



STORMWATER MANAGEMENT REPORT

PROPOSED
ELLINGTON
SOLAR PROJECT

277 SADDS MILL ROAD
ELLINGTON, CONNECTICUT
TOLLAND COUNTY

Prepared for:

**C-TEC SOLAR, LLC
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Bloomfield, CT 06002**

Prepared by:

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April 2021

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Introduction

At the request of C-TEC Solar, LLC, All-Points Technology Corporation, P.C. (“APT”) has undertaken analysis of and design to address stormwater impacts resulting from development of a proposed 8.85 MW direct current (“DC”) (6.0 MW alternating current (“AC”)) solar electric generating facility herein referred to as Ellington Solar (the “Project”) located at 277 Sadds Mill Road, in Ellington, Connecticut (the “Site”).

The purpose of this report is to provide an analysis of the potential stormwater drainage impacts associated with the Project, as well as a description of the design to mitigate such potential stormwater drainage impacts. The design is intended to be in full compliance with the State and Town regulations while taking prevailing site conditions and practical factors into account. In addition, this report will also describe how the proposed Project adheres to the updated Connecticut Department of Energy & Environmental Protection (“CT DEEP”) Appendix I, Stormwater Management at Solar Array Construction Projects.

Existing Site Conditions

The Site consists of two (2) privately-owned irregular shaped parcels that consists of approximately 157.30± acres. The Site’s northern and eastern extents consist of undeveloped wooded areas while the eastern extent is a mix of undeveloped wooded land and agricultural fields. The central portion of the Site is currently developed with as a materials recycling facility for sand, gravel, mulch, and compost that is currently operational. Several temporary structures associated with the materials recycling facility are located within the central and eastern portions of the developed areas as well as a guard shack/operations office located along the Site’s main access road to the west. The majority of the two parcels are zoned Industrial (I) by the Town of Ellington. A small portion to the north of the northern parcel is zoned Rural Agricultural Residential (RAR). The site is accesses from an existing access road off of Sadds Mills Rd.

The Site’s existing topography generally slopes downward from northeast to both the southwest and southeast. Within the specific Project area, the topography includes slopes that range from approximately 0 to 15 percent throughout, which isolated areas that have slopes upwards of 45 percent. Elevations within the Site range from approximately 305 feet AMSL to the northwest to approximately 225 feet AMSL along the southern and western sides.

Developed Site Conditions

The Project will be constructed in the southeastern corner of the Site, just east of the existing recycling materials facility. Access to the Site will be provided via an existing access road associated with the recycling materials facility that splits off from the main road and runs northeast. The Project includes the installation of 18,432 480W modules and associated fencing, access road, utility and stormwater management features, within 32.13± acres of the Site. Of the 32.13± acres of disturbance, approximately 27± acres will require clearing and grubbing for the fenced solar facility and associated stormwater management and sediment control features. The remaining 5± acres is anticipated to require tree cutting only for shading purposes.

The proposed solar panels will be installed on a post driven ground mounted racking system, with minimal changes to the existing grades. As a result, the post-development site conditions will mimic the pre-developed site conditions. Areas of clearing and grubbing and any existing ground cover that is disturbed during construction will be reseeded with a low growth seed mix. In order to account for the change in ground cover and time of concentration, grass-lined stormwater management basins are proposed along the western and southern sides of the proposed Project area.

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, Volume 10, Version 2 Precipitation 2-, 25-, 50-, and 100-year storm event with rainfall depths of 3.18, 6.20, 7.05, and 7.99 inches respectively. An additional hydrograph was developed for the NOAA Atlas 14, Volume 10, Version 2 Precipitation 1-year storm event with rainfall depth of 2.56 inches for use during the stream channel protection calculations.

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 are attached.

Utilizing Appendix I Draft 10.1, this hydrologic analysis will reflect an increase of the Hydrologic Soil Group (“HSG”) present on-site by either a full step (1), where proposed grading within the fenced array area exceeds a two (2) foot difference between existing and proposed grades, or a half (1/2) step within the remaining fenced array areas (e.g., half the difference between the runoff curve number for HSG B versus HSG C). This reduction, as indicated by CT DEEP, is intended to account for the compaction of soils that results from extensive machinery traffic during construction of the array. The Water Quality Volume (“WQV”) for the site will be calculated assuming that the roadways, gravel surfaces, and transformer pads are effectively impervious cover. The Project area will be graded to ensure that the proposed solar panels are not located in areas of existing and proposed slopes that are above 15%, and therefore will not be considered impervious cover for the WQV calculations. Additional Appendix I regulations and proposed compliance are presented in a later section.

Existing Drainage Patterns

The proposed Project area drains from the northeast to various ridgelines that end up splitting the flows ultimately to either the south or the west.

The Site was modeled at two (2) Analysis Points (“AP-1” and “AP-2”). AP-1 is along the southeast corner of the Site. AP-2 is the existing recycling materials facility to the west of the

Project area. Peak discharges have been computed at the points of study for the 2-, 25-, 50-, and 100-year storm events. Additionally, a significant off-site watershed drains from the northeast wooded and agricultural lands into the Project area and ultimately towards AP-2. This off-site watershed drainage is accounted for in both the existing and proposed models.

The project site soils identified by the United States Department of Agriculture (USDA) Natural Resources Conservation Service consist primarily of a HSG rating of “B”, with the existing recycling materials facility area consisting of a HSG rating of “C”. The specific Map Unit Symbol soils include 67B, 67C, 704A, 704B, and 305. Specific details for each soil Map Unit Symbol are provided in Appendix A.

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

Table 1

<i>Analysis Point</i>	Pre-developed Peak Storm Runoff (Q), cubic feet per second (cfs)			
	2-year	25-year	50-year	100-year
AP-1	1.19	15.88	21.74	28.71
AP-2	4.90	52.53	71.09	93.06

Proposed Drainage Patterns

The Project will require clearing and grubbing, although minimal, in the immediate area for the proposed solar installation, including the necessary utilities, access road, and stormwater management features, resulting in approximately 32.13± acres of disturbance. Areas within the immediate array fenced facility with existing slopes above 15 percent will be graded to a maximum proposed 15 percent slope, while maintaining the existing hydrology of the Site. Overall, hydrologically, through the addition of catchment areas associated with the individual drainage areas of each proposed basin, the post-developed condition is designed to mimic the pre-developed condition. To protect the facility area during construction and to keep Basin 2B at a reasonable size, a berm will be constructed to the north of the fenced facility area to redirect flow into an existing natural depression and additional grading will be proposed to provide an overflow path that mimics the existing flows for the off-site drainage back to AP-2.

To manage the increase in post-development runoff due to the change in cover type associated with converting woods to meadow and the increase in either a full step or a half step of HSG within the proposed limit of disturbance, three (3) grass-lined stormwater management basins are proposed throughout the project area; two (2) located immediately south of the fenced facility and one (1) located between the existing recycling materials facility and the proposed Project. Using outlet control structure/s with a grate top in each basin, as needed, the basins are designed to provide the necessary water quality treatment volume for the additional impervious area, as recommended by CT DEEP Appendix I. See calculations attached. Additional flow and volume control is provided via rip-rap overflow weirs and associated plunge pool level spreaders.

Since the proposed development mimics the existing conditions, the post-development condition was modeled using the same Analysis Points. Peak discharges have been computed at the point of study for the 2-year, 25-year, 50-year, and 100-year storm events. The post-development discharges at each point of study are tabulated in Table 1.

Table 2

<i>Analysis Point</i>	Post-developed Peak Storm Runoff (Q), cubic feet per second (cfs)			
	2-year	25-year	50-year	100-year
AP-1	0.00	6.19	10.87	24.37
AP-2	4.34	52.38	68.66	91.01

The reduction in runoff achieved by the post-development discharges in comparison with the pre-development discharges are tabulated in Table 3.

Table 3

<i>Analysis Point</i>	Peak Storm Runoff (Q) Comparison Pre- and Post-, cubic feet per second (cfs)			
	2-year	25-year	50-year	100-year
AP-1	-1.19	-9.69	-10.87	-4.34
AP-2	-0.56	-0.15	-2.43	-2.05

Appendix I Design Regulations/Compliance

The following identifies and details the regulations and proposed compliance measures within Appendix I that pertain specifically to civil, stormwater, and erosion control designs.

(I) Design and construction requirements:

1. Roadways, gravel surfaces, transformer pads are considered effective impervious cover for the purposes of calculating the WQV. All proposed solar panels in the array are within post-construction slopes that are less than 15% and are not considered impervious for the purposes of calculating the WQV because the following have been met:
 - a. Vegetative areas between the rows of solar panels have a width of 15 feet which is greater than the solar panel width of 12.4 feet.
 - b. The stormwater runoff from the proposed array is designed to drain to proposed stormwater management controls.
 - c. The Project meets (iv) of this requirement as the plan includes specific engineered stormwater control measures with phased construction plans and detailed erosion control measures.
 - d. The panels are spaced and provide a minimum height of 3' from the ground to provide growth of native vegetation.
2. Setback and buffer requirements have been met following the below:

- a. See subsection requirements below:
 - i. No wetlands or waters are located within 100 feet of the proposed solar facility area. No solar panels are located within the 50-foot setback of any property boundary that is located downgradient of the construction activity.
 - ii. No wetlands or waters are located within 100 feet of the proposed solar facility area.
 - iii. A 10-foot buffer is maintained between the proposed access road and electrical interconnection path.
- b. No wetland or waters are located within 100 feet of the proposed solar facility area. Therefore, the Project will not discharge into existing wetland/water resources. However, the Project is designed to meet the following:
 - i. The stormwater control measures for the Project are not designed to discharge into existing wetland/water resources and follow the conditions below:
 - 1. A minimum sediment load reduction of ninety percent (90%) for the discharge will be achieved by the use of a combination of sediment/stormwater control best management practices, including compost filter socks, swales with check dams, and sediment basins with baffles. Sediment removal efficiency calculations for each proposed drainage area is provided in Appendix E.
 - 2. Each of the stormwater basins and proposed drainage areas are designed to meet the Stream Channel Protection guidance of the Stormwater Quality Manual where the 2-yr, 24-hr post-development peak flow rate is controlled to or below the pre-development 1-yr, 24-hr level, as shown in Table 4. For AP-2, the runoff volume is calculated from the discharge from Basins B-2A and B-2B only.

Table 4

<i>Analysis Point</i>	Stream Channel Protection Peak Storm Runoff (Q), cubic feet per second (cfs)		
	1-year Pre	2-year Post	Delta
AP-1	0.24	0.00	-0.24
AP-2*	1.19	0.90	-0.29

*Discharge from Basins B-2A and B-2B

- 3. The proposed stormwater management basins discharge to have a slope less than or equal to 15%.
 - c. The existing wetlands and waters were delineated by Registered Soil Scientist Matthew Gustafson (APT) between September and November of 2020. The locations delineated resources as well as buffers are present on the development plans.
- 3. The lowest vertical clearance of the solar panels above the ground is proposed to be 3 feet.

II. Design requirements for post-construction stormwater management measures.

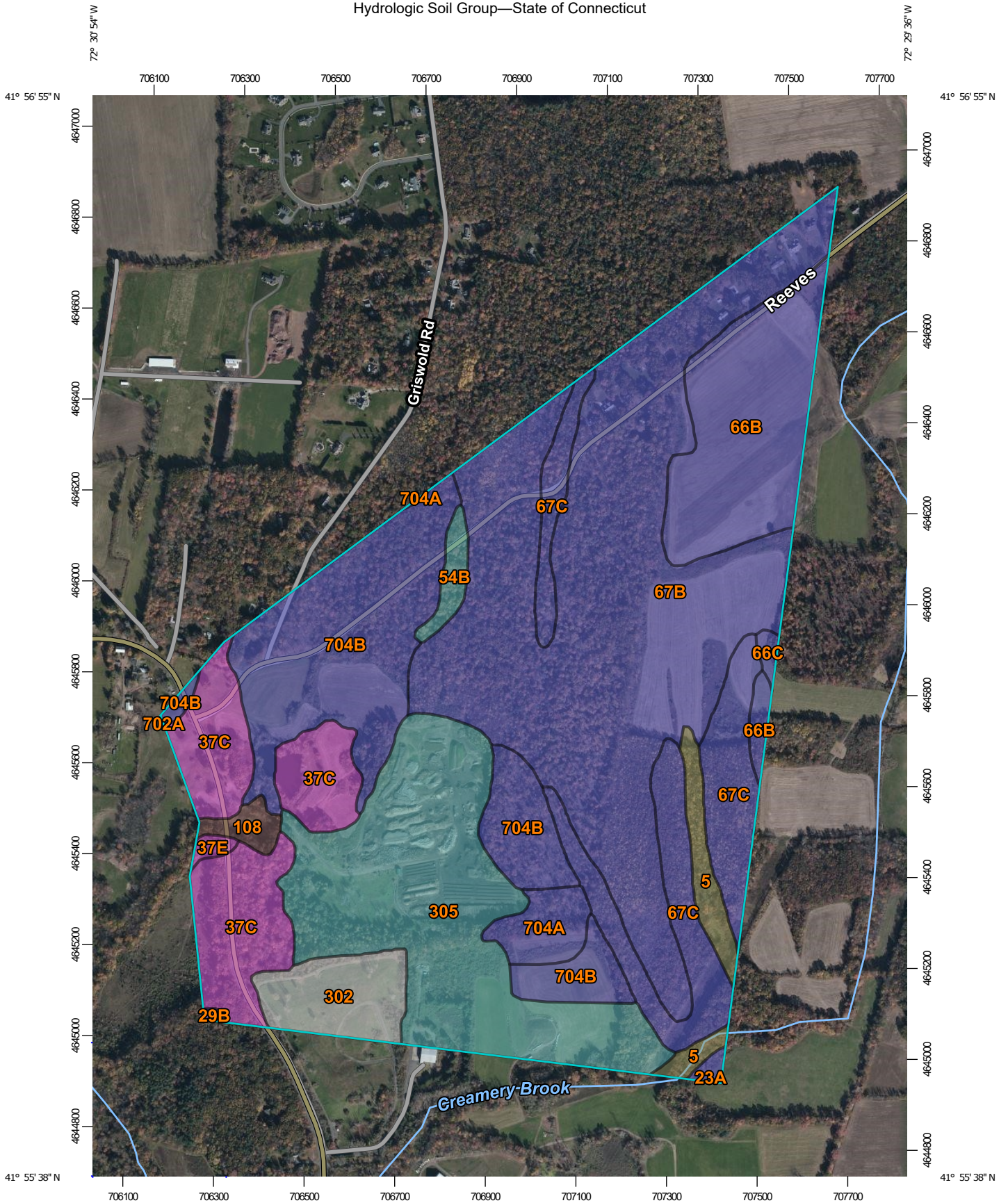
1. Post-construction stormwater control measures are designed and will be constructed to provide permanent stabilization and non-erosive conveyance of runoff on the site.
2. The orientation of the panels follows the existing slopes on the site to the extent practicable.
3. The hydrologic analysis has been completed as describe above, with the following details:
 - a. The Project evaluates and controls the 2, 25, 50, and 100-year 24-hour rainfall events in accordance with the Stormwater Quality Manual. Maximum sheet flow was kept to 100 feet and shallow concentrated flows are calculated using values for grassed waterways within HydroCAD.
 - b. NRCS soil mapping was used for the stormwater/erosion control design.
 - c. The proposed stormwater management basins are conservatively sized and modeled to not include infiltration. However, based on the NRCS existing soils data, the majority of the basin areas should experience moderate infiltration with a significantly deep groundwater table.
 - d. Pre-and post-development drainage area maps are provided in Appendices B and C.
 - e. The analysis above demonstrates that the Project will have no net increase in peak flows, erosive velocities or volumes, or adverse impacts to downstream properties.

Conclusion

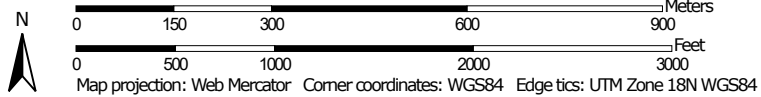
The stormwater management for the proposed site has been designed such that the post-development peak discharges to the waters of the State of Connecticut for the 2-, 25-, 50-, and 100- year storm events are less than the pre-development peak discharges. In addition, the Project adheres to the regulations and guidelines presented by CT DEEP's Appendix I as described above. As a result, the proposed solar array will not result in any adverse conditions to the surrounding areas and properties.

APPENDIX A: NRCS SOIL SURVEY

Hydrologic Soil Group—State of Connecticut



Map Scale: 1:11,600 if printed on A portrait (8.5" x 11") sheet.



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




Natural Resources Conservation Service

Web Soil Survey National Cooperative Soil Survey

12/7/2020 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.

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 20, Jun 9, 2020

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

Date(s) aerial images were photographed: Aug 24, 2019—Oct 24, 2019

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
5	Wilbraham silt loam, 0 to 3 percent slopes	C/D	7.8	1.8%
23A	Sudbury sandy loam, 0 to 5 percent slopes	B	0.9	0.2%
29B	Agawam fine sandy loam, 3 to 8 percent slopes	B	0.3	0.1%
37C	Manchester gravelly sandy loam, 3 to 15 percent slopes	A	37.8	8.8%
37E	Manchester gravelly sandy loam, 15 to 45 percent slopes	A	1.0	0.2%
54B	Wapping very fine sandy loam, 2 to 8 percent slopes, very stony	C	3.4	0.8%
66B	Narragansett silt loam, 2 to 8 percent slopes	B	38.5	9.0%
66C	Narragansett silt loam, 8 to 15 percent slopes	B	1.0	0.2%
67B	Narragansett silt loam, 3 to 8 percent slopes, very stony	B	142.4	33.3%
67C	Narragansett silt loam, 8 to 15 percent slopes, very stony	B	38.6	9.0%
108	Saco silt loam	B/D	3.0	0.7%
302	Dumps		13.4	3.1%
305	Udorthents-Pits complex, gravelly	C	70.4	16.4%
702A	Tisbury silt loam, 0 to 3 percent slopes	C	0.0	0.0%
704A	Enfield silt loam, 0 to 3 percent slopes	B	7.2	1.7%
704B	Enfield silt loam, 3 to 8 percent slopes	B	62.2	14.5%
Totals for Area of Interest			427.9	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

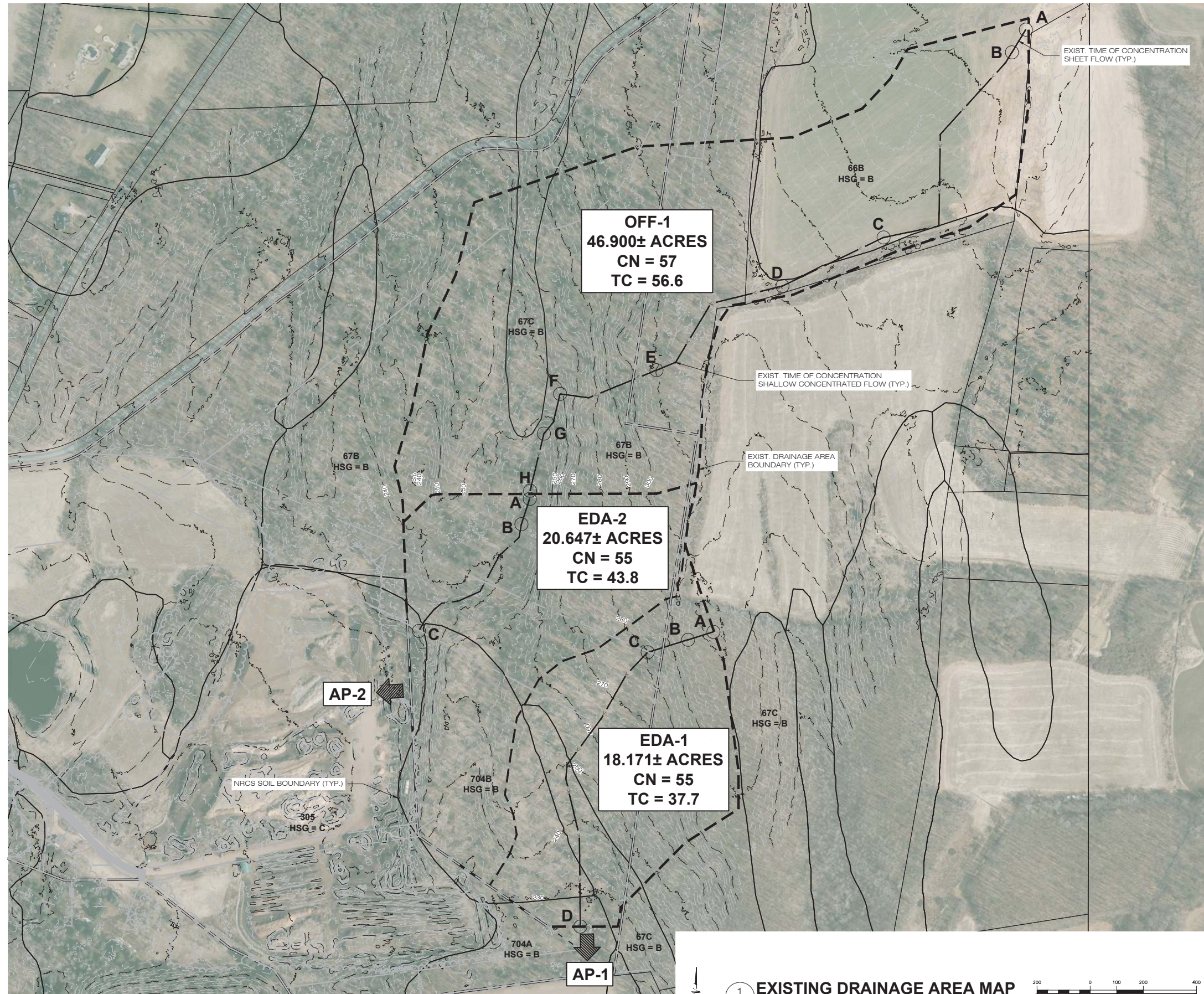
**APPENDIX B: EXISTING DRAINAGE AREA MAP (EDA-1) &
HYDROLOGIC COMPUTATION (HYDROCAD)**

