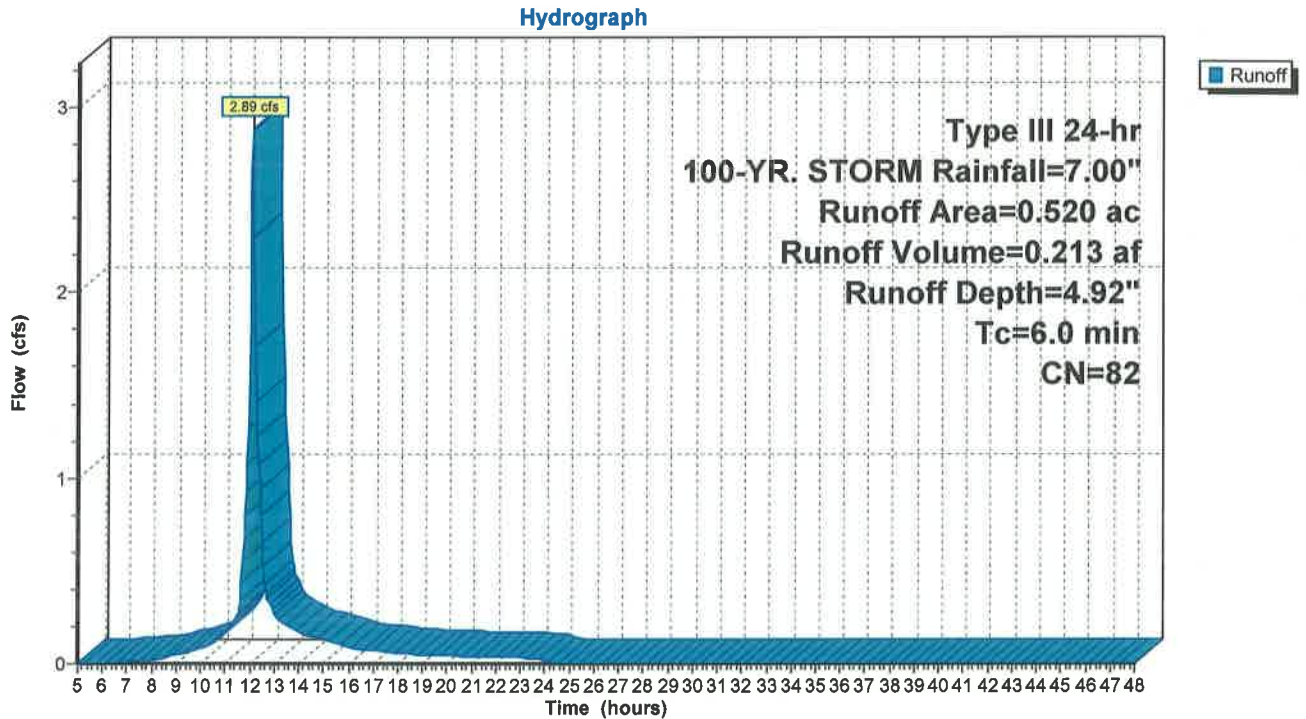
Runoff = 2.89 cfs @ 12.09 hrs, Volume= 0.213 af, Depth= 4.92"
 Routed to Pond DP : Detention Pond

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-YR. STORM Rainfall=7.00"

Area (ac)	CN	Description
0.040	39	>75% Grass cover, Good, HSG A
0.160	61	>75% Grass cover, Good, HSG B
* 0.320	98	Impervious
0.520	82	Weighted Average
0.200		38.46% Pervious Area
0.320		61.54% Impervious Area

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

Subcatchment PC-1: Proposed Conditions-1



Summary for Subcatchment PC-2: Bypass

Runoff = 1.76 cfs @ 12.12 hrs, Volume= 0.145 af, Depth= 2.12"
 Routed to Pond AP : AP-1

