



April 10, 2019

Cela Sinay-Bernie
Citrine Power, LLC
55 Greens Farms Road
Westport, CT 06880

RE: Middletown/Middlefield Solar Project
Meriden Road
Middlefield, Connecticut

Dear Mrs. Sinay-Bernie:

We are pleased to submit this Stormwater Management Report and supporting documentation for the proposed Middletown/Middlefield Solar Project ("Project"). This proposed Project includes the installation of two (2) solar photovoltaic electric generating facilities ("Solar Array"), one having an output of ± 0.986 megawatts ("MW") alternating current ("AC") and the second having an output of ± 1.0 MW AC, on a ± 30.0 -acre subject site located at approximately 144 Meriden Road (CT Route 66) in Middlefield, Connecticut ("Site"). The Site is located within both the Town of Middlefield and City of Middletown, Connecticut (the "Municipalities").

The purpose of this report is to provide an analysis of the potential stormwater drainage impacts associated with the proposed Project. The design is intended to be in full compliance with the State and Municipal regulations while taking prevailing Site conditions and practical needs into account.

The proposed Project area will reside primarily within an area of Open Field habitat with periphery areas of Upland Forest habitat and Developed areas. While the Project area consists of approximately ± 8.7 acres, ground disturbance is anticipated to be limited to the clearing of the wind row of trees in the center of the site and the proposed gravel access road, for an area of disturbance of 0.95 acres.

Existing Site Conditions

The Site is a combination of parcels under common ownership consisting of ± 30.0 acres that lie in the Municipalities of the Town of Middlefield and City of Middletown. The existing cover type is a primarily open field with periphery Upland Forest. A wind row of trees does bisect the proposed Project area. Wetlands surround the Site to the east, west, and south.

The existing site topography is relatively flat and includes slopes that range from approximately 0 to 20 percent throughout. Drainage typically flows from north to south with an east west break just west of the wind row of trees bisecting the existing field, and ultimately drains to the wetland features. The field can be classified with an existing cover type consisting of short meadow grasses.

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Developed Site Conditions

The proposed Project will consist of two separate solar arrays, a west solar array generating approximately ± 1.0 MW and an east solar array generating approximately ± 0.986 MW. The proposed solar arrays will be installed on a post driven ground mounted racking system and surrounded by chain link fence, within the existing short meadow grasses. These items along with the inverter posts will be installed with no changes to the existing grades and minimal disturbance.

As a result of the Project being located principally in an existing open field, little clearing and/or grubbing is required. The only change to the existing ground cover results from the clearing, grubbing, and minor shaping of the wind row of trees. The proposed electrical trench is anticipated to be installed within this area as a further effort to minimize the disturbance on-site. The use of the post driven racking system and installation in the existing field should result in no change in existing ground cover. The total fenced area for the two solar arrays and proposed gravel access is anticipated to cover ± 8.7 acres.

Two (2) concrete equipment pads will be located near the middle of the Project, between the two solar arrays. These pads will contain electrical equipment for the interconnection into the electrical grid. Trenching will be required from each array to the concrete pads as well as to the connection point in the street, and will be kept within the disturbance associated with the clearing of the wind row of trees and the proposed access road.

As a result of maintaining the existing ground cover on the site, the post-development site conditions will mimic the pre-developed site conditions.

Stormwater Management

Analysis Methodology

The hydrologic analysis was performed using the HydroCAD stormwater modeling system computer program developed by HydroCAD Software Solutions, LLC.

Hydrographs for each watershed were developed using the SCS Synthetic Unit Hydrograph Method with a Type III rainfall distribution. Hydrographs were developed for the NOAA Atlas 14 2, 10, 25, and 100-year storm event with rainfall depths of 3.31, 5.15, 6.30, and 8.07 inches respectively, per the Connecticut DOT Engineering Bulletin issued on November 3, 2015.

The existing and proposed drainage areas used in the calculations are illustrated on the Existing and Proposed Drainage Area Plans (EDA-1 & PDA-1). These maps and the corresponding HydroCAD output have been attached for your use.

Existing Drainage Patterns

The proposed work will be conducted in the existing field with three drainage catchment areas. The Project area drains from north to south with an east west break near the middle of the site, resulting in two (2) subcatchments, EDA-1 and EDA-2. A third catchment area, EDA-3, is associated with the access route into the site and drains to the west. (See Existing Drainage Area Map)

The Site soils identified by the United States Department of Agriculture (USDA) Natural Resources Conservation Service consists of Map Unit Symbol 87B, named “Wethersfield loam, 3 to 8 percent slopes”, and 87C, names “Wethersfield loam, 8 to 15 percent slopes”, and are both classified in the hydrologic soil group rating of “C”.

In order to analyze the Site, the existing Site was modeled at two (2) Analysis Points. Peak discharges have been computed at the point of study for the 2-year, 10-year, 25-year, and 100-year storm events.

The pre-developed discharges at each Analysis Point are tabulated in Table 1-1.

Table 1-1

<i>Analysis Point</i>	Pre-developed Peak Storm Runoff (Q), cubic feet per second (cfs)			
	2-year Storm Event	10-year Storm Event	25-year Storm Event	100-year Storm Event
AP-1	2.11	5.36	7.64	11.32
AP-2	4.03	10.24	14.59	21.62

Proposed Drainage Patterns

The Site remains unchanged hydrologically from the pre-developed condition as a result of little change to the ground cover.

Since the proposed development mimics, the existing conditions the post-development condition was modeled using the same two (2) Analysis Points. Peak discharges have been computed at the point of study for the 2-year, 10-year, 25-year, and 100-year storm events.

The post-development discharges at each point of study are tabulated in Table 1-2.

Table 1-2

<i>Analysis Point</i>	Post-development Peak Storm Runoff (Q), cubic feet per second (cfs)			
	2-year Storm Event	10-year Storm Event	25-year Storm Event	100-year Storm Event
AP-1	2.06	5.25	7.48	11.09
AP-2	3.93	9.99	14.23	21.09

Conclusion

The proposed Project results in no changes to the ground cover on the Site and as shown in the attached stormwater calculations there will not be any increase in the peak discharges to the waters of the State of Connecticut during the 2, 10, 25, and 100-year storm event. As a result, the proposed solar array will not have any adverse conditions to the surrounding areas and properties.

Should you have any questions, please contact me.

Very truly yours,
All-Points Technology

A handwritten signature in blue ink, appearing to read 'B. Parsons', with a long horizontal flourish extending to the right.

Bradley Parsons, PE, PMP
Project Manager

Attachments

NRCS Soils Report
Existing Drainage Area Map and HydroCAD Report
Proposed Drainage Area Map and HydroCAD Report

Hydrologic Soil Group—State of Connecticut




Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

1/30/2019
Page 1 of 4









MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils





Soil Rating Polygons





 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines


 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
6	Wilbraham and Menlo soils, 0 to 8 percent slopes, extremely stony	C/D	39.8	22.5%
17	Timakwa and Natchaug soils, 0 to 2 percent slopes	B/D	4.0	2.3%
40A	Ludlow silt loam, 0 to 3 percent slopes	C	16.4	9.3%
40B	Ludlow silt loam, 3 to 8 percent slopes	C	12.2	6.9%
41B	Ludlow silt loam, 2 to 8 percent slopes, very stony	C	3.2	1.8%
87B	Wethersfield loam, 3 to 8 percent slopes	C	71.9	40.6%
87C	Wethersfield loam, 8 to 15 percent slopes	C	23.9	13.5%
87D	Wethersfield loam, 15 to 25 percent slopes	C	0.1	0.0%
88C	Wethersfield loam, 8 to 15 percent slopes, very stony	C	0.0	0.0%
306	Udorthents-Urban land complex	B	5.3	3.0%
Totals for Area of Interest			177.0	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

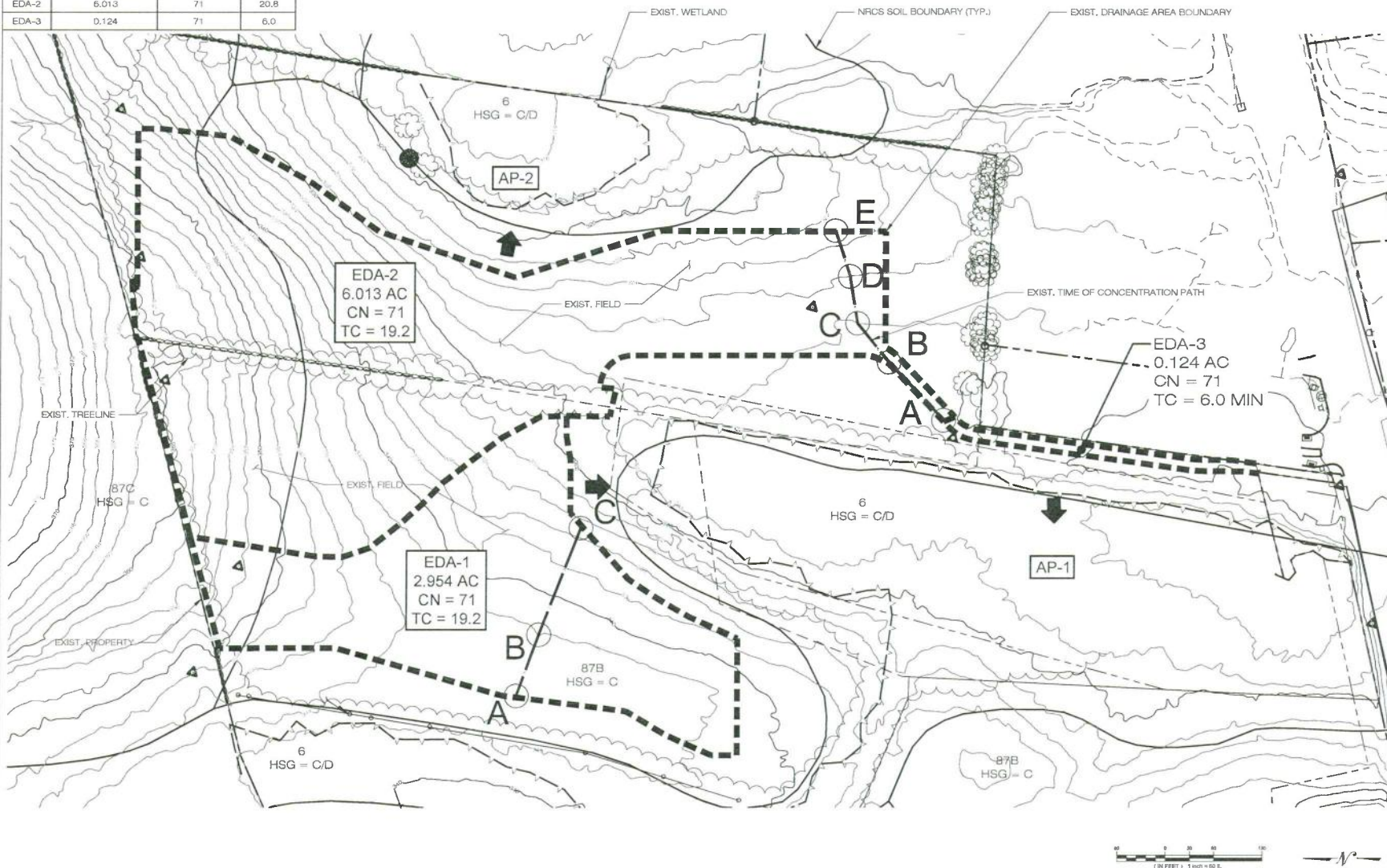
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

EXISTING DRAINAGE AREAS			
	TOTAL AREA (ACRES)	COMPOSITE CN	TC (MINS.)
EDA-1	2.954	71	19.2
EDA-2	6.013	71	20.8
EDA-3	0.124	71	6.0



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PERMITTING		
NO	DATE	REVISION
0	04/10/19	FOR REVIEW: BJP
1		
2		
3		
4		
5		
6		

DESIGN PROFESSIONAL OF RECORD

PROF: BRADLEY J. PARSONS P.E.
COMP: ALL-POINTS TECHNOLOGY
CORPORATION
ADD: 3 SADDLEBROOK DRIVE
KILLINGWORTH, CT 06419

OWNER: BARBARA J. PENNEY
ANN L. CHARTON
ADDRESS: 41 CHELSEA DRIVE
CROMWELL, CT 06416

MIDDLETOWN/MIDDLEFIELD

SITE MERIDEN ROAD (ROUTE 66)
ADDRESS: MIDDLEFIELD, CT 06455

APT FILING NUMBER: CT567100

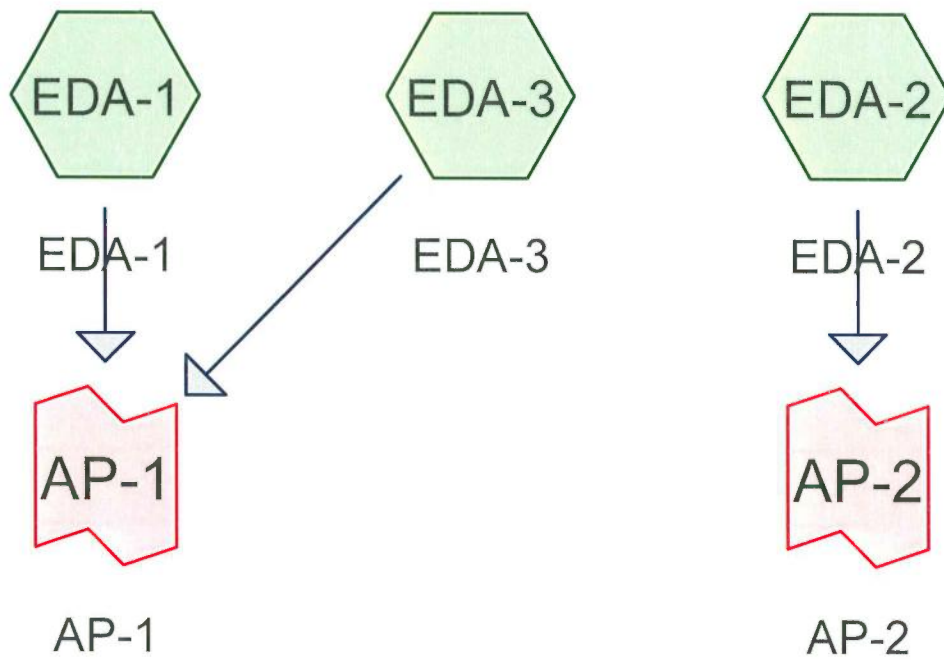
	DRAWN BY: JT
DATE: 04/10/19	CHECKED BY: RJP

SHEET TITLE:

EXISTING DRAINAGE
AREA MAP

SHEET NUMBER:

EDA-1



Middletown-Middlefield - EX - Rev0

Prepared by Microsoft

Printed 3/29/2019

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
8.543	71	Meadow, non-grazed, HSG C (EDA-1, EDA-2, EDA-3)
0.548	73	Woods, Fair, HSG C (EDA-2)
9.091	71	TOTAL AREA

Middletown-Middlefield - EX - Rev0

Type III 24-hr 2 YR Rainfall=3.31"

Prepared by Microsoft

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Page 3

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EDA-1: EDA-1

Runoff Area=2.954 ac 0.00% Impervious Runoff Depth=0.94"
Flow Length=224' Tc=19.2 min CN=71 Runoff=2.04 cfs 0.233 af

Subcatchment EDA-2: EDA-2

Runoff Area=6.013 ac 0.00% Impervious Runoff Depth=0.94"
Flow Length=282' Tc=20.8 min CN=71 Runoff=4.03 cfs 0.474 af

Subcatchment EDA-3: EDA-3

Runoff Area=0.124 ac 0.00% Impervious Runoff Depth=0.94"
Tc=6.0 min CN=71 Runoff=0.12 cfs 0.010 af

Link AP-1: AP-1

Inflow=2.11 cfs 0.242 af
Primary=2.11 cfs 0.242 af

Link AP-2: AP-2

Inflow=4.03 cfs 0.474 af
Primary=4.03 cfs 0.474 af

Total Runoff Area = 9.091 ac Runoff Volume = 0.716 af Average Runoff Depth = 0.94"
100.00% Pervious = 9.091 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment EDA-1: EDA-1

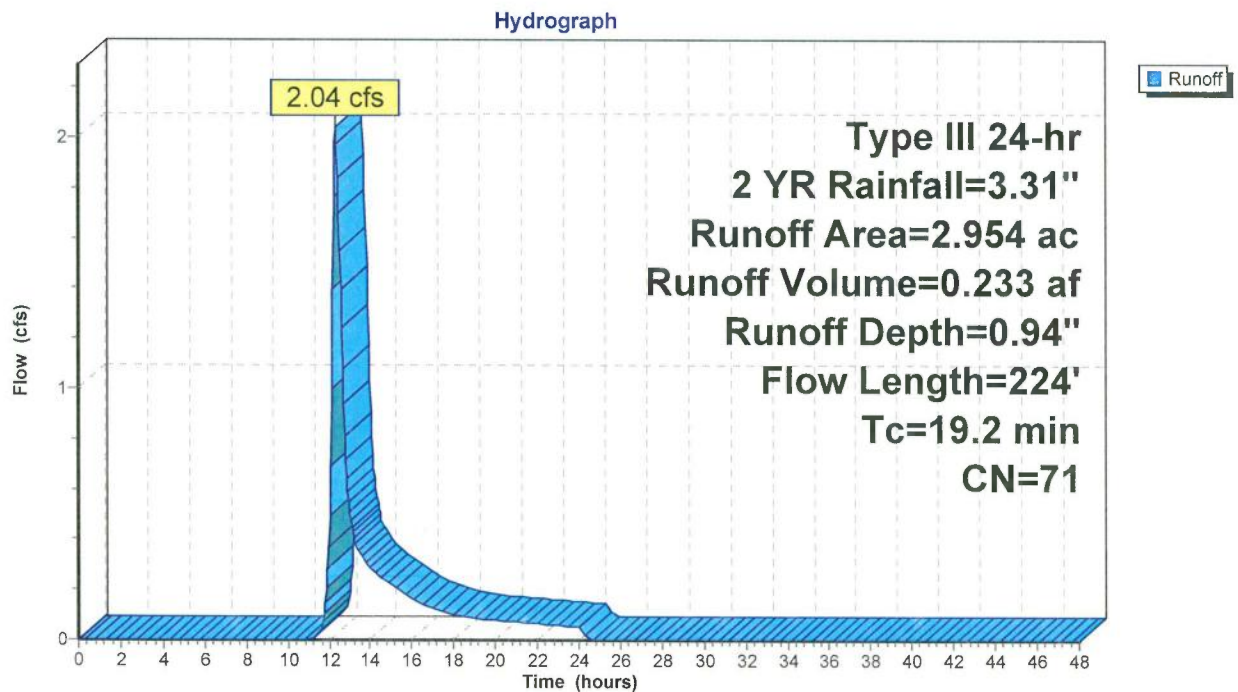
Runoff = 2.04 cfs @ 12.30 hrs, Volume= 0.233 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.31"

Area (ac)	CN	Description
2.954	71	Meadow, non-grazed, HSG C
2.954		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	81	0.0073	0.08		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.31"
1.5	143	0.0485	1.54		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
19.2	224	Total			

Subcatchment EDA-1: EDA-1



Summary for Subcatchment EDA-2: EDA-2

Runoff = 4.03 cfs @ 12.32 hrs, Volume= 0.474 af, Depth= 0.94"

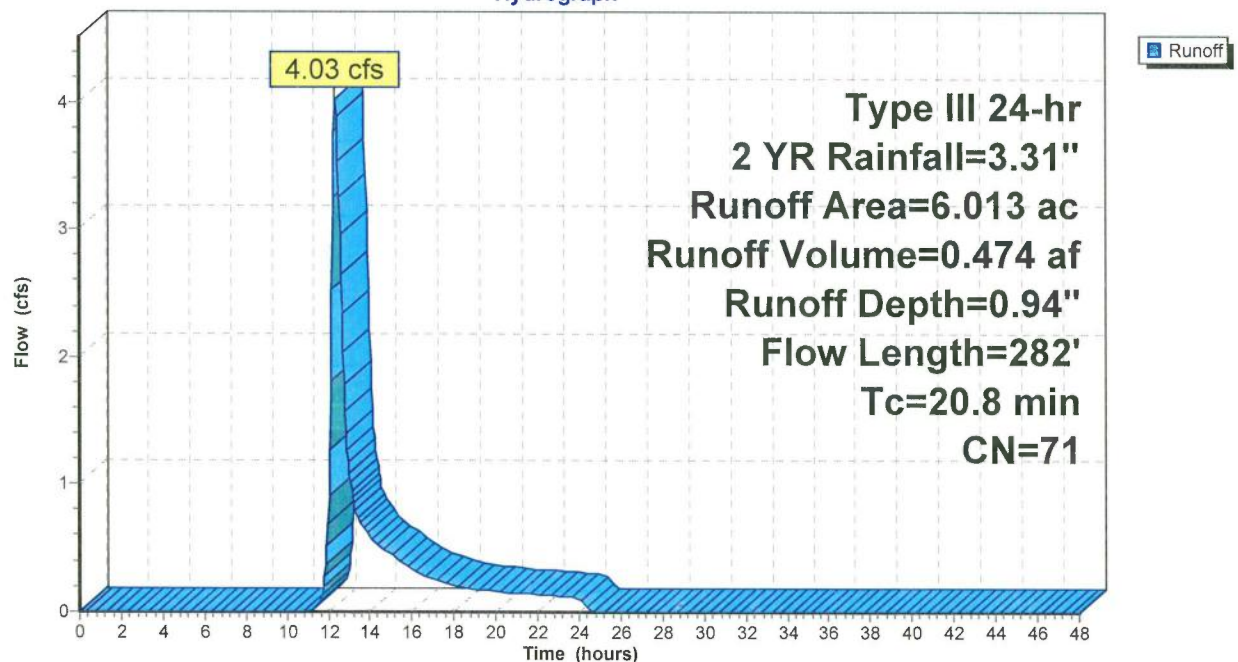
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.31"

Area (ac)	CN	Description
0.548	73	Woods, Fair, HSG C
5.465	71	Meadow, non-grazed, HSG C
6.013	71	Weighted Average
6.013		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.8	100	0.0110	0.09		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.31"
1.6	63	0.0083	0.64		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.8	59	0.0336	1.28		Shallow Concentrated Flow, C-D Short Grass Pasture Kv= 7.0 fps
0.6	60	0.0521	1.60		Shallow Concentrated Flow, D-E Short Grass Pasture Kv= 7.0 fps
20.8	282	Total			

Subcatchment EDA-2: EDA-2

Hydrograph



Summary for Subcatchment EDA-3: EDA-3

Runoff = 0.12 cfs @ 12.10 hrs, Volume= 0.010 af, Depth= 0.94"

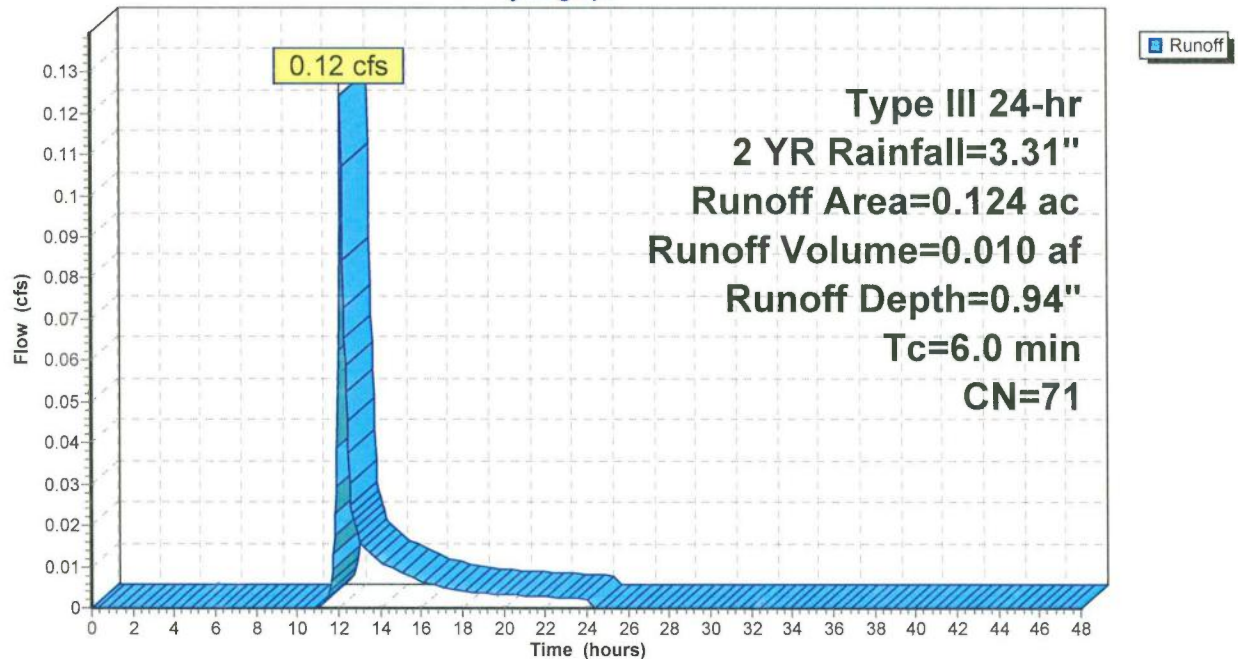
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.31"

Area (ac)	CN	Description
0.124	71	Meadow, non-grazed, HSG C
0.124		100.00% Pervious Area

