Stormwater Management Report
Barry Equipment
1608 John Fitch Boulevard (Route 5)
South Windsor, Connecticut

Prepared by:

Design Professionals, Inc.
21 Jeffrey Drive
South Windsor, CT 06074

September 1, 2020

Table of Contents

`Introduction

Barry Equipment Company, Inc., a family owned and operated heavy equipment dealership, is proposing a rehabilitation and expansion of the existing Airgas facility located at 1608 John Fitch Boulevard South Windsor, Connecticut. The property is referenced on the Town of South Windsor Tax Assessors map as GIS # 47701608. The proposed development will include the renovation of the existing building and construction of 5,000± sf building addition. Associated site improvements will include but not be limited to new parking areas for vehicles, outdoor storage and display areas, sidewalks, landscaping, lighting, utilities, and updates to existing stormwater management BMP's.

The total property area is 3.08 acres, 2.28 acres of which is proposed to be disturbed during construction. For more information, please refer to the plans entitled "Barry Equipment ~ Site Plan Modification & Special Exception ~ 1608 John Fitch Boulevard ~ South Windsor, CT" prepared by Design Professionals, Inc., and dated September 1, 2020, as amended.

Pre-Development Site Conditions

The existing surficial characteristics of the area to be developed can be primarily classified as an existing industrial site that is approximately 50% developed. The existing building with parking and loading areas make up the western portion of the site. Woodland areas occupy the eastern half. Two existing detention basins located in the western (adjacent to John Fitch Boulevard) and eastern portion of the site currently provide attenuation of stormwater runoff for the existing facility and pavement areas. A single catchbasin located adjacent to the loading area, east of the existing building, currently collects all sheet flow from the pavement areas and existing roof. All runoff collected by this catchbasin gets conveyed to the eastern detention basin. The outlet for the eastern existing basin sends attenuated flows to the outlet control structure of the western basin. Outflows from the western basin are conveyed to an existing Storm Manhole in John Fitch Boulevard. This storm drainage manhole served as one of four design points evaluated in the drainage analysis. Descriptions of the four design points are included below:

- DP1 – Storm Drainage Manhole located in John Fitch Boulevard
- DP2 – Sheet flow to the southern property boundary
- DP3 – Sheet flow Eastern property boundary
- DP4 – 15" RCP in the Route 5 Right of Way (Western Existing Basin Overflow)

Existing conditions watershed delineations are identified in the Existing Conditions Drainage Map located in **Appendix E**.

Based on Natural Resources Conservation Service (NRCS) Hydrologic Soil Group (HSG) mapping, soils types B & D are located on site. See **Appendix C** for The NRCS Soil Map & Data.

An evaluation was performed to quantify the peak rate of stormwater discharge offsite to all three design points. The Natural Resources Conservation Service's TR-55 Manual was followed

in predicting the peak rates of runoff and volumes. HydroCAD computer modeling software was utilized.

Peak rates of stormwater runoff were evaluated for the 2-, 10-, 25-, 50- and 100-year storm events. For more information, please refer to the enclosed Pre-Development Drainage HydroCAD Report located in **Appendix A**.

Post-Development Site Conditions

The subject project proposes the renovation of the existing building and construction of a 5,000± sf building addition. The existing eastern basin will be expanded to enable detention of increased peak flows induced by the building addition and new impervious areas. The proposed grading for the new pavement and milling areas was designed to promote sheet flow to the modified eastern basin. This basin was elongated along the southern and eastern property boundary lines to accomplish this. All water exiting the basin will pass through a 5" orifice to control peak flows. The expected 100-year storm elevation is Elev. 78.76 based on the HydroCAD model results.

A spillway is proposed at the North Eastern corner of the site to release peak flows from the 50- and 100-yr storm events. This spillway will also serve as an emergency spillway to release larger peak flows in the event of a storm greater than the 100-year storm. The top of frame for the existing outlet control structure will also serve as an additional emergency overflow if needed. One foot of freeboard is also provided at the southern property line to protect overflows to that property.

See **Appendix B** for the Post Development Condition HydroCAD report. The Proposed Conditions Drainage Map for the site can be found in **Appendix E**.

Analysis of Results

The pre-development and post-development conditions were analyzed using HydroCAD consistent with National Resource Conservation Service (NRCS) hydrology methods. The discharge locations were identified as points of interest for assessing downstream effects. The following table contains the data generated from the HydroCAD software:

Reach		2 year	10 year	25 year	50 year	100 year
DP#1 – Storm Drainage Manhole located in John Fitch Boulevard	**Pre**	1.18	1.70	1.93	2.07	3.07
	Post	1.02	1.35	1.49	1.58	1.63
DP#2 – Sheet flow to the southern property boundary	**Pre**	0.32	0.65	0.87	1.03	1.20
	Post	0.04	0.11	0.17	0.21	0.26
DP#3 – Sheet flow Eastern property boundary	**Pre**	0.27	0.98	1.53	1.96	2.46
	Post	0.08	0.21	0.29	0.67	2.46
DP#4 – 15" RCP in the Route 5 Right of Way	**Pre**	0.00	0.00	0.01	0.06	0.16
	Post	0.00	0.00	0.02	0.08	0.19

As seen in the table above, the subject project will result in peak runoff rates in the proposed condition that are less than the peak runoff rates of the existing condition for 2-, 10-, 25- and 100-year design storms for all design points except for small increases observed in the 25-, 50- & 100-year storms at DP#4. It is our professional opinion that these increases are negligible and will not cause any detrimental impacts downstream.

Water Quality

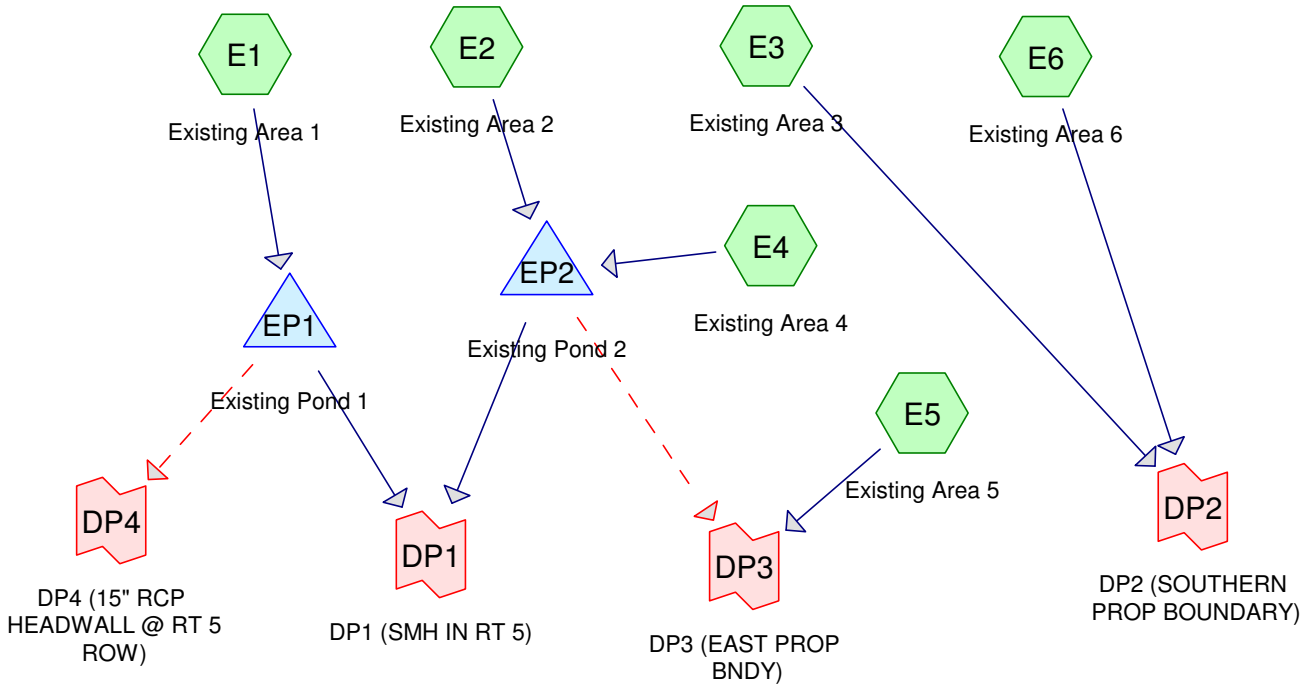
An ADA Barracuda S6 unit will be utilized to address water quality for all flows that will enter the modified western detention basin. This unit was sized based on recommendations made in the 2004 Connecticut Stormwater Quality Manual for determining the water quality flow rate for the site. See **Appendix E** for water quality flow calculations, and ADS Barracuda manufacturer's sizing.

Conclusion

The proposed stormwater management system as discussed herein and shown on the referenced plans is appropriate for the proposed development on the subject site and should not pose any detrimental impacts to the environment.

APPENDIX A
Watershed Computations
(Pre-Development Drainage HydroCAD Report)

EXISTING CONDITIONS



Subcat Reach Pond Link

Routing Diagram for 4342 - Drainage
Prepared by Design Professionals Inc. , Printed 9/1/2020

Time span=0.00-36.00 hrs, dt=0.02 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: Existing Area 1 Runoff Area=0.654 ac 5.50% Impervious Runoff Depth=1.28"
Flow Length=289' Tc=23.7 min CN=79 Runoff=0.60 cfs 0.070 af

Subcatchment E2: Existing Area 2 Runoff Area=0.897 ac 80.27% Impervious Runoff Depth=2.48"
Tc=6.0 min CN=94 Runoff=2.49 cfs 0.185 af

Subcatchment E3: Existing Area 3 Runoff Area=0.054 ac 0.00% Impervious Runoff Depth=0.69"
Tc=6.0 min CN=68 Runoff=0.04 cfs 0.003 af

Subcatchment E4: Existing Area 4 Runoff Area=0.304 ac 1.32% Impervious Runoff Depth=0.79"
Tc=6.0 min CN=70 Runoff=0.25 cfs 0.020 af

Subcatchment E5: Existing Area 5 Runoff Area=1.308 ac 1.99% Impervious Runoff Depth=0.53"
Flow Length=439' Slope=0.0060 '/' Tc=49.7 min CN=64 Runoff=0.27 cfs 0.057 af

Subcatchment E6: Existing Area 6 Runoff Area=0.133 ac 71.43% Impervious Runoff Depth=1.85"
Tc=6.0 min CN=87 Runoff=0.29 cfs 0.021 af

Pond EP1: Existing Pond 1 Peak Elev=78.60' Storage=1,032 cf Inflow=0.60 cfs 0.070 af
Primary=0.28 cfs 0.057 af Secondary=0.00 cfs 0.000 af Outflow=0.28 cfs 0.057 af

Pond EP2: Existing Pond 2 Peak Elev=77.37' Storage=1,868 cf Inflow=2.74 cfs 0.205 af
Primary=0.94 cfs 0.205 af Secondary=0.00 cfs 0.000 af Outflow=0.94 cfs 0.205 af

Link DP1: DP1 (SMH IN RT 5) Inflow=1.18 cfs 0.263 af
Primary=1.18 cfs 0.263 af

Link DP2: DP2 (SOUTHERN PROP BOUNDARY) Inflow=0.32 cfs 0.024 af
Primary=0.32 cfs 0.024 af

Link DP3: DP3 (EAST PROP BNDY) Inflow=0.27 cfs 0.057 af
Primary=0.27 cfs 0.057 af

Link DP4: DP4 (15" RCP HEADWALL @ RT 5 ROW) Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Time span=0.00-36.00 hrs, dt=0.02 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: Existing Area 1 Runoff Area=0.654 ac 5.50% Impervious Runoff Depth=2.78"
Flow Length=289' Tc=23.7 min CN=79 Runoff=1.33 cfs 0.151 af

Subcatchment E2: Existing Area 2 Runoff Area=0.897 ac 80.27% Impervious Runoff Depth=4.28"
Tc=6.0 min CN=94 Runoff=4.18 cfs 0.320 af

Subcatchment E3: Existing Area 3 Runoff Area=0.054 ac 0.00% Impervious Runoff Depth=1.86"
Tc=6.0 min CN=68 Runoff=0.11 cfs 0.008 af

Subcatchment E4: Existing Area 4 Runoff Area=0.304 ac 1.32% Impervious Runoff Depth=2.01"
Tc=6.0 min CN=70 Runoff=0.70 cfs 0.051 af

Subcatchment E5: Existing Area 5 Runoff Area=1.308 ac 1.99% Impervious Runoff Depth=1.56"
Flow Length=439' Slope=0.0060 '/' Tc=49.7 min CN=64 Runoff=0.98 cfs 0.170 af

Subcatchment E6: Existing Area 6 Runoff Area=0.133 ac 71.43% Impervious Runoff Depth=3.54"
Tc=6.0 min CN=87 Runoff=0.54 cfs 0.039 af

Pond EP1: Existing Pond 1 Peak Elev=78.88' Storage=2,404 cf Inflow=1.33 cfs 0.151 af
Primary=0.47 cfs 0.139 af Secondary=0.00 cfs 0.000 af Outflow=0.47 cfs 0.139 af

Pond EP2: Existing Pond 2 Peak Elev=78.17' Storage=4,197 cf Inflow=4.88 cfs 0.371 af
Primary=1.26 cfs 0.371 af Secondary=0.00 cfs 0.000 af Outflow=1.26 cfs 0.371 af

Link DP1: DP1 (SMH IN RT 5) Inflow=1.70 cfs 0.510 af
Primary=1.70 cfs 0.510 af

Link DP2: DP2 (SOUTHERN PROP BOUNDARY) Inflow=0.65 cfs 0.048 af
Primary=0.65 cfs 0.048 af

Link DP3: DP3 (EAST PROP BNDY) Inflow=0.98 cfs 0.170 af
Primary=0.98 cfs 0.170 af

Link DP4: DP4 (15" RCP HEADWALL @ RT 5 ROW) Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Time span=0.00-36.00 hrs, dt=0.02 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: Existing Area 1 Runoff Area=0.654 ac 5.50% Impervious Runoff Depth=3.79"
Flow Length=289' Tc=23.7 min CN=79 Runoff=1.82 cfs 0.206 af

Subcatchment E2: Existing Area 2 Runoff Area=0.897 ac 80.27% Impervious Runoff Depth=5.42"
Tc=6.0 min CN=94 Runoff=5.22 cfs 0.405 af

Subcatchment E3: Existing Area 3 Runoff Area=0.054 ac 0.00% Impervious Runoff Depth=2.71"
Tc=6.0 min CN=68 Runoff=0.17 cfs 0.012 af

Subcatchment E4: Existing Area 4 Runoff Area=0.304 ac 1.32% Impervious Runoff Depth=2.90"
Tc=6.0 min CN=70 Runoff=1.03 cfs 0.073 af

Subcatchment E5: Existing Area 5 Runoff Area=1.308 ac 1.99% Impervious Runoff Depth=2.35"
Flow Length=439' Slope=0.0060 '/' Tc=49.7 min CN=64 Runoff=1.53 cfs 0.256 af

Subcatchment E6: Existing Area 6 Runoff Area=0.133 ac 71.43% Impervious Runoff Depth=4.63"
Tc=6.0 min CN=87 Runoff=0.70 cfs 0.051 af

Pond EP1: Existing Pond 1 Peak Elev=79.02' Storage=3,407 cf Inflow=1.82 cfs 0.206 af
Primary=0.54 cfs 0.193 af Secondary=0.01 cfs 0.000 af Outflow=0.55 cfs 0.194 af

Pond EP2: Existing Pond 2 Peak Elev=78.63' Storage=5,864 cf Inflow=6.24 cfs 0.478 af
Primary=1.42 cfs 0.478 af Secondary=0.00 cfs 0.000 af Outflow=1.42 cfs 0.478 af

Link DP1: DP1 (SMH IN RT 5) Inflow=1.93 cfs 0.672 af
Primary=1.93 cfs 0.672 af

Link DP2: DP2 (SOUTHERN PROP BOUNDARY) Inflow=0.87 cfs 0.064 af
Primary=0.87 cfs 0.064 af

Link DP3: DP3 (EAST PROP BNDY) Inflow=1.53 cfs 0.256 af
Primary=1.53 cfs 0.256 af

Link DP4: DP4 (15" RCP HEADWALL @ RT 5 ROW) Inflow=0.01 cfs 0.000 af
Primary=0.01 cfs 0.000 af

Time span=0.00-36.00 hrs, dt=0.02 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: Existing Area 1 Runoff Area=0.654 ac 5.50% Impervious Runoff Depth=4.55"
Flow Length=289' Tc=23.7 min CN=79 Runoff=2.18 cfs 0.248 af

Subcatchment E2: Existing Area 2 Runoff Area=0.897 ac 80.27% Impervious Runoff Depth=6.25"
Tc=6.0 min CN=94 Runoff=5.98 cfs 0.467 af

Subcatchment E3: Existing Area 3 Runoff Area=0.054 ac 0.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=68 Runoff=0.21 cfs 0.015 af

Subcatchment E4: Existing Area 4 Runoff Area=0.304 ac 1.32% Impervious Runoff Depth=3.59"
Tc=6.0 min CN=70 Runoff=1.28 cfs 0.091 af

Subcatchment E5: Existing Area 5 Runoff Area=1.308 ac 1.99% Impervious Runoff Depth=2.97"
Flow Length=439' Slope=0.0060 '/' Tc=49.7 min CN=64 Runoff=1.96 cfs 0.324 af

Subcatchment E6: Existing Area 6 Runoff Area=0.133 ac 71.43% Impervious Runoff Depth=5.44"
Tc=6.0 min CN=87 Runoff=0.82 cfs 0.060 af

Pond EP1: Existing Pond 1 Peak Elev=79.11' Storage=4,121 cf Inflow=2.18 cfs 0.248 af
Primary=0.58 cfs 0.231 af Secondary=0.06 cfs 0.004 af Outflow=0.64 cfs 0.235 af

Pond EP2: Existing Pond 2 Peak Elev=78.96' Storage=7,157 cf Inflow=7.25 cfs 0.558 af
Primary=1.52 cfs 0.558 af Secondary=0.00 cfs 0.000 af Outflow=1.52 cfs 0.558 af

Link DP1: DP1 (SMH IN RT 5) Inflow=2.07 cfs 0.789 af
Primary=2.07 cfs 0.789 af

Link DP2: DP2 (SOUTHERN PROP BOUNDARY) Inflow=1.03 cfs 0.076 af
Primary=1.03 cfs 0.076 af

Link DP3: DP3 (EAST PROP BNDY) Inflow=1.96 cfs 0.324 af
Primary=1.96 cfs 0.324 af

Link DP4: DP4 (15" RCP HEADWALL @ RT 5 ROW) Inflow=0.06 cfs 0.004 af
Primary=0.06 cfs 0.004 af

Time span=0.00-36.00 hrs, dt=0.02 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: Existing Area 1 Runoff Area=0.654 ac 5.50% Impervious Runoff Depth=5.41"
Flow Length=289' Tc=23.7 min CN=79 Runoff=2.58 cfs 0.295 af

Subcatchment E2: Existing Area 2 Runoff Area=0.897 ac 80.27% Impervious Runoff Depth=7.17"
Tc=6.0 min CN=94 Runoff=6.81 cfs 0.536 af

Subcatchment E3: Existing Area 3 Runoff Area=0.054 ac 0.00% Impervious Runoff Depth=4.14"
Tc=6.0 min CN=68 Runoff=0.26 cfs 0.019 af

Subcatchment E4: Existing Area 4 Runoff Area=0.304 ac 1.32% Impervious Runoff Depth=4.37"
Tc=6.0 min CN=70 Runoff=1.56 cfs 0.111 af

Subcatchment E5: Existing Area 5 Runoff Area=1.308 ac 1.99% Impervious Runoff Depth=3.69"
Flow Length=439' Slope=0.0060 '/' Tc=49.7 min CN=64 Runoff=2.46 cfs 0.403 af

Subcatchment E6: Existing Area 6 Runoff Area=0.133 ac 71.43% Impervious Runoff Depth=6.34"
Tc=6.0 min CN=87 Runoff=0.94 cfs 0.070 af

Pond EP1: Existing Pond 1 Peak Elev=79.20' Storage=4,872 cf Inflow=2.58 cfs 0.295 af
Primary=0.61 cfs 0.269 af Secondary=0.16 cfs 0.014 af Outflow=0.77 cfs 0.282 af

Pond EP2: Existing Pond 2 Peak Elev=79.19' Storage=8,137 cf Inflow=8.36 cfs 0.647 af
Primary=2.52 cfs 0.647 af Secondary=0.00 cfs 0.000 af Outflow=2.52 cfs 0.647 af

Link DP1: DP1 (SMH IN RT 5) Inflow=3.07 cfs 0.915 af
Primary=3.07 cfs 0.915 af

Link DP2: DP2 (SOUTHERN PROP BOUNDARY) Inflow=1.20 cfs 0.089 af
Primary=1.20 cfs 0.089 af

Link DP3: DP3 (EAST PROP BNDY) Inflow=2.46 cfs 0.403 af
Primary=2.46 cfs 0.403 af

Link DP4: DP4 (15" RCP HEADWALL @ RT 5 ROW) Inflow=0.16 cfs 0.014 af
Primary=0.16 cfs 0.014 af

Summary for Subcatchment E1: Existing Area 1

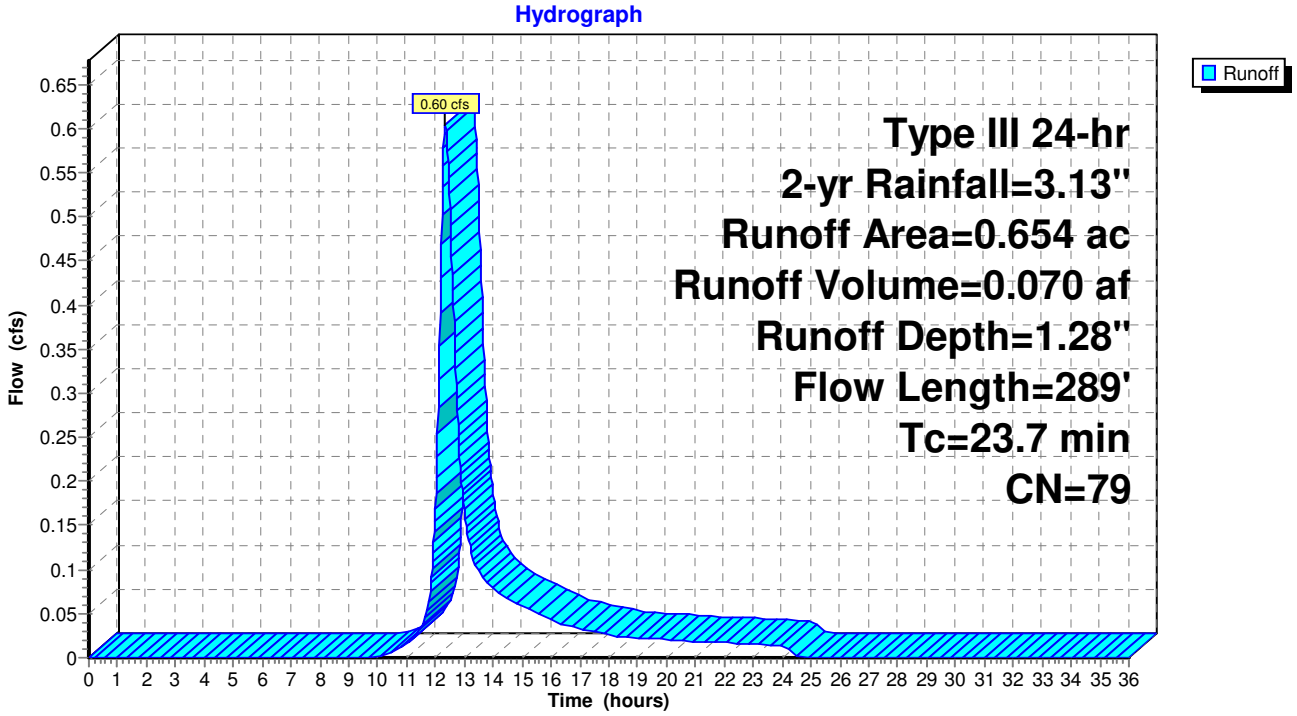
Runoff = 0.60 cfs @ 12.34 hrs, Volume= 0.070 af, Depth= 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-yr Rainfall=3.13"

	Area (ac)	CN	Description
	0.355	80	>75% Grass cover, Good, HSG D
*	0.036	98	Impervious
	0.140	73	Brush, Good, HSG D
	0.123	79	Woods/grass comb., Good, HSG D
	0.654	79	Weighted Average
	0.618		94.50% Pervious Area
	0.036		5.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0300	0.14		**Sheet Flow, Grass SF** Grass: Dense n= 0.240 P2= 3.13"
6.1	25	0.0300	0.07		**Sheet Flow, Wood SF** Woods: Light underbrush n= 0.400 P2= 3.13"
1.5	62	0.0180	0.67		**Shallow Concentrated Flow, Woods SCF** Woodland Kv= 5.0 fps
3.8	102	0.0080	0.45		**Shallow Concentrated Flow, Brush SCF** Woodland Kv= 5.0 fps
23.7	289	Total			

Subcatchment E1: Existing Area 1



Summary for Subcatchment E2: Existing Area 2

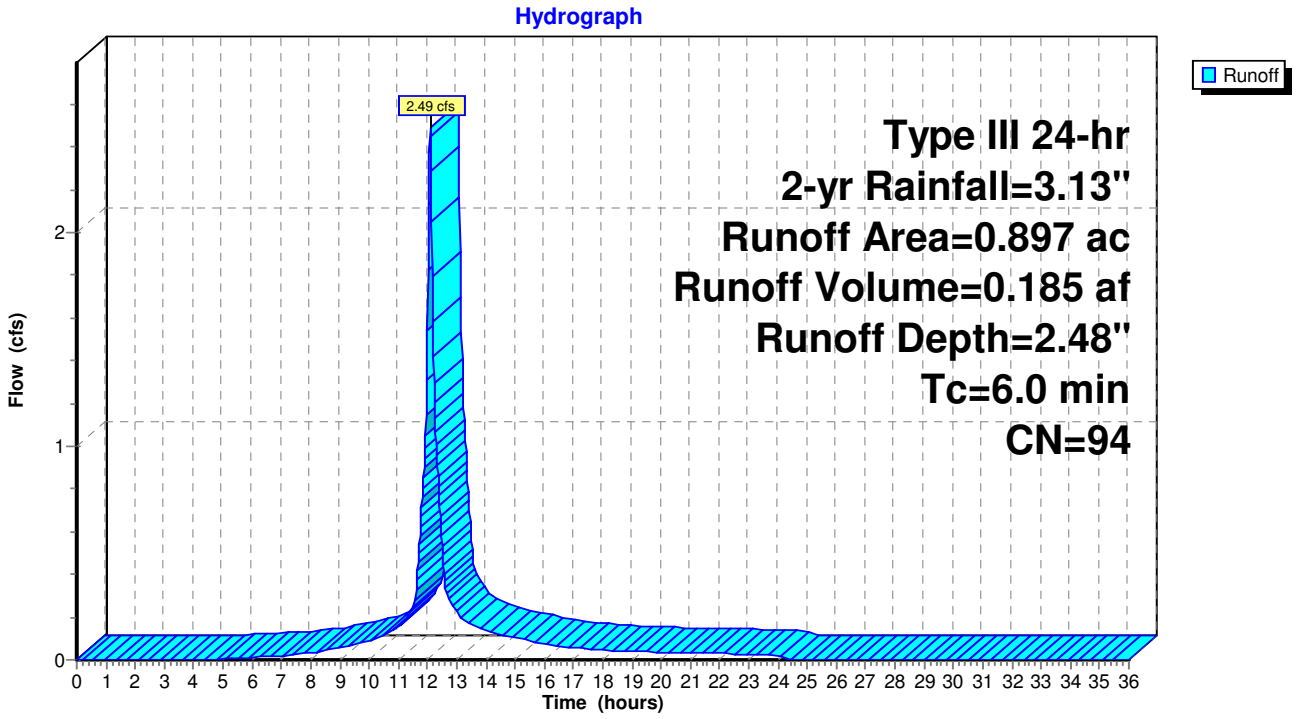
Runoff = 2.49 cfs @ 12.08 hrs, Volume= 0.185 af, Depth= 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-yr Rainfall=3.13"

	Area (ac)	CN	Description
	0.009	61	>75% Grass cover, Good, HSG B
	0.115	80	>75% Grass cover, Good, HSG D
*	0.720	98	Impervious
	0.053	79	Woods/grass comb., Good, HSG D
	0.897	94	Weighted Average
	0.177		19.73% Pervious Area
	0.720		80.27% Impervious Area

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

Subcatchment E2: Existing Area 2



Summary for Subcatchment E3: Existing Area 3

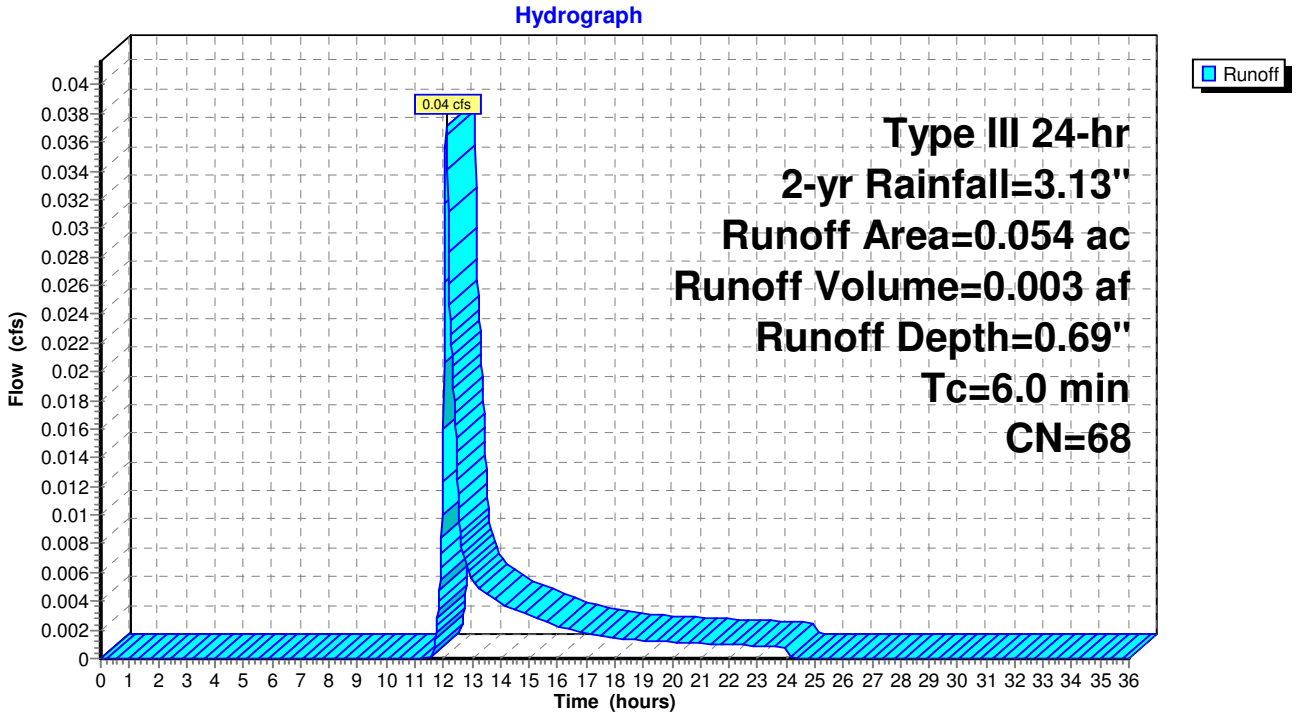
Runoff = 0.04 cfs @ 12.10 hrs, Volume= 0.003 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-yr Rainfall=3.13"

Area (ac)	CN	Description
0.034	61	>75% Grass cover, Good, HSG B
0.020	80	>75% Grass cover, Good, HSG D
0.054	68	Weighted Average
0.054		100.00% Pervious Area

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

Subcatchment E3: Existing Area 3



Summary for Subcatchment E4: Existing Area 4

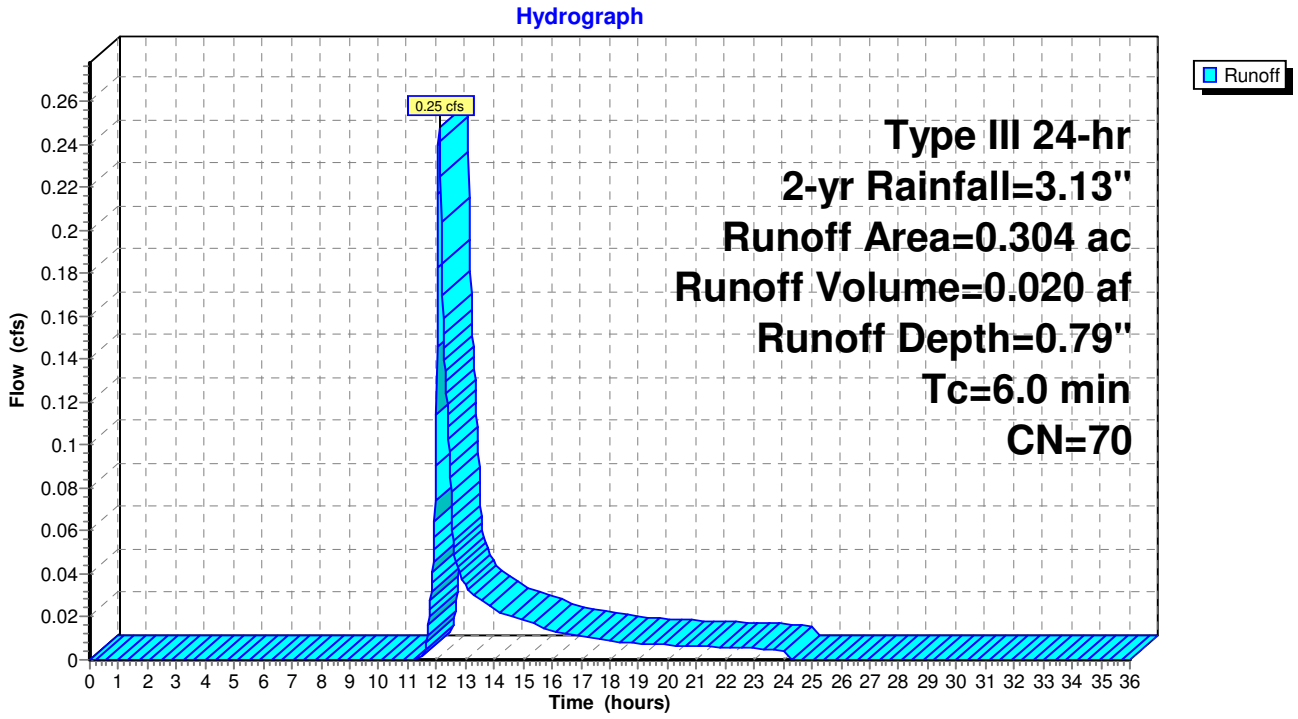
Runoff = 0.25 cfs @ 12.10 hrs, Volume= 0.020 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-yr Rainfall=3.13"

	Area (ac)	CN	Description
	0.163	61	>75% Grass cover, Good, HSG B
	0.126	80	>75% Grass cover, Good, HSG D
*	0.004	98	Impervious
	0.011	79	Woods/grass comb., Good, HSG D
	0.304	70	Weighted Average
	0.300		98.68% Pervious Area
	0.004		1.32% Impervious Area

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

Subcatchment E4: Existing Area 4



Summary for Subcatchment E5: Existing Area 5

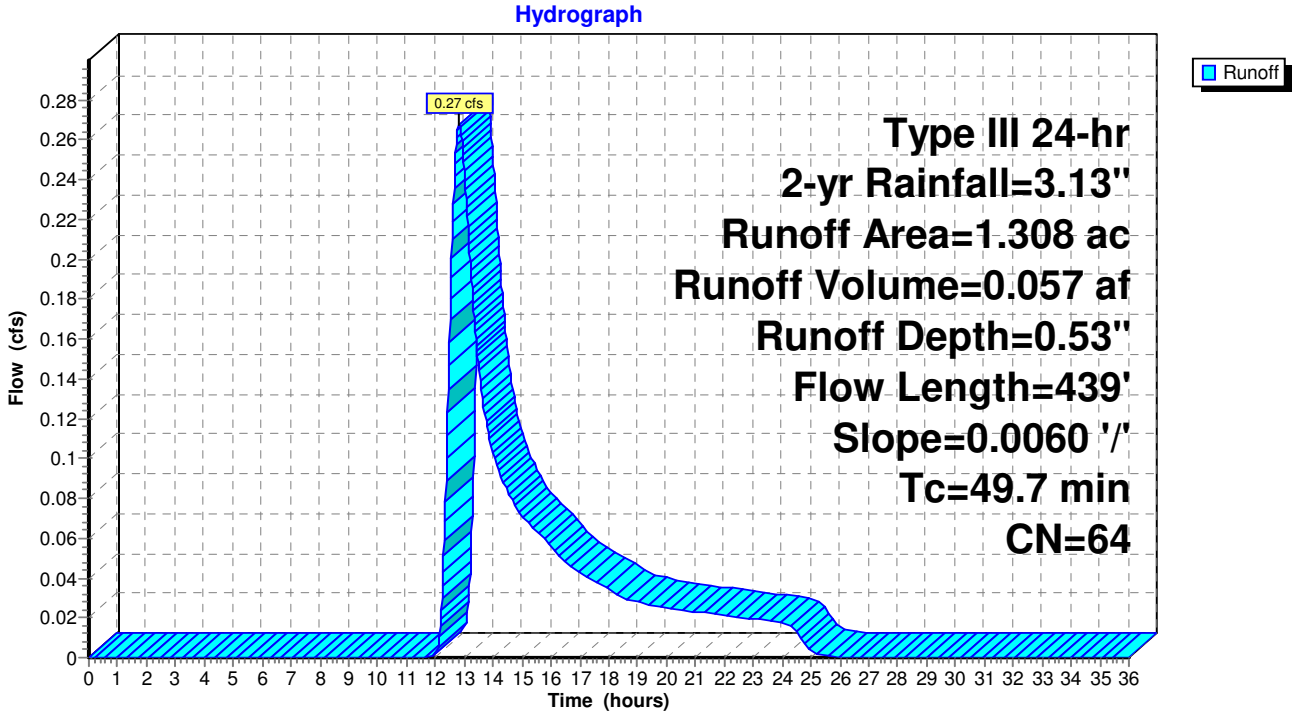
Runoff = 0.27 cfs @ 12.82 hrs, Volume= 0.057 af, Depth= 0.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-yr Rainfall=3.13"

	Area (ac)	CN	Description
	0.035	61	>75% Grass cover, Good, HSG B
	0.022	80	>75% Grass cover, Good, HSG D
*	0.026	98	Impervious
	0.920	58	Woods/grass comb., Good, HSG B
	0.305	79	Woods/grass comb., Good, HSG D
	1.308	64	Weighted Average
	1.282		98.01% Pervious Area
	0.026		1.99% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.1	100	0.0060	0.05		**Sheet Flow, Woodland SF** Woods: Light underbrush n= 0.400 P2= 3.13"
14.6	339	0.0060	0.39		**Shallow Concentrated Flow, Woodland SCF** Woodland Kv= 5.0 fps
49.7	439	Total			

Subcatchment E5: Existing Area 5



Summary for Subcatchment E6: Existing Area 6

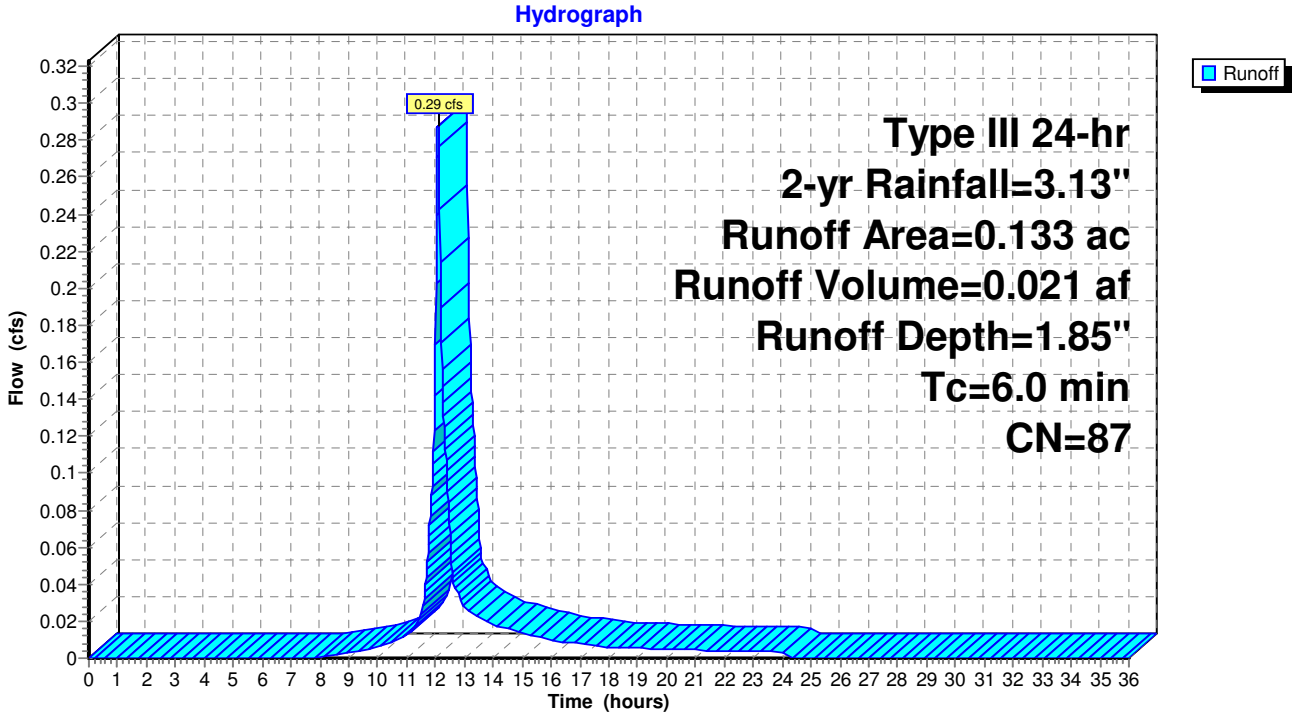
Runoff = 0.29 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-yr Rainfall=3.13"

	Area (ac)	CN	Description
*	0.095	98	Impervious
	0.038	58	Woods/grass comb., Good, HSG B
	0.133	87	Weighted Average
	0.038		28.57% Pervious Area
	0.095		71.43% Impervious Area

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

Subcatchment E6: Existing Area 6



Summary for Pond EP1: Existing Pond 1

Inflow Area = 0.654 ac, 5.50% Impervious, Inflow Depth = 1.28" for 2-yr event
Inflow = 0.60 cfs @ 12.34 hrs, Volume= 0.070 af
Outflow = 0.28 cfs @ 12.76 hrs, Volume= 0.057 af, Atten= 53%, Lag= 24.7 min
Primary = 0.28 cfs @ 12.76 hrs, Volume= 0.057 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs
Peak Elev= 78.60' @ 12.76 hrs Surf.Area= 3,625 sf Storage= 1,032 cf

Plug-Flow detention time= 141.8 min calculated for 0.057 af (82% of inflow)
Center-of-Mass det. time= 67.6 min (931.2 - 863.6)

Volume	Invert	Avail.Storage	Storage Description
#1	78.00'	14,089 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

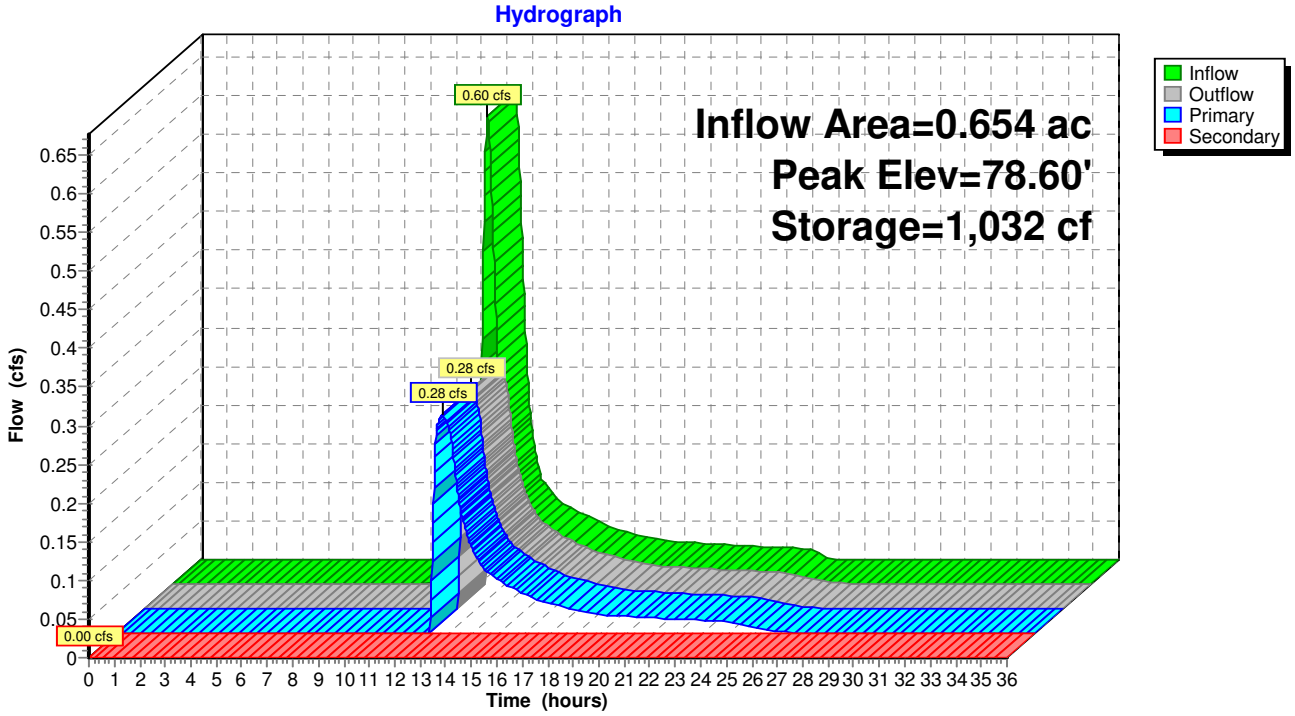
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
78.00	365	0	0	365
79.00	7,633	3,222	3,222	7,635
80.00	14,461	10,867	14,089	14,473

Device	Routing	Invert	Outlet Devices
#1	Primary	75.51'	**15.0" Round 15" RCP** L= 61.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 75.51' / 75.20' S= 0.0051 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Secondary	78.96'	**15.0" Round 15" RCP** L= 23.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 78.96' / 78.91' S= 0.0022 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Device 1	78.44'	**3.5" x 6.0" Horiz. CB Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.28 cfs @ 12.76 hrs HW=78.60' (Free Discharge)
↑—**1=15" RCP** (Passes 0.28 cfs of 8.77 cfs potential flow)
↑—**3=CB Grate** (Orifice Controls 0.28 cfs @ 1.94 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=78.00' (Free Discharge)
↑—**2=15" RCP** (Controls 0.00 cfs)

Pond EP1: Existing Pond 1



Summary for Pond EP2: Existing Pond 2

Inflow Area = 1.201 ac, 60.28% Impervious, Inflow Depth = 2.05" for 2-yr event
Inflow = 2.74 cfs @ 12.09 hrs, Volume= 0.205 af
Outflow = 0.94 cfs @ 12.38 hrs, Volume= 0.205 af, Atten= 66%, Lag= 17.4 min
Primary = 0.94 cfs @ 12.38 hrs, Volume= 0.205 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs
Peak Elev= 77.37' @ 12.38 hrs Surf.Area= 2,579 sf Storage= 1,868 cf

Plug-Flow detention time= 16.4 min calculated for 0.205 af (100% of inflow)
Center-of-Mass det. time= 16.4 min (813.0 - 796.6)

Volume	Invert	Avail.Storage	Storage Description
#1	76.14'	12,693 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

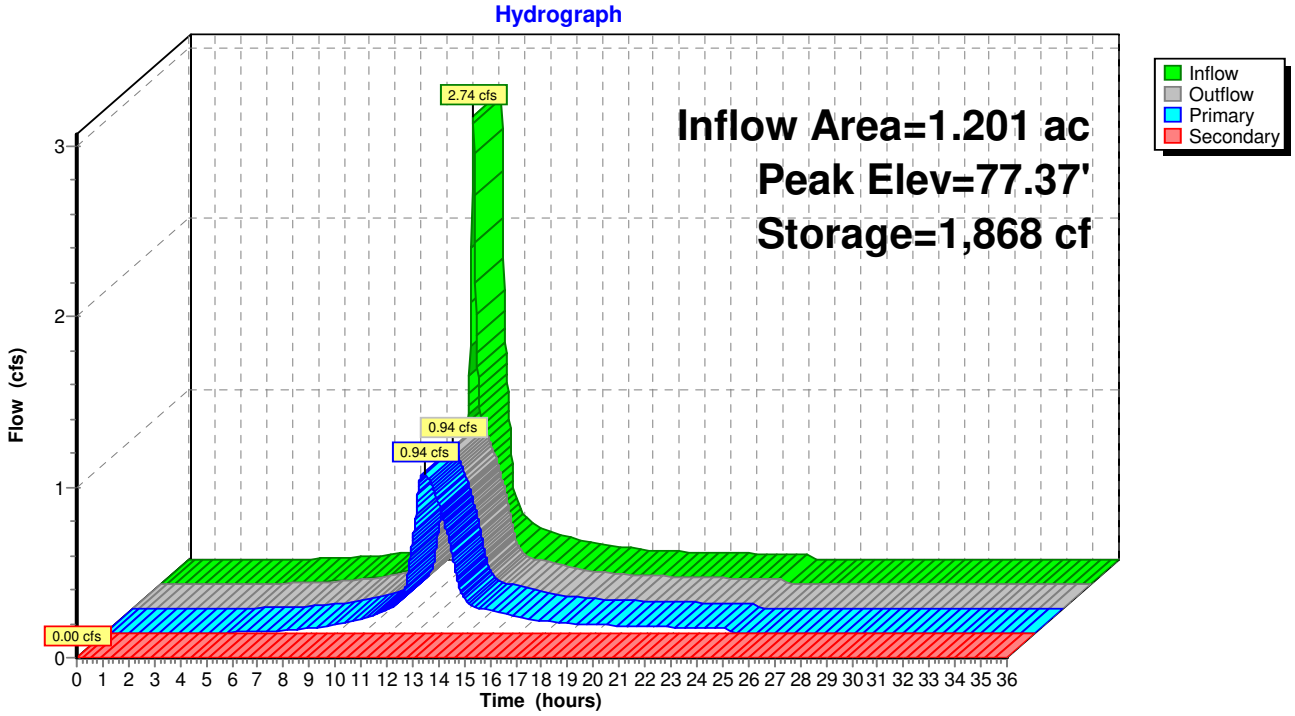
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.14	10	0	0
77.00	2,239	967	967
78.00	3,148	2,694	3,661
79.00	4,174	3,661	7,322
80.00	6,568	5,371	12,693

Device	Routing	Invert	Outlet Devices
#1	Primary	75.99'	**15.0" Round 15" HDPE** L= 198.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 75.99' / 75.51' S= 0.0024 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	76.14'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	79.07'	**27.7" x 16.2" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	79.90'	**11.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.94 cfs @ 12.38 hrs HW=77.37' (Free Discharge)
└**1=15" HDPE** (Passes 0.94 cfs of 3.53 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.94 cfs @ 4.78 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=76.14' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond EP2: Existing Pond 2