EXISTING DRAINAGE AREAS

	TOTAL AREA (ACRES)	COMPOSITE CN	TC (MINS.)
EDA-1	18.171	55	37.7
EDA-2	20.647	55	43.8
OFF-1	46.900	57	56.6

EXISTING CONDITION PEAK FLOWS

ANALYSIS POINT	2-YEAR (CFS)	25-YEAR (CFS)	50-YEAR (CFS)	100-YEAR (CFS)
AP-1	1.19	15.88	21.74	28.71
AP-2	4.90	52.53	71.09	93.06



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567 VAUXHAUL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTSTECH.COM FAX: (860)-663-0935

CSC PERMIT SET

NO	DATE	REVISION
0	04/08/21	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: 567 VAUXHAUL STREET EXTENSION - SUITE 311 WATERFORD, CT 06385

OWNER: THOMPSON FAMILY LAND TRUST
ADDRESS: SADDs MILL RD ELLINGTON, CT

ELLINGTON SOLAR

SITE 277 SADDs MILL RD
ADDRESS: ELLINGTON, CT

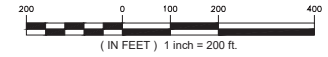
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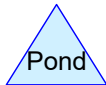
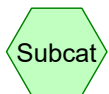
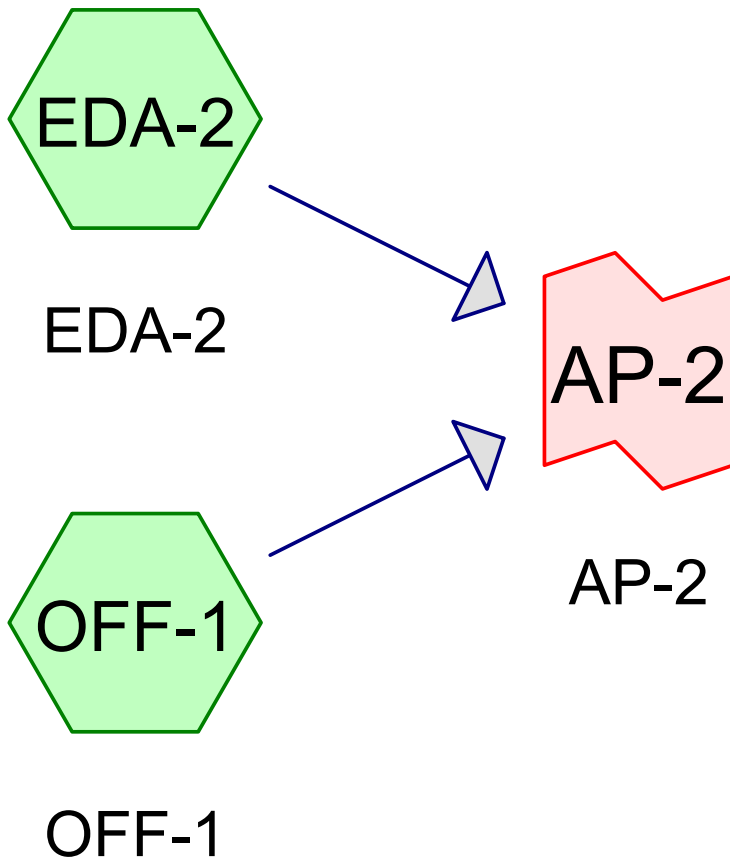
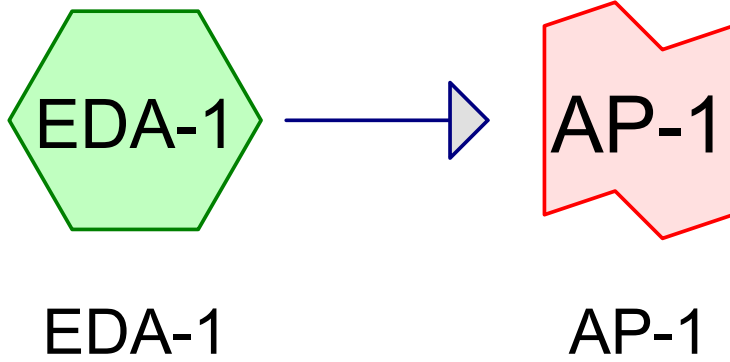
DATE: 04/08/21 DRAWN BY: JT
CHECKED BY: BJP

SHEET TITLE:
EXISTING DRAINAGE AREA MAP

SHEET NUMBER:
EDA-1

EXISTING DRAINAGE AREA MAP
SCALE: 1" = 200'-0"





CT481520_Ellington - EX - Rev0

Prepared by Microsoft

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
14.095	61	Pasture/grassland/range, Good, HSG B (OFF-1)
71.075	55	Woods, Good, HSG B (EDA-1, EDA-2, OFF-1)
0.548	70	Woods, Good, HSG C (EDA-2)
85.718	56	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
85.170	HSG B	EDA-1, EDA-2, OFF-1
0.548	HSG C	EDA-2
0.000	HSG D	
0.000	Other	
85.718		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	14.095	0.000	0.000	0.000	14.095	Pasture/grassland/range, Good	OFF -1
0.000	71.075	0.548	0.000	0.000	71.623	Woods, Good	ED A-1, ED A-2, OFF -1
0.000	85.170	0.548	0.000	0.000	85.718	TOTAL AREA	

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=18.171 ac 0.00% Impervious Runoff Depth=0.25"
Flow Length=1,397' Tc=37.7 min CN=55 Runoff=1.19 cfs 0.371 af

Subcatchment EDA-2: EDA-2

Runoff Area=20.647 ac 0.00% Impervious Runoff Depth=0.25"
Flow Length=621' Tc=43.8 min CN=55 Runoff=1.26 cfs 0.422 af

Subcatchment OFF-1: OFF-1

Runoff Area=46.900 ac 0.00% Impervious Runoff Depth=0.30"
Flow Length=2,873' Tc=56.6 min CN=57 Runoff=3.67 cfs 1.185 af

Link AP-1: AP-1

Inflow=1.19 cfs 0.371 af
Primary=1.19 cfs 0.371 af

Link AP-2: AP-2

Inflow=4.90 cfs 1.606 af
Primary=4.90 cfs 1.606 af

Total Runoff Area = 85.718 ac Runoff Volume = 1.977 af Average Runoff Depth = 0.28"
100.00% Pervious = 85.718 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment EDA-1: EDA-1

Runoff = 1.19 cfs @ 12.81 hrs, Volume= 0.371 af, Depth= 0.25"

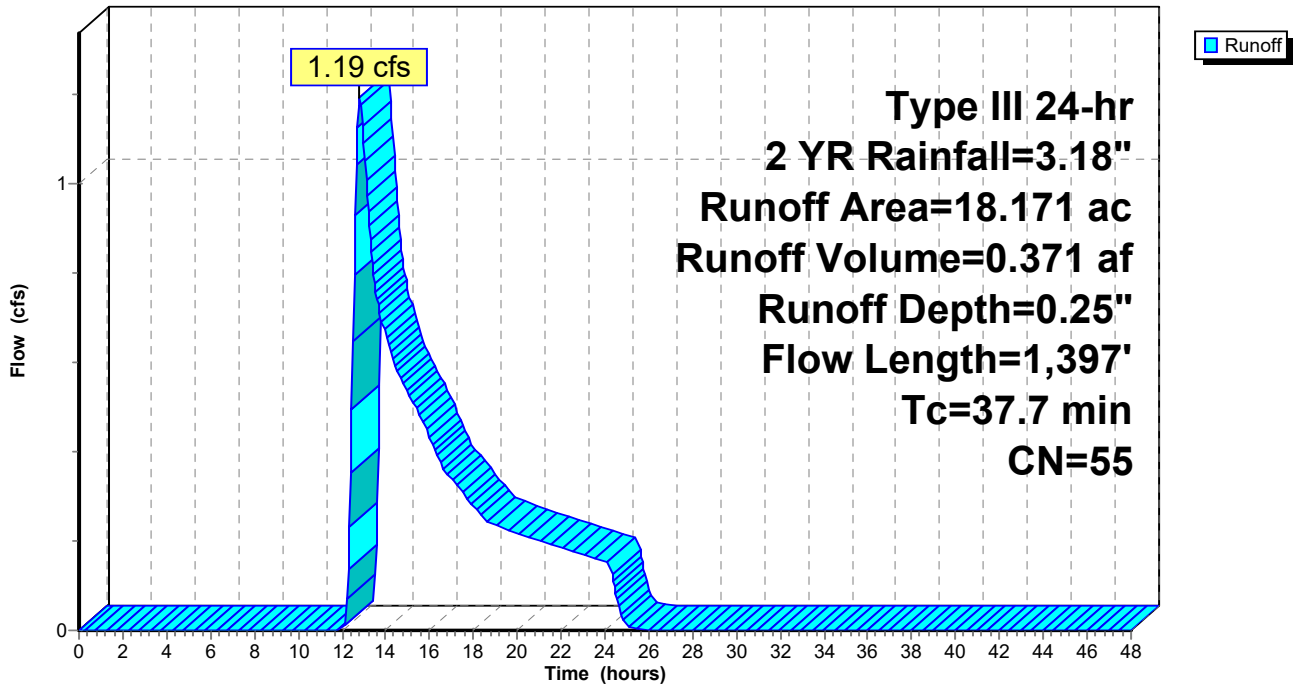
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2 YR Rainfall=3.18"

Area (ac)	CN	Description
18.171	55	Woods, Good, HSG B
18.171		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	100	0.0266	0.09		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.18"
1.6	159	0.1122	1.67		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
16.9	1,138	0.0506	1.12		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
37.7	1,397	Total			

Subcatchment EDA-1: EDA-1

Hydrograph



Summary for Subcatchment EDA-2: EDA-2

Runoff = 1.26 cfs @ 12.91 hrs, Volume= 0.422 af, Depth= 0.25"

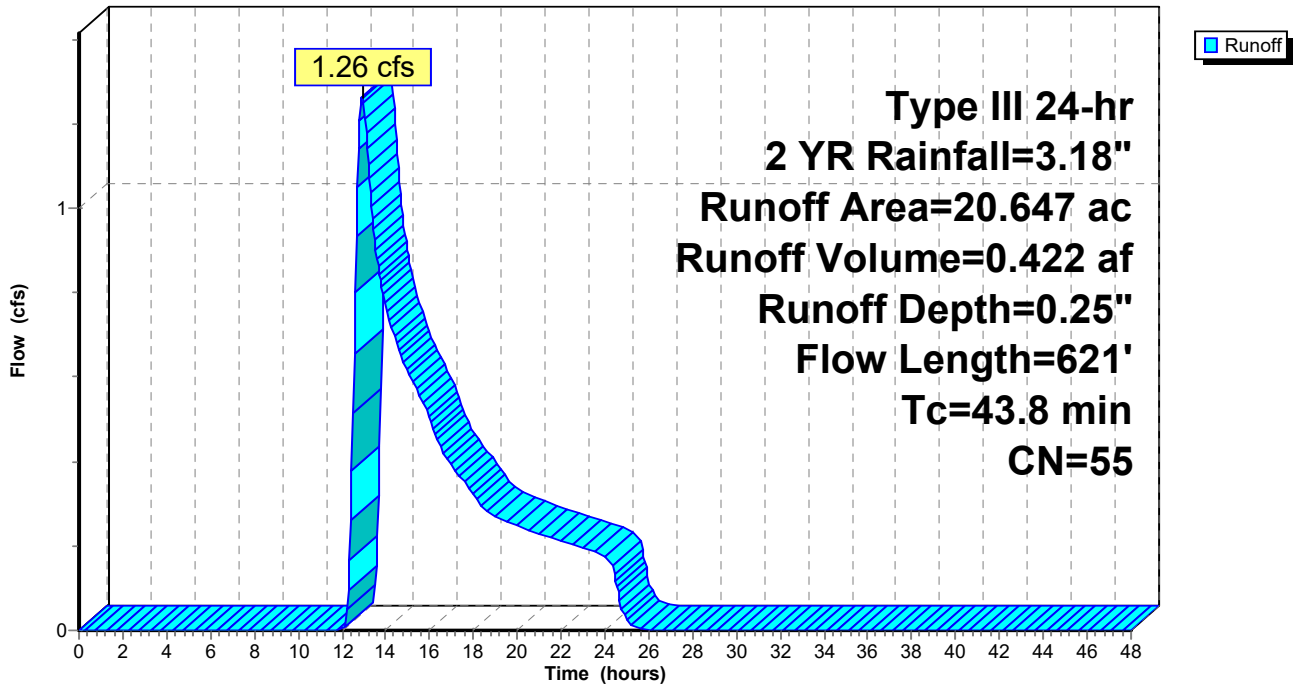
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2 YR Rainfall=3.18"

Area (ac)	CN	Description
20.099	55	Woods, Good, HSG B
0.548	70	Woods, Good, HSG C
20.647	55	Weighted Average
20.647		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	100	0.0089	0.06		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.18"
14.0	521	0.0154	0.62		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
43.8	621	Total			

Subcatchment EDA-2: EDA-2

Hydrograph



Summary for Subcatchment OFF-1: OFF-1

Runoff = 3.67 cfs @ 13.06 hrs, Volume= 1.185 af, Depth= 0.30"

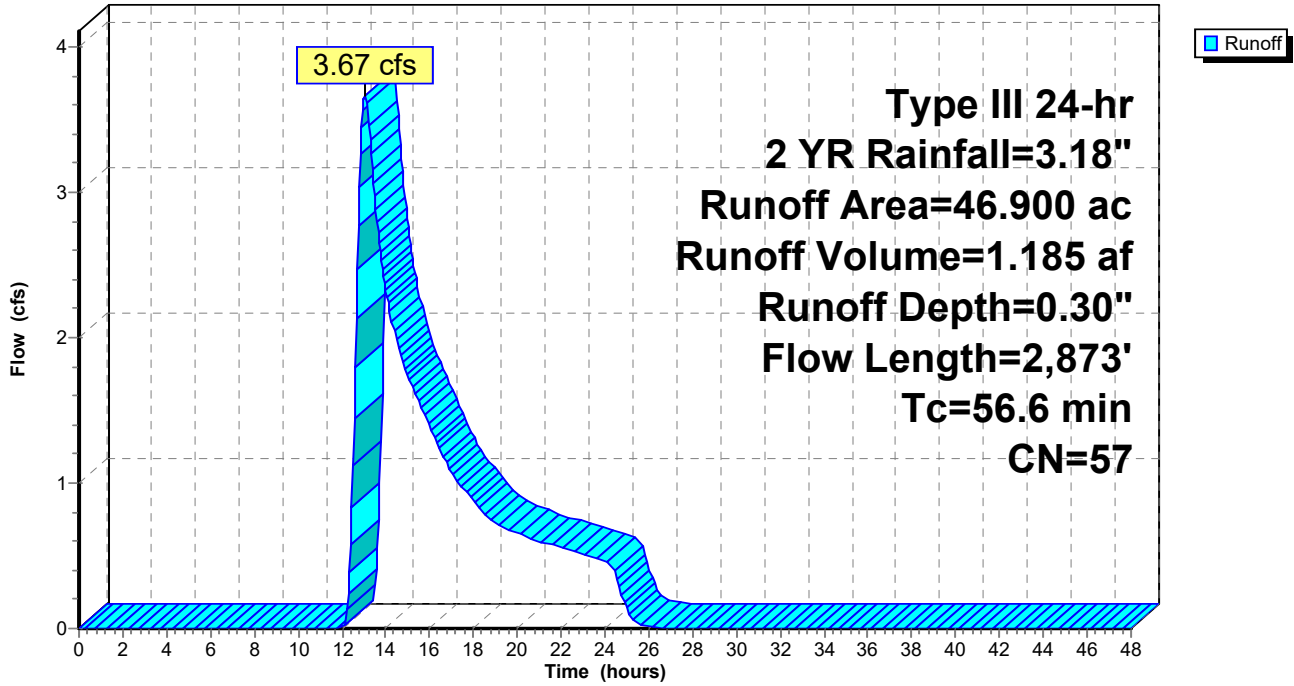
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2 YR Rainfall=3.18"

Area (ac)	CN	Description
32.805	55	Woods, Good, HSG B
14.095	61	Pasture/grassland/range, Good, HSG B
46.900	57	Weighted Average
46.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0211	0.16		Sheet Flow, A-B Cultivated: Residue>20% n= 0.170 P2= 3.18"
14.3	968	0.0158	1.13		Shallow Concentrated Flow, B-C Cultivated Straight Rows Kv= 9.0 fps
3.9	422	0.0411	1.82		Shallow Concentrated Flow, C-D Cultivated Straight Rows Kv= 9.0 fps
15.9	613	0.0166	0.64		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
3.5	384	0.1355	1.84		Shallow Concentrated Flow, E-F Woodland Kv= 5.0 fps
2.0	165	0.0789	1.40		Shallow Concentrated Flow, F-G Woodland Kv= 5.0 fps
6.4	221	0.0133	0.58		Shallow Concentrated Flow, G-H Woodland Kv= 5.0 fps
56.6	2,873	Total			

Subcatchment OFF-1: OFF-1

Hydrograph



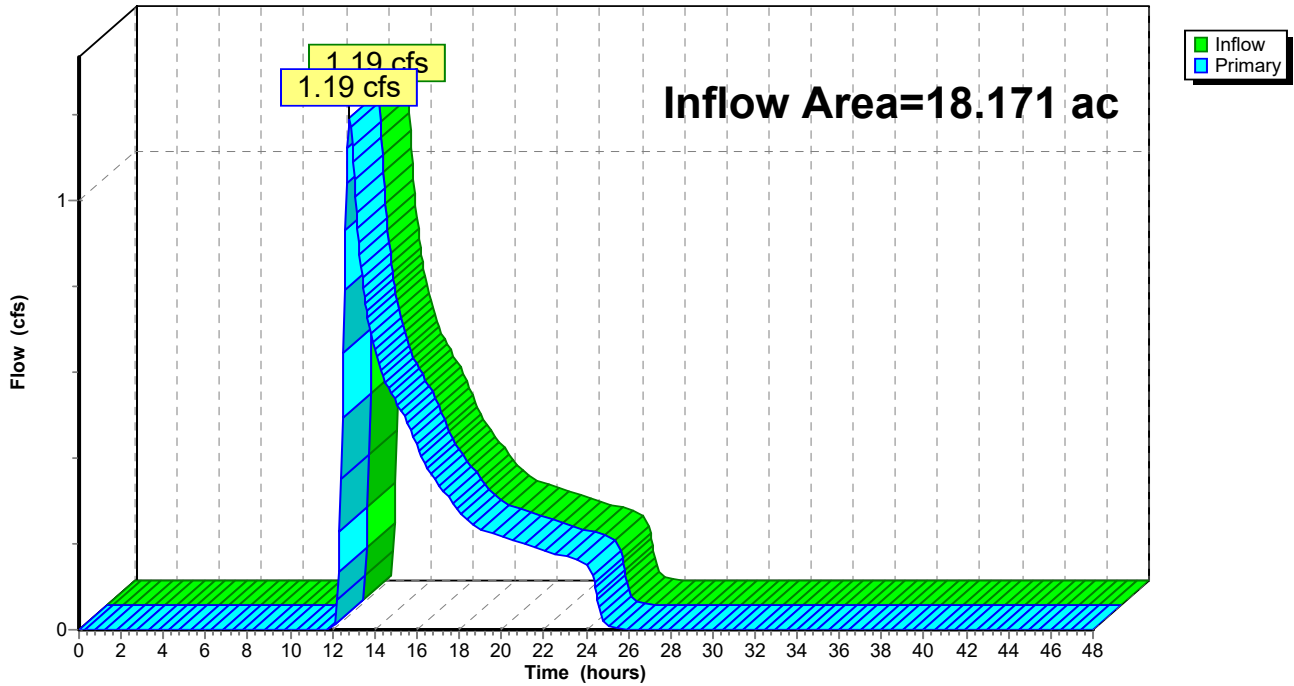
Summary for Link AP-1: AP-1

Inflow Area = 18.171 ac, 0.00% Impervious, Inflow Depth = 0.25" for 2 YR event
Inflow = 1.19 cfs @ 12.81 hrs, Volume= 0.371 af
Primary = 1.19 cfs @ 12.81 hrs, Volume= 0.371 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



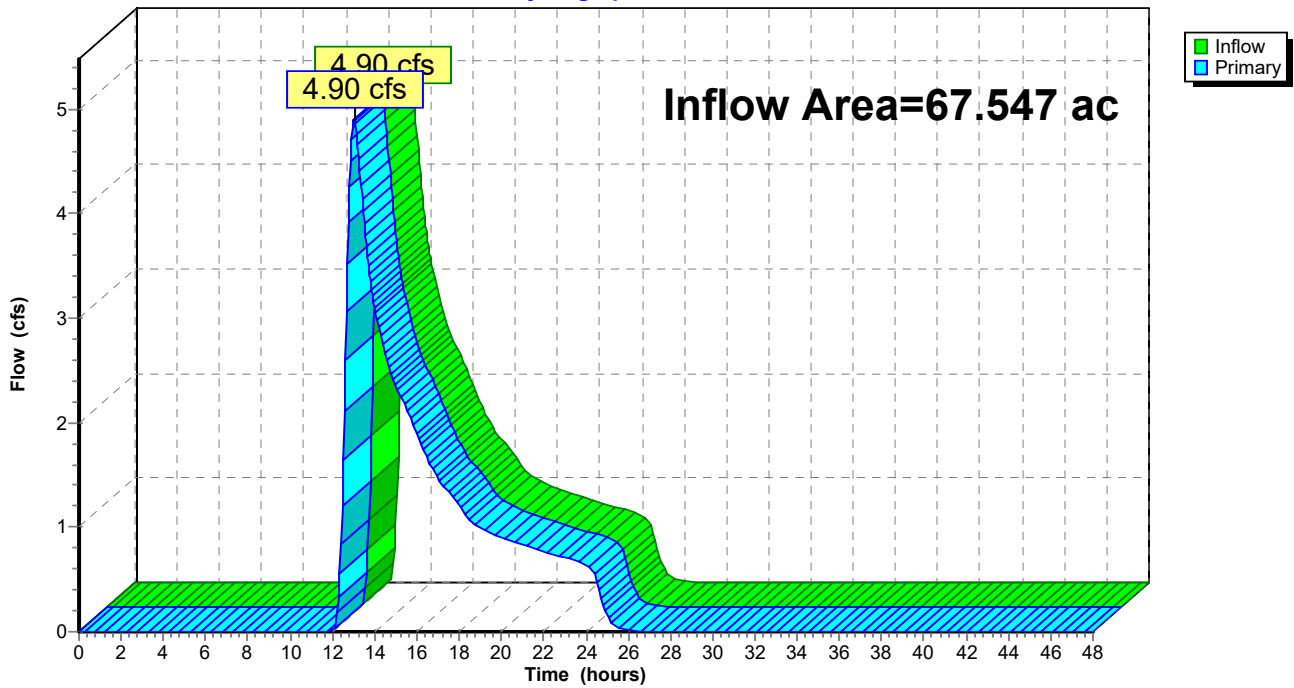
Summary for Link AP-2: AP-2

Inflow Area = 67.547 ac, 0.00% Impervious, Inflow Depth = 0.29" for 2 YR event
Inflow = 4.90 cfs @ 13.02 hrs, Volume= 1.606 af
Primary = 4.90 cfs @ 13.02 hrs, Volume= 1.606 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