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

Subcatchment EDA-3: EDA-3

Hydrograph



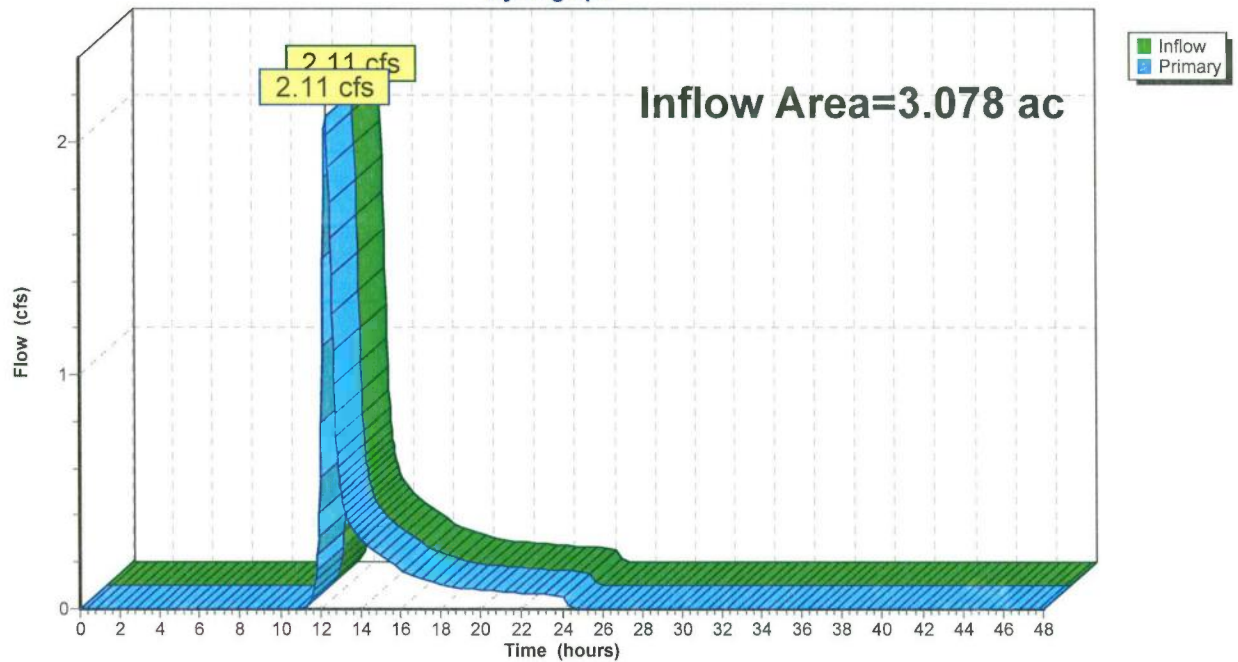
Summary for Link AP-1: AP-1

Inflow Area = 3.078 ac, 0.00% Impervious, Inflow Depth = 0.94" for 2 YR event
 Inflow = 2.11 cfs @ 12.29 hrs, Volume= 0.242 af
 Primary = 2.11 cfs @ 12.29 hrs, Volume= 0.242 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-1: AP-1

Hydrograph



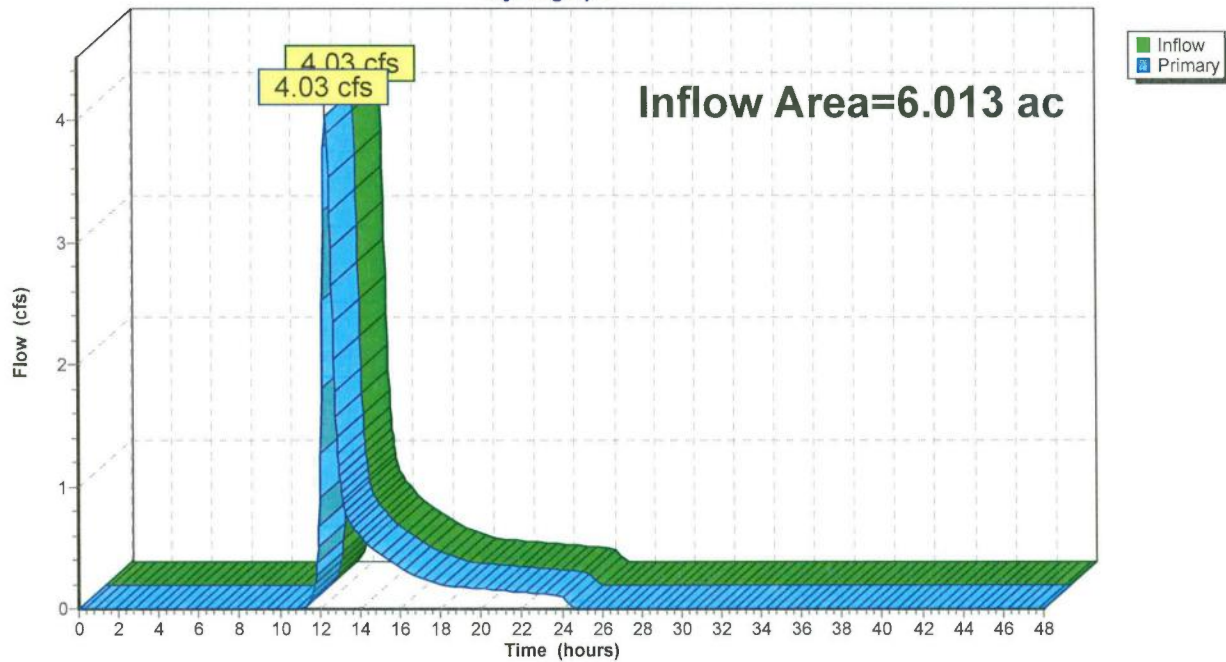
Summary for Link AP-2: AP-2

Inflow Area = 6.013 ac, 0.00% Impervious, Inflow Depth = 0.94" for 2 YR event
Inflow = 4.03 cfs @ 12.32 hrs, Volume= 0.474 af
Primary = 4.03 cfs @ 12.32 hrs, Volume= 0.474 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-2: AP-2

Hydrograph



Middletown-Middlefield - EX - Rev0*Type III 24-hr 10 YR Rainfall=5.15"*

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EDA-1: EDA-1Runoff Area=2.954 ac 0.00% Impervious Runoff Depth=2.23"
Flow Length=224' Tc=19.2 min CN=71 Runoff=5.21 cfs 0.549 af**Subcatchment EDA-2: EDA-2**Runoff Area=6.013 ac 0.00% Impervious Runoff Depth=2.23"
Flow Length=282' Tc=20.8 min CN=71 Runoff=10.24 cfs 1.118 af**Subcatchment EDA-3: EDA-3**Runoff Area=0.124 ac 0.00% Impervious Runoff Depth=2.23"
Tc=6.0 min CN=71 Runoff=0.31 cfs 0.023 af**Link AP-1: AP-1**Inflow=5.36 cfs 0.572 af
Primary=5.36 cfs 0.572 af**Link AP-2: AP-2**Inflow=10.24 cfs 1.118 af
Primary=10.24 cfs 1.118 af**Total Runoff Area = 9.091 ac Runoff Volume = 1.690 af Average Runoff Depth = 2.23"**
100.00% Pervious = 9.091 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment EDA-1: EDA-1

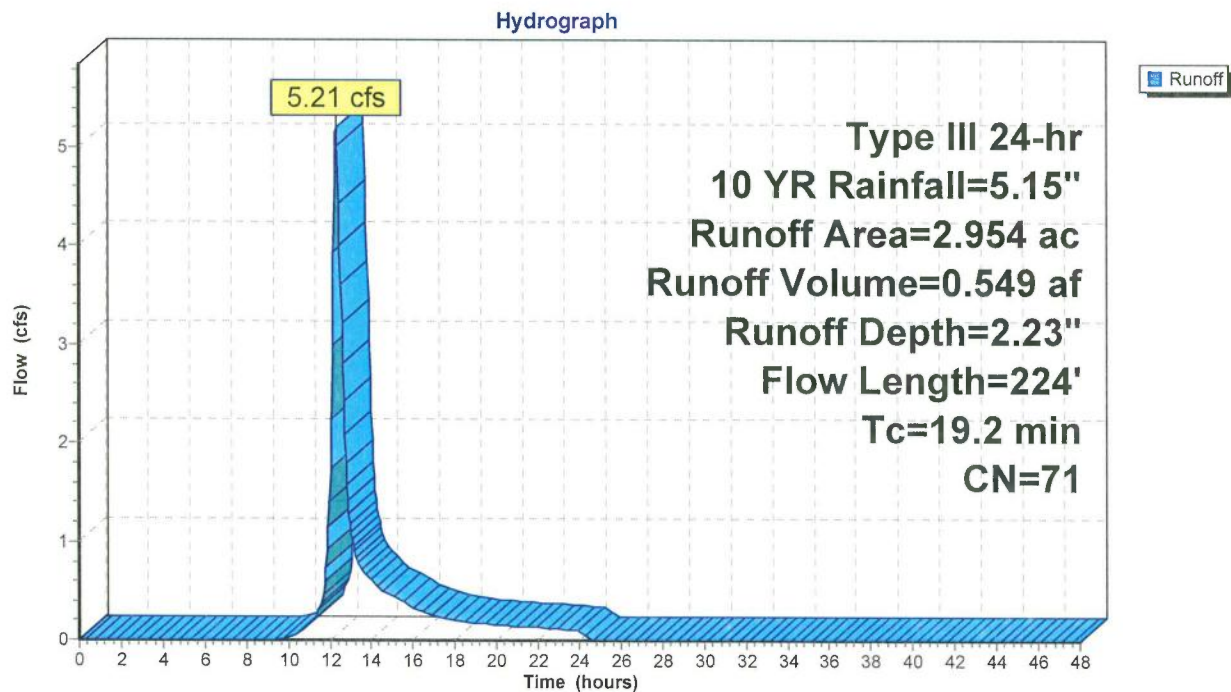
Runoff = 5.21 cfs @ 12.27 hrs, Volume= 0.549 af, Depth= 2.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.15"

Area (ac)	CN	Description
2.954	71	Meadow, non-grazed, HSG C
2.954		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	81	0.0073	0.08		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.31"
1.5	143	0.0485	1.54		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
19.2	224	Total			

Subcatchment EDA-1: EDA-1



Summary for Subcatchment EDA-2: EDA-2

Runoff = 10.24 cfs @ 12.30 hrs, Volume= 1.118 af, Depth= 2.23"

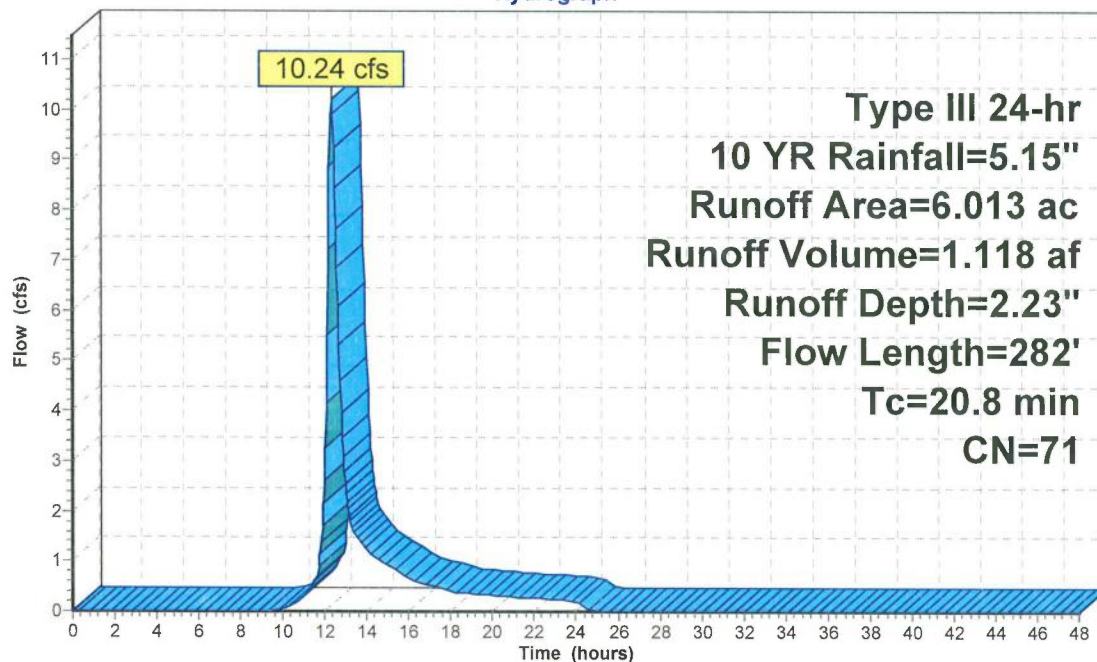
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.15"

Area (ac)	CN	Description
0.548	73	Woods, Fair, HSG C
5.465	71	Meadow, non-grazed, HSG C
6.013	71	Weighted Average
6.013		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.8	100	0.0110	0.09		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.31"
1.6	63	0.0083	0.64		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.8	59	0.0336	1.28		Shallow Concentrated Flow, C-D Short Grass Pasture Kv= 7.0 fps
0.6	60	0.0521	1.60		Shallow Concentrated Flow, D-E Short Grass Pasture Kv= 7.0 fps
20.8	282	Total			

Subcatchment EDA-2: EDA-2

Hydrograph



Summary for Subcatchment EDA-3: EDA-3

Runoff = 0.31 cfs @ 12.10 hrs, Volume= 0.023 af, Depth= 2.23"

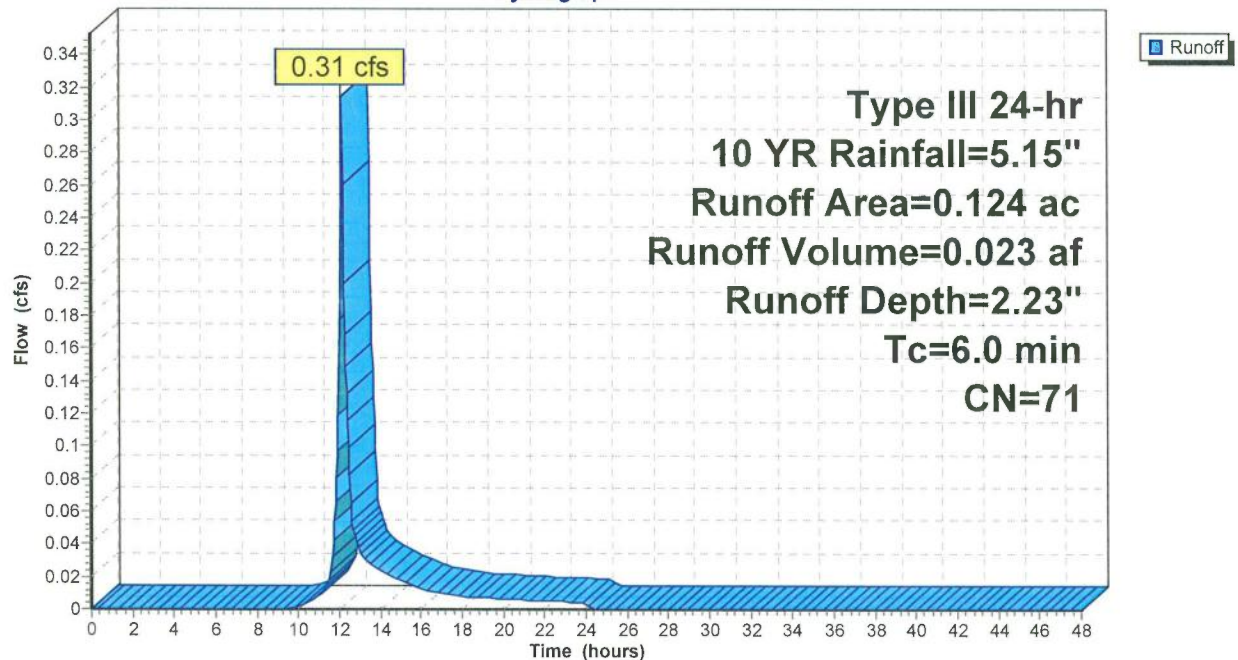
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.15"

Area (ac)	CN	Description
0.124	71	Meadow, non-grazed, HSG C
0.124		100.00% Pervious Area

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

Subcatchment EDA-3: EDA-3

Hydrograph



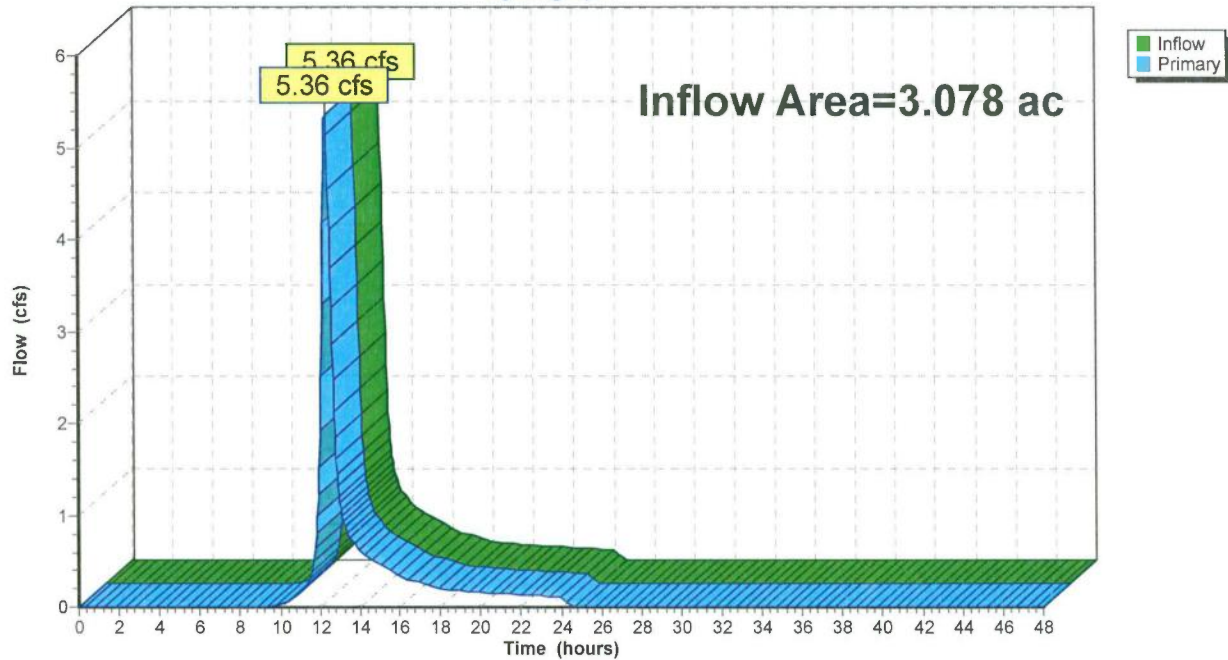
Summary for Link AP-1: AP-1

Inflow Area = 3.078 ac, 0.00% Impervious, Inflow Depth = 2.23" for 10 YR event
 Inflow = 5.36 cfs @ 12.27 hrs, Volume= 0.572 af
 Primary = 5.36 cfs @ 12.27 hrs, Volume= 0.572 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-1: AP-1

Hydrograph



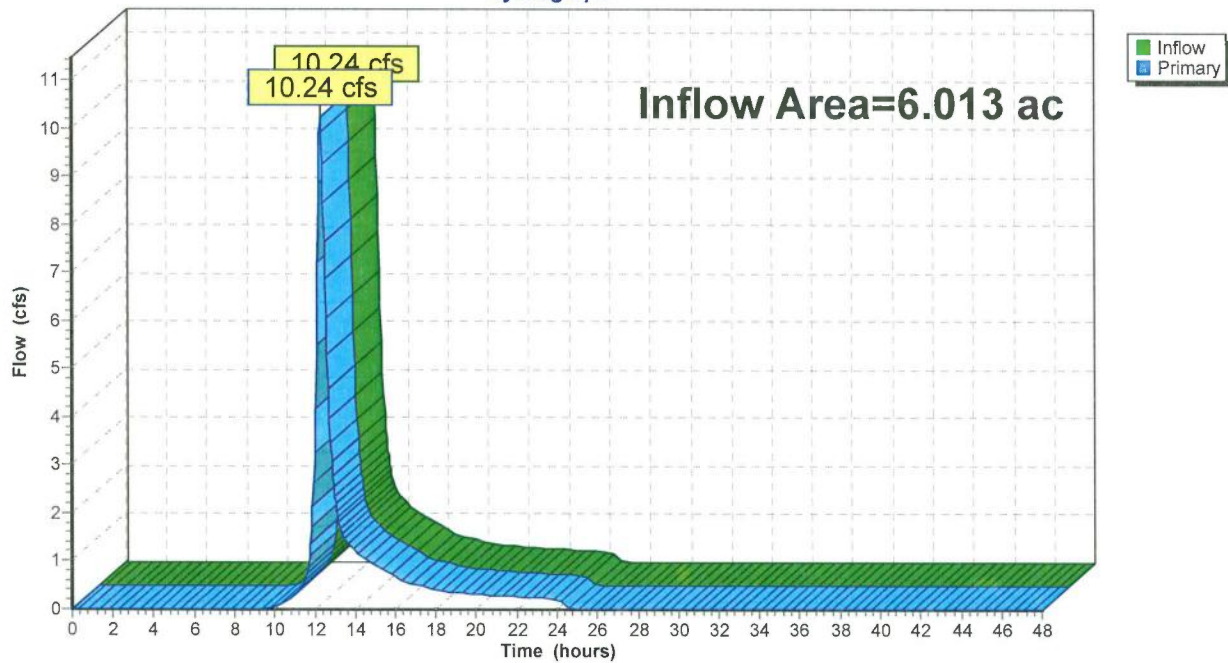
Summary for Link AP-2: AP-2

Inflow Area = 6.013 ac, 0.00% Impervious, Inflow Depth = 2.23" for 10 YR event
 Inflow = 10.24 cfs @ 12.30 hrs, Volume= 1.118 af
 Primary = 10.24 cfs @ 12.30 hrs, Volume= 1.118 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-2: AP-2

Hydrograph



Middletown-Middlefield - EX - Rev0

Type III 24-hr 25 YR Rainfall=6.30"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EDA-1: EDA-1Runoff Area=2.954 ac 0.00% Impervious Runoff Depth=3.14"
Flow Length=224' Tc=19.2 min CN=71 Runoff=7.42 cfs 0.774 af**Subcatchment EDA-2: EDA-2**Runoff Area=6.013 ac 0.00% Impervious Runoff Depth=3.14"
Flow Length=282' Tc=20.8 min CN=71 Runoff=14.59 cfs 1.575 af**Subcatchment EDA-3: EDA-3**Runoff Area=0.124 ac 0.00% Impervious Runoff Depth=3.14"
Tc=6.0 min CN=71 Runoff=0.45 cfs 0.032 af**Link AP-1: AP-1**Inflow=7.64 cfs 0.806 af
Primary=7.64 cfs 0.806 af**Link AP-2: AP-2**Inflow=14.59 cfs 1.575 af
Primary=14.59 cfs 1.575 af**Total Runoff Area = 9.091 ac Runoff Volume = 2.381 af Average Runoff Depth = 3.14"**
100.00% Pervious = 9.091 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment EDA-1: EDA-1

Runoff = 7.42 cfs @ 12.27 hrs, Volume= 0.774 af, Depth= 3.14"

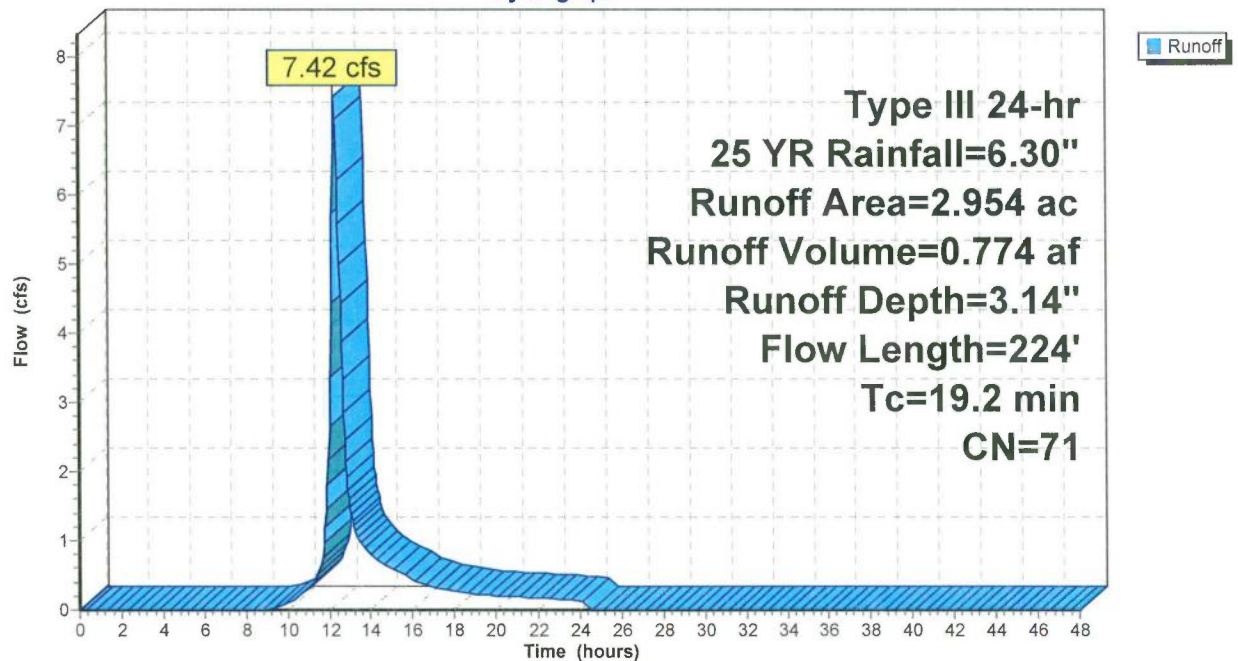
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.30"

Area (ac)	CN	Description
2.954	71	Meadow, non-grazed, HSG C
2.954		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	81	0.0073	0.08		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.31"
1.5	143	0.0485	1.54		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
19.2	224	Total			

Subcatchment EDA-1: EDA-1

Hydrograph



Middletown-Middlefield - EX - Rev0

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Type III 24-hr 25 YR Rainfall=6.30"

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Summary for Subcatchment EDA-2: EDA-2

Runoff = 14.59 cfs @ 12.29 hrs, Volume= 1.575 af, Depth= 3.14"