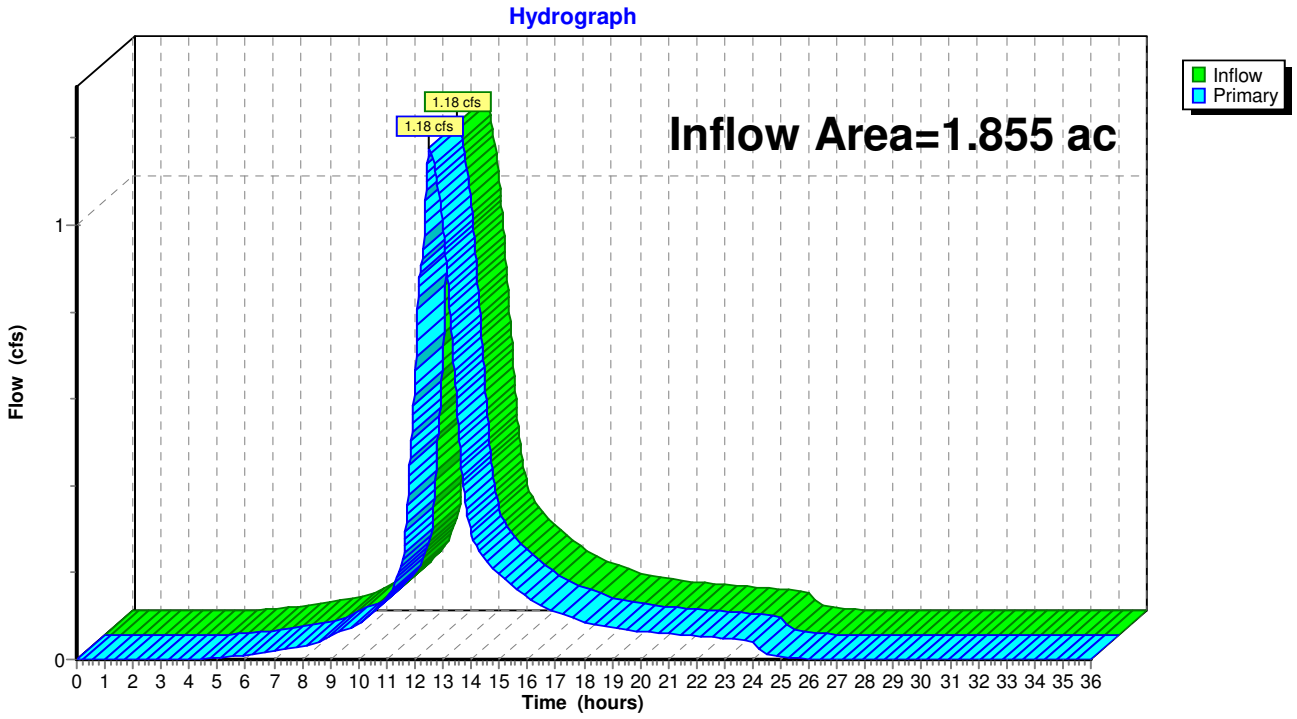


Summary for Link DP1: DP1 (SMH IN RT 5)

Inflow Area = 1.855 ac, 40.97% Impervious, Inflow Depth = 1.70" for 2-yr event
Inflow = 1.18 cfs @ 12.53 hrs, Volume= 0.263 af
Primary = 1.18 cfs @ 12.53 hrs, Volume= 0.263 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs

Link DP1: DP1 (SMH IN RT 5)

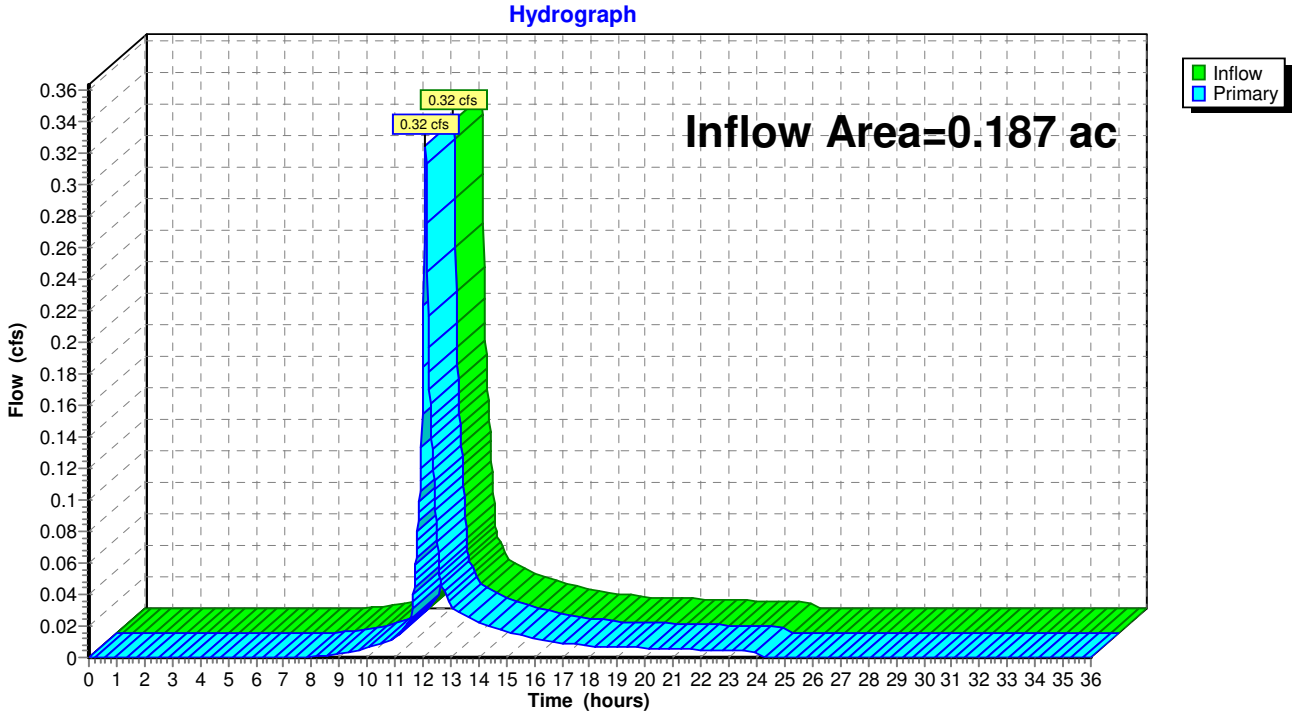


Summary for Link DP2: DP2 (SOUTHERN PROP BOUNDARY)

Inflow Area = 0.187 ac, 50.80% Impervious, Inflow Depth = 1.52" for 2-yr event
Inflow = 0.32 cfs @ 12.09 hrs, Volume= 0.024 af
Primary = 0.32 cfs @ 12.09 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs

Link DP2: DP2 (SOUTHERN PROP BOUNDARY)

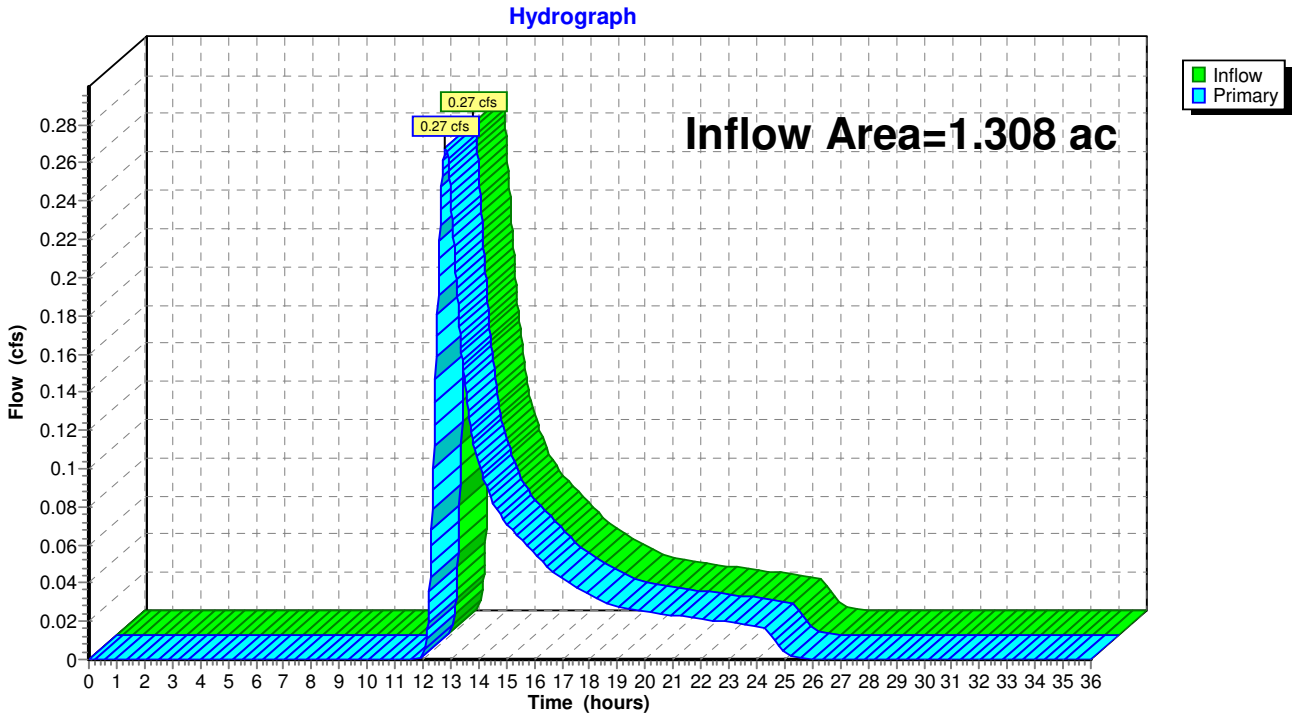


Summary for Link DP3: DP3 (EAST PROP BNDY)

Inflow Area = 1.308 ac, 1.99% Impervious, Inflow Depth = 0.53" for 2-yr event
Inflow = 0.27 cfs @ 12.82 hrs, Volume= 0.057 af
Primary = 0.27 cfs @ 12.82 hrs, Volume= 0.057 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs

Link DP3: DP3 (EAST PROP BNDY)

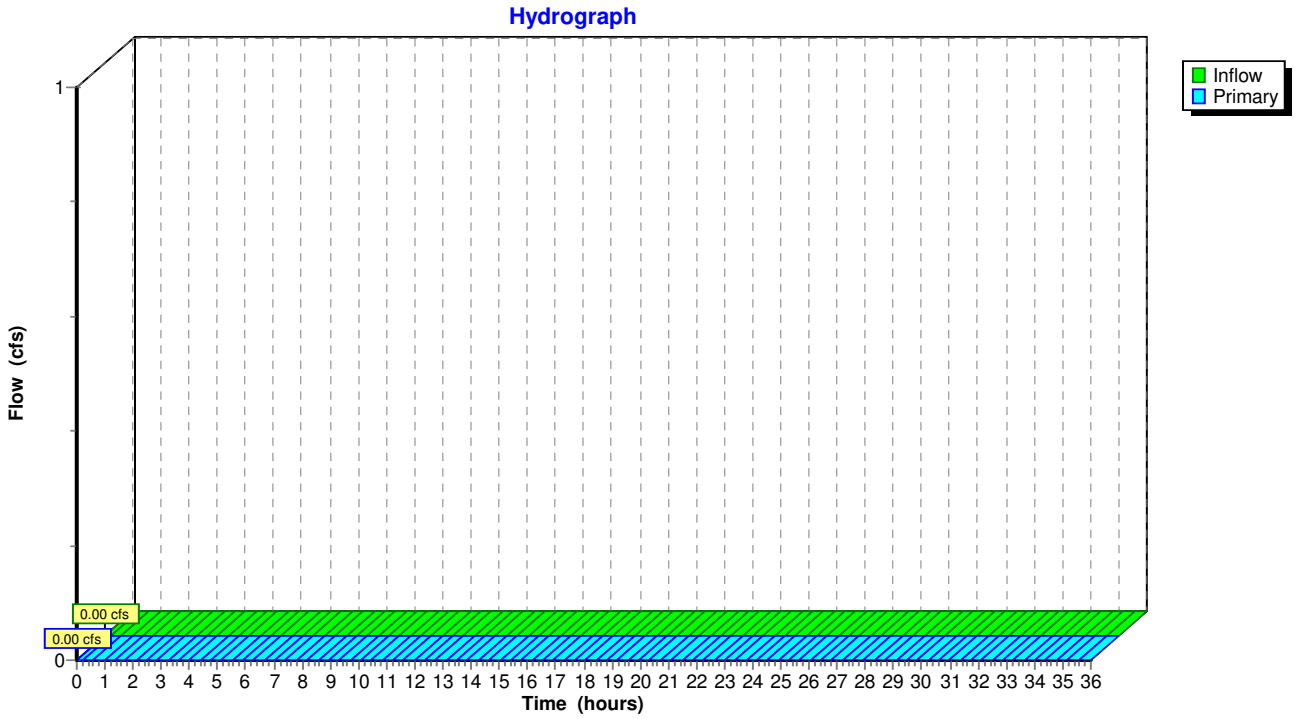


Summary for Link DP4: DP4 (15" RCP HEADWALL @ RT 5 ROW)

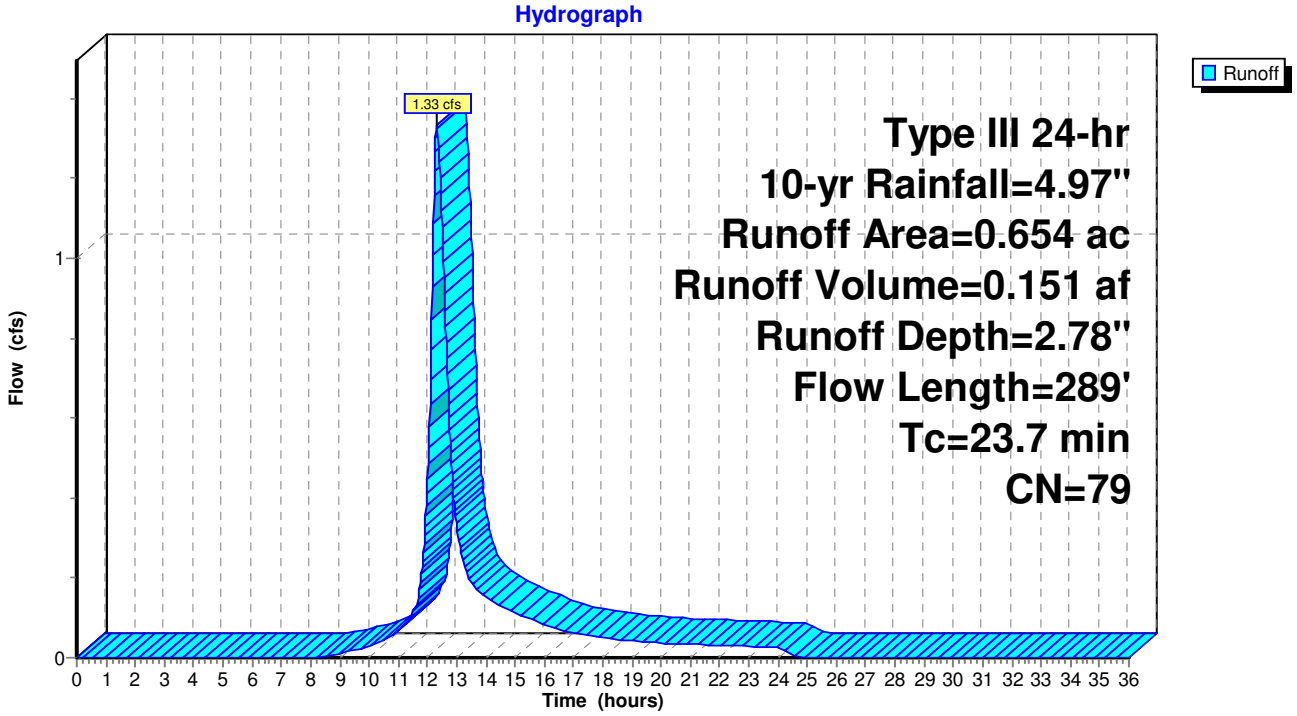
Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Primary	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs

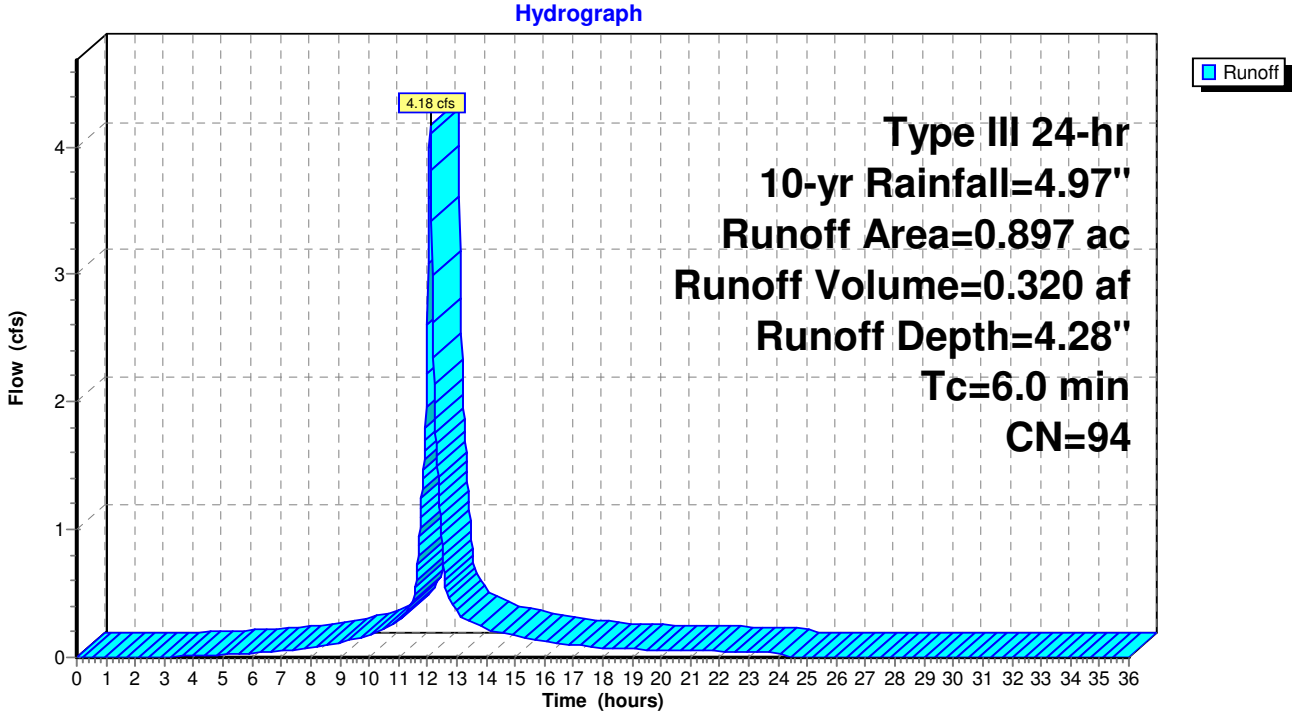
Link DP4: DP4 (15" RCP HEADWALL @ RT 5 ROW)



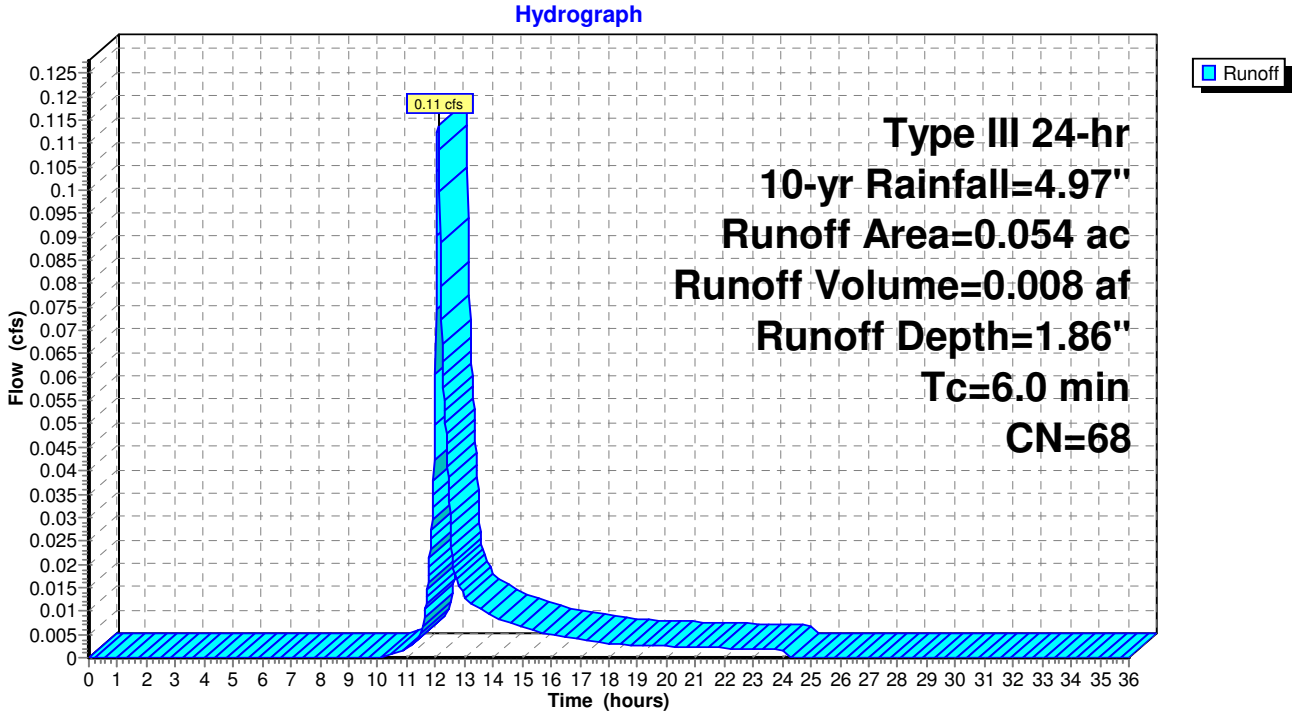
Subcatchment E1: Existing Area 1



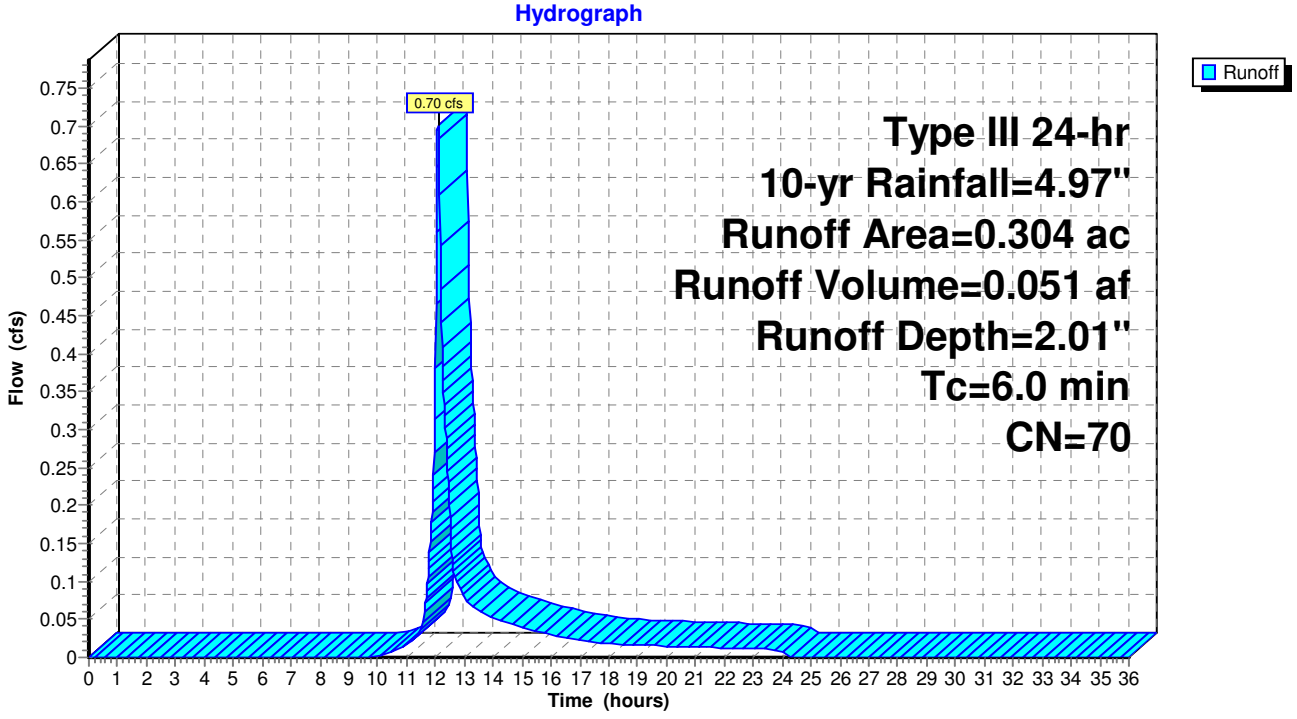
Subcatchment E2: Existing Area 2



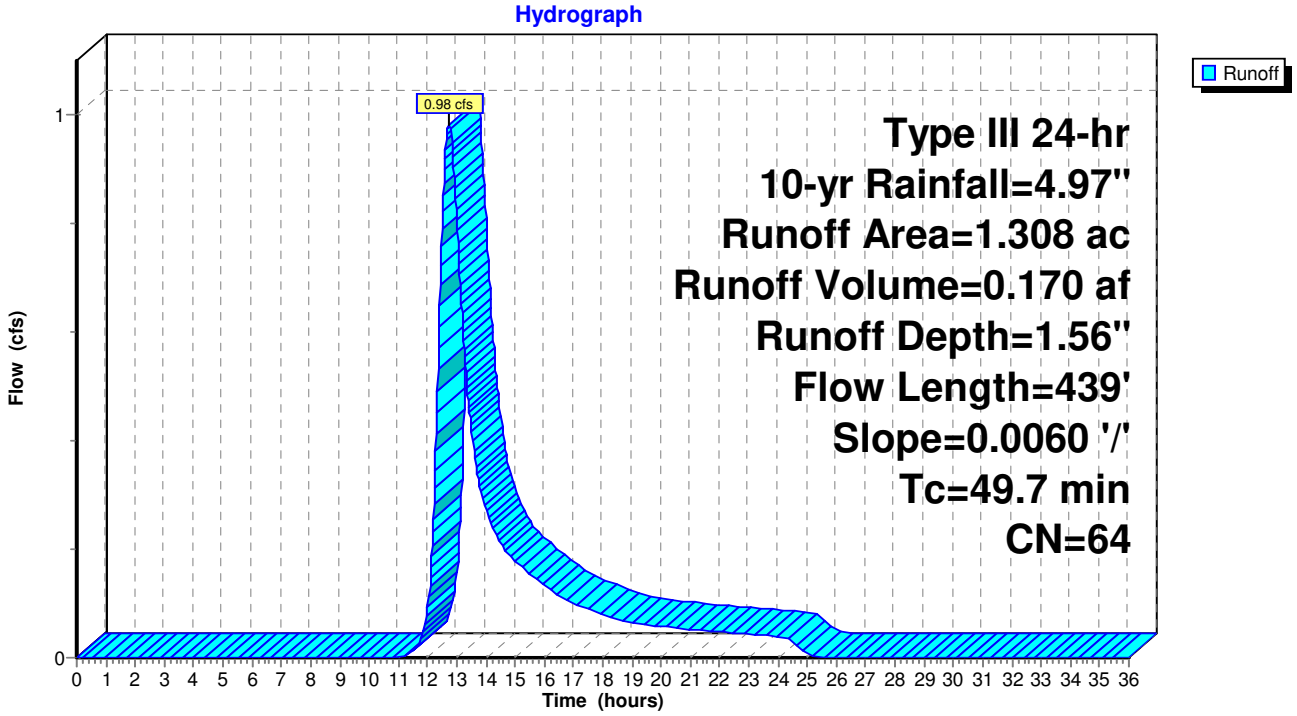
Subcatchment E3: Existing Area 3



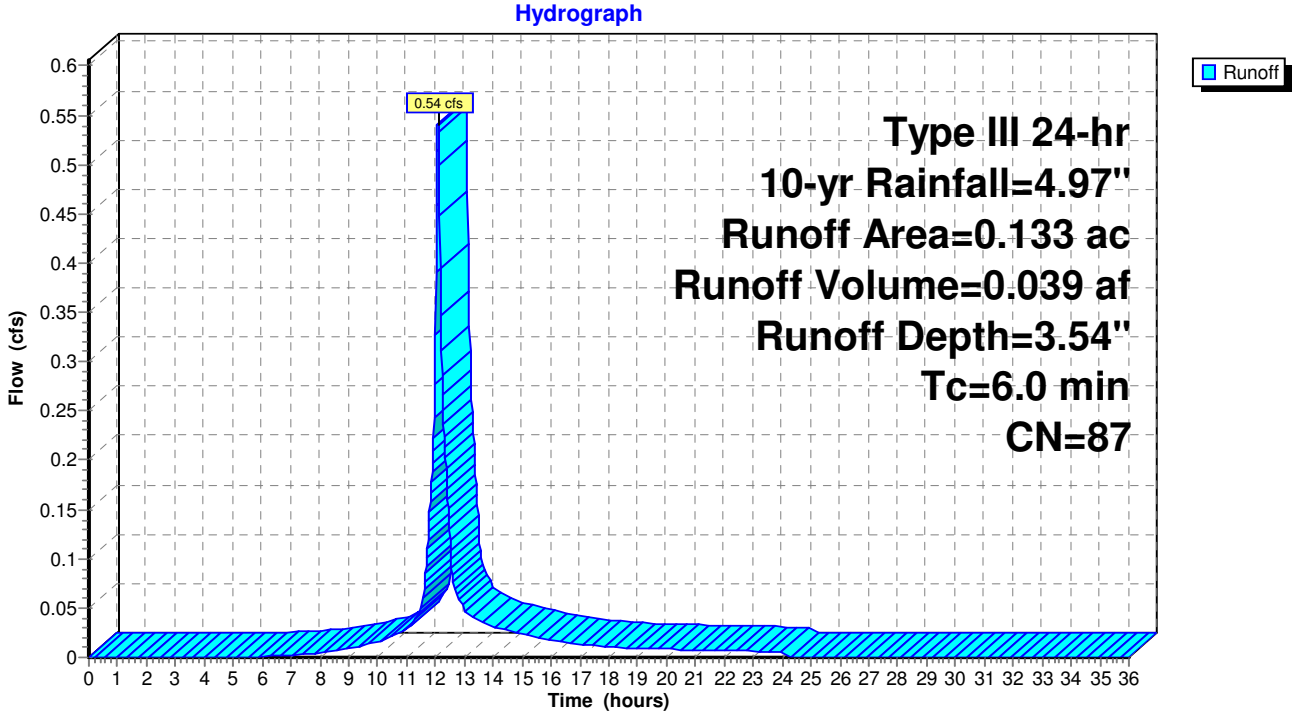
Subcatchment E4: Existing Area 4



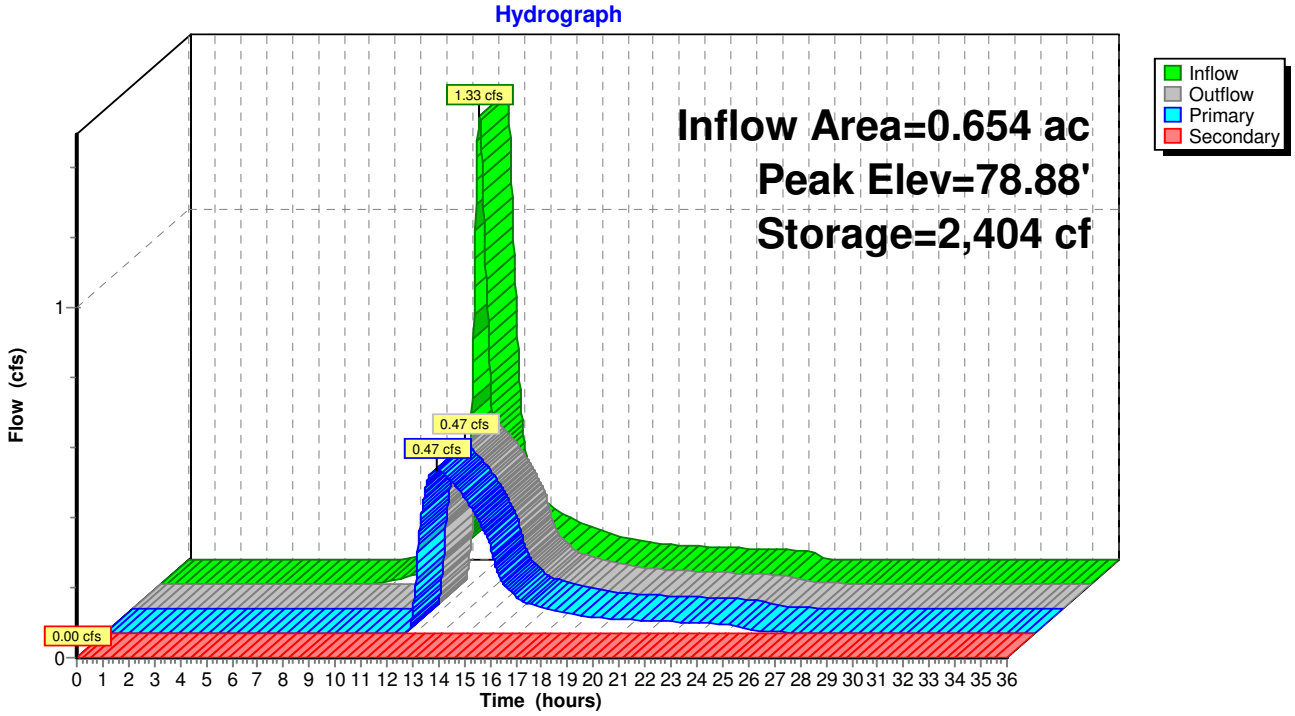
Subcatchment E5: Existing Area 5



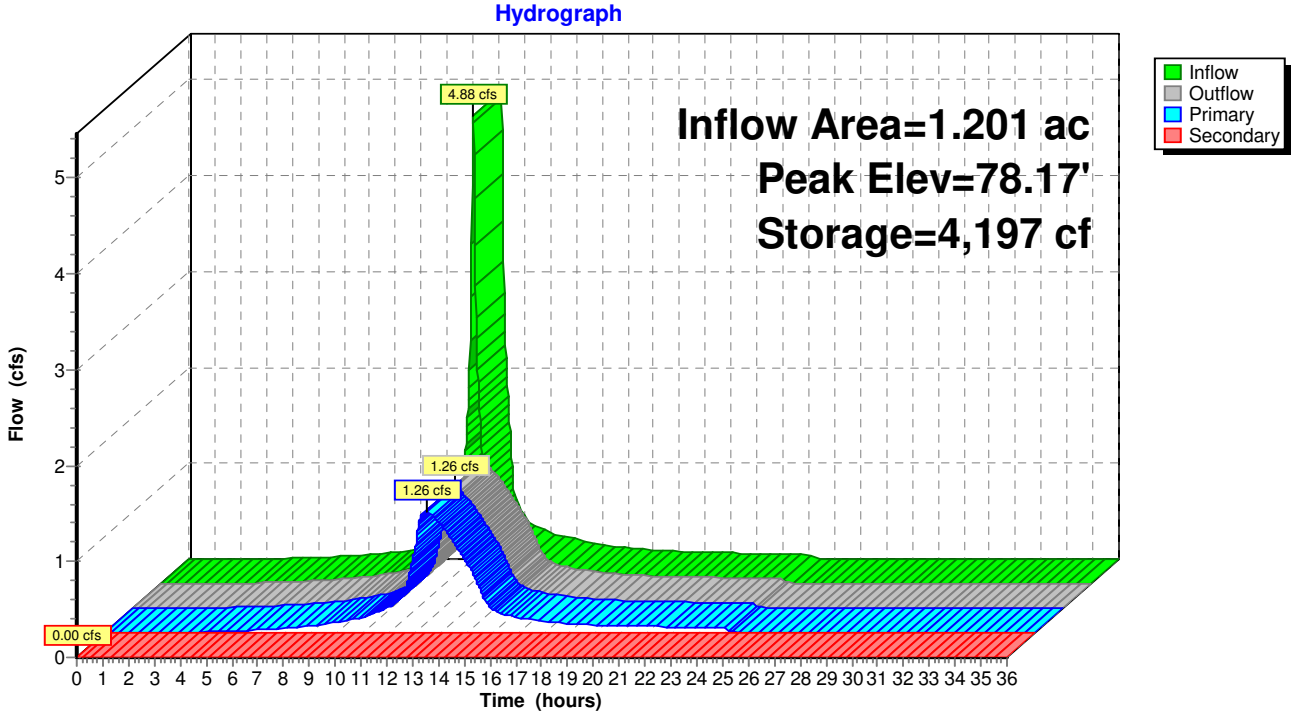
Subcatchment E6: Existing Area 6



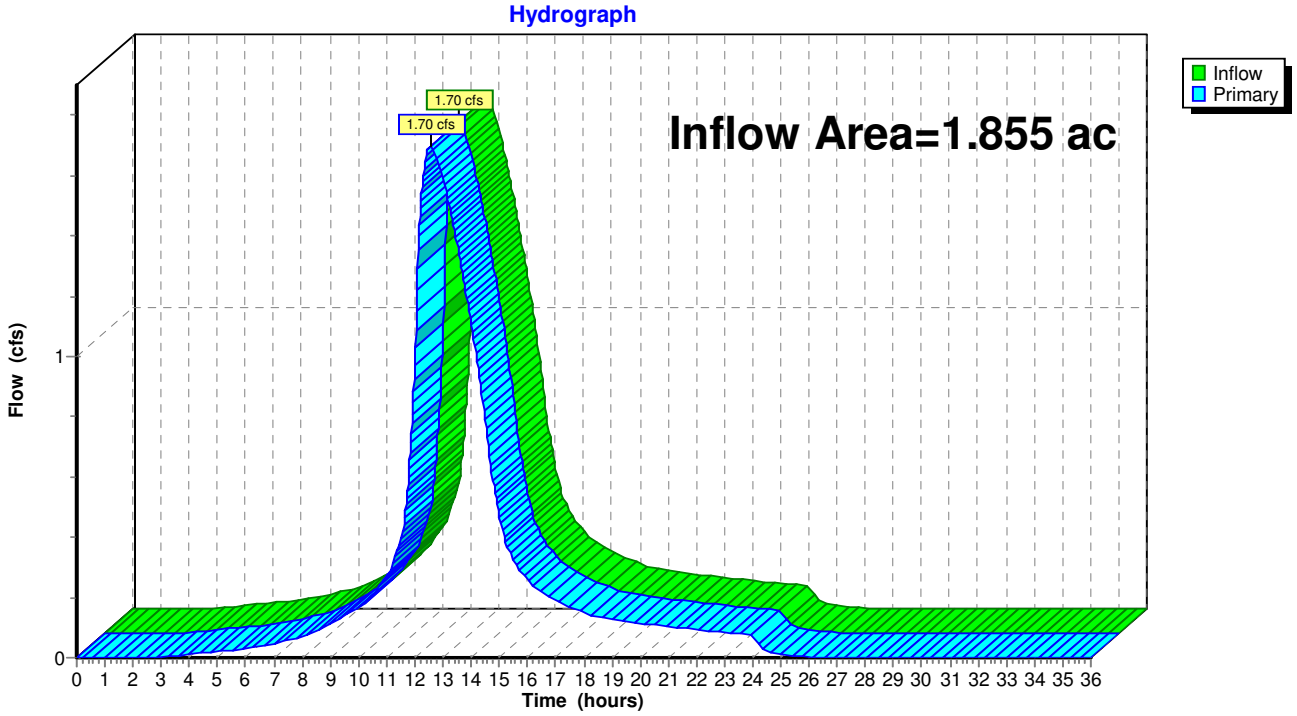
Pond EP1: Existing Pond 1



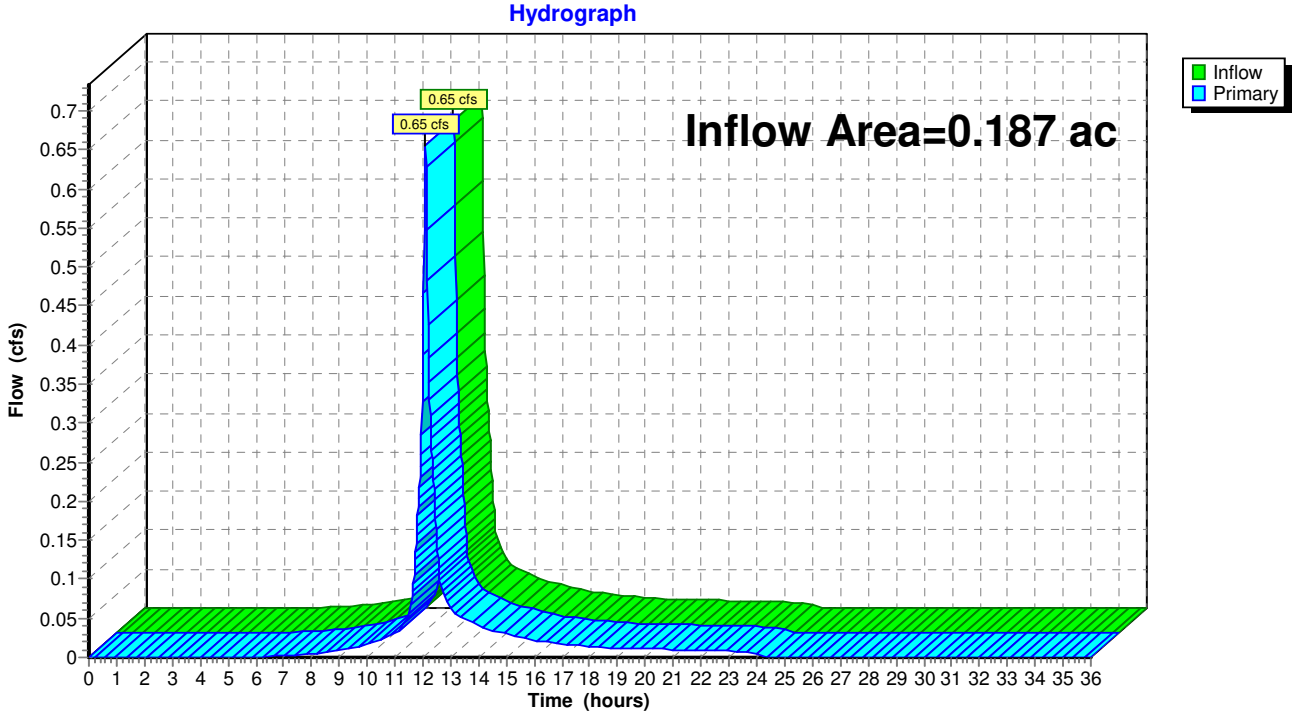
Pond EP2: Existing Pond 2



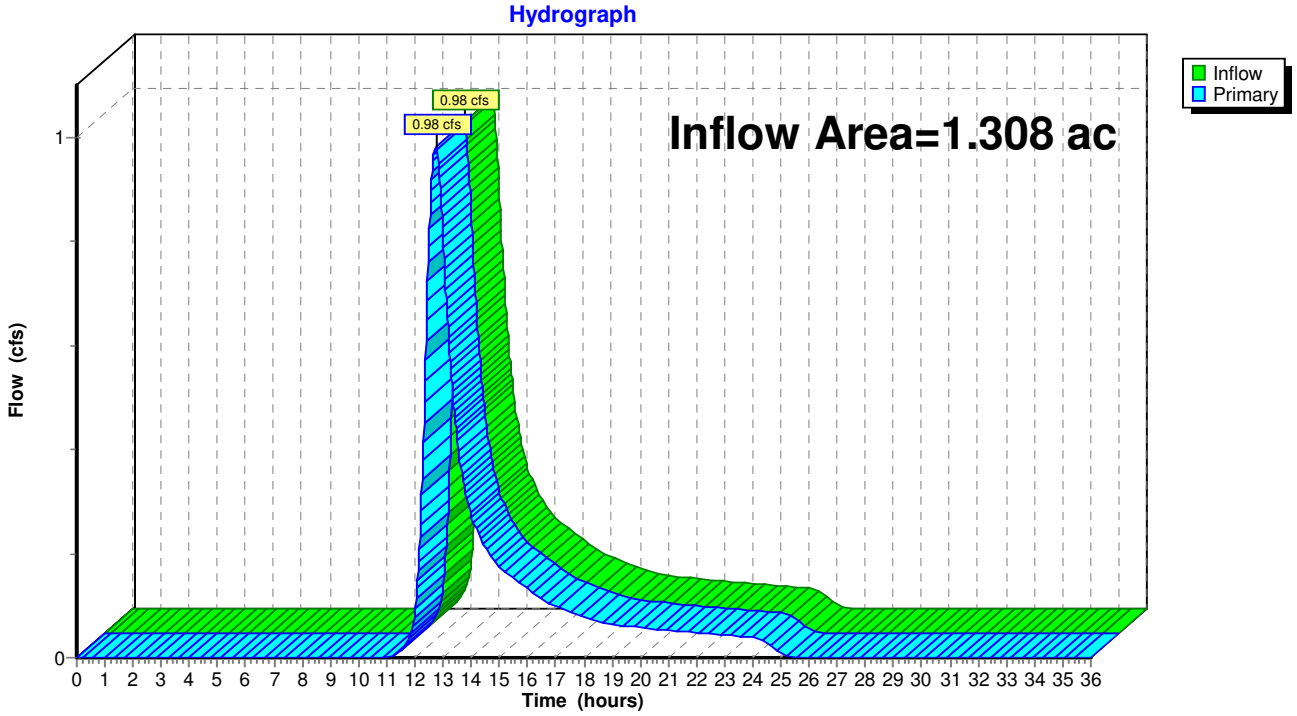
Link DP1: DP1 (SMH IN RT 5)



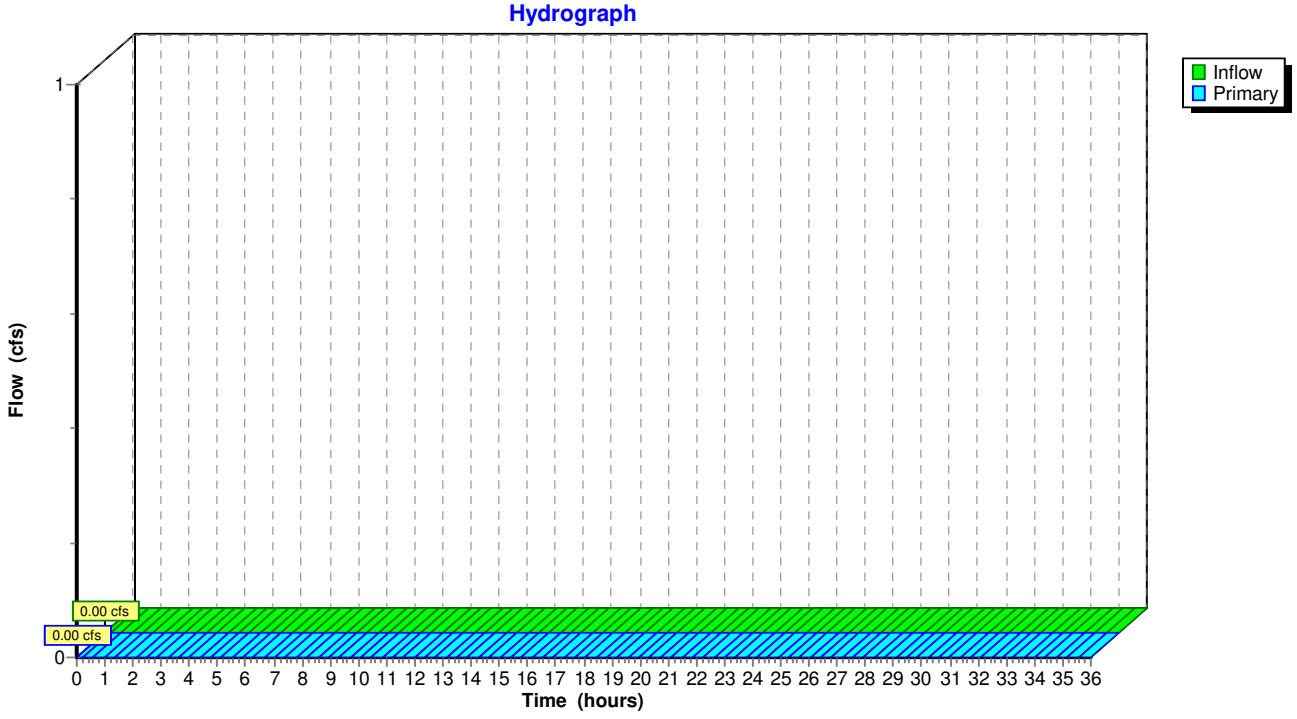
Link DP2: DP2 (SOUTHERN PROP BOUNDARY)



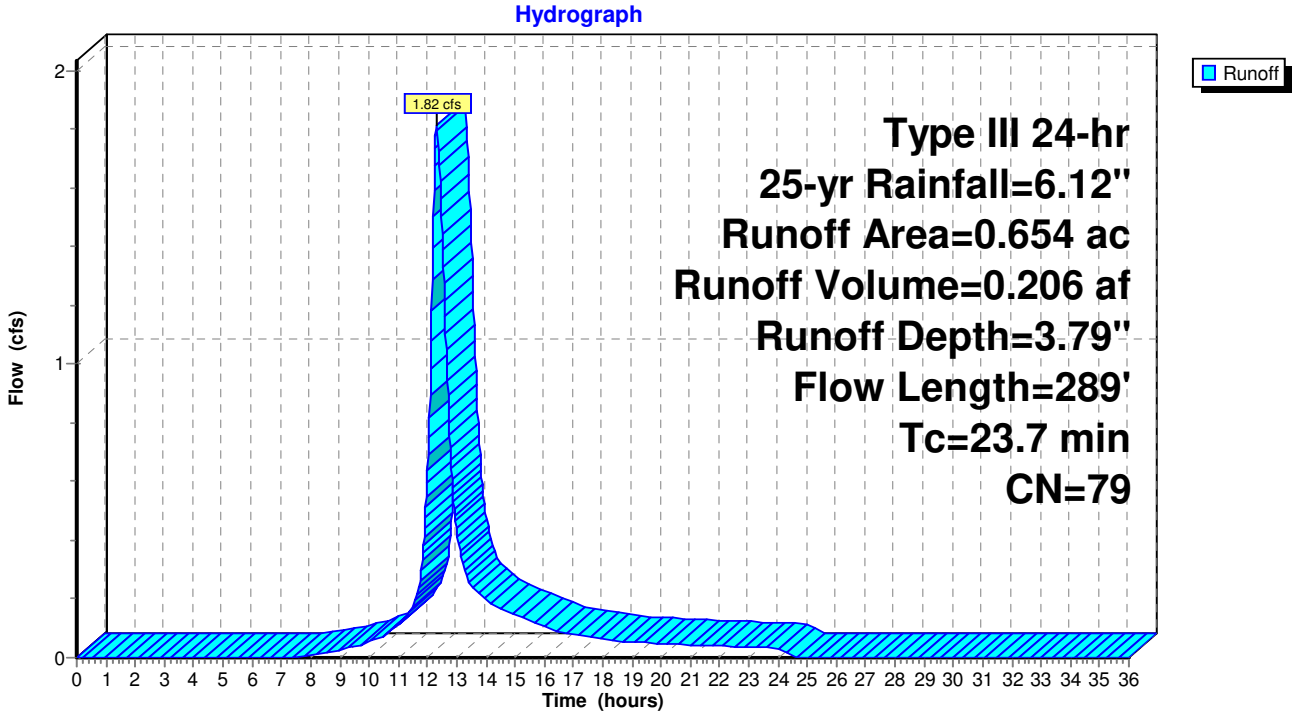
Link DP3: DP3 (EAST PROP BNDY)



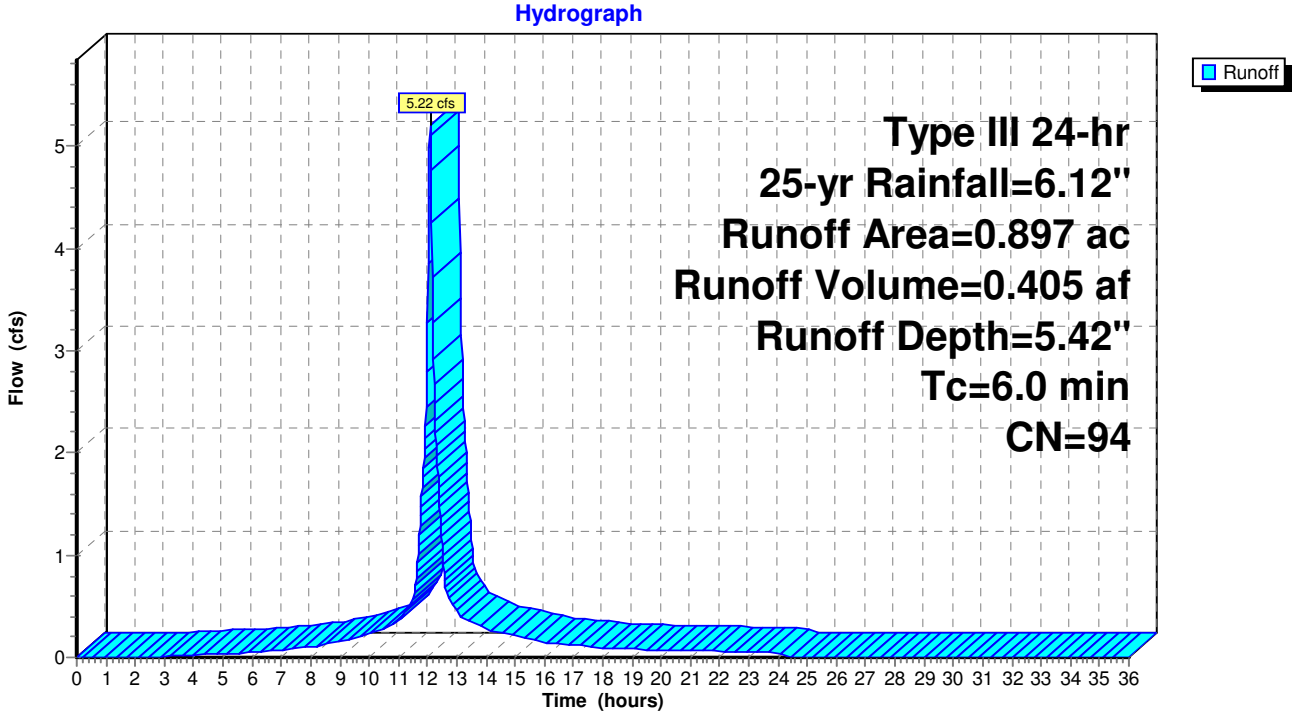
Link DP4: DP4 (15" RCP HEADWALL @ RT 5 ROW)