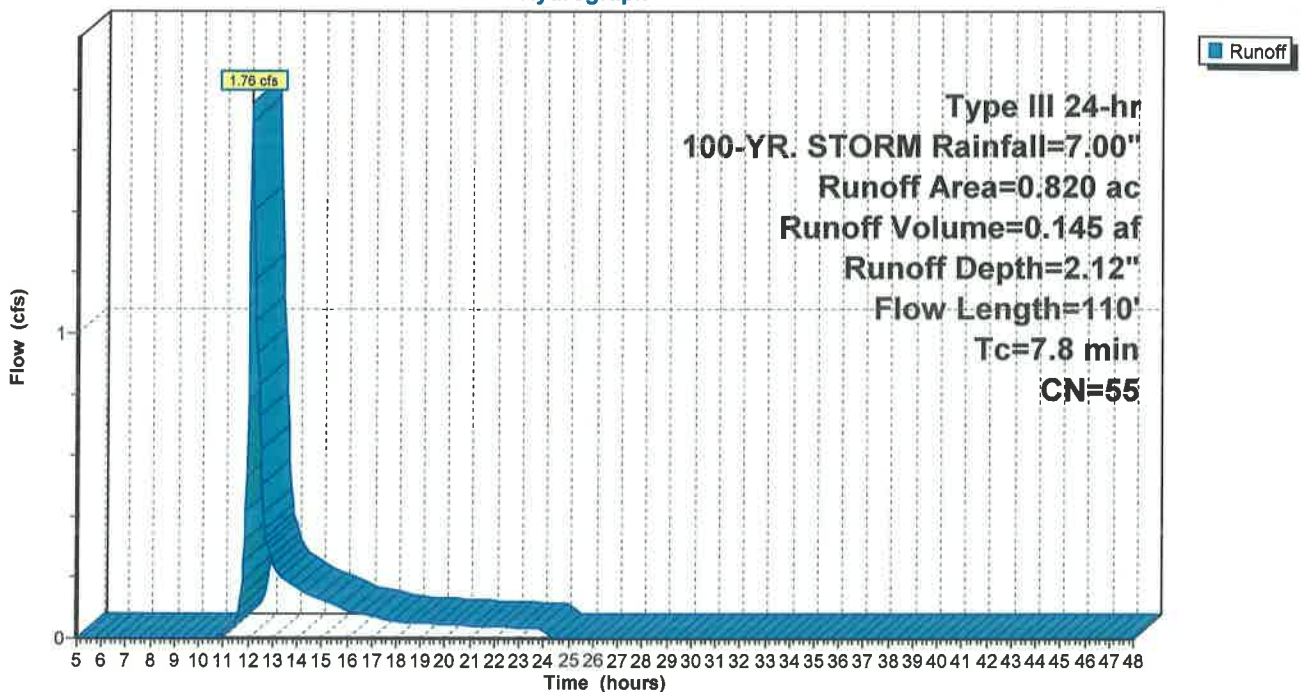
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100-YR. STORM Rainfall=7.00"

Area (ac)	CN	Description
0.220	36	Woods, Fair, HSG A
0.300	60	Woods, Fair, HSG B
0.050	98	Paved parking, HSG A
0.050	39	>75% Grass cover, Good, HSG A
0.200	61	>75% Grass cover, Good, HSG B
0.820	55	Weighted Average
0.770		93.90% Pervious Area
0.050		6.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0740	0.12		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.40"
0.7	60	0.0920	1.52		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
7.8	110	Total			