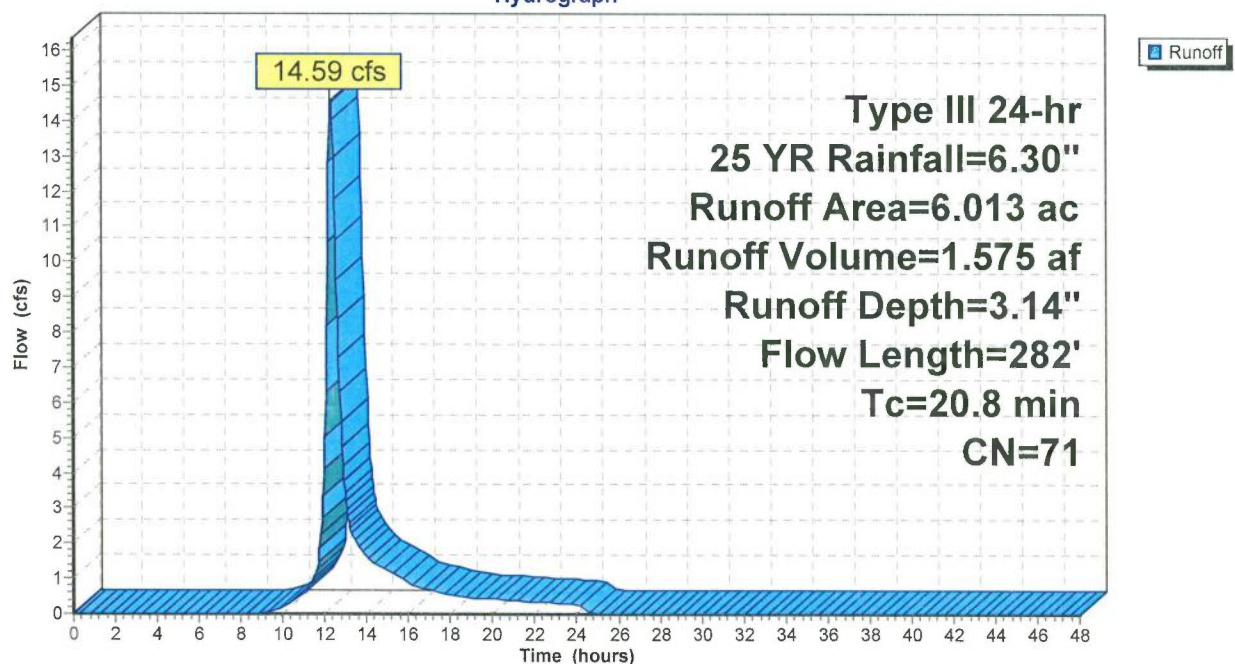
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.30"

Area (ac)	CN	Description
0.548	73	Woods, Fair, HSG C
5.465	71	Meadow, non-grazed, HSG C
6.013	71	Weighted Average
6.013		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.8	100	0.0110	0.09		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.31"
1.6	63	0.0083	0.64		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.8	59	0.0336	1.28		Shallow Concentrated Flow, C-D Short Grass Pasture Kv= 7.0 fps
0.6	60	0.0521	1.60		Shallow Concentrated Flow, D-E Short Grass Pasture Kv= 7.0 fps
20.8	282	Total			

Subcatchment EDA-2: EDA-2

Hydrograph



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Type III 24-hr 25 YR Rainfall=6.30"

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Summary for Subcatchment EDA-3: EDA-3

Runoff = 0.45 cfs @ 12.09 hrs, Volume= 0.032 af, Depth= 3.14"

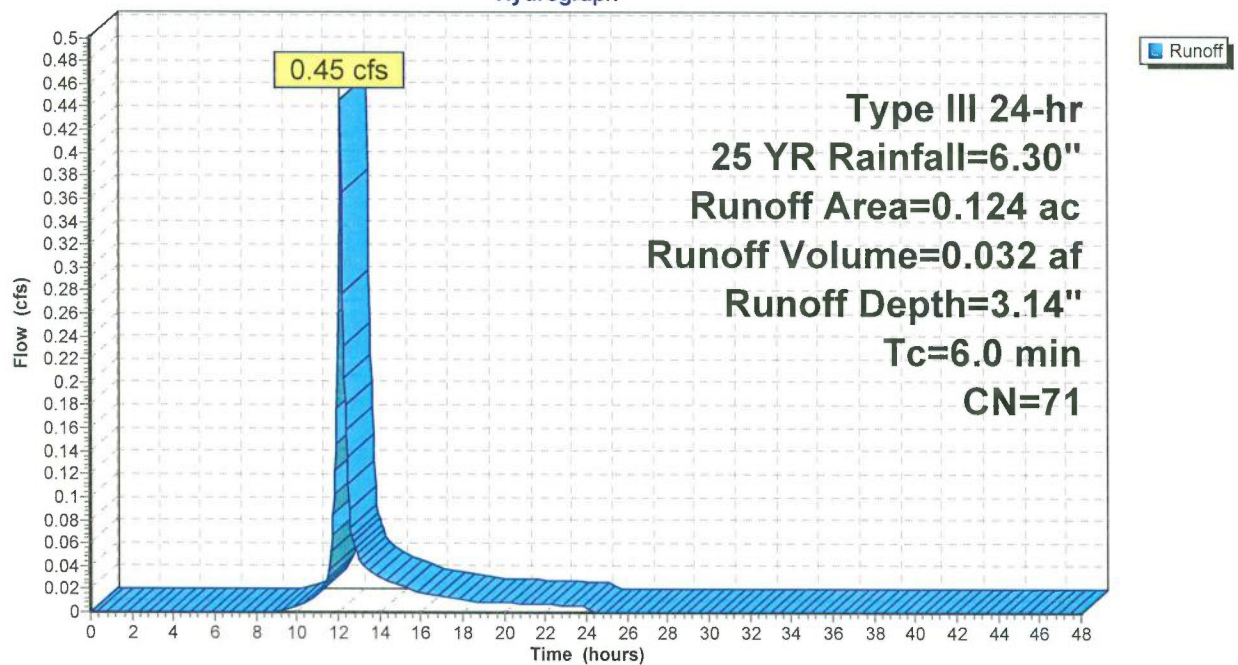
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.30"

Area (ac)	CN	Description
0.124	71	Meadow, non-grazed, HSG C
0.124		100.00% Pervious Area

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

Subcatchment EDA-3: EDA-3

Hydrograph



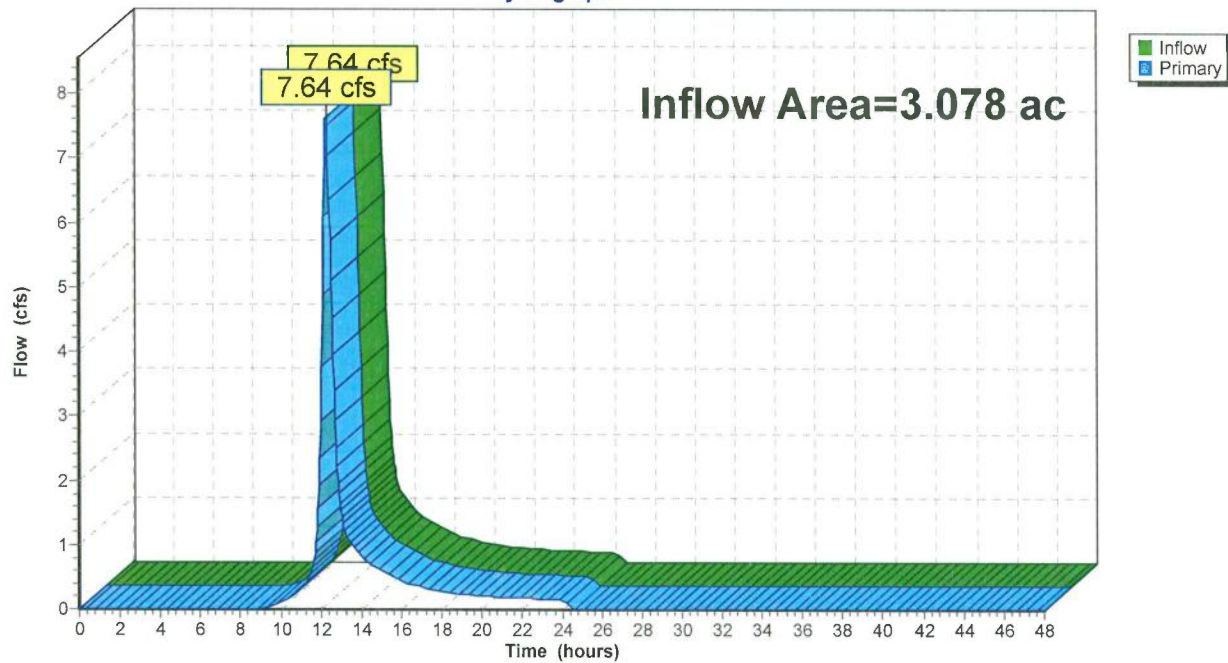
Summary for Link AP-1: AP-1

Inflow Area = 3.078 ac, 0.00% Impervious, Inflow Depth = 3.14" for 25 YR event
 Inflow = 7.64 cfs @ 12.27 hrs, Volume= 0.806 af
 Primary = 7.64 cfs @ 12.27 hrs, Volume= 0.806 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-1: AP-1

Hydrograph



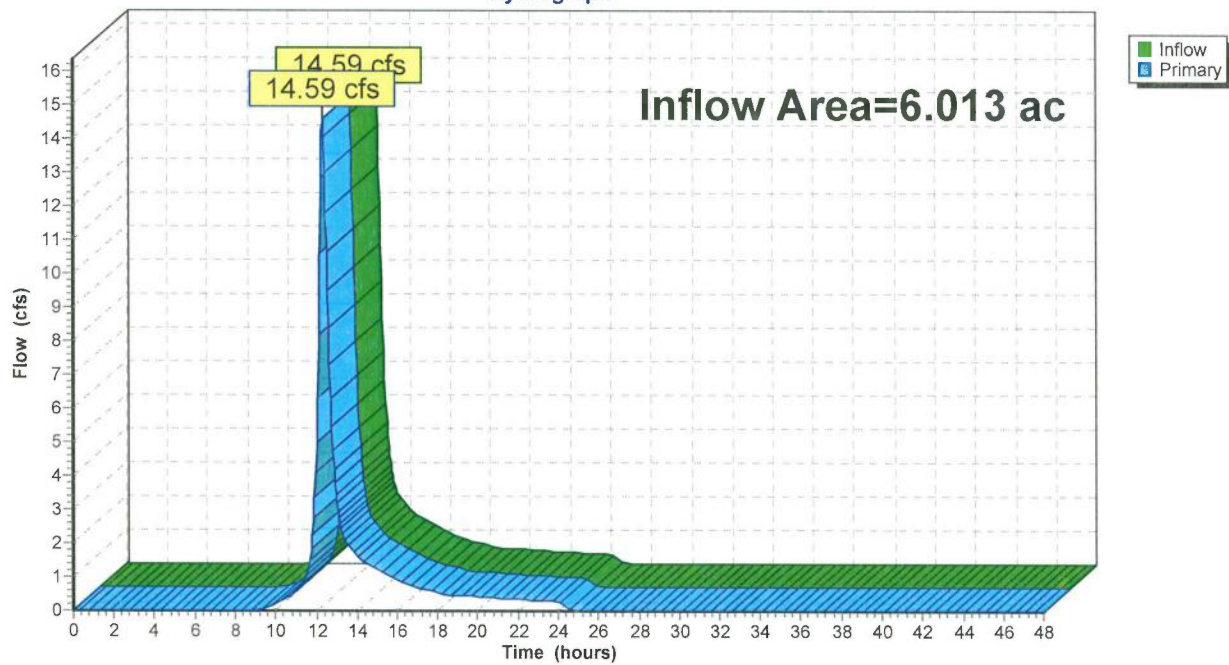
Summary for Link AP-2: AP-2

Inflow Area = 6.013 ac, 0.00% Impervious, Inflow Depth = 3.14" for 25 YR event
 Inflow = 14.59 cfs @ 12.29 hrs, Volume= 1.575 af
 Primary = 14.59 cfs @ 12.29 hrs, Volume= 1.575 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-2: AP-2

Hydrograph



Middletown-Middlefield - EX - Rev0

Type III 24-hr 100 YR Rainfall=8.07"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment EDA-1: EDA-1Runoff Area=2.954 ac 0.00% Impervious Runoff Depth=4.64"
Flow Length=224' Tc=19.2 min CN=71 Runoff=11.00 cfs 1.142 af**Subcatchment EDA-2: EDA-2**Runoff Area=6.013 ac 0.00% Impervious Runoff Depth=4.64"
Flow Length=282' Tc=20.8 min CN=71 Runoff=21.62 cfs 2.325 af**Subcatchment EDA-3: EDA-3**Runoff Area=0.124 ac 0.00% Impervious Runoff Depth=4.64"
Tc=6.0 min CN=71 Runoff=0.66 cfs 0.048 af**Link AP-1: AP-1**Inflow=11.32 cfs 1.190 af
Primary=11.32 cfs 1.190 af**Link AP-2: AP-2**Inflow=21.62 cfs 2.325 af
Primary=21.62 cfs 2.325 af**Total Runoff Area = 9.091 ac Runoff Volume = 3.515 af Average Runoff Depth = 4.64"**
100.00% Pervious = 9.091 ac 0.00% Impervious = 0.000 ac

Middletown-Middlefield - EX - Rev0

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Type III 24-hr 100 YR Rainfall=8.07"

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Summary for Subcatchment EDA-1: EDA-1

Runoff = 11.00 cfs @ 12.27 hrs, Volume= 1.142 af, Depth= 4.64"

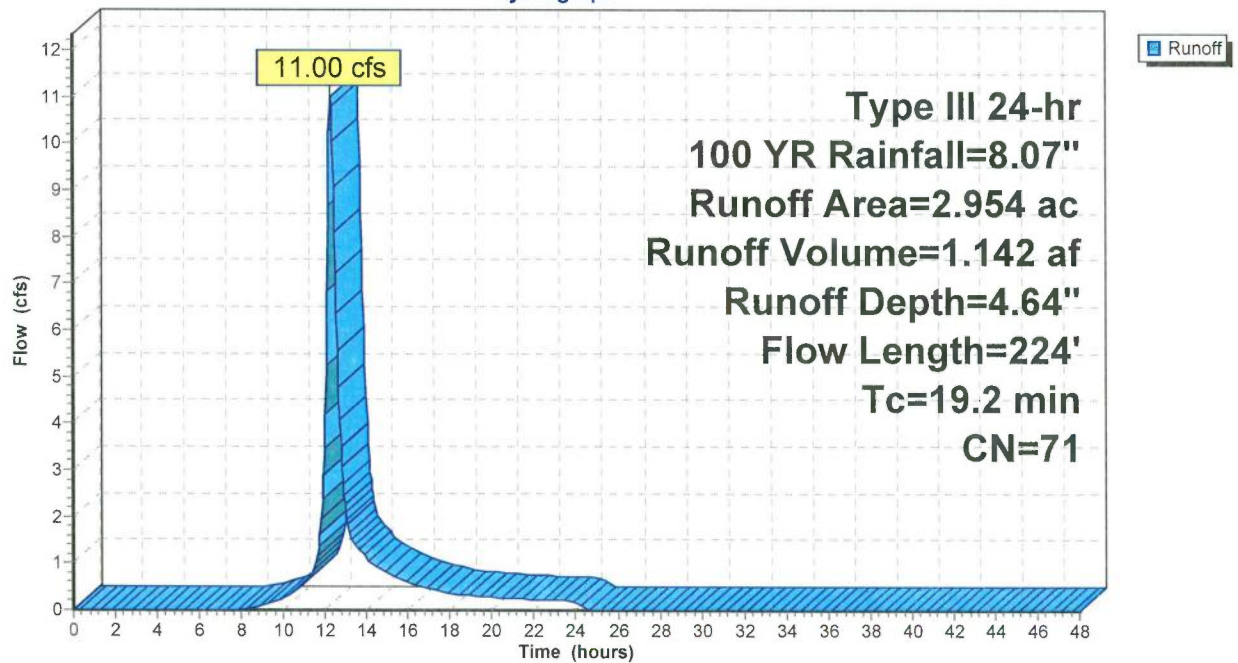
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.07"

Area (ac)	CN	Description
2.954	71	Meadow, non-grazed, HSG C
2.954		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	81	0.0073	0.08		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.31"
1.5	143	0.0485	1.54		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
19.2	224	Total			

Subcatchment EDA-1: EDA-1

Hydrograph



Summary for Subcatchment EDA-2: EDA-2

Runoff = 21.62 cfs @ 12.29 hrs, Volume= 2.325 af, Depth= 4.64"

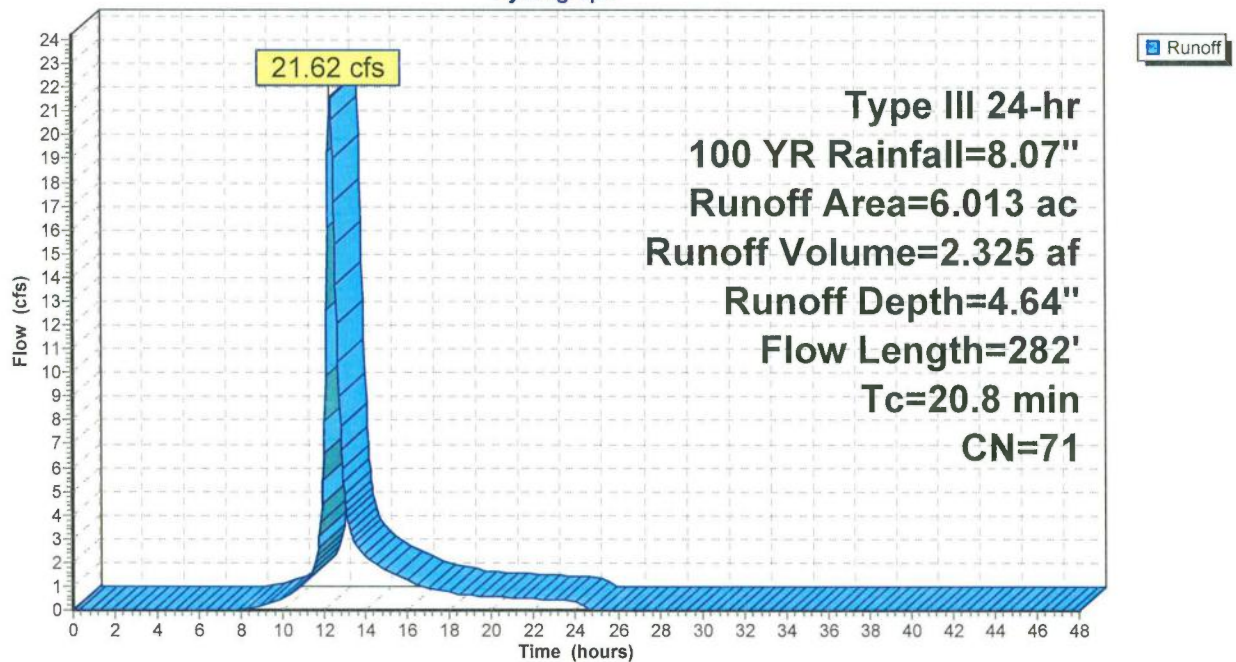
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.07"

Area (ac)	CN	Description
0.548	73	Woods, Fair, HSG C
5.465	71	Meadow, non-grazed, HSG C
6.013	71	Weighted Average
6.013		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.8	100	0.0110	0.09		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.31"
1.6	63	0.0083	0.64		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.8	59	0.0336	1.28		Shallow Concentrated Flow, C-D Short Grass Pasture Kv= 7.0 fps
0.6	60	0.0521	1.60		Shallow Concentrated Flow, D-E Short Grass Pasture Kv= 7.0 fps
20.8	282	Total			

Subcatchment EDA-2: EDA-2

Hydrograph



Middletown-Middlefield - EX - Rev0

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Type III 24-hr 100 YR Rainfall=8.07"

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Summary for Subcatchment EDA-3: EDA-3

Runoff = 0.66 cfs @ 12.09 hrs, Volume= 0.048 af, Depth= 4.64"

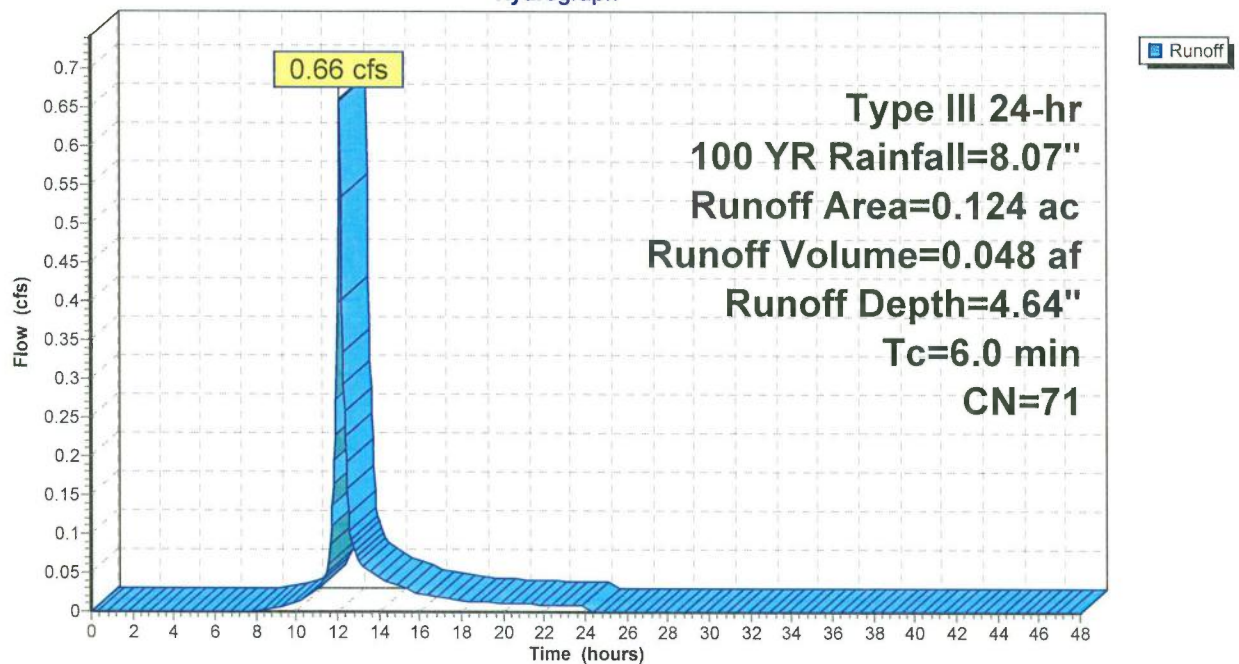
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.07"

Area (ac)	CN	Description
0.124	71	Meadow, non-grazed, HSG C
0.124		100.00% Pervious Area

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

Subcatchment EDA-3: EDA-3

Hydrograph



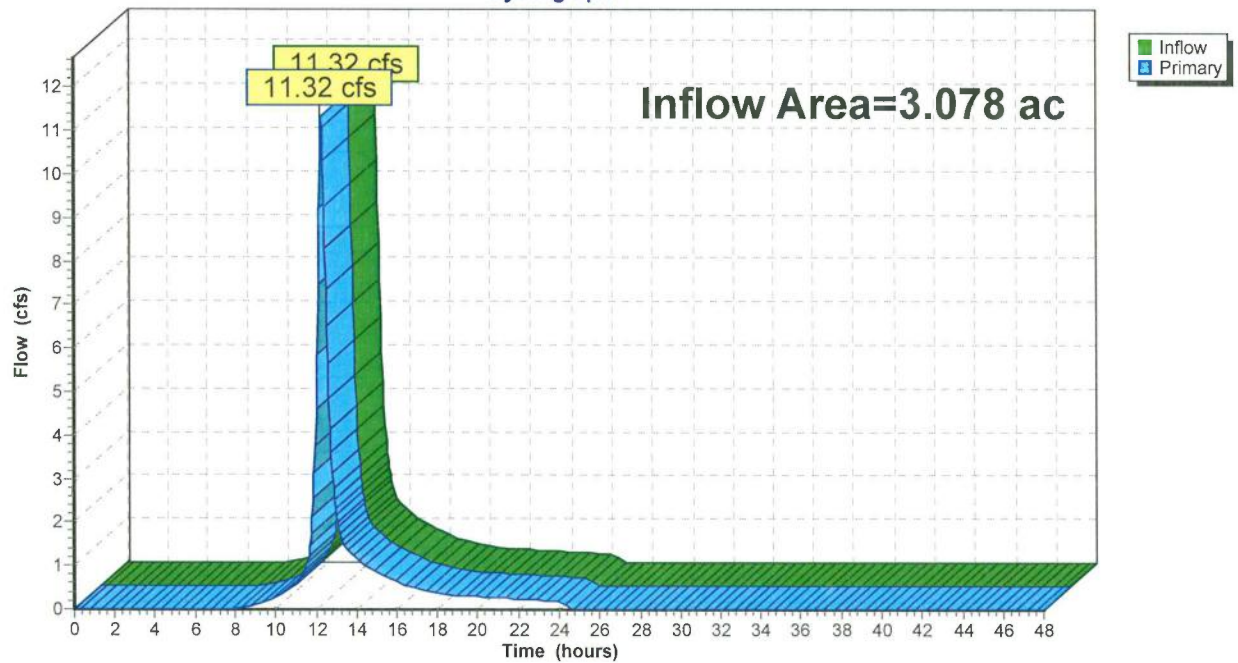
Summary for Link AP-1: AP-1

Inflow Area = 3.078 ac, 0.00% Impervious, Inflow Depth = 4.64" for 100 YR event
 Inflow = 11.32 cfs @ 12.26 hrs, Volume= 1.190 af
 Primary = 11.32 cfs @ 12.26 hrs, Volume= 1.190 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-1: AP-1