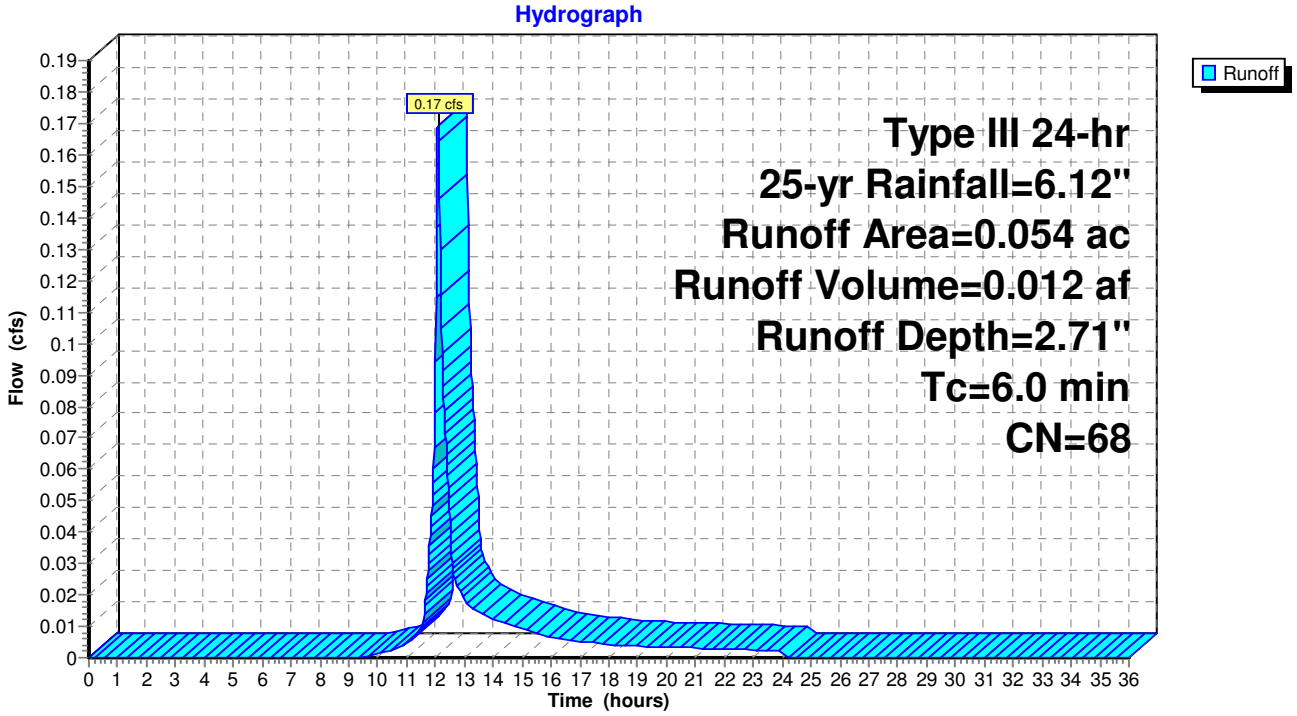
Subcatchment E1: Existing Area 1



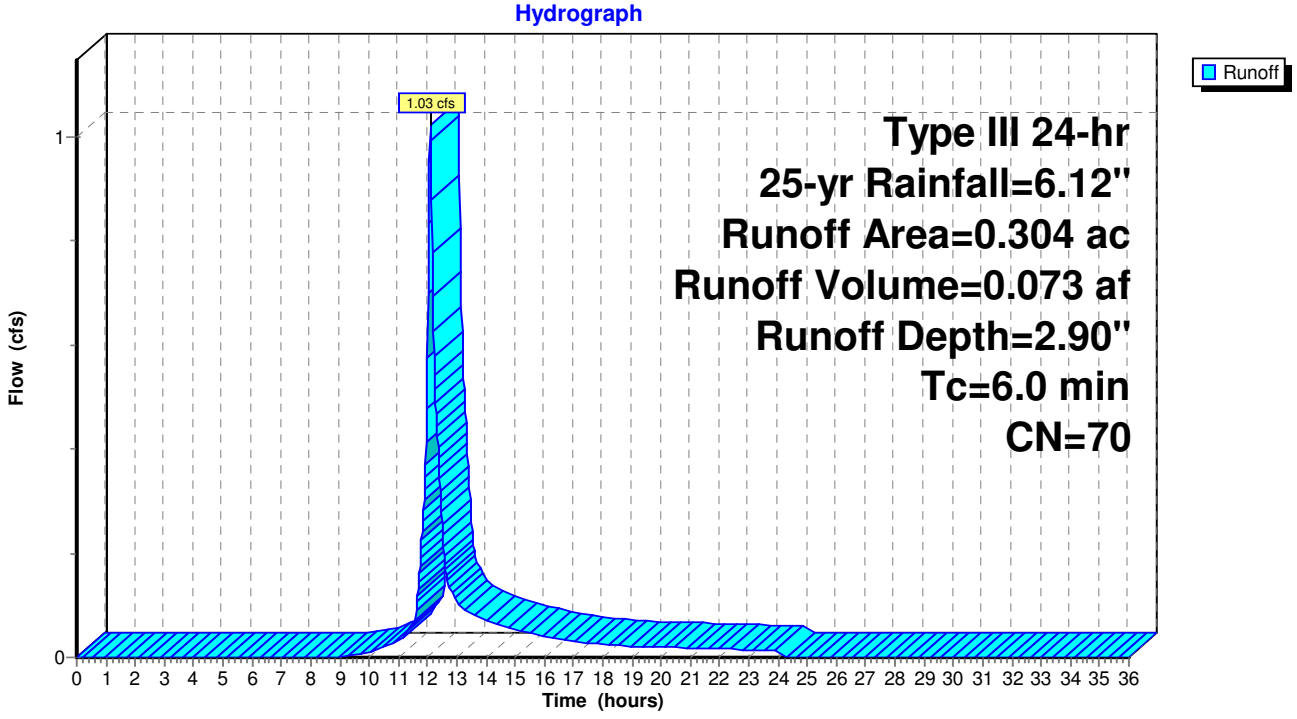
Subcatchment E2: Existing Area 2



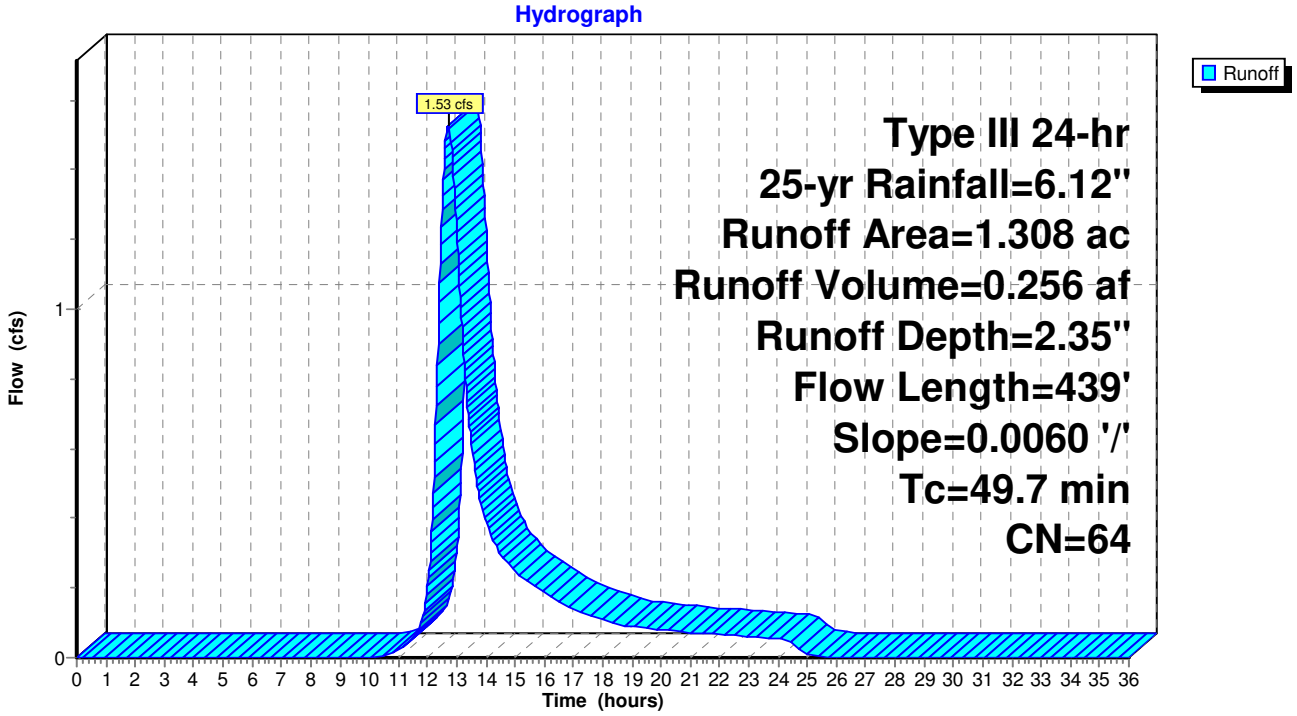
Subcatchment E3: Existing Area 3



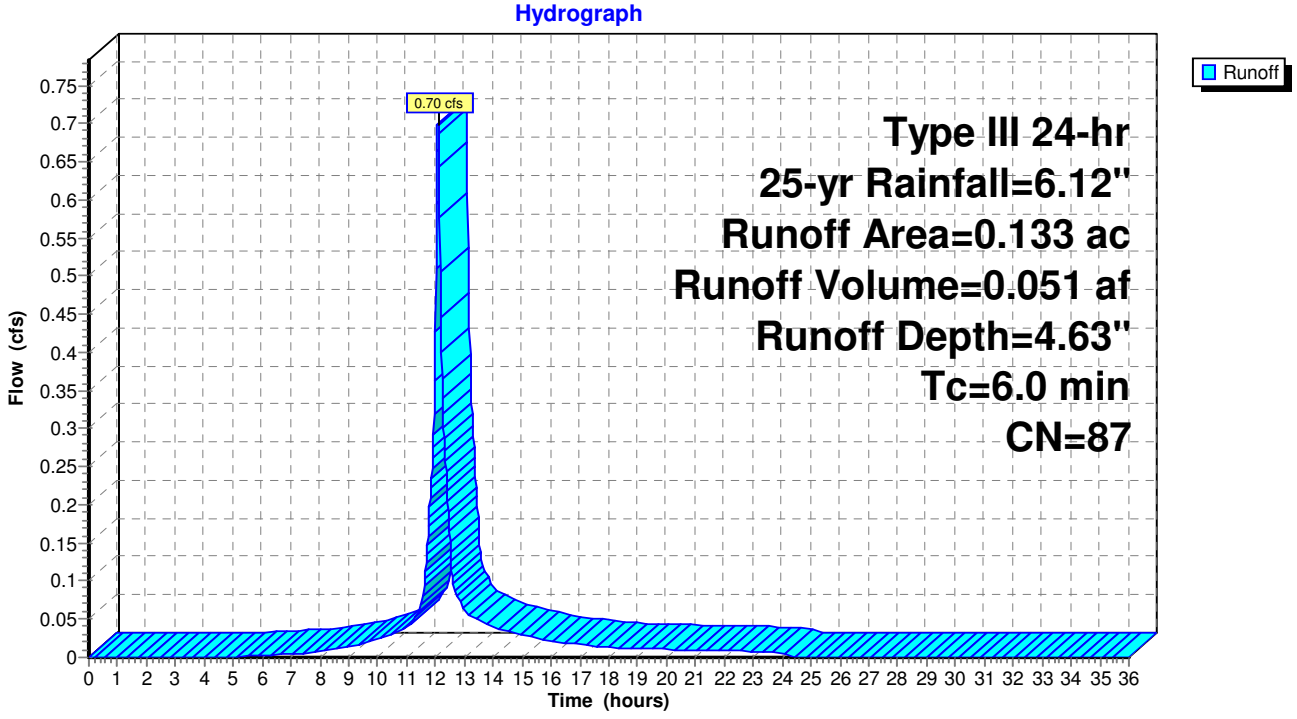
Subcatchment E4: Existing Area 4



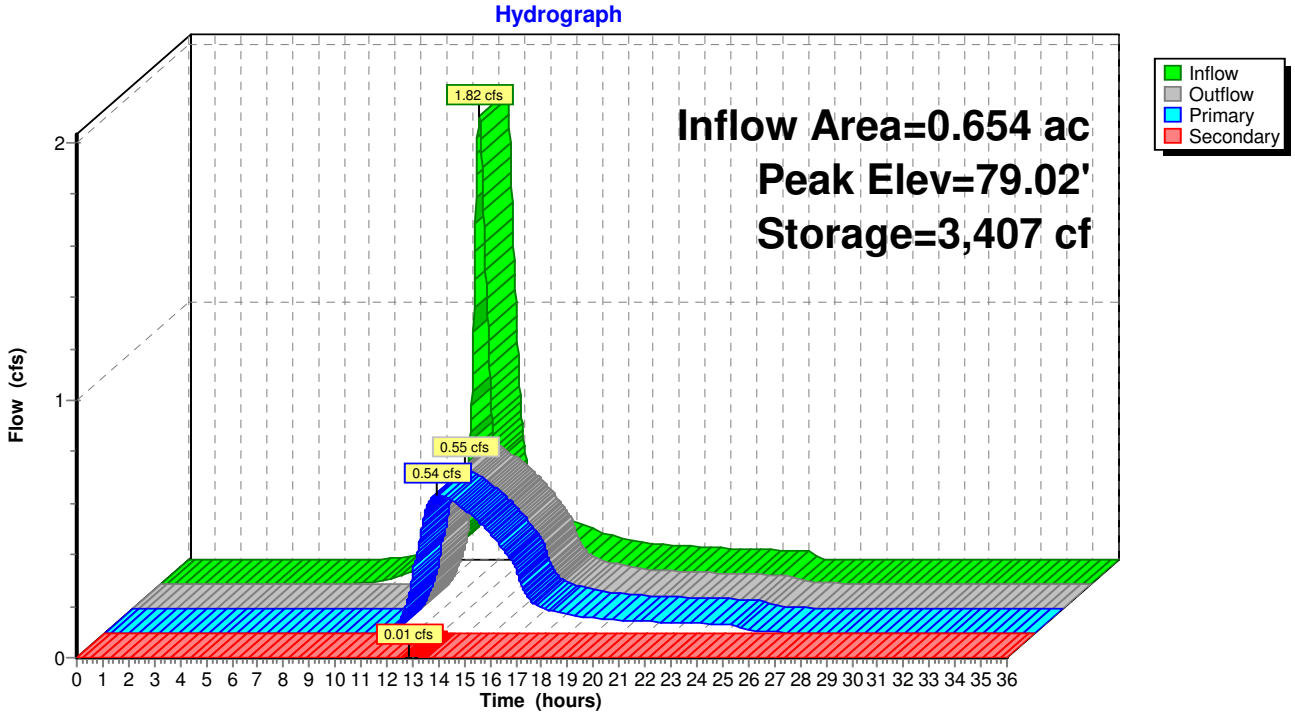
Subcatchment E5: Existing Area 5



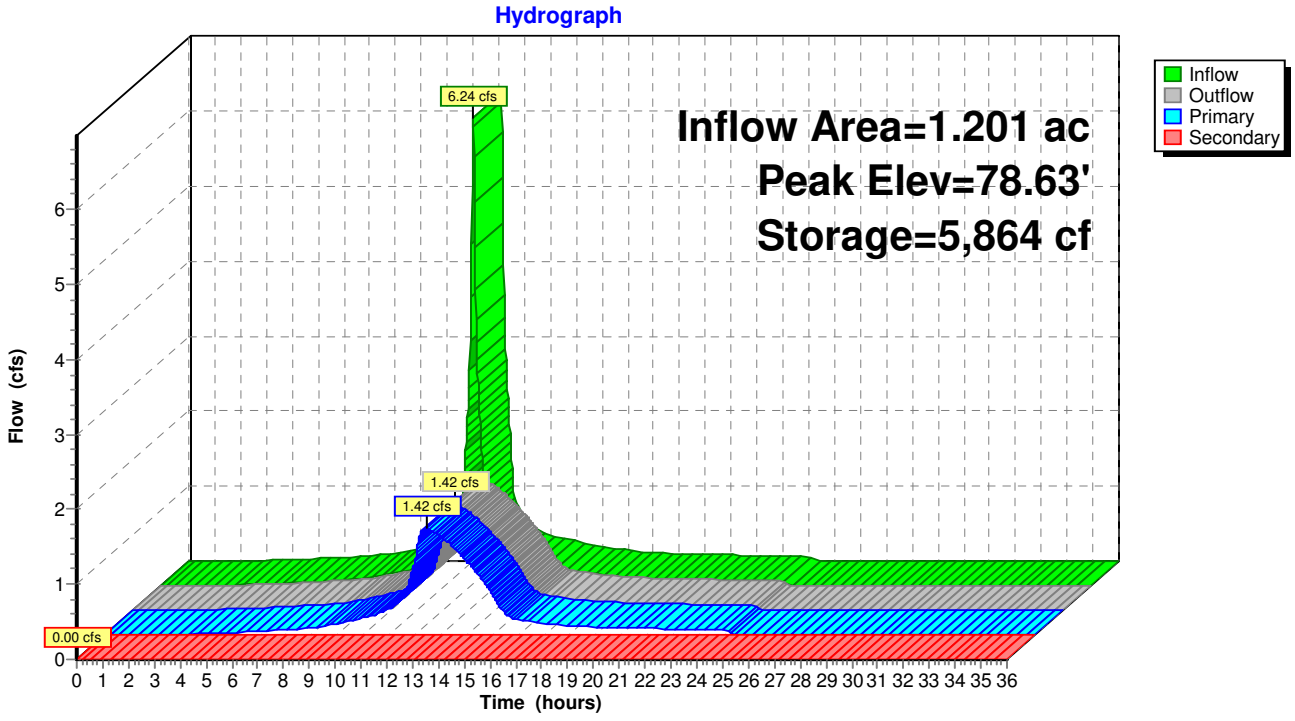
Subcatchment E6: Existing Area 6



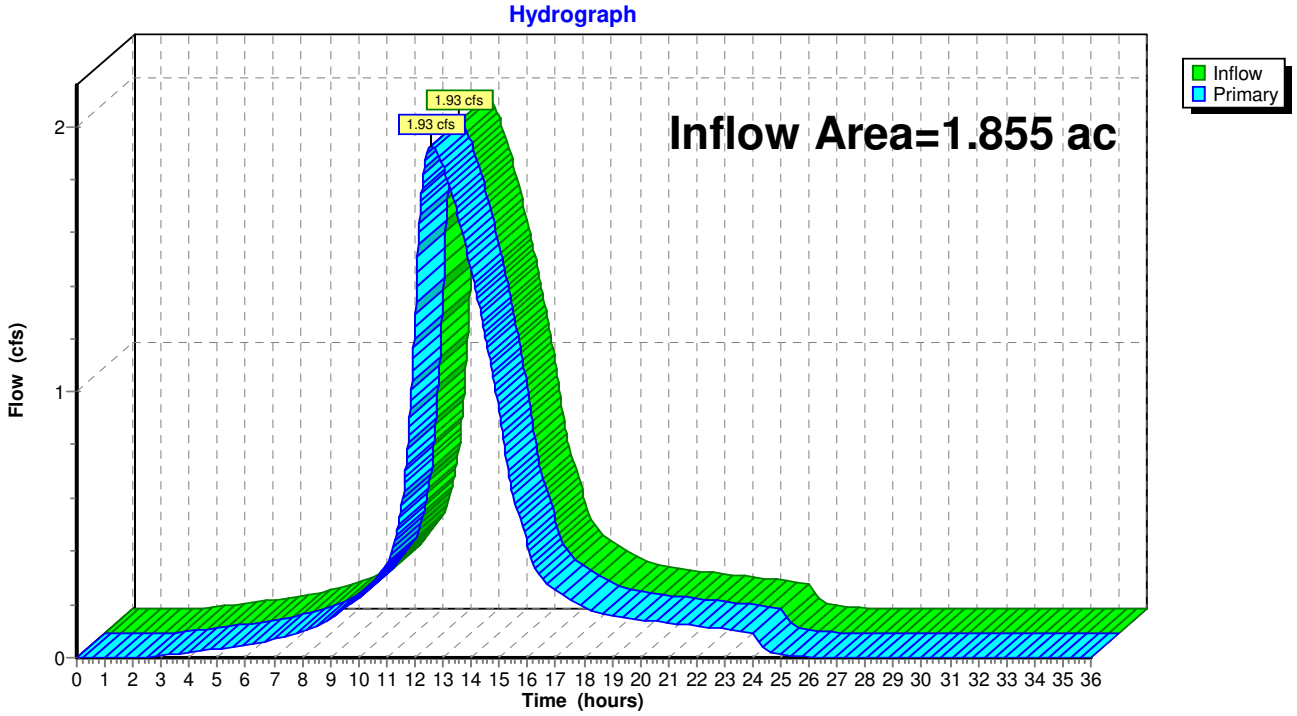
Pond EP1: Existing Pond 1



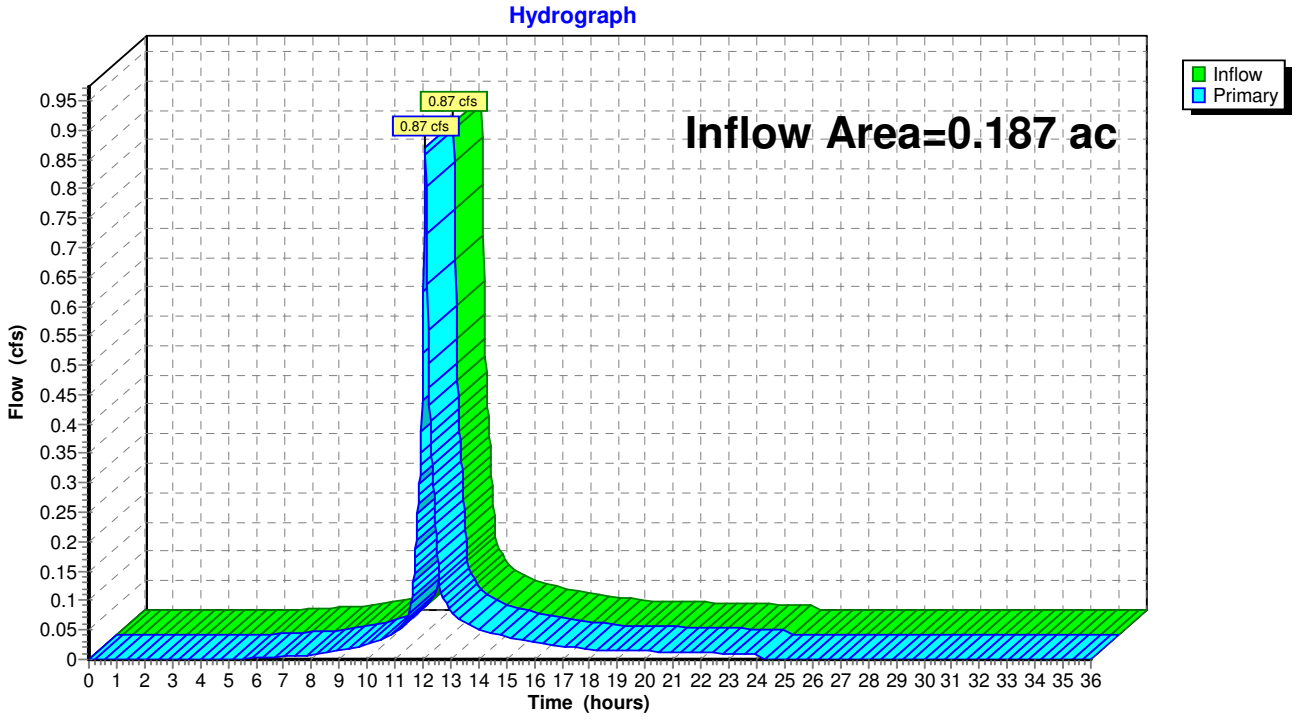
Pond EP2: Existing Pond 2



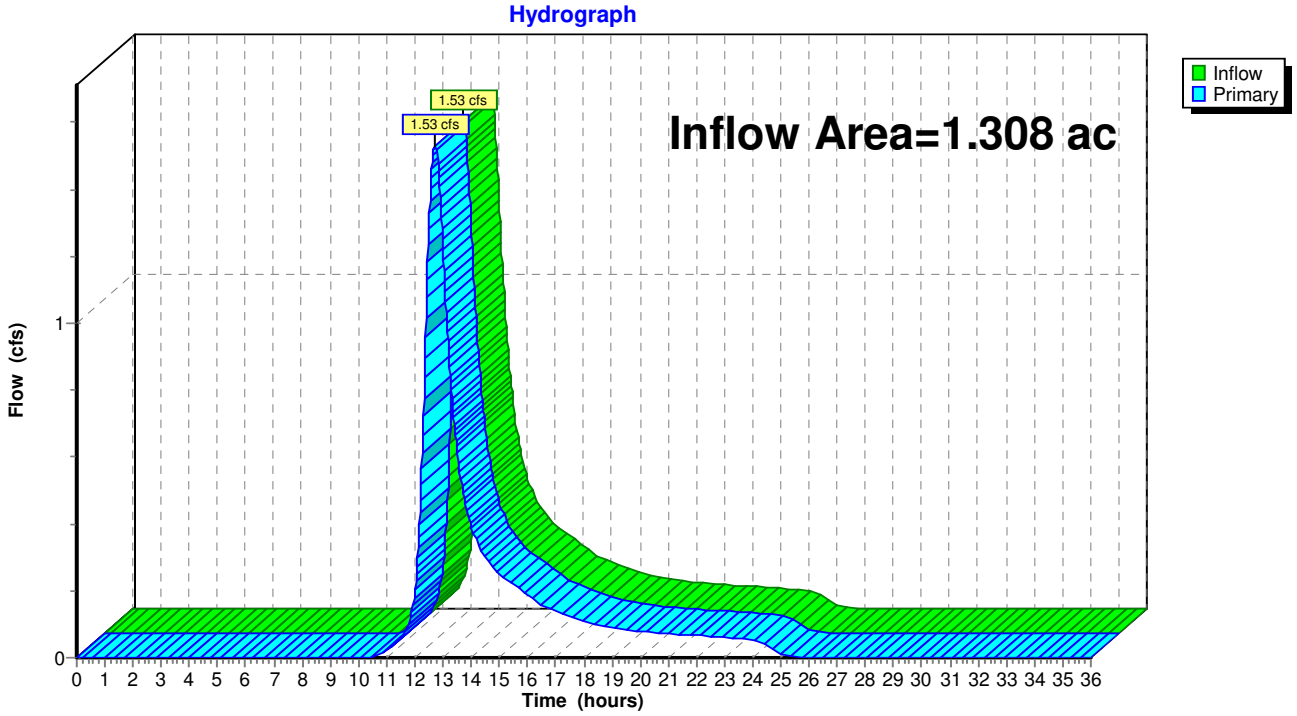
Link DP1: DP1 (SMH IN RT 5)



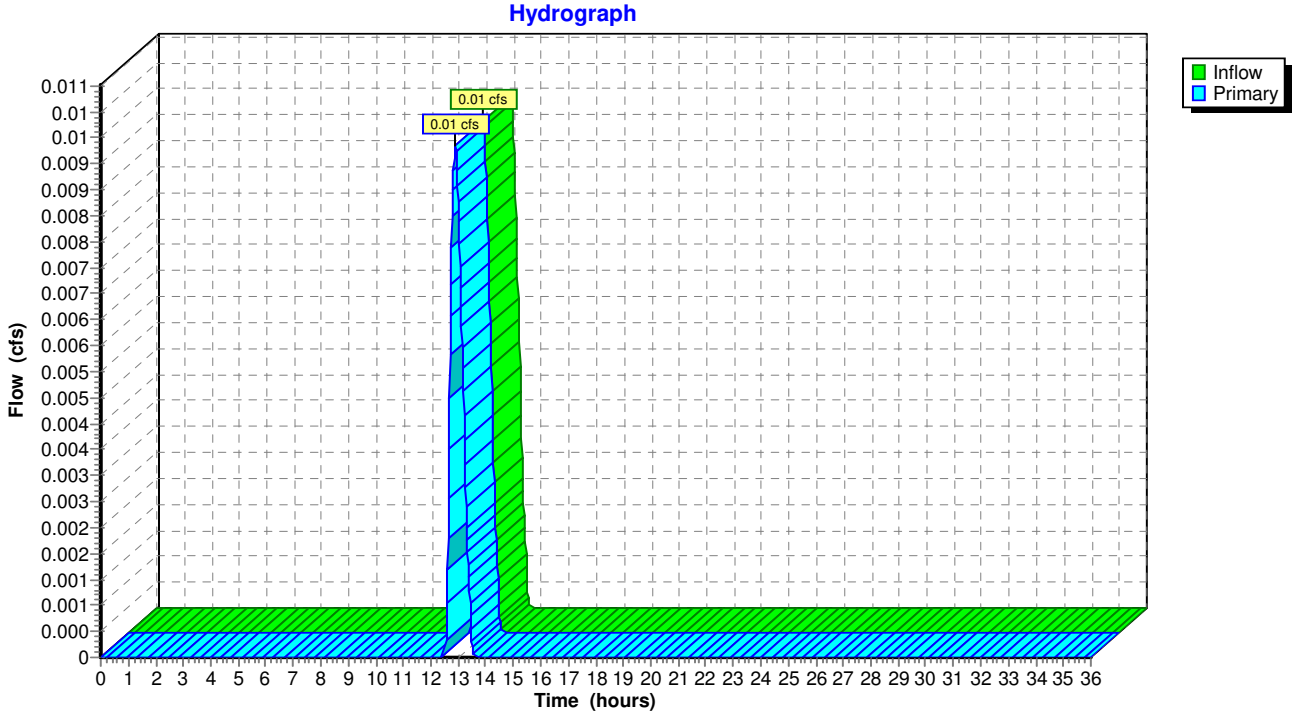
Link DP2: DP2 (SOUTHERN PROP BOUNDARY)



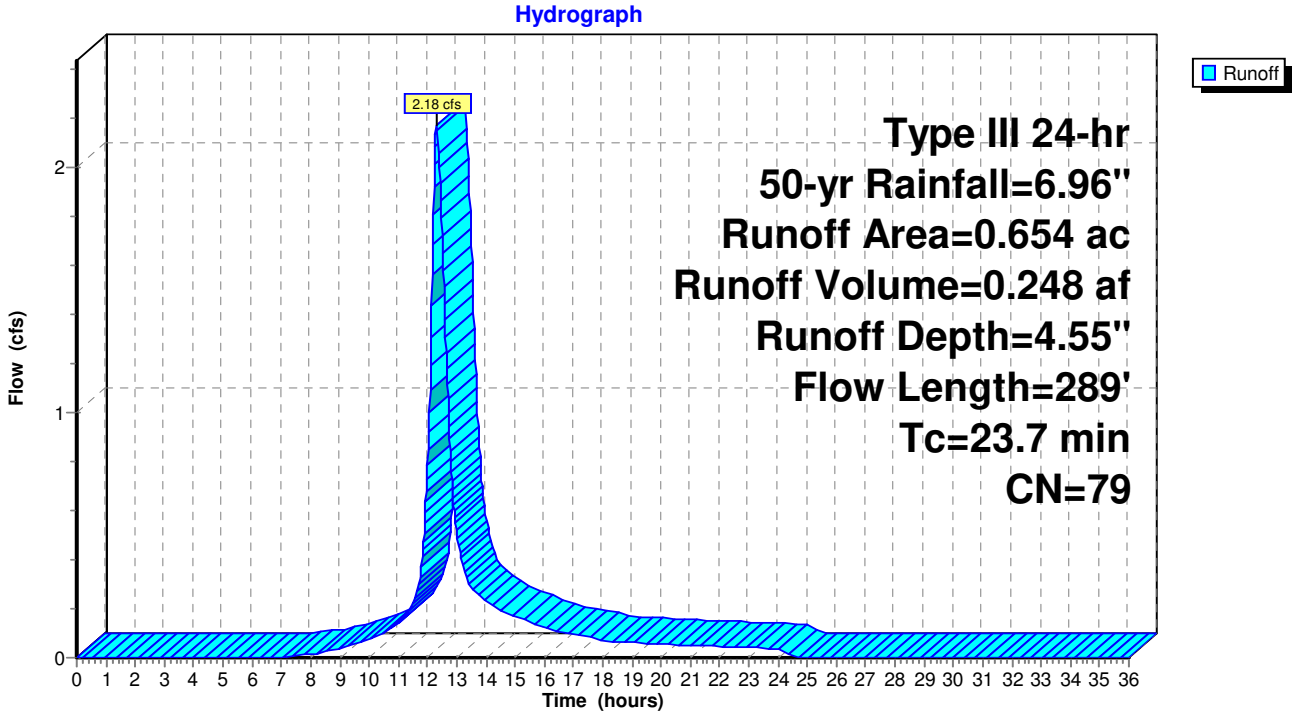
Link DP3: DP3 (EAST PROP BNDY)



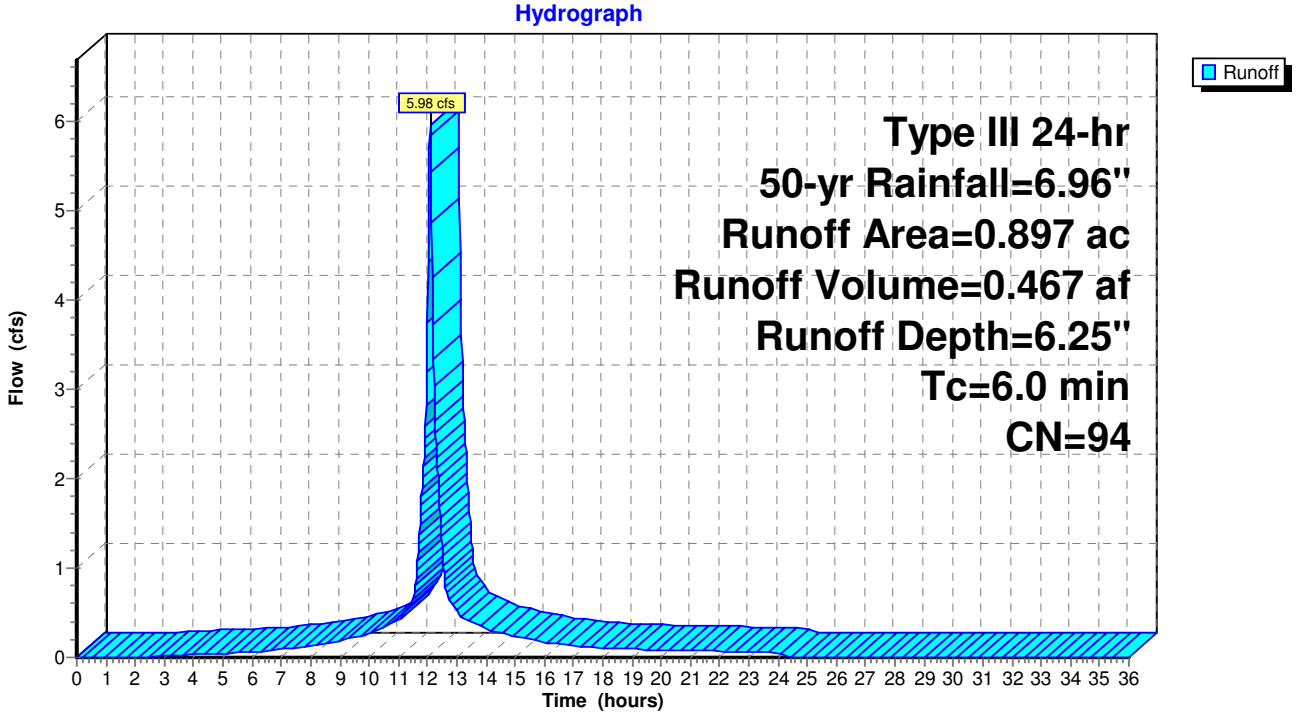
Link DP4: DP4 (15" RCP HEADWALL @ RT 5 ROW)