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=18.171 ac 0.00% Impervious Runoff Depth=1.63"
Flow Length=1,397' Tc=37.7 min CN=55 Runoff=15.88 cfs 2.474 af

Subcatchment EDA-2: EDA-2

Runoff Area=20.647 ac 0.00% Impervious Runoff Depth=1.63"
Flow Length=621' Tc=43.8 min CN=55 Runoff=16.68 cfs 2.812 af

Subcatchment OFF-1: OFF-1

Runoff Area=46.900 ac 0.00% Impervious Runoff Depth=1.80"
Flow Length=2,873' Tc=56.6 min CN=57 Runoff=36.86 cfs 7.030 af

Link AP-1: AP-1

Inflow=15.88 cfs 2.474 af
Primary=15.88 cfs 2.474 af

Link AP-2: AP-2

Inflow=52.53 cfs 9.842 af
Primary=52.53 cfs 9.842 af

Total Runoff Area = 85.718 ac Runoff Volume = 12.316 af Average Runoff Depth = 1.72"
100.00% Pervious = 85.718 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment EDA-1: EDA-1

Runoff = 15.88 cfs @ 12.59 hrs, Volume= 2.474 af, Depth= 1.63"

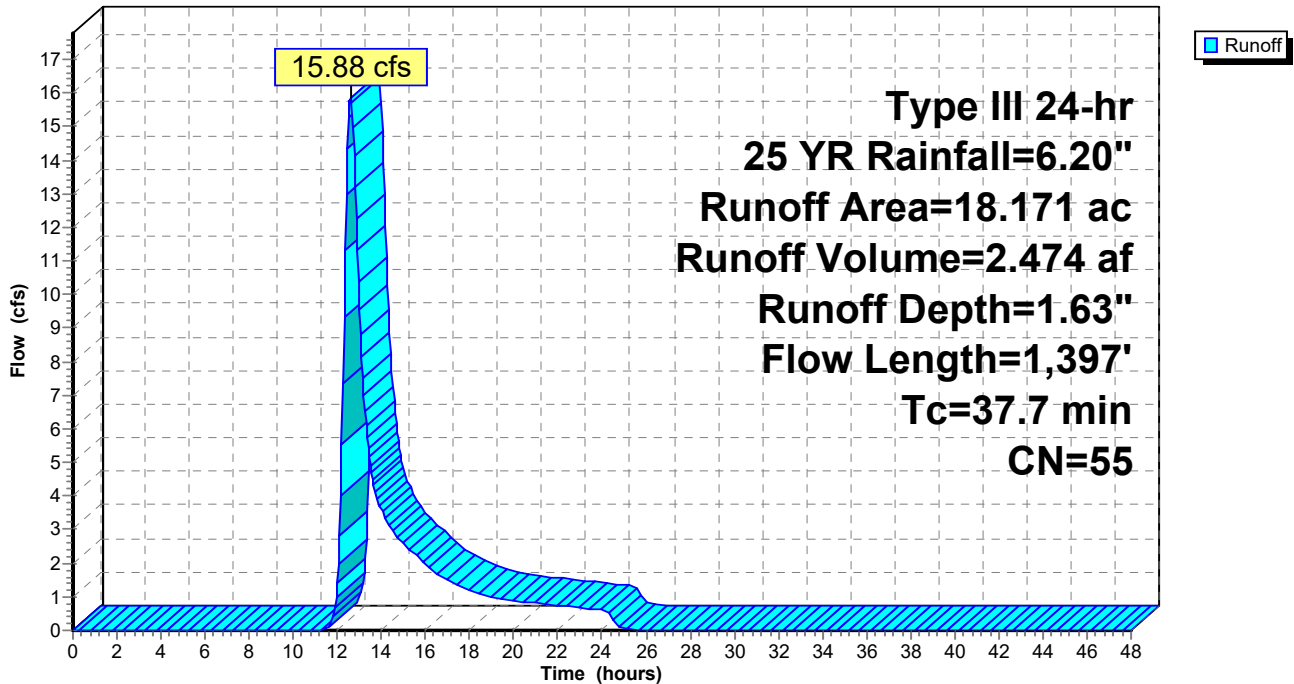
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25 YR Rainfall=6.20"

Area (ac)	CN	Description
18.171	55	Woods, Good, HSG B
18.171		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	100	0.0266	0.09		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.18"
1.6	159	0.1122	1.67		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
16.9	1,138	0.0506	1.12		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
37.7	1,397	Total			

Subcatchment EDA-1: EDA-1

Hydrograph



Summary for Subcatchment EDA-2: EDA-2

Runoff = 16.68 cfs @ 12.68 hrs, Volume= 2.812 af, Depth= 1.63"

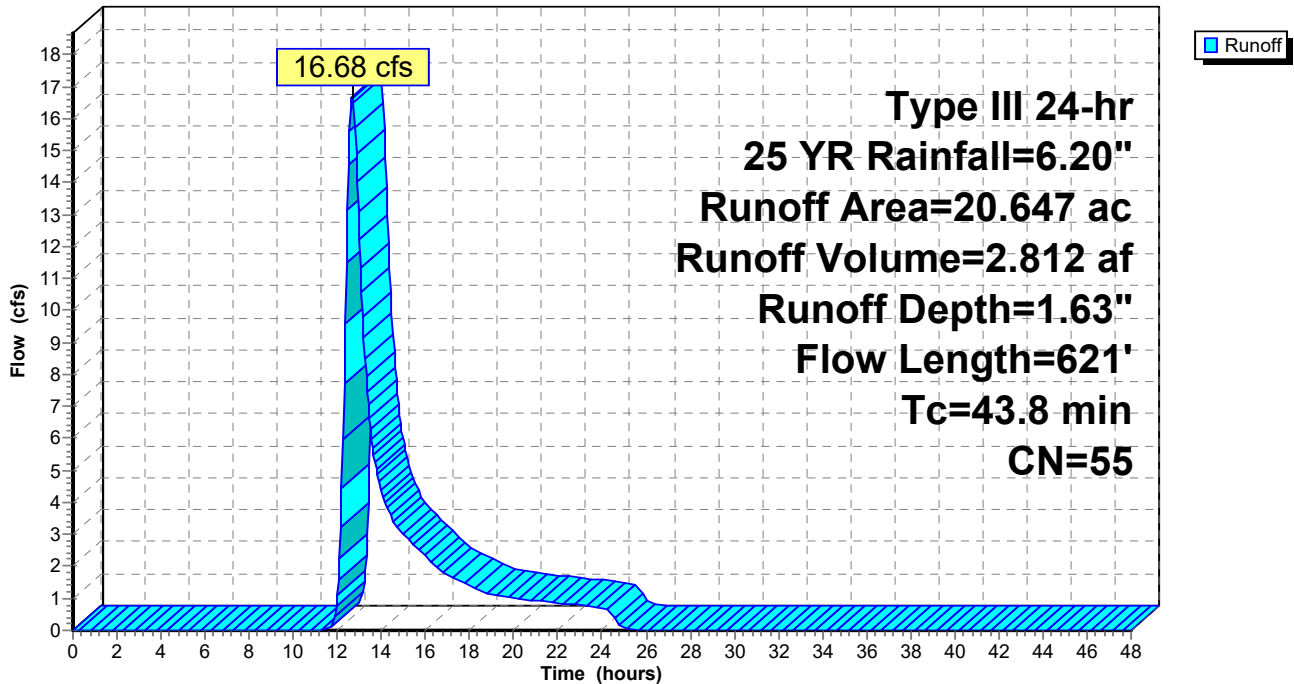
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YR Rainfall=6.20"

Area (ac)	CN	Description
20.099	55	Woods, Good, HSG B
0.548	70	Woods, Good, HSG C
20.647	55	Weighted Average
20.647		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	100	0.0089	0.06		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.18"
14.0	521	0.0154	0.62		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
43.8	621	Total			

Subcatchment EDA-2: EDA-2

Hydrograph



Summary for Subcatchment OFF-1: OFF-1

Runoff = 36.86 cfs @ 12.84 hrs, Volume= 7.030 af, Depth= 1.80"

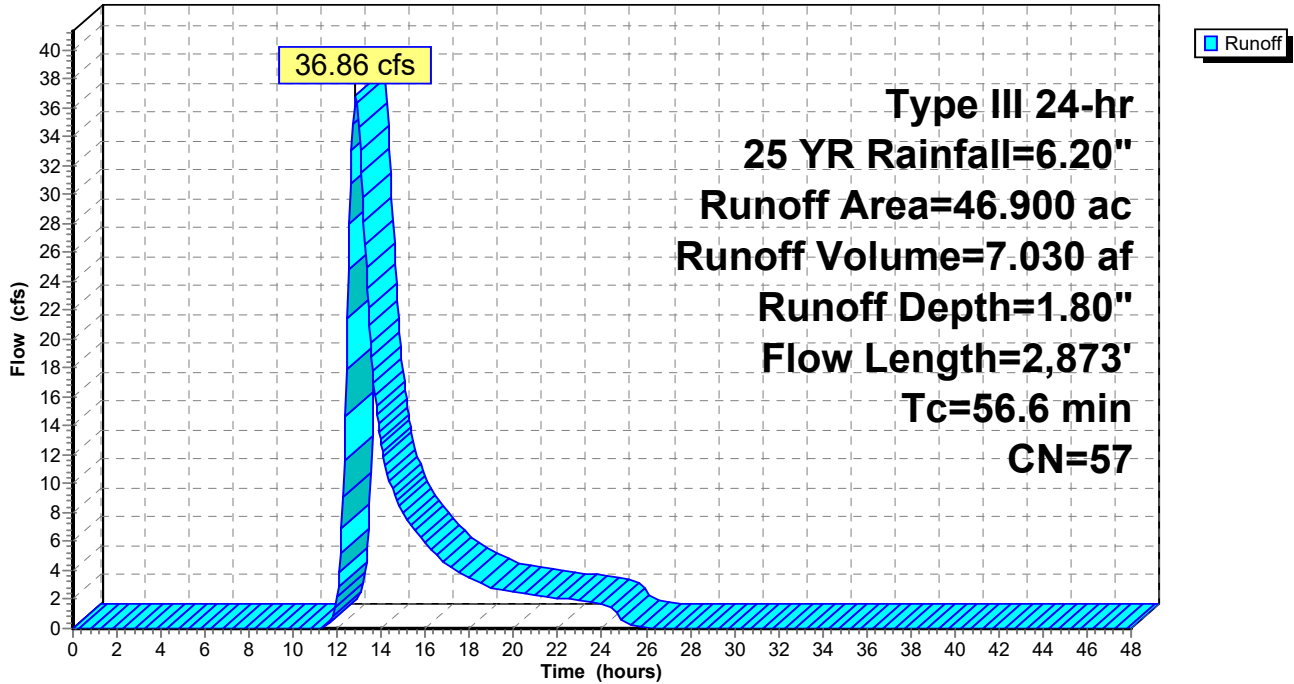
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25 YR Rainfall=6.20"

Area (ac)	CN	Description
32.805	55	Woods, Good, HSG B
14.095	61	Pasture/grassland/range, Good, HSG B
46.900	57	Weighted Average
46.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0211	0.16		Sheet Flow, A-B Cultivated: Residue>20% n= 0.170 P2= 3.18"
14.3	968	0.0158	1.13		Shallow Concentrated Flow, B-C Cultivated Straight Rows Kv= 9.0 fps
3.9	422	0.0411	1.82		Shallow Concentrated Flow, C-D Cultivated Straight Rows Kv= 9.0 fps
15.9	613	0.0166	0.64		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
3.5	384	0.1355	1.84		Shallow Concentrated Flow, E-F Woodland Kv= 5.0 fps
2.0	165	0.0789	1.40		Shallow Concentrated Flow, F-G Woodland Kv= 5.0 fps
6.4	221	0.0133	0.58		Shallow Concentrated Flow, G-H Woodland Kv= 5.0 fps
56.6	2,873	Total			

Subcatchment OFF-1: OFF-1

Hydrograph



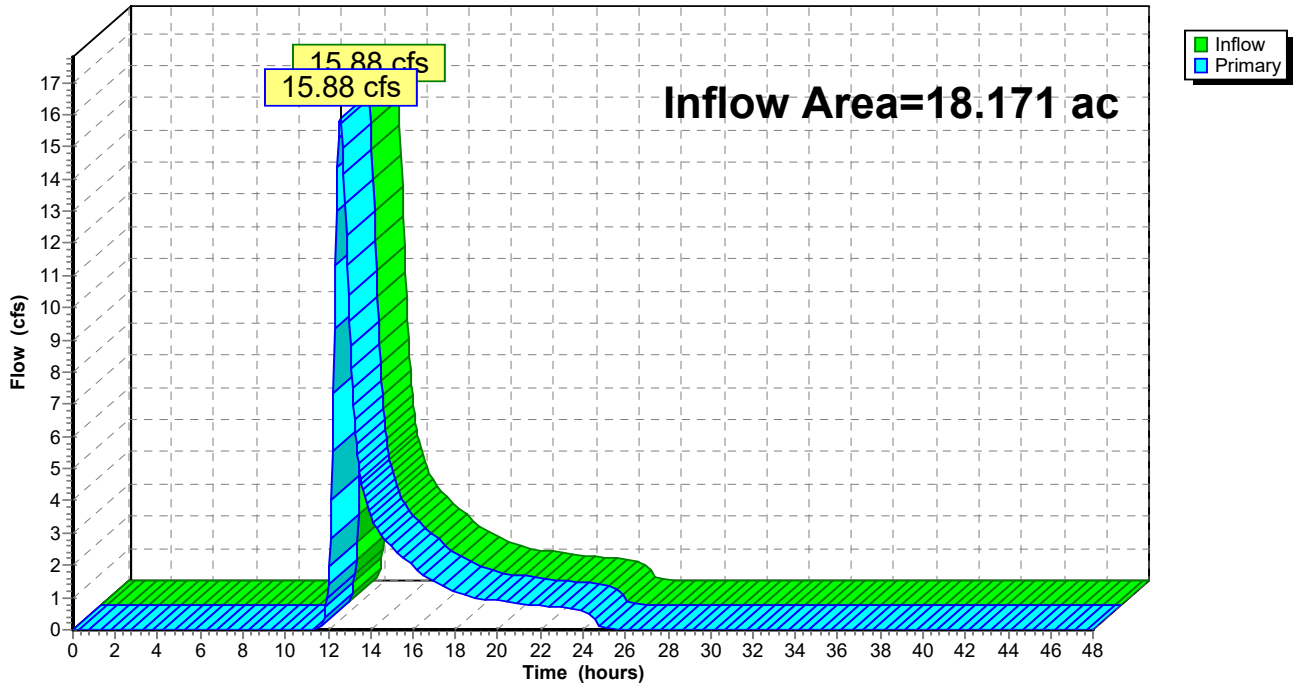
Summary for Link AP-1: AP-1

Inflow Area = 18.171 ac, 0.00% Impervious, Inflow Depth = 1.63" for 25 YR event
Inflow = 15.88 cfs @ 12.59 hrs, Volume= 2.474 af
Primary = 15.88 cfs @ 12.59 hrs, Volume= 2.474 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



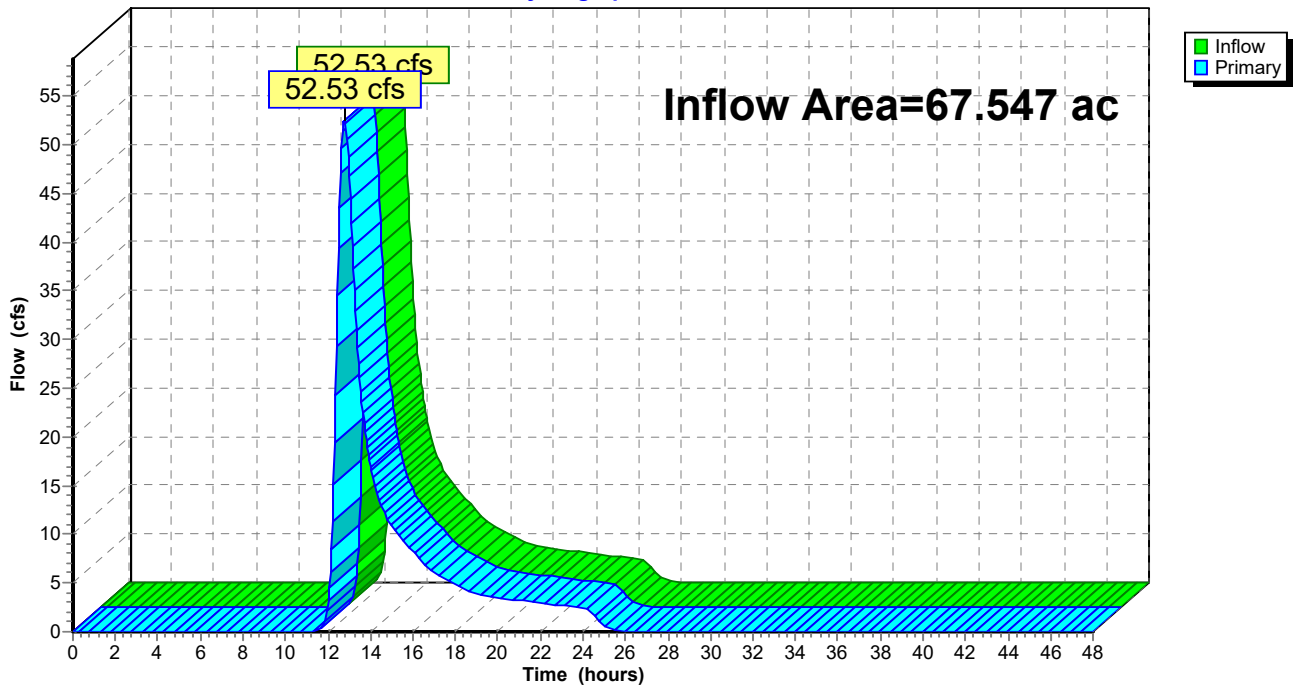
Summary for Link AP-2: AP-2

Inflow Area = 67.547 ac, 0.00% Impervious, Inflow Depth = 1.75" for 25 YR event
Inflow = 52.53 cfs @ 12.78 hrs, Volume= 9.842 af
Primary = 52.53 cfs @ 12.78 hrs, Volume= 9.842 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



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=18.171 ac 0.00% Impervious Runoff Depth=2.16"
Flow Length=1,397' Tc=37.7 min CN=55 Runoff=21.74 cfs 3.264 af

Subcatchment EDA-2: EDA-2

Runoff Area=20.647 ac 0.00% Impervious Runoff Depth=2.16"
Flow Length=621' Tc=43.8 min CN=55 Runoff=22.82 cfs 3.709 af

Subcatchment OFF-1: OFF-1

Runoff Area=46.900 ac 0.00% Impervious Runoff Depth=2.35"
Flow Length=2,873' Tc=56.6 min CN=57 Runoff=49.61 cfs 9.171 af

Link AP-1: AP-1

Inflow=21.74 cfs 3.264 af
Primary=21.74 cfs 3.264 af

Link AP-2: AP-2

Inflow=71.09 cfs 12.880 af
Primary=71.09 cfs 12.880 af

Total Runoff Area = 85.718 ac Runoff Volume = 16.144 af Average Runoff Depth = 2.26"
100.00% Pervious = 85.718 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment EDA-1: EDA-1

Runoff = 21.74 cfs @ 12.57 hrs, Volume= 3.264 af, Depth= 2.16"

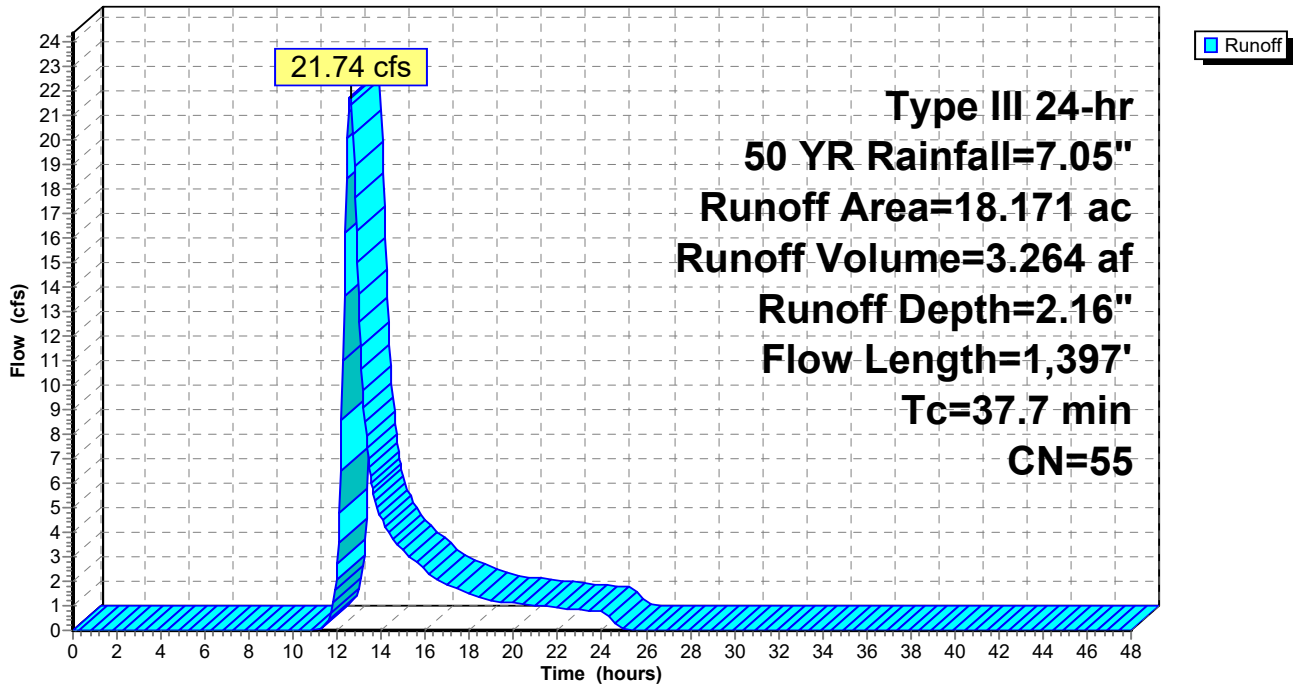
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50 YR Rainfall=7.05"