Hydrograph



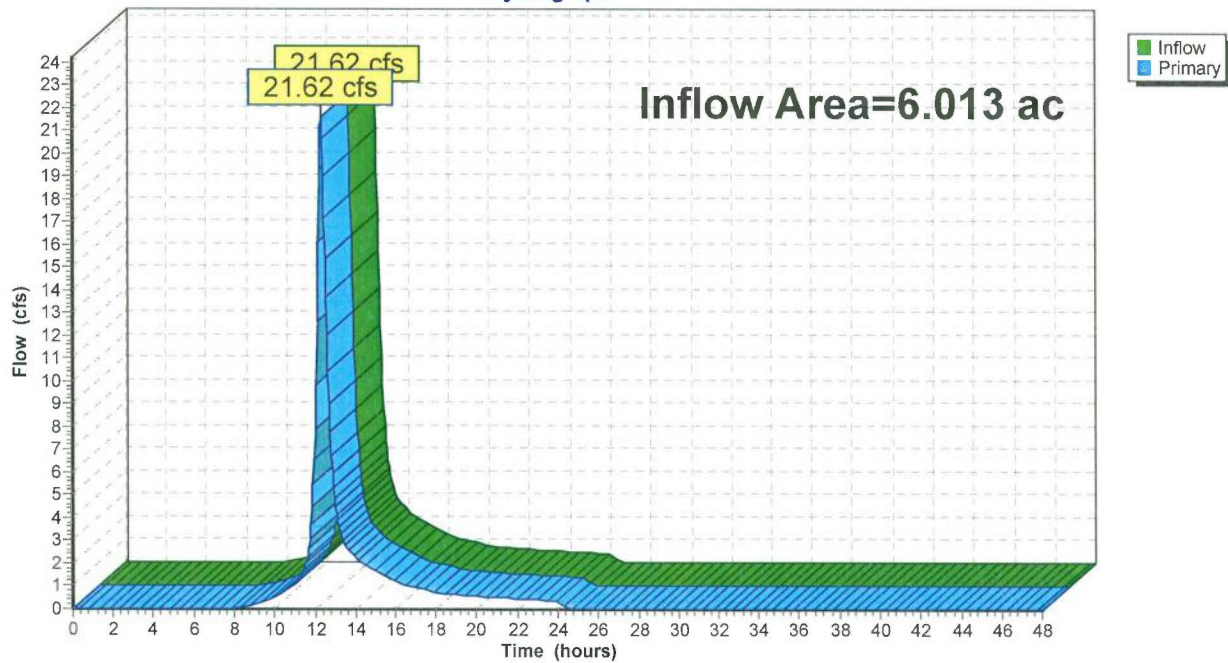
Summary for Link AP-2: AP-2

Inflow Area = 6.013 ac, 0.00% Impervious, Inflow Depth = 4.64" for 100 YR event
 Inflow = 21.62 cfs @ 12.29 hrs, Volume= 2.325 af
 Primary = 21.62 cfs @ 12.29 hrs, Volume= 2.325 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

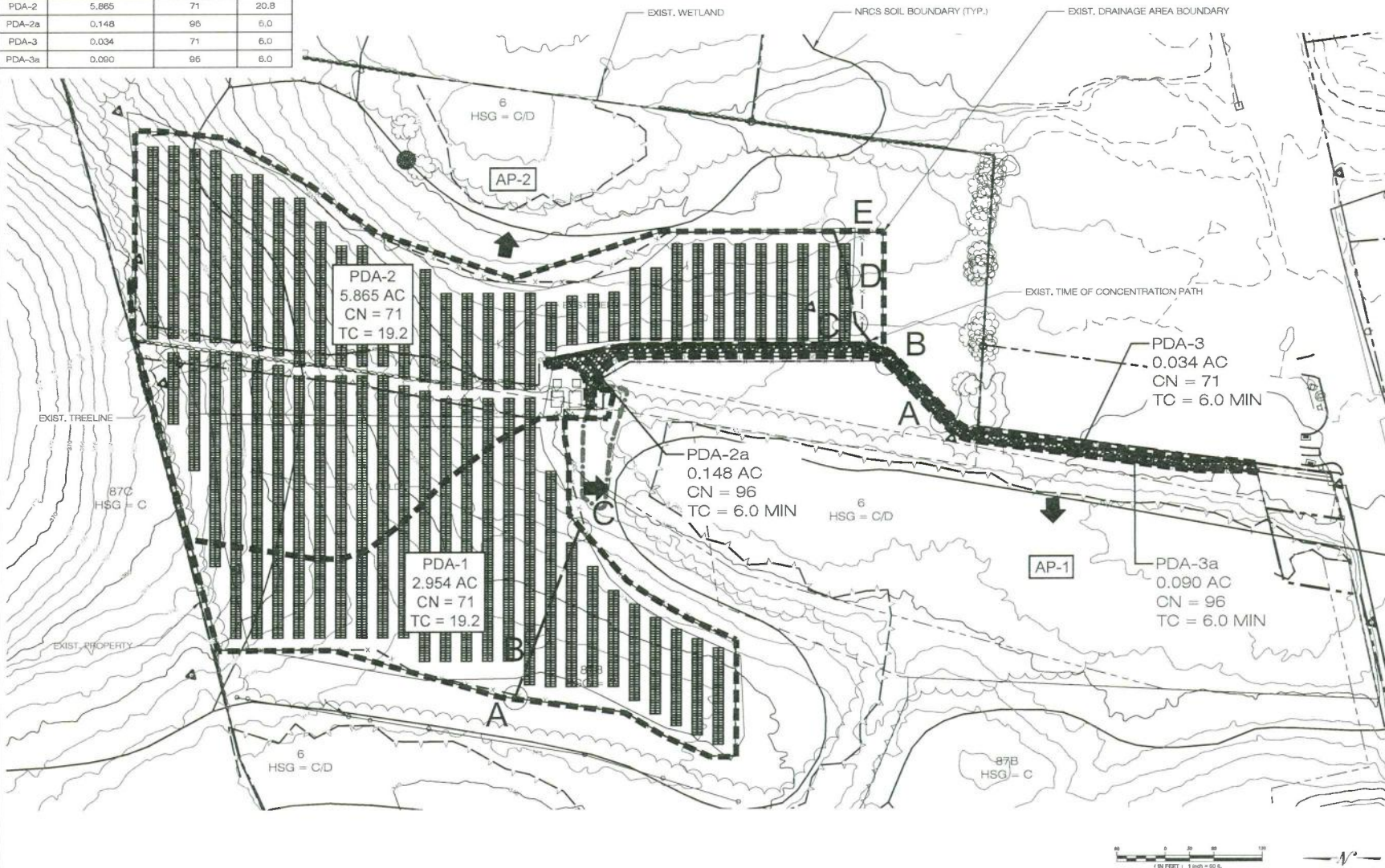
Link AP-2: AP-2

Hydrograph



PROPOSED DRAINAGE AREAS

	TOTAL AREA (ACRES)	COMPOSITE CN	TC (MINS.)
PDA-1	2.954	71	19.2
PDA-2	5.865	71	20.8
PDA-2a	0.148	96	6.0
PDA-3	0.034	71	6.0
PDA-3a	0.090	96	6.0



55 GREENS FARMS ROAD
WESTPORT, CT 06880
OFFICE: (203)-557-5554



3 SADDLEBROOK DRIVE PHONE: (860)-453-1887
KILLINGWORTH, CT 06419 FAX: (860)-453-0935
WWW.ALLPOINTSTECH.COM

PERMITTING

NO.	DATE	REVISION
1	04/10/19	FOR REVIEW: BJP
2		
3		
4		
5		
6		

DESIGN PROFESSIONAL OF RECORD

PROF: BRADLEY J. PARSONS P.E.
COMP: ALL-POINTS TECHNOLOGY CORPORATION
ADD: 3 SADDLEBROOK DRIVE KILLINGWORTH, CT 06419
OWNER: BARBARA J. PENNEY
ANN L. CHARTON
ADDRESS: 41 CHELSEA DRIVE CROMWELL, CT 06416

MIDDLETOWN/MIDDLEFIELD

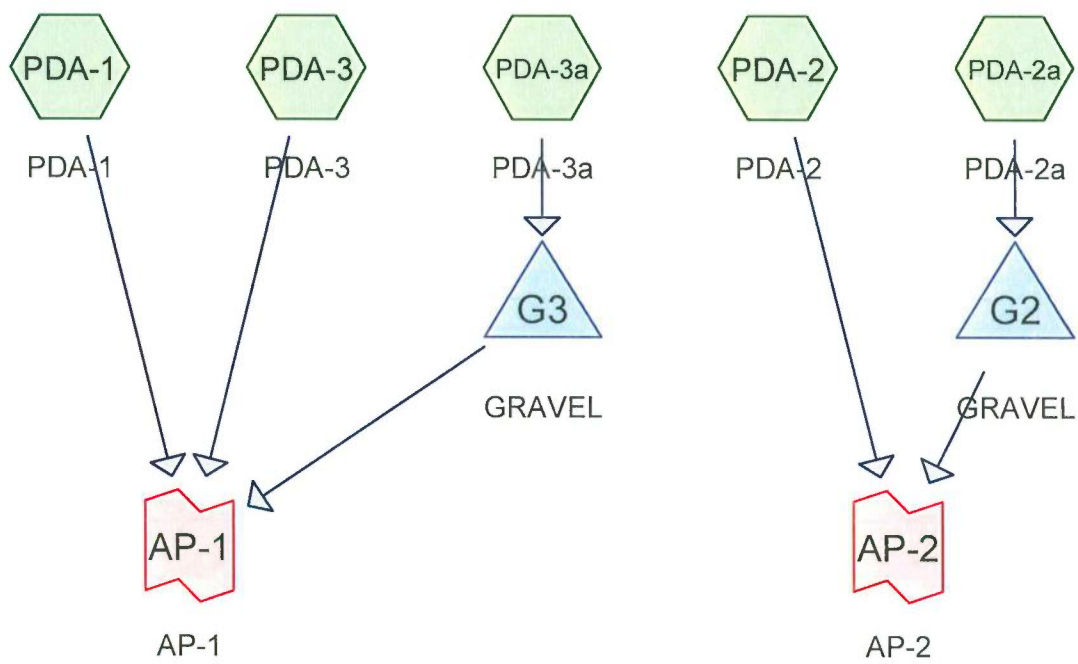
SITE: MERIDEN ROAD (ROUTE 66)
ADDRESS: MIDDLEFIELD, CT 06459
APT. FILING NUMBER: CT567100
DATE: 04/10/19
DRAWN BY: JT
CHECKED BY: BJP

SHEET TITLE:

PROPOSED DRAINAGE AREA MAP

SHEET NUMBER:

PDA-1



Routing Diagram for Middletown-Middlefield - PR - Rev0

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Middletown-Middlefield - PR - Rev0

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.238	96	Gravel surface, HSG C (PDA-2a, PDA-3a)
8.835	71	Meadow, non-grazed, HSG C (PDA-1, PDA-2, PDA-3)
0.018	98	Unconnected pavement, HSG C (PDA-2)
9.091	72	TOTAL AREA

Middletown-Middlefield - PR - Rev0

Type III 24-hr 2 YR Rainfall=3.31"

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PDA-1: PDA-1

Runoff Area=2.954 ac 0.00% Impervious Runoff Depth=0.94"
Flow Length=224' Tc=19.2 min CN=71 Runoff=2.04 cfs 0.233 af

Subcatchment PDA-2: PDA-2

Runoff Area=5.865 ac 0.31% Impervious Runoff Depth=0.94"
Flow Length=282' Tc=20.8 min CN=71 Runoff=3.93 cfs 0.462 af

Subcatchment PDA-2a: PDA-2a

Runoff Area=0.148 ac 0.00% Impervious Runoff Depth=2.86"
Tc=6.0 min CN=96 Runoff=0.45 cfs 0.035 af

Subcatchment PDA-3: PDA-3

Runoff Area=0.034 ac 0.00% Impervious Runoff Depth=0.94"
Tc=6.0 min CN=71 Runoff=0.03 cfs 0.003 af

Subcatchment PDA-3a: PDA-3a

Runoff Area=0.090 ac 0.00% Impervious Runoff Depth=2.86"
Tc=6.0 min CN=96 Runoff=0.27 cfs 0.021 af

Pond G2: GRAVEL

Peak Elev=0.26' Storage=680 cf Inflow=0.45 cfs 0.035 af
Discarded=0.03 cfs 0.035 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.035 af

Pond G3: GRAVEL

Peak Elev=0.26' Storage=413 cf Inflow=0.27 cfs 0.021 af
Discarded=0.02 cfs 0.021 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.021 af

Link AP-1: AP-1

Inflow=2.06 cfs 0.235 af
Primary=2.06 cfs 0.235 af

Link AP-2: AP-2

Inflow=3.93 cfs 0.462 af
Primary=3.93 cfs 0.462 af

Total Runoff Area = 9.091 ac Runoff Volume = 0.754 af Average Runoff Depth = 1.00"
99.80% Pervious = 9.073 ac 0.20% Impervious = 0.018 ac

Summary for Subcatchment PDA-1: PDA-1

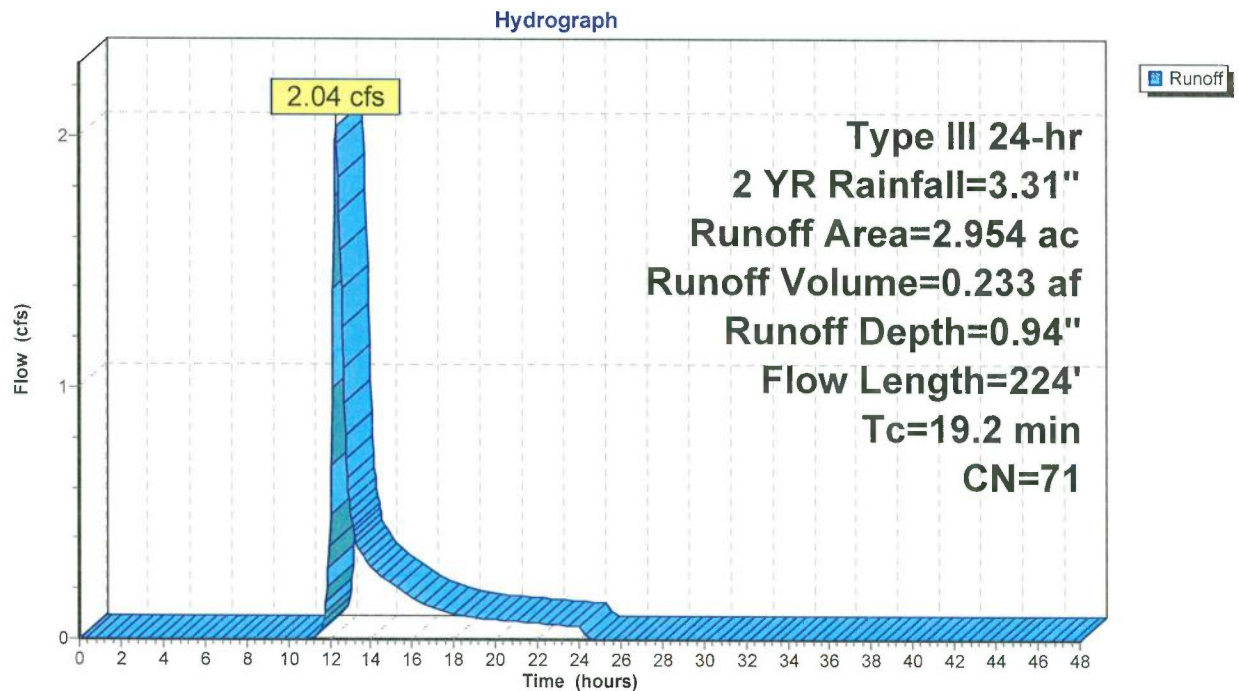
Runoff = 2.04 cfs @ 12.30 hrs, Volume= 0.233 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.31"

Area (ac)	CN	Description
2.954	71	Meadow, non-grazed, HSG C
2.954		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	81	0.0073	0.08		Sheet Flow, A-B
					Grass: Dense n= 0.240 P2= 3.31"
1.5	143	0.0485	1.54		Shallow Concentrated Flow, B-C
					Short Grass Pasture Kv= 7.0 fps
19.2	224	Total			

Subcatchment PDA-1: PDA-1



Summary for Subcatchment PDA-2: PDA-2

Runoff = 3.93 cfs @ 12.32 hrs, Volume= 0.462 af, Depth= 0.94"

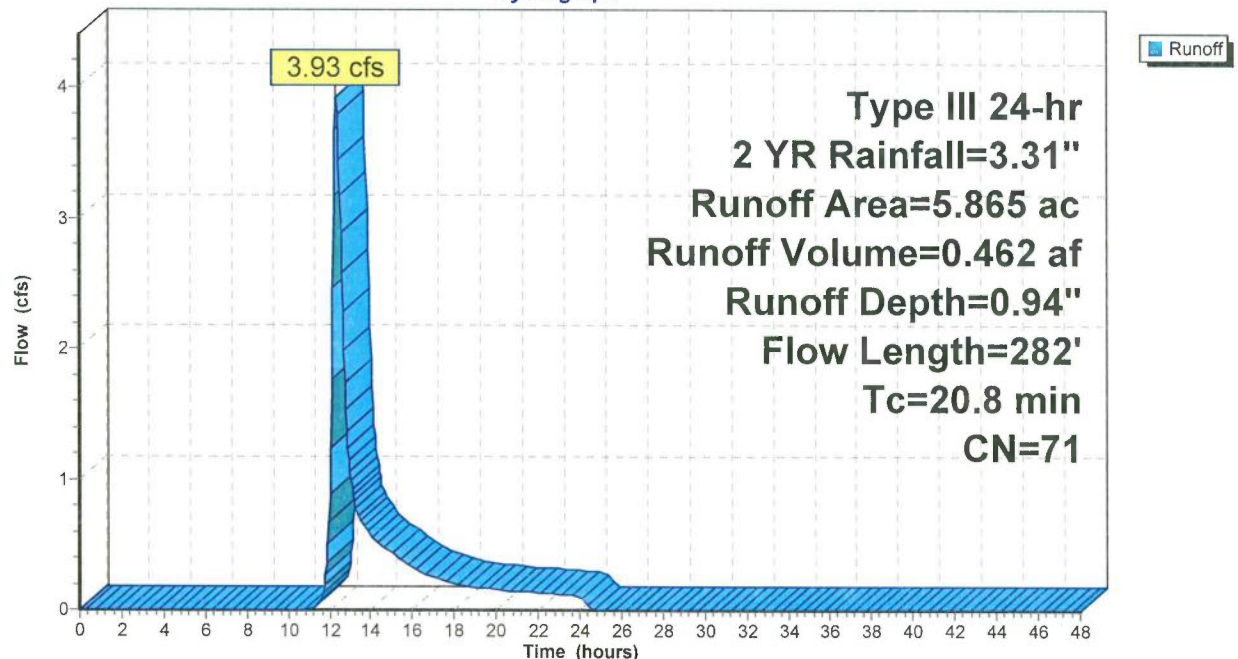
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.31"

Area (ac)	CN	Description
5.847	71	Meadow, non-grazed, HSG C
0.018	98	Unconnected pavement, HSG C
5.865	71	Weighted Average
5.847		99.69% Pervious Area
0.018		0.31% Impervious Area
0.018		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.8	100	0.0110	0.09		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.31"
1.6	63	0.0083	0.64		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.8	59	0.0336	1.28		Shallow Concentrated Flow, C-D Short Grass Pasture Kv= 7.0 fps
0.6	60	0.0521	1.60		Shallow Concentrated Flow, D-E Short Grass Pasture Kv= 7.0 fps
20.8	282	Total			

Subcatchment PDA-2: PDA-2

Hydrograph



Summary for Subcatchment PDA-2a: PDA-2a

Runoff = 0.45 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 2.86"

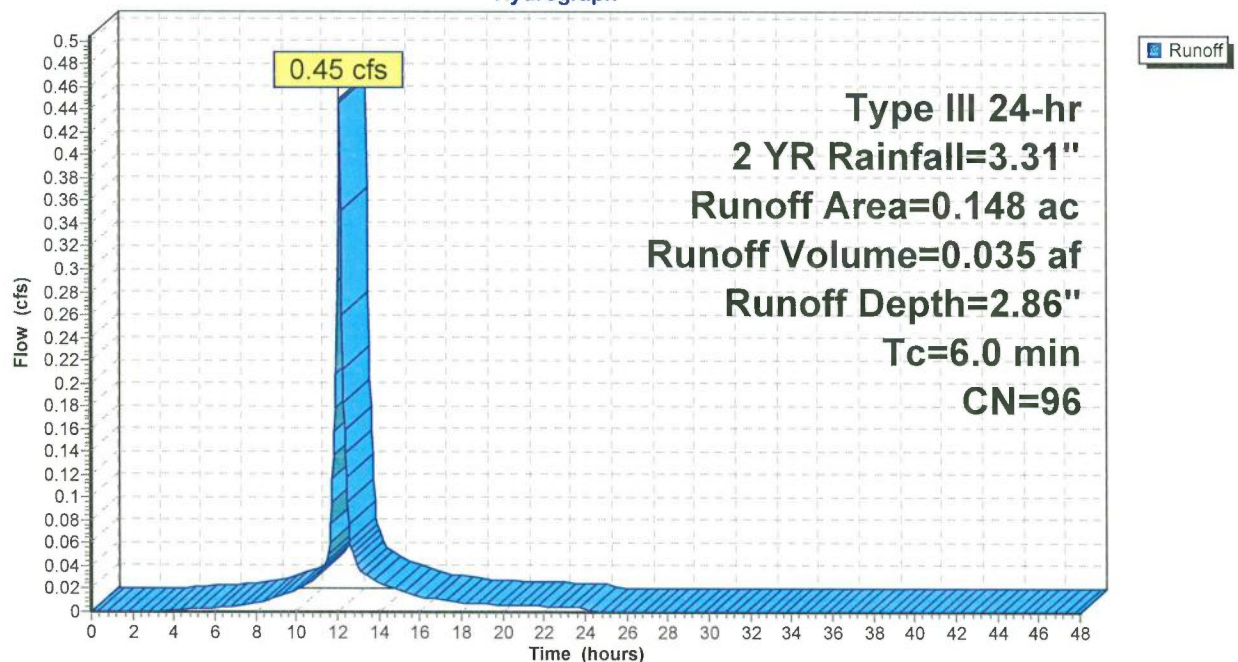
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.31"

Area (ac)	CN	Description
0.148	96	Gravel surface, HSG C
0.148		100.00% Pervious Area

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

Subcatchment PDA-2a: PDA-2a

Hydrograph



Summary for Subcatchment PDA-3: PDA-3

Runoff = 0.03 cfs @ 12.10 hrs, Volume= 0.003 af, Depth= 0.94"

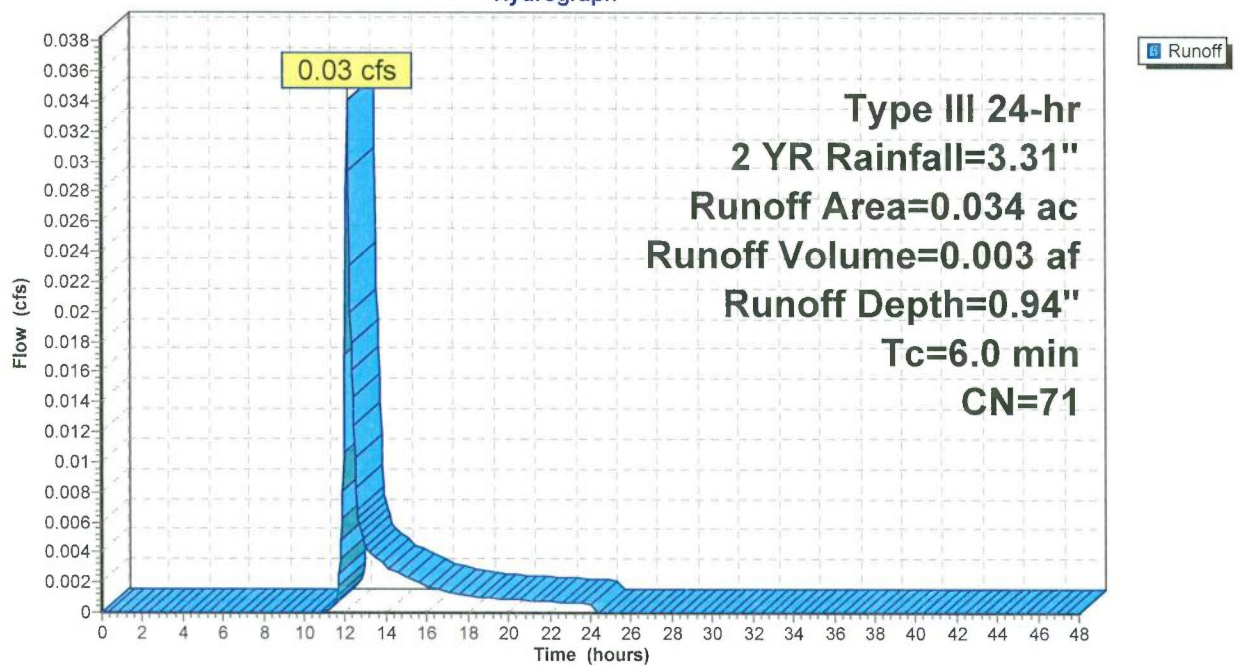
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.31"

Area (ac)	CN	Description
0.034	71	Meadow, non-grazed, HSG C
0.034		100.00% Pervious Area

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

Subcatchment PDA-3: PDA-3

Hydrograph



Summary for Subcatchment PDA-3a: PDA-3a

Runoff = 0.27 cfs @ 12.09 hrs, Volume= 0.021 af, Depth= 2.86"

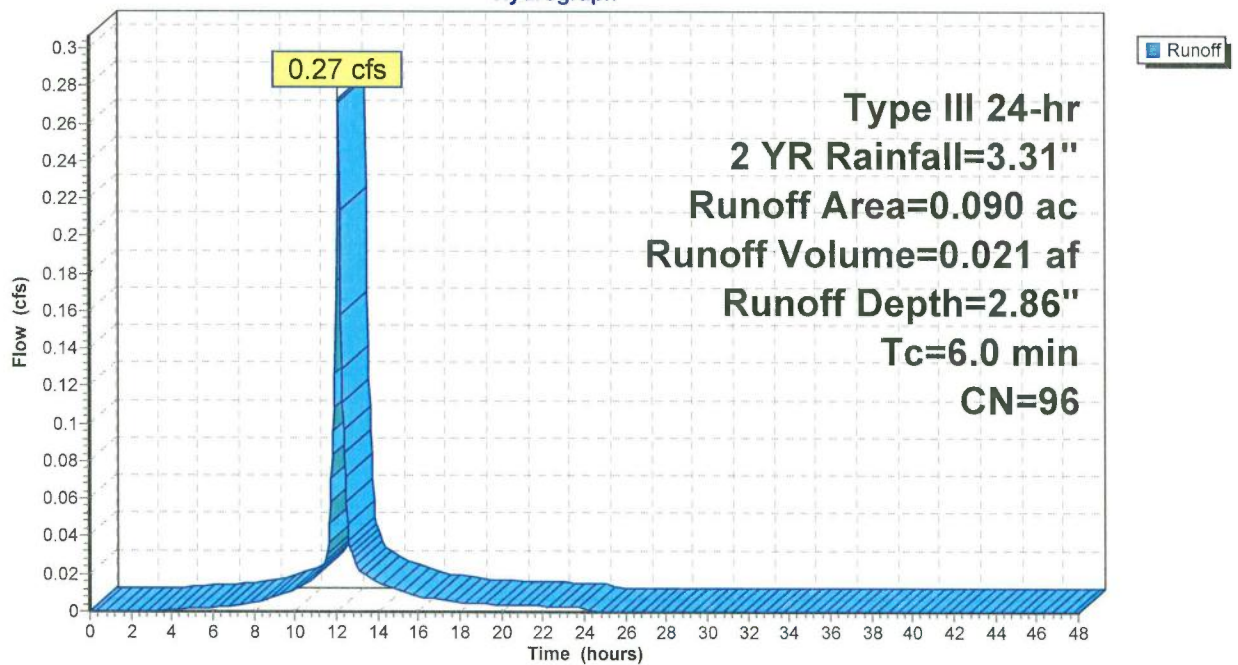
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.31"