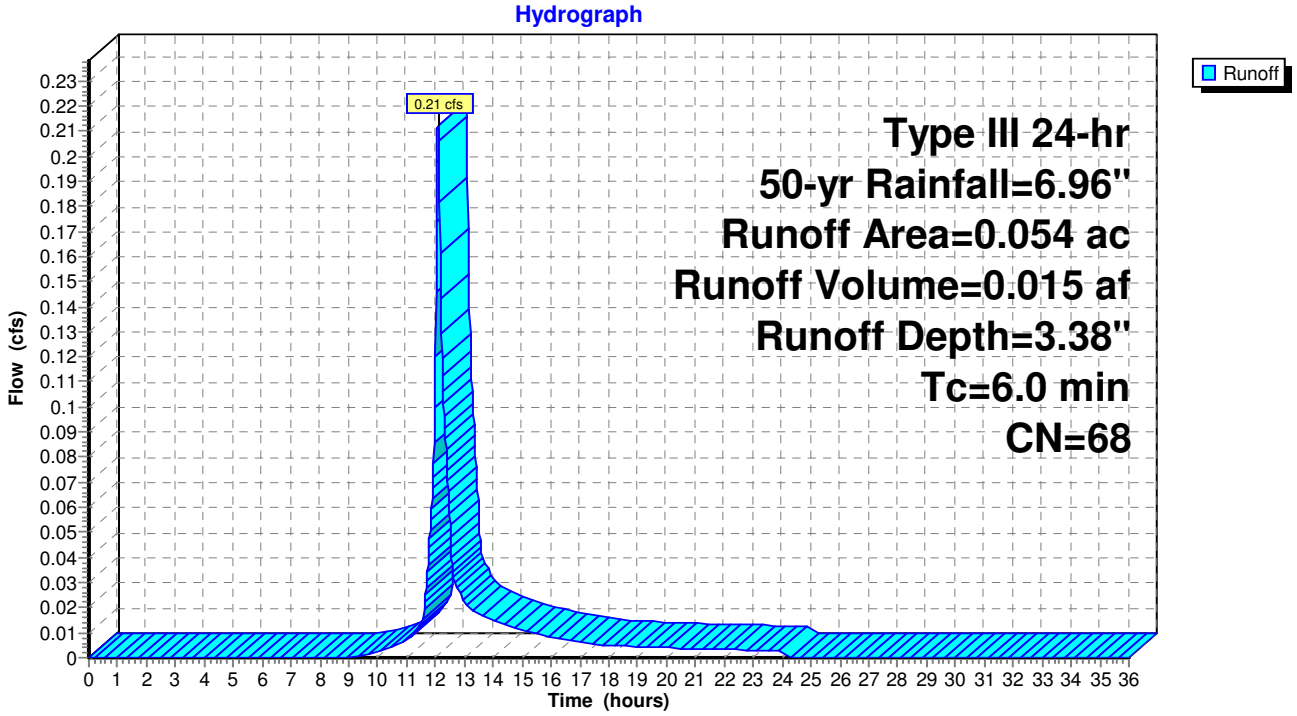
Subcatchment E1: Existing Area 1



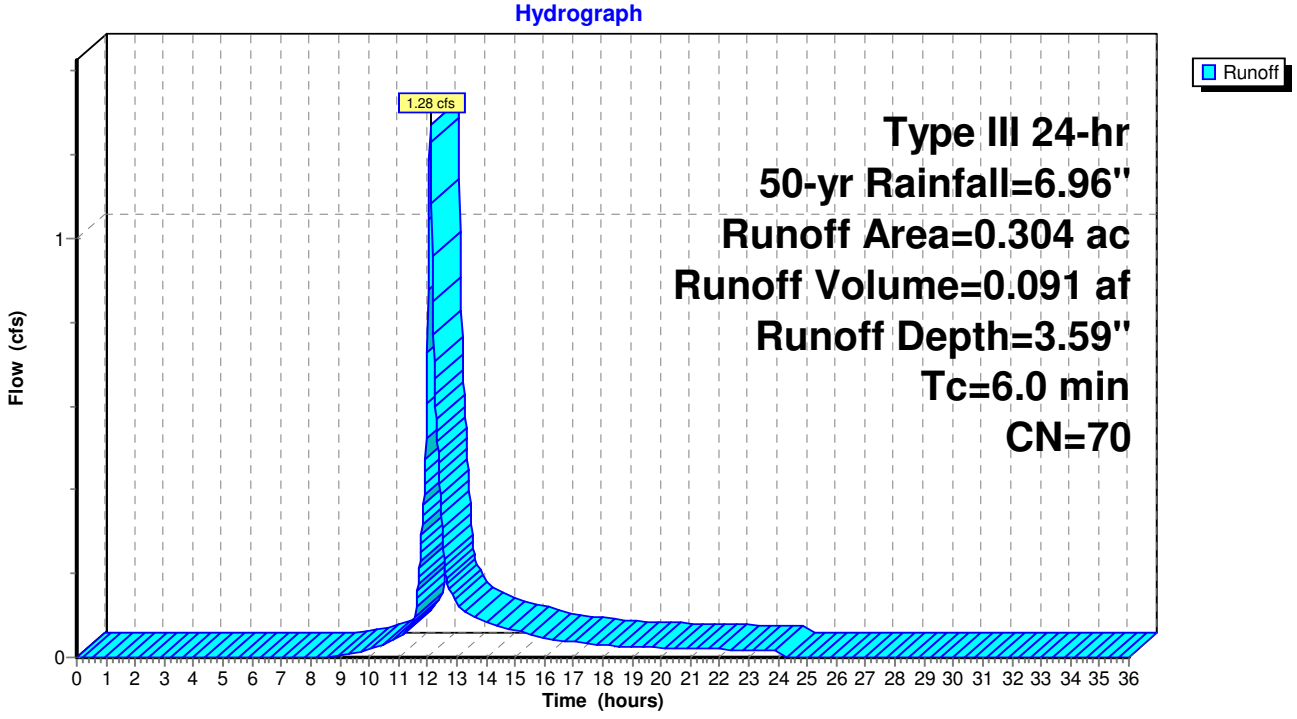
Subcatchment E2: Existing Area 2



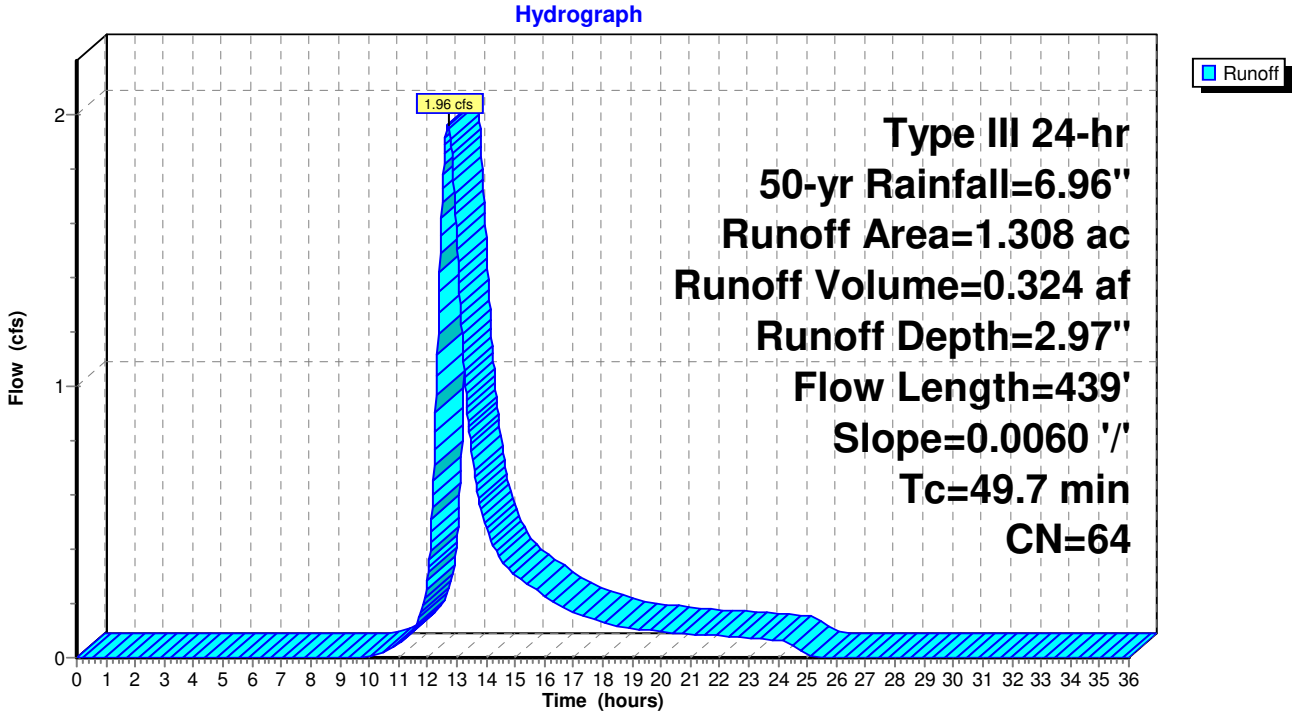
Subcatchment E3: Existing Area 3



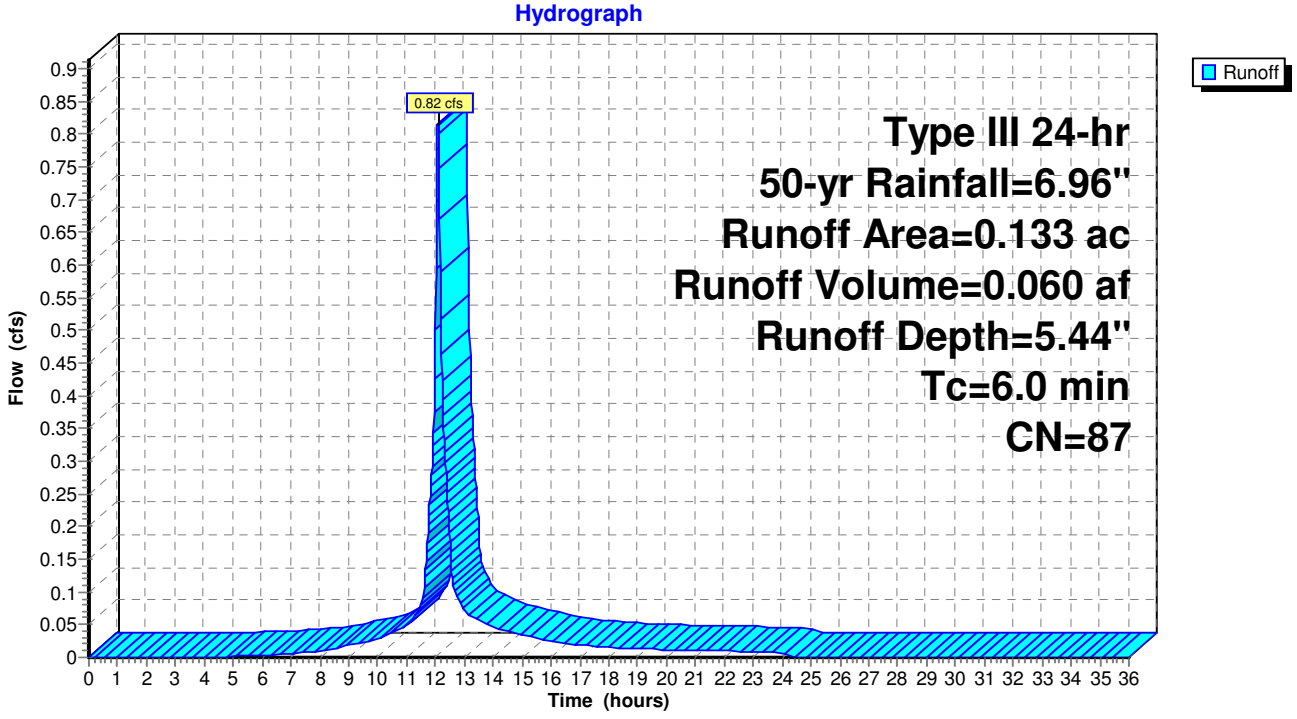
Subcatchment E4: Existing Area 4



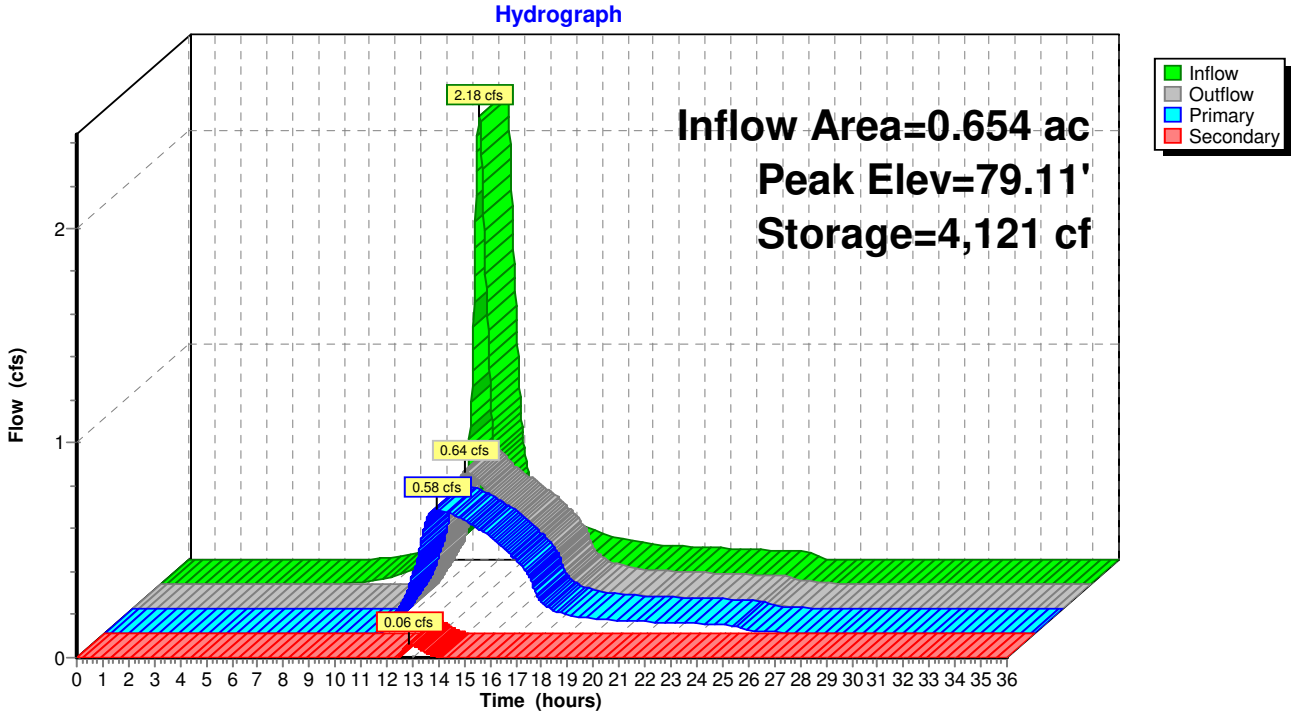
Subcatchment E5: Existing Area 5



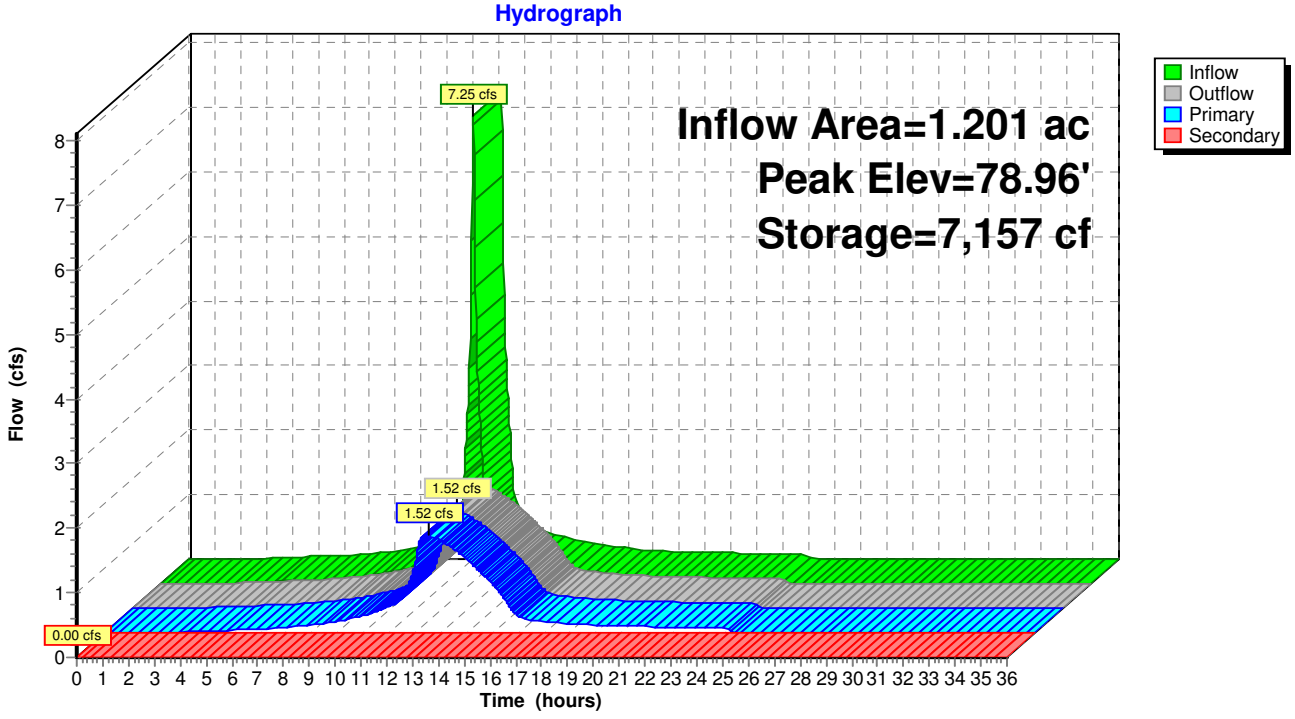
Subcatchment E6: Existing Area 6



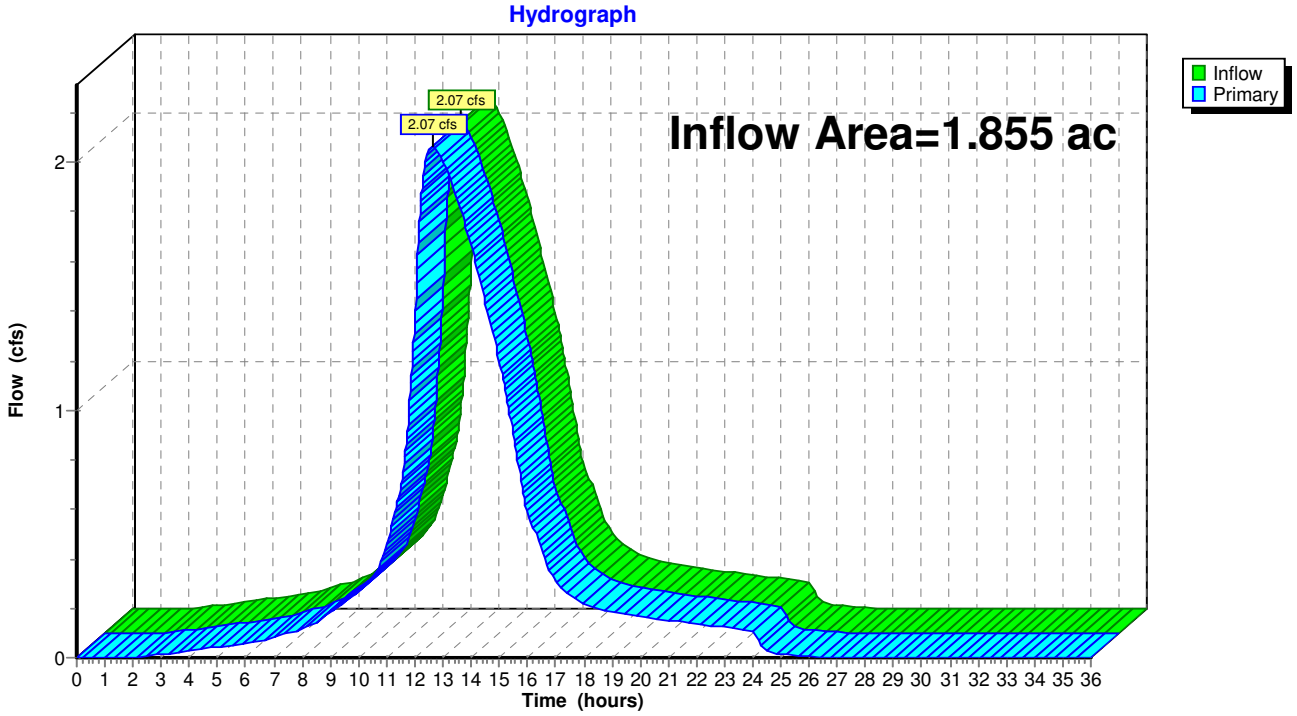
Pond EP1: Existing Pond 1



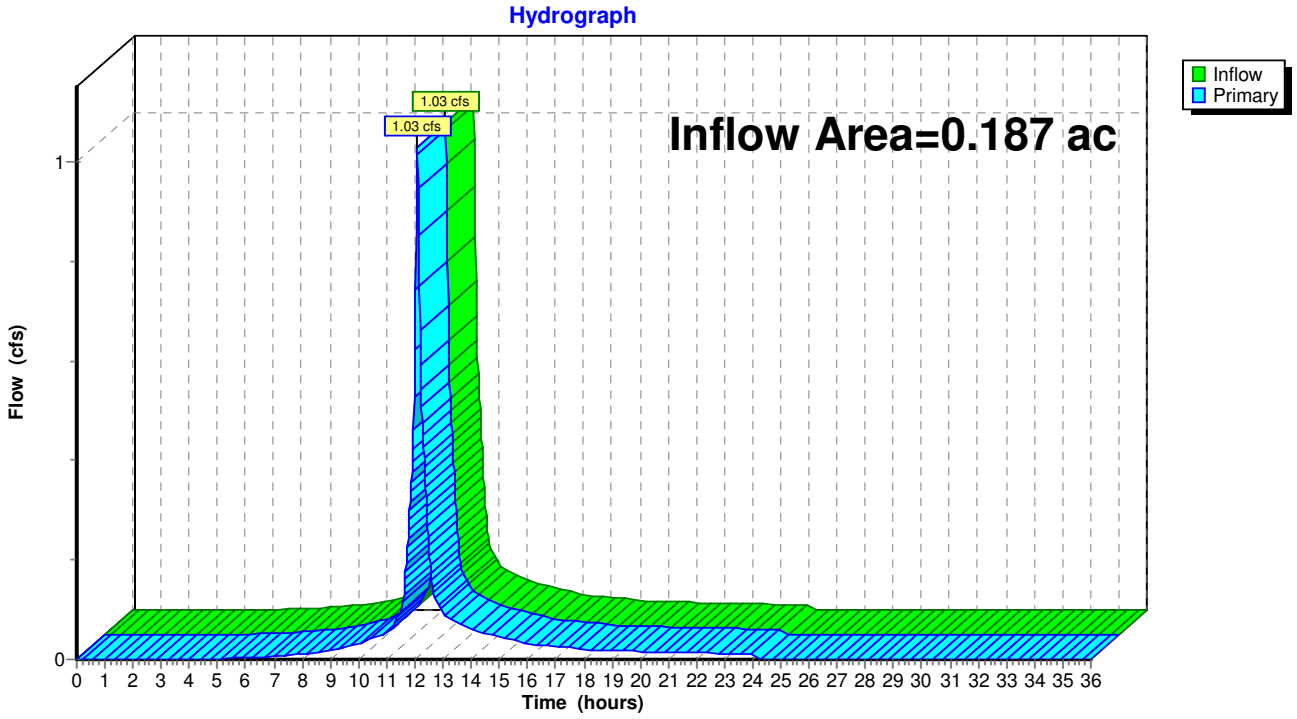
Pond EP2: Existing Pond 2



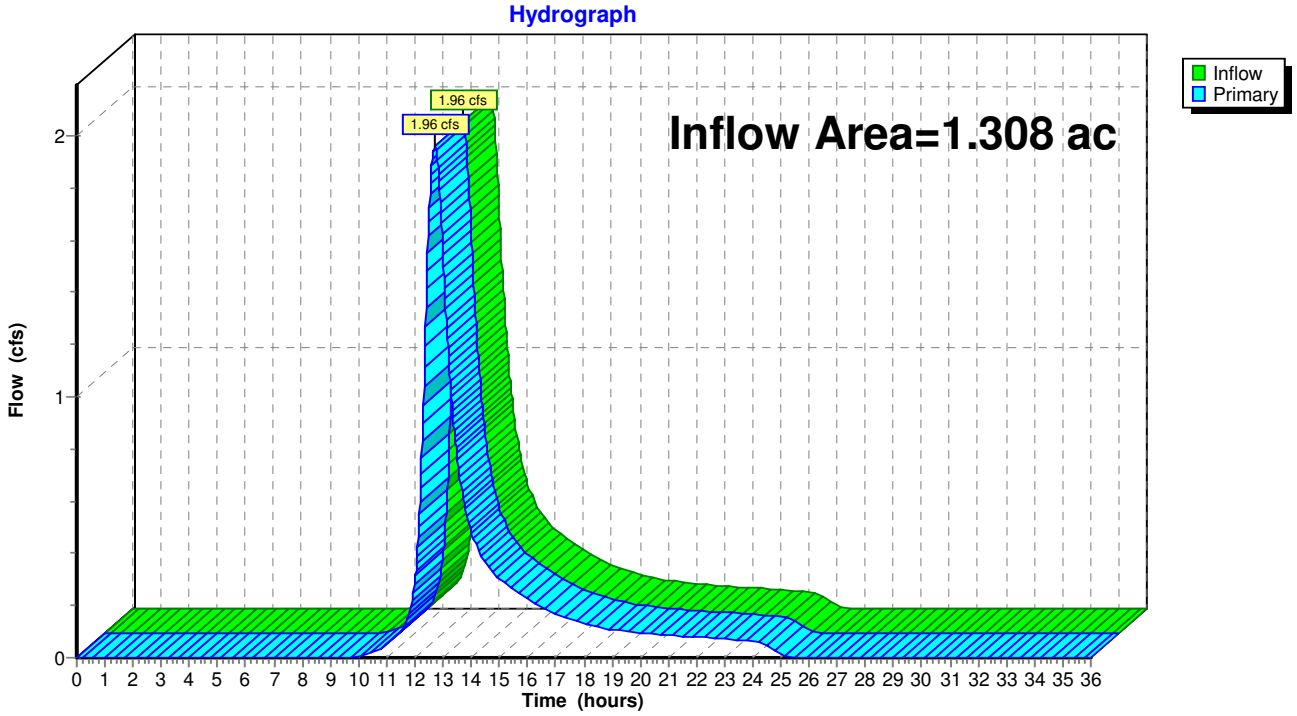
Link DP1: DP1 (SMH IN RT 5)



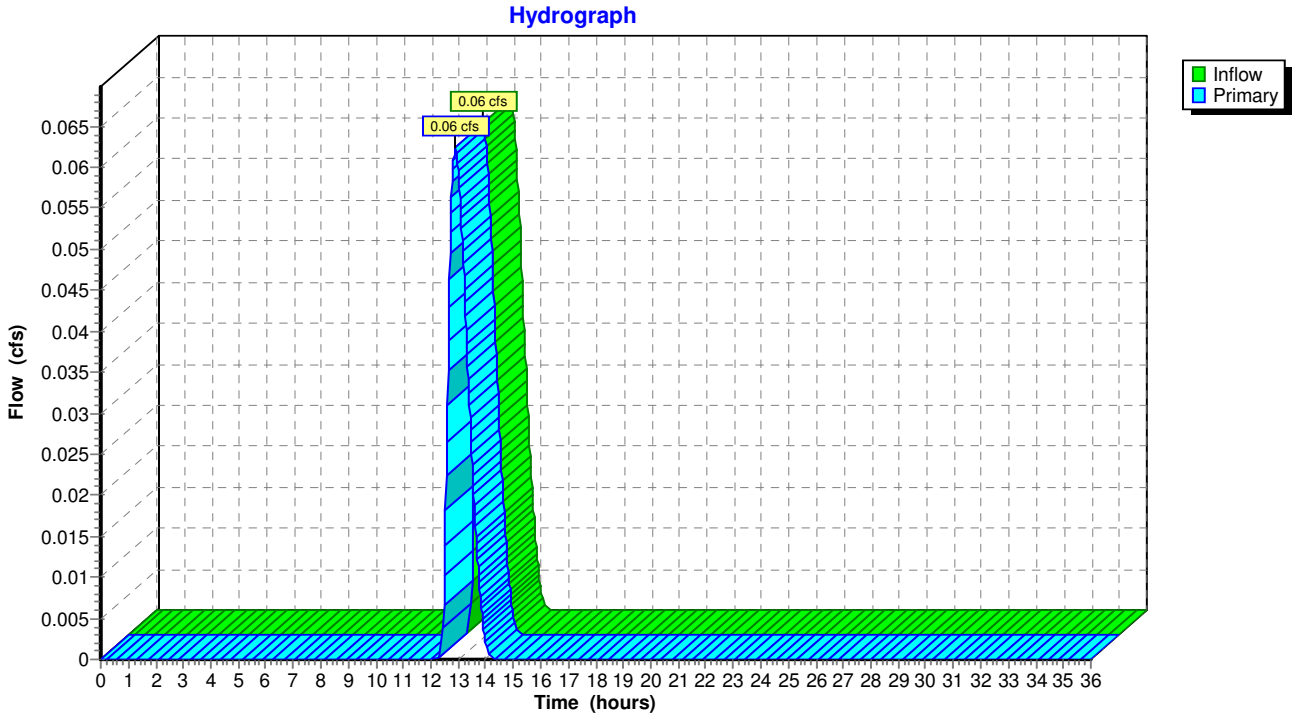
Link DP2: DP2 (SOUTHERN PROP BOUNDARY)



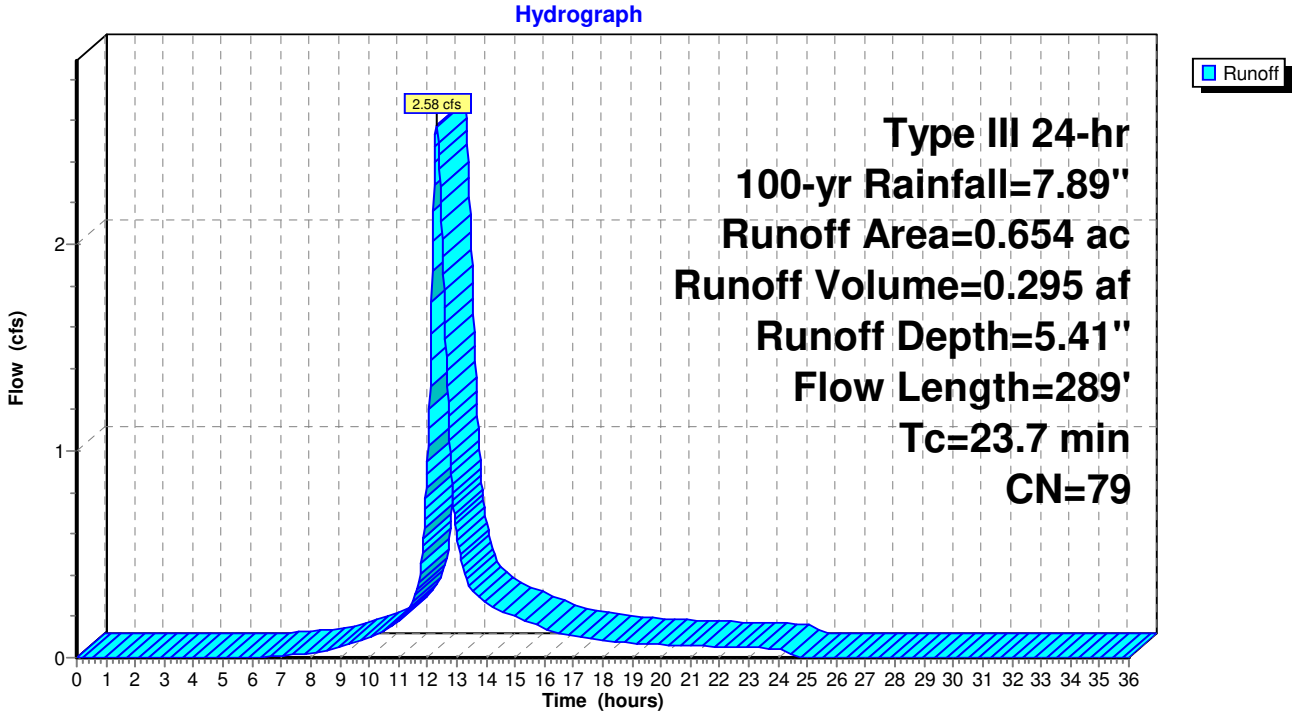
Link DP3: DP3 (EAST PROP BNDY)



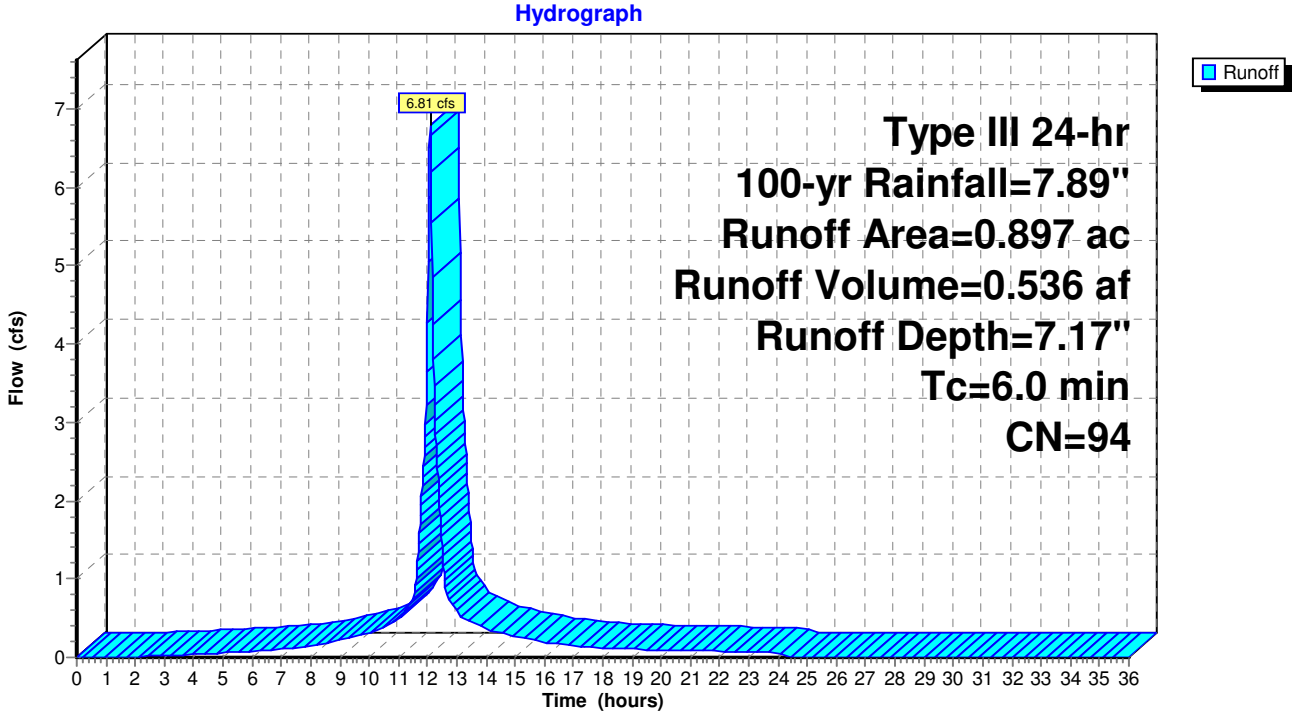
Link DP4: DP4 (15" RCP HEADWALL @ RT 5 ROW)



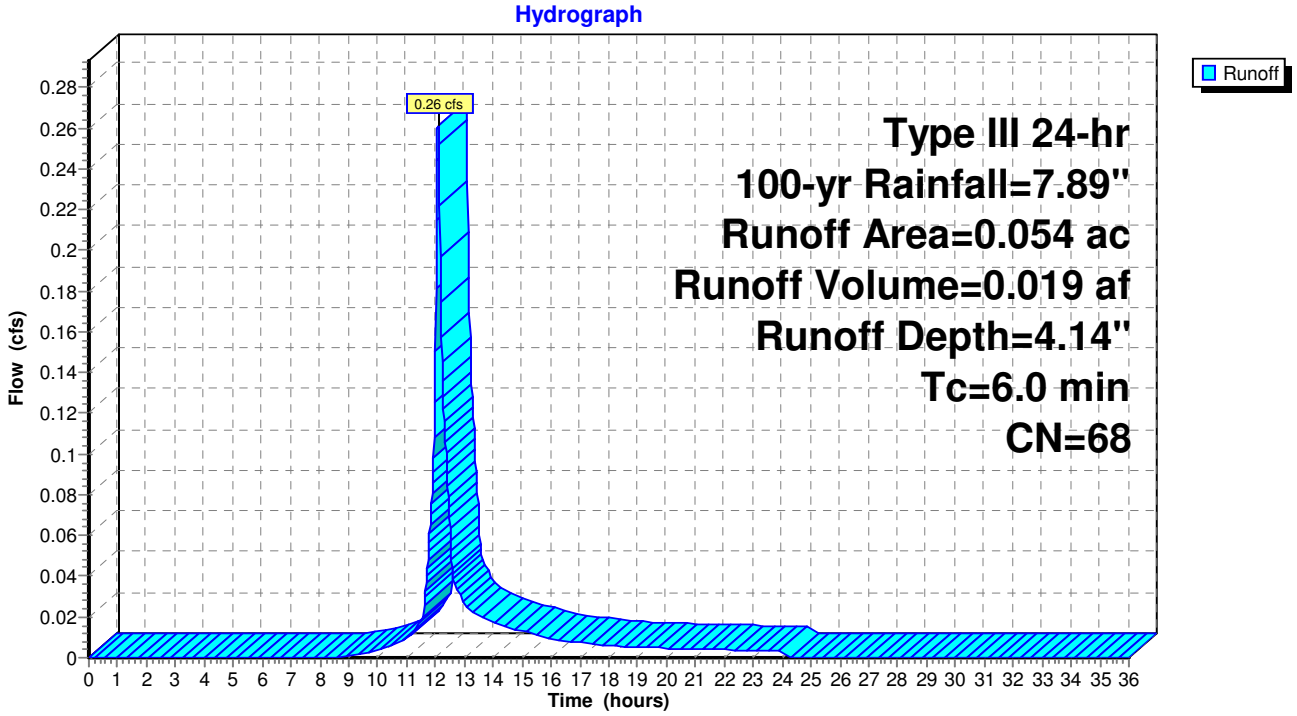
Subcatchment E1: Existing Area 1



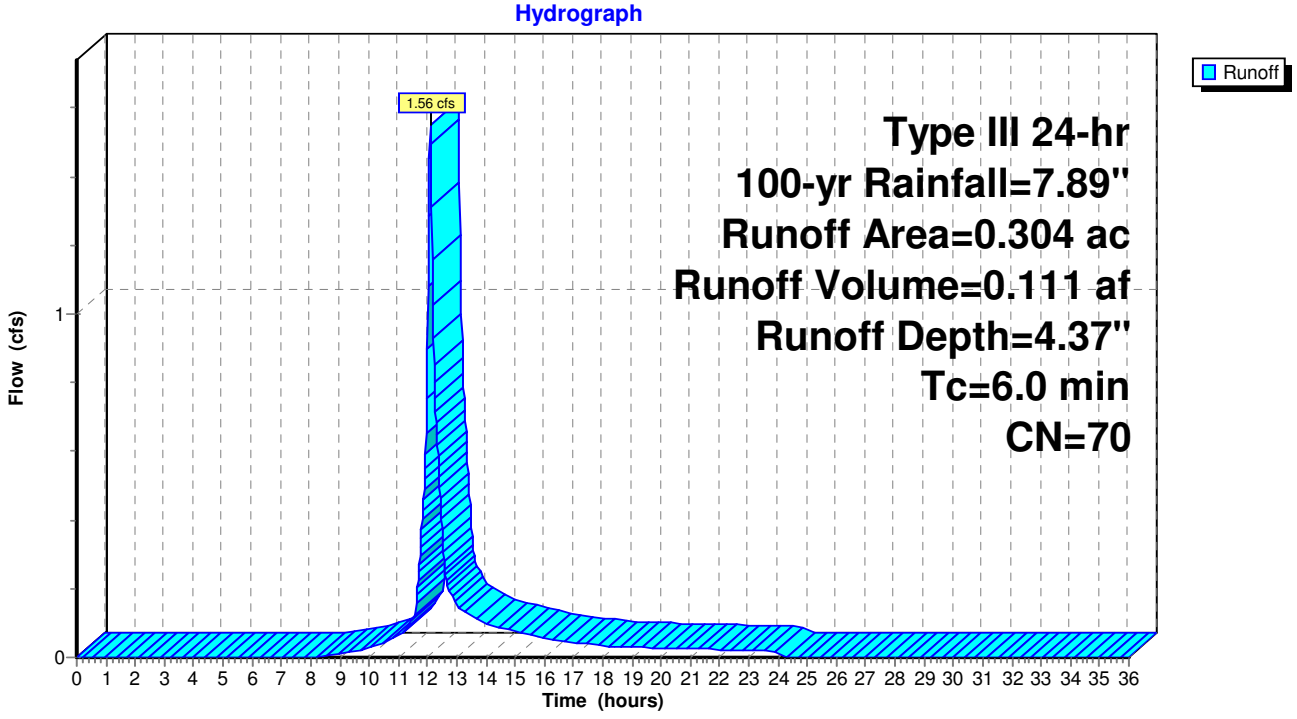
Subcatchment E2: Existing Area 2



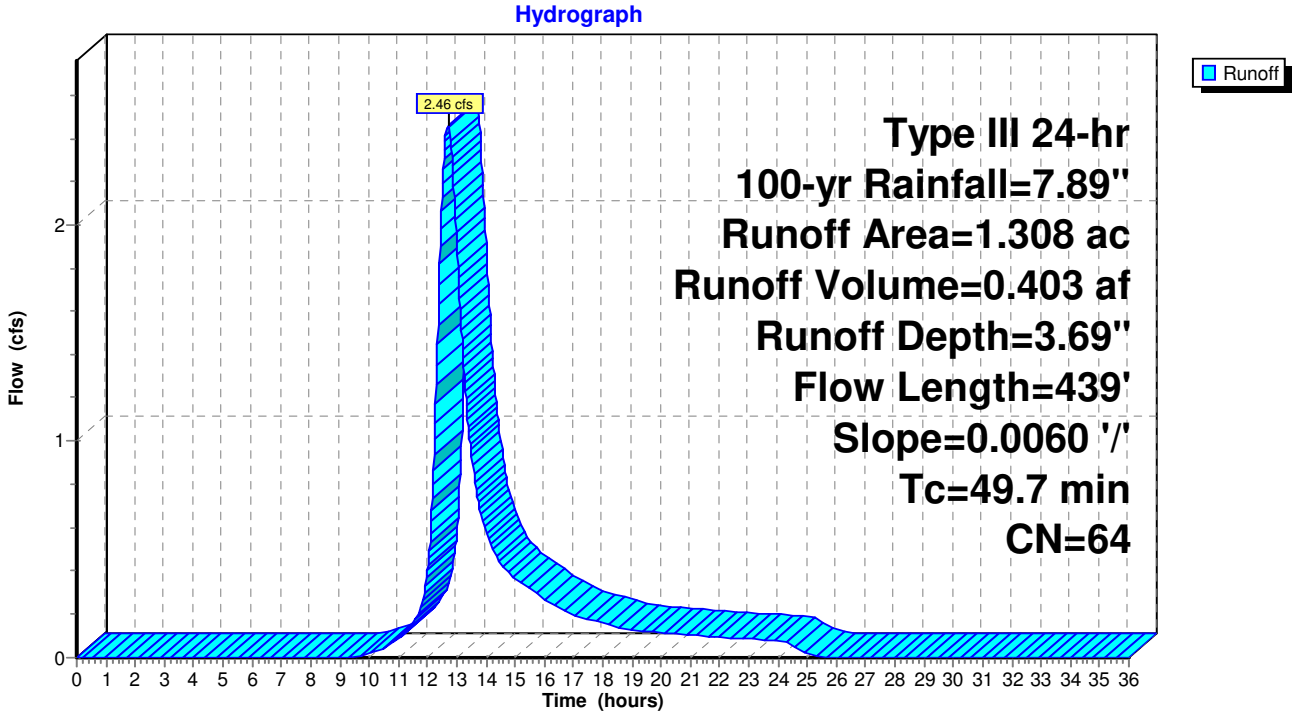
Subcatchment E3: Existing Area 3



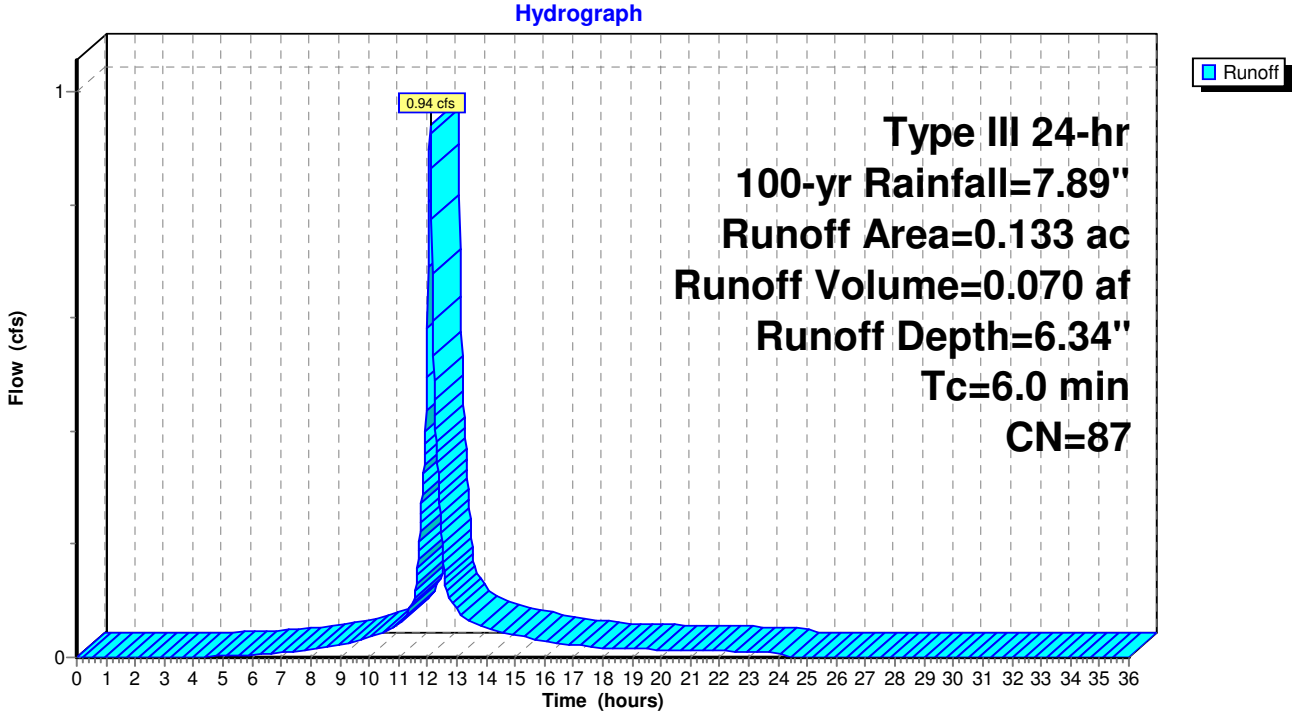
Subcatchment E4: Existing Area 4



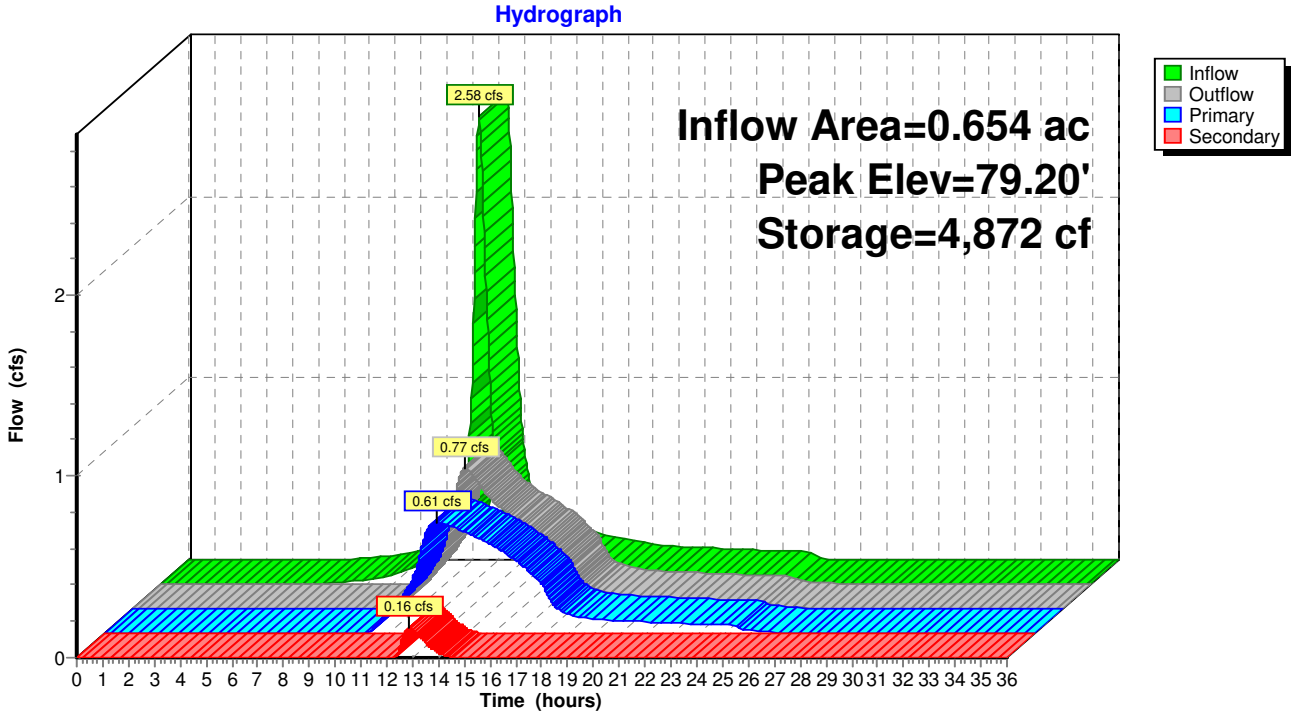
Subcatchment E5: Existing Area 5



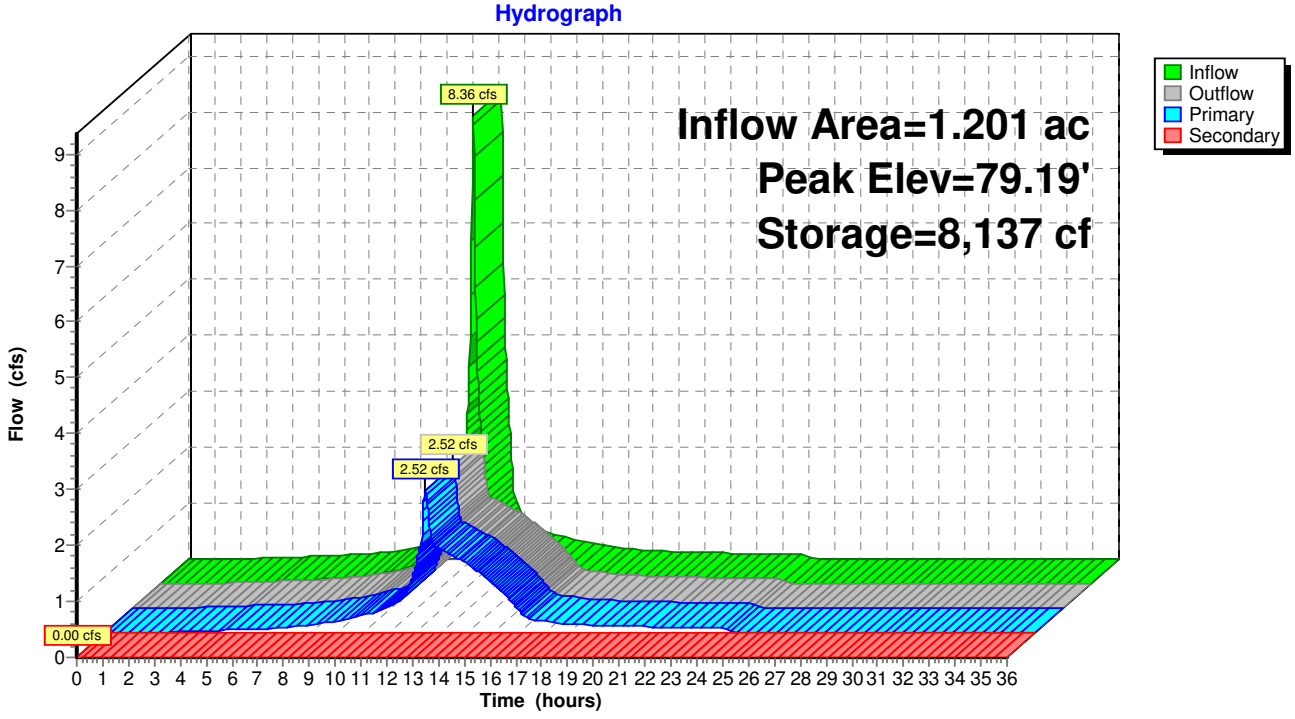
Subcatchment E6: Existing Area 6



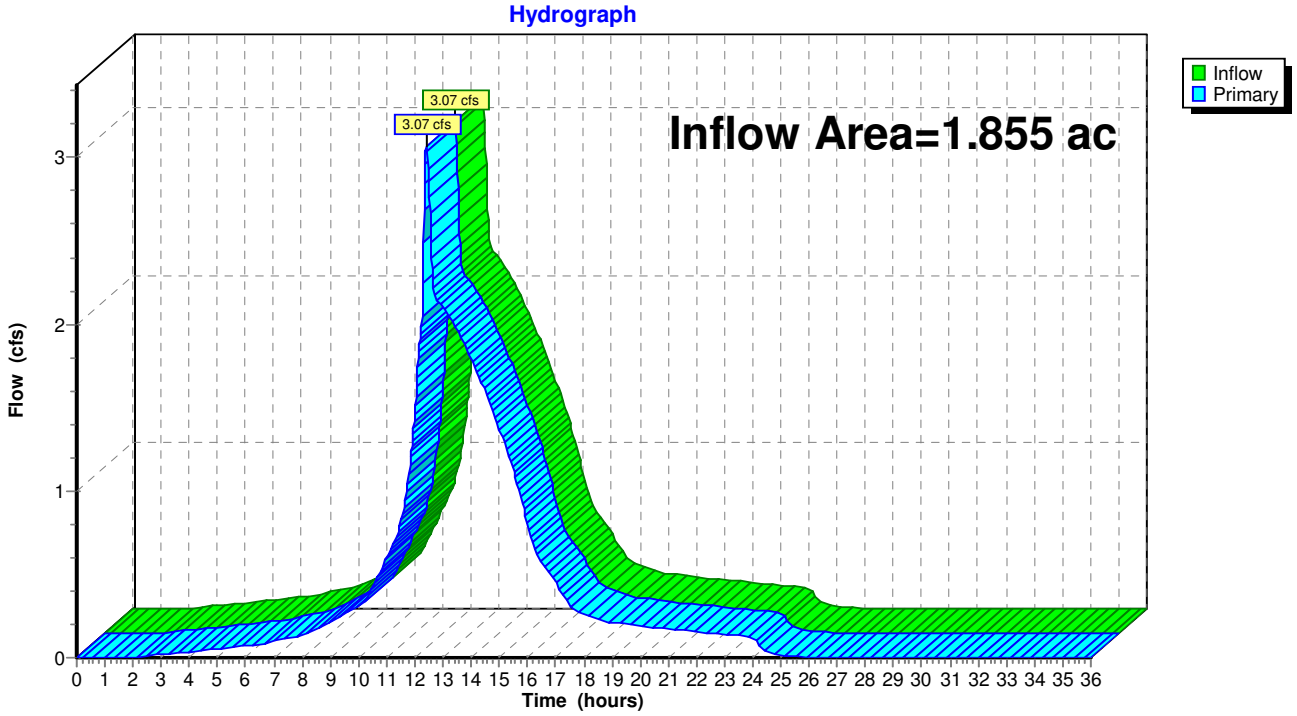
Pond EP1: Existing Pond 1



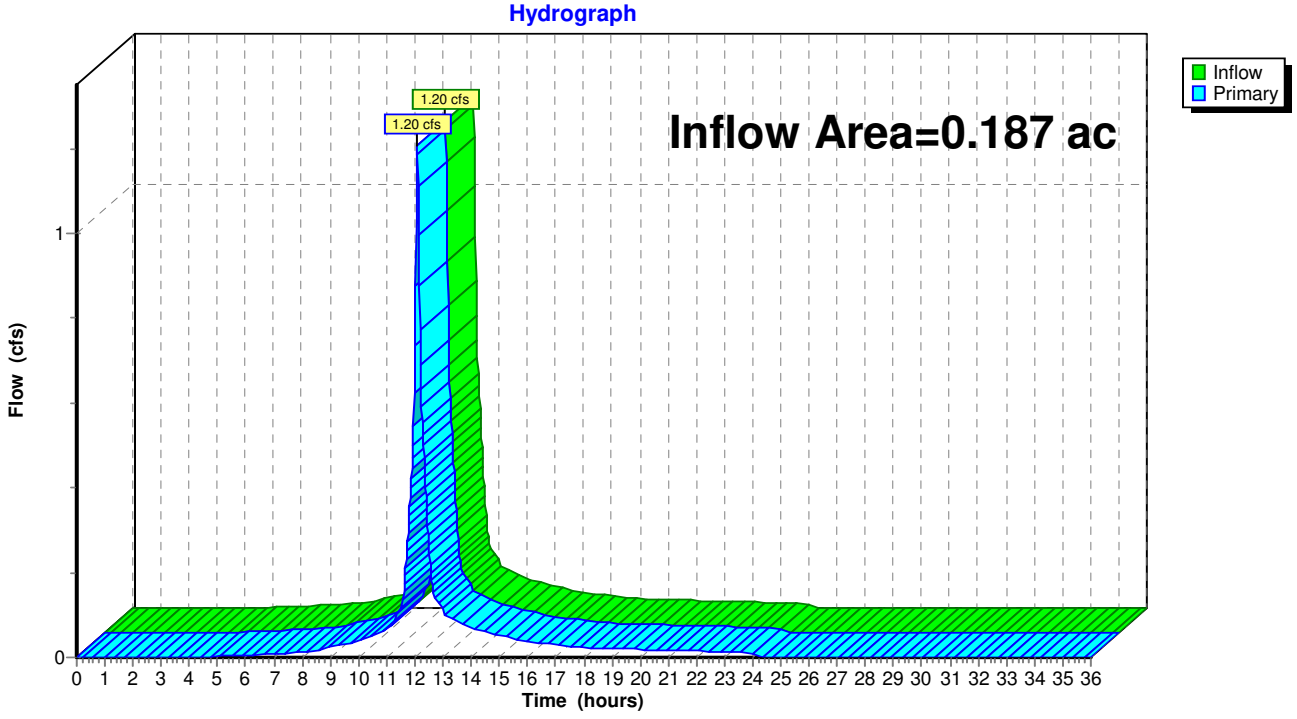
Pond EP2: Existing Pond 2



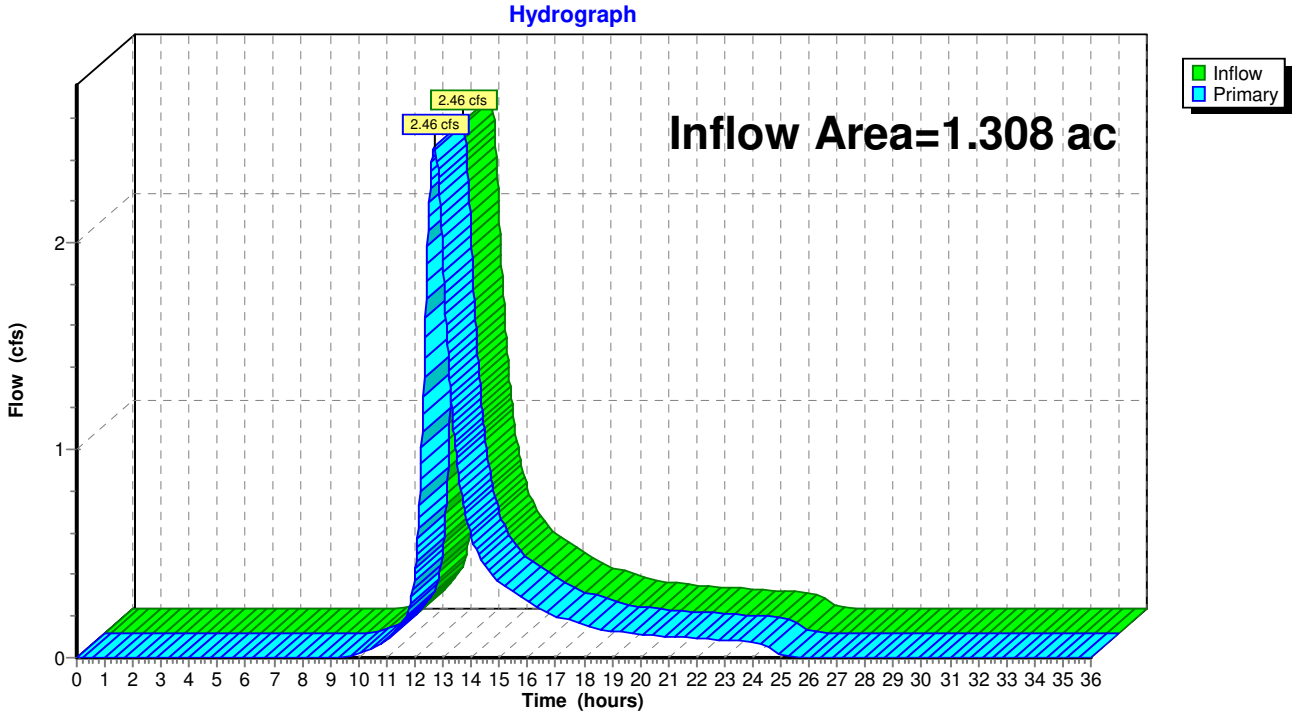
Link DP1: DP1 (SMH IN RT 5)



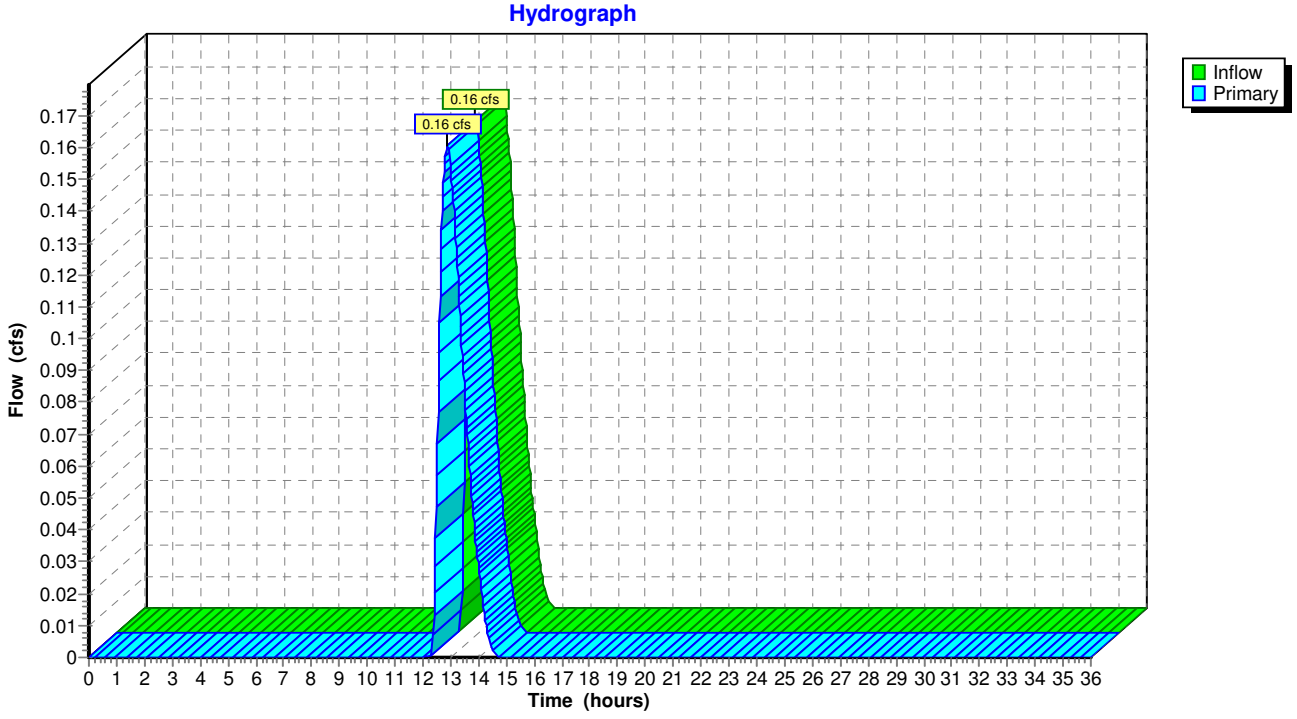
Link DP2: DP2 (SOUTHERN PROP BOUNDARY)



Link DP3: DP3 (EAST PROP BNDY)



Link DP4: DP4 (15" RCP HEADWALL @ RT 5 ROW)



Summary for Pond EP1: Existing Pond 1

Inflow Area = 0.654 ac, 5.50% Impervious, Inflow Depth = 5.41" for 100-yr event
Inflow = 2.58 cfs @ 12.32 hrs, Volume= 0.295 af
Outflow = 0.77 cfs @ 12.87 hrs, Volume= 0.282 af, Atten= 70%, Lag= 33.4 min
Primary = 0.61 cfs @ 12.87 hrs, Volume= 0.269 af
Secondary = 0.16 cfs @ 12.87 hrs, Volume= 0.014 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs
Peak Elev= 79.20' @ 12.87 hrs Surf.Area= 8,829 sf Storage= 4,872 cf

Plug-Flow detention time= 101.7 min calculated for 0.282 af (96% of inflow)
Center-of-Mass det. time= 77.9 min (900.0 - 822.2)

Volume	Invert	Avail.Storage	Storage Description
#1	78.00'	14,089 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
78.00	365	0	0	365
79.00	7,633	3,222	3,222	7,635
80.00	14,461	10,867	14,089	14,473

Device	Routing	Invert	Outlet Devices
#1	Primary	75.51'	**15.0" Round 15" RCP** L= 61.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 75.51' / 75.20' S= 0.0051 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Secondary	78.96'	**15.0" Round 15" RCP** L= 23.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 78.96' / 78.91' S= 0.0022 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Device 1	78.44'	**3.5" x 6.0" Horiz. CB Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.61 cfs @ 12.87 hrs HW=79.20' (Free Discharge)
└**1=15" RCP** (Passes 0.61 cfs of 9.92 cfs potential flow)
└**3=CB Grate** (Orifice Controls 0.61 cfs @ 4.20 fps)

Secondary OutFlow Max=0.16 cfs @ 12.87 hrs HW=79.20' (Free Discharge)
└**2=15" RCP** (Barrel Controls 0.16 cfs @ 1.47 fps)