Area (ac)	CN	Description
18.171	55	Woods, Good, HSG B
18.171		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	100	0.0266	0.09		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.18"
1.6	159	0.1122	1.67		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
16.9	1,138	0.0506	1.12		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
37.7	1,397	Total			

Subcatchment EDA-1: EDA-1

Hydrograph



Summary for Subcatchment EDA-2: EDA-2

Runoff = 22.82 cfs @ 12.66 hrs, Volume= 3.709 af, Depth= 2.16"

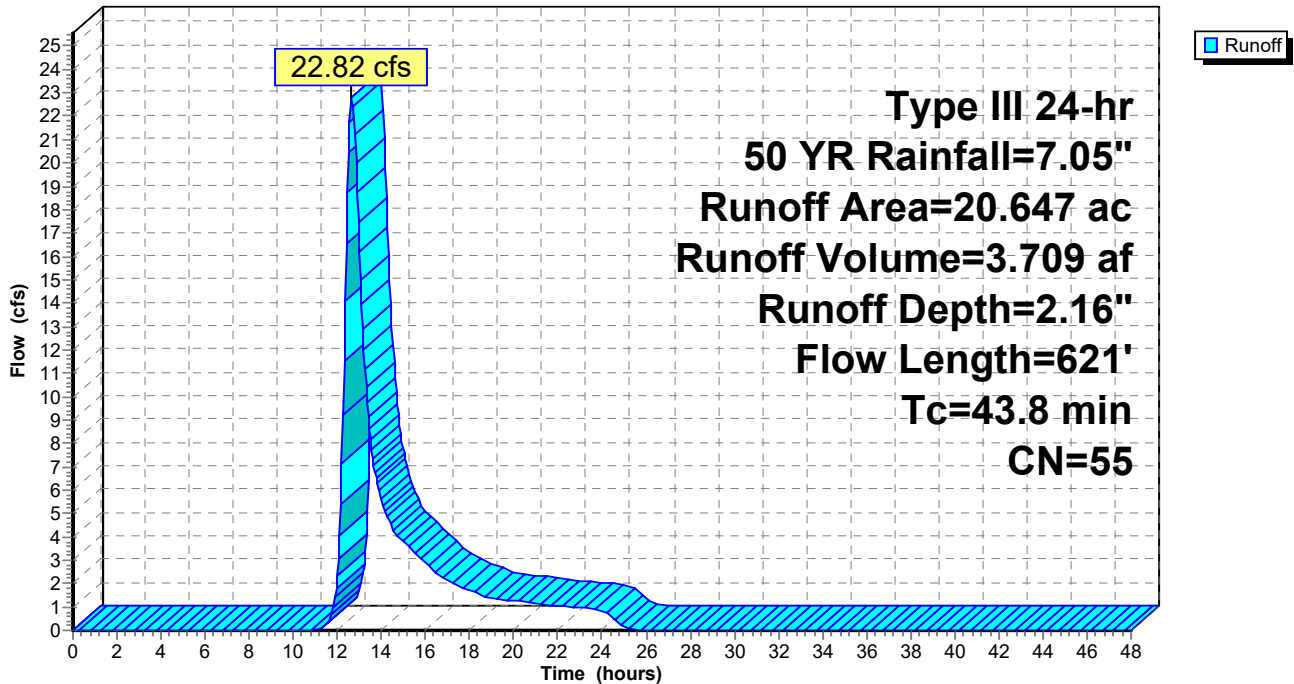
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 YR Rainfall=7.05"

Area (ac)	CN	Description
20.099	55	Woods, Good, HSG B
0.548	70	Woods, Good, HSG C
20.647	55	Weighted Average
20.647		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	100	0.0089	0.06		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.18"
14.0	521	0.0154	0.62		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
43.8	621	Total			

Subcatchment EDA-2: EDA-2

Hydrograph



Summary for Subcatchment OFF-1: OFF-1

Runoff = 49.61 cfs @ 12.82 hrs, Volume= 9.171 af, Depth= 2.35"

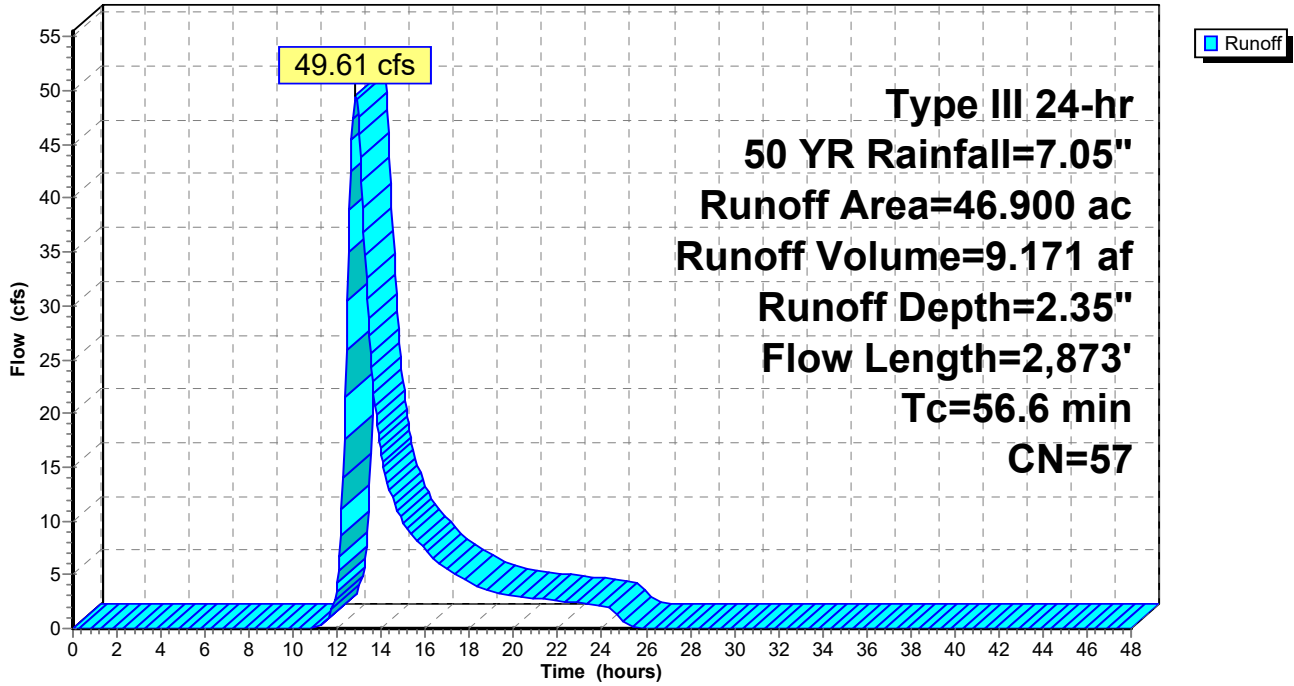
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50 YR Rainfall=7.05"

Area (ac)	CN	Description
32.805	55	Woods, Good, HSG B
14.095	61	Pasture/grassland/range, Good, HSG B
46.900	57	Weighted Average
46.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0211	0.16		Sheet Flow, A-B Cultivated: Residue>20% n= 0.170 P2= 3.18"
14.3	968	0.0158	1.13		Shallow Concentrated Flow, B-C Cultivated Straight Rows Kv= 9.0 fps
3.9	422	0.0411	1.82		Shallow Concentrated Flow, C-D Cultivated Straight Rows Kv= 9.0 fps
15.9	613	0.0166	0.64		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
3.5	384	0.1355	1.84		Shallow Concentrated Flow, E-F Woodland Kv= 5.0 fps
2.0	165	0.0789	1.40		Shallow Concentrated Flow, F-G Woodland Kv= 5.0 fps
6.4	221	0.0133	0.58		Shallow Concentrated Flow, G-H Woodland Kv= 5.0 fps
56.6	2,873	Total			

Subcatchment OFF-1: OFF-1

Hydrograph



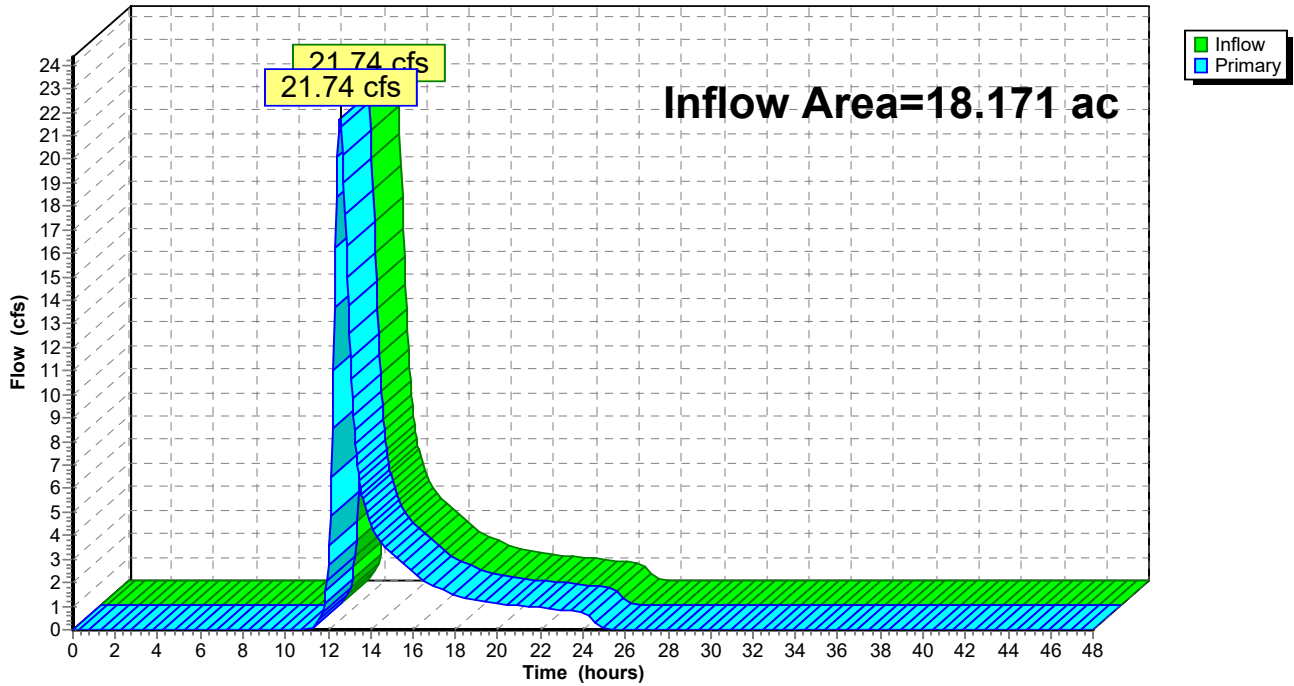
Summary for Link AP-1: AP-1

Inflow Area = 18.171 ac, 0.00% Impervious, Inflow Depth = 2.16" for 50 YR event
Inflow = 21.74 cfs @ 12.57 hrs, Volume= 3.264 af
Primary = 21.74 cfs @ 12.57 hrs, Volume= 3.264 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



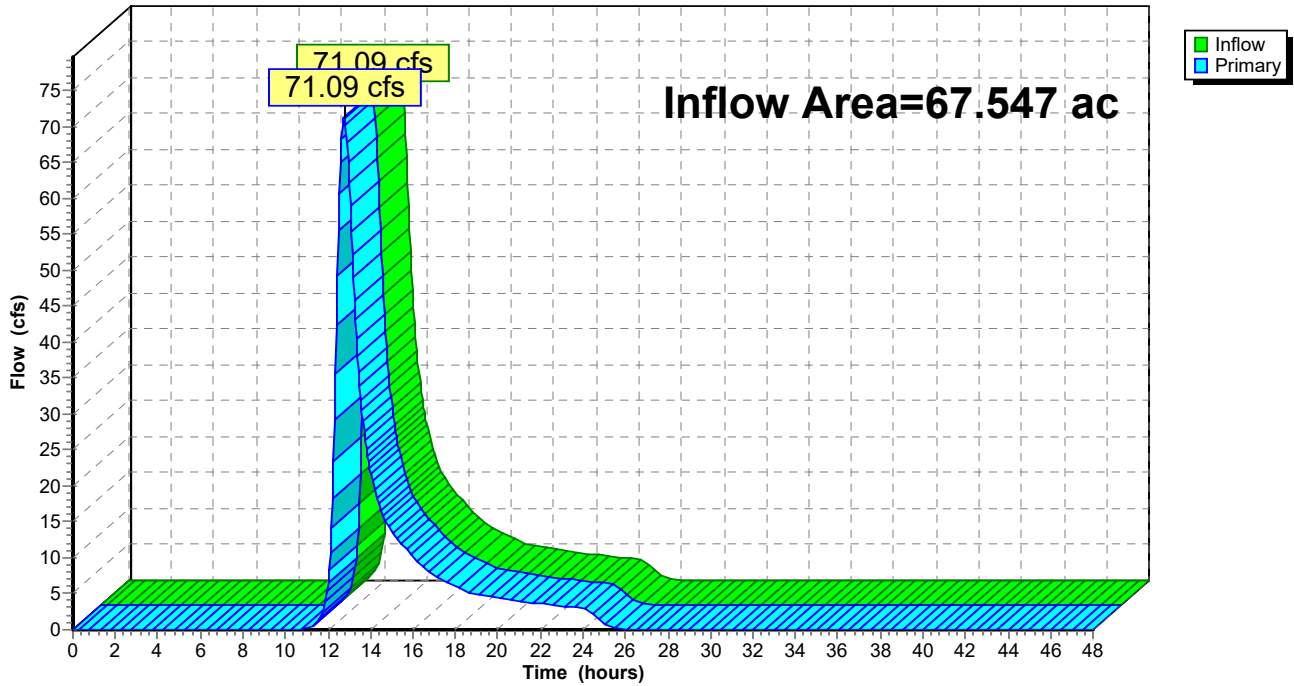
Summary for Link AP-2: AP-2

Inflow Area = 67.547 ac, 0.00% Impervious, Inflow Depth = 2.29" for 50 YR event
Inflow = 71.09 cfs @ 12.76 hrs, Volume= 12.880 af
Primary = 71.09 cfs @ 12.76 hrs, Volume= 12.880 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



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=18.171 ac 0.00% Impervious Runoff Depth=2.78"
Flow Length=1,397' Tc=37.7 min CN=55 Runoff=28.71 cfs 4.205 af

Subcatchment EDA-2: EDA-2

Runoff Area=20.647 ac 0.00% Impervious Runoff Depth=2.78"
Flow Length=621' Tc=43.8 min CN=55 Runoff=30.15 cfs 4.779 af

Subcatchment OFF-1: OFF-1

Runoff Area=46.900 ac 0.00% Impervious Runoff Depth=3.00"
Flow Length=2,873' Tc=56.6 min CN=57 Runoff=64.67 cfs 11.706 af

Link AP-1: AP-1

Inflow=28.71 cfs 4.205 af
Primary=28.71 cfs 4.205 af

Link AP-2: AP-2

Inflow=93.06 cfs 16.484 af
Primary=93.06 cfs 16.484 af

Total Runoff Area = 85.718 ac Runoff Volume = 20.690 af Average Runoff Depth = 2.90"
100.00% Pervious = 85.718 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment EDA-1: EDA-1

Runoff = 28.71 cfs @ 12.56 hrs, Volume= 4.205 af, Depth= 2.78"

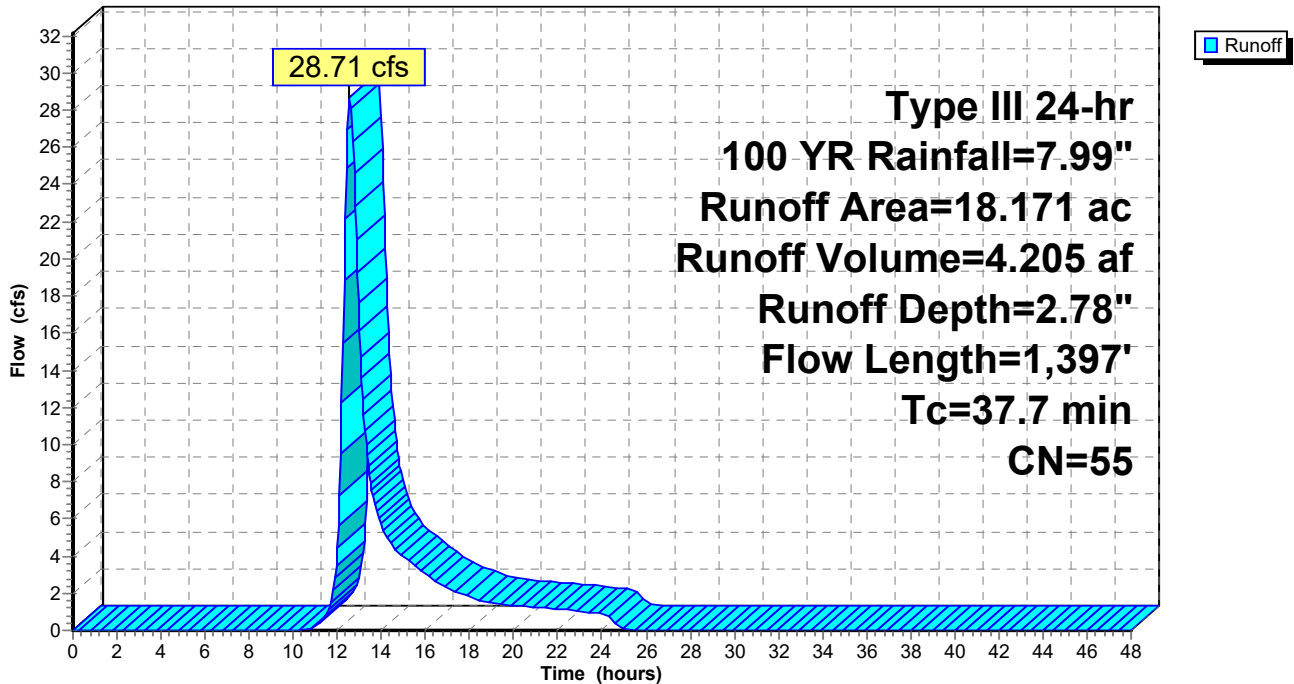
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100 YR Rainfall=7.99"

Area (ac)	CN	Description
18.171	55	Woods, Good, HSG B
18.171		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	100	0.0266	0.09		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.18"
1.6	159	0.1122	1.67		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
16.9	1,138	0.0506	1.12		Shallow Concentrated Flow, C-D Woodland Kv= 5.0 fps
37.7	1,397	Total			

Subcatchment EDA-1: EDA-1

Hydrograph



Summary for Subcatchment EDA-2: EDA-2

Runoff = 30.15 cfs @ 12.64 hrs, Volume= 4.779 af, Depth= 2.78"

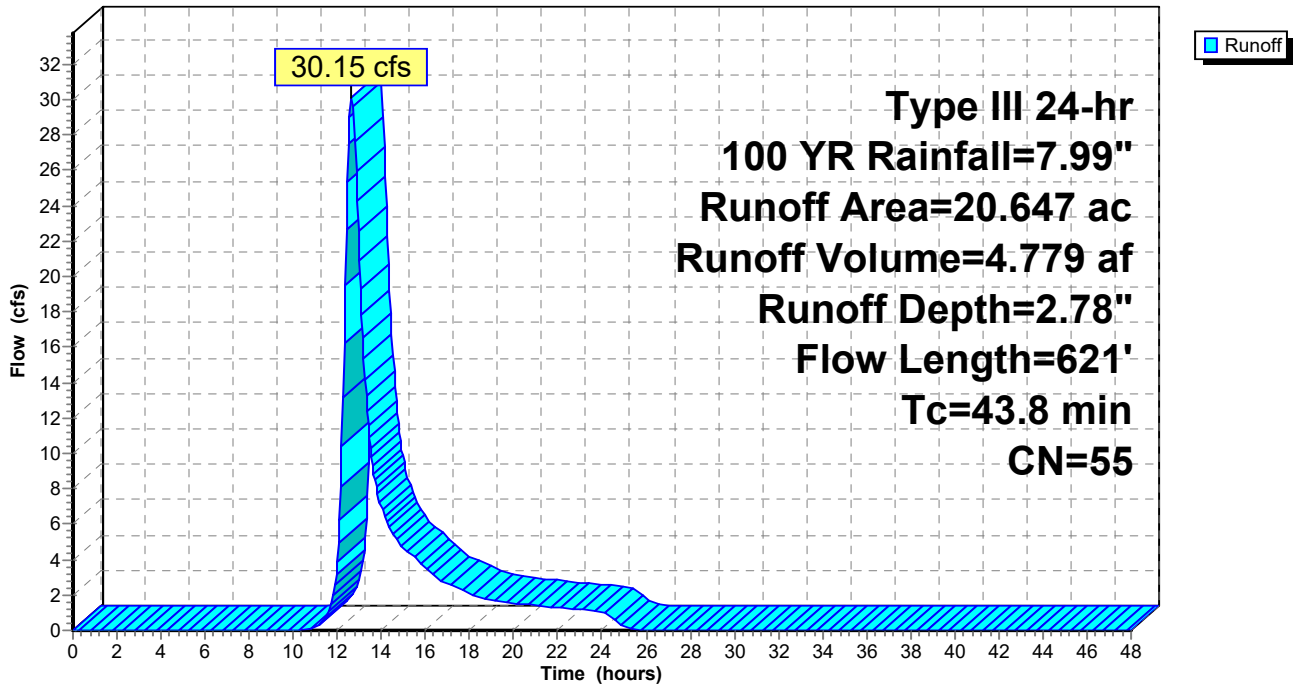
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100 YR Rainfall=7.99"