Area (ac)	CN	Description
0.090	96	Gravel surface, HSG C
0.090		100.00% Pervious Area

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

Subcatchment PDA-3a: PDA-3a

Hydrograph



Summary for Pond G2: GRAVEL

Inflow Area = 0.148 ac, 0.00% Impervious, Inflow Depth = 2.86" for 2 YR event
 Inflow = 0.45 cfs @ 12.09 hrs, Volume= 0.035 af
 Outflow = 0.03 cfs @ 11.50 hrs, Volume= 0.035 af, Atten= 94%, Lag= 0.0 min
 Discarded = 0.03 cfs @ 11.50 hrs, Volume= 0.035 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Peak Elev= 0.26' @ 13.95 hrs Surf.Area= 6,446 sf Storage= 680 cf

Plug-Flow detention time= 224.8 min calculated for 0.035 af (100% of inflow)

Center-of-Mass det. time= 225.3 min (998.4 - 773.1)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	2,578 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 6,446 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	6,446	0	0
1.00	6,446	6,446	6,446

Device	Routing	Invert	Outlet Devices
#1	Primary	0.99'	150.0' long x 3.0' 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 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Discarded	0.00'	0.170 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.03 cfs @ 11.50 hrs HW=0.01' (Free Discharge)

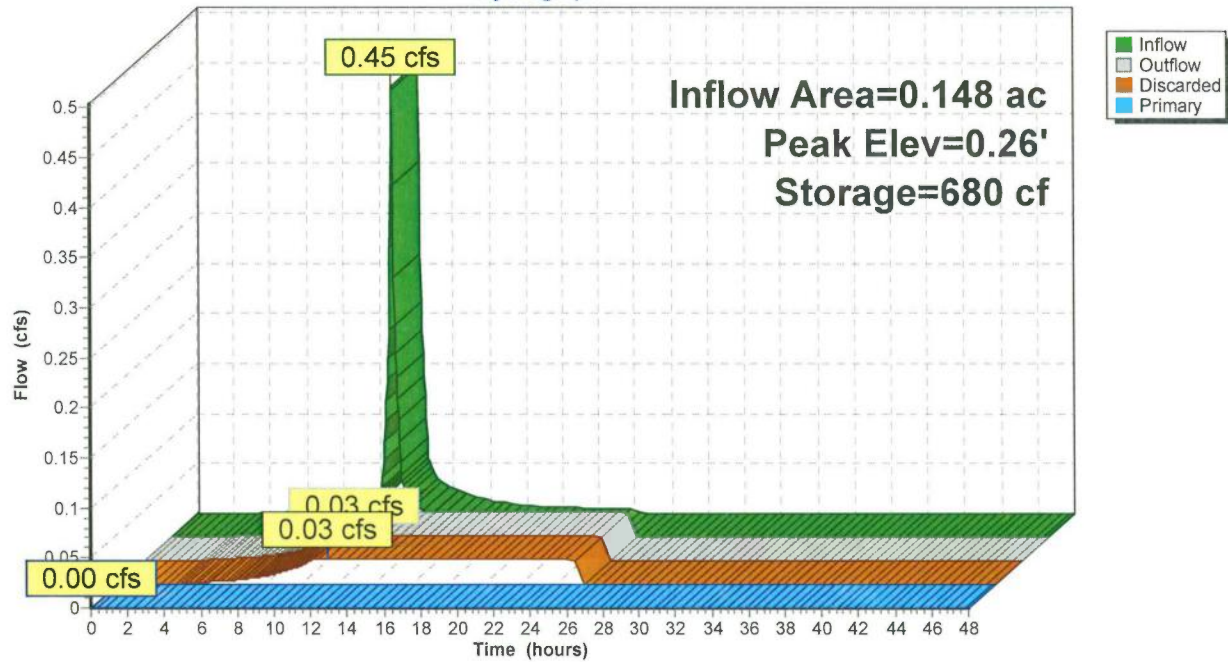
↳ **2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)

↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond G2: GRAVEL

Hydrograph



Summary for Pond G3: GRAVEL

Inflow Area = 0.090 ac, 0.00% Impervious, Inflow Depth = 2.86" for 2 YR event
 Inflow = 0.27 cfs @ 12.09 hrs, Volume= 0.021 af
 Outflow = 0.02 cfs @ 11.50 hrs, Volume= 0.021 af, Atten= 94%, Lag= 0.0 min
 Discarded = 0.02 cfs @ 11.50 hrs, Volume= 0.021 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Peak Elev= 0.26' @ 13.95 hrs Surf.Area= 3,931 sf Storage= 413 cf

Plug-Flow detention time= 223.8 min calculated for 0.021 af (100% of inflow)

Center-of-Mass det. time= 224.0 min (997.0 - 773.1)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	1,572 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 3,931 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	3,931	0	0
1.00	3,931	3,931	3,931

Device	Routing	Invert	Outlet Devices
#1	Primary	0.99'	150.0' long x 3.0' 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 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Discarded	0.00'	0.170 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.02 cfs @ 11.50 hrs HW=0.01' (Free Discharge)

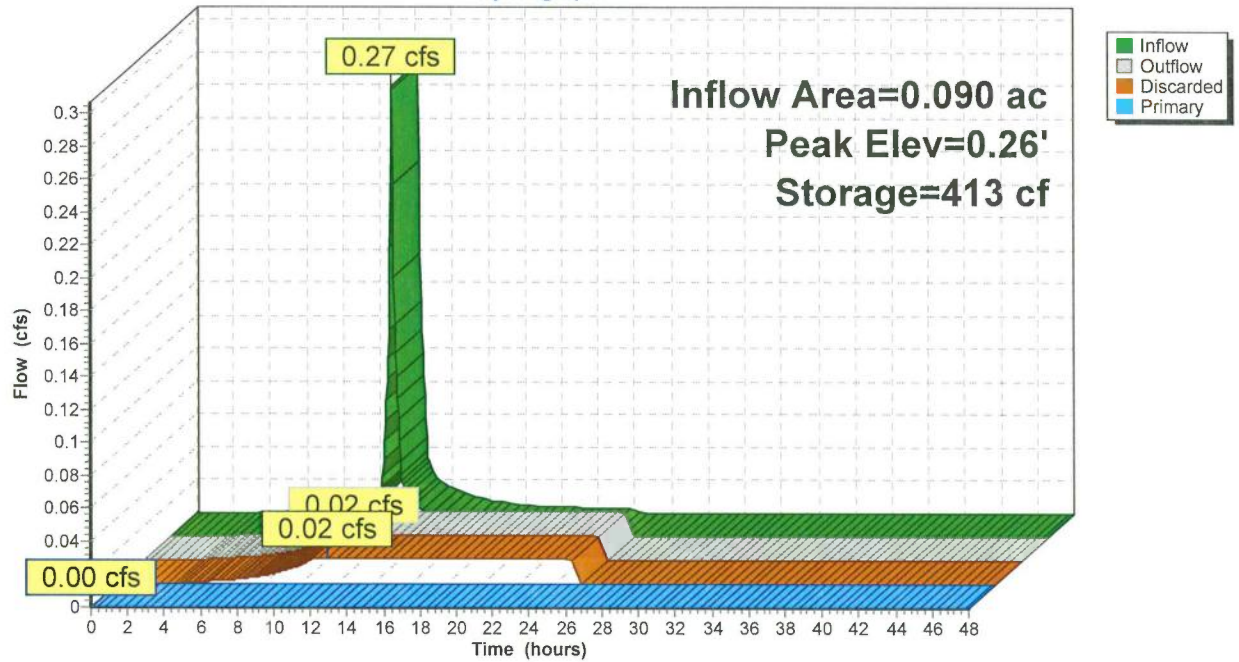
↑**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond G3: GRAVEL

Hydrograph



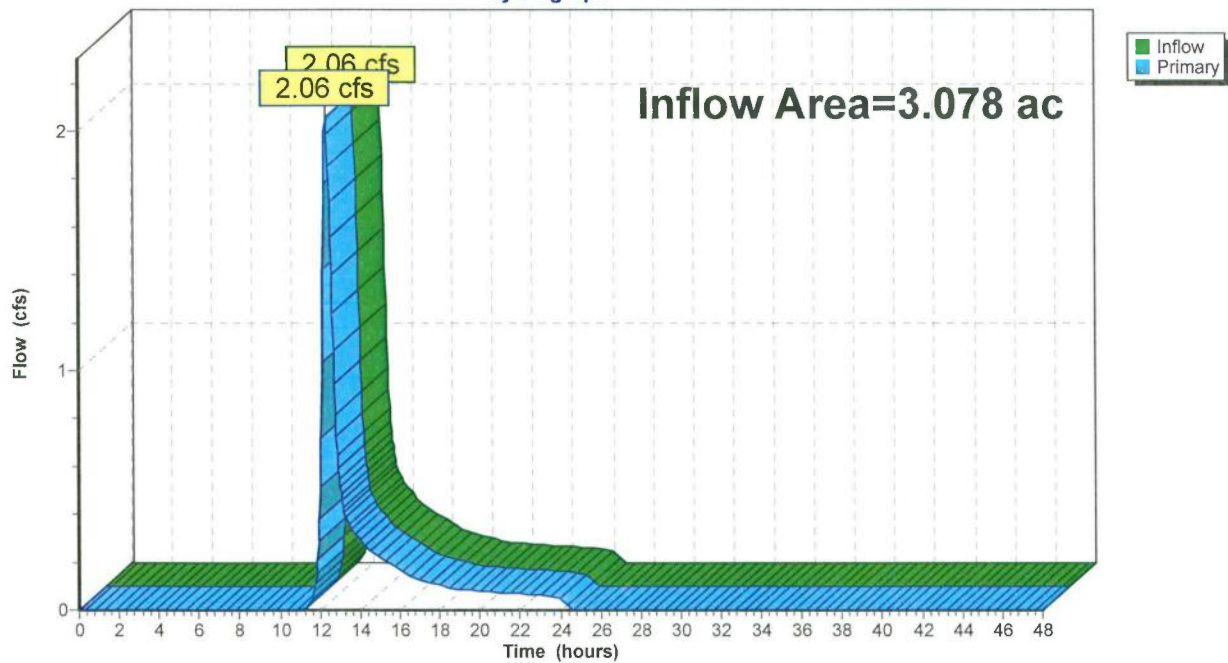
Summary for Link AP-1: AP-1

Inflow Area = 3.078 ac, 0.00% Impervious, Inflow Depth = 0.92" for 2 YR event
 Inflow = 2.06 cfs @ 12.30 hrs, Volume= 0.235 af
 Primary = 2.06 cfs @ 12.30 hrs, Volume= 0.235 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-1: AP-1

Hydrograph



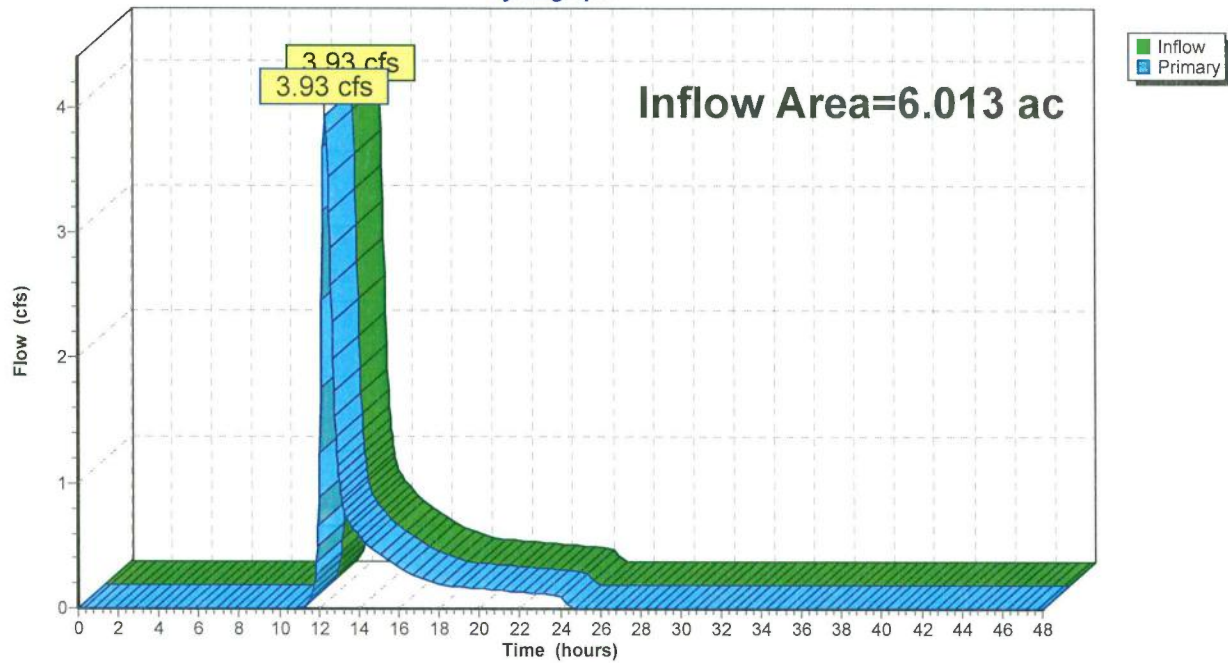
Summary for Link AP-2: AP-2

Inflow Area = 6.013 ac, 0.30% Impervious, Inflow Depth = 0.92" for 2 YR event
Inflow = 3.93 cfs @ 12.32 hrs, Volume= 0.462 af
Primary = 3.93 cfs @ 12.32 hrs, Volume= 0.462 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-2: AP-2

Hydrograph



Middletown-Middlefield - PR - Rev0

Type III 24-hr 10 YR Rainfall=5.15"

Prepared by Microsoft

Printed 3/29/2019

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPDA-1: PDA-1

Runoff Area=2.954 ac 0.00% Impervious Runoff Depth=2.23"
Flow Length=224' Tc=19.2 min CN=71 Runoff=5.21 cfs 0.549 af

SubcatchmentPDA-2: PDA-2

Runoff Area=5.865 ac 0.31% Impervious Runoff Depth=2.23"
Flow Length=282' Tc=20.8 min CN=71 Runoff=9.99 cfs 1.090 af

SubcatchmentPDA-2a: PDA-2a

Runoff Area=0.148 ac 0.00% Impervious Runoff Depth=4.68"
Tc=6.0 min CN=96 Runoff=0.72 cfs 0.058 af

SubcatchmentPDA-3: PDA-3

Runoff Area=0.034 ac 0.00% Impervious Runoff Depth=2.23"
Tc=6.0 min CN=71 Runoff=0.09 cfs 0.006 af

SubcatchmentPDA-3a: PDA-3a

Runoff Area=0.090 ac 0.00% Impervious Runoff Depth=4.68"
Tc=6.0 min CN=96 Runoff=0.44 cfs 0.035 af

Pond G2: GRAVEL

Peak Elev=0.52' Storage=1,348 cf Inflow=0.72 cfs 0.058 af
Discarded=0.03 cfs 0.058 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.058 af

Pond G3: GRAVEL

Peak Elev=0.52' Storage=819 cf Inflow=0.44 cfs 0.035 af
Discarded=0.02 cfs 0.035 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.035 af

Link AP-1: AP-1

Inflow=5.25 cfs 0.555 af
Primary=5.25 cfs 0.555 af

Link AP-2: AP-2

Inflow=9.99 cfs 1.090 af
Primary=9.99 cfs 1.090 af

Total Runoff Area = 9.091 ac Runoff Volume = 1.738 af Average Runoff Depth = 2.29"
99.80% Pervious = 9.073 ac 0.20% Impervious = 0.018 ac

Summary for Subcatchment PDA-1: PDA-1

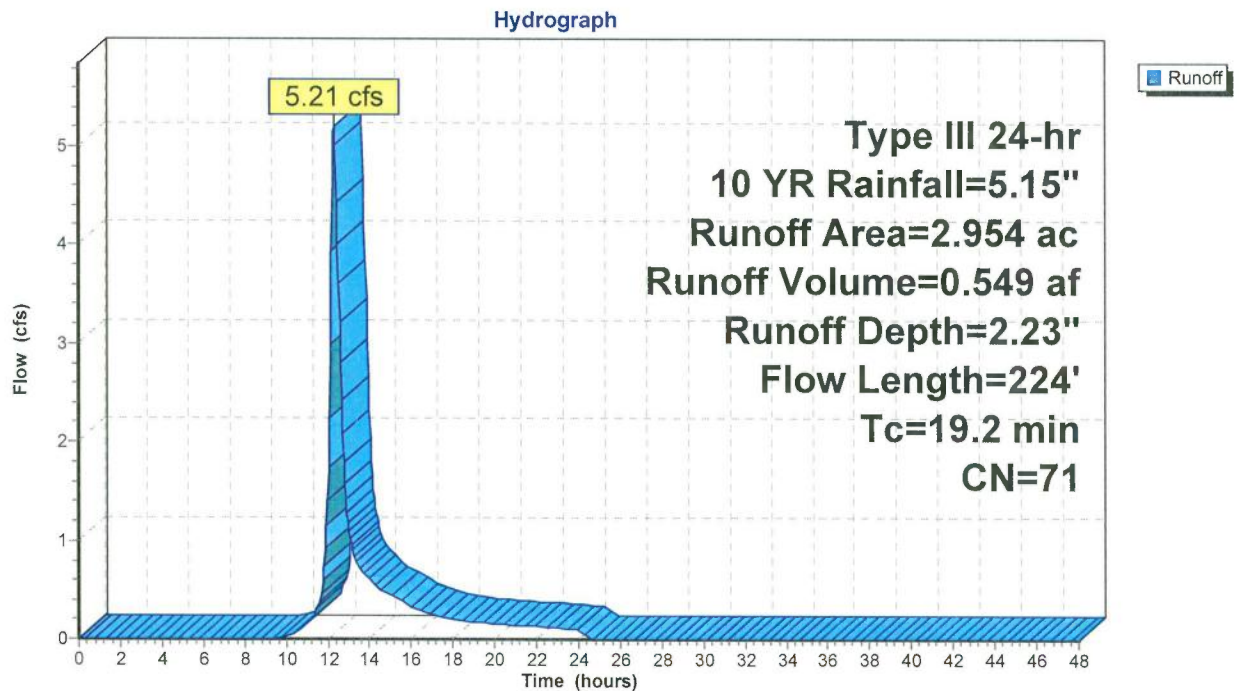
Runoff = 5.21 cfs @ 12.27 hrs, Volume= 0.549 af, Depth= 2.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.15"

Area (ac)	CN	Description
2.954	71	Meadow, non-grazed, HSG C
2.954		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	81	0.0073	0.08		Sheet Flow, A-B
					Grass: Dense n= 0.240 P2= 3.31"
1.5	143	0.0485	1.54		Shallow Concentrated Flow, B-C
					Short Grass Pasture Kv= 7.0 fps
19.2	224	Total			

Subcatchment PDA-1: PDA-1



Summary for Subcatchment PDA-2: PDA-2

Runoff = 9.99 cfs @ 12.30 hrs, Volume= 1.090 af, Depth= 2.23"

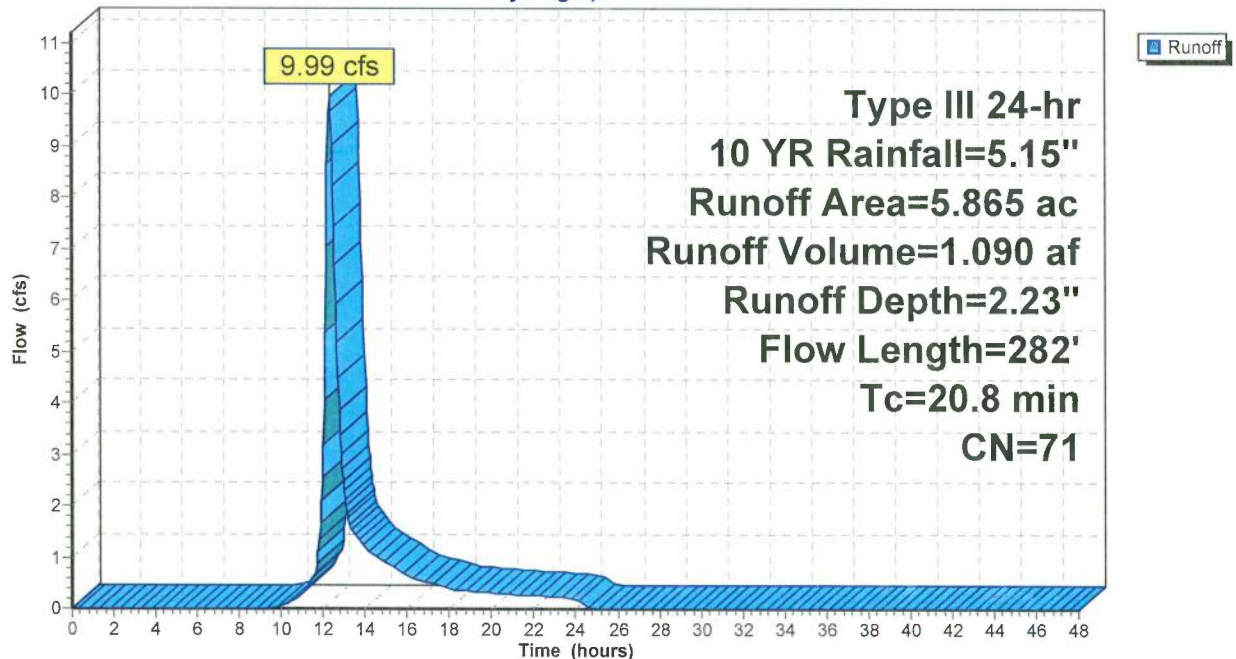
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.15"

Area (ac)	CN	Description
5.847	71	Meadow, non-grazed, HSG C
0.018	98	Unconnected pavement, HSG C
5.865	71	Weighted Average
5.847		99.69% Pervious Area
0.018		0.31% Impervious Area
0.018		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.8	100	0.0110	0.09		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.31"
1.6	63	0.0083	0.64		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.8	59	0.0336	1.28		Shallow Concentrated Flow, C-D Short Grass Pasture Kv= 7.0 fps
0.6	60	0.0521	1.60		Shallow Concentrated Flow, D-E Short Grass Pasture Kv= 7.0 fps
20.8	282	Total			

Subcatchment PDA-2: PDA-2

Hydrograph



Summary for Subcatchment PDA-2a: PDA-2a

Runoff = 0.72 cfs @ 12.09 hrs, Volume= 0.058 af, Depth= 4.68"

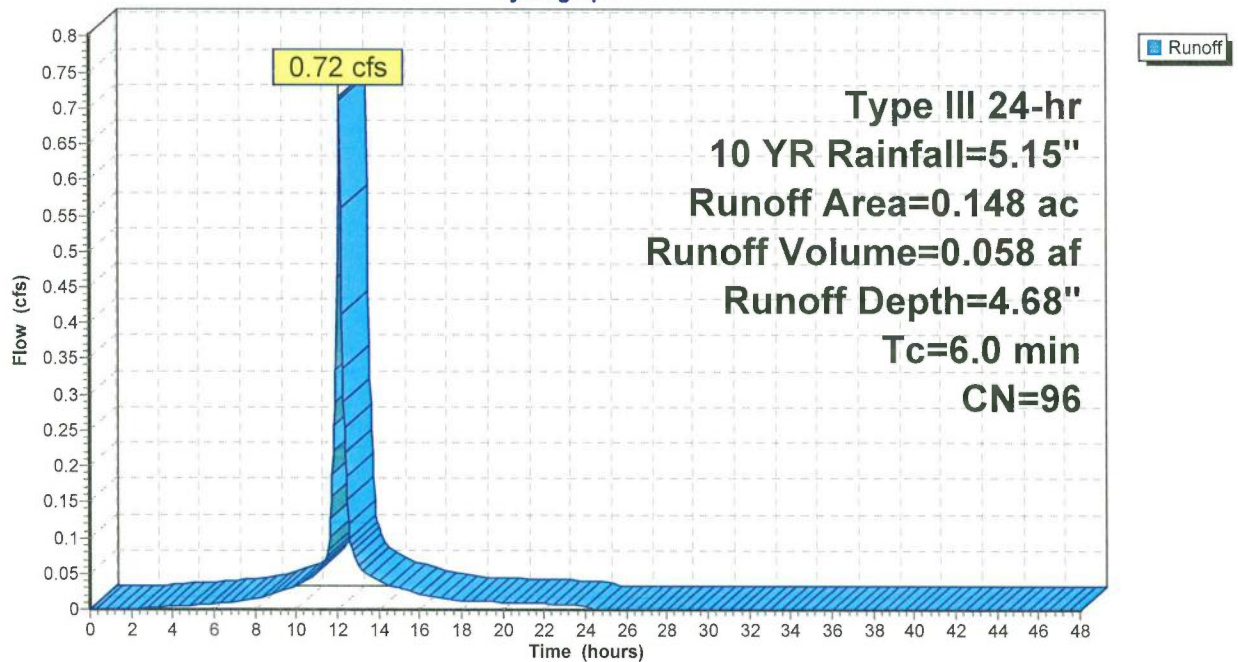
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.15"

Area (ac)	CN	Description
0.148	96	Gravel surface, HSG C
0.148		100.00% Pervious Area