Summary for Pond EP2: Existing Pond 2

Inflow Area = 1.201 ac, 60.28% Impervious, Inflow Depth = 6.46" for 100-yr event
Inflow = 8.36 cfs @ 12.08 hrs, Volume= 0.647 af
Outflow = 2.52 cfs @ 12.41 hrs, Volume= 0.647 af, Atten= 70%, Lag= 19.3 min
Primary = 2.52 cfs @ 12.41 hrs, Volume= 0.647 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs
Peak Elev= 79.19' @ 12.41 hrs Surf.Area= 4,618 sf Storage= 8,137 cf

Plug-Flow detention time= 38.8 min calculated for 0.646 af (100% of inflow)
Center-of-Mass det. time= 38.8 min (811.4 - 772.6)

Volume	Invert	Avail.Storage	Storage Description
#1	76.14'	12,693 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.14	10	0	0
77.00	2,239	967	967
78.00	3,148	2,694	3,661
79.00	4,174	3,661	7,322
80.00	6,568	5,371	12,693

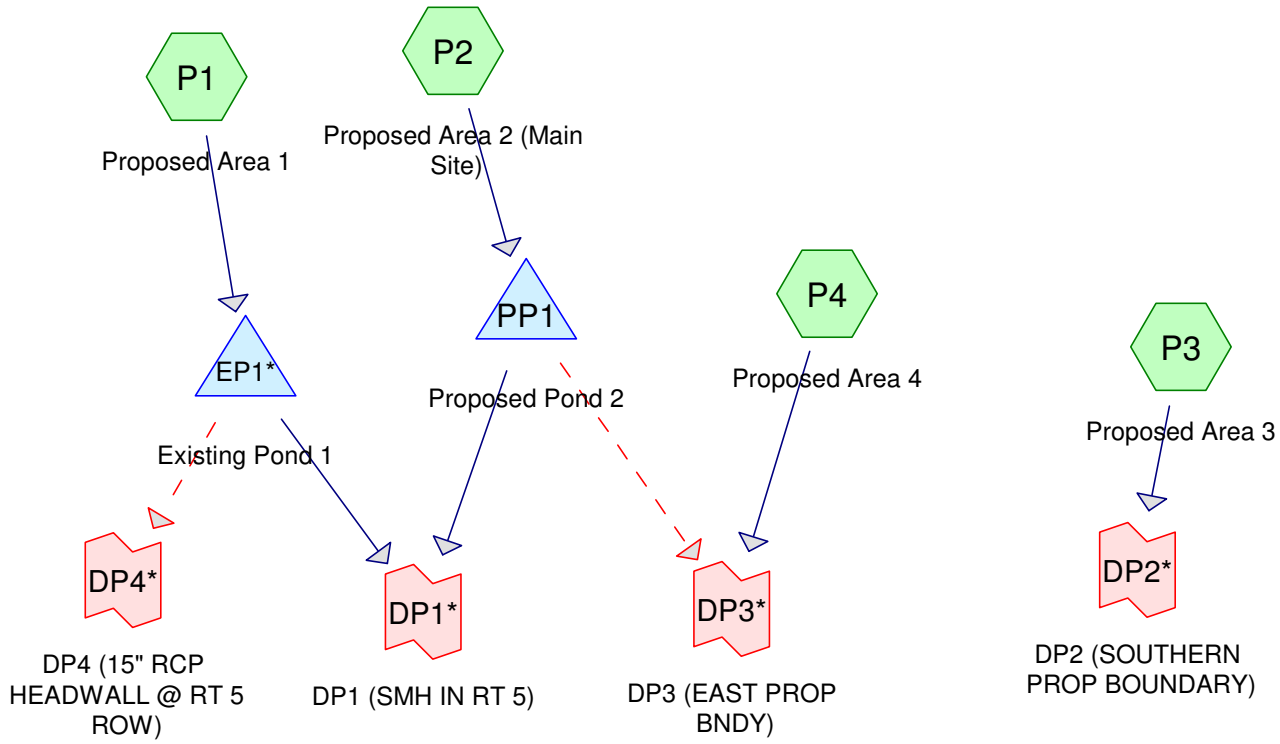
Device	Routing	Invert	Outlet Devices
#1	Primary	75.99'	**15.0" Round 15" HDPE** L= 198.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 75.99' / 75.51' S= 0.0024 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	76.14'	**6.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	79.07'	**27.7" x 16.2" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Secondary	79.90'	**11.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=2.52 cfs @ 12.41 hrs HW=79.19' (Free Discharge)
↑—**1=15" HDPE** (Passes 2.52 cfs of 6.20 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 1.58 cfs @ 8.05 fps)
—**3=Orifice/Grate** (Weir Controls 0.94 cfs @ 1.11 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=76.14' (Free Discharge)
↑—**4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

APPENDIX B
Watershed Computations
(Post-Development Drainage HydroCAD Report)

PROPOSED CONDITIONS



Subcat Reach Pond Link

Routing Diagram for 4342 - Drainage
Prepared by Design Professionals Inc. , Printed 9/1/2020

Time span=0.00-36.00 hrs, dt=0.02 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: Proposed Area 1 Runoff Area=0.654 ac 13.76% Impervious Runoff Depth=1.41"
Flow Length=289' Tc=23.7 min CN=81 Runoff=0.67 cfs 0.077 af

Subcatchment P2: Proposed Area 2 (Main Runoff Area=2.468 ac 73.58% Impervious Runoff Depth=2.02"
Tc=6.0 min CN=89 Runoff=5.80 cfs 0.415 af

Subcatchment P3: Proposed Area 3 Runoff Area=0.054 ac 0.00% Impervious Runoff Depth=0.69"
Tc=6.0 min CN=68 Runoff=0.04 cfs 0.003 af

Subcatchment P4: Proposed Area 4 Runoff Area=0.173 ac 0.00% Impervious Runoff Depth=0.99"
Flow Length=439' Slope=0.0060 '/' Tc=49.7 min CN=74 Runoff=0.08 cfs 0.014 af

Pond EP1*: Existing Pond 1 Peak Elev=78.63' Storage=1,147 cf Inflow=0.67 cfs 0.077 af
Primary=0.31 cfs 0.065 af Secondary=0.00 cfs 0.000 af Outflow=0.31 cfs 0.065 af

Pond PP1: Proposed Pond 2 Peak Elev=77.54' Storage=6,714 cf Inflow=5.80 cfs 0.415 af
Primary=0.72 cfs 0.415 af Secondary=0.00 cfs 0.000 af Outflow=0.72 cfs 0.415 af

Link DP1*: DP1 (SMH IN RT 5) Inflow=1.02 cfs 0.480 af
Primary=1.02 cfs 0.480 af

Link DP2*: DP2 (SOUTHERN PROP BOUNDARY) Inflow=0.04 cfs 0.003 af
Primary=0.04 cfs 0.003 af

Link DP3*: DP3 (EAST PROP BNDY) Inflow=0.08 cfs 0.014 af
Primary=0.08 cfs 0.014 af

Link DP4*: DP4 (15" RCP HEADWALL @ RT 5 ROW) Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Time span=0.00-36.00 hrs, dt=0.02 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: Proposed Area 1 Runoff Area=0.654 ac 13.76% Impervious Runoff Depth=2.96"
Flow Length=289' Tc=23.7 min CN=81 Runoff=1.42 cfs 0.161 af

Subcatchment P2: Proposed Area 2 (Main Runoff Area=2.468 ac 73.58% Impervious Runoff Depth=3.74"
Tc=6.0 min CN=89 Runoff=10.51 cfs 0.770 af

Subcatchment P3: Proposed Area 3 Runoff Area=0.054 ac 0.00% Impervious Runoff Depth=1.86"
Tc=6.0 min CN=68 Runoff=0.11 cfs 0.008 af

Subcatchment P4: Proposed Area 4 Runoff Area=0.173 ac 0.00% Impervious Runoff Depth=2.34"
Flow Length=439' Slope=0.0060 '/' Tc=49.7 min CN=74 Runoff=0.21 cfs 0.034 af

Pond EP1*: Existing Pond 1 Peak Elev=78.91' Storage=2,599 cf Inflow=1.42 cfs 0.161 af
Primary=0.48 cfs 0.149 af Secondary=0.00 cfs 0.000 af Outflow=0.48 cfs 0.149 af

Pond PP1: Proposed Pond 2 Peak Elev=78.09' Storage=14,587 cf Inflow=10.51 cfs 0.770 af
Primary=0.87 cfs 0.770 af Secondary=0.00 cfs 0.000 af Outflow=0.87 cfs 0.770 af

Link DP1*: DP1 (SMH IN RT 5) Inflow=1.35 cfs 0.919 af
Primary=1.35 cfs 0.919 af

Link DP2*: DP2 (SOUTHERN PROP BOUNDARY) Inflow=0.11 cfs 0.008 af
Primary=0.11 cfs 0.008 af

Link DP3*: DP3 (EAST PROP BNDY) Inflow=0.21 cfs 0.034 af
Primary=0.21 cfs 0.034 af

Link DP4*: DP4 (15" RCP HEADWALL @ RT 5 ROW) Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Time span=0.00-36.00 hrs, dt=0.02 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: Proposed Area 1 Runoff Area=0.654 ac 13.76% Impervious Runoff Depth=3.99"
Flow Length=289' Tc=23.7 min CN=81 Runoff=1.91 cfs 0.218 af

Subcatchment P2: Proposed Area 2 (Main Runoff Area=2.468 ac 73.58% Impervious Runoff Depth=4.85"
Tc=6.0 min CN=89 Runoff=13.44 cfs 0.998 af

Subcatchment P3: Proposed Area 3 Runoff Area=0.054 ac 0.00% Impervious Runoff Depth=2.71"
Tc=6.0 min CN=68 Runoff=0.17 cfs 0.012 af

Subcatchment P4: Proposed Area 4 Runoff Area=0.173 ac 0.00% Impervious Runoff Depth=3.29"
Flow Length=439' Slope=0.0060 '/' Tc=49.7 min CN=74 Runoff=0.29 cfs 0.047 af

Pond EP1*: Existing Pond 1 Peak Elev=79.05' Storage=3,605 cf Inflow=1.91 cfs 0.218 af
Primary=0.55 cfs 0.204 af Secondary=0.02 cfs 0.001 af Outflow=0.57 cfs 0.205 af

Pond PP1: Proposed Pond 2 Peak Elev=78.43' Storage=20,104 cf Inflow=13.44 cfs 0.998 af
Primary=0.95 cfs 0.998 af Secondary=0.00 cfs 0.000 af Outflow=0.95 cfs 0.998 af

Link DP1*: DP1 (SMH IN RT 5) Inflow=1.49 cfs 1.202 af
Primary=1.49 cfs 1.202 af

Link DP2*: DP2 (SOUTHERN PROP BOUNDARY) Inflow=0.17 cfs 0.012 af
Primary=0.17 cfs 0.012 af

Link DP3*: DP3 (EAST PROP BNDY) Inflow=0.29 cfs 0.047 af
Primary=0.29 cfs 0.047 af

Link DP4*: DP4 (15" RCP HEADWALL @ RT 5 ROW) Inflow=0.02 cfs 0.001 af
Primary=0.02 cfs 0.001 af

Time span=0.00-36.00 hrs, dt=0.02 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: Proposed Area 1 Runoff Area=0.654 ac 13.76% Impervious Runoff Depth=4.77"
Flow Length=289' Tc=23.7 min CN=81 Runoff=2.27 cfs 0.260 af

Subcatchment P2: Proposed Area 2 (Main Runoff Area=2.468 ac 73.58% Impervious Runoff Depth=5.67"
Tc=6.0 min CN=89 Runoff=15.57 cfs 1.166 af

Subcatchment P3: Proposed Area 3 Runoff Area=0.054 ac 0.00% Impervious Runoff Depth=3.38"
Tc=6.0 min CN=68 Runoff=0.21 cfs 0.015 af

Subcatchment P4: Proposed Area 4 Runoff Area=0.173 ac 0.00% Impervious Runoff Depth=4.01"
Flow Length=439' Slope=0.0060 '/' Tc=49.7 min CN=74 Runoff=0.36 cfs 0.058 af

Pond EP1*: Existing Pond 1 Peak Elev=79.14' Storage=4,311 cf Inflow=2.27 cfs 0.260 af
Primary=0.59 cfs 0.241 af Secondary=0.08 cfs 0.006 af Outflow=0.67 cfs 0.247 af

Pond PP1: Proposed Pond 2 Peak Elev=78.64' Storage=23,671 cf Inflow=15.57 cfs 1.166 af
Primary=0.99 cfs 1.135 af Secondary=0.37 cfs 0.031 af Outflow=1.36 cfs 1.166 af

Link DP1*: DP1 (SMH IN RT 5) Inflow=1.58 cfs 1.376 af
Primary=1.58 cfs 1.376 af

Link DP2*: DP2 (SOUTHERN PROP BOUNDARY) Inflow=0.21 cfs 0.015 af
Primary=0.21 cfs 0.015 af

Link DP3*: DP3 (EAST PROP BNDY) Inflow=0.67 cfs 0.089 af
Primary=0.67 cfs 0.089 af

Link DP4*: DP4 (15" RCP HEADWALL @ RT 5 ROW) Inflow=0.08 cfs 0.006 af
Primary=0.08 cfs 0.006 af

Time span=0.00-36.00 hrs, dt=0.02 hrs, 1801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: Proposed Area 1 Runoff Area=0.654 ac 13.76% Impervious Runoff Depth=5.64"
Flow Length=289' Tc=23.7 min CN=81 Runoff=2.67 cfs 0.307 af

Subcatchment P2: Proposed Area 2 (Main Runoff Area=2.468 ac 73.58% Impervious Runoff Depth=6.58"
Tc=6.0 min CN=89 Runoff=17.91 cfs 1.353 af

Subcatchment P3: Proposed Area 3 Runoff Area=0.054 ac 0.00% Impervious Runoff Depth=4.14"
Tc=6.0 min CN=68 Runoff=0.26 cfs 0.019 af

Subcatchment P4: Proposed Area 4 Runoff Area=0.173 ac 0.00% Impervious Runoff Depth=4.83"
Flow Length=439' Slope=0.0060 '/' Tc=49.7 min CN=74 Runoff=0.43 cfs 0.070 af

Pond EP1*: Existing Pond 1 Peak Elev=79.22' Storage=5,057 cf Inflow=2.67 cfs 0.307 af
Primary=0.62 cfs 0.278 af Secondary=0.19 cfs 0.017 af Outflow=0.81 cfs 0.295 af

Pond PP1: Proposed Pond 2 Peak Elev=78.76' Storage=25,891 cf Inflow=17.91 cfs 1.353 af
Primary=1.02 cfs 1.204 af Secondary=2.06 cfs 0.149 af Outflow=3.08 cfs 1.353 af

Link DP1*: DP1 (SMH IN RT 5) Inflow=1.63 cfs 1.482 af
Primary=1.63 cfs 1.482 af

Link DP2*: DP2 (SOUTHERN PROP BOUNDARY) Inflow=0.26 cfs 0.019 af
Primary=0.26 cfs 0.019 af

Link DP3*: DP3 (EAST PROP BNDY) Inflow=2.46 cfs 0.219 af
Primary=2.46 cfs 0.219 af

Link DP4*: DP4 (15" RCP HEADWALL @ RT 5 ROW) Inflow=0.19 cfs 0.017 af
Primary=0.19 cfs 0.017 af

Summary for Subcatchment P1: Proposed Area 1

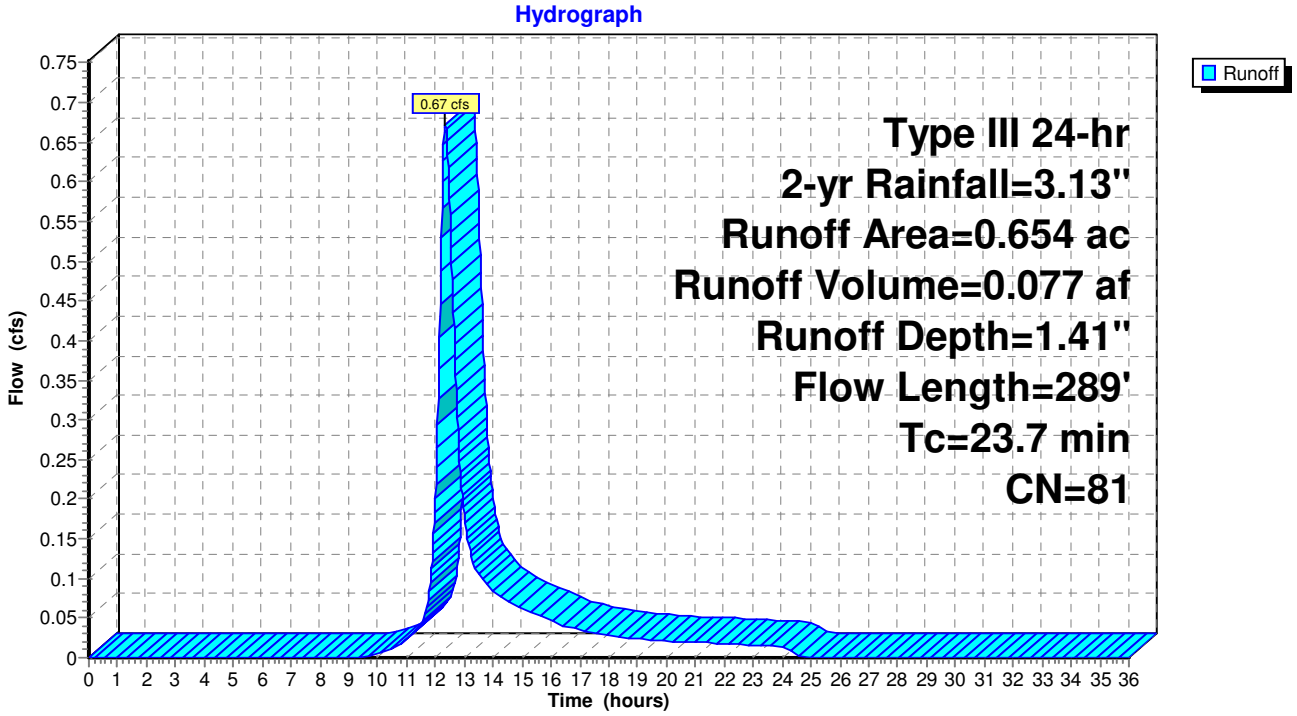
Runoff = 0.67 cfs @ 12.34 hrs, Volume= 0.077 af, Depth= 1.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-yr Rainfall=3.13"

	Area (ac)	CN	Description
	0.301	80	>75% Grass cover, Good, HSG D
*	0.090	98	Impervious
	0.140	73	Brush, Good, HSG D
	0.123	79	Woods/grass comb., Good, HSG D
	0.654	81	Weighted Average
	0.564		86.24% Pervious Area
	0.090		13.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.3	100	0.0300	0.14		**Sheet Flow, Grass SF** Grass: Dense n= 0.240 P2= 3.13"
6.1	25	0.0300	0.07		**Sheet Flow, Wood SF** Woods: Light underbrush n= 0.400 P2= 3.13"
1.5	62	0.0180	0.67		**Shallow Concentrated Flow, Woods SCF** Woodland Kv= 5.0 fps
3.8	102	0.0080	0.45		**Shallow Concentrated Flow, Brush SCF** Woodland Kv= 5.0 fps
23.7	289	Total			

Subcatchment P1: Proposed Area 1



Summary for Subcatchment P2: Proposed Area 2 (Main Site)

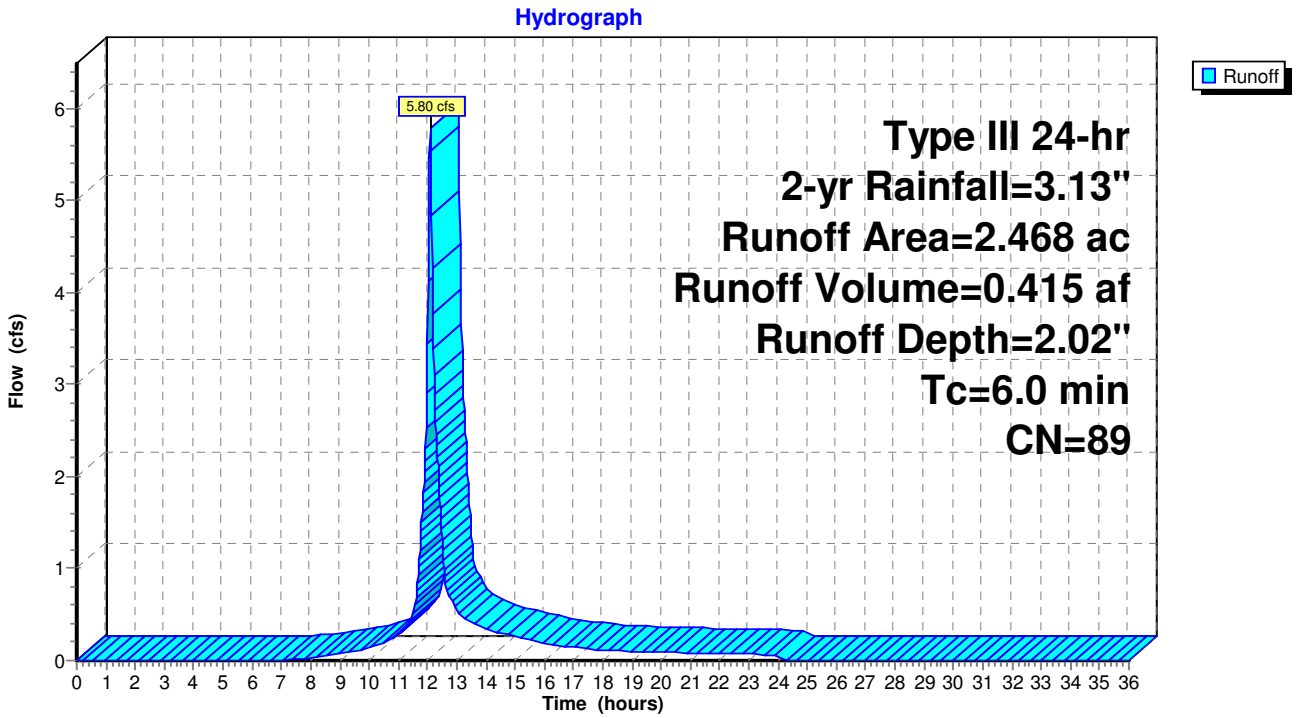
Runoff = 5.80 cfs @ 12.09 hrs, Volume= 0.415 af, Depth= 2.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-yr Rainfall=3.13"

	Area (ac)	CN	Description
	0.505	61	>75% Grass cover, Good, HSG B
	0.147	80	>75% Grass cover, Good, HSG D
*	1.816	98	Impervious
	2.468	89	Weighted Average
	0.652		26.42% Pervious Area
	1.816		73.58% Impervious Area

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

Subcatchment P2: Proposed Area 2 (Main Site)



Summary for Subcatchment P3: Proposed Area 3

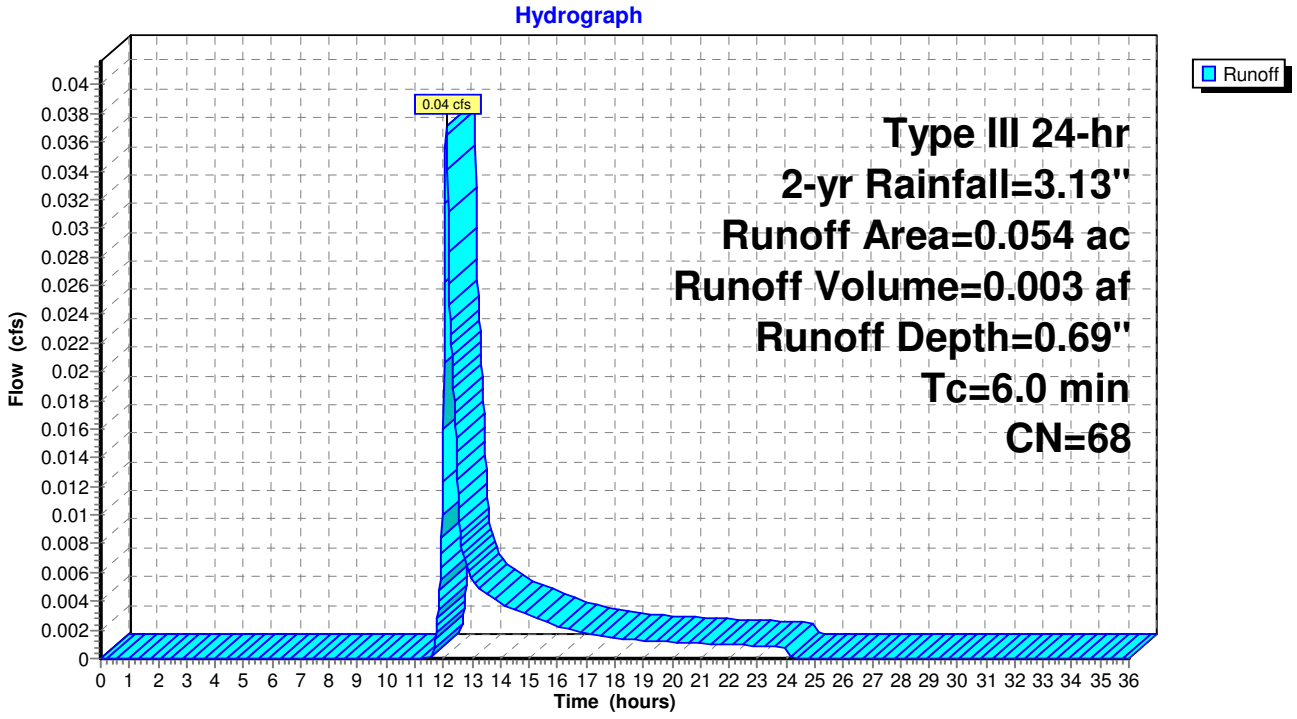
Runoff = 0.04 cfs @ 12.10 hrs, Volume= 0.003 af, Depth= 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-yr Rainfall=3.13"

Area (ac)	CN	Description
0.034	61	>75% Grass cover, Good, HSG B
0.020	80	>75% Grass cover, Good, HSG D
0.054	68	Weighted Average
0.054		100.00% Pervious Area

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

Subcatchment P3: Proposed Area 3



Summary for Subcatchment P4: Proposed Area 4

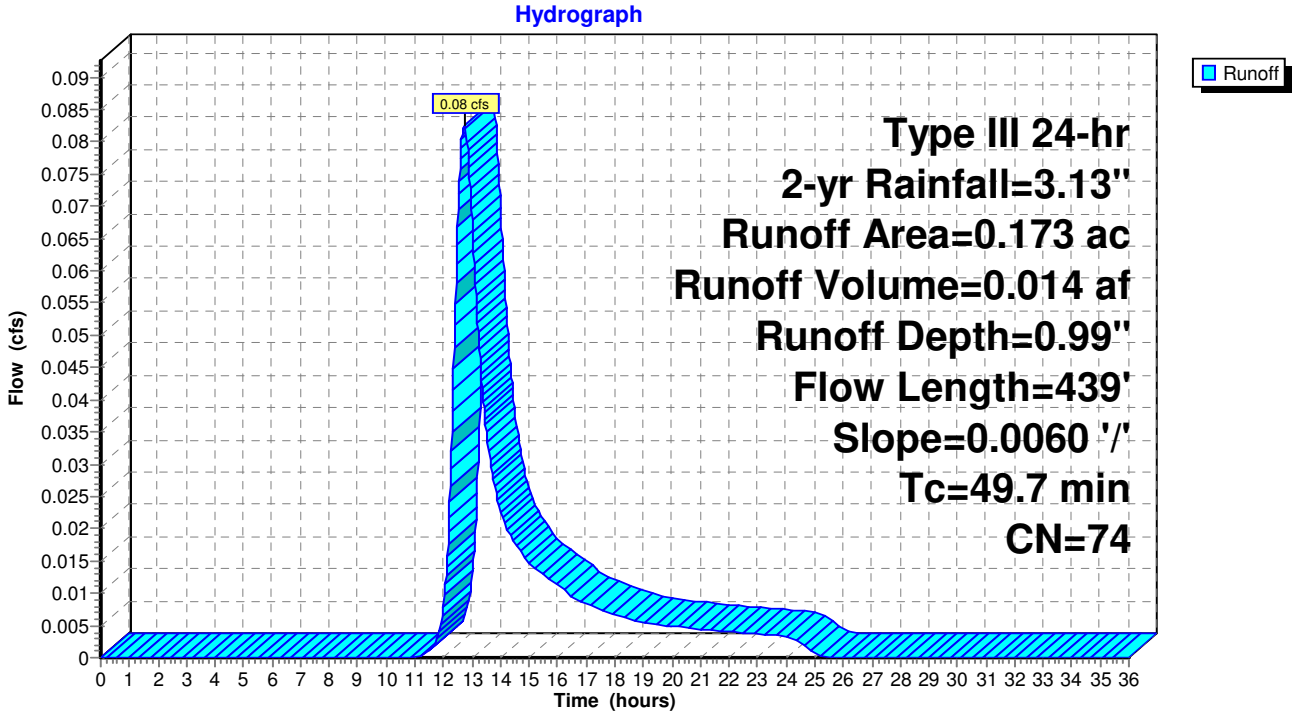
Runoff = 0.08 cfs @ 12.75 hrs, Volume= 0.014 af, Depth= 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-yr Rainfall=3.13"

Area (ac)	CN	Description
0.047	61	>75% Grass cover, Good, HSG B
0.049	80	>75% Grass cover, Good, HSG D
0.006	58	Woods/grass comb., Good, HSG B
0.071	79	Woods/grass comb., Good, HSG D
0.173	74	Weighted Average
0.173		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
35.1	100	0.0060	0.05		**Sheet Flow, Woodland SF** Woods: Light underbrush n= 0.400 P2= 3.13"
14.6	339	0.0060	0.39		**Shallow Concentrated Flow, Woodland SCF** Woodland Kv= 5.0 fps
49.7	439	Total			

Subcatchment P4: Proposed Area 4



Summary for Pond EP1*: Existing Pond 1

Inflow Area = 0.654 ac, 13.76% Impervious, Inflow Depth = 1.41" for 2-yr event
Inflow = 0.67 cfs @ 12.34 hrs, Volume= 0.077 af
Outflow = 0.31 cfs @ 12.75 hrs, Volume= 0.065 af, Atten= 54%, Lag= 24.8 min
Primary = 0.31 cfs @ 12.75 hrs, Volume= 0.065 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs
Peak Elev= 78.63' @ 12.75 hrs Surf.Area= 3,882 sf Storage= 1,147 cf

Plug-Flow detention time= 134.0 min calculated for 0.065 af (84% of inflow)
Center-of-Mass det. time= 64.5 min (921.6 - 857.1)

Volume	Invert	Avail.Storage	Storage Description
#1	78.00'	14,089 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

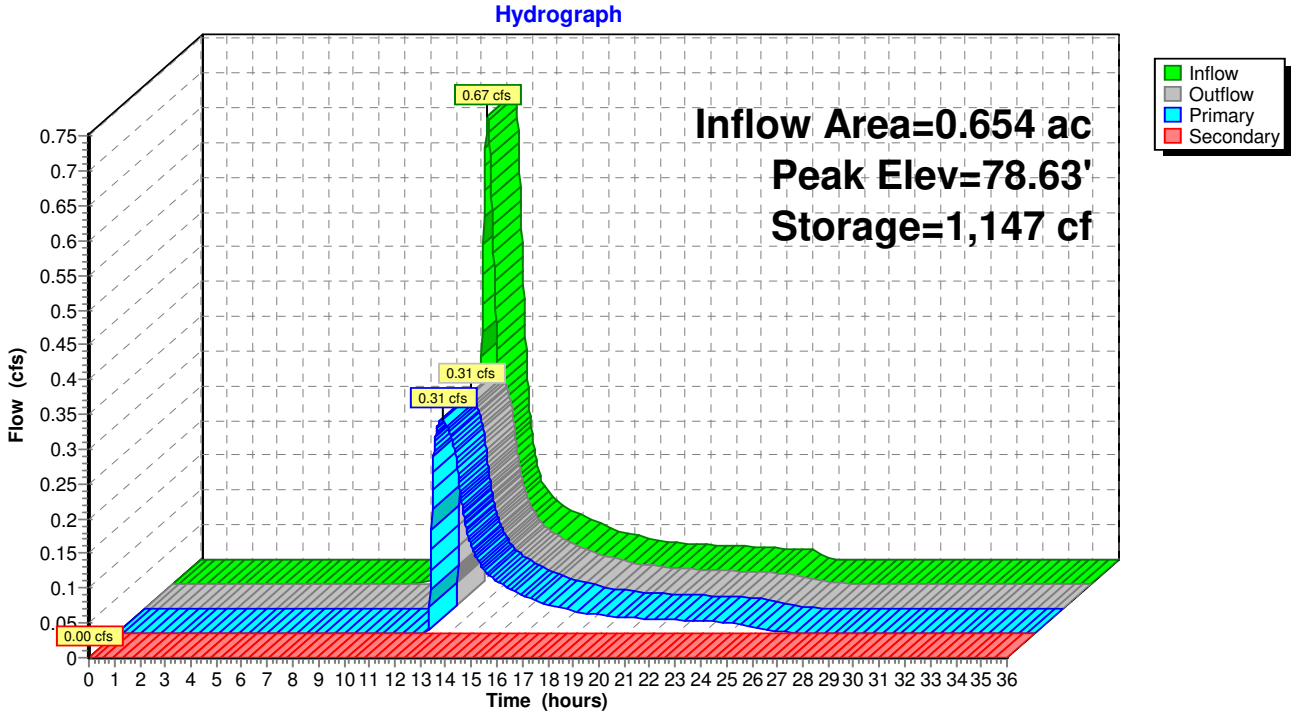
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
78.00	365	0	0	365
79.00	7,633	3,222	3,222	7,635
80.00	14,461	10,867	14,089	14,473

Device	Routing	Invert	Outlet Devices
#1	Primary	75.51'	**15.0" Round 15" RCP** L= 61.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 75.51' / 75.20' S= 0.0051 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Secondary	78.96'	**15.0" Round 15" RCP** L= 23.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 78.96' / 78.91' S= 0.0022 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Device 1	78.44'	**3.5" x 6.0" Horiz. CB Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.31 cfs @ 12.75 hrs HW=78.63' (Free Discharge)
↑—**1=15" RCP** (Passes 0.31 cfs of 8.84 cfs potential flow)
↑—**3=CB Grate** (Orifice Controls 0.31 cfs @ 2.11 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=78.00' (Free Discharge)
↑—**2=15" RCP** (Controls 0.00 cfs)

Pond EP1*: Existing Pond 1



Summary for Pond PP1: Proposed Pond 2

Inflow Area = 2.468 ac, 73.58% Impervious, Inflow Depth = 2.02" for 2-yr event
Inflow = 5.80 cfs @ 12.09 hrs, Volume= 0.415 af
Outflow = 0.72 cfs @ 12.72 hrs, Volume= 0.415 af, Atten= 88%, Lag= 38.0 min
Primary = 0.72 cfs @ 12.72 hrs, Volume= 0.415 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs
Peak Elev= 77.54' @ 12.72 hrs Surf.Area= 12,794 sf Storage= 6,714 cf

Plug-Flow detention time= 81.0 min calculated for 0.415 af (100% of inflow)
Center-of-Mass det. time= 80.9 min (892.9 - 812.0)

Volume	Invert	Avail.Storage	Storage Description
#1	76.14'	30,912 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

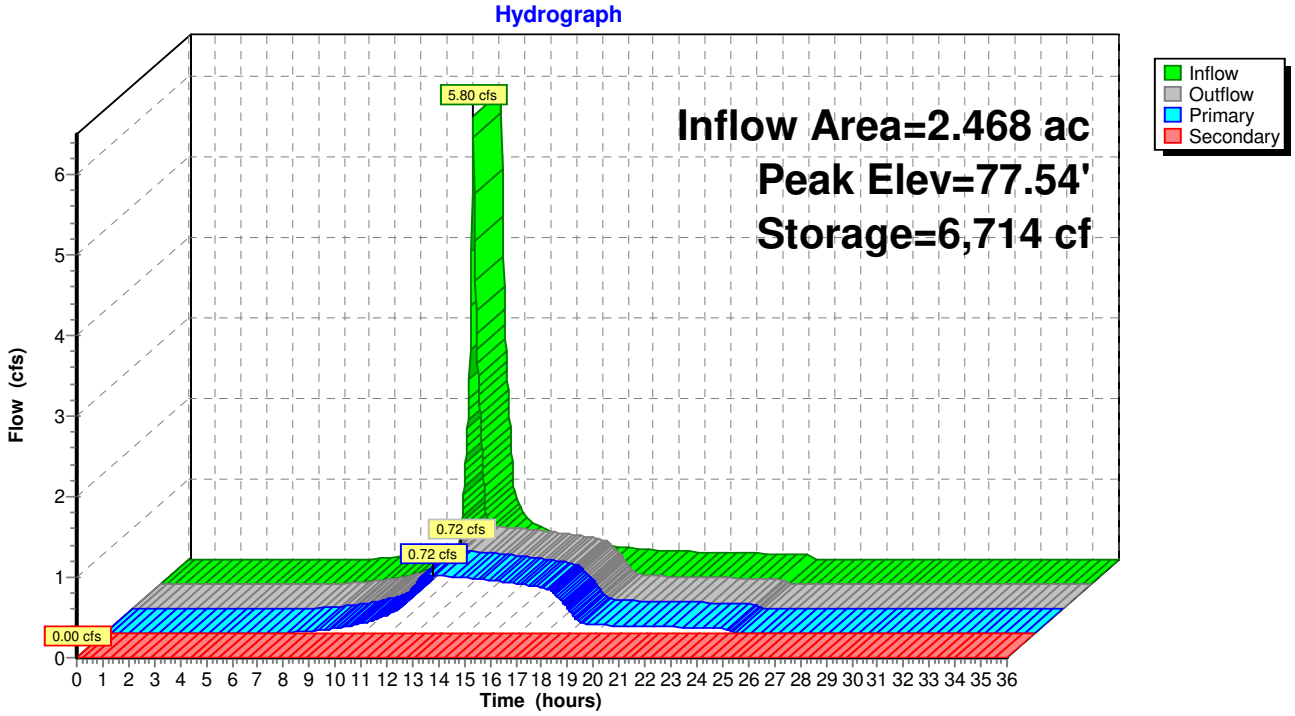
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.14	10	0	0
77.00	2,239	967	967
77.10	10,474	636	1,603
78.00	15,228	11,566	13,169
78.77	18,292	12,905	26,074
79.00	23,775	4,838	30,912

Device	Routing	Invert	Outlet Devices
#1	Primary	75.99'	**15.0" Round 15" HDPE** L= 198.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 75.99' / 75.51' S= 0.0024 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	76.14'	**5.0" Vert. Orifice/Grate** C= 0.600
#3	Secondary	78.58'	**10.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=0.72 cfs @ 12.72 hrs HW=77.54' (Free Discharge)
└**1=15" HDPE** (Passes 0.72 cfs of 3.88 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 0.72 cfs @ 5.25 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=76.14' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PP1: Proposed Pond 2

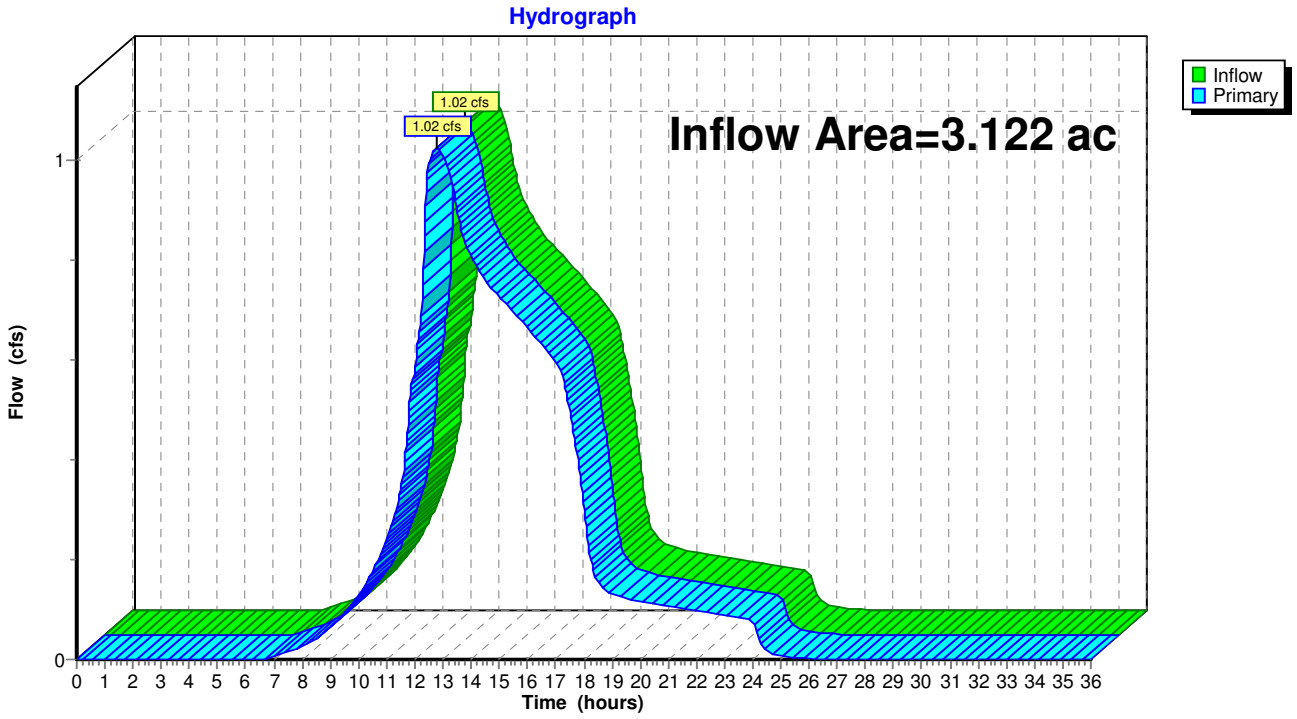


Summary for Link DP1*: DP1 (SMH IN RT 5)

Inflow Area = 3.122 ac, 61.05% Impervious, Inflow Depth = 1.84" for 2-yr event
Inflow = 1.02 cfs @ 12.75 hrs, Volume= 0.480 af
Primary = 1.02 cfs @ 12.75 hrs, Volume= 0.480 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs

Link DP1*: DP1 (SMH IN RT 5)

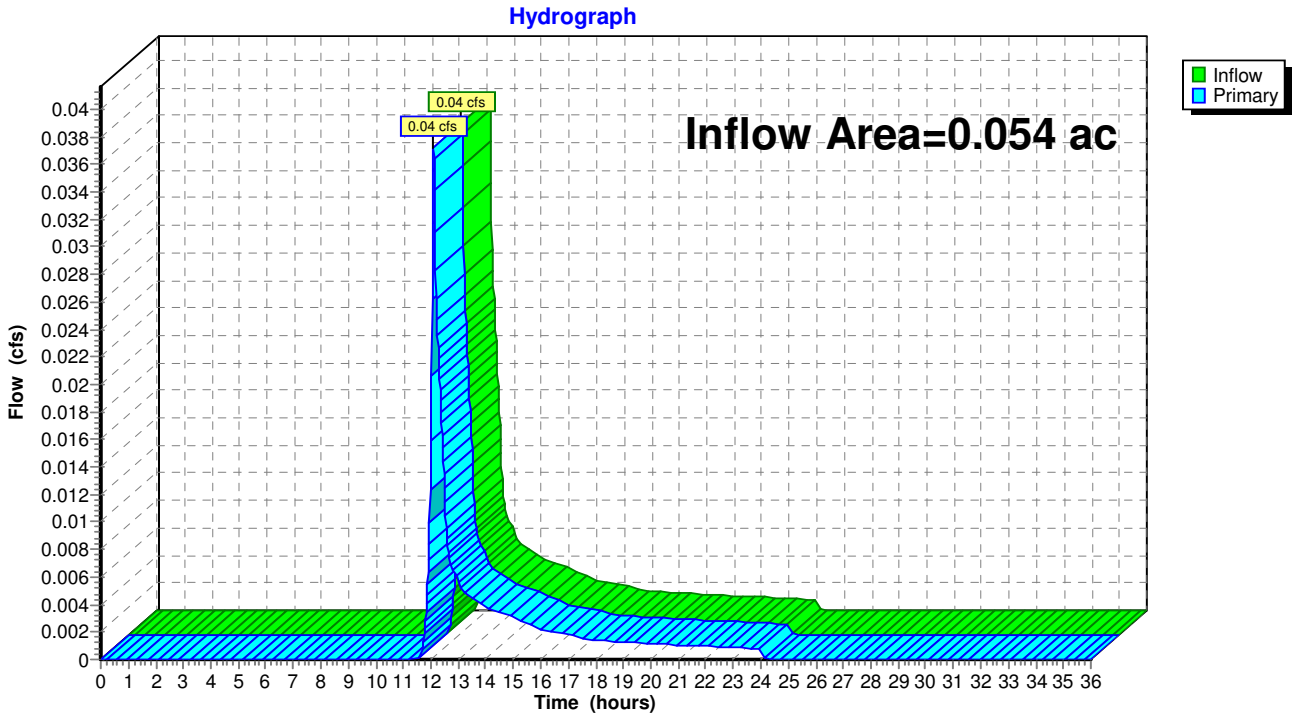


Summary for Link DP2*: DP2 (SOUTHERN PROP BOUNDARY)

Inflow Area = 0.054 ac, 0.00% Impervious, Inflow Depth = 0.69" for 2-yr event
Inflow = 0.04 cfs @ 12.10 hrs, Volume= 0.003 af
Primary = 0.04 cfs @ 12.10 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs

Link DP2*: DP2 (SOUTHERN PROP BOUNDARY)

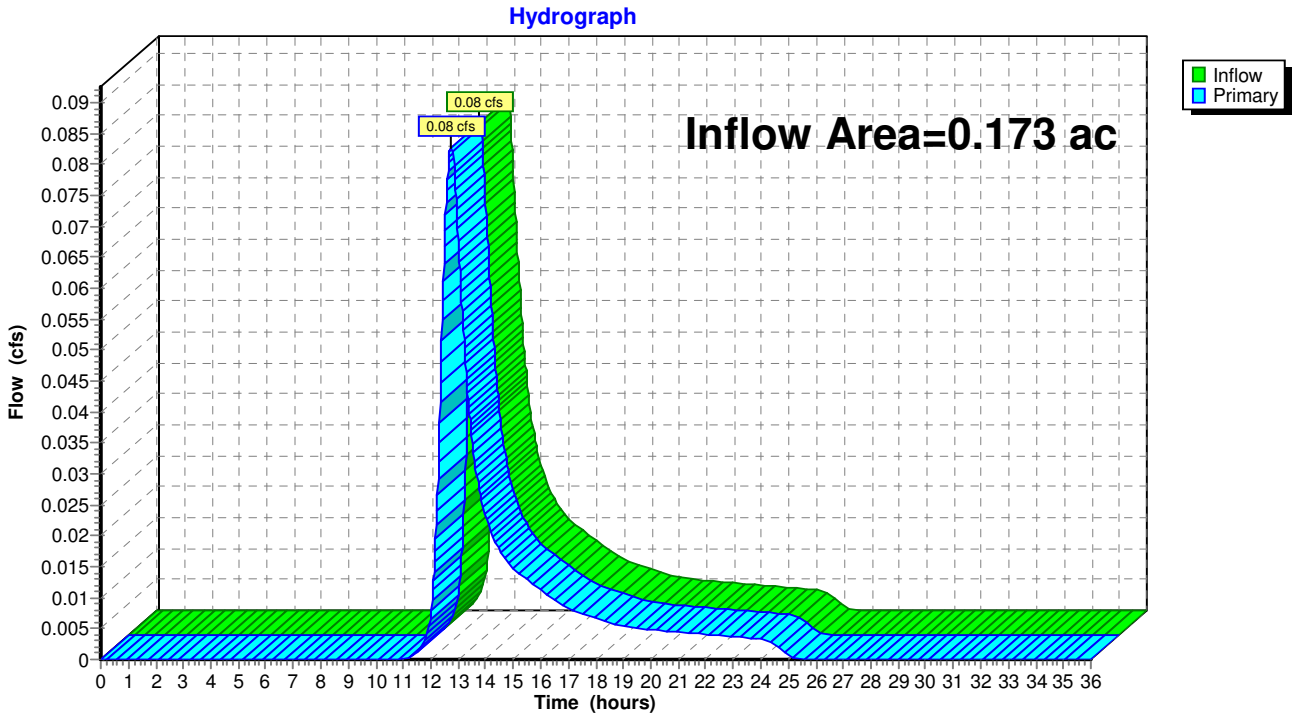


Summary for Link DP3*: DP3 (EAST PROP BNDY)

Inflow Area = 0.173 ac, 0.00% Impervious, Inflow Depth = 0.99" for 2-yr event
Inflow = 0.08 cfs @ 12.75 hrs, Volume= 0.014 af
Primary = 0.08 cfs @ 12.75 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs

Link DP3*: DP3 (EAST PROP BNDY)

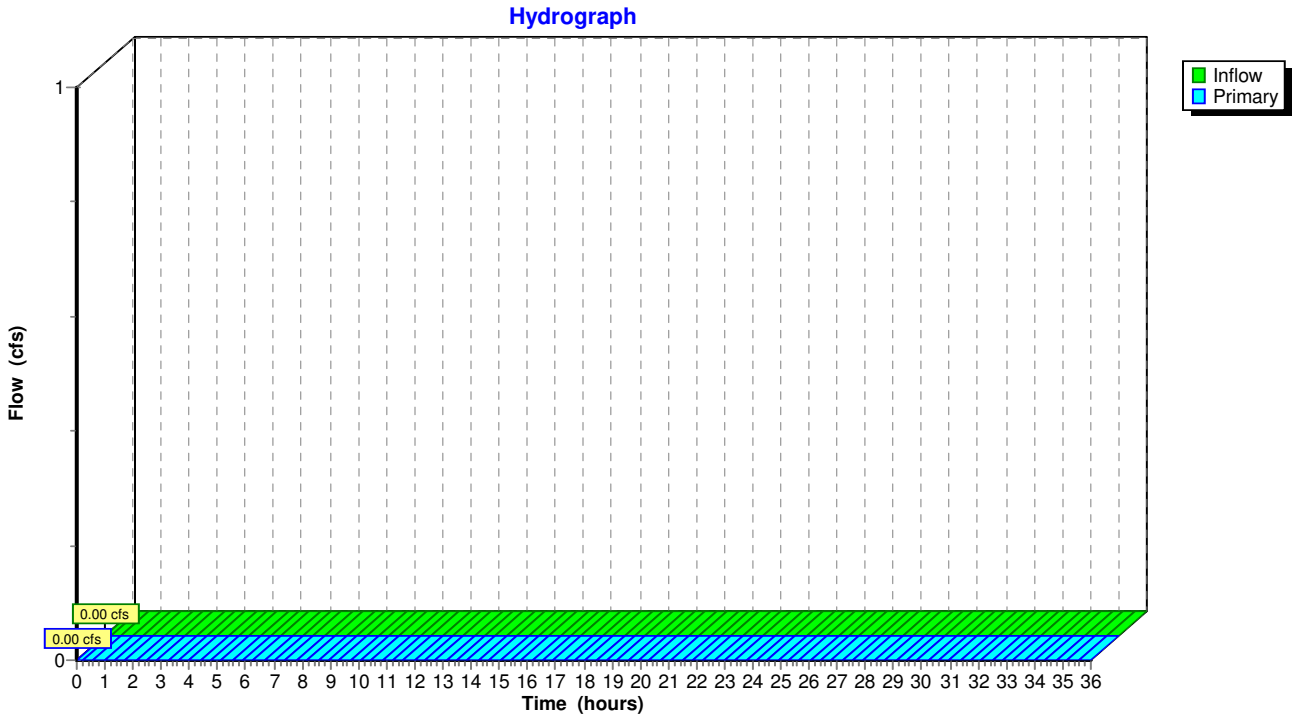


Summary for Link DP4*: DP4 (15" RCP HEADWALL @ RT 5 ROW)

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af
Primary	=	0.00 cfs @	0.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs

Link DP4*: DP4 (15" RCP HEADWALL @ RT 5 ROW)



Summary for Pond P1P: Chase Pond

Inflow Area = 60,243 sf, 69.78% Impervious, Inflow Depth = 6.70" for 100-yr event
Inflow = 10.03 cfs @ 12.08 hrs, Volume= 33,623 cf
Outflow = 3.78 cfs @ 12.32 hrs, Volume= 32,460 cf, Atten= 62%, Lag= 14.4 min
Primary = 3.78 cfs @ 12.32 hrs, Volume= 32,460 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.03 hrs / 3
Peak Elev= 149.66' @ 12.32 hrs Surf.Area= 4,175 sf Storage= 8,594 cf