Area (ac)	CN	Description
20.099	55	Woods, Good, HSG B
0.548	70	Woods, Good, HSG C
20.647	55	Weighted Average
20.647		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	100	0.0089	0.06		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.18"
14.0	521	0.0154	0.62		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
43.8	621	Total			

Subcatchment EDA-2: EDA-2

Hydrograph



Summary for Subcatchment OFF-1: OFF-1

Runoff = 64.67 cfs @ 12.81 hrs, Volume= 11.706 af, Depth= 3.00"

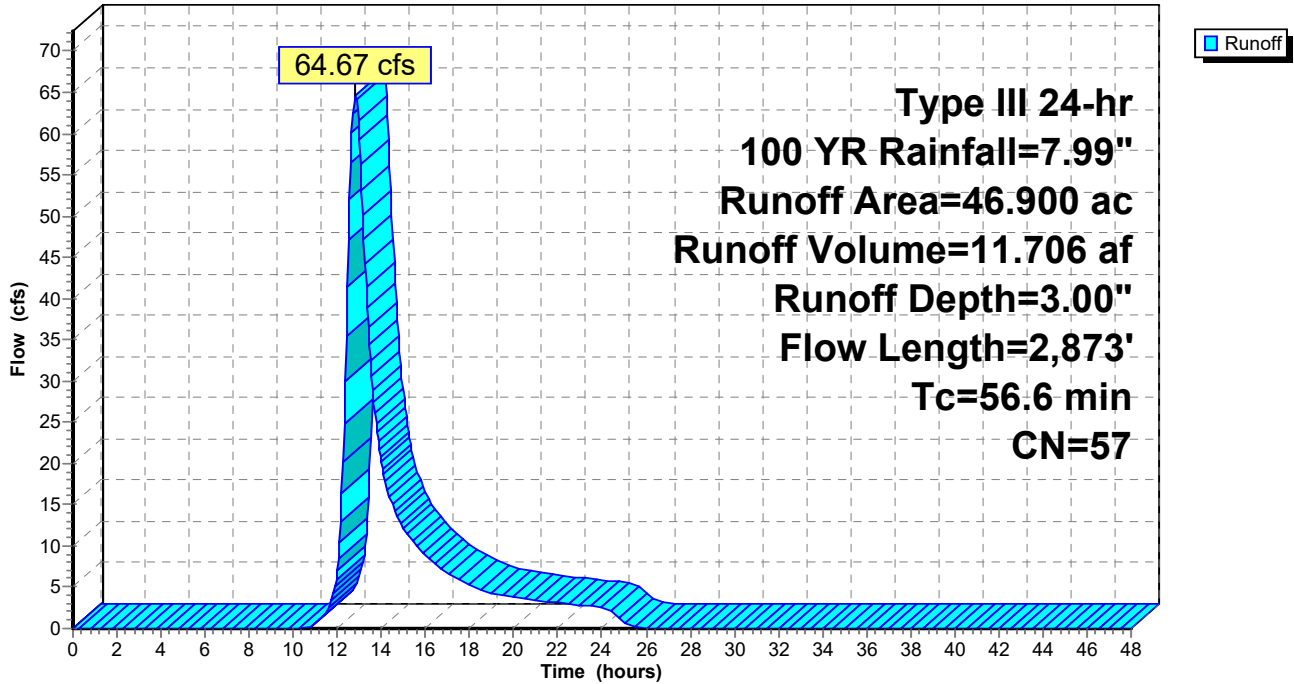
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100 YR Rainfall=7.99"

Area (ac)	CN	Description
32.805	55	Woods, Good, HSG B
14.095	61	Pasture/grassland/range, Good, HSG B
46.900	57	Weighted Average
46.900		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0211	0.16		Sheet Flow, A-B Cultivated: Residue>20% n= 0.170 P2= 3.18"
14.3	968	0.0158	1.13		Shallow Concentrated Flow, B-C Cultivated Straight Rows Kv= 9.0 fps
3.9	422	0.0411	1.82		Shallow Concentrated Flow, C-D Cultivated Straight Rows Kv= 9.0 fps
15.9	613	0.0166	0.64		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
3.5	384	0.1355	1.84		Shallow Concentrated Flow, E-F Woodland Kv= 5.0 fps
2.0	165	0.0789	1.40		Shallow Concentrated Flow, F-G Woodland Kv= 5.0 fps
6.4	221	0.0133	0.58		Shallow Concentrated Flow, G-H Woodland Kv= 5.0 fps
56.6	2,873	Total			

Subcatchment OFF-1: OFF-1

Hydrograph



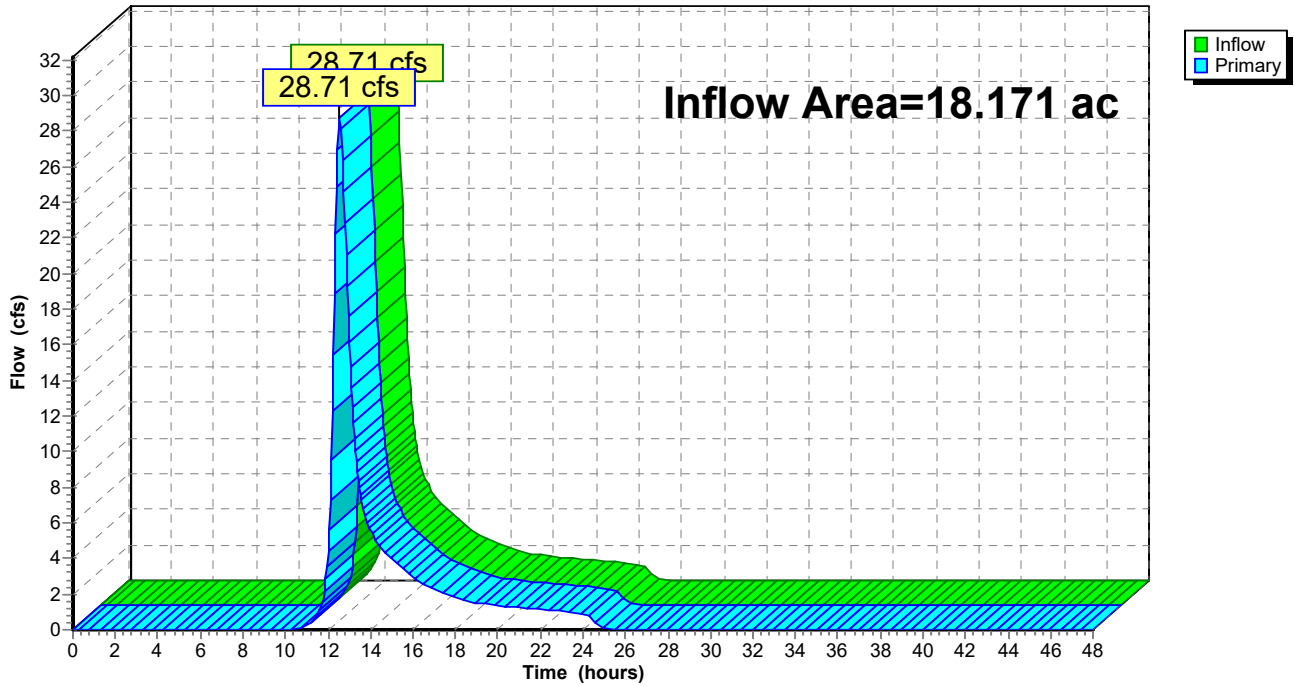
Summary for Link AP-1: AP-1

Inflow Area = 18.171 ac, 0.00% Impervious, Inflow Depth = 2.78" for 100 YR event
Inflow = 28.71 cfs @ 12.56 hrs, Volume= 4.205 af
Primary = 28.71 cfs @ 12.56 hrs, Volume= 4.205 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



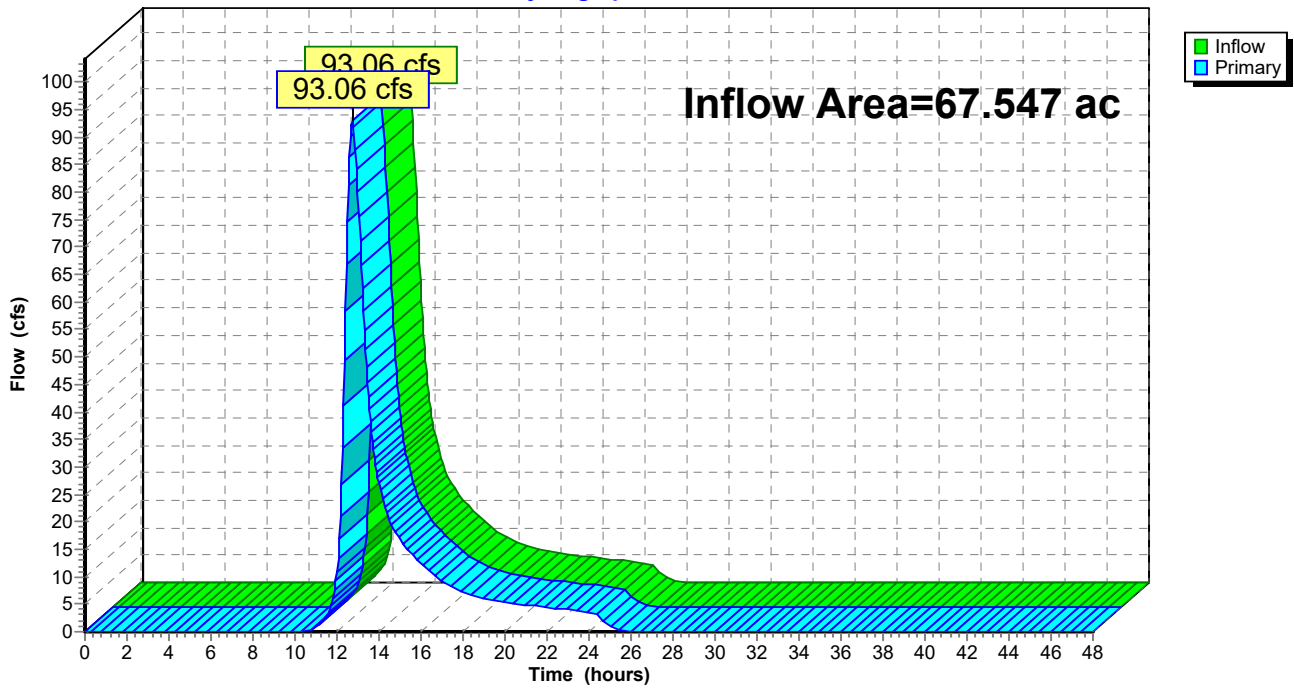
Summary for Link AP-2: AP-2

Inflow Area = 67.547 ac, 0.00% Impervious, Inflow Depth = 2.93" for 100 YR event
Inflow = 93.06 cfs @ 12.75 hrs, Volume= 16.484 af
Primary = 93.06 cfs @ 12.75 hrs, Volume= 16.484 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



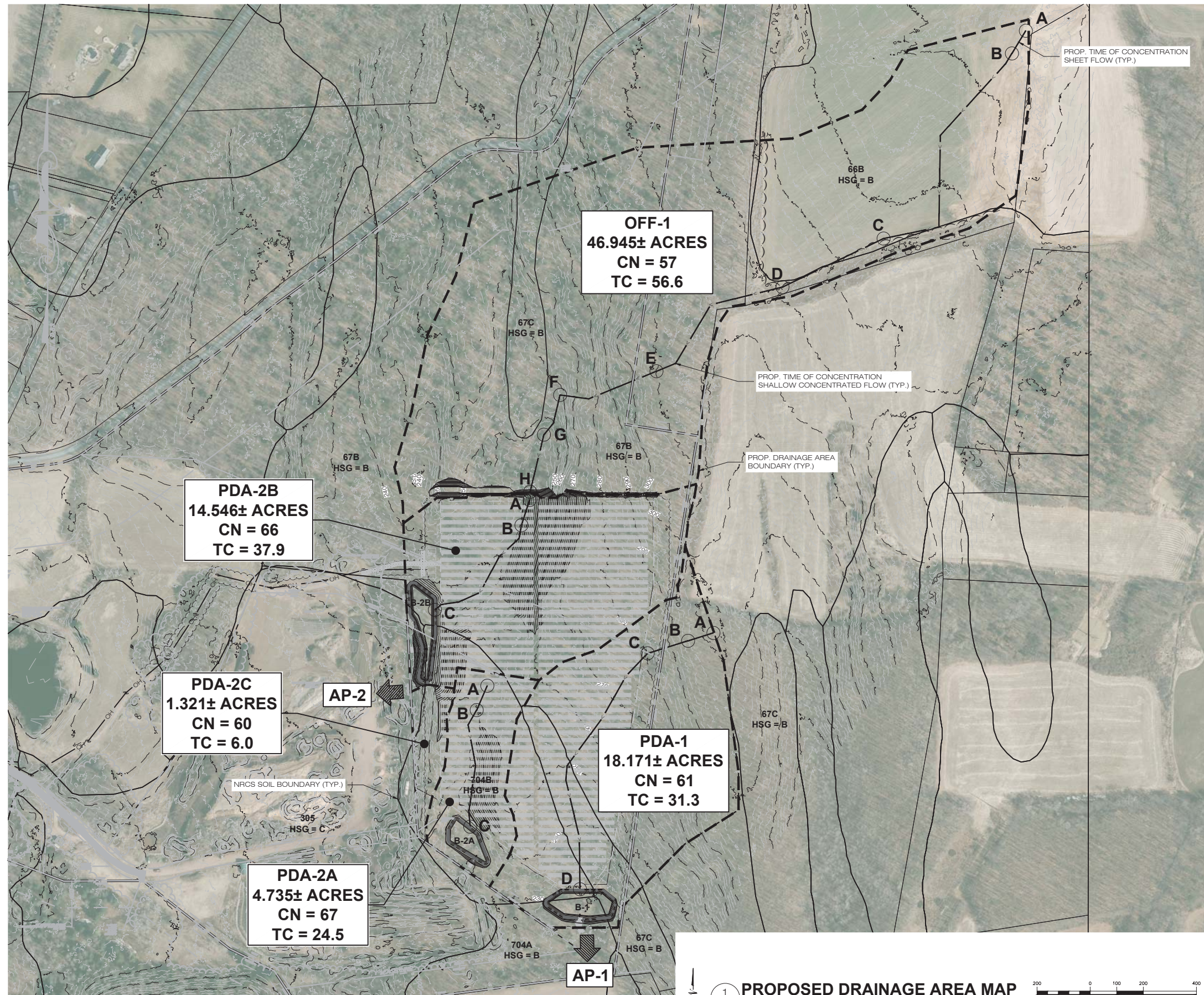
**APPENDIX C: PROPOSED DRAINAGE AREA MAP (PDA-1) &
HYDROLOGIC COMPUTATION (HYDROCAD)**

PROPOSED DRAINAGE AREAS

	TOTAL AREA (ACRES)	COMPOSITE CN	TC (MINS.)
PDA-1	18.171	61	31.3
PDA-2A	4.735	67	24.5
PDA-2B	14.546	66	37.9
PDA-2C	1.321	60	6.0
OFF-1	46.945	57	56.6

PROPOSED CONDITION PEAK FLOWS

ANALYSIS POINT	2-YEAR (CFS)	25-YEAR (CFS)	50-YEAR (CFS)	100-YEAR (CFS)
AP-1	0.00	6.19	10.87	24.37
AP-2	4.34	52.38	68.66	91.01



1 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860)-580-7174



567 VAUXHAUL STREET EXTENSION - SUITE 311
WATERFORD, CT 06385 PHONE: (860)-663-1697
WWW.ALLPOINTS TECH.COM FAX: (860)-663-0935

CSC PERMIT SET

NO	DATE	REVISION
0	04/08/21	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: 567 VAUXHAUL STREET EXTENSION - SUITE 311 WATERFORD, CT 06385

OWNER: THOMPSON FAMILY LAND TRUST
ADDRESS: SADDs MILL RD ELLINGTON, CT

ELLINGTON SOLAR

SITE 277 SADDs MILL RD
ADDRESS: ELLINGTON, CT

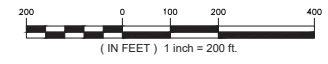
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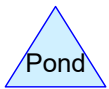
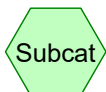
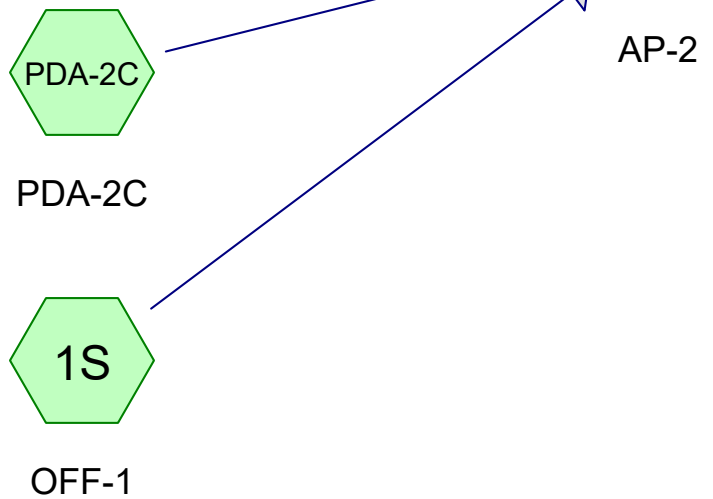
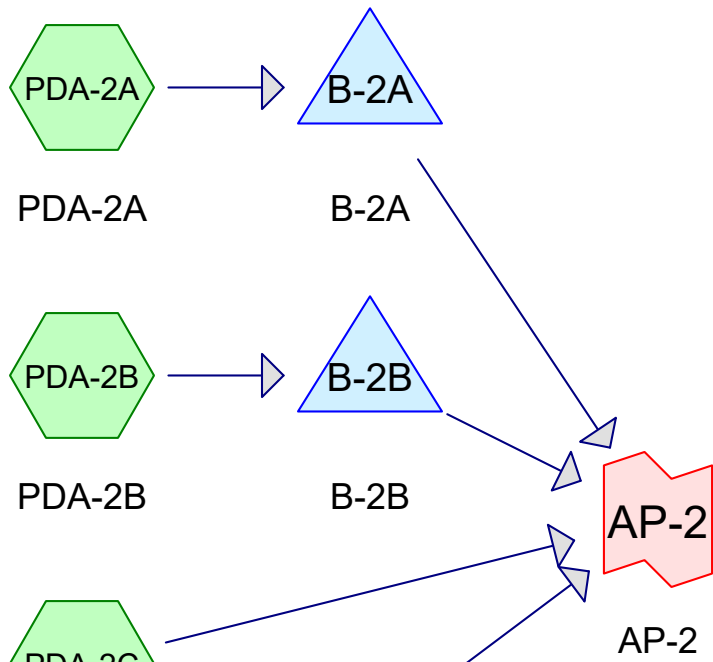
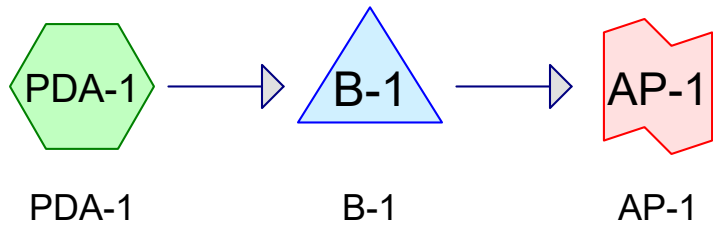
DRAWN BY: JT
DATE: 04/08/21 CHECKED BY: BJP

SHEET TITLE:
PROPOSED DRAINAGE AREA MAP

SHEET NUMBER:
PDA-1

1 PROPOSED DRAINAGE AREA MAP
SCALE: 1" = 200'-0"





Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.076	96	Gravel surface, HSG B-C (PDA-2B)
0.971	58	Meadow, non-grazed, HSG B (1S, PDA-2A, PDA-2B)
20.106	65	Meadow, non-grazed, HSG B-C (PDA-1, PDA-2A, PDA-2B, PDA-2C)
4.084	71	Meadow, non-grazed, HSG C (PDA-2A, PDA-2B, PDA-2C)
14.095	61	Pasture/grassland/range, Good, HSG B (1S)
0.028	98	Unconnected pavement, HSG B-C (PDA-2B)
1.249	98	Water Surface, HSG B (PDA-1, PDA-2A, PDA-2B)
0.139	98	Water Surface, HSG C (PDA-2B)
44.668	55	Woods, Good, HSG B (1S, PDA-1, PDA-2A, PDA-2B, PDA-2C)
0.302	70	Woods, Good, HSG C (PDA-2B, PDA-2C)
85.718	60	TOTAL AREA

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
81.193	HSG B	1S, PDA-1, PDA-2A, PDA-2B, PDA-2C
4.525	HSG C	PDA-2A, PDA-2B, PDA-2C
0.000	HSG D	
0.000	Other	
85.718		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.076	0.000	0.000	0.000	0.076	Gravel surface	PD A-2 B
0.000	21.077	4.084	0.000	0.000	25.161	Meadow, non-grazed	1S, PD A-1, PD A-2 A, PD A-2 B, PD A-2 C
0.000	14.095	0.000	0.000	0.000	14.095	Pasture/grassland/range, Good	1S
0.000	0.028	0.000	0.000	0.000	0.028	Unconnected pavement	PD A-2 B
0.000	1.249	0.139	0.000	0.000	1.388	Water Surface	PD A-1, PD A-2 A, PD A-2 B
0.000	44.668	0.302	0.000	0.000	44.970	Woods, Good	1S, PD A-1, PD A-2 A, PD A-2 B, PD A-2 C