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

Subcatchment PDA-2a: PDA-2a

Hydrograph



Summary for Subcatchment PDA-3: PDA-3

Runoff = 0.09 cfs @ 12.10 hrs, Volume= 0.006 af, Depth= 2.23"

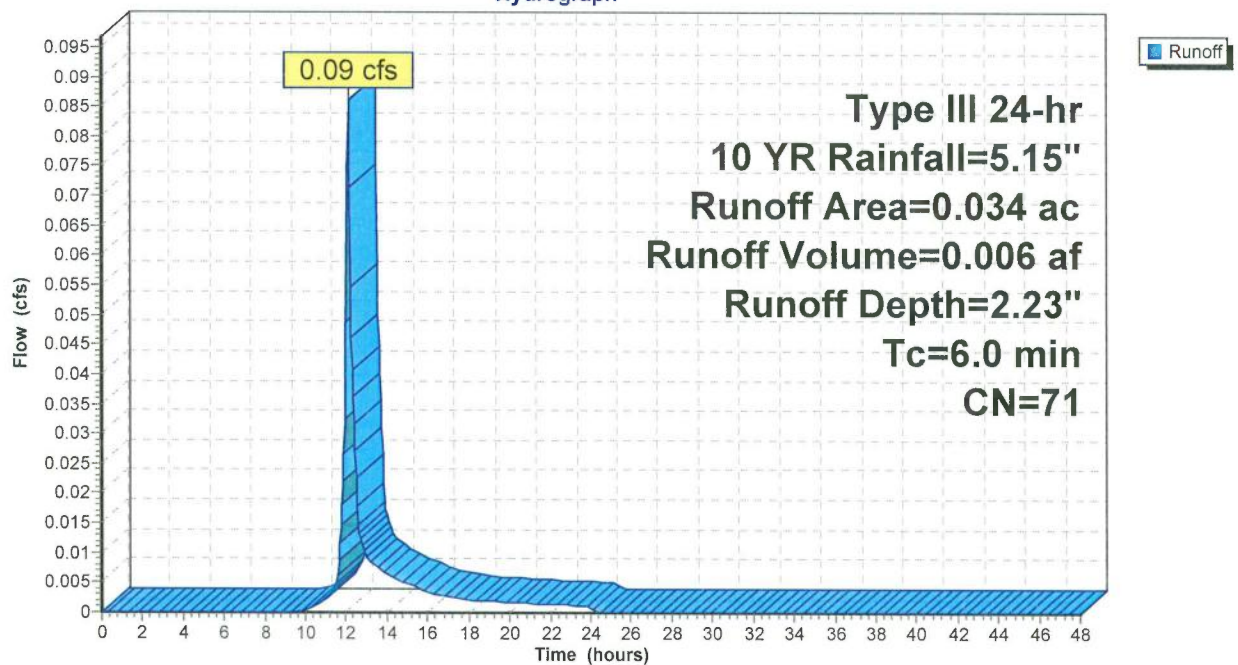
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.15"

Area (ac)	CN	Description
0.034	71	Meadow, non-grazed, HSG C
0.034		100.00% Pervious Area

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

Subcatchment PDA-3: PDA-3

Hydrograph



Summary for Subcatchment PDA-3a: PDA-3a

Runoff = 0.44 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 4.68"

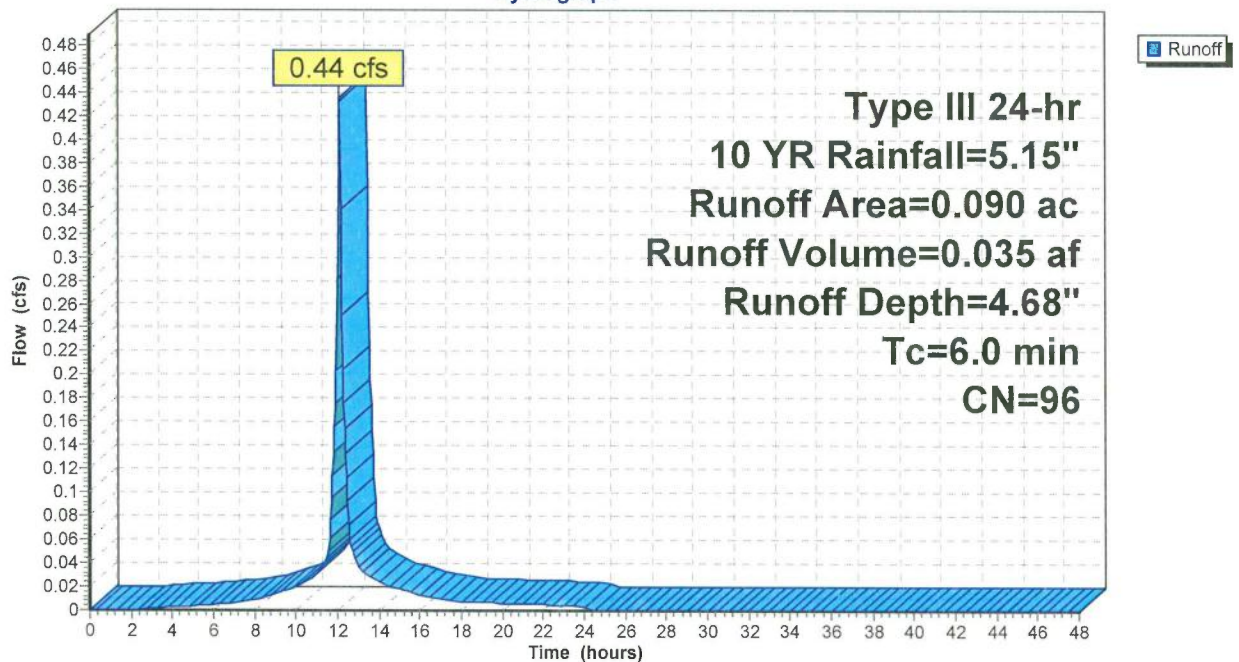
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YR Rainfall=5.15"

Area (ac)	CN	Description
0.090	96	Gravel surface, HSG C
0.090		100.00% Pervious Area

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

Subcatchment PDA-3a: PDA-3a

Hydrograph



Summary for Pond G2: GRAVEL

Inflow Area = 0.148 ac, 0.00% Impervious, Inflow Depth = 4.68" for 10 YR event
 Inflow = 0.72 cfs @ 12.09 hrs, Volume= 0.058 af
 Outflow = 0.03 cfs @ 10.40 hrs, Volume= 0.058 af, Atten= 96%, Lag= 0.0 min
 Discarded = 0.03 cfs @ 10.40 hrs, Volume= 0.058 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 0.52' @ 15.46 hrs Surf.Area= 6,446 sf Storage= 1,348 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
 Center-of-Mass det. time= 460.4 min (1,222.1 - 761.7)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	2,578 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 6,446 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	6,446	0	0
1.00	6,446	6,446	6,446

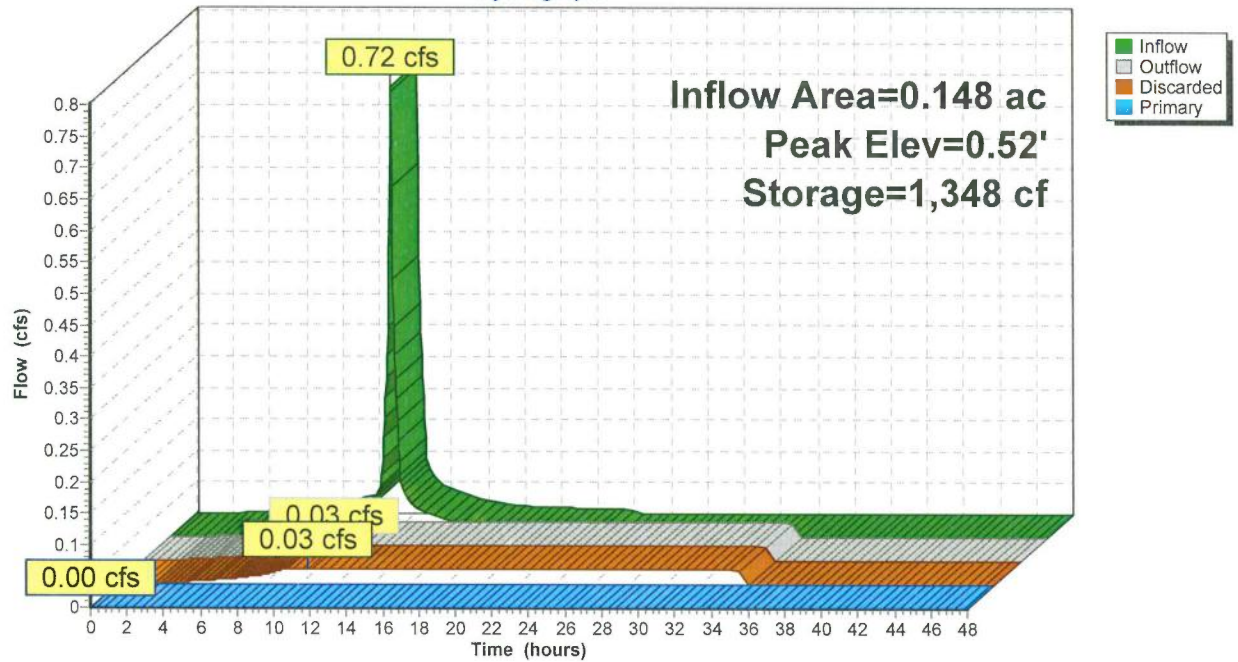
Device	Routing	Invert	Outlet Devices
#1	Primary	0.99'	150.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Discarded	0.00'	0.170 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.03 cfs @ 10.40 hrs HW=0.01' (Free Discharge)
 ↳ **2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)
 ↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond G2: GRAVEL

Hydrograph



Summary for Pond G3: GRAVEL

Inflow Area = 0.090 ac, 0.00% Impervious, Inflow Depth = 4.68" for 10 YR event
 Inflow = 0.44 cfs @ 12.09 hrs, Volume= 0.035 af
 Outflow = 0.02 cfs @ 10.40 hrs, Volume= 0.035 af, Atten= 96%, Lag= 0.0 min
 Discarded = 0.02 cfs @ 10.40 hrs, Volume= 0.035 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Peak Elev= 0.52' @ 15.45 hrs Surf.Area= 3,931 sf Storage= 819 cf

Plug-Flow detention time= 458.4 min calculated for 0.035 af (100% of inflow)

Center-of-Mass det. time= 459.1 min (1,220.8 - 761.7)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	1,572 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 3,931 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	3,931	0	0
1.00	3,931	3,931	3,931

Device	Routing	Invert	Outlet Devices
#1	Primary	0.99'	150.0' long x 3.0' 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 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Discarded	0.00'	0.170 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.02 cfs @ 10.40 hrs HW=0.01' (Free Discharge)

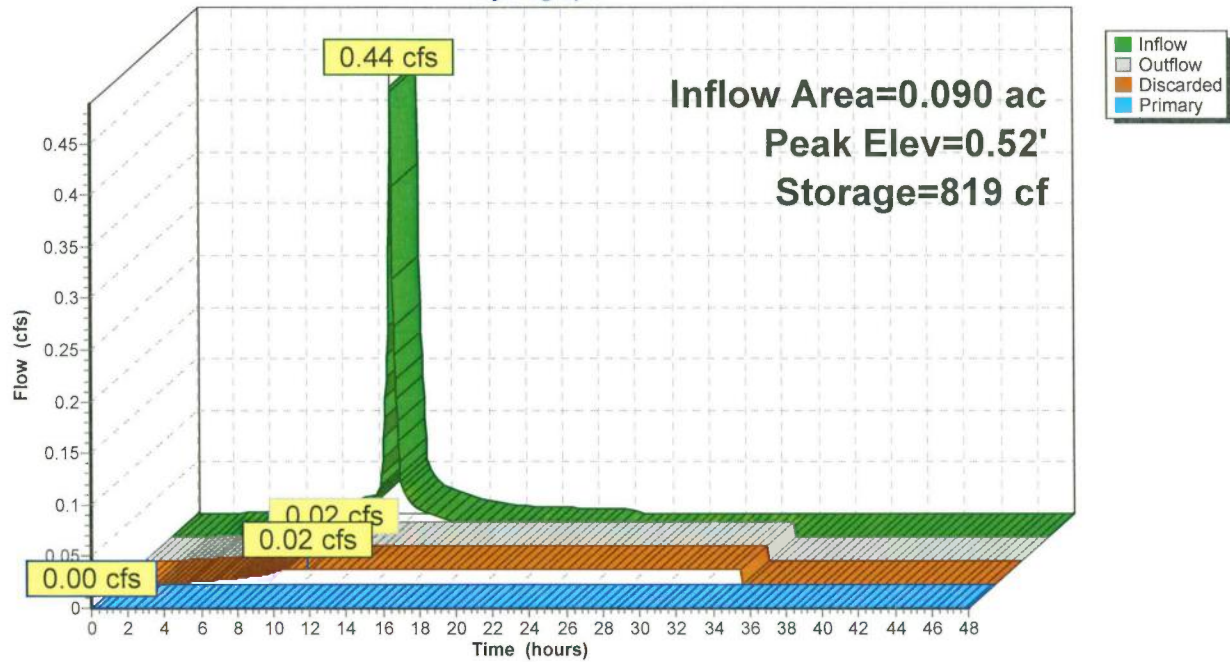
↳ **2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)

↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond G3: GRAVEL

Hydrograph



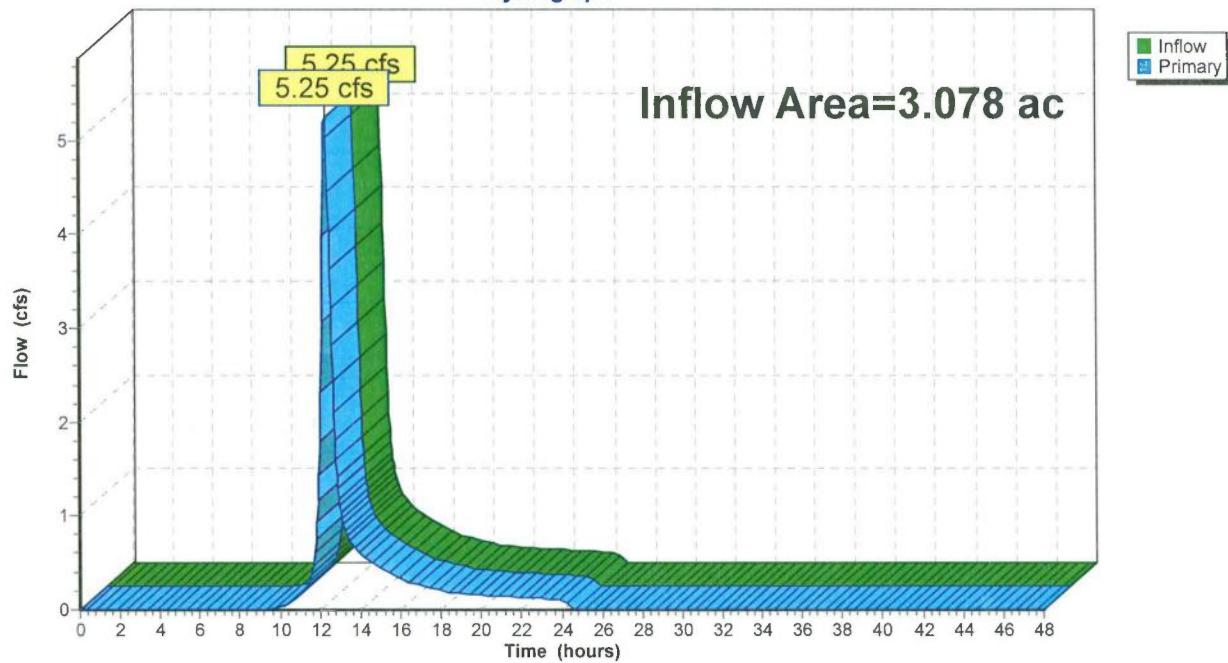
Summary for Link AP-1: AP-1

Inflow Area = 3.078 ac, 0.00% Impervious, Inflow Depth = 2.17" for 10 YR event
 Inflow = 5.25 cfs @ 12.27 hrs, Volume= 0.555 af
 Primary = 5.25 cfs @ 12.27 hrs, Volume= 0.555 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-1: AP-1

Hydrograph



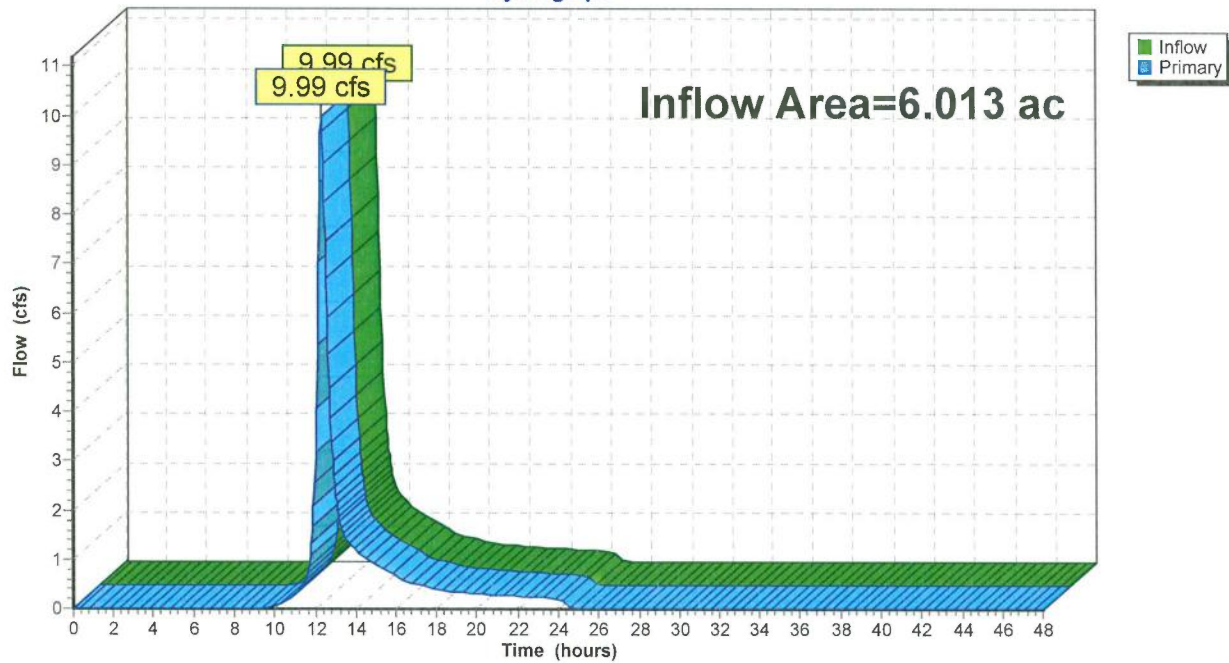
Summary for Link AP-2: AP-2

Inflow Area = 6.013 ac, 0.30% Impervious, Inflow Depth = 2.18" for 10 YR event
Inflow = 9.99 cfs @ 12.30 hrs, Volume= 1.090 af
Primary = 9.99 cfs @ 12.30 hrs, Volume= 1.090 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-2: AP-2

Hydrograph



Middletown-Middlefield - PR - Rev0

Type III 24-hr 25 YR Rainfall=6.30"

Prepared by Microsoft

Printed 3/29/2019

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPDA-1: PDA-1

Runoff Area=2.954 ac 0.00% Impervious Runoff Depth=3.14"
Flow Length=224' Tc=19.2 min CN=71 Runoff=7.42 cfs 0.774 af

SubcatchmentPDA-2: PDA-2

Runoff Area=5.865 ac 0.31% Impervious Runoff Depth=3.14"
Flow Length=282' Tc=20.8 min CN=71 Runoff=14.23 cfs 1.536 af

SubcatchmentPDA-2a: PDA-2a

Runoff Area=0.148 ac 0.00% Impervious Runoff Depth=5.83"
Tc=6.0 min CN=96 Runoff=0.88 cfs 0.072 af

SubcatchmentPDA-3: PDA-3

Runoff Area=0.034 ac 0.00% Impervious Runoff Depth=3.14"
Tc=6.0 min CN=71 Runoff=0.12 cfs 0.009 af

SubcatchmentPDA-3a: PDA-3a

Runoff Area=0.090 ac 0.00% Impervious Runoff Depth=5.83"
Tc=6.0 min CN=96 Runoff=0.54 cfs 0.044 af

Pond G2: GRAVEL

Peak Elev=0.70' Storage=1,814 cf Inflow=0.88 cfs 0.072 af
Discarded=0.03 cfs 0.072 af Primary=0.00 cfs 0.000 af Outflow=0.03 cfs 0.072 af

Pond G3: GRAVEL

Peak Elev=0.70' Storage=1,102 cf Inflow=0.54 cfs 0.044 af
Discarded=0.02 cfs 0.044 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.044 af

Link AP-1: AP-1

Inflow=7.48 cfs 0.782 af
Primary=7.48 cfs 0.782 af

Link AP-2: AP-2

Inflow=14.23 cfs 1.536 af
Primary=14.23 cfs 1.536 af

Total Runoff Area = 9.091 ac Runoff Volume = 2.434 af Average Runoff Depth = 3.21"
99.80% Pervious = 9.073 ac 0.20% Impervious = 0.018 ac

Summary for Subcatchment PDA-1: PDA-1

Runoff = 7.42 cfs @ 12.27 hrs, Volume= 0.774 af, Depth= 3.14"

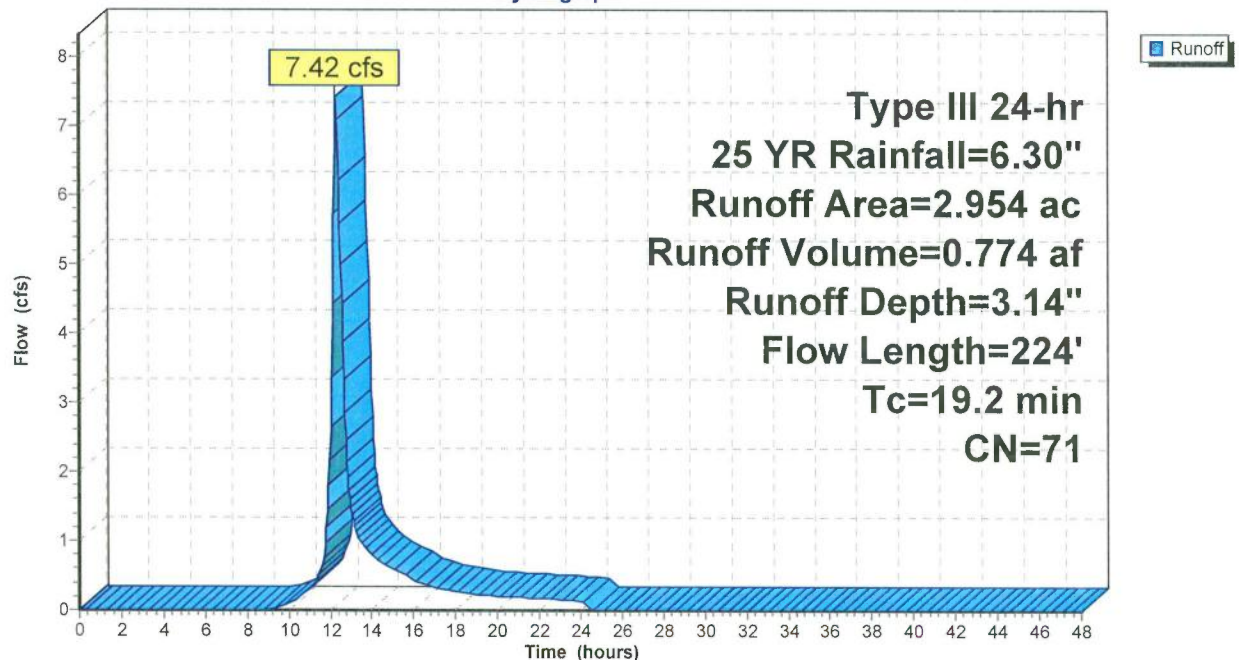
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.30"

Area (ac)	CN	Description
2.954	71	Meadow, non-grazed, HSG C
2.954		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	81	0.0073	0.08		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.31"
1.5	143	0.0485	1.54		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
19.2	224	Total			

Subcatchment PDA-1: PDA-1

Hydrograph



Summary for Subcatchment PDA-2: PDA-2

Runoff = 14.23 cfs @ 12.29 hrs, Volume= 1.536 af, Depth= 3.14"

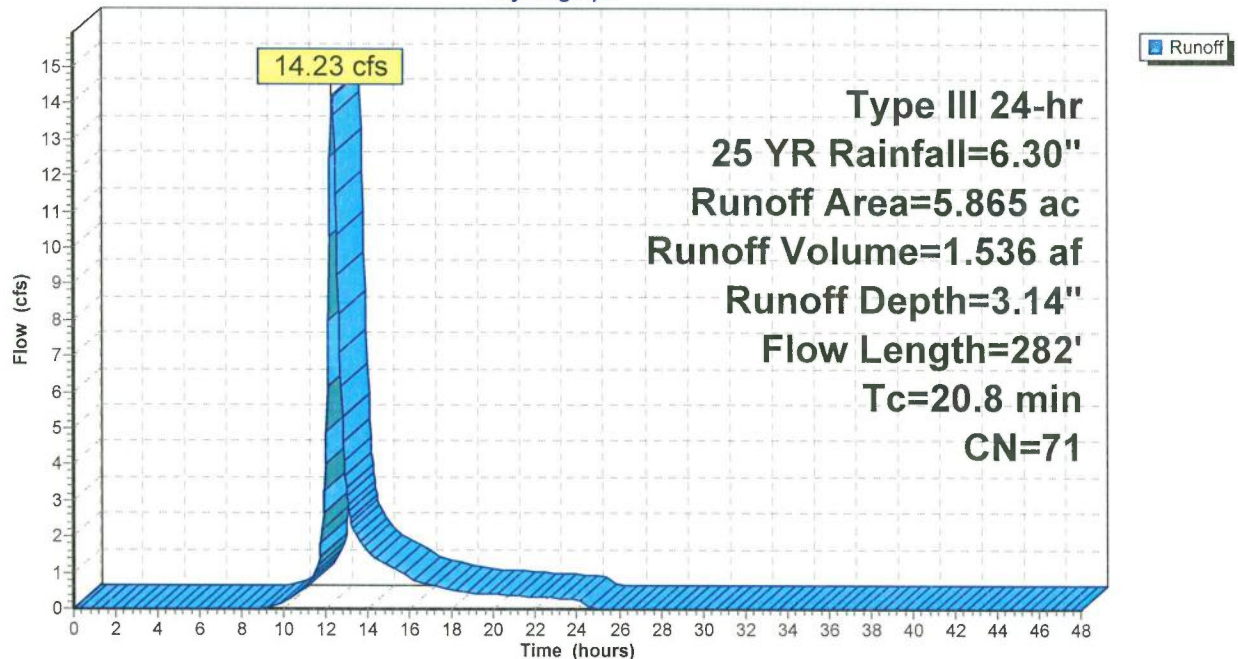
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.30"