Plug-Flow detention time= 56.7 min calculated for 32,430 cf (96% of inflow)
Center-of-Mass det. time= 36.3 min (809.7 - 773.4)

Volume	Invert	Avail.Storage	Storage Description
#1	146.00'	14,881 cf	**Pond (Pyramidal)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
146.00	836	0	0	836
147.00	1,524	1,163	1,163	1,537
148.00	2,437	1,963	3,126	2,467
149.00	3,468	2,937	6,063	3,521
150.00	4,559	4,001	10,064	4,641
151.00	5,080	4,817	14,881	5,231

Device	Routing	Invert	Outlet Devices
#1	Primary	146.00'	**12.0" Round Culvert** L= 250.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 146.00' / 143.50' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	147.00'	**20.0" W x 2.0" H Vert. Orifice/Grate** C= 0.600
#3	Device 1	148.10'	**20.0" W x 2.0" H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=3.77 cfs @ 12.32 hrs HW=149.66' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 3.77 cfs of 4.68 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 2.15 cfs @ 7.73 fps)
  └─**3=Orifice/Grate** (Orifice Controls 1.63 cfs @ 5.86 fps)

Summary for Pond P2P: Existing Wetlands - Pond

Inflow Area = 668,391 sf, 4.13% Impervious, Inflow Depth = 3.82" for 100-yr event
Inflow = 49.66 cfs @ 12.23 hrs, Volume= 212,767 cf
Outflow = 49.00 cfs @ 12.26 hrs, Volume= 209,881 cf, Atten= 1%, Lag= 1.6 min
Primary = 49.00 cfs @ 12.26 hrs, Volume= 209,881 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-33.00 hrs, dt= 0.03 hrs / 3
Peak Elev= 171.01' @ 12.26 hrs Surf.Area= 6,683 sf Storage= 7,804 cf

Plug-Flow detention time= 14.2 min calculated for 209,881 cf (99% of inflow)
Center-of-Mass det. time= 6.0 min (850.4 - 844.4)

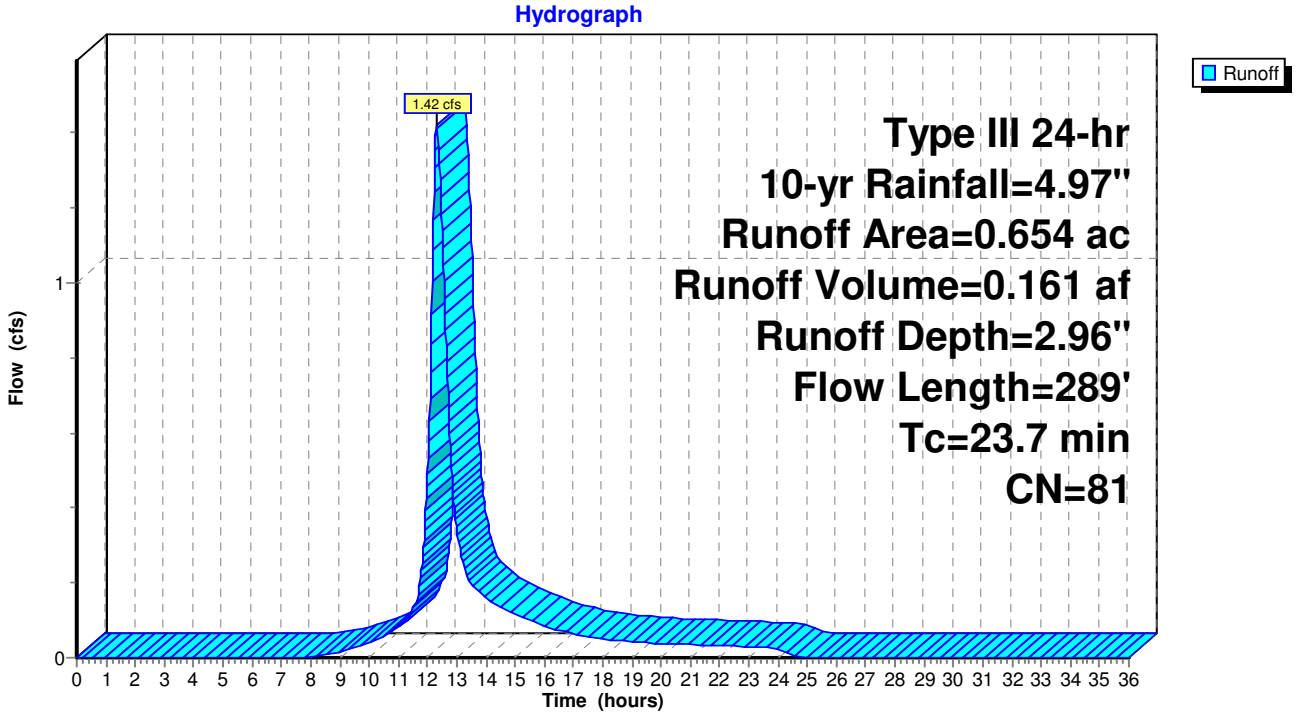
Volume	Invert	Avail.Storage	Storage Description
#1	167.00'	17,482 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
167.00	300	80.0	0	0	300
169.00	760	224.0	1,025	1,025	3,797
170.00	3,250	407.0	1,861	2,886	12,991
171.00	6,611	393.0	4,832	7,718	13,968
172.00	13,303	755.0	9,764	17,482	47,044

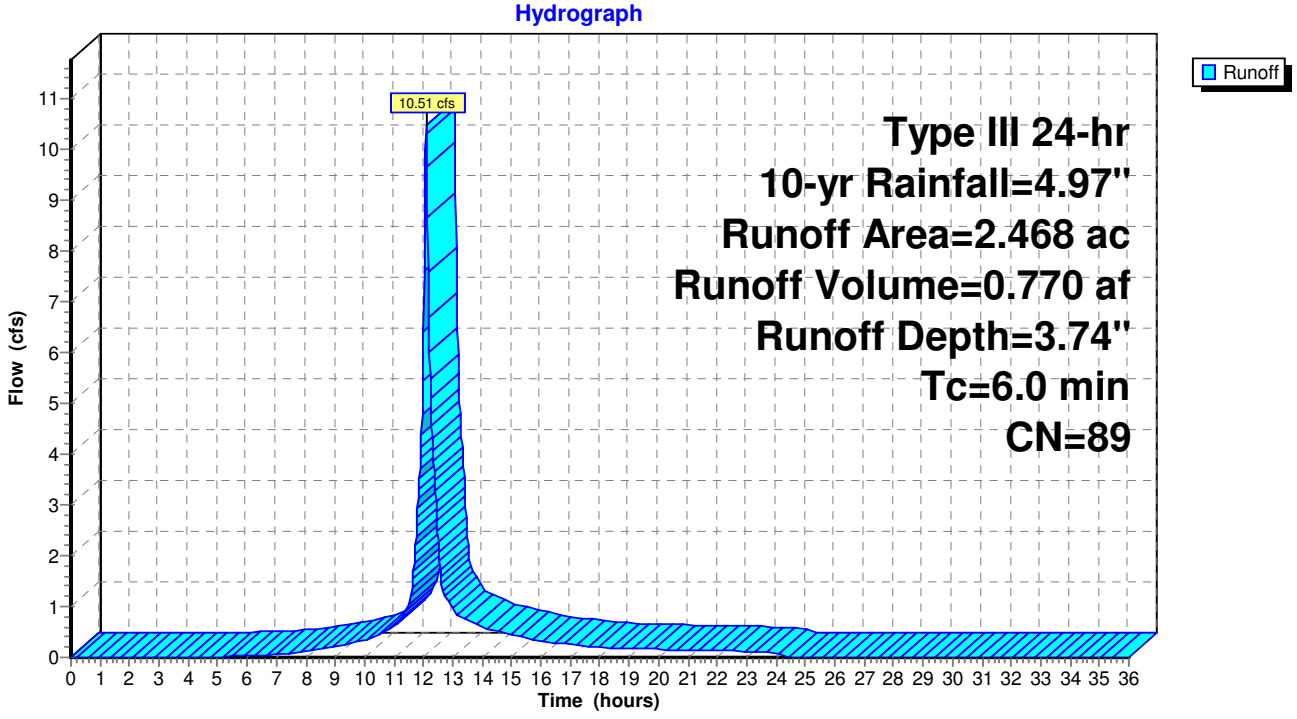
Device	Routing	Invert	Outlet Devices
#1	Primary	170.00'	**18.0' long x 4.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

Primary OutFlow Max=48.84 cfs @ 12.26 hrs HW=171.01' TW=0.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 48.84 cfs @ 2.68 fps)

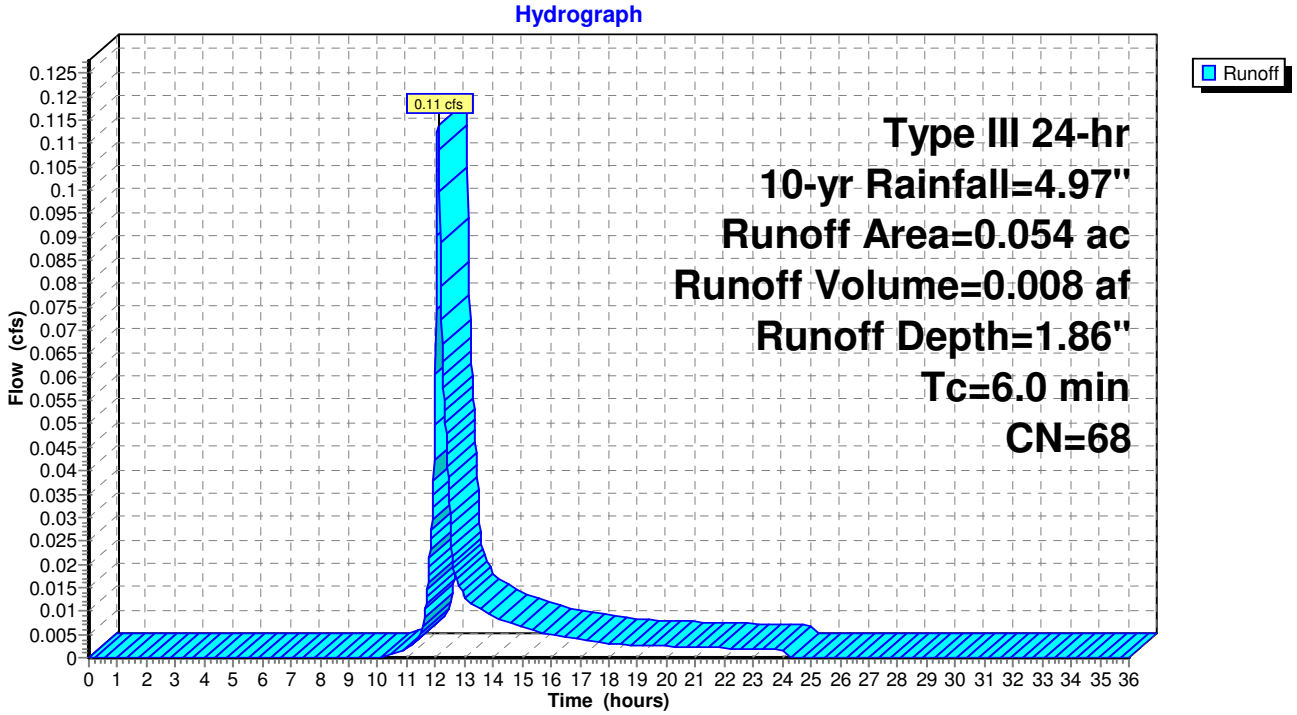
Subcatchment P1: Proposed Area 1



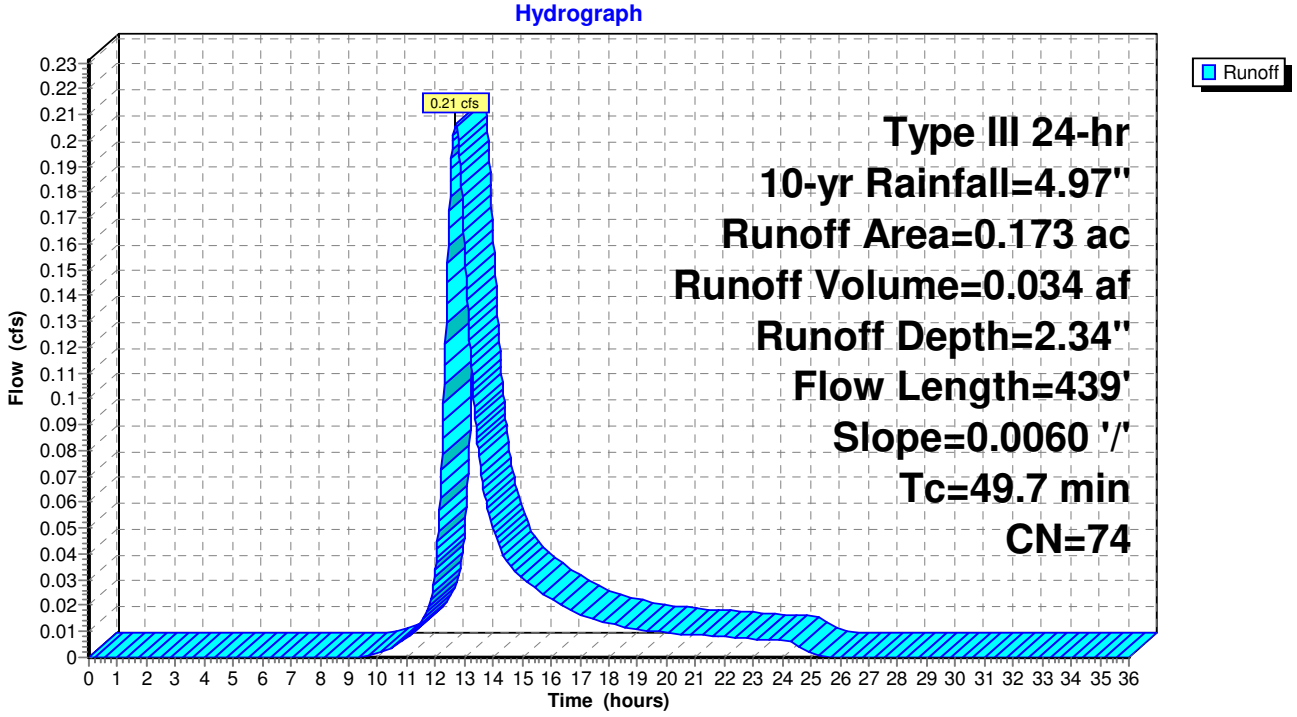
Subcatchment P2: Proposed Area 2 (Main Site)



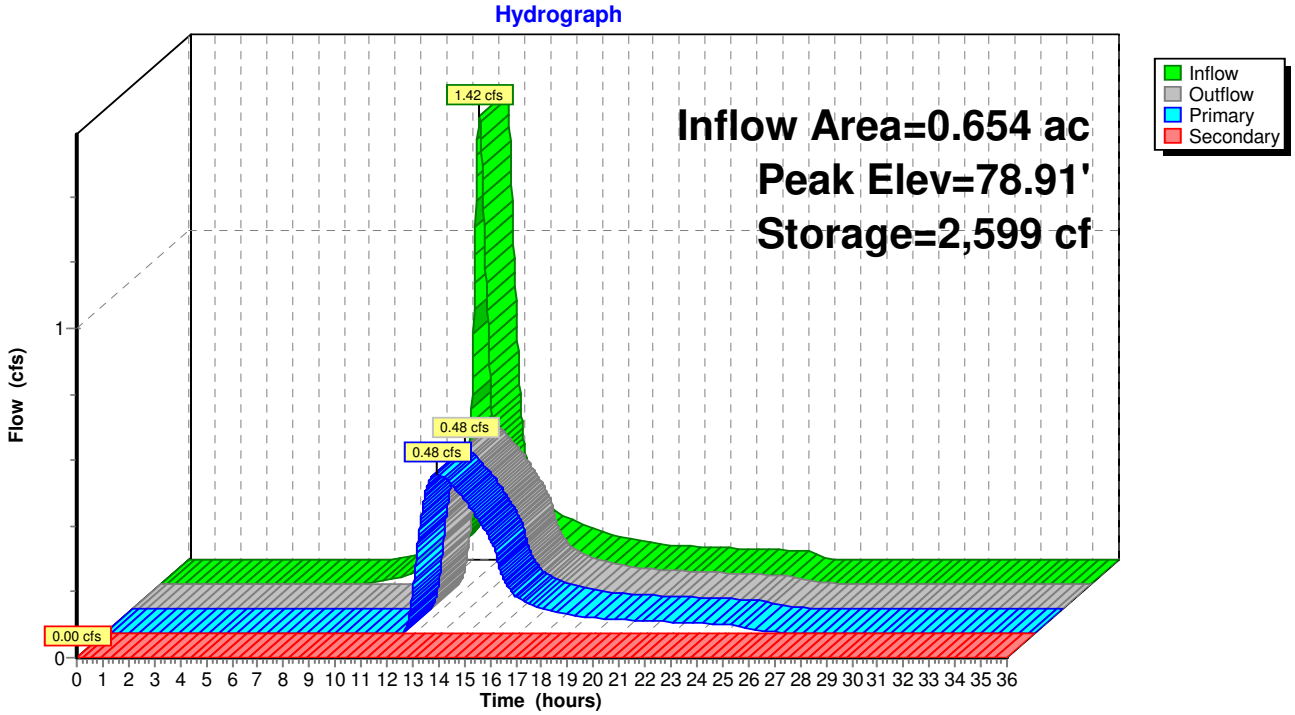
Subcatchment P3: Proposed Area 3



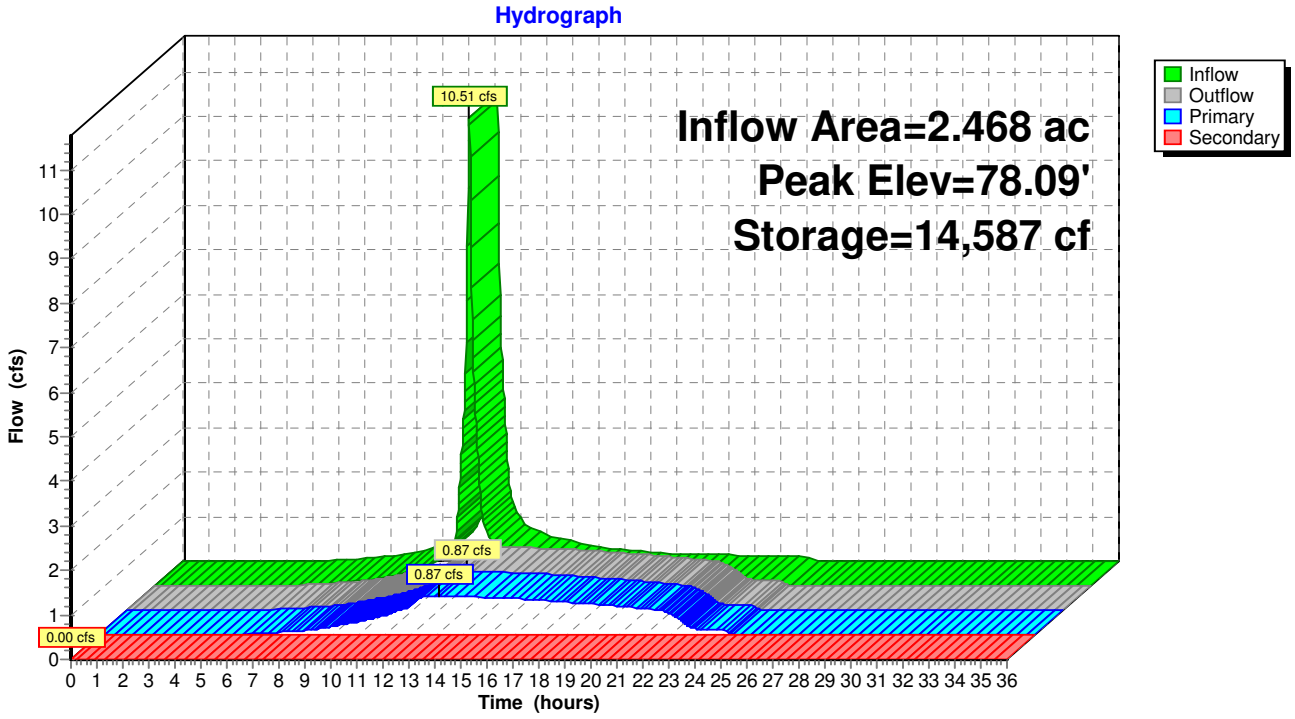
Subcatchment P4: Proposed Area 4



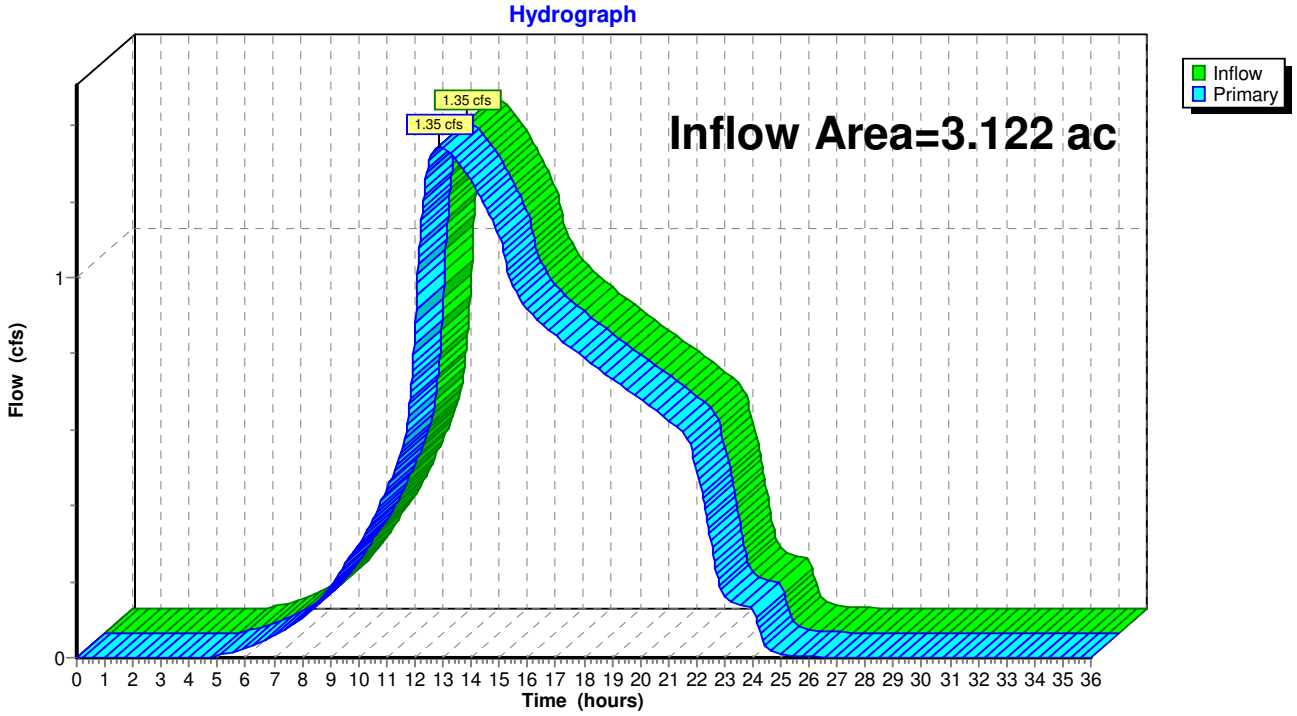
Pond EP1*: Existing Pond 1



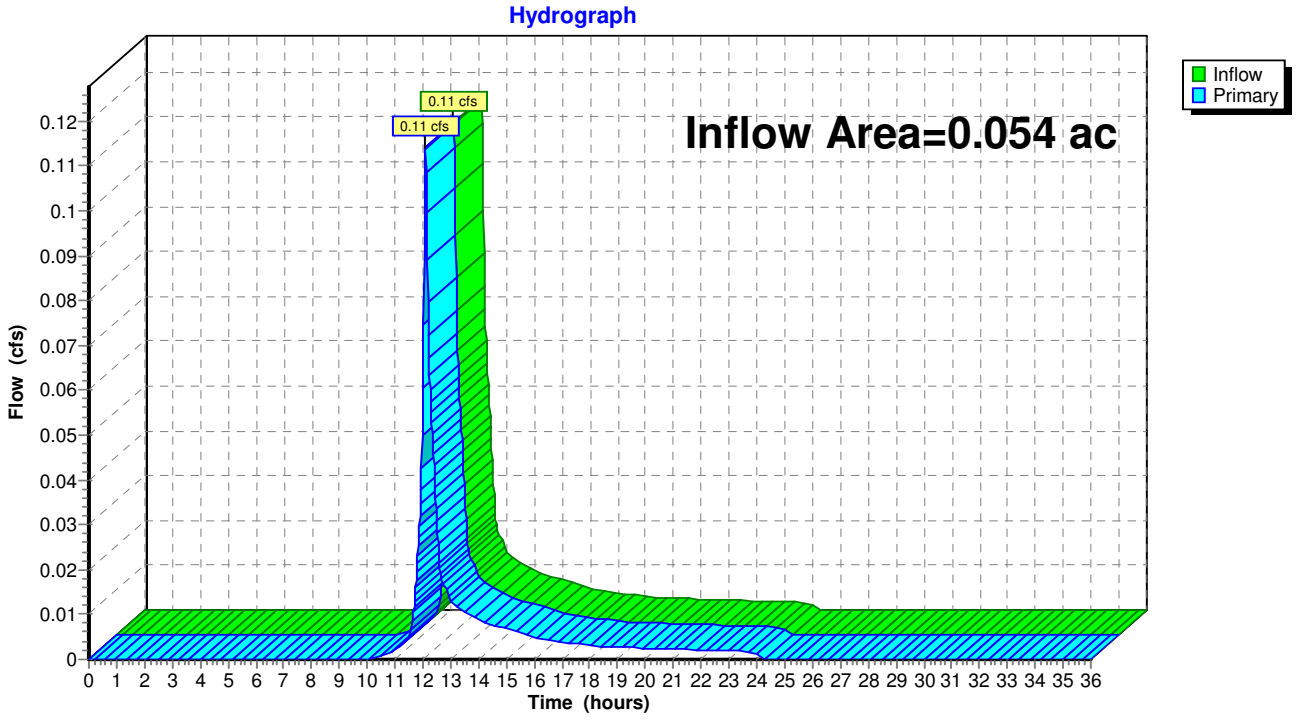
Pond PP1: Proposed Pond 2



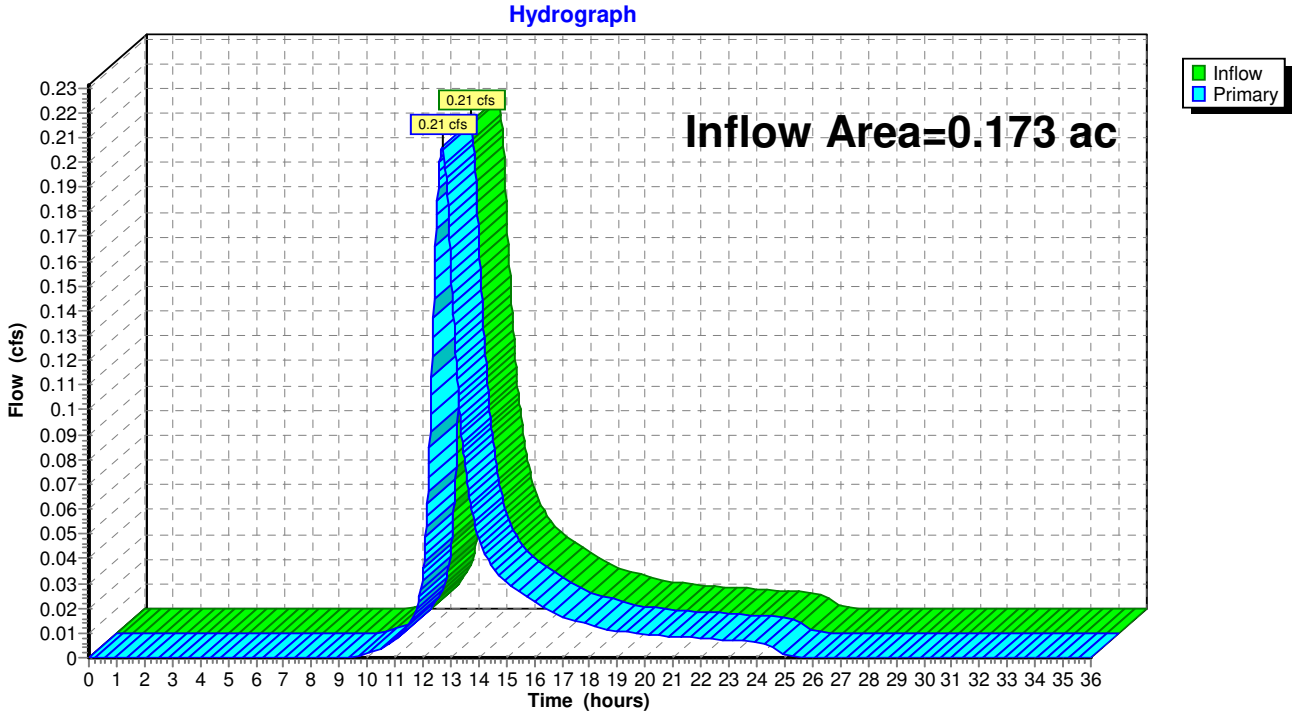
Link DP1*: DP1 (SMH IN RT 5)



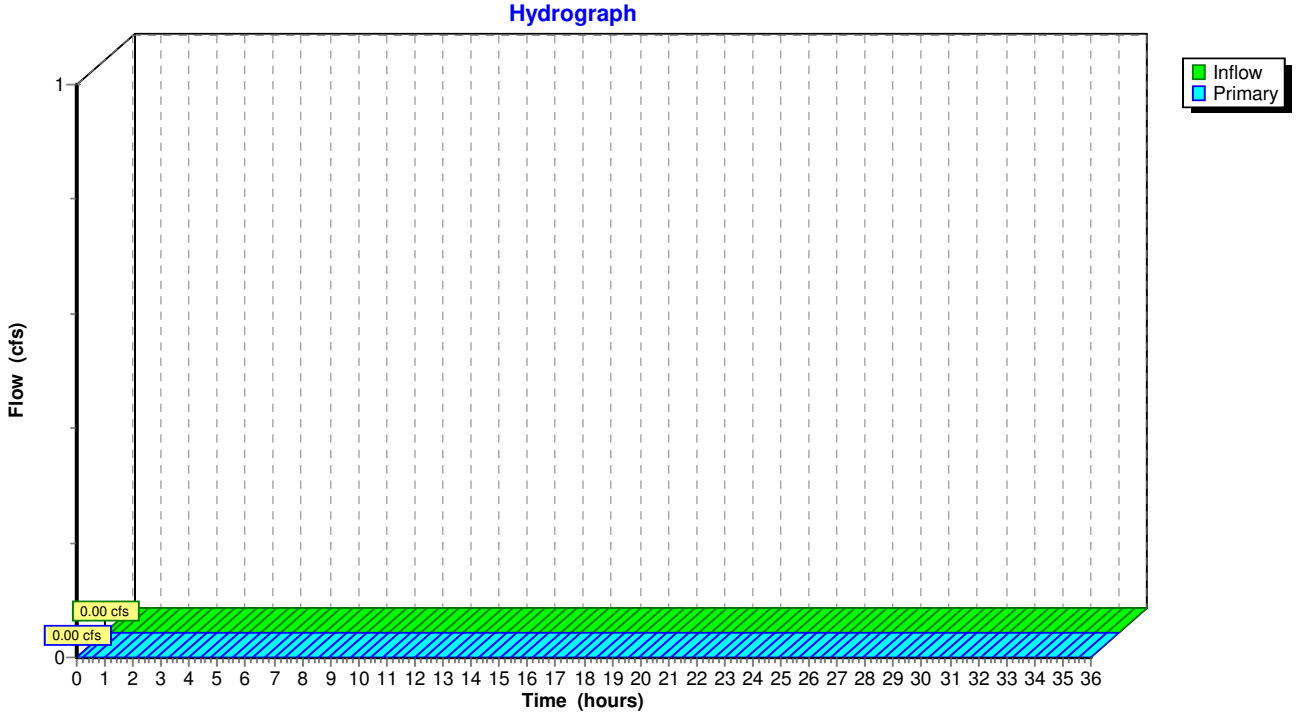
Link DP2*: DP2 (SOUTHERN PROP BOUNDARY)



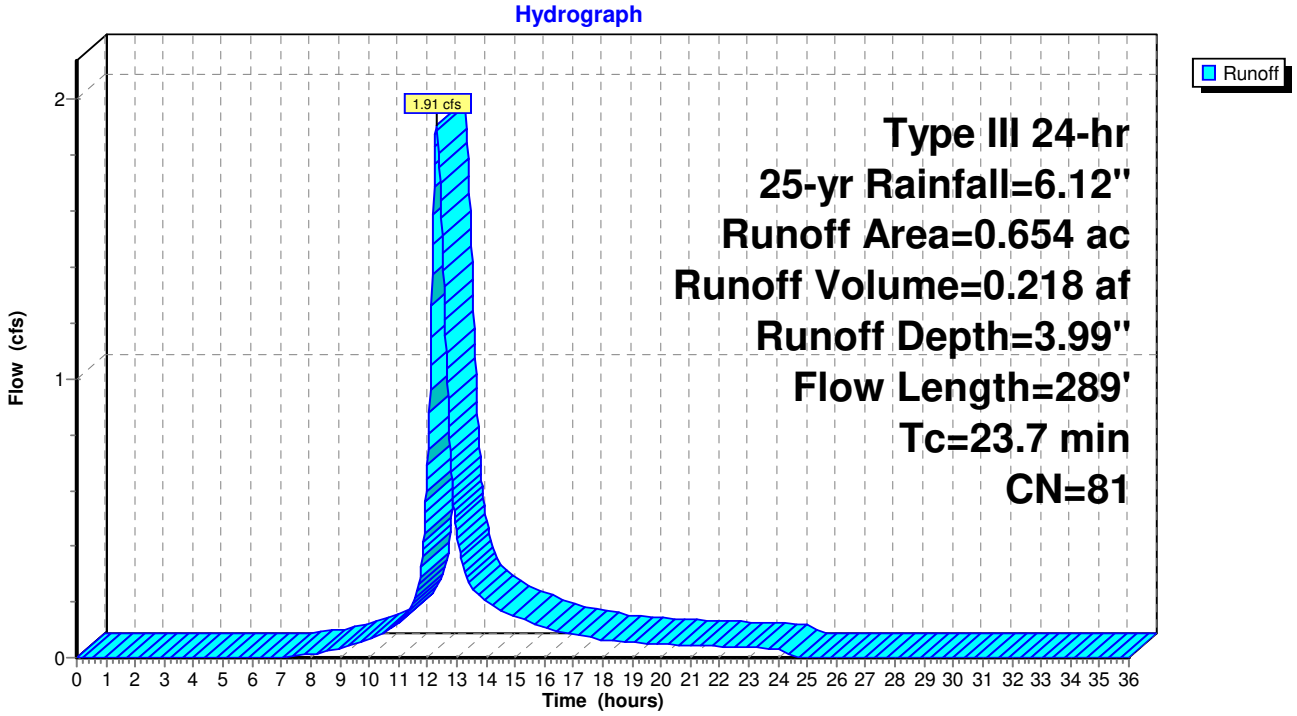
Link DP3*: DP3 (EAST PROP BNDY)



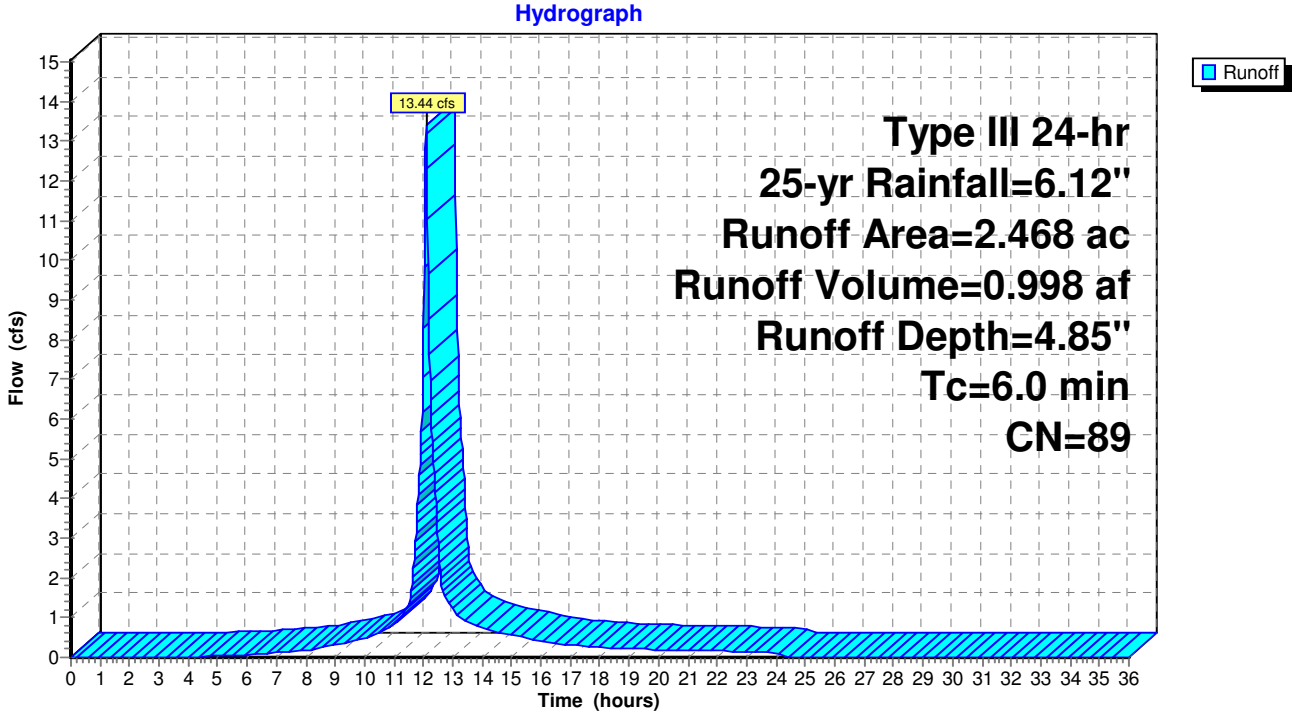
Link DP4*: DP4 (15" RCP HEADWALL @ RT 5 ROW)



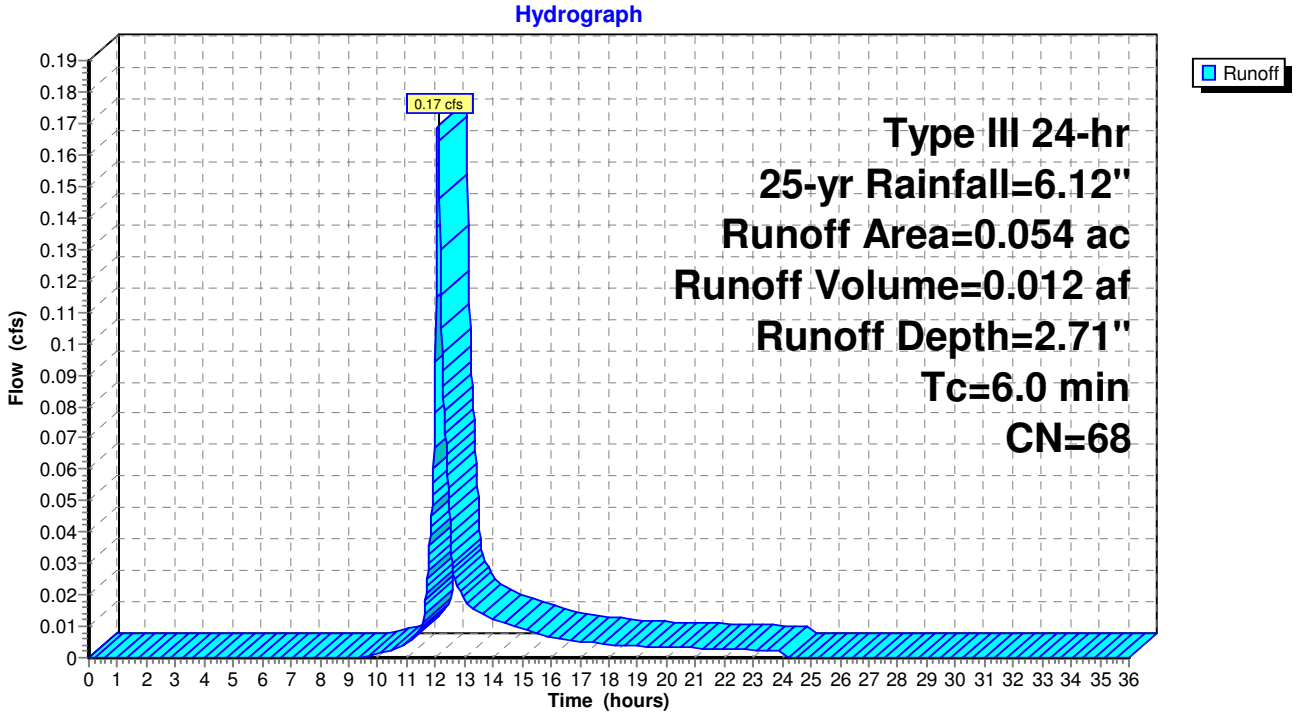
Subcatchment P1: Proposed Area 1



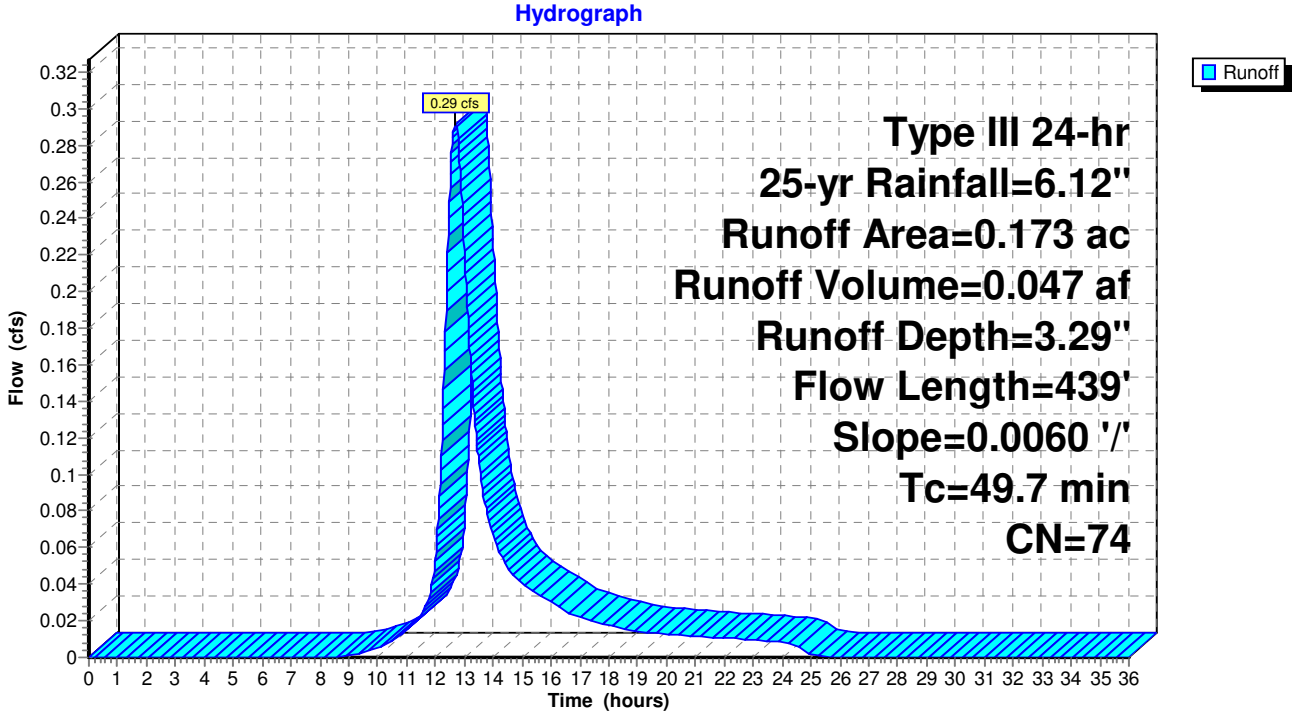
Subcatchment P2: Proposed Area 2 (Main Site)



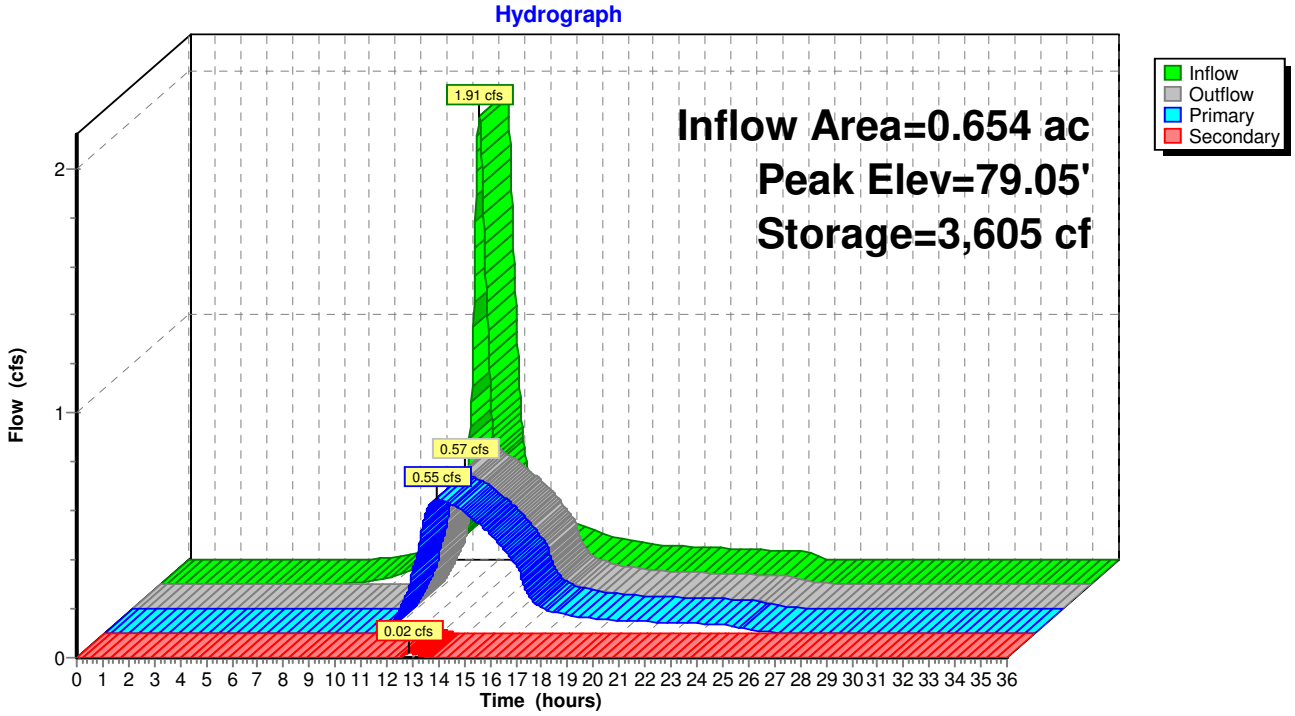
Subcatchment P3: Proposed Area 3



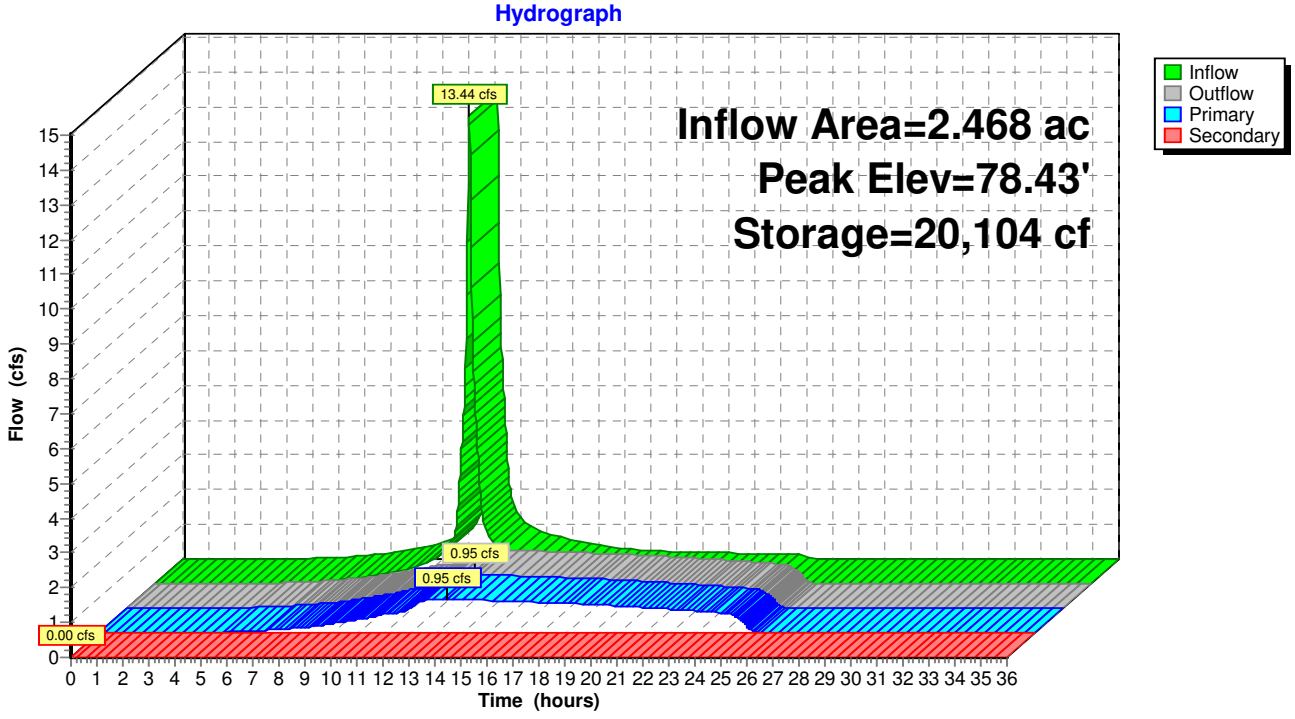
Subcatchment P4: Proposed Area 4



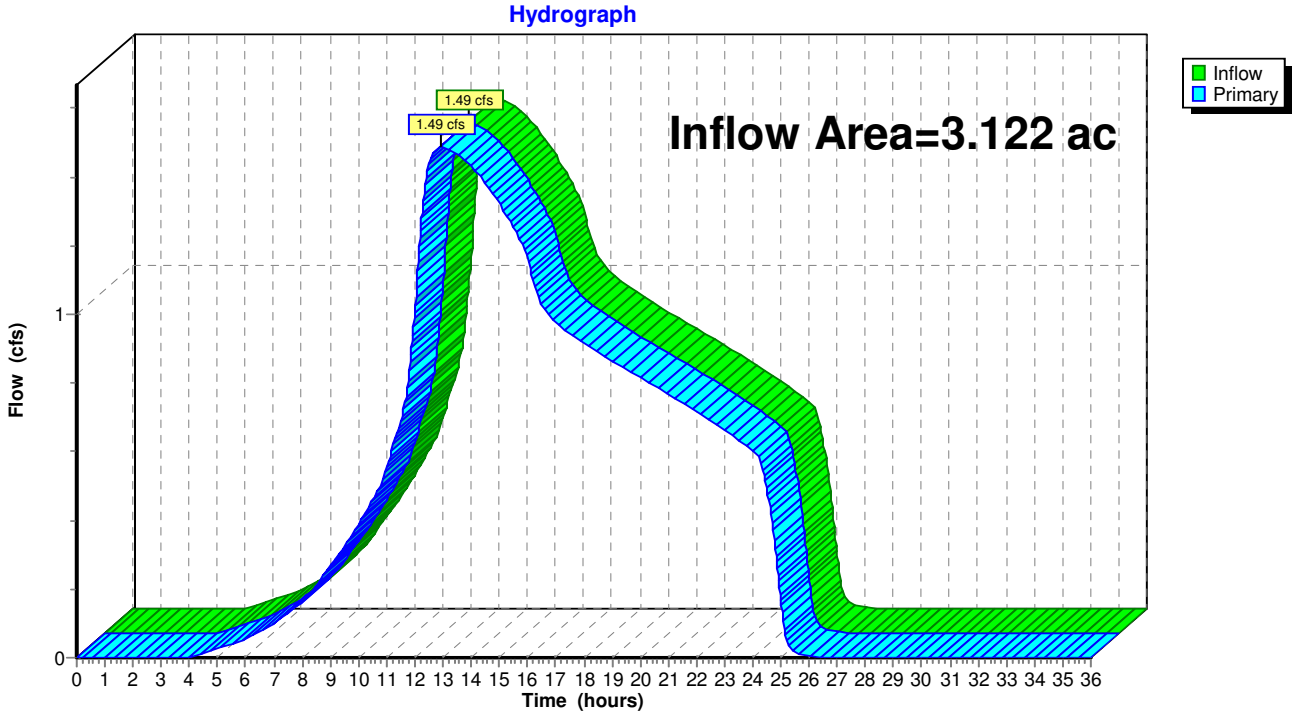
Pond EP1*: Existing Pond 1



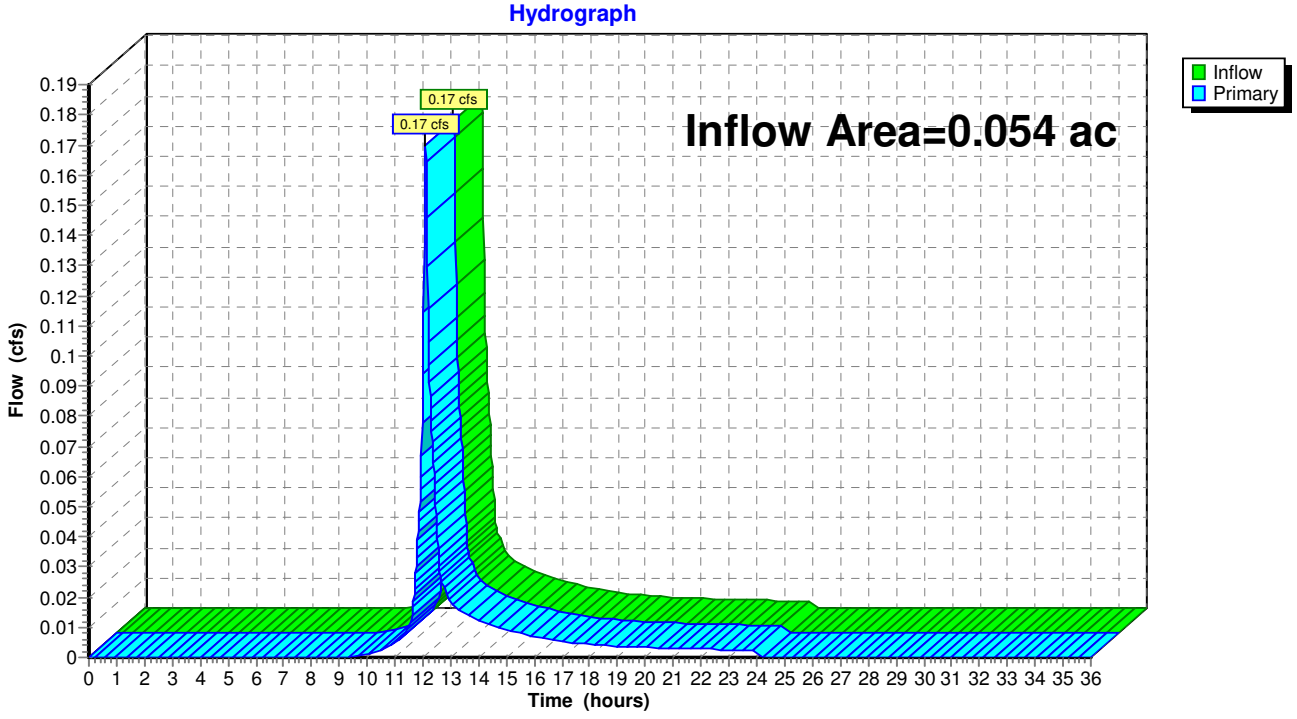
Pond PP1: Proposed Pond 2



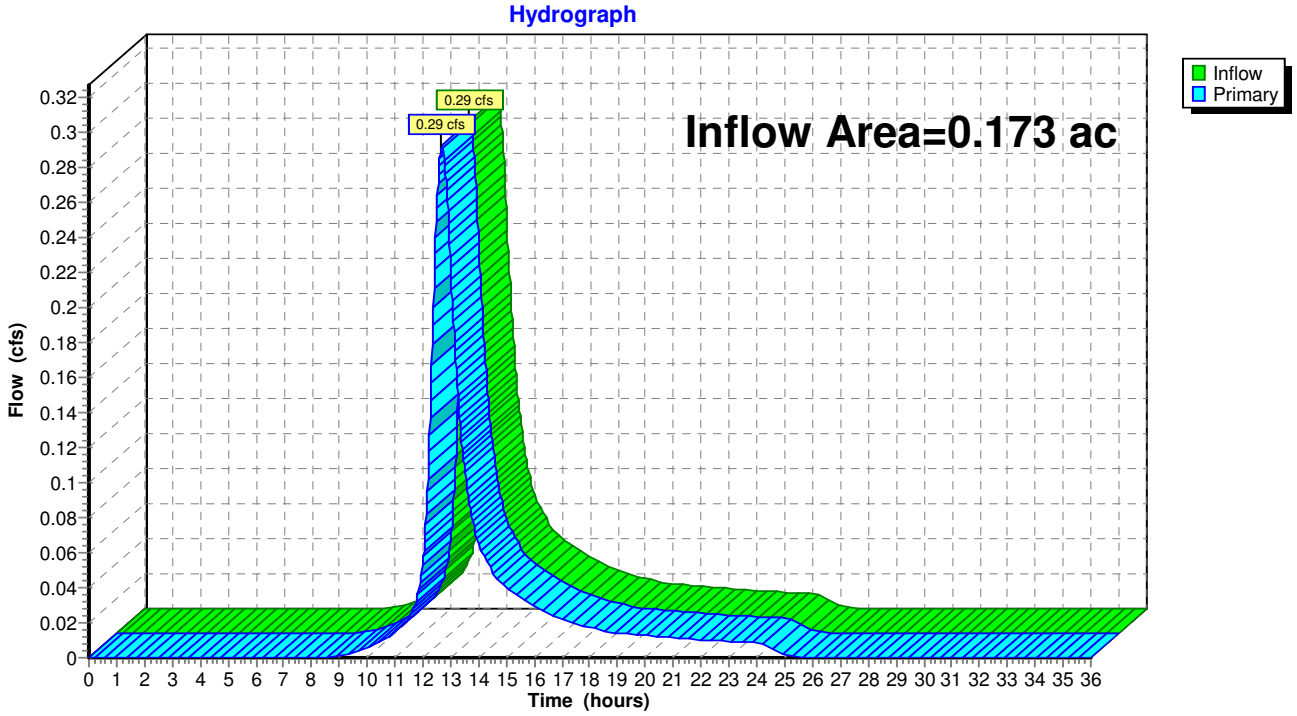
Link DP1*: DP1 (SMH IN RT 5)