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Page 5

Ground Covers (all nodes) (continued)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	81.193	4.525	0.000	0.000	85.718	TOTAL AREA	

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Page 6

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	B-1	225.00	224.50	40.5	0.0123	0.013	15.0	0.0	0.0
2	B-2A	230.50	230.00	30.5	0.0164	0.013	12.0	0.0	0.0
3	B-2B	228.00	227.50	36.5	0.0137	0.013	15.0	0.0	0.0
4	B-2B	228.00	227.50	36.5	0.0137	0.013	15.0	0.0	0.0

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 1S: OFF-1	Runoff Area=46.945 ac 0.00% Impervious Runoff Depth=0.30" Flow Length=2,873' Tc=56.6 min CN=57 Runoff=3.68 cfs 1.186 af
Subcatchment PDA-1: PDA-1	Runoff Area=18.171 ac 2.96% Impervious Runoff Depth=0.44" Flow Length=1,252' Tc=31.3 min CN=61 Runoff=3.48 cfs 0.660 af
Subcatchment PDA-2A: PDA-2A	Runoff Area=4.735 ac 6.48% Impervious Runoff Depth=0.68" Flow Length=552' Tc=24.5 min CN=67 Runoff=1.93 cfs 0.267 af
Subcatchment PDA-2B: PDA-2B	Runoff Area=14.546 ac 3.93% Impervious Runoff Depth=0.63" Flow Length=591' Tc=37.9 min CN=66 Runoff=4.46 cfs 0.767 af
Subcatchment PDA-2C: PDA-2C	Runoff Area=1.321 ac 0.00% Impervious Runoff Depth=0.40" Tc=6.0 min CN=60 Runoff=0.34 cfs 0.044 af
Pond B-1: B-1	Peak Elev=226.62' Storage=28,747 cf Inflow=3.48 cfs 0.660 af Outflow=0.00 cfs 0.000 af
Pond B-2A: B-2A	Peak Elev=231.13' Storage=6,032 cf Inflow=1.93 cfs 0.267 af Outflow=0.22 cfs 0.216 af
Pond B-2B: B-2B	Peak Elev=229.23' Storage=15,919 cf Inflow=4.46 cfs 0.767 af Outflow=0.68 cfs 0.648 af
Link AP-1: AP-1	Inflow=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af
Link AP-2: AP-2	Inflow=4.34 cfs 2.093 af Primary=4.34 cfs 2.093 af

Total Runoff Area = 85.718 ac Runoff Volume = 2.924 af Average Runoff Depth = 0.41"
98.35% Pervious = 84.302 ac 1.65% Impervious = 1.416 ac

Summary for Subcatchment 1S: OFF-1

Runoff = 3.68 cfs @ 13.06 hrs, Volume= 1.186 af, Depth= 0.30"

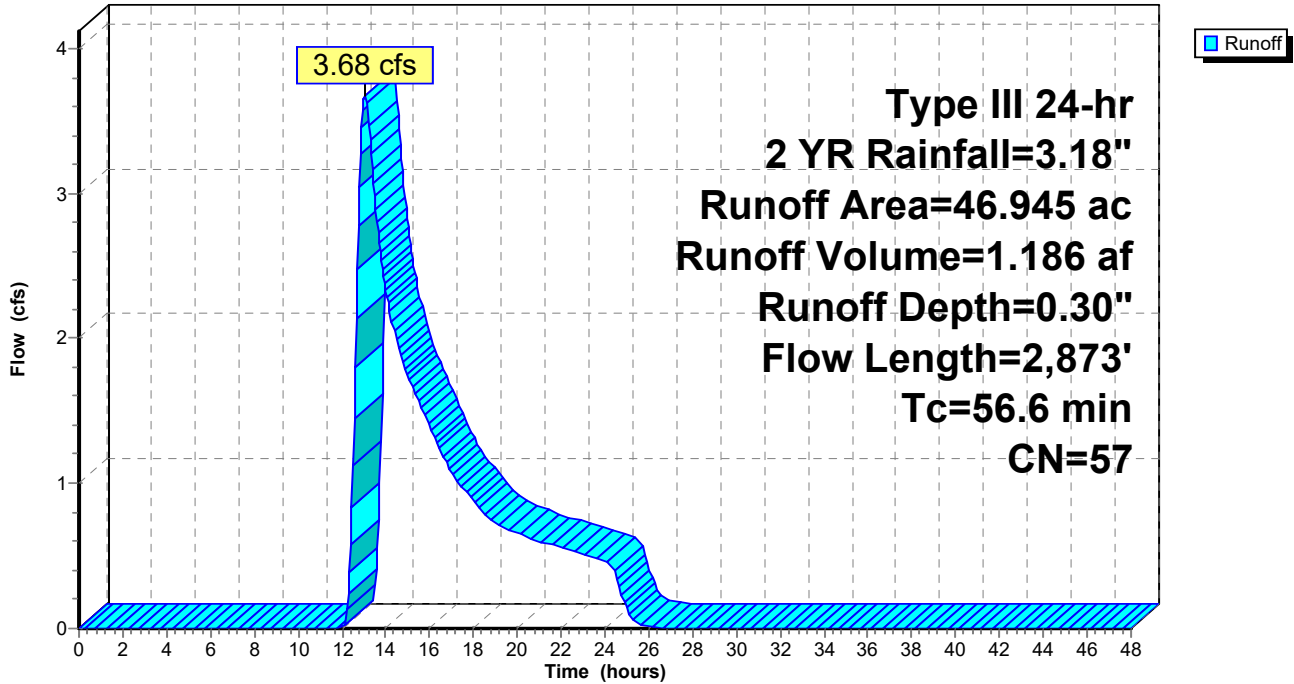
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2 YR Rainfall=3.18"

Area (ac)	CN	Description
32.391	55	Woods, Good, HSG B
0.459	58	Meadow, non-grazed, HSG B
14.095	61	Pasture/grassland/range, Good, HSG B
46.945	57	Weighted Average
46.945		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0211	0.16		Sheet Flow, A-B Cultivated: Residue>20% n= 0.170 P2= 3.18"
14.3	968	0.0158	1.13		Shallow Concentrated Flow, B-C Cultivated Straight Rows Kv= 9.0 fps
3.9	422	0.0411	1.82		Shallow Concentrated Flow, C-D Cultivated Straight Rows Kv= 9.0 fps
15.9	613	0.0166	0.64		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
3.5	384	0.1355	1.84		Shallow Concentrated Flow, E-F Woodland Kv= 5.0 fps
2.0	165	0.0789	1.40		Shallow Concentrated Flow, F-G Woodland Kv= 5.0 fps
6.4	221	0.0133	0.58		Shallow Concentrated Flow, G-H Woodland Kv= 5.0 fps
56.6	2,873	Total			

Subcatchment 1S: OFF-1

Hydrograph



Summary for Subcatchment PDA-1: PDA-1

Runoff = 3.48 cfs @ 12.58 hrs, Volume= 0.660 af, Depth= 0.44"

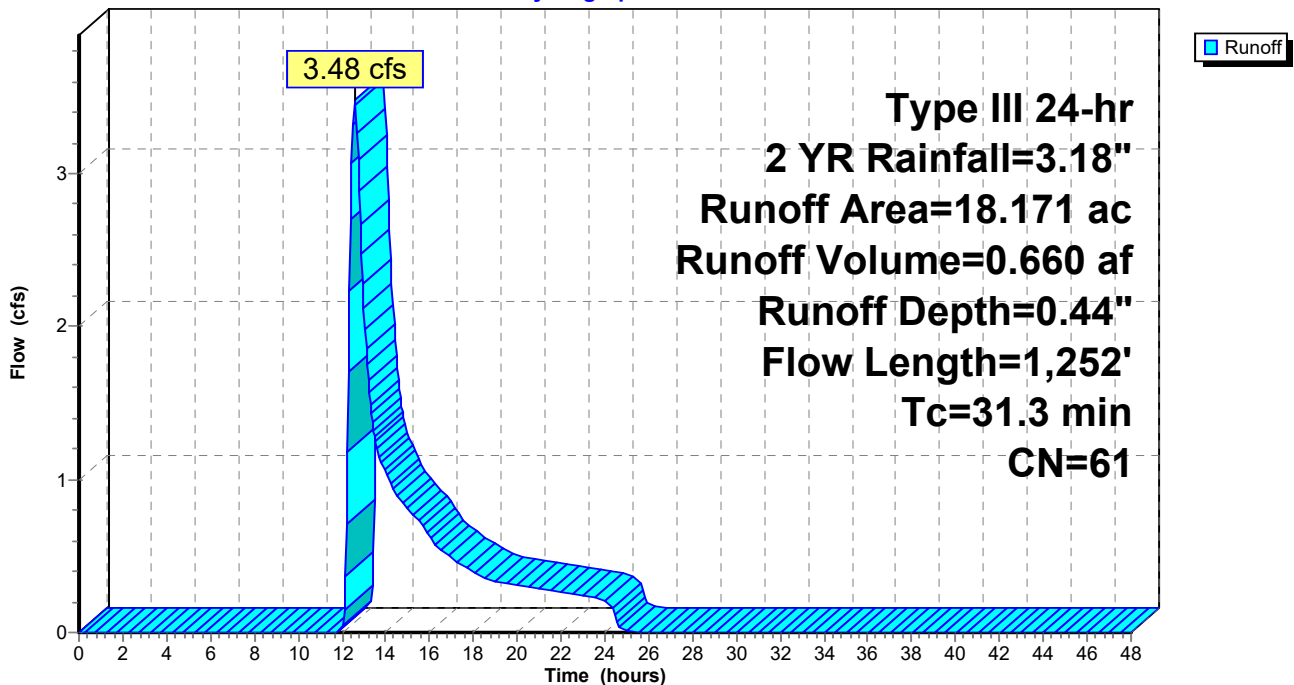
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.18"

Area (ac)	CN	Description
9.046	55	Woods, Good, HSG B
0.538	98	Water Surface, HSG B
* 8.587	65	Meadow, non-grazed, HSG B-C
18.171	61	Weighted Average
17.633		97.04% Pervious Area
0.538		2.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	100	0.0266	0.09		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.18"
1.6	159	0.1122	1.67		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
10.5	993	0.0504	1.57		Shallow Concentrated Flow, C-D Short Grass Pasture Kv= 7.0 fps
31.3	1,252	Total			

Subcatchment PDA-1: PDA-1

Hydrograph



Summary for Subcatchment PDA-2A: PDA-2A

Runoff = 1.93 cfs @ 12.41 hrs, Volume= 0.267 af, Depth= 0.68"

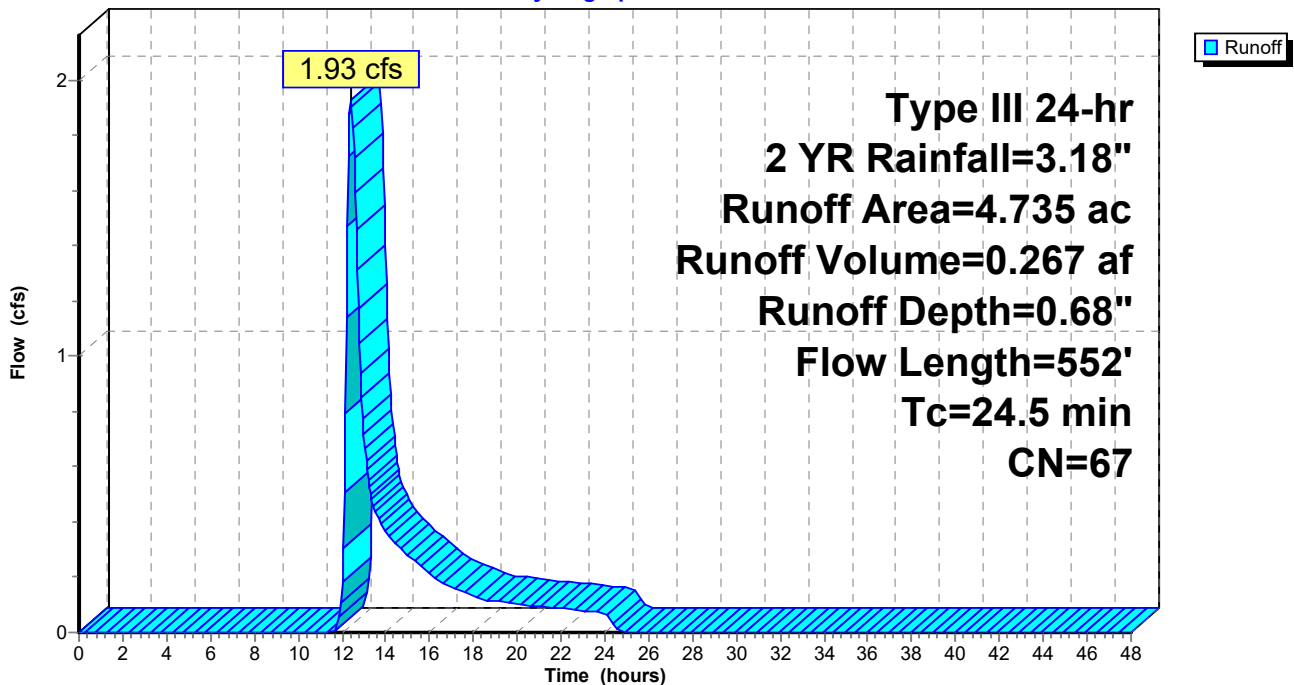
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.18"

Area (ac)	CN	Description
0.699	55	Woods, Good, HSG B
0.147	58	Meadow, non-grazed, HSG B
0.307	98	Water Surface, HSG B
* 2.595	65	Meadow, non-grazed, HSG B-C
0.987	71	Meadow, non-grazed, HSG C
4.735	67	Weighted Average
4.428		93.52% Pervious Area
0.307		6.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.9	100	0.0100	0.09		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.18"
5.6	452	0.0376	1.36		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
24.5	552	Total			

Subcatchment PDA-2A: PDA-2A

Hydrograph



Summary for Subcatchment PDA-2B: PDA-2B

Runoff = 4.46 cfs @ 12.62 hrs, Volume= 0.767 af, Depth= 0.63"

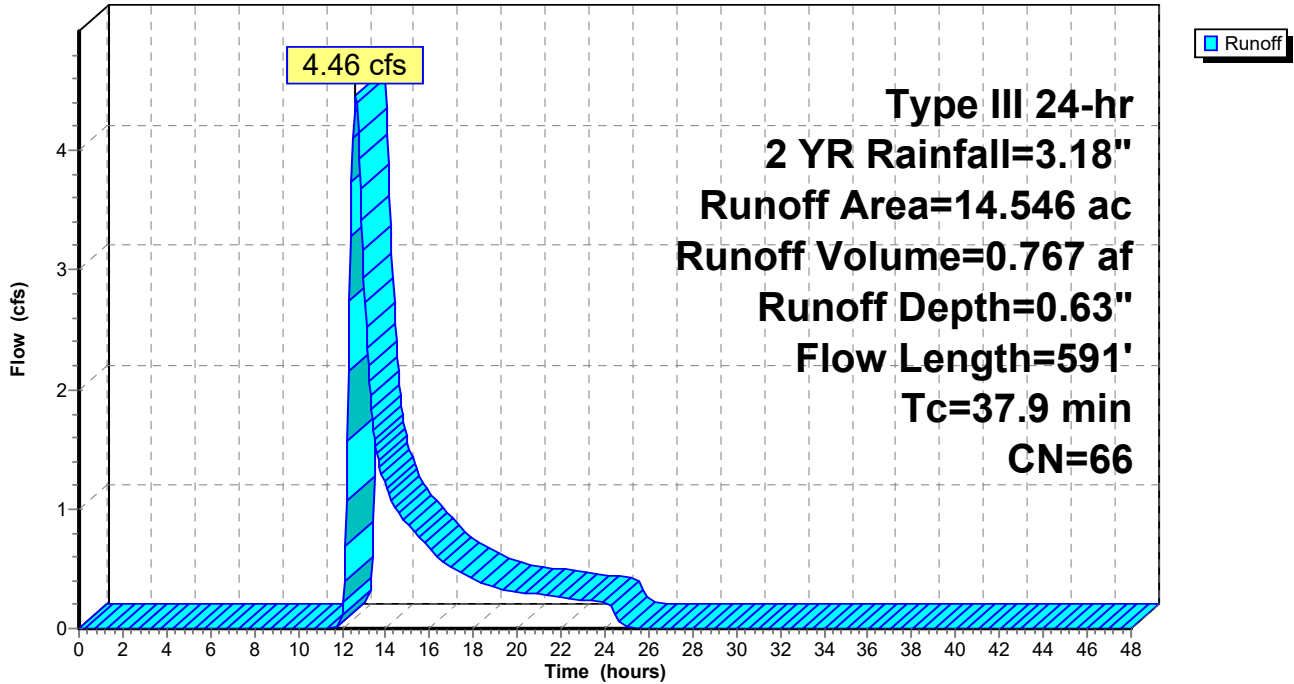
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2 YR Rainfall=3.18"

Area (ac)	CN	Description
1.687	55	Woods, Good, HSG B
0.365	58	Meadow, non-grazed, HSG B
0.404	98	Water Surface, HSG B
* 8.766	65	Meadow, non-grazed, HSG B-C
* 0.076	96	Gravel surface, HSG B-C
* 0.028	98	Unconnected pavement, HSG B-C
0.156	70	Woods, Good, HSG C
2.925	71	Meadow, non-grazed, HSG C
0.139	98	Water Surface, HSG C
14.546	66	Weighted Average
13.975		96.07% Pervious Area
0.571		3.93% Impervious Area
0.028		4.90% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.3	100	0.0040	0.06		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.18"
10.6	491	0.0122	0.77		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
37.9	591	Total			

Subcatchment PDA-2B: PDA-2B

Hydrograph



Summary for Subcatchment PDA-2C: PDA-2C

Runoff = 0.34 cfs @ 12.14 hrs, Volume= 0.044 af, Depth= 0.40"

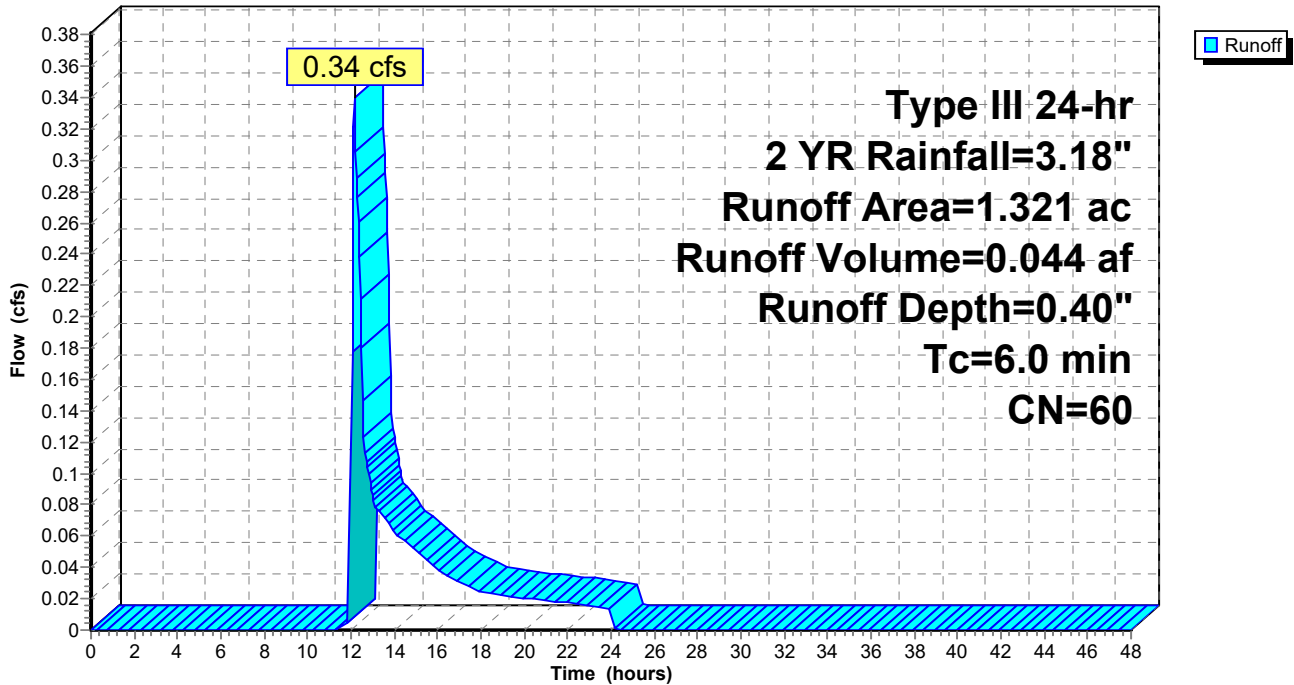
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 2 YR Rainfall=3.18"

Area (ac)	CN	Description
0.845	55	Woods, Good, HSG B
* 0.158	65	Meadow, non-grazed, HSG B-C
0.146	70	Woods, Good, HSG C
0.172	71	Meadow, non-grazed, HSG C
1.321	60	Weighted Average
1.321		100.00% Pervious Area

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

Subcatchment PDA-2C: PDA-2C

Hydrograph



Summary for Pond B-1: B-1

Inflow Area = 18.171 ac, 2.96% Impervious, Inflow Depth = 0.44" for 2 YR event
 Inflow = 3.48 cfs @ 12.58 hrs, Volume= 0.660 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
 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= 226.62' @ 25.85 hrs Surf.Area= 19,077 sf Storage= 28,747 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description		
#1	225.00'	103,509 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)
225.00	16,377	551.2	0	0	16,377
230.00	25,352	645.5	103,509	103,509	25,842