Subcatchment PC-2: Bypass

Hydrograph



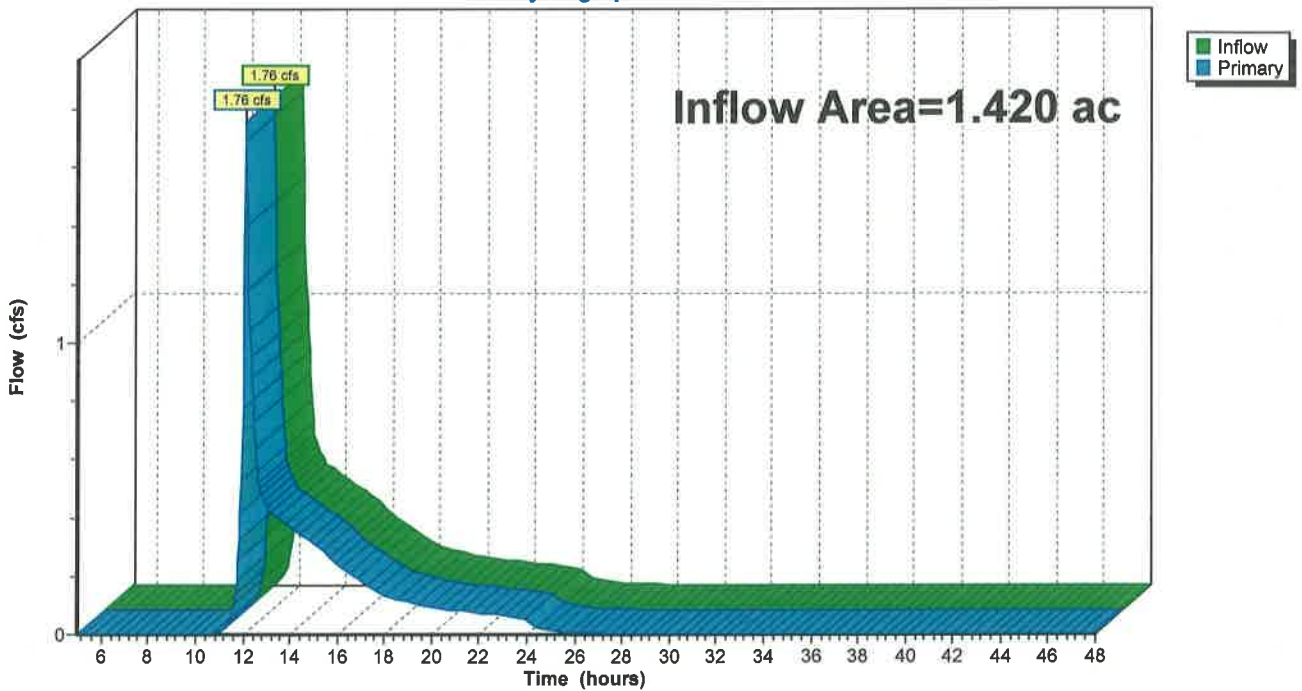
Summary for Pond AP: AP-1

Inflow Area = 1.420 ac, 31.71% Impervious, Inflow Depth = 2.06" for 100-YR. STORM event
Inflow = 1.76 cfs @ 12.12 hrs, Volume= 0.244 af
Primary = 1.76 cfs @ 12.12 hrs, Volume= 0.244 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs / 2

Pond AP: AP-1

Hydrograph



Summary for Pond DP: Detention Pond

Inflow Area = 0.600 ac, 66.69% Impervious, Inflow Depth = 4.86" for 100-YR. STORM event
 Inflow = 3.32 cfs @ 12.09 hrs, Volume= 0.243 af
 Outflow = 0.22 cfs @ 13.73 hrs, Volume= 0.133 af, Atten= 93%, Lag= 98.0 min
 Discarded = 0.01 cfs @ 8.50 hrs, Volume= 0.034 af
 Primary = 0.21 cfs @ 13.73 hrs, Volume= 0.099 af
 Routed to Pond AP : AP-1

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 90.41' @ 13.73 hrs Surf.Area= 3,416 sf Storage= 6,766 cf

Plug-Flow detention time= 458.4 min calculated for 0.133 af (55% of inflow)
 Center-of-Mass det. time= 359.7 min (1,154.0 - 794.3)

Volume	Invert	Avail.Storage	Storage Description
#1	88.00'	8,900 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.00	2,300	0	0
88.50	2,500	1,200	1,200
89.00	2,700	1,300	2,500
90.00	3,150	2,925	5,425
91.00	3,800	3,475	8,900