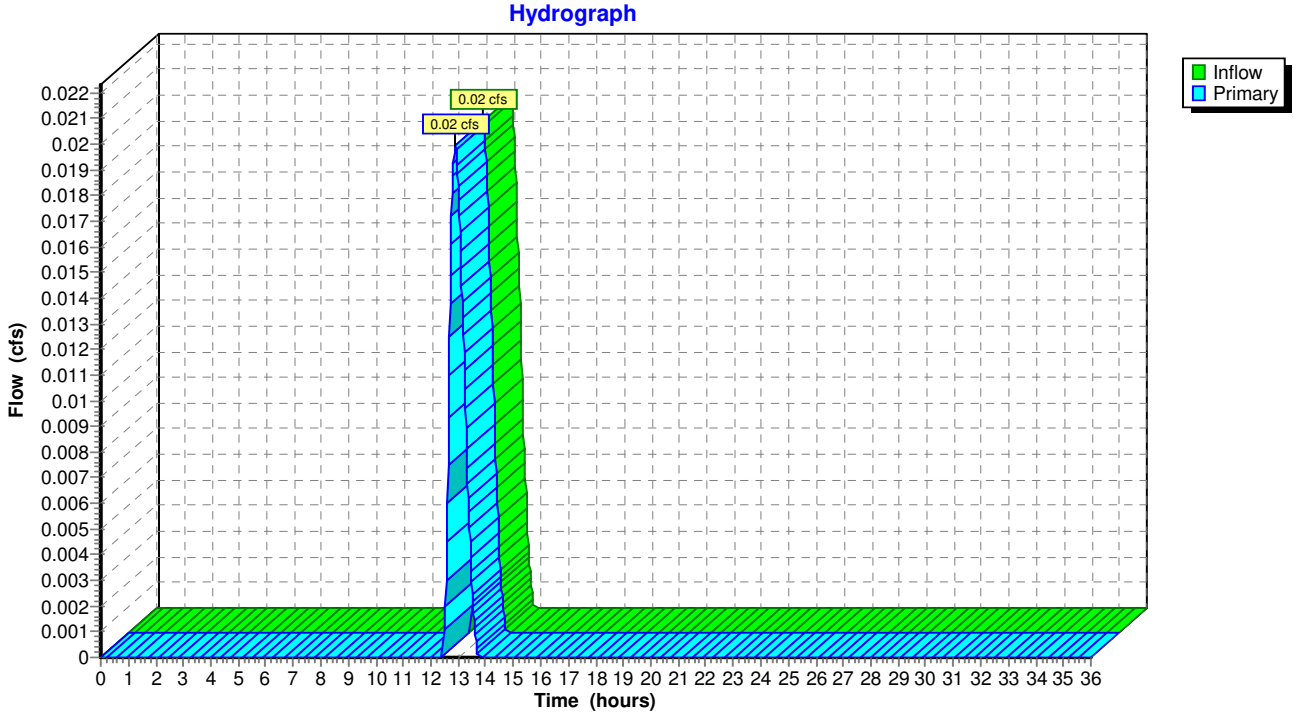
Link DP2*: DP2 (SOUTHERN PROP BOUNDARY)



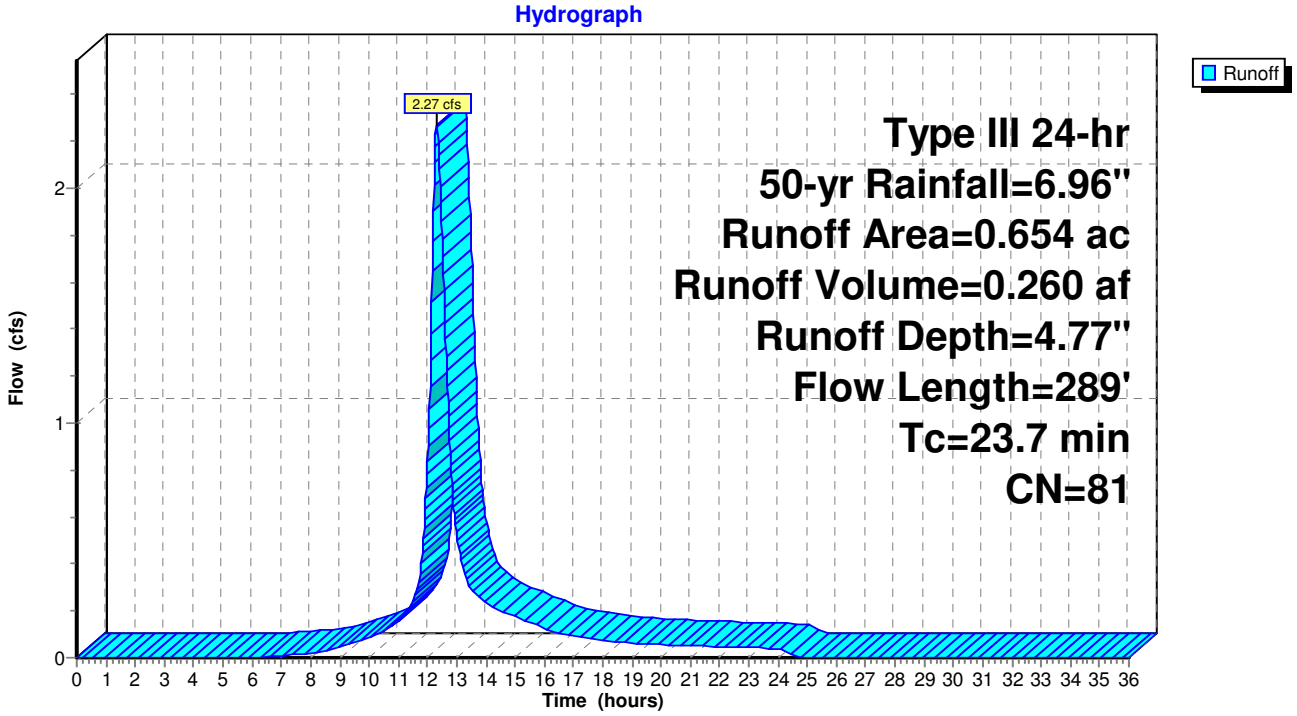
Link DP3*: DP3 (EAST PROP BNDY)



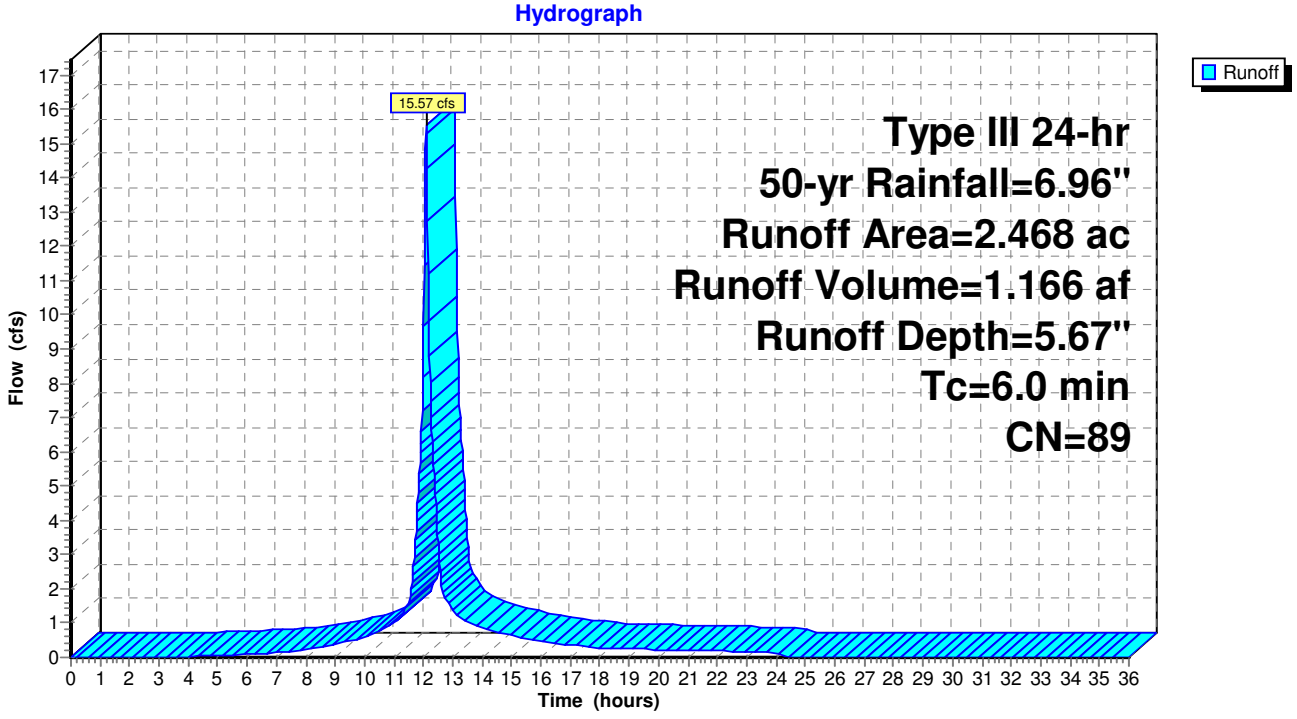
Link DP4*: DP4 (15" RCP HEADWALL @ RT 5 ROW)



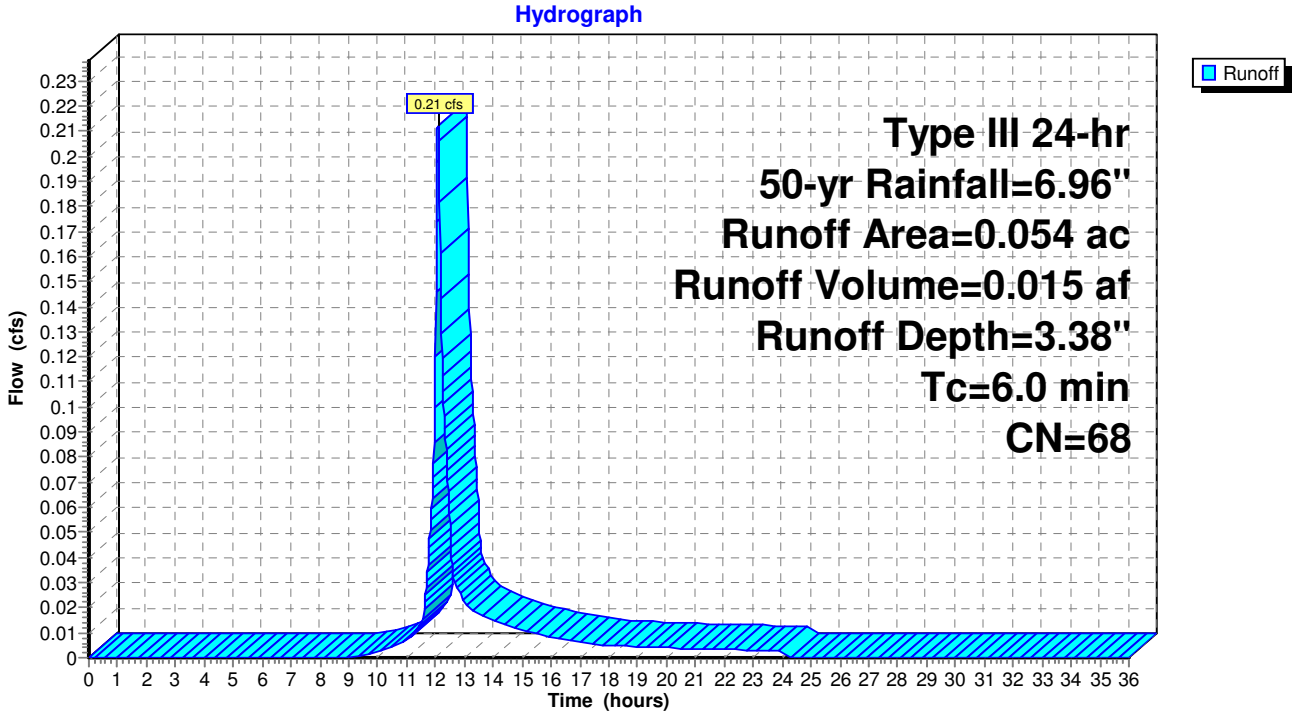
Subcatchment P1: Proposed Area 1



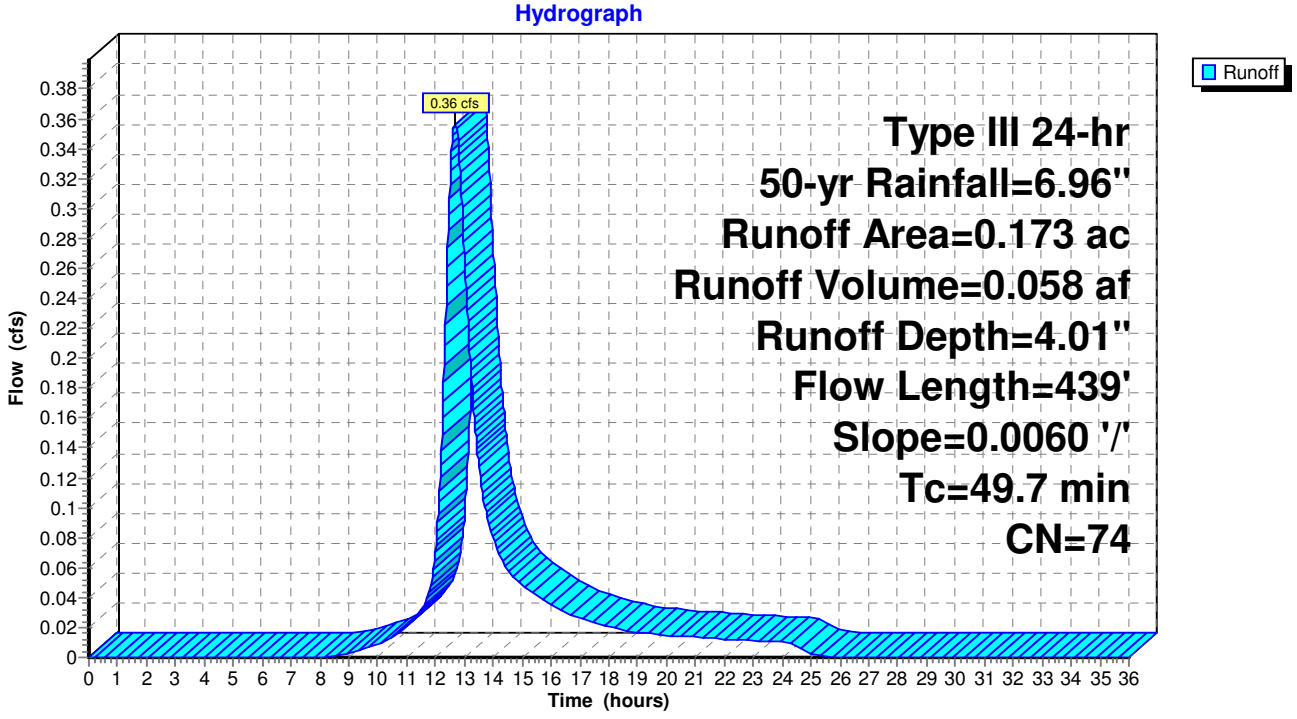
Subcatchment P2: Proposed Area 2 (Main Site)



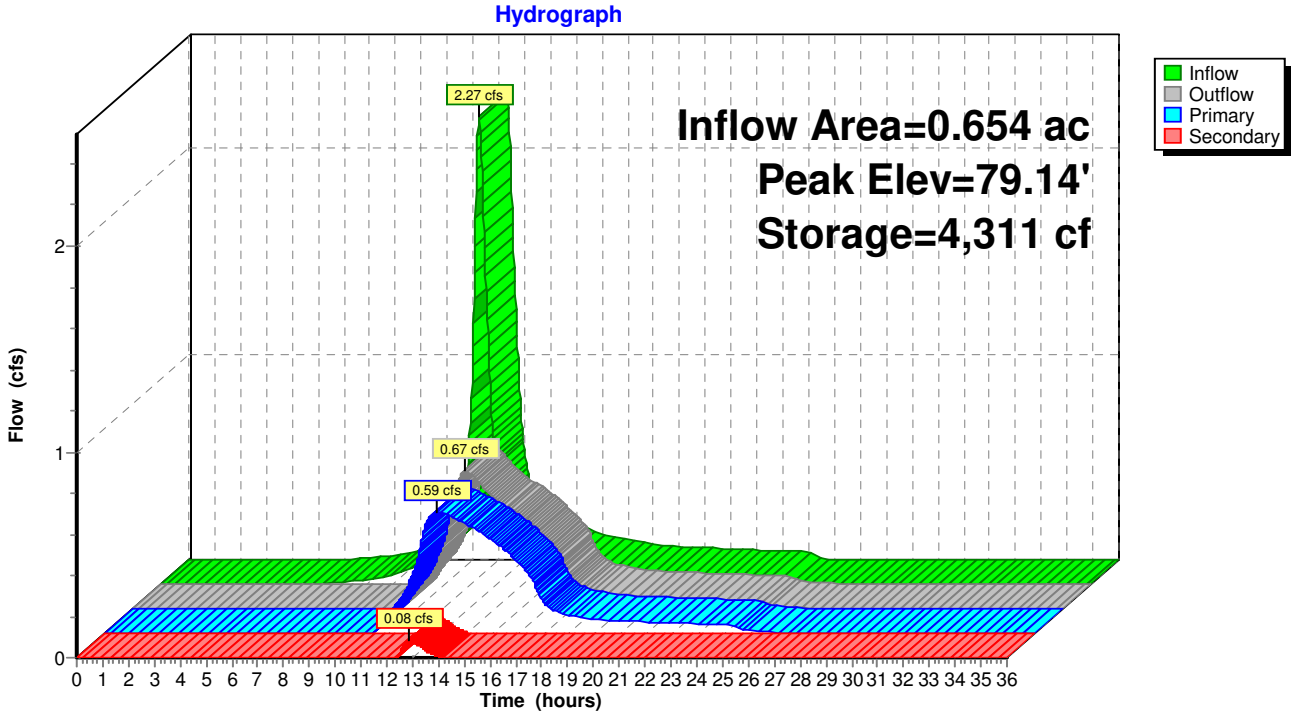
Subcatchment P3: Proposed Area 3



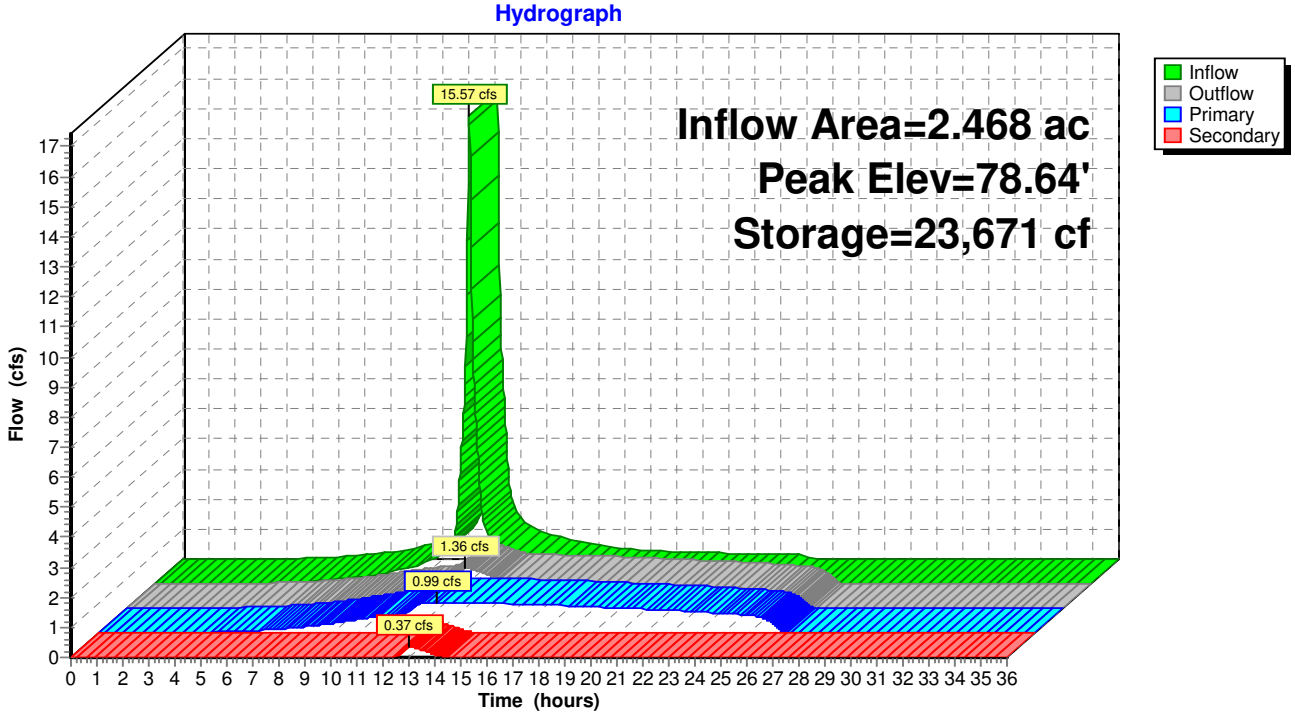
Subcatchment P4: Proposed Area 4



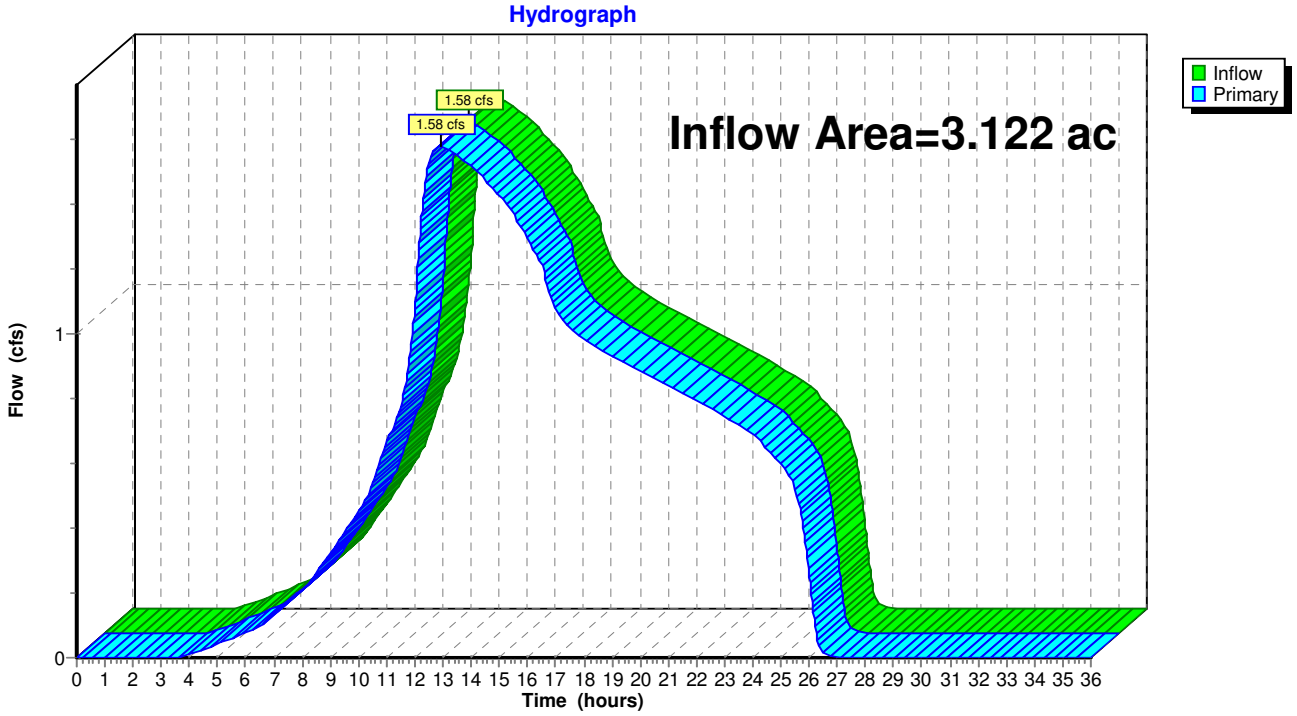
Pond EP1*: Existing Pond 1



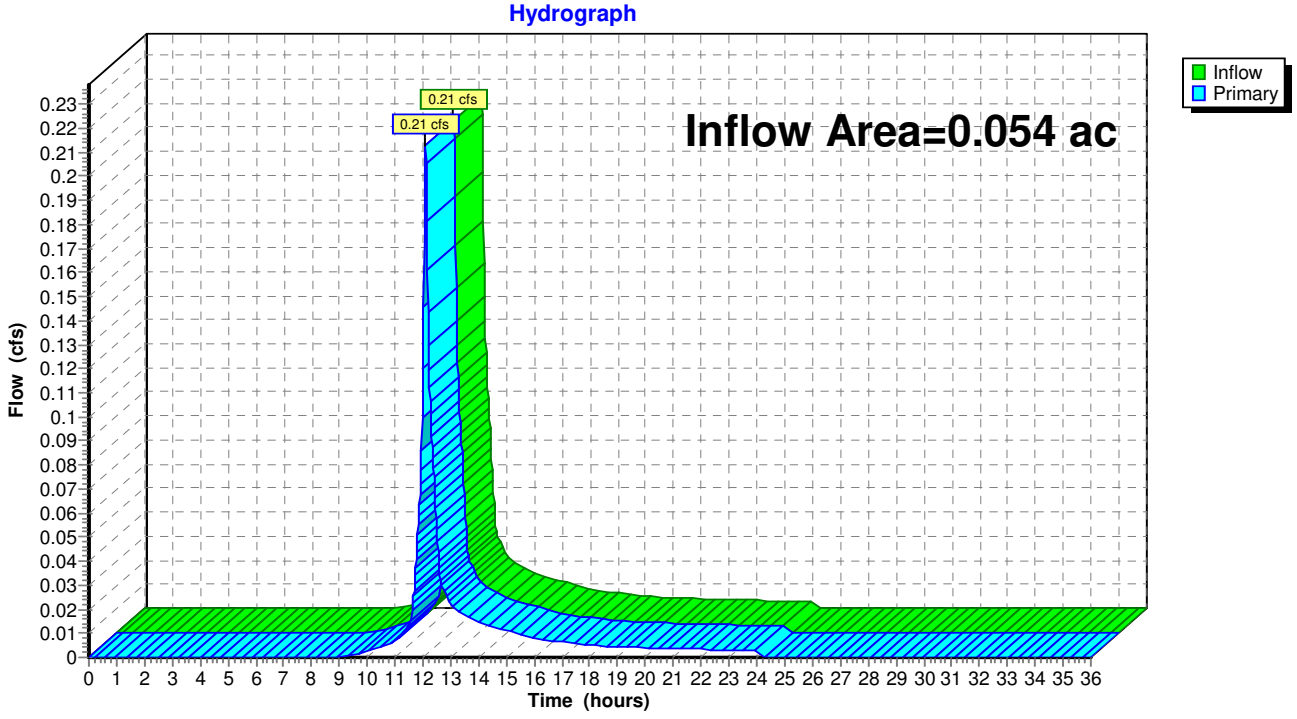
Pond PP1: Proposed Pond 2



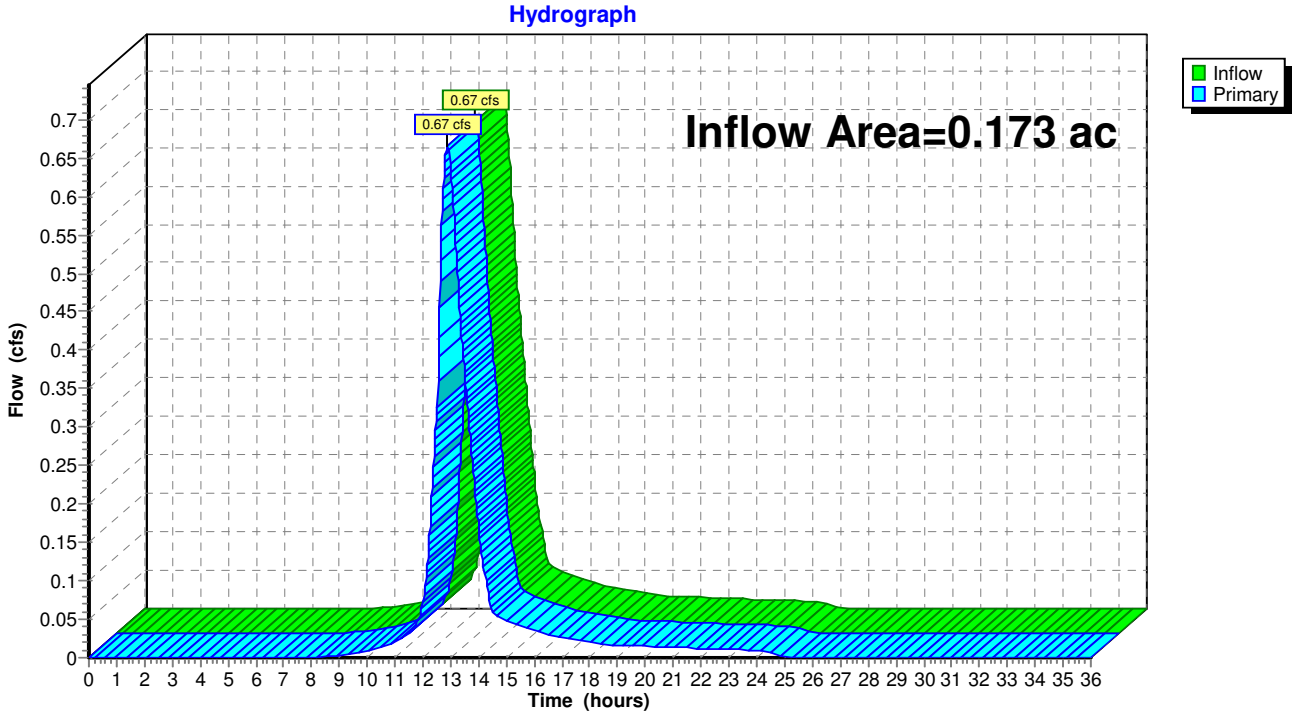
Link DP1*: DP1 (SMH IN RT 5)



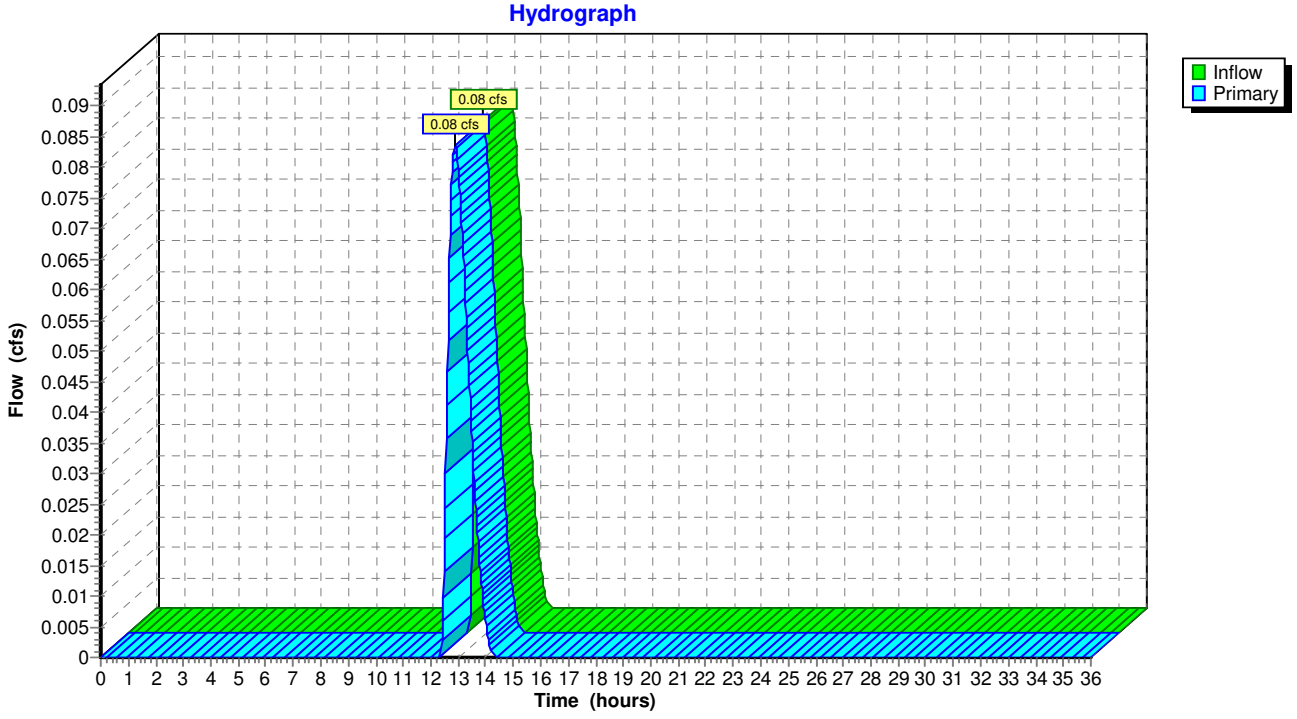
Link DP2*: DP2 (SOUTHERN PROP BOUNDARY)



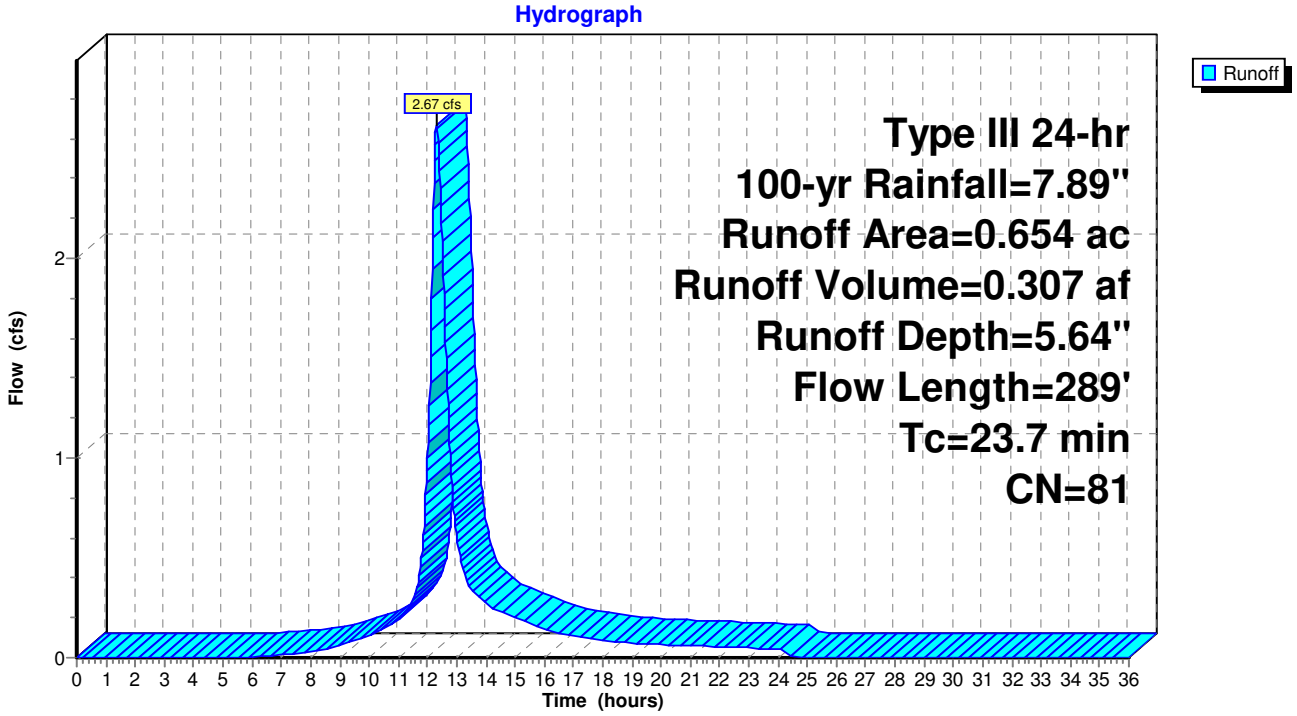
Link DP3*: DP3 (EAST PROP BNDY)



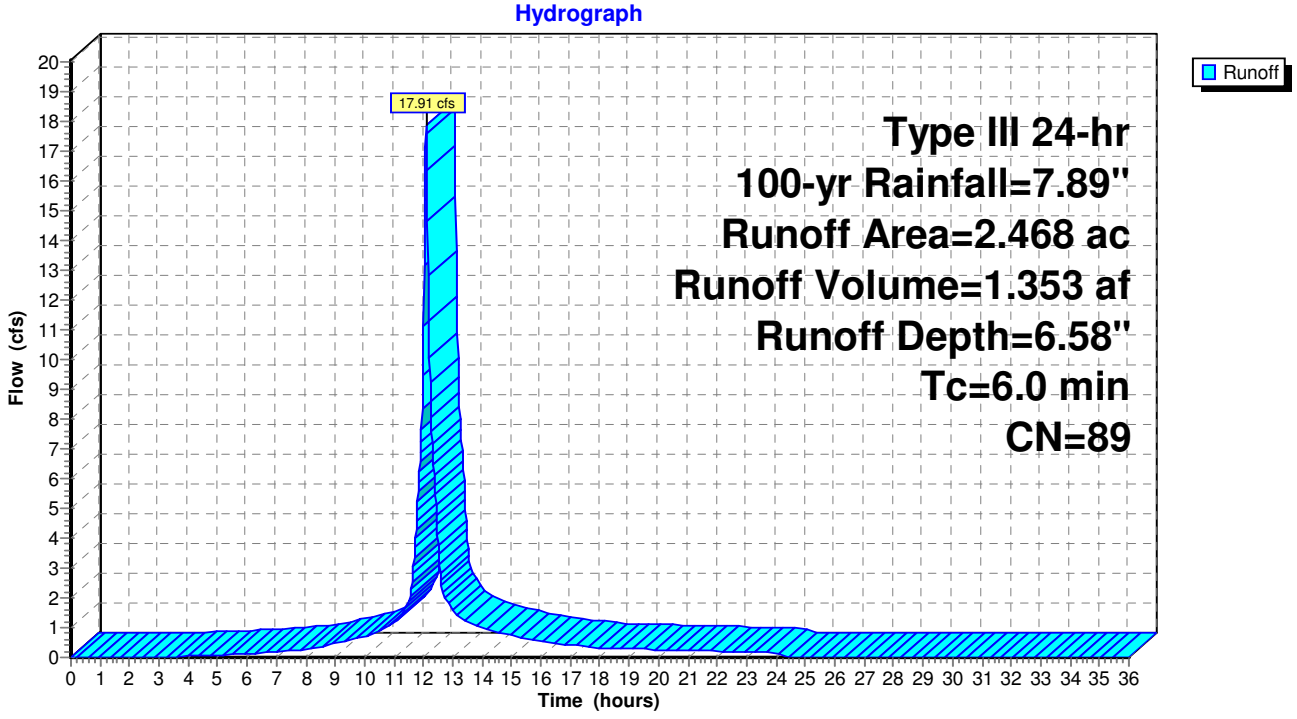
Link DP4*: DP4 (15" RCP HEADWALL @ RT 5 ROW)



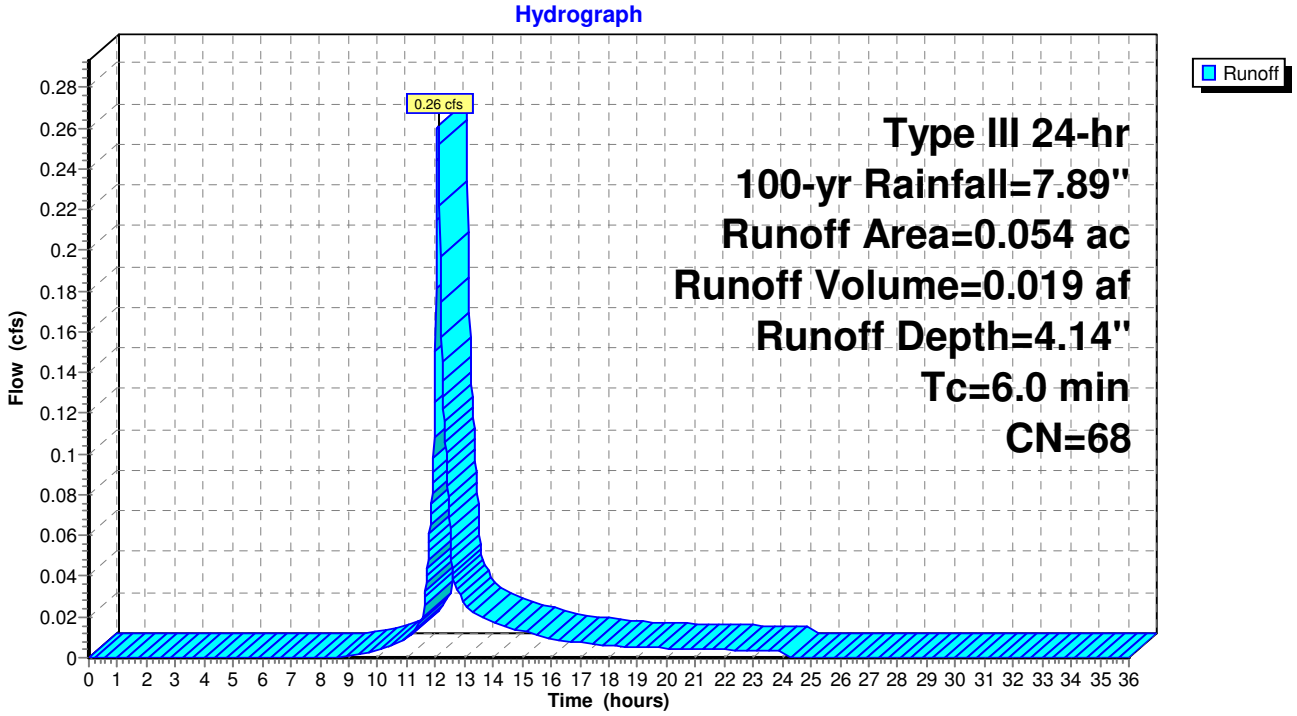
Subcatchment P1: Proposed Area 1



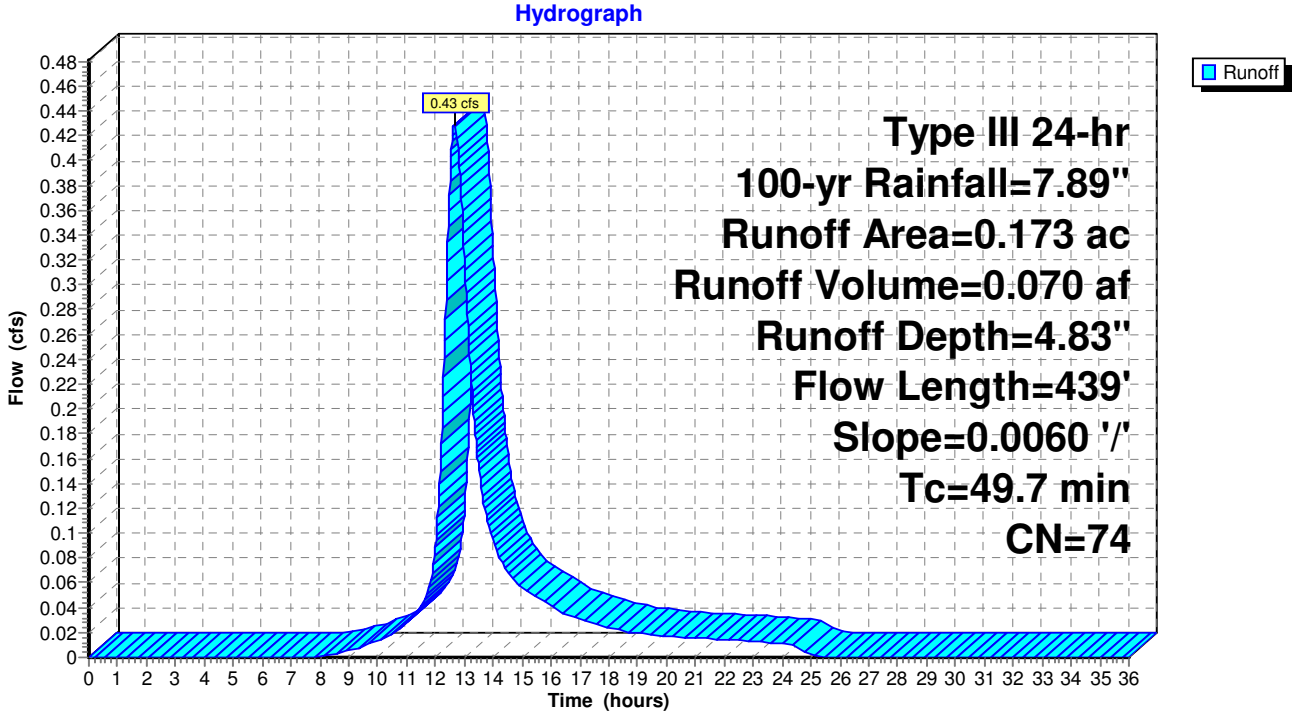
Subcatchment P2: Proposed Area 2 (Main Site)