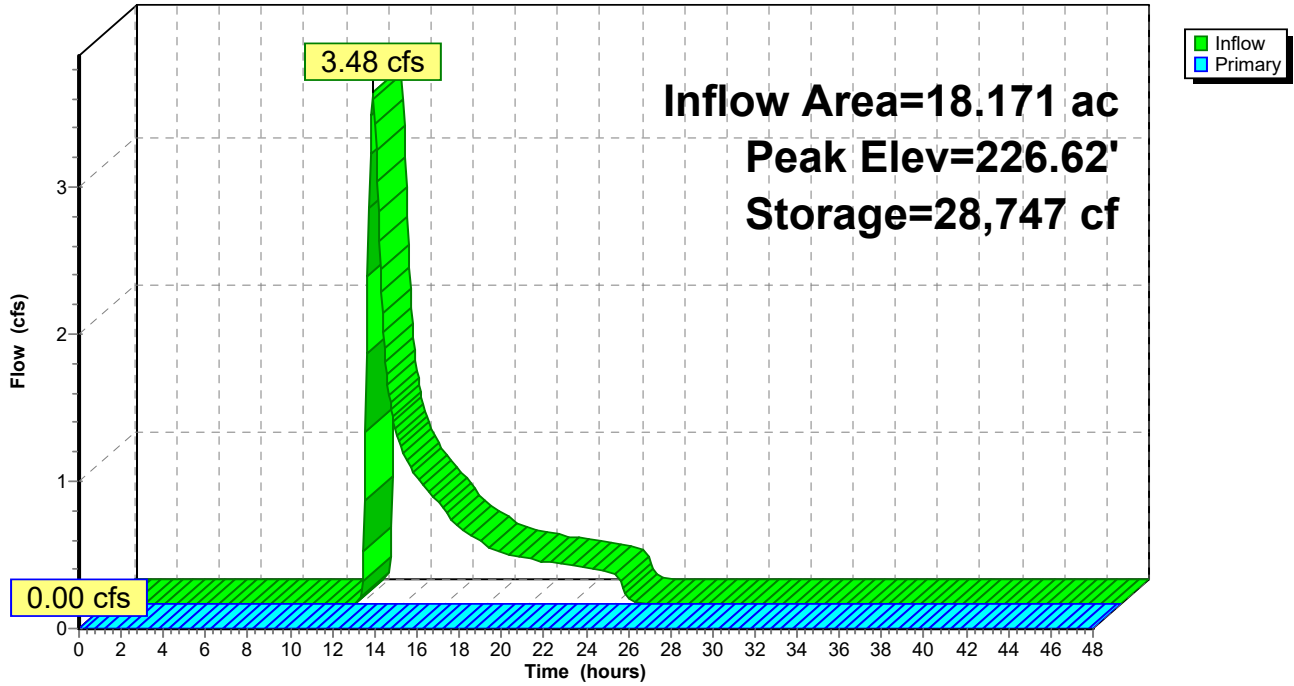
Device	Routing	Invert	Outlet Devices
#1	Primary	225.00'	15.0" Round Culvert L= 40.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 225.00' / 224.50' S= 0.0123 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	227.00'	15.0" Horiz. Orifice/Gate C= 0.600 Limited to weir flow at low heads
#3	Primary	228.60'	25.0' long x 17.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=225.00' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Controls 0.00 cfs)
- 2=Orifice/Gate (Controls 0.00 cfs)
- 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond B-1: B-1

Hydrograph



Summary for Pond B-2A: B-2A

Inflow Area = 4.735 ac, 6.48% Impervious, Inflow Depth = 0.68" for 2 YR event
 Inflow = 1.93 cfs @ 12.41 hrs, Volume= 0.267 af
 Outflow = 0.22 cfs @ 15.98 hrs, Volume= 0.216 af, Atten= 89%, Lag= 214.1 min
 Primary = 0.22 cfs @ 15.98 hrs, Volume= 0.216 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 231.13' @ 15.98 hrs Surf.Area= 9,999 sf Storage= 6,032 cf

Plug-Flow detention time= 416.9 min calculated for 0.216 af (81% of inflow)
 Center-of-Mass det. time= 335.4 min (1,240.2 - 904.8)

Volume	Invert	Avail.Storage	Storage Description		
#1	230.50'	47,673 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)
230.50	9,198	434.5	0	0	9,198
234.50	14,864	509.9	47,673	47,673	15,171

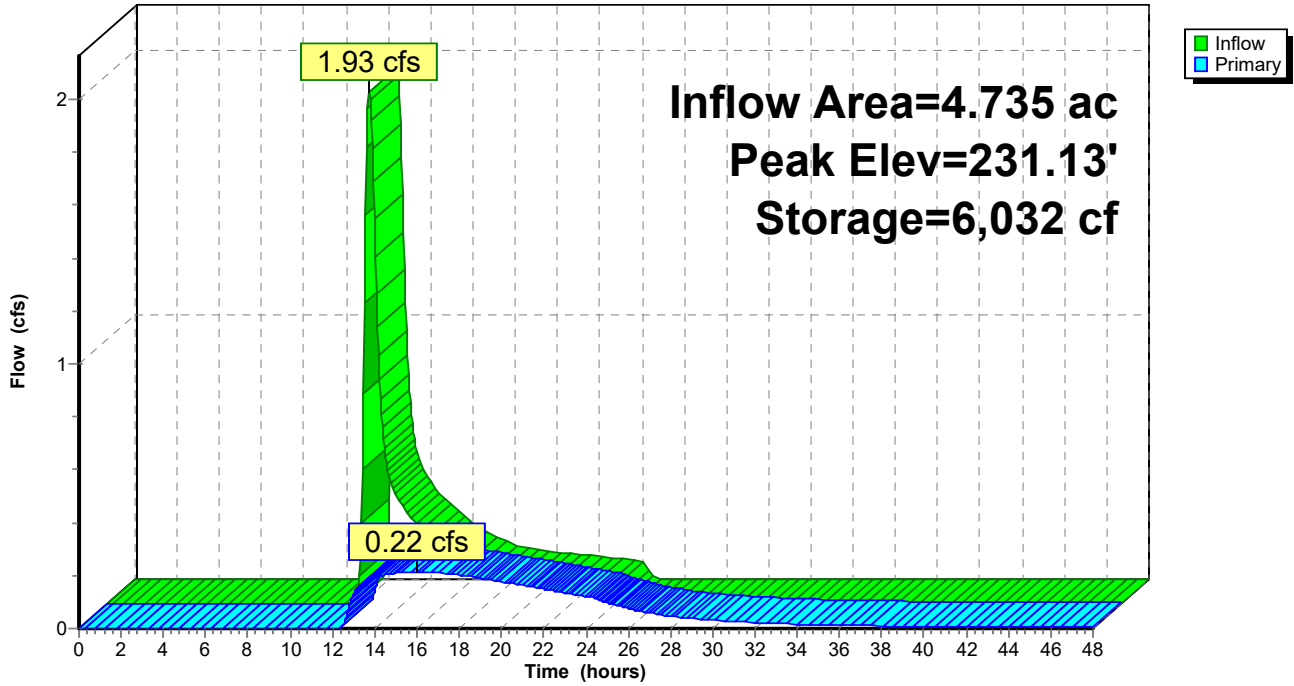
Device	Routing	Invert	Outlet Devices
#1	Primary	230.50'	12.0" Round Culvert L= 30.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 230.50' / 230.00' S= 0.0164 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	230.70'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	231.50'	12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	233.00'	5.0' long x 14.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

Primary OutFlow Max=0.22 cfs @ 15.98 hrs HW=231.13' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.22 cfs of 1.11 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.22 cfs @ 2.46 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)
- 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond B-2A: B-2A

Hydrograph



Summary for Pond B-2B: B-2B

Inflow Area = 14.546 ac, 3.93% Impervious, Inflow Depth = 0.63" for 2 YR event
 Inflow = 4.46 cfs @ 12.62 hrs, Volume= 0.767 af
 Outflow = 0.68 cfs @ 15.94 hrs, Volume= 0.648 af, Atten= 85%, Lag= 198.8 min
 Primary = 0.68 cfs @ 15.94 hrs, Volume= 0.648 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 229.23' @ 15.94 hrs Surf.Area= 14,255 sf Storage= 15,919 cf

Plug-Flow detention time= 338.2 min calculated for 0.648 af (84% of inflow)
 Center-of-Mass det. time= 268.7 min (1,190.0 - 921.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	228.00'	86,674 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)
228.00	11,703	750.1	0	0	11,703
233.00	23,661	844.3	86,674	86,674	24,302

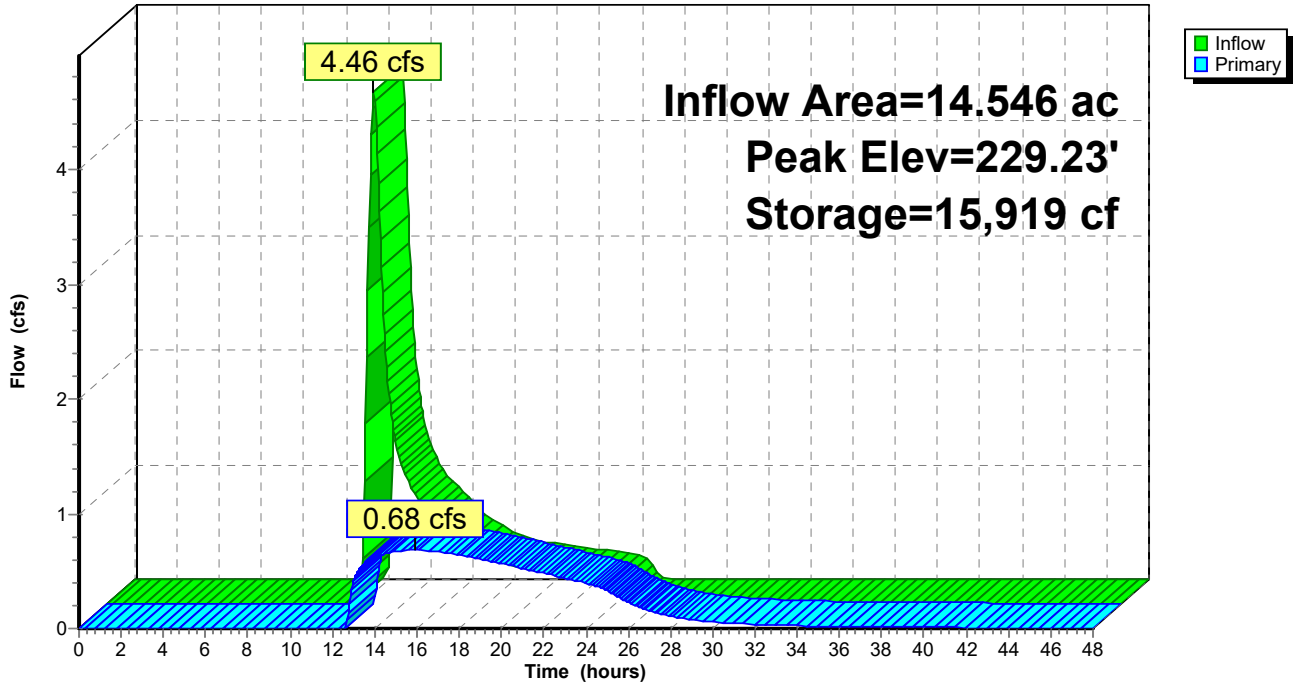
Device	Routing	Invert	Outlet Devices
#1	Primary	228.00'	15.0" Round Culvert L= 36.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 228.00' / 227.50' S= 0.0137 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Primary	228.00'	15.0" Round Culvert L= 36.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 228.00' / 227.50' S= 0.0137 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 1	228.40'	4.0" Vert. Orifice/Grate C= 0.600
#4	Device 2	228.40'	4.0" Vert. Orifice/Grate C= 0.600
#5	Device 1	230.10'	15.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Device 2	230.10'	15.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#7	Primary	231.50'	7.0' long x 14.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

Primary OutFlow Max=0.68 cfs @ 15.94 hrs HW=229.23' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 0.34 cfs of 3.64 cfs potential flow)
- 3=Orifice/Grate (Orifice Controls 0.34 cfs @ 3.92 fps)
- 5=Orifice/Grate (Controls 0.00 cfs)
- 2=Culvert (Passes 0.34 cfs of 3.64 cfs potential flow)
- 4=Orifice/Grate (Orifice Controls 0.34 cfs @ 3.92 fps)
- 6=Orifice/Grate (Controls 0.00 cfs)
- 7=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond B-2B: B-2B

Hydrograph



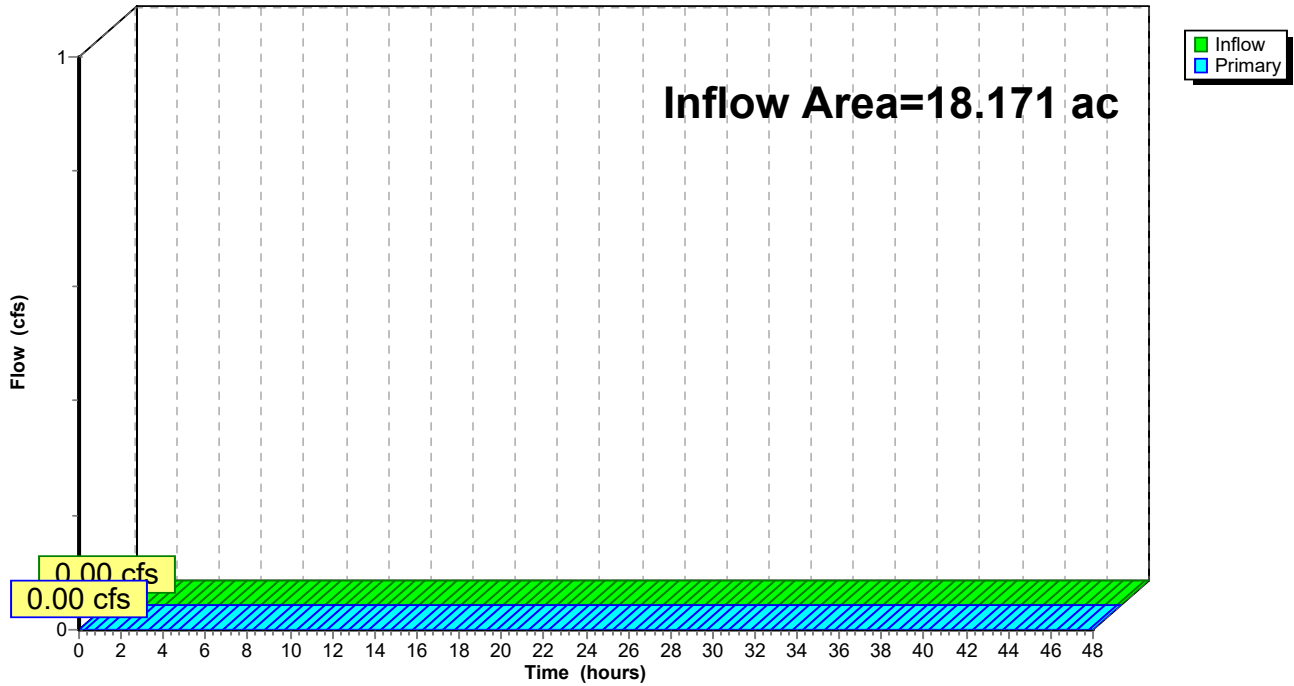
Summary for Link AP-1: AP-1

Inflow Area = 18.171 ac, 2.96% Impervious, Inflow Depth = 0.00" for 2 YR event
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= 0.00-48.00 hrs, dt= 0.05 hrs

Link AP-1: AP-1

Hydrograph



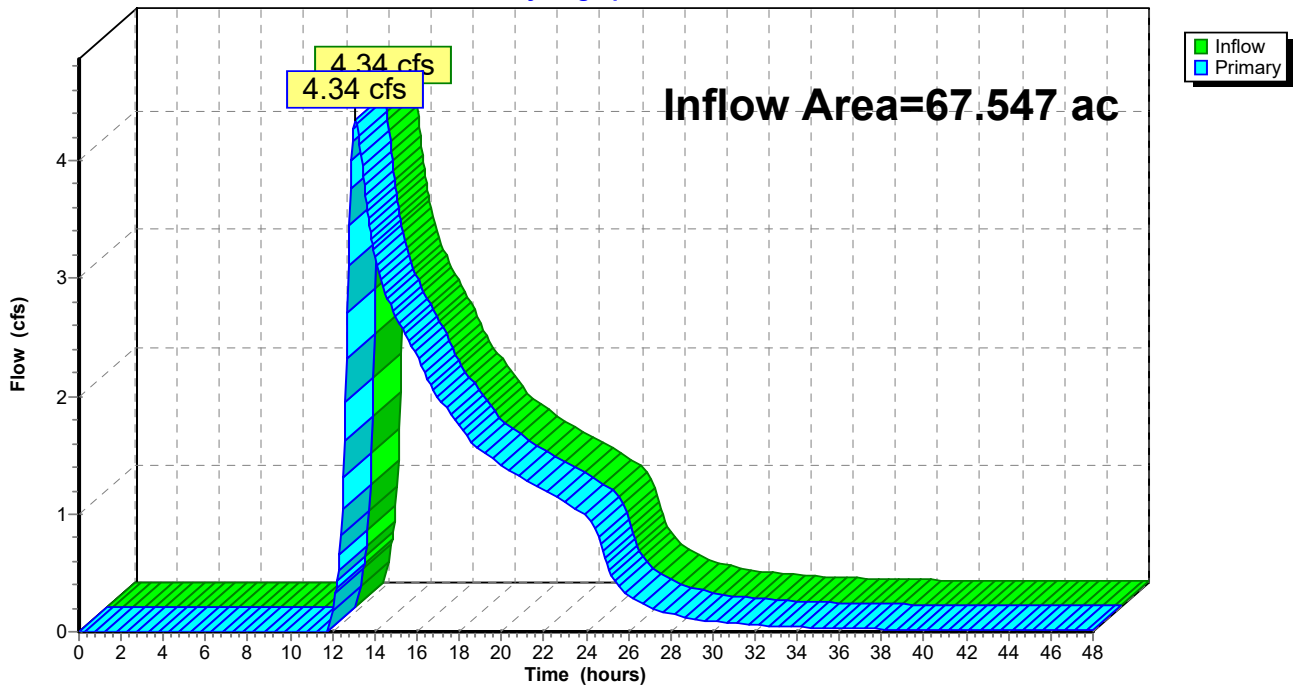
Summary for Link AP-2: AP-2

Inflow Area = 67.547 ac, 1.30% Impervious, Inflow Depth > 0.37" for 2 YR event
Inflow = 4.34 cfs @ 13.10 hrs, Volume= 2.093 af
Primary = 4.34 cfs @ 13.10 hrs, Volume= 2.093 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



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 1S: OFF-1 Runoff Area=46.945 ac 0.00% Impervious Runoff Depth=1.80"
Flow Length=2,873' Tc=56.6 min CN=57 Runoff=36.89 cfs 7.037 af

Subcatchment PDA-1: PDA-1 Runoff Area=18.171 ac 2.96% Impervious Runoff Depth=2.14"
Flow Length=1,252' Tc=31.3 min CN=61 Runoff=24.13 cfs 3.241 af

Subcatchment PDA-2A: PDA-2A Runoff Area=4.735 ac 6.48% Impervious Runoff Depth=2.68"
Flow Length=552' Tc=24.5 min CN=67 Runoff=9.06 cfs 1.058 af

Subcatchment PDA-2B: PDA-2B Runoff Area=14.546 ac 3.93% Impervious Runoff Depth=2.59"
Flow Length=591' Tc=37.9 min CN=66 Runoff=21.90 cfs 3.139 af

Subcatchment PDA-2C: PDA-2C Runoff Area=1.321 ac 0.00% Impervious Runoff Depth=2.05"
Tc=6.0 min CN=60 Runoff=2.98 cfs 0.226 af

Pond B-1: B-1 Peak Elev=228.10' Storage=58,765 cf Inflow=24.13 cfs 3.241 af
Outflow=6.19 cfs 2.413 af

Pond B-2A: B-2A Peak Elev=232.18' Storage=17,299 cf Inflow=9.06 cfs 1.058 af
Outflow=3.25 cfs 1.004 af

Pond B-2B: B-2B Peak Elev=230.94' Storage=43,686 cf Inflow=21.90 cfs 3.139 af
Outflow=12.14 cfs 3.016 af

Link AP-1: AP-1 Inflow=6.19 cfs 2.413 af
Primary=6.19 cfs 2.413 af

Link AP-2: AP-2 Inflow=52.38 cfs 11.284 af
Primary=52.38 cfs 11.284 af

Total Runoff Area = 85.718 ac Runoff Volume = 14.701 af Average Runoff Depth = 2.06"
98.35% Pervious = 84.302 ac 1.65% Impervious = 1.416 ac

Summary for Subcatchment 1S: OFF-1

Runoff = 36.89 cfs @ 12.84 hrs, Volume= 7.037 af, Depth= 1.80"