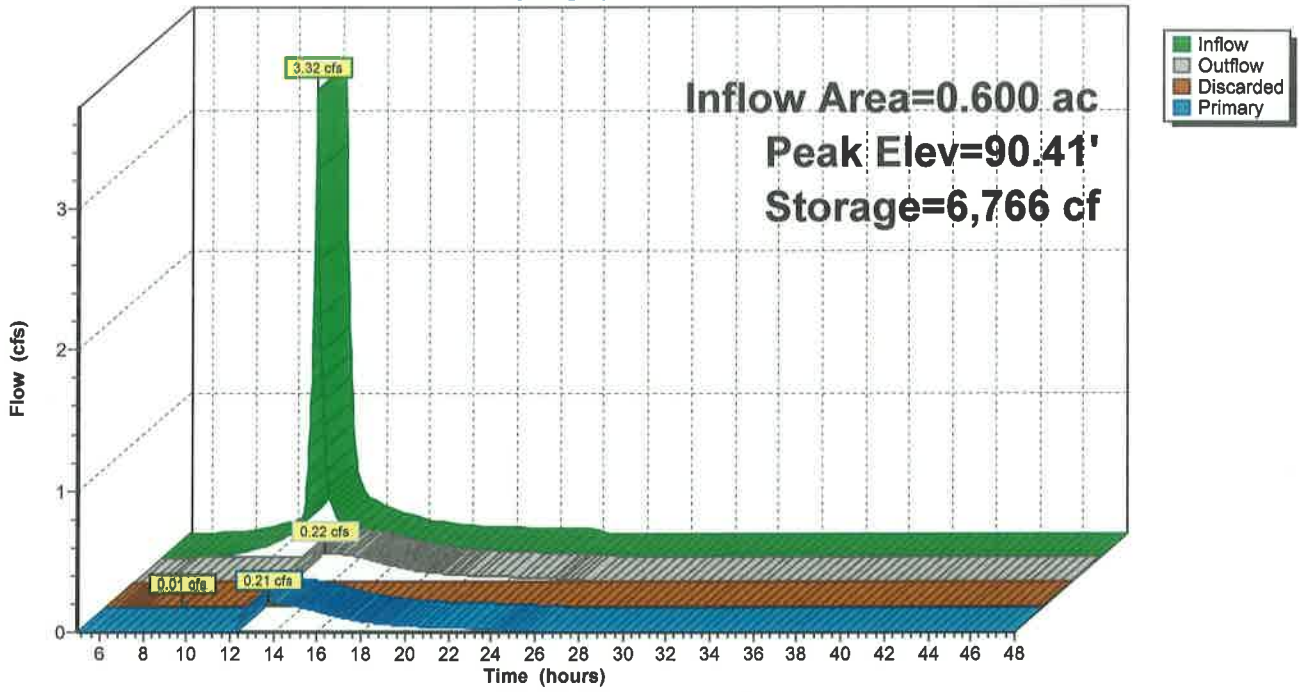
Device	Routing	Invert	Outlet Devices
#1	Discarded	88.00'	0.01 cfs Exfiltration at all elevations
#2	Primary	90.00'	4.0" Vert. 89.4 C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 8.50 hrs HW=88.03' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.21 cfs @ 13.73 hrs HW=90.41' TW=0.00' (Dynamic Tailwater)
 ↑2=89.4 (Orifice Controls 0.21 cfs @ 2.37 fps)