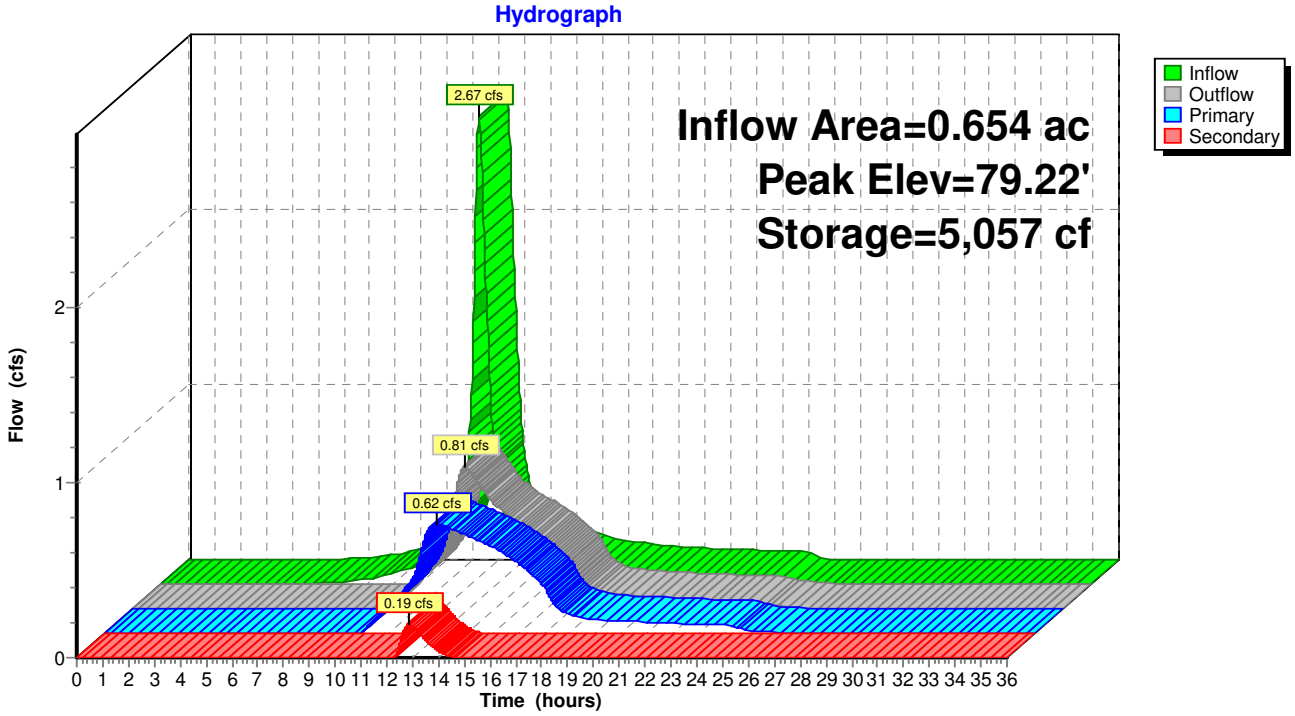
Subcatchment P3: Proposed Area 3



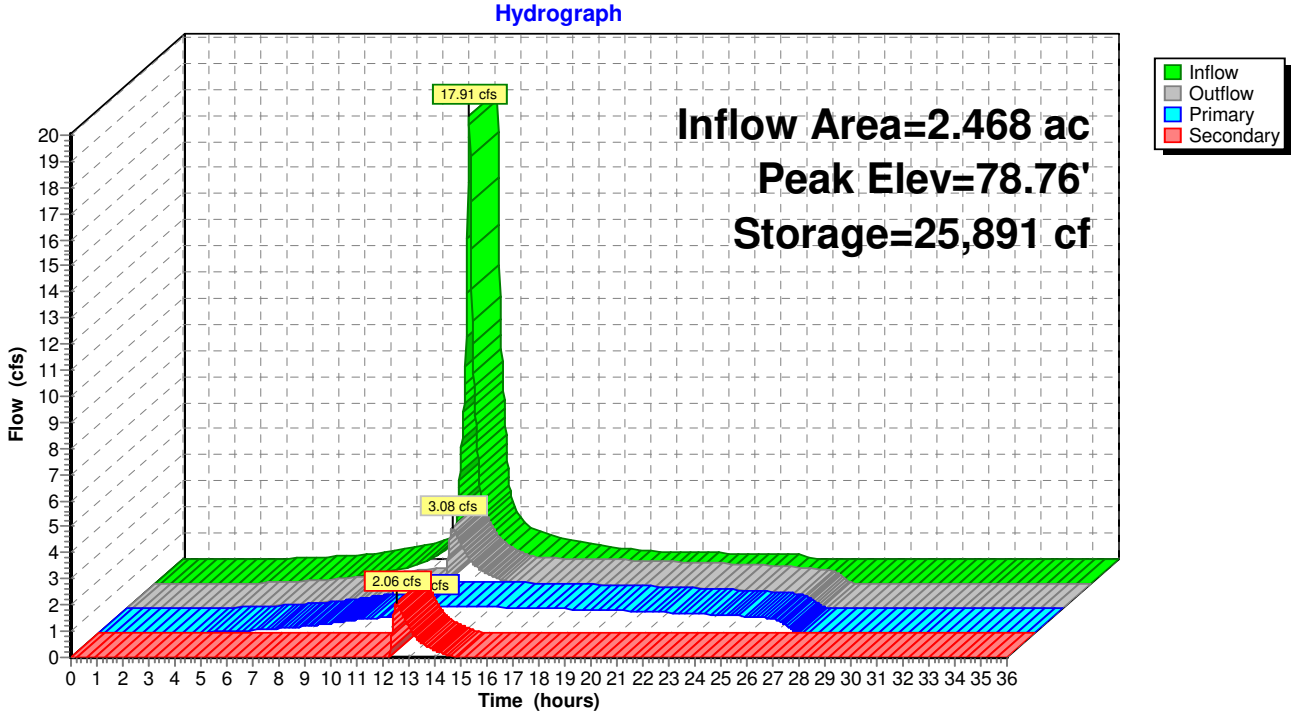
Subcatchment P4: Proposed Area 4



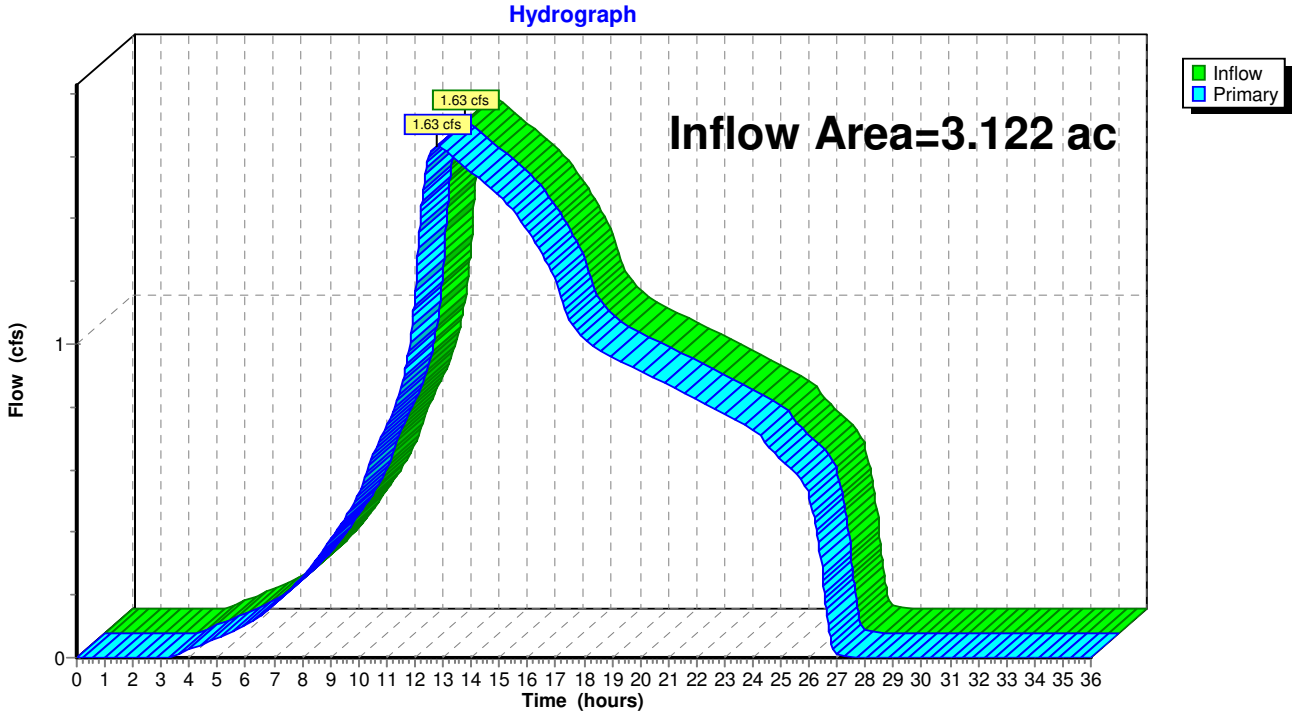
Pond EP1*: Existing Pond 1



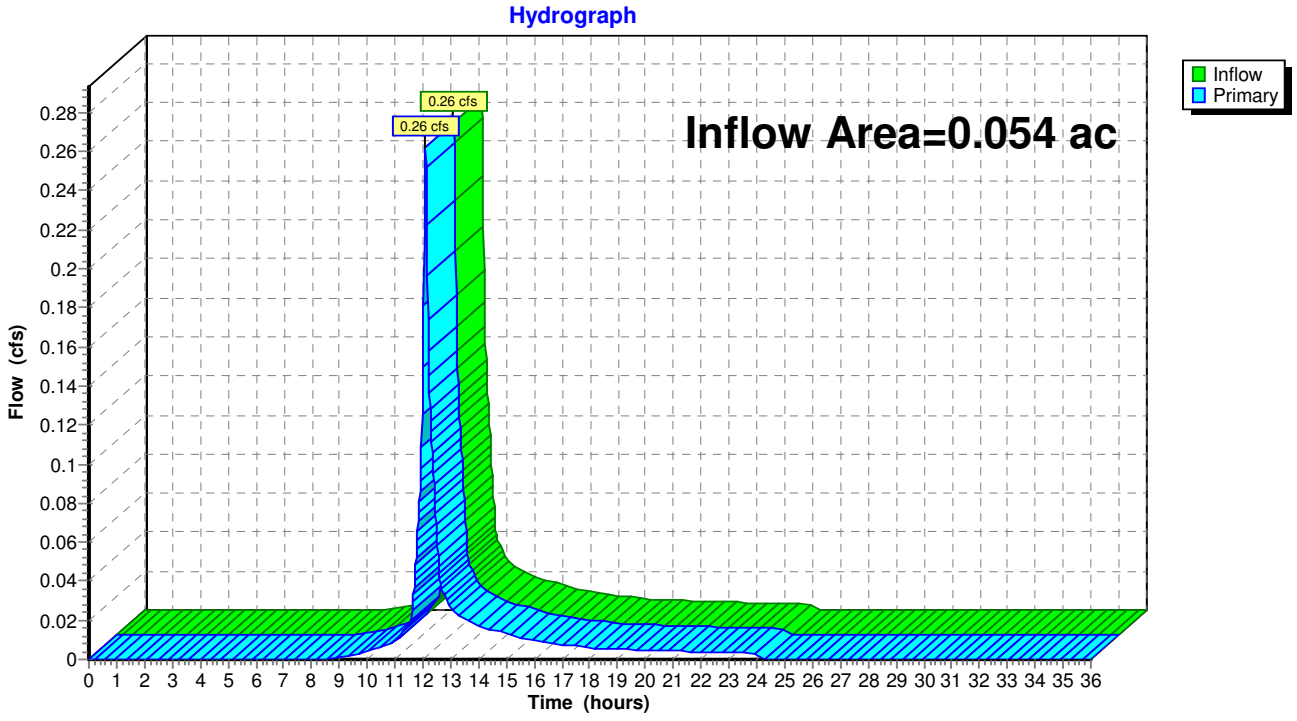
Pond PP1: Proposed Pond 2



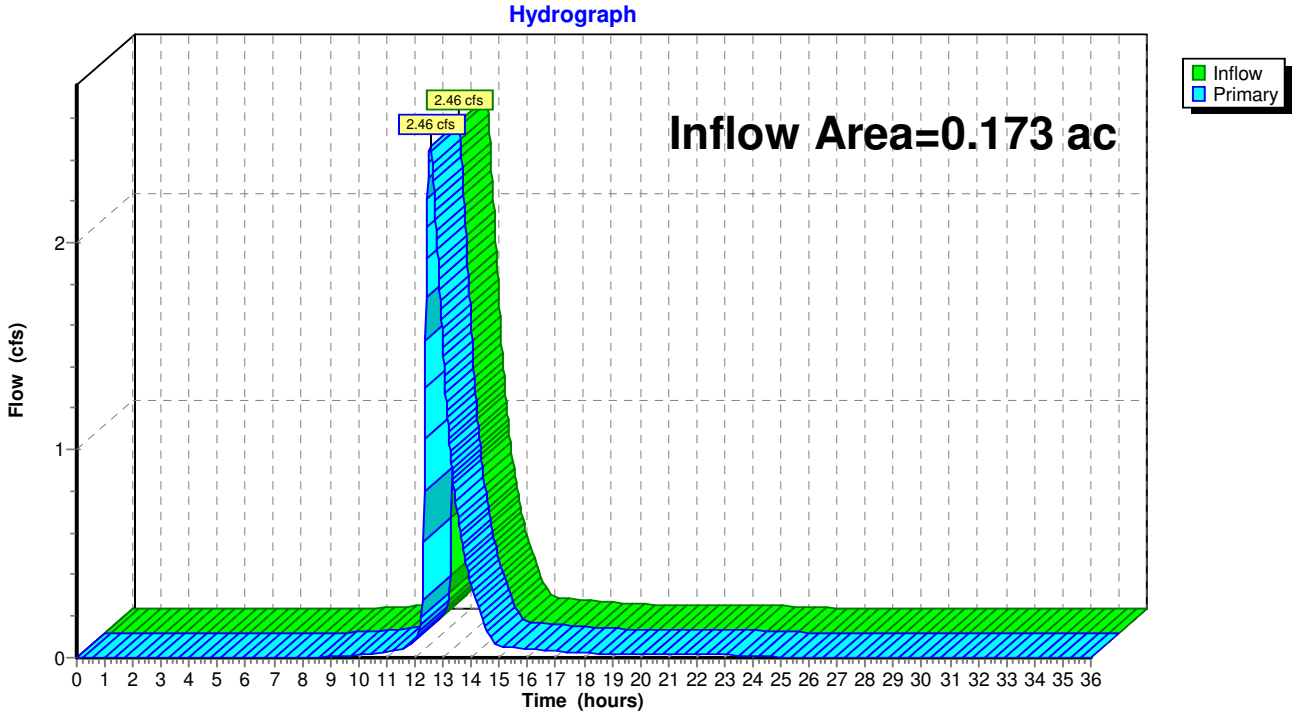
Link DP1*: DP1 (SMH IN RT 5)



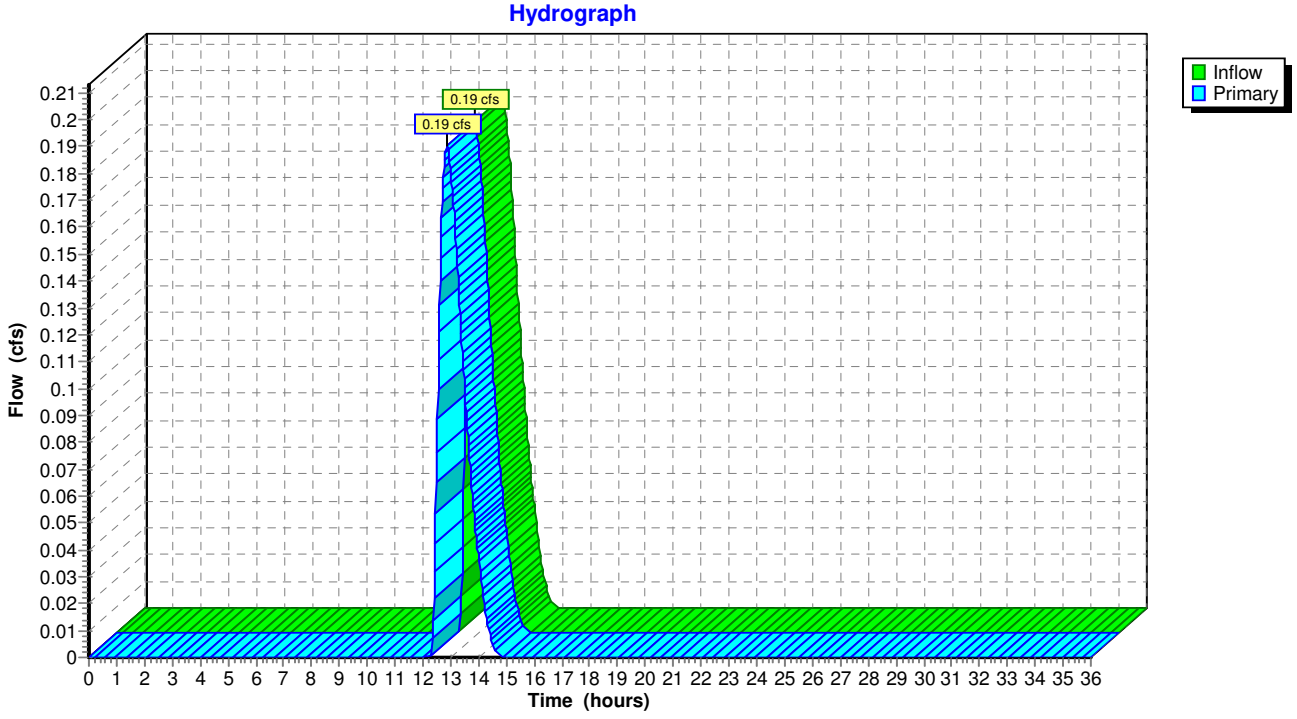
Link DP2*: DP2 (SOUTHERN PROP BOUNDARY)



Link DP3*: DP3 (EAST PROP BNDY)



Link DP4*: DP4 (15" RCP HEADWALL @ RT 5 ROW)



Summary for Pond EP1*: Existing Pond 1

Inflow Area = 0.654 ac, 13.76% Impervious, Inflow Depth = 5.64" for 100-yr event
Inflow = 2.67 cfs @ 12.32 hrs, Volume= 0.307 af
Outflow = 0.81 cfs @ 12.87 hrs, Volume= 0.295 af, Atten= 70%, Lag= 33.0 min
Primary = 0.62 cfs @ 12.87 hrs, Volume= 0.278 af
Secondary = 0.19 cfs @ 12.87 hrs, Volume= 0.017 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs
Peak Elev= 79.22' @ 12.87 hrs Surf.Area= 8,958 sf Storage= 5,057 cf

Plug-Flow detention time= 101.5 min calculated for 0.295 af (96% of inflow)
Center-of-Mass det. time= 78.4 min (895.9 - 817.4)

Volume	Invert	Avail.Storage	Storage Description
#1	78.00'	14,089 cf	**Custom Stage Data (Conic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
78.00	365	0	0	365
79.00	7,633	3,222	3,222	7,635
80.00	14,461	10,867	14,089	14,473

Device	Routing	Invert	Outlet Devices
#1	Primary	75.51'	**15.0" Round 15" RCP** L= 61.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 75.51' / 75.20' S= 0.0051 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Secondary	78.96'	**15.0" Round 15" RCP** L= 23.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 78.96' / 78.91' S= 0.0022 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#3	Device 1	78.44'	**3.5" x 6.0" Horiz. CB Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.62 cfs @ 12.87 hrs HW=79.22' (Free Discharge)
└**1=15" RCP** (Passes 0.62 cfs of 9.96 cfs potential flow)
└**3=CB Grate** (Orifice Controls 0.62 cfs @ 4.26 fps)

Secondary OutFlow Max=0.19 cfs @ 12.87 hrs HW=79.22' (Free Discharge)
└**2=15" RCP** (Barrel Controls 0.19 cfs @ 1.54 fps)

Summary for Pond PP1: Proposed Pond 2

Inflow Area = 2.468 ac, 73.58% Impervious, Inflow Depth = 6.58" for 100-yr event
Inflow = 17.91 cfs @ 12.08 hrs, Volume= 1.353 af
Outflow = 3.08 cfs @ 12.54 hrs, Volume= 1.353 af, Atten= 83%, Lag= 27.6 min
Primary = 1.02 cfs @ 12.54 hrs, Volume= 1.204 af
Secondary = 2.06 cfs @ 12.54 hrs, Volume= 0.149 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.02 hrs
Peak Elev= 78.76' @ 12.54 hrs Surf.Area= 18,252 sf Storage= 25,891 cf

Plug-Flow detention time= 216.0 min calculated for 1.353 af (100% of inflow)
Center-of-Mass det. time= 215.9 min (995.4 - 779.5)

Volume	Invert	Avail.Storage	Storage Description
#1	76.14'	30,912 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
76.14	10	0	0
77.00	2,239	967	967
77.10	10,474	636	1,603
78.00	15,228	11,566	13,169
78.77	18,292	12,905	26,074
79.00	23,775	4,838	30,912

Device	Routing	Invert	Outlet Devices
#1	Primary	75.99'	**15.0" Round 15" HDPE** L= 198.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 75.99' / 75.51' S= 0.0024 '/' Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Device 1	76.14'	**5.0" Vert. Orifice/Grate** C= 0.600
#3	Secondary	78.58'	**10.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=1.02 cfs @ 12.54 hrs HW=78.76' (Free Discharge)
↑—**1=15" HDPE** (Passes 1.02 cfs of 5.63 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 1.02 cfs @ 7.48 fps)

Secondary OutFlow Max=2.05 cfs @ 12.54 hrs HW=78.76' (Free Discharge)
↑—**3=Broad-Crested Rectangular Weir** (Weir Controls 2.05 cfs @ 1.14 fps)

APPENDIX C
NRCS Soil Map & Data

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for State of Connecticut

December 26, 2018

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

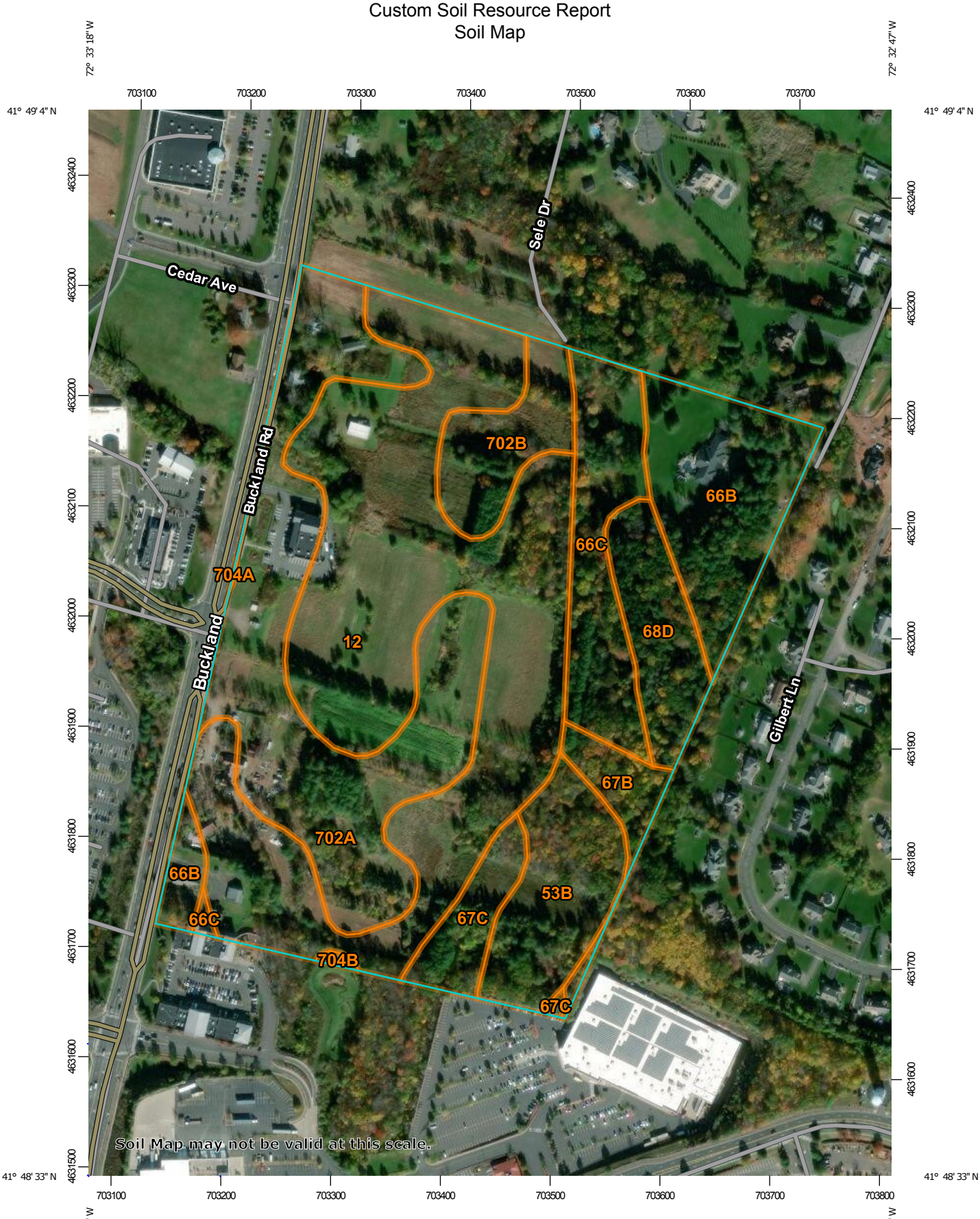
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:4,710 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut
Survey Area Data: Version 18, Dec 6, 2018

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

Date(s) aerial images were photographed: Aug 27, 2016—Oct 30, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
12	Raypol silt loam	24.7	38.0%
53B	Wapping very fine sandy loam, 3 to 8 percent slopes	4.5	6.9%
66B	Narragansett silt loam, 2 to 8 percent slopes	6.8	10.5%
66C	Narragansett silt loam, 8 to 15 percent slopes	5.0	7.7%
67B	Narragansett silt loam, 3 to 8 percent slopes, very stony	1.5	2.3%
67C	Narragansett silt loam, 8 to 15 percent slopes, very stony	1.9	3.0%
68D	Narragansett silt loam, 15 to 25 percent slopes, extremely stony	3.2	5.0%
702A	Tisbury silt loam, 0 to 3 percent slopes	14.2	21.8%
702B	Tisbury silt loam, 3 to 8 percent slopes	3.0	4.6%
704A	Enfield silt loam, 0 to 3 percent slopes	0.0	0.0%
704B	Enfield silt loam, 3 to 8 percent slopes	0.1	0.1%
Totals for Area of Interest		**65.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called

noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can

be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

State of Connecticut

12—Raypol silt loam

Map Unit Setting

National map unit symbol: 9ljx
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Raypol and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Raypol

Setting

Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss

Typical profile

Ap - 0 to 8 inches: silt loam
Bg1 - 8 to 12 inches: very fine sandy loam
Bg2 - 12 to 20 inches: silt loam
Bw1 - 20 to 26 inches: silt loam
Bw2 - 26 to 29 inches: very fine sandy loam
2C1 - 29 to 52 inches: stratified very gravelly coarse sand to loamy fine sand
2C2 - 52 to 65 inches: stratified very gravelly coarse sand to loamy fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Minor Components

Haven
Percent of map unit: 5 percent
Landform: Outwash plains, terraces
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Enfield
Percent of map unit: 5 percent
Landform: Terraces, outwash plains
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Ninigret
Percent of map unit: 3 percent
Landform: Outwash plains, terraces
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Tisbury
Percent of map unit: 2 percent
Landform: Outwash plains, terraces
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Walpole
Percent of map unit: 2 percent
Landform: Depressions on terraces, drainageways on terraces
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro
Percent of map unit: 2 percent
Landform: Depressions, drainageways, terraces
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Unnamed, loamy substratum
Percent of map unit: 1 percent

53B—Wapping very fine sandy loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 9lp7

Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Wapping and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wapping

Setting

Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy eolian deposits over sandy and gravelly melt-out till derived from gneiss and/or schist and/or sandstone and shale

Typical profile

Ap - 0 to 11 inches: very fine sandy loam
Bw1 - 11 to 16 inches: very fine sandy loam
Bw2 - 16 to 20 inches: very fine sandy loam
2C1 - 20 to 28 inches: gravelly sandy loam
2C2 - 28 to 36 inches: gravelly loamy sand
2C3 - 36 to 80 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Narragansett

Percent of map unit: 5 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Leicester

Percent of map unit: 5 percent

Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Wilbraham

Percent of map unit: 3 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Menlo

Percent of map unit: 3 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Watchaug

Percent of map unit: 2 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Ludlow

Percent of map unit: 2 percent
Landform: Drumlins, hills
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

66B—Narragansett silt loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 9lq3
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Narragansett and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Narragansett

Setting

Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy eolian deposits over sandy and gravelly melt-out till derived from gneiss and/or schist and/or sandstone and shale

Typical profile

Ap - 0 to 6 inches: silt loam
Bw1 - 6 to 15 inches: silt loam
Bw2 - 15 to 24 inches: silt loam
Bw3 - 24 to 28 inches: gravelly silt loam
2C - 28 to 60 inches: very gravelly loamy coarse sand

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Broadbrook

Percent of map unit: 5 percent
Landform: Drumlins, hills, till plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Charlton

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Leicester

Percent of map unit: 3 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Unnamed, red parent material
Percent of map unit: 2 percent
Hydric soil rating: No

Canton
Percent of map unit: 2 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Wapping
Percent of map unit: 2 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Sutton
Percent of map unit: 1 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

66C—Narragansett silt loam, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: 9lq4
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Narragansett and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Narragansett

Setting
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy eolian deposits over sandy and gravelly melt-out till derived from gneiss and/or schist and/or sandstone and shale

Typical profile
Ap - 0 to 6 inches: silt loam

Bw1 - 6 to 15 inches: silt loam
Bw2 - 15 to 24 inches: silt loam
Bw3 - 24 to 28 inches: gravelly silt loam
2C - 28 to 60 inches: very gravelly loamy coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Broadbrook

Percent of map unit: 5 percent
Landform: Drumlins, hills, till plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Canton

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Charlton

Percent of map unit: 3 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Wapping

Percent of map unit: 3 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Sutton

Percent of map unit: 2 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Linear

Hydric soil rating: No

Leicester

Percent of map unit: 2 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

67B—Narragansett silt loam, 3 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9lq5
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Narragansett and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Narragansett

Setting

Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy eolian deposits over sandy and gravelly melt-out till derived from gneiss and/or schist and/or sandstone and shale

Typical profile

Ap - 0 to 6 inches: silt loam
Bw1 - 6 to 15 inches: silt loam
Bw2 - 15 to 24 inches: silt loam
Bw3 - 24 to 28 inches: gravelly silt loam
2C - 28 to 60 inches: very gravelly loamy coarse sand

Properties and qualities

Slope: 3 to 8 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Available water storage in profile: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Charlton

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Broadbrook

Percent of map unit: 5 percent
Landform: Drumlins, hills, till plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Leicester

Percent of map unit: 3 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Unnamed, red parent material

Percent of map unit: 2 percent
Hydric soil rating: No

Canton

Percent of map unit: 2 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Wapping

Percent of map unit: 2 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Sutton

Percent of map unit: 1 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

67C—Narragansett silt loam, 8 to 15 percent slopes, very stony

Map Unit Setting

National map unit symbol: 9lq6
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Narragansett and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Narragansett

Setting

Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy eolian deposits over sandy and gravelly melt-out till derived from gneiss and/or schist and/or sandstone and shale

Typical profile

Ap - 0 to 6 inches: silt loam
Bw1 - 6 to 15 inches: silt loam
Bw2 - 15 to 24 inches: silt loam
Bw3 - 24 to 28 inches: gravelly silt loam
2C - 28 to 60 inches: very gravelly loamy coarse sand

Properties and qualities

Slope: 8 to 15 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Broadbrook
Percent of map unit: 5 percent
Landform: Drumlins, hills, till plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Canton
Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Charlton
Percent of map unit: 3 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Wapping
Percent of map unit: 3 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Sutton
Percent of map unit: 2 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Leicester
Percent of map unit: 2 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

68D—Narragansett silt loam, 15 to 25 percent slopes, extremely stony

Map Unit Setting
National map unit symbol: 9lq8
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F

Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Narragansett and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Narragansett

Setting

Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Coarse-loamy eolian deposits over sandy and gravelly melt-out till derived from gneiss and/or schist and/or sandstone and shale

Typical profile

Ap - 0 to 6 inches: silt loam
Bw1 - 6 to 15 inches: silt loam
Bw2 - 15 to 24 inches: silt loam
Bw3 - 24 to 28 inches: gravelly silt loam
2C - 28 to 60 inches: very gravelly loamy coarse sand

Properties and qualities

Slope: 15 to 25 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Broadbrook

Percent of map unit: 5 percent
Landform: Drumlins, hills, till plains
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Charlton

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear

Hydric soil rating: No

Leicester

Percent of map unit: 3 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Unnamed, red parent material

Percent of map unit: 2 percent
Hydric soil rating: No

Canton

Percent of map unit: 2 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Wapping

Percent of map unit: 2 percent
Landform: Hills, till plains
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Sutton

Percent of map unit: 1 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

702A—Tisbury silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2y07g
Elevation: 0 to 1,260 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Tisbury and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tisbury

Setting

Landform: Valley trains, outwash plains, deltas, outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-silty eolian deposits over sandy and gravelly glaciofluvial deposits derived from granite, schist, and/or gneiss

Typical profile

Ap - 0 to 8 inches: silt loam
Bw1 - 8 to 18 inches: silt loam
Bw2 - 18 to 26 inches: silt loam
2C - 26 to 65 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 24 to 36 inches to strongly contrasting textural stratification
Natural drainage class: Moderately well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent
Landform: Kames, eskers, moraines, outwash terraces, outwash plains
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Crest, side slope, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Agawam

Percent of map unit: 5 percent
Landform: Kames, moraines, outwash terraces, outwash plains, kame terraces
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope, crest, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Ninigret

Percent of map unit: 3 percent
Landform: Outwash terraces, kames, moraines, outwash plains, kame terraces
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear, convex
Across-slope shape: Concave, convex
Hydric soil rating: No

Raypol

Percent of map unit: 2 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

702B—Tisbury silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2y07h
Elevation: 0 to 1,260 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Tisbury and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tisbury

Setting

Landform: Deltas, valley trains, outwash plains, outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-silty eolian deposits over sandy and gravelly glaciofluvial deposits derived from granite, schist, and/or gneiss

Typical profile

Ap - 0 to 8 inches: silt loam
Bw1 - 8 to 18 inches: silt loam
Bw2 - 18 to 26 inches: silt loam
2C - 26 to 65 inches: extremely gravelly sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: 24 to 36 inches to strongly contrasting textural stratification
Natural drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent
Landform: Outwash plains, kames, eskers, moraines, outwash terraces
Landform position (two-dimensional): Backslope, footslope, shoulder, summit, toeslope
Landform position (three-dimensional): Side slope, crest, head slope, nose slope, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Agawam

Percent of map unit: 5 percent
Landform: Kames, moraines, outwash terraces, outwash plains, kame terraces
Landform position (two-dimensional): Backslope, shoulder, footslope, summit, toeslope
Landform position (three-dimensional): Side slope, crest, head slope, nose slope, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Ninigret

Percent of map unit: 3 percent
Landform: Moraines, outwash terraces, kames, outwash plains, kame terraces
Landform position (two-dimensional): Toeslope, footslope, backslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, concave
Hydric soil rating: No

Raypol

Percent of map unit: 2 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

704A—Enfield silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2y07p
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Enfield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Enfield

Setting

Landform: Outwash terraces, outwash plains
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-silty eolian deposits over sandy and gravelly glaciofluvial deposits derived from granite, schist, and/or gneiss

Typical profile

Ap - 0 to 7 inches: silt loam
Bw1 - 7 to 15 inches: silt loam
Bw2 - 15 to 25 inches: silt loam
2C - 25 to 60 inches: stratified very gravelly coarse sand to loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 16 to 39 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Haven

Percent of map unit: 5 percent
Landform: Outwash terraces, outwash plains
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Tisbury

Percent of map unit: 5 percent
Landform: Outwash plains, deltas, valley trains, outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Agawam

Percent of map unit: 3 percent
Landform: Kames, moraines, outwash terraces, outwash plains, kame terraces
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Side slope, crest, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Raypol

Percent of map unit: 2 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

704B—Enfield silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2y07q
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Enfield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Enfield

Setting

Landform: Outwash plains, outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-silty eolian deposits over sandy and gravelly glaciofluvial deposits derived from granite, schist, and/or gneiss

Typical profile

Ap - 0 to 7 inches: silt loam
Bw1 - 7 to 15 inches: silt loam
Bw2 - 15 to 25 inches: silt loam
2C - 25 to 60 inches: stratified very gravelly coarse sand to loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 16 to 39 inches to strongly contrasting textural stratification
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Haven

Percent of map unit: 5 percent
Landform: Outwash plains, outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Tisbury

Percent of map unit: 5 percent
Landform: Outwash plains, deltas, valley trains, outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Agawam

Percent of map unit: 3 percent
Landform: Kames, moraines, outwash terraces, outwash plains, kame terraces

Landform position (two-dimensional): Toeslope, summit, footslope, shoulder, backslope
Landform position (three-dimensional): Nose slope, head slope, crest, side slope, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Raypol

Percent of map unit: 2 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX D
Water Quality Calculations

1608 John Fitch Blvd.
DPI Project No.:4342
September 01, 2020

Barry Equipment Water Quality Unit Sizing
Sub-catchment: P2 (Excluding Roof Area)

To find Unit Peak Discharge qu with Exhibit 4-III, the following is needed:

Time of Concentration (Tc):

6 mins = 0.10 hours

Initial Abstraction (Ia) in inches / Design Precipitation (P) in inches:

Initial abstraction (Ia) from Table 4-I in Chapter 4 of TR-55 needs Curve Number (CN)

CN = 88

Ia = 0.273 inches

Design Precipitation (P) = 1" for water quality storms per Appendix B

Ia/P = 0.273

Unit Peak Discharge qu = 650 cfs/mi^2/inch

Drainage Area A = 2.243 acres = 0.004 mi^2

Runoff Depth Q = WQV (acre-feet) x 12 / drainage area (acres)

Water Quality Volume (WQV) = (1")(R)(A)/12, where:

R = volumetric runoff coefficient

= 0.05 + 0.009(I), where I = percent impervious cover = 70.9%

R = 0.05 + 0.009(I)

R = 0.05 + 0.009(70.9)

R = 0.688

A = drainage area in acres = 2.243 acres

WQV = (1")(R)(A)/12

WQV = (1")(0.688)(2.243 acres) / 12 in/ft

WQV = 0.129 acre-feet

Q = (WQV X 12 in/ft)/Drainage Area

Q = (0.129 acre-feet x 12 in/ft) / 2.243 acres

Q = 0.690 in

WQF = qu x A x Q

WQF = 650 cfs/mi^2/inch x 0.004 mi^2 x 0.690 in

WQF = **1.79 cfs required**

Proposed

As shown on the enclosed water quality unit sizing report, the proposed BaySaver Barracuda S6 is rated for 80% TSS removal for the required 1.79 cfs water quality flow and Bypass the expected during 10.51 cfs during the 10-yr storm. See Barracuda sizing chart included in the Appendix.

BOGGS ENVIRONMENTAL CONSULTANTS

Middletown, MD & Morgantown, WV

Administrative Office:
200 W Main Street
Middletown, Maryland 21769
Office (301) 694-5687
Fax (301) 694-9799

BaySaver Technologies, LLC
1030 Deer Hollow Drive
Mount Airy, MD 21771
(301) 679-0640; dfigola@ads-pipe.com

November 1, 2017

ATTENTION: Daniel Figola, General Manager
REFERENCE: Third Party Review of Testing Procedures for Barracuda™ Separator at the Mid Atlantic Storm Water Research Center, 1207 Park Ridge Drive, Mount Airy, MD 21771

SUMMARY

Boggs Environmental Consultants, Inc. (BEC) was hired by Advanced Drainage Systems (ADS) in August of 2017, to serve as independent third-party oversight of the BaySaver Barracuda S4 Separator test unit for removal of sediment with equivalent particle size distribution to the industry standard OK-110. The BaySaver Barracuda S4 is a storm water treatment device with a Maximum Treatment Flow Rate (MTFR) of approximately 1.08 cubic feet per second (cfs) that removes suspended solids from storm water runoff, with an average removal efficiency of 80% at the MTFR and a feed concentration of 300 mg/L. The device is an insert that can be installed in either Polypropylene plastic pipe or concrete vault, and consists of a cone (vortex separator) and baffles ("teeth").

SCALED RESULTS

Testing flow rates ranged from 0.31 to 1.61 cfs, with a feed OK-110 concentration of 300 mg/L. Based upon New Jersey scaling methodology, the table below represents treatment and device information for the S4, S6, and S8 units.

Table 1: MTFR's and Sizing for BaySaver Barracuda Models

Model[1]	Man-hole Diam-eter[1] (ft)	OK110 80% TSS Maximum Treatment Flow Rate (cfs)	Treat-ment Area (ft^2)	Hydraulic Loading rate (gpm/ft^2)	Chamber Depth (ft)	Wet Volume (ft^3)	50% Maximum Sediment Storage[2] (ft^3)
Barracuda S4	4	1.08	12.57	38.6	6.83	75.4	10.47
Barracuda S6	6	2.43	28.27	38.6	6.83	169.7	23.56
Barracuda S8	8	4.32	50.27	38.6	11.03	512.7	41.89

Notes:
1. In some areas, Barracuda units are available in additional diameters. Units not listed here are sized not to exceed 38.6 gpm/ft^2 of effective treatment during the peak water quality flow.
2. 50% Sediment Storage Capacity is equal to manhole diameter x 10 inches of sediment depth. Each Barracuda unit has a 20 inches deep sediment sump.

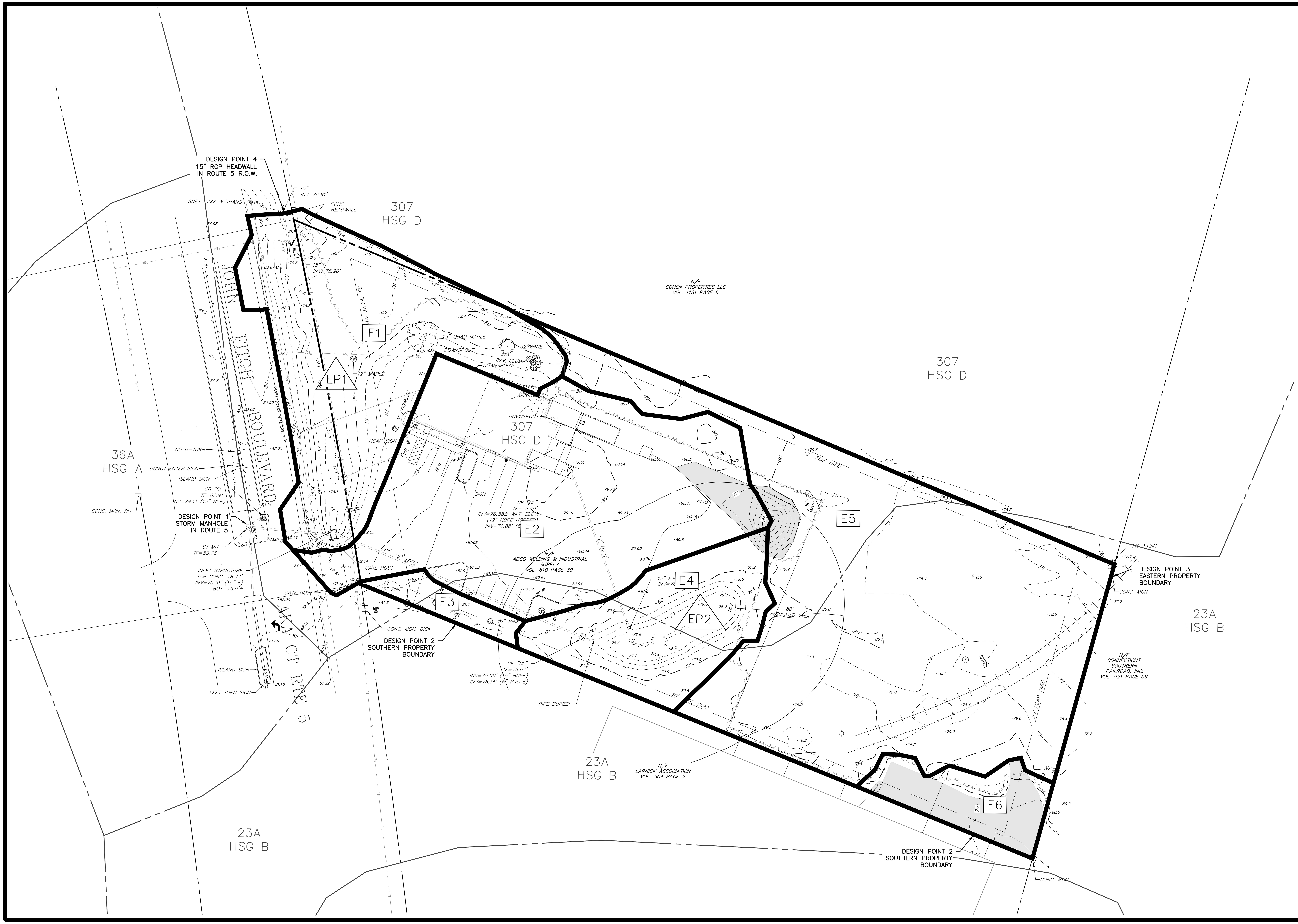
Should you have any questions, contact our office at your earliest convenience.

Sincerely,
BOGGS ENVIRONMENTAL CONSULTANTS, INC.

William R. Warfel
Principal Environmental Scientist

Robin J. Maliszewskyj
Chemical Engineer

APPENDIX E
Drainage Area Maps



File: C:\jobs\4342\Engineering\Stormwater\4342 -- Drainage Map.dwg Layout: 01 C-DA1 Plotted: 9/1/2020 2:55 PM Last Saved: 9/1/2020 2:51 PM Last Saved By: danieljameson

Design Professionals INC

21 JEFFREY DRIVE
P.O. BOX 1167
SOUTH WINDSOR, CT 06074
860-291-8755 – T
860-291-8757 – F
www.designprofessionalsinc.com

CIVIL & TRAFFIC ENGINEERS / LAND SURVEYORS
PLANNERS / LANDSCAPE ARCHITECTS

- This plan is invalid unless it bears the seal or stamp, and original signature of the Professional Engineer, Land Surveyor, or Landscape Architect
- Reproduction techniques used in the production of this plan can stretch or shrink the paper. Scaling of this drawing may be inaccurate. Contact DPI if additional information is required.
- This plan and other items prepared by Design Professionals, Inc. (DPI) are instruments of service and remain its property. The use of these items by DPI's client is subject to the terms set forth in the agreement between client and DPI. Additional use of these items is prohibited without the written consent of DPI.

PREPARED FOR:
Barry Equipment
c/o Tom & Joseph Barry
30 Birch Island Road
Webster, MA 01570
508-949-0005 – T
508-943-9072 – F

PROJECT NO:	DATE:	DESIGN BY:	DRAWN BY:	CHECKED BY:
4342	9/1/2020	DHJ	REM	DHJ

BARRY EQUIPMENT

SITE PLAN MODIFICATION & SPECIAL EXCEPTION

1608 JOHN FITCH BOULEVARD
SOUTH WINDSOR, CONNECTICUT
GIS No. 47701608

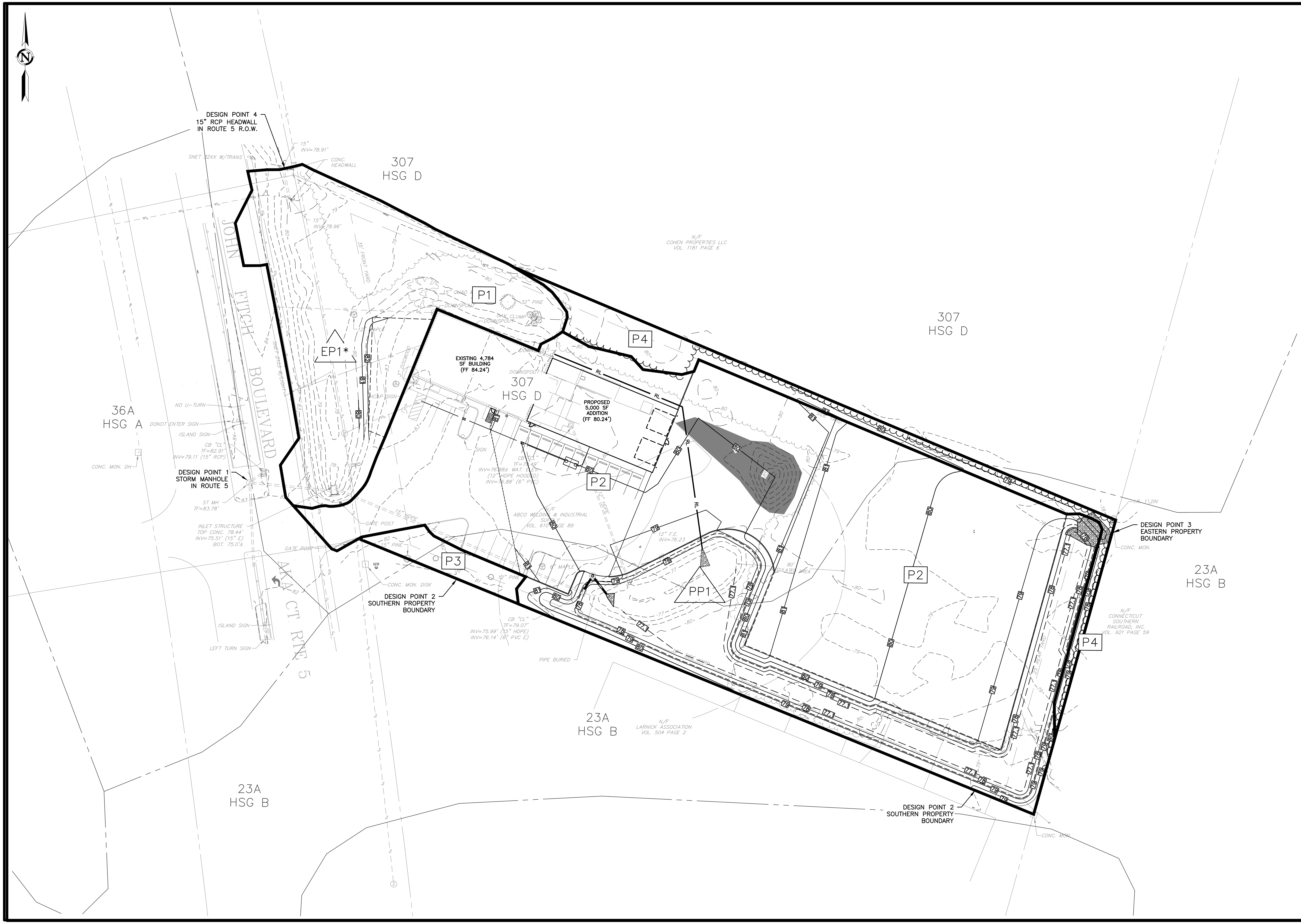
REVISIONS

NO.	DATE		BY

EXISTING DRAINAGE AREA MAP

SCALE: 1" = 30' — 0, 15', 30', 60'

SHEET
C-DA1
SHEET 1 OF 2



File: C:\jobs\4342\Engineering\Stormwater\4342 - Drainage Maps.dwg Layout: 02 C-DA2 Plotted: 9/1/2020 2:57 PM Last Saved: 9/1/2020 2:51 PM Last Saved By: daniel.jameson

Design Professionals INC

CIVIL & TRAFFIC ENGINEERS / LAND SURVEYORS
PLANNERS / LANDSCAPE ARCHITECTS

21 JEFFREY DRIVE
P.O. BOX 1167
SOUTH WINDSOR, CT 06074
860-291-8755 – T
860-291-8757 – F
www.designprofessionalsinc.com

- This plan is invalid unless it bears the seal or stamp, and original signature of the Professional Engineer, Land Surveyor, or Landscape Architect.
- Reproduction techniques used in the production of this plan can stretch or shrink the paper. Scaling of this drawing may be inaccurate. Contact DPI if additional information is required.
- This plan and other items prepared by Design Professionals, Inc. (DPI) are instruments of service and remain its property. The use of these items by DPI's client is subject to the terms set forth in the agreement between client and DPI. Additional use of these items is prohibited without the written consent of DPI.

PREPARED FOR:
Barry Equipment
c/o Tom & Joseph Barry
30 Birch Island Road
Webster, MA 01570
508-949-0005 – T
508-943-9072 – F

PROJECT NO:	4342
DATE:	9/1/2020
DESIGN BY:	DHJ
DRAWN BY:	REM
CHECKED BY:	DHJ

BARRY EQUIPMENT

SITE PLAN MODIFICATION & SPECIAL EXCEPTION

1608 JOHN FITCH BOULEVARD
SOUTH WINDSOR, CONNECTICUT
GIS No. 47701608

REVISIONS

NO.	DATE	REVISIONS	BY

PROPOSED DRAINAGE AREA MAP

SCALE: 1" = 100'

SHEET
C-DA2
SHEET 2 OF 2