Area (ac)	CN	Description
5.847	71	Meadow, non-grazed, HSG C
0.018	98	Unconnected pavement, HSG C
5.865	71	Weighted Average
5.847		99.69% Pervious Area
0.018		0.31% Impervious Area
0.018		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.8	100	0.0110	0.09		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.31"
1.6	63	0.0083	0.64		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.8	59	0.0336	1.28		Shallow Concentrated Flow, C-D Short Grass Pasture Kv= 7.0 fps
0.6	60	0.0521	1.60		Shallow Concentrated Flow, D-E Short Grass Pasture Kv= 7.0 fps
20.8	282	Total			

Subcatchment PDA-2: PDA-2

Hydrograph



Summary for Subcatchment PDA-2a: PDA-2a

Runoff = 0.88 cfs @ 12.09 hrs, Volume= 0.072 af, Depth= 5.83"

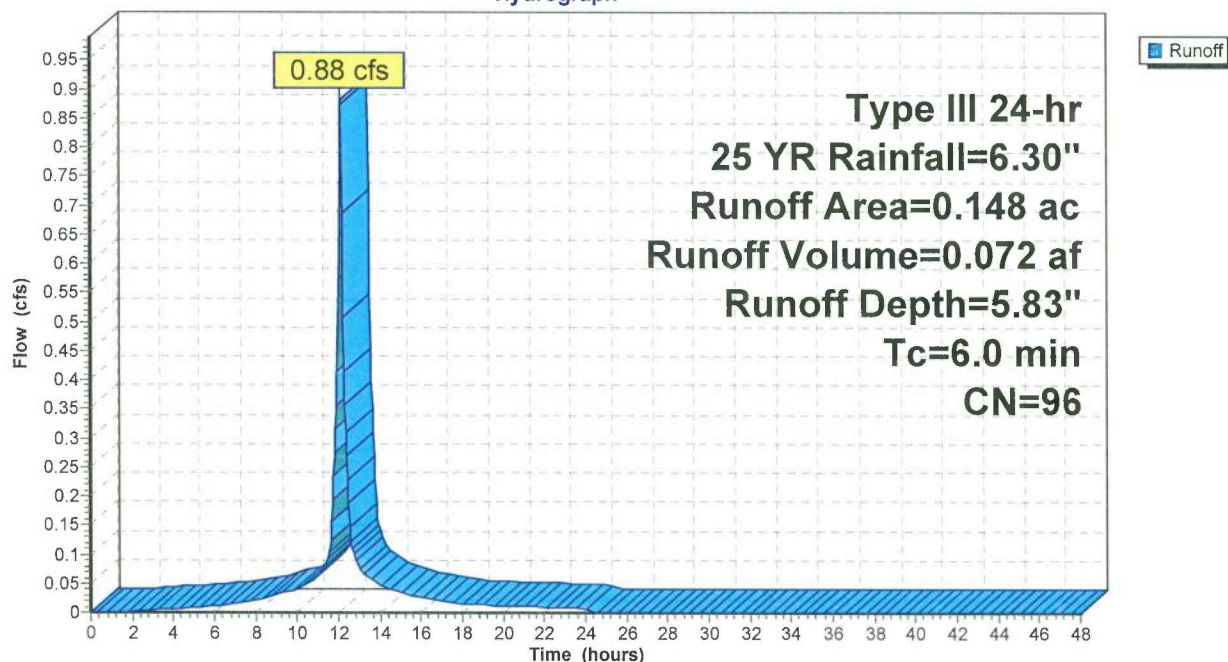
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.30"

Area (ac)	CN	Description
0.148	96	Gravel surface, HSG C
0.148		100.00% Pervious Area

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

Subcatchment PDA-2a: PDA-2a

Hydrograph



Summary for Subcatchment PDA-3: PDA-3

Runoff = 0.12 cfs @ 12.09 hrs, Volume= 0.009 af, Depth= 3.14"

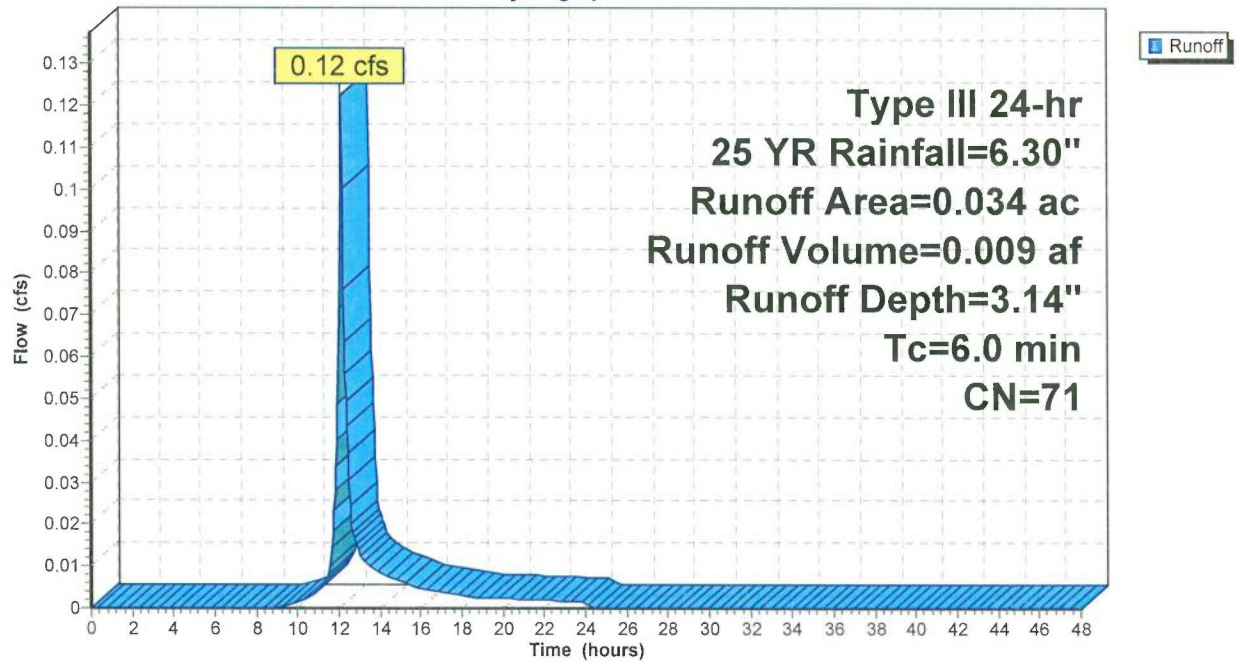
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.30"

Area (ac)	CN	Description
0.034	71	Meadow, non-grazed, HSG C
0.034		100.00% Pervious Area

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

Subcatchment PDA-3: PDA-3

Hydrograph



Summary for Subcatchment PDA-3a: PDA-3a

Runoff = 0.54 cfs @ 12.09 hrs, Volume= 0.044 af, Depth= 5.83"

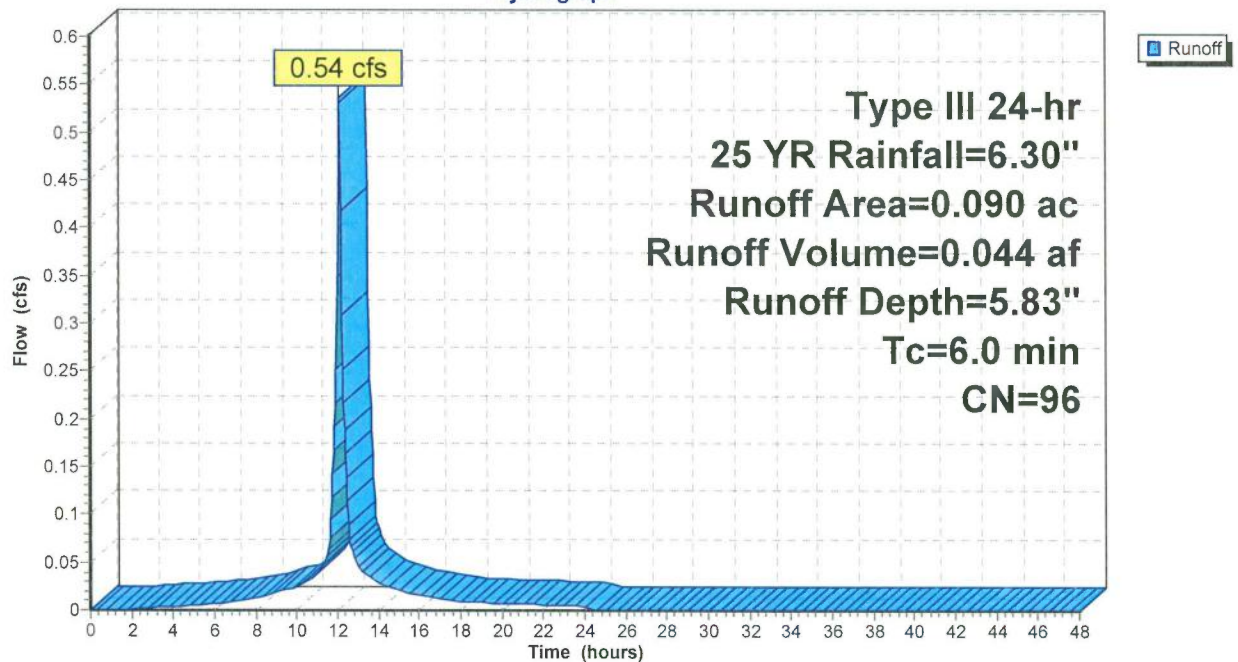
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.30"

Area (ac)	CN	Description
0.090	96	Gravel surface, HSG C
0.090		100.00% Pervious Area

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

Subcatchment PDA-3a: PDA-3a

Hydrograph



Summary for Pond G2: GRAVEL

Inflow Area = 0.148 ac, 0.00% Impervious, Inflow Depth = 5.83" for 25 YR event
 Inflow = 0.88 cfs @ 12.09 hrs, Volume= 0.072 af
 Outflow = 0.03 cfs @ 9.70 hrs, Volume= 0.072 af, Atten= 97%, Lag= 0.0 min
 Discarded = 0.03 cfs @ 9.70 hrs, Volume= 0.072 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Peak Elev= 0.70' @ 16.00 hrs Surf.Area= 6,446 sf Storage= 1,814 cf

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

Center-of-Mass det. time= 620.5 min (1,377.6 - 757.2)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	2,578 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 6,446 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	6,446	0	0
1.00	6,446	6,446	6,446

Device	Routing	Invert	Outlet Devices
#1	Primary	0.99'	150.0' long x 3.0' 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 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Discarded	0.00'	0.170 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.03 cfs @ 9.70 hrs HW=0.01' (Free Discharge)

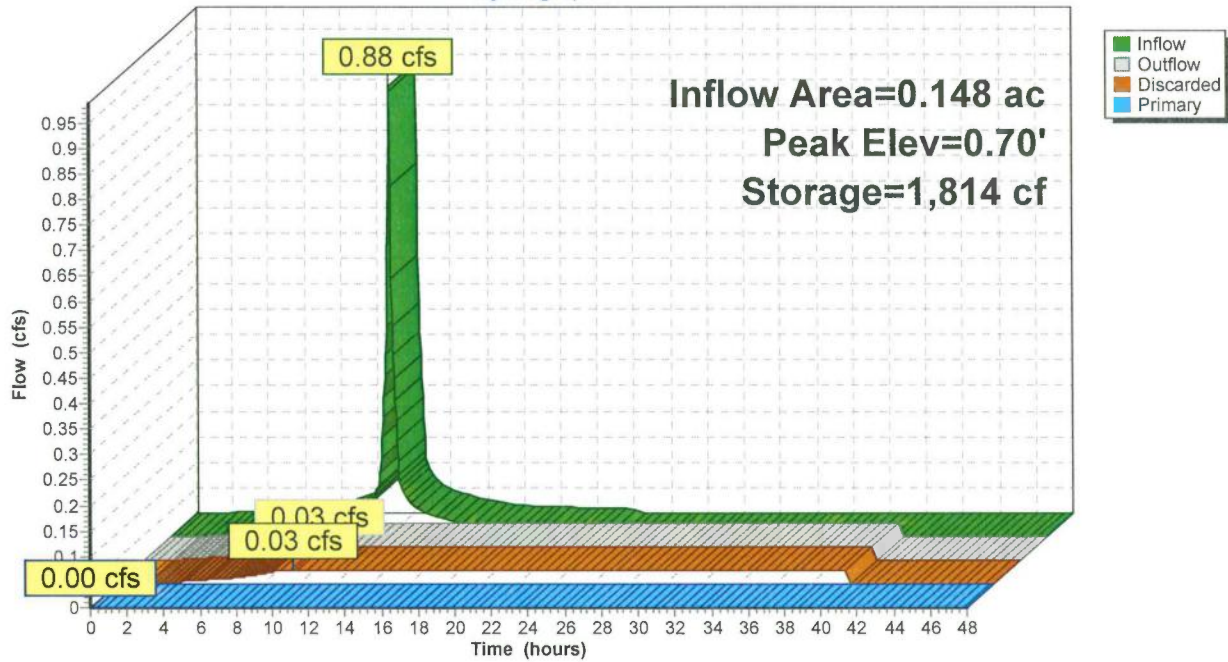
↳ **2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)

↳ **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond G2: GRAVEL

Hydrograph



Summary for Pond G3: GRAVEL

Inflow Area = 0.090 ac, 0.00% Impervious, Inflow Depth = 5.83" for 25 YR event
 Inflow = 0.54 cfs @ 12.09 hrs, Volume= 0.044 af
 Outflow = 0.02 cfs @ 9.70 hrs, Volume= 0.044 af, Atten= 97%, Lag= 0.0 min
 Discarded = 0.02 cfs @ 9.70 hrs, Volume= 0.044 af
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Peak Elev= 0.70' @ 15.99 hrs Surf.Area= 3,931 sf Storage= 1,102 cf

Plug-Flow detention time= 617.2 min calculated for 0.044 af (100% of inflow)

Center-of-Mass det. time= 617.7 min (1,374.8 - 757.2)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	1,572 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 3,931 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	3,931	0	0
1.00	3,931	3,931	3,931

Device	Routing	Invert	Outlet Devices
#1	Primary	0.99'	150.0' long x 3.0' 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 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Discarded	0.00'	0.170 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.02 cfs @ 9.70 hrs HW=0.01' (Free Discharge)

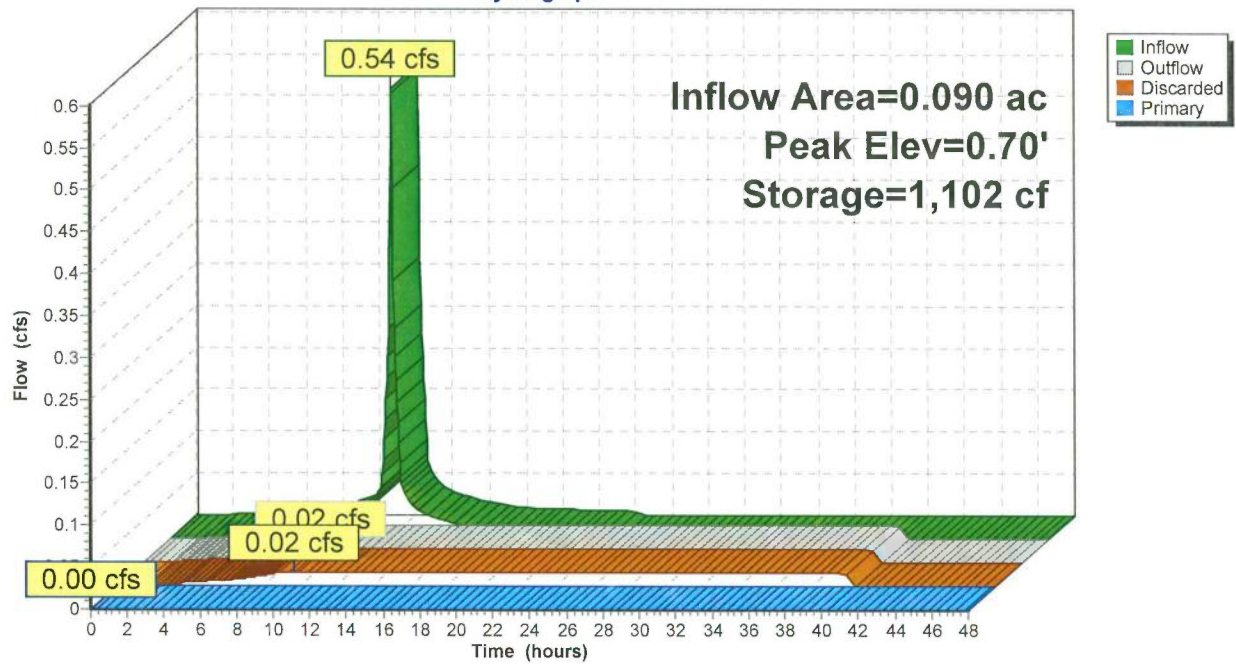
↑**2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond G3: GRAVEL

Hydrograph



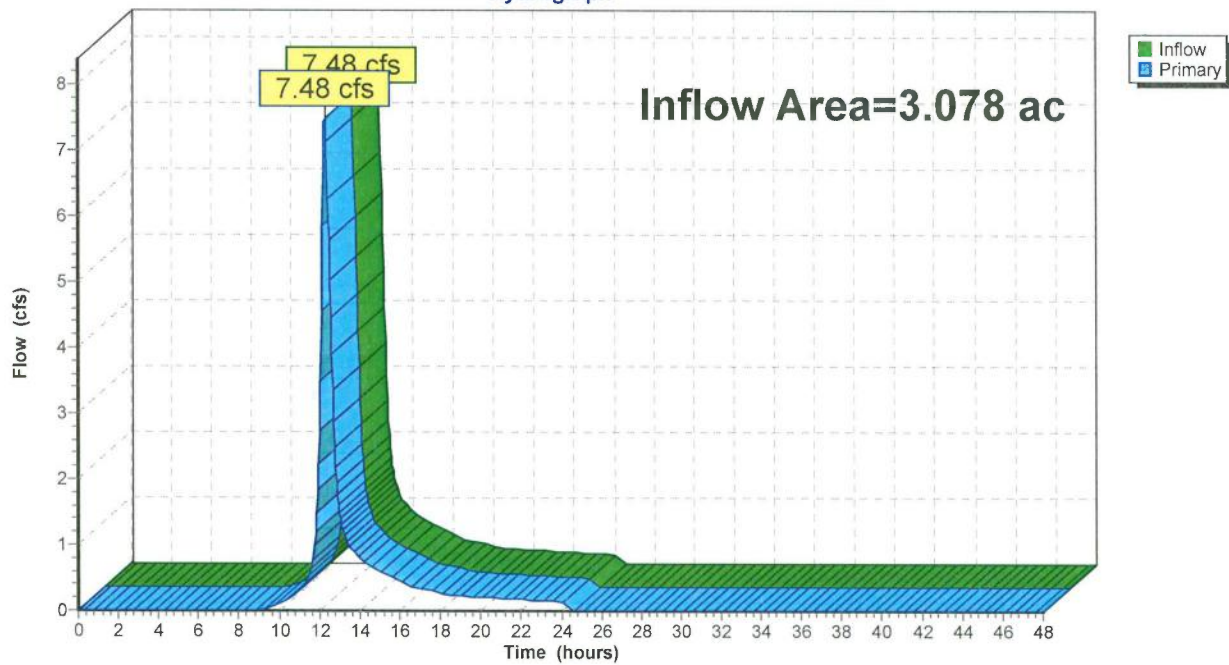
Summary for Link AP-1: AP-1

Inflow Area = 3.078 ac, 0.00% Impervious, Inflow Depth = 3.05" for 25 YR event
Inflow = 7.48 cfs @ 12.27 hrs, Volume= 0.782 af
Primary = 7.48 cfs @ 12.27 hrs, Volume= 0.782 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-1: AP-1

Hydrograph



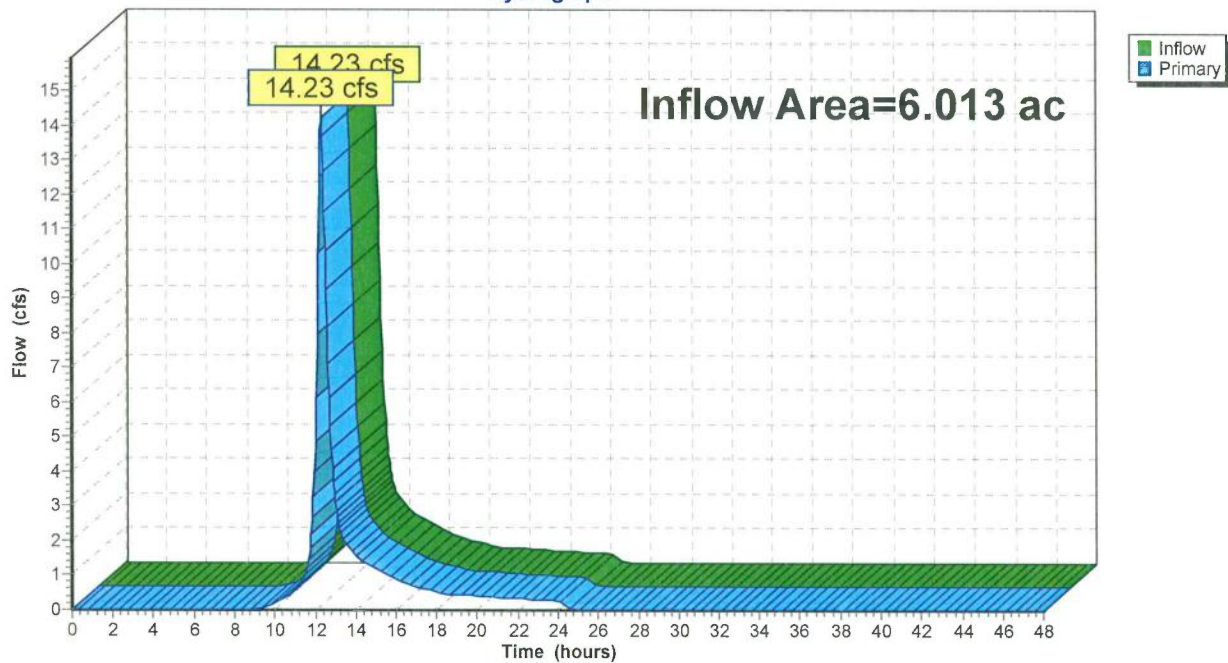
Summary for Link AP-2: AP-2

Inflow Area = 6.013 ac, 0.30% Impervious, Inflow Depth = 3.06" for 25 YR event
 Inflow = 14.23 cfs @ 12.29 hrs, Volume= 1.536 af
 Primary = 14.23 cfs @ 12.29 hrs, Volume= 1.536 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-2: AP-2

Hydrograph



Middletown-Middlefield - PR - Rev0

Type III 24-hr 100 YR Rainfall=8.07"

Prepared by Microsoft

Printed 3/29/2019

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Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPDA-1: PDA-1Runoff Area=2.954 ac 0.00% Impervious Runoff Depth=4.64"
Flow Length=224' Tc=19.2 min CN=71 Runoff=11.00 cfs 1.142 af**SubcatchmentPDA-2: PDA-2**Runoff Area=5.865 ac 0.31% Impervious Runoff Depth=4.64"
Flow Length=282' Tc=20.8 min CN=71 Runoff=21.09 cfs 2.268 af**SubcatchmentPDA-2a: PDA-2a**Runoff Area=0.148 ac 0.00% Impervious Runoff Depth=7.59"
Tc=6.0 min CN=96 Runoff=1.14 cfs 0.094 af**SubcatchmentPDA-3: PDA-3**Runoff Area=0.034 ac 0.00% Impervious Runoff Depth=4.64"
Tc=6.0 min CN=71 Runoff=0.18 cfs 0.013 af**SubcatchmentPDA-3a: PDA-3a**Runoff Area=0.090 ac 0.00% Impervious Runoff Depth=7.59"
Tc=6.0 min CN=96 Runoff=0.69 cfs 0.057 af**Pond G2: GRAVEL**Peak Elev=0.99' Storage=2,554 cf Inflow=1.14 cfs 0.094 af
Discarded=0.03 cfs 0.091 af Primary=0.01 cfs 0.000 af Outflow=0.03 cfs 0.091 af**Pond G3: GRAVEL**Peak Elev=0.99' Storage=1,557 cf Inflow=0.69 cfs 0.057 af
Discarded=0.02 cfs 0.055 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.055 af**Link AP-1: AP-1**Inflow=11.09 cfs 1.155 af
Primary=11.09 cfs 1.155 af**Link AP-2: AP-2**Inflow=21.09 cfs 2.268 af
Primary=21.09 cfs 2.268 af**Total Runoff Area = 9.091 ac Runoff Volume = 3.574 af Average Runoff Depth = 4.72"**
99.80% Pervious = 9.073 ac 0.20% Impervious = 0.018 ac

Summary for Subcatchment PDA-1: PDA-1

Runoff = 11.00 cfs @ 12.27 hrs, Volume= 1.142 af, Depth= 4.64"