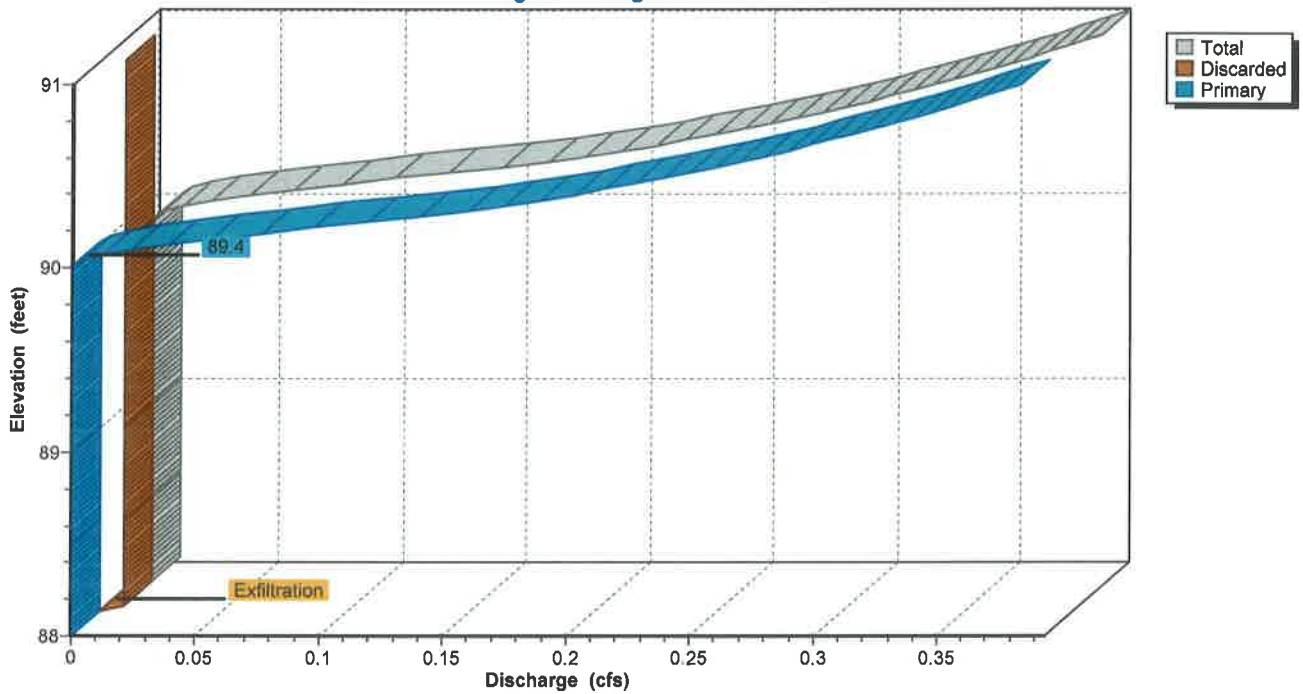
Pond DP: Detention Pond

Hydrograph



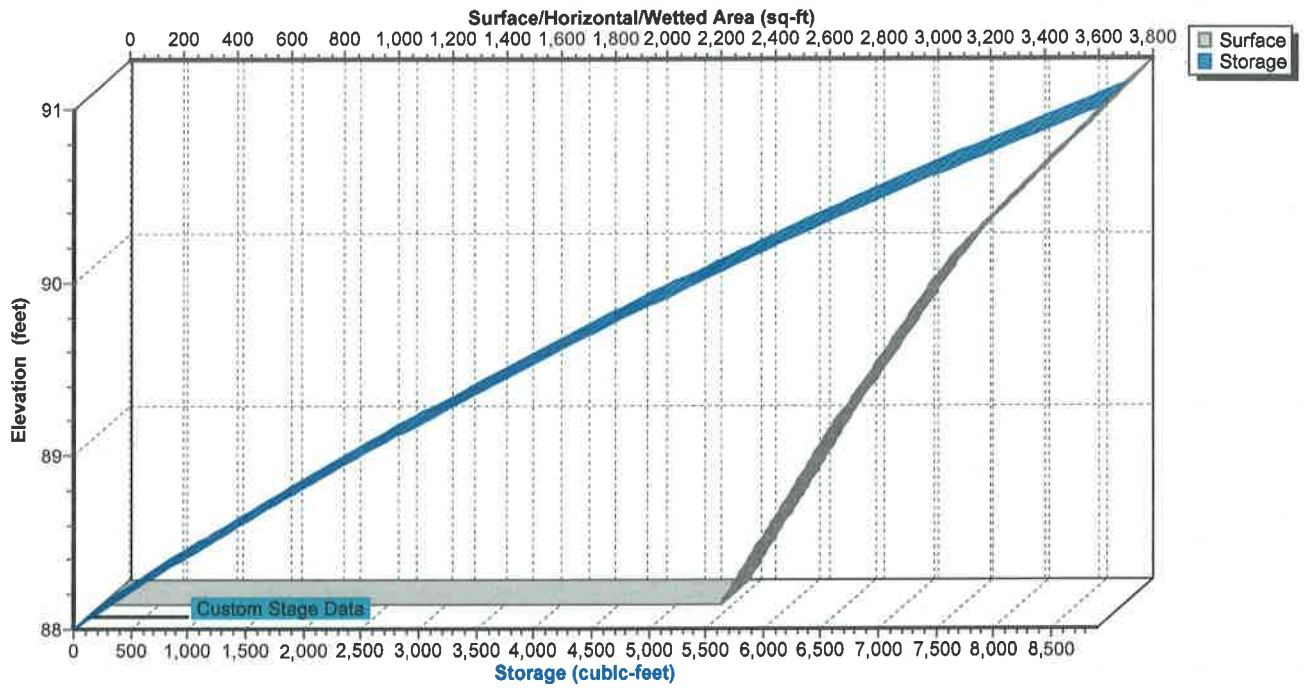
Pond DP: Detention Pond

Stage-Discharge



Pond DP: Detention Pond

Stage-Area-Storage



Summary for Pond R-1: Roof Recharge System

Inflow Area = 0.080 ac, 100.00% Impervious, Inflow Depth > 6.55" for 100-YR. STORM event
 Inflow = 0.51 cfs @ 12.11 hrs, Volume= 0.044 af
 Outflow = 0.49 cfs @ 12.14 hrs, Volume= 0.044 af, Atten= 5%, Lag= 1.8 min
 Discarded = 0.01 cfs @ 7.30 hrs, Volume= 0.014 af
 Primary = 0.48 cfs @ 12.14 hrs, Volume= 0.030 af
 Routed to Pond DP : Detention Pond

Routing by Dyn-Stor-Ind method, Time Span= 5.00-48.00 hrs, dt= 0.05 hrs / 2
 Peak Elev= 92.06' @ 12.14 hrs Surf.Area= 0.001 ac Storage= 0.001 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 2.3 min (764.8 - 762.5)

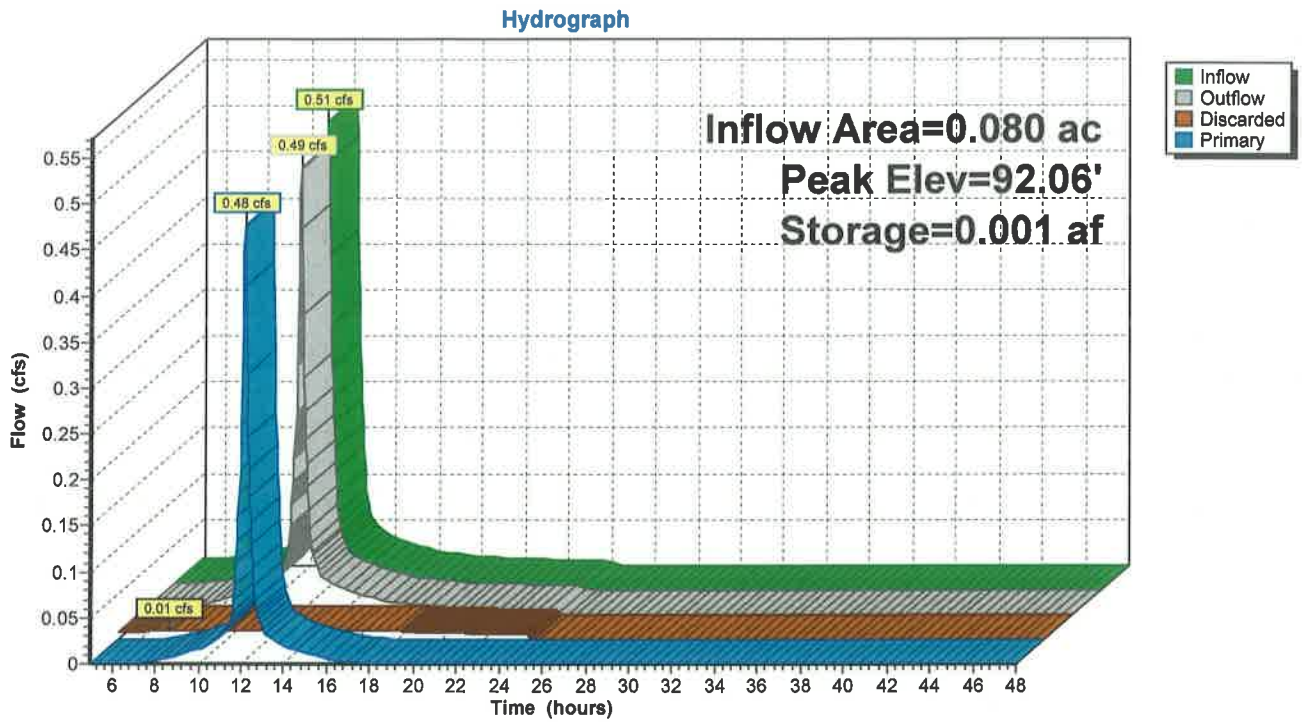
Volume	Invert	Avail.Storage	Storage Description
#1	91.40'	0.002 af	Cultec R-180 x 4 Effective Size= 33.6"W x 20.0"H => 3.44 sf x 6.33'L = 21.8 cf Overall Size= 36.0"W x 20.5"H x 7.33'L with 1.00' Overlap Row Length Adjustment= +1.00' x 3.44 sf x 1 rows