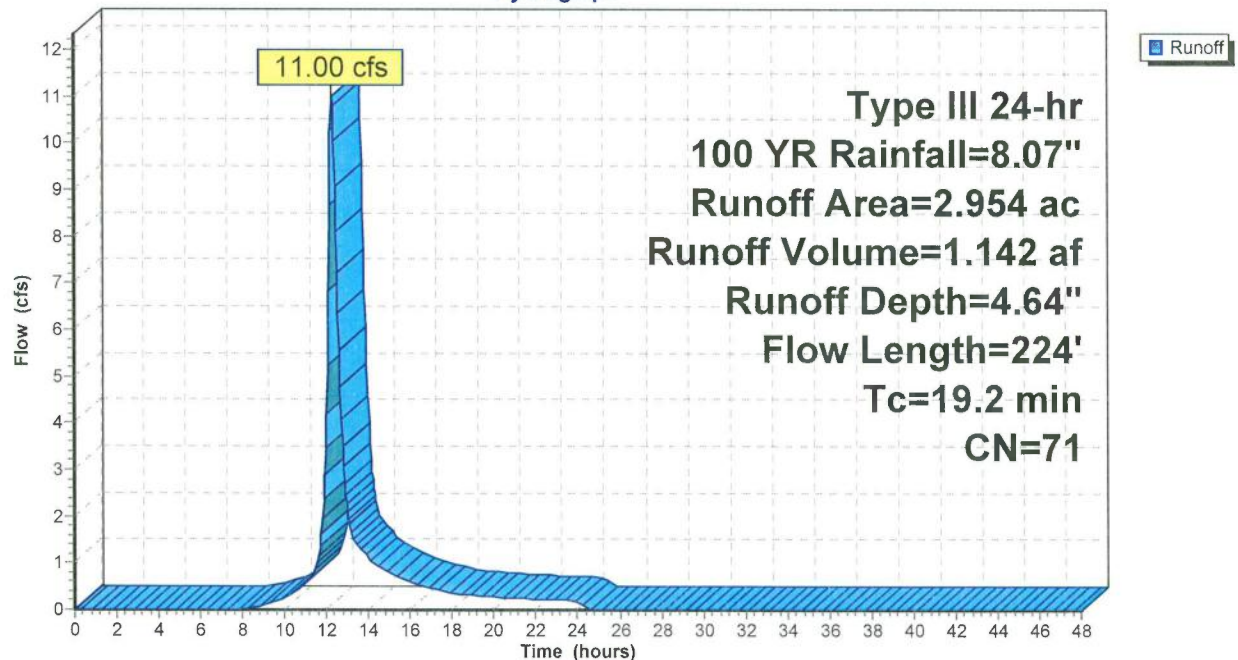
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.07"

Area (ac)	CN	Description
2.954	71	Meadow, non-grazed, HSG C
2.954		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	81	0.0073	0.08		Sheet Flow, A-B
					Grass: Dense n= 0.240 P2= 3.31"
1.5	143	0.0485	1.54		Shallow Concentrated Flow, B-C
					Short Grass Pasture Kv= 7.0 fps
19.2	224	Total			

Subcatchment PDA-1: PDA-1

Hydrograph



Summary for Subcatchment PDA-2: PDA-2

Runoff = 21.09 cfs @ 12.29 hrs, Volume= 2.268 af, Depth= 4.64"

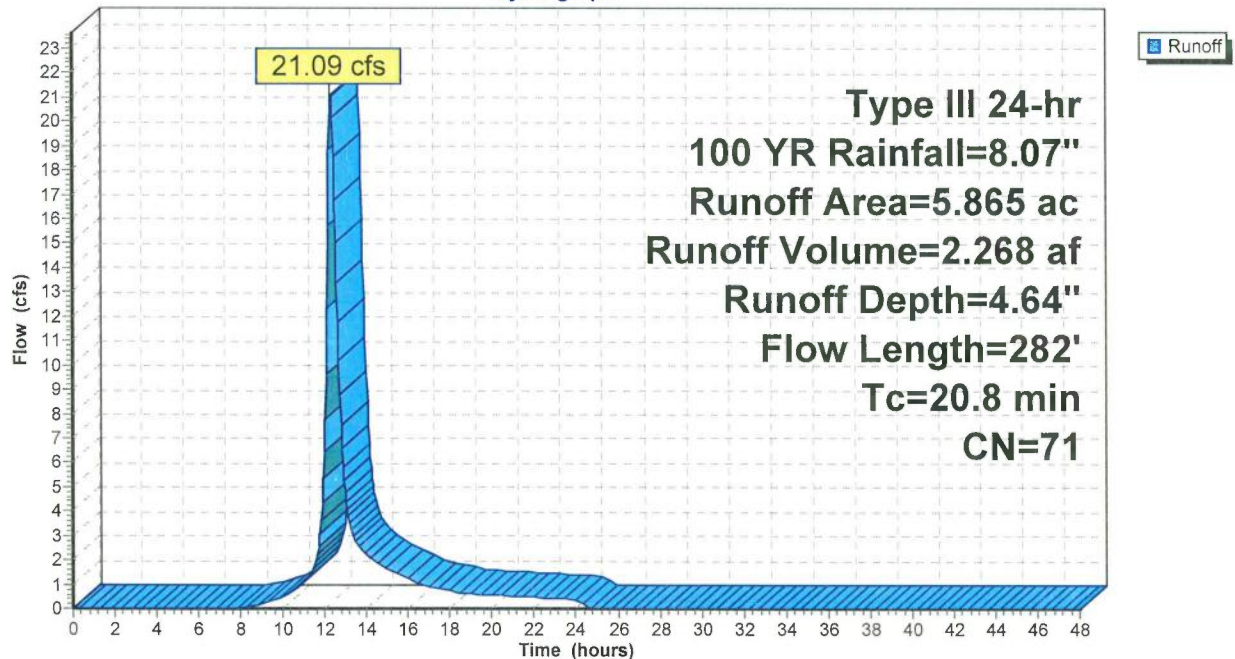
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.07"

Area (ac)	CN	Description
5.847	71	Meadow, non-grazed, HSG C
0.018	98	Unconnected pavement, HSG C
5.865	71	Weighted Average
5.847		99.69% Pervious Area
0.018		0.31% Impervious Area
0.018		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.8	100	0.0110	0.09		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.31"
1.6	63	0.0083	0.64		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
0.8	59	0.0336	1.28		Shallow Concentrated Flow, C-D Short Grass Pasture Kv= 7.0 fps
0.6	60	0.0521	1.60		Shallow Concentrated Flow, D-E Short Grass Pasture Kv= 7.0 fps
20.8	282	Total			

Subcatchment PDA-2: PDA-2

Hydrograph



Summary for Subcatchment PDA-2a: PDA-2a

Runoff = 1.14 cfs @ 12.09 hrs, Volume= 0.094 af, Depth= 7.59"

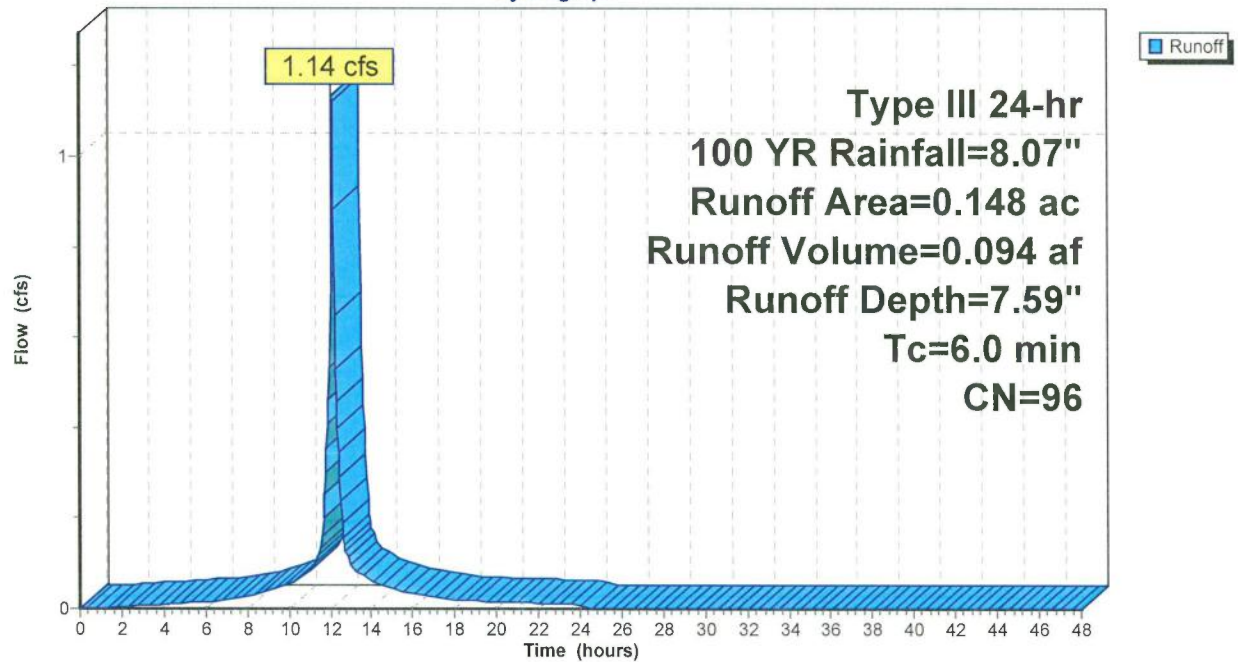
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.07"

Area (ac)	CN	Description
0.148	96	Gravel surface, HSG C
0.148		100.00% Pervious Area

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

Subcatchment PDA-2a: PDA-2a

Hydrograph



Summary for Subcatchment PDA-3: PDA-3

Runoff = 0.18 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 4.64"

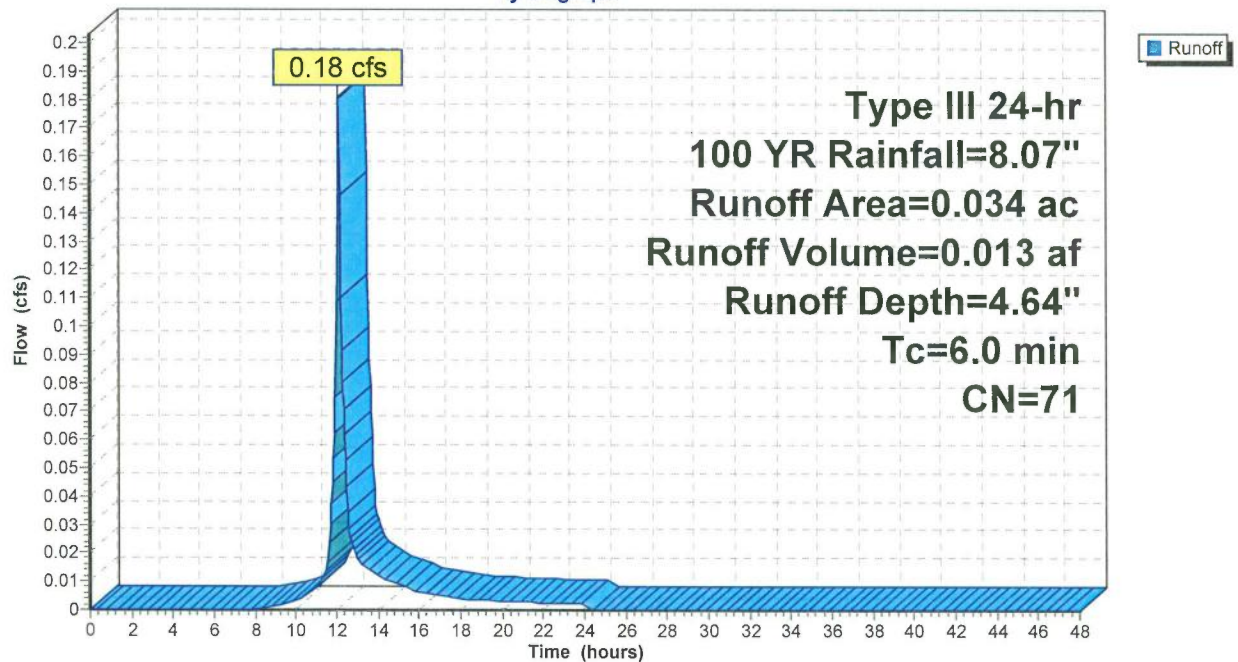
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.07"

Area (ac)	CN	Description
0.034	71	Meadow, non-grazed, HSG C
0.034		100.00% Pervious Area

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

Subcatchment PDA-3: PDA-3

Hydrograph



Summary for Subcatchment PDA-3a: PDA-3a

Runoff = 0.69 cfs @ 12.09 hrs, Volume= 0.057 af, Depth= 7.59"

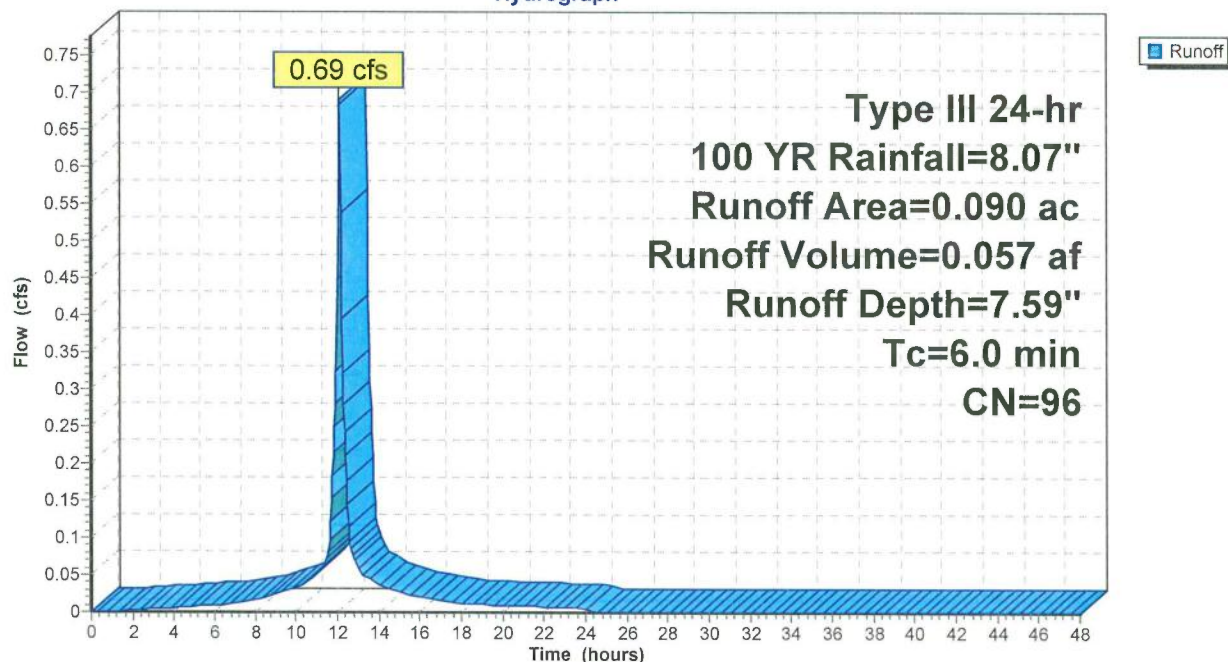
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.07"

Area (ac)	CN	Description
0.090	96	Gravel surface, HSG C
0.090		100.00% Pervious Area

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

Subcatchment PDA-3a: PDA-3a

Hydrograph



Summary for Pond G2: GRAVEL

Inflow Area = 0.148 ac, 0.00% Impervious, Inflow Depth = 7.59" for 100 YR event
 Inflow = 1.14 cfs @ 12.09 hrs, Volume= 0.094 af
 Outflow = 0.03 cfs @ 16.11 hrs, Volume= 0.091 af, Atten= 97%, Lag= 241.4 min
 Discarded = 0.03 cfs @ 8.95 hrs, Volume= 0.091 af
 Primary = 0.01 cfs @ 16.11 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Peak Elev= 0.99' @ 16.11 hrs Surf.Area= 6,446 sf Storage= 2,554 cf

Plug-Flow detention time= 845.9 min calculated for 0.091 af (97% of inflow)

Center-of-Mass det. time= 828.4 min (1,580.5 - 752.2)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	2,578 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 6,446 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	6,446	0	0
1.00	6,446	6,446	6,446

Device	Routing	Invert	Outlet Devices
#1	Primary	0.99'	150.0' long x 3.0' 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 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Discarded	0.00'	0.170 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.03 cfs @ 8.95 hrs HW=0.01' (Free Discharge)

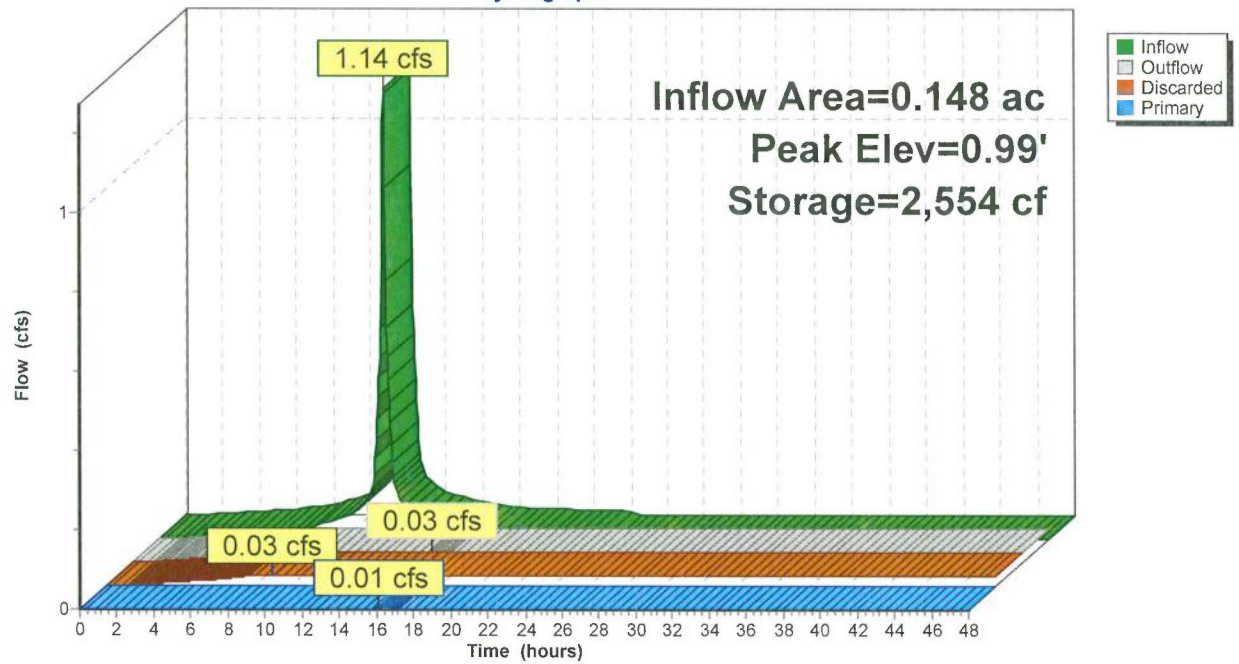
↳ **2=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.01 cfs @ 16.11 hrs HW=0.99' TW=0.00' (Dynamic Tailwater)

↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 0.01 cfs @ 0.06 fps)

Pond G2: GRAVEL

Hydrograph



Summary for Pond G3: GRAVEL

Inflow Area = 0.090 ac, 0.00% Impervious, Inflow Depth = 7.59" for 100 YR event
 Inflow = 0.69 cfs @ 12.09 hrs, Volume= 0.057 af
 Outflow = 0.02 cfs @ 16.57 hrs, Volume= 0.055 af, Atten= 97%, Lag= 269.1 min
 Discarded = 0.02 cfs @ 8.95 hrs, Volume= 0.055 af
 Primary = 0.00 cfs @ 16.57 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Peak Elev= 0.99' @ 16.57 hrs Surf.Area= 3,931 sf Storage= 1,557 cf

Plug-Flow detention time= 848.3 min calculated for 0.055 af (97% of inflow)

Center-of-Mass det. time= 830.1 min (1,582.3 - 752.2)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	1,572 cf	Custom Stage Data (Prismatic) Listed below (Recalc) 3,931 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	3,931	0	0
1.00	3,931	3,931	3,931

Device	Routing	Invert	Outlet Devices
#1	Primary	0.99'	150.0' long x 3.0' 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 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#2	Discarded	0.00'	0.170 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.02 cfs @ 8.95 hrs HW=0.01' (Free Discharge)

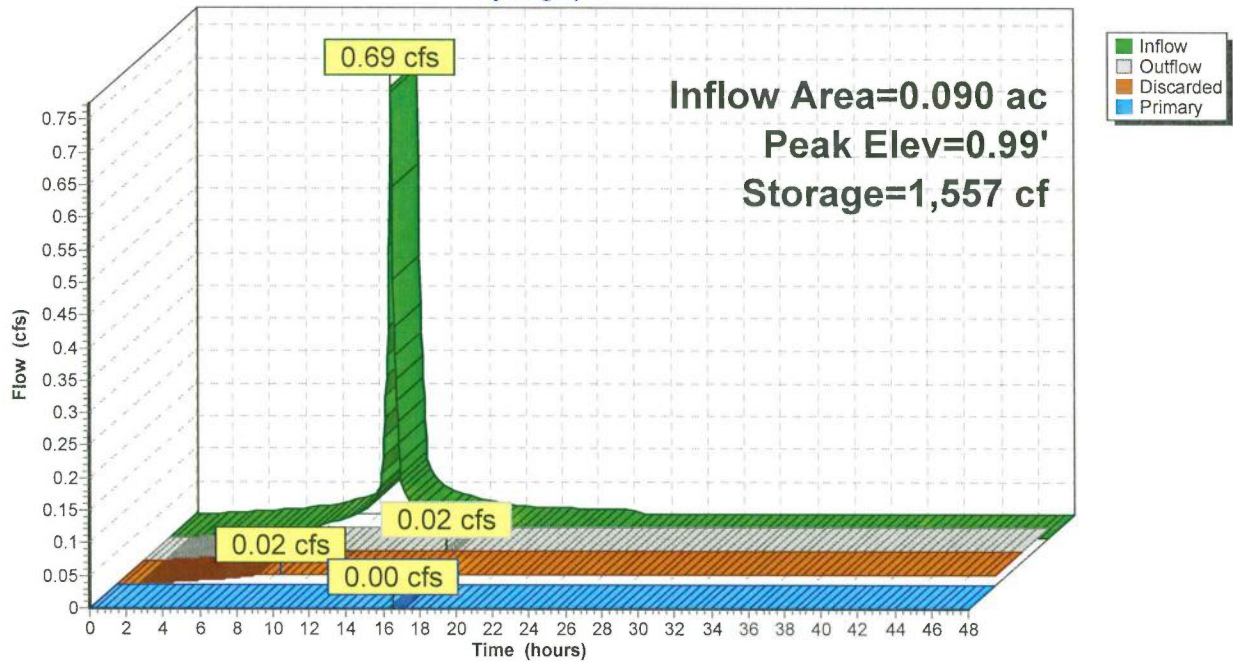
↳ **2=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 16.57 hrs HW=0.99' TW=0.00' (Dynamic Tailwater)

↳ **1=Broad-Crested Rectangular Weir** (Weir Controls 0.00 cfs @ 0.04 fps)

Pond G3: GRAVEL

Hydrograph



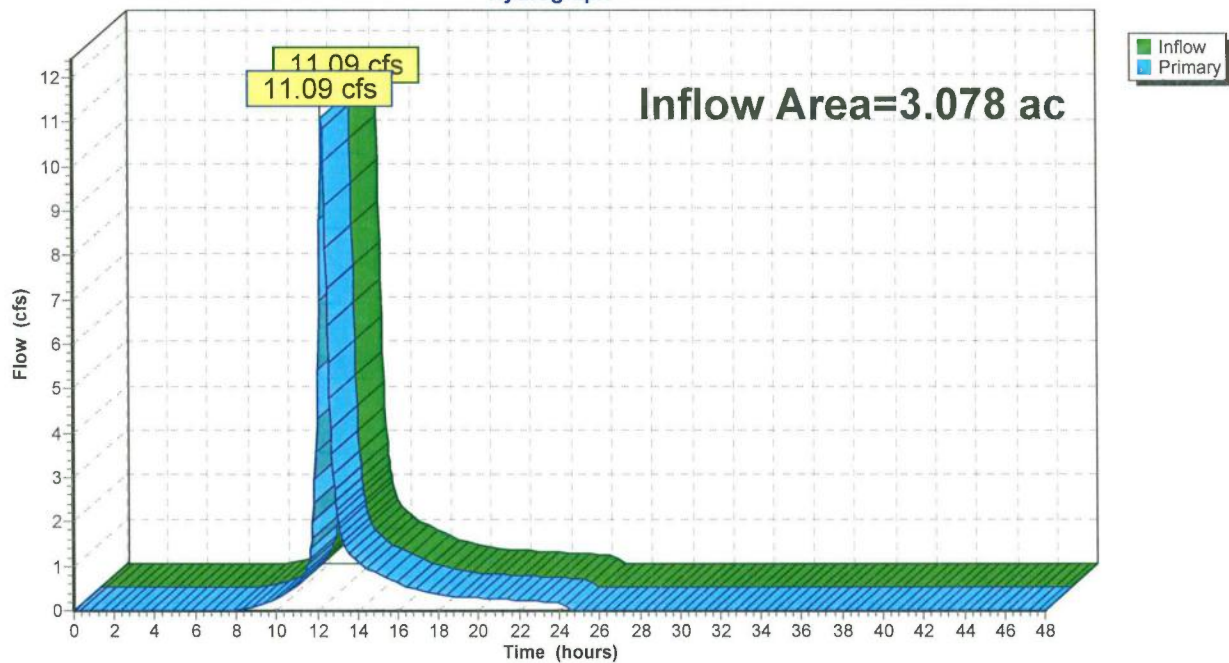
Summary for Link AP-1: AP-1

Inflow Area = 3.078 ac, 0.00% Impervious, Inflow Depth = 4.50" for 100 YR event
Inflow = 11.09 cfs @ 12.26 hrs, Volume= 1.155 af
Primary = 11.09 cfs @ 12.26 hrs, Volume= 1.155 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-1: AP-1

Hydrograph



Summary for Link AP-2: AP-2

Inflow Area = 6.013 ac, 0.30% Impervious, Inflow Depth = 4.53" for 100 YR event
 Inflow = 21.09 cfs @ 12.29 hrs, Volume= 2.268 af
 Primary = 21.09 cfs @ 12.29 hrs, Volume= 2.268 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-2: AP-2

Hydrograph