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.40'	0.01 cfs Exfiltration at all elevations
#2	Primary	91.40'	6.0" Round Culvert L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.40' / 90.50' S= 0.0150 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf

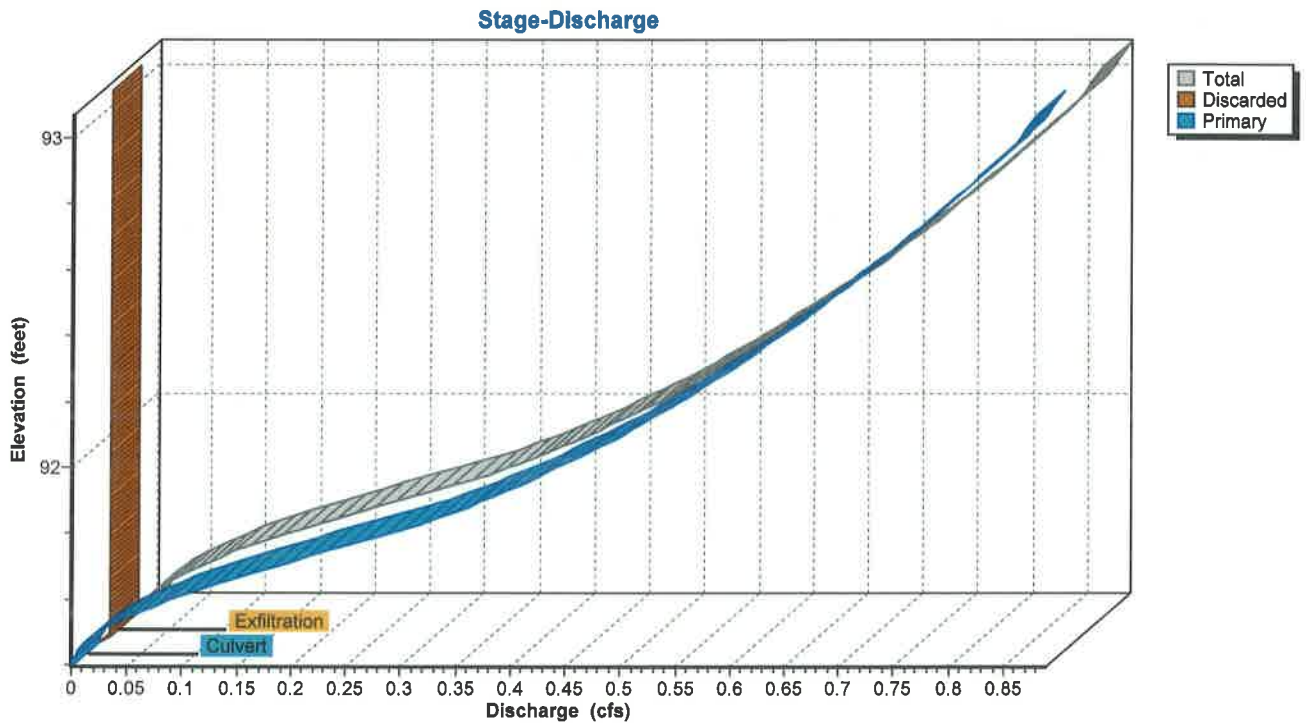
Discarded OutFlow Max=0.01 cfs @ 7.30 hrs HW=91.42' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.47 cfs @ 12.14 hrs HW=92.05' TW=89.62' (Dynamic Tailwater)
 ↑2=Culvert (Inlet Controls 0.47 cfs @ 2.39 fps)

Pond R-1: Roof Recharge System



Pond R-1: Roof Recharge System



Pond R-1: Roof Recharge System