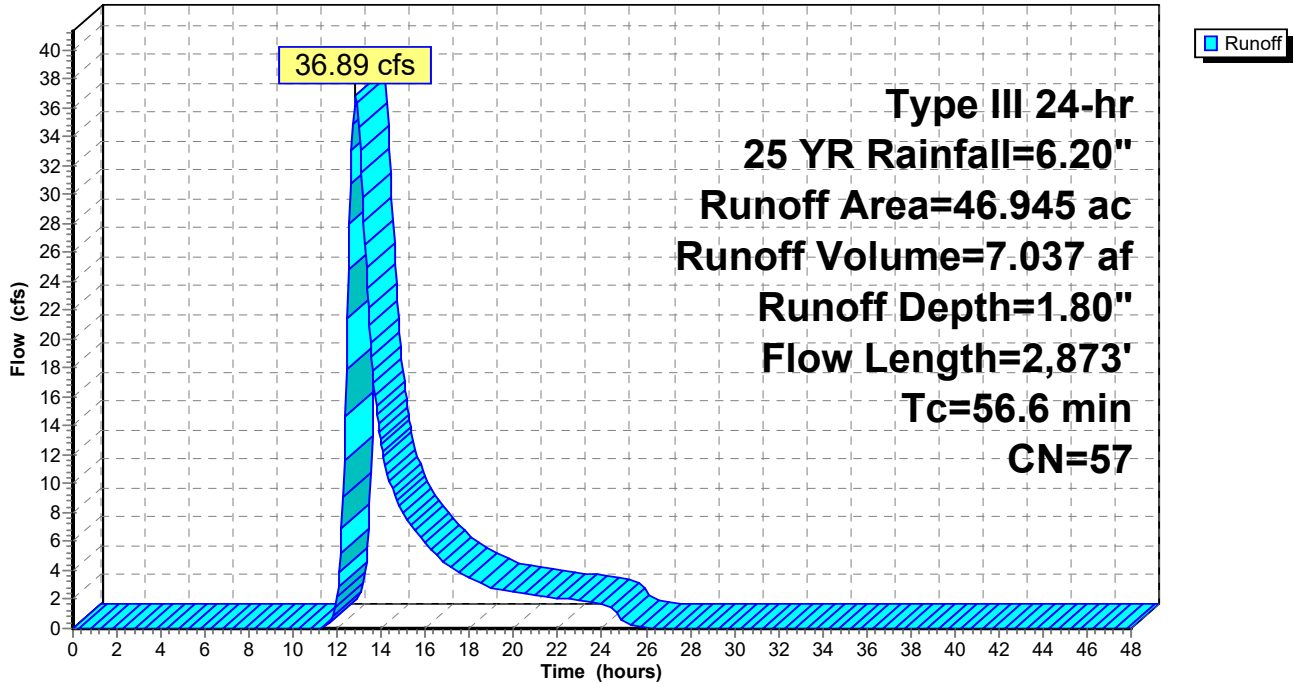
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25 YR Rainfall=6.20"

Area (ac)	CN	Description
32.391	55	Woods, Good, HSG B
0.459	58	Meadow, non-grazed, HSG B
14.095	61	Pasture/grassland/range, Good, HSG B
46.945	57	Weighted Average
46.945		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0211	0.16		Sheet Flow, A-B Cultivated: Residue>20% n= 0.170 P2= 3.18"
14.3	968	0.0158	1.13		Shallow Concentrated Flow, B-C Cultivated Straight Rows Kv= 9.0 fps
3.9	422	0.0411	1.82		Shallow Concentrated Flow, C-D Cultivated Straight Rows Kv= 9.0 fps
15.9	613	0.0166	0.64		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
3.5	384	0.1355	1.84		Shallow Concentrated Flow, E-F Woodland Kv= 5.0 fps
2.0	165	0.0789	1.40		Shallow Concentrated Flow, F-G Woodland Kv= 5.0 fps
6.4	221	0.0133	0.58		Shallow Concentrated Flow, G-H Woodland Kv= 5.0 fps
56.6	2,873	Total			

Subcatchment 1S: OFF-1

Hydrograph



Summary for Subcatchment PDA-1: PDA-1

Runoff = 24.13 cfs @ 12.47 hrs, Volume= 3.241 af, Depth= 2.14"

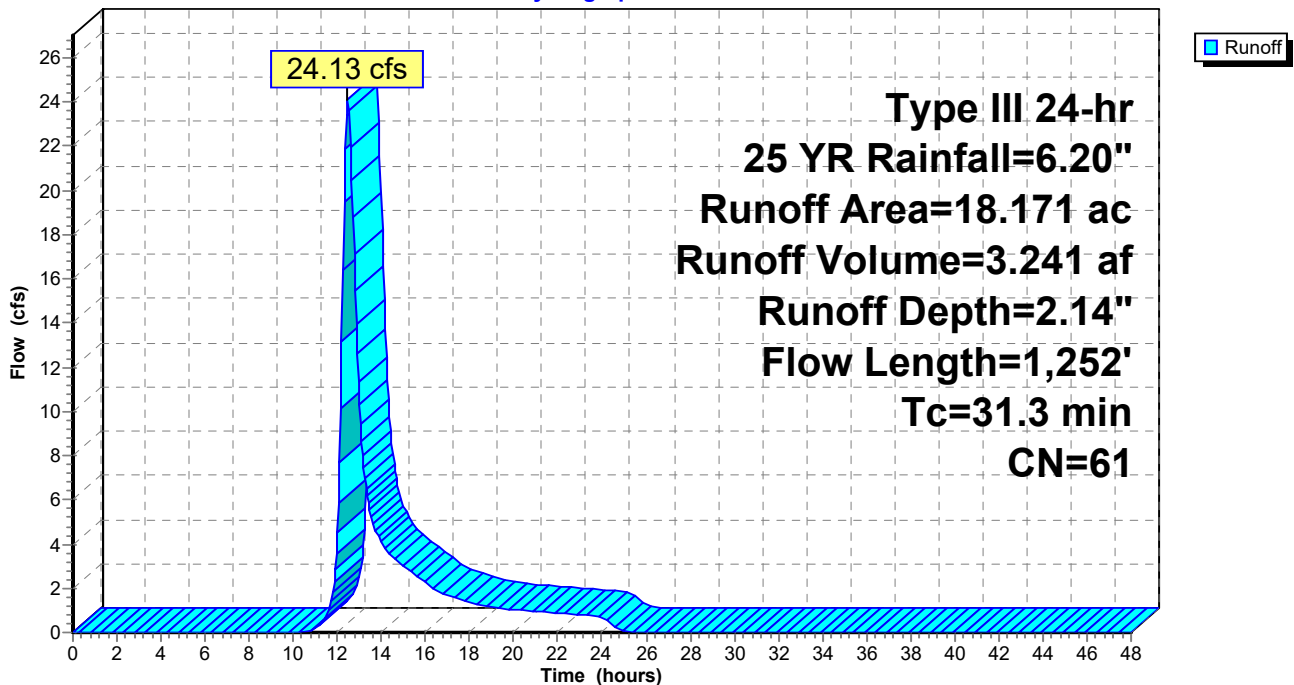
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25 YR Rainfall=6.20"

Area (ac)	CN	Description
9.046	55	Woods, Good, HSG B
0.538	98	Water Surface, HSG B
* 8.587	65	Meadow, non-grazed, HSG B-C
18.171	61	Weighted Average
17.633		97.04% Pervious Area
0.538		2.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	100	0.0266	0.09		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.18"
1.6	159	0.1122	1.67		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
10.5	993	0.0504	1.57		Shallow Concentrated Flow, C-D Short Grass Pasture Kv= 7.0 fps
31.3	1,252	Total			

Subcatchment PDA-1: PDA-1

Hydrograph



Summary for Subcatchment PDA-2A: PDA-2A

Runoff = 9.06 cfs @ 12.35 hrs, Volume= 1.058 af, Depth= 2.68"

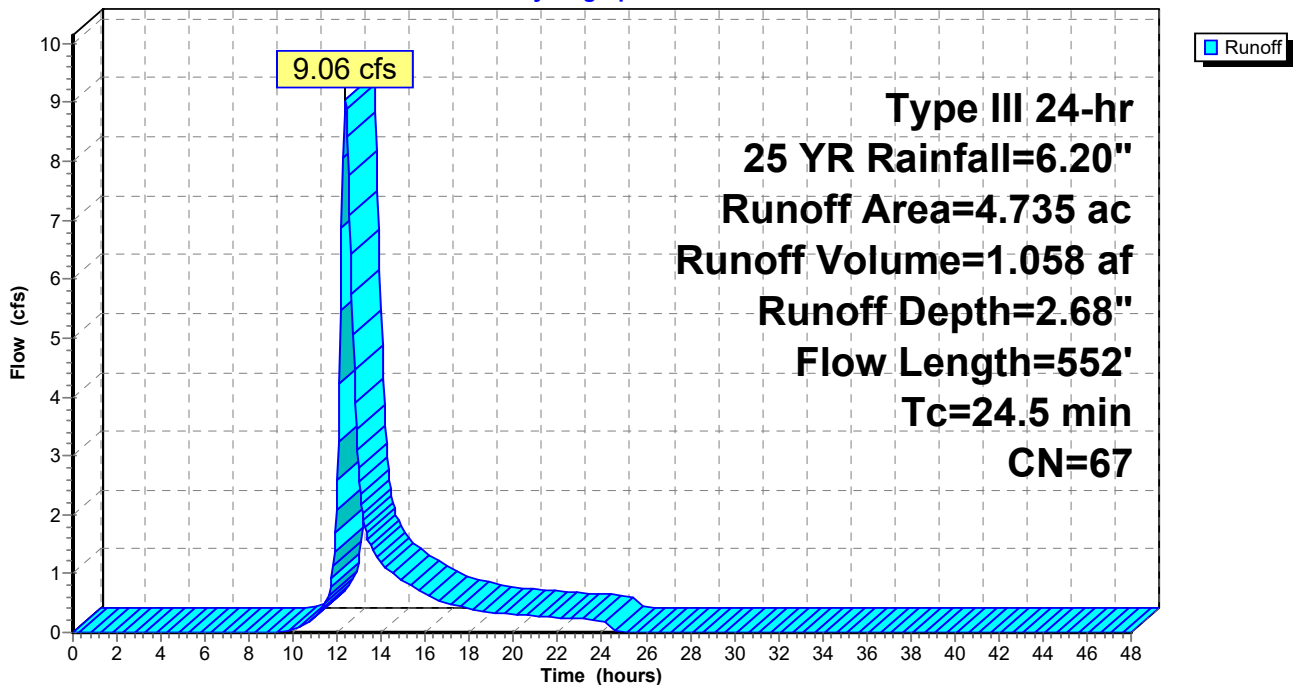
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25 YR Rainfall=6.20"

Area (ac)	CN	Description
0.699	55	Woods, Good, HSG B
0.147	58	Meadow, non-grazed, HSG B
0.307	98	Water Surface, HSG B
* 2.595	65	Meadow, non-grazed, HSG B-C
0.987	71	Meadow, non-grazed, HSG C
4.735	67	Weighted Average
4.428		93.52% Pervious Area
0.307		6.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.9	100	0.0100	0.09		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.18"
5.6	452	0.0376	1.36		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
24.5	552	Total			

Subcatchment PDA-2A: PDA-2A

Hydrograph



Summary for Subcatchment PDA-2B: PDA-2B

Runoff = 21.90 cfs @ 12.55 hrs, Volume= 3.139 af, Depth= 2.59"

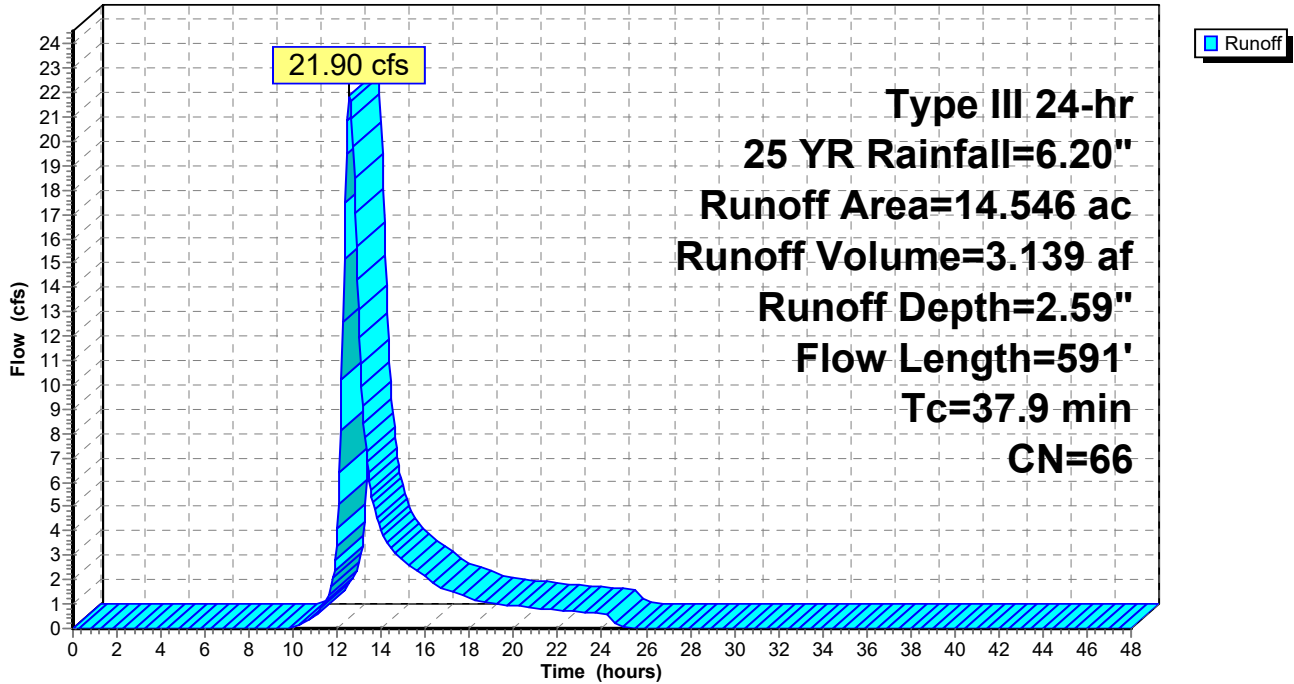
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 25 YR Rainfall=6.20"

Area (ac)	CN	Description
1.687	55	Woods, Good, HSG B
0.365	58	Meadow, non-grazed, HSG B
0.404	98	Water Surface, HSG B
* 8.766	65	Meadow, non-grazed, HSG B-C
* 0.076	96	Gravel surface, HSG B-C
* 0.028	98	Unconnected pavement, HSG B-C
0.156	70	Woods, Good, HSG C
2.925	71	Meadow, non-grazed, HSG C
0.139	98	Water Surface, HSG C
14.546	66	Weighted Average
13.975		96.07% Pervious Area
0.571		3.93% Impervious Area
0.028		4.90% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.3	100	0.0040	0.06		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.18"
10.6	491	0.0122	0.77		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
37.9	591	Total			

Subcatchment PDA-2B: PDA-2B

Hydrograph



Summary for Subcatchment PDA-2C: PDA-2C

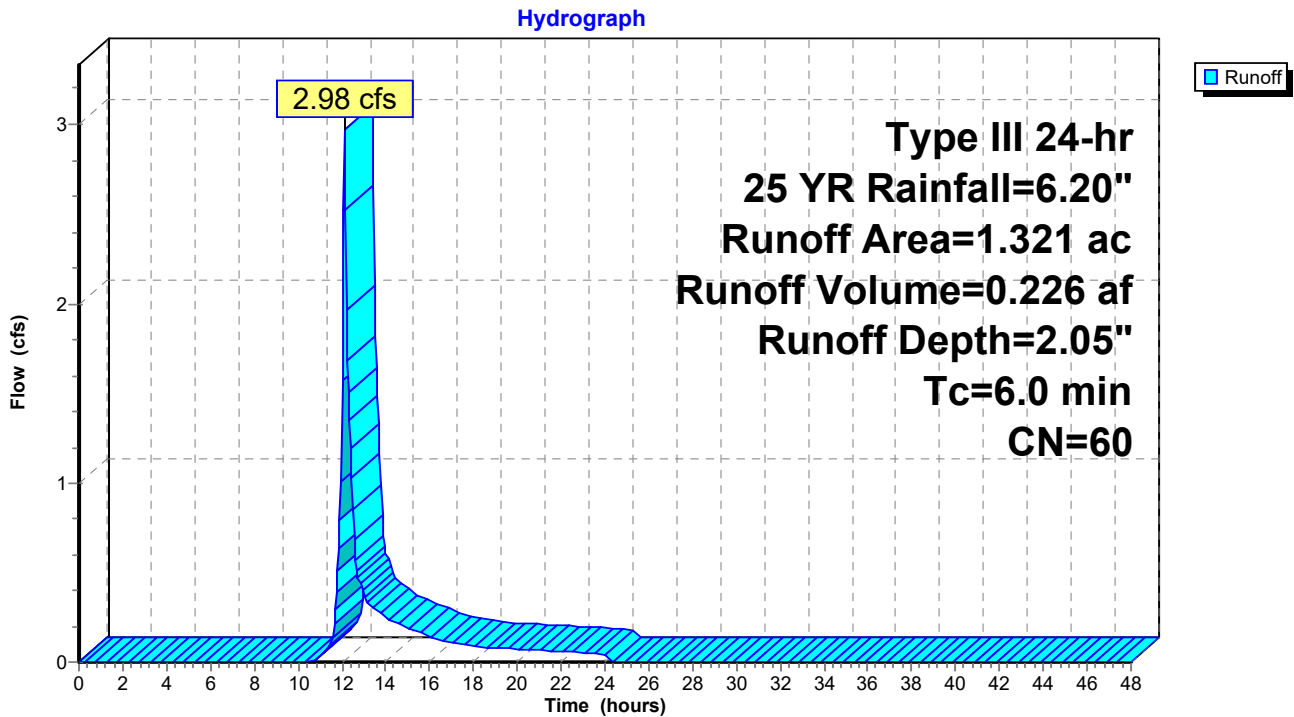
Runoff = 2.98 cfs @ 12.10 hrs, Volume= 0.226 af, Depth= 2.05"

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=6.20"

Area (ac)	CN	Description
0.845	55	Woods, Good, HSG B
* 0.158	65	Meadow, non-grazed, HSG B-C
0.146	70	Woods, Good, HSG C
0.172	71	Meadow, non-grazed, HSG C
1.321	60	Weighted Average
1.321		100.00% Pervious Area

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

Subcatchment PDA-2C: PDA-2C



Summary for Pond B-1: B-1

Inflow Area = 18.171 ac, 2.96% Impervious, Inflow Depth = 2.14" for 25 YR event
 Inflow = 24.13 cfs @ 12.47 hrs, Volume= 3.241 af
 Outflow = 6.19 cfs @ 13.35 hrs, Volume= 2.413 af, Atten= 74%, Lag= 52.7 min
 Primary = 6.19 cfs @ 13.35 hrs, Volume= 2.413 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 228.10' @ 13.35 hrs Surf.Area= 21,705 sf Storage= 58,765 cf

Plug-Flow detention time= 199.6 min calculated for 2.413 af (74% of inflow)
 Center-of-Mass det. time= 104.8 min (986.5 - 881.7)

Volume	Invert	Avail.Storage	Storage Description			
#1	225.00'	103,509 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)	
225.00	16,377	551.2	0	0	16,377	
230.00	25,352	645.5	103,509	103,509	25,842	

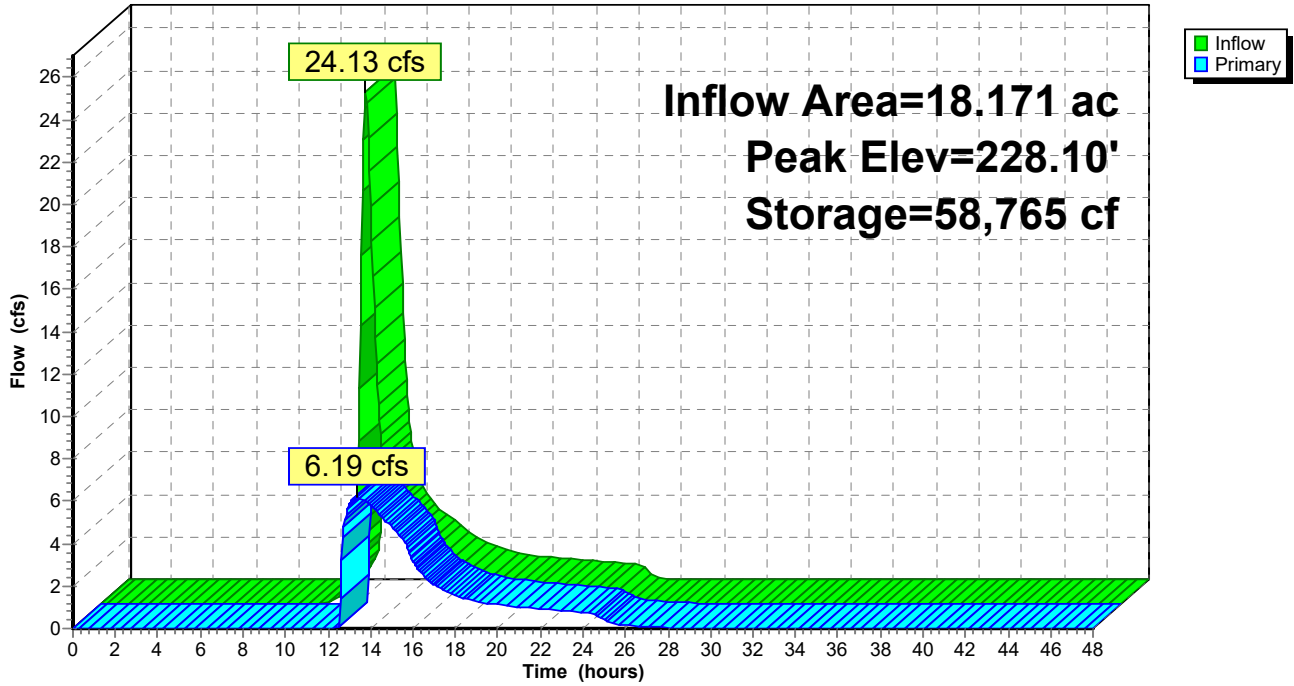
Device	Routing	Invert	Outlet Devices
#1	Primary	225.00'	15.0" Round Culvert L= 40.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 225.00' / 224.50' S= 0.0123 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	227.00'	15.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	228.60'	25.0' long x 17.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=6.19 cfs @ 13.35 hrs HW=228.10' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 6.19 cfs of 7.33 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 6.19 cfs @ 5.04 fps)
- 3=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond B-1: B-1

Hydrograph



Summary for Pond B-2A: B-2A

Inflow Area = 4.735 ac, 6.48% Impervious, Inflow Depth = 2.68" for 25 YR event
 Inflow = 9.06 cfs @ 12.35 hrs, Volume= 1.058 af
 Outflow = 3.25 cfs @ 12.88 hrs, Volume= 1.004 af, Atten= 64%, Lag= 31.4 min
 Primary = 3.25 cfs @ 12.88 hrs, Volume= 1.004 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 232.18' @ 12.88 hrs Surf.Area= 11,415 sf Storage= 17,299 cf

Plug-Flow detention time= 223.6 min calculated for 1.004 af (95% of inflow)
 Center-of-Mass det. time= 196.2 min (1,057.0 - 860.8)

Volume	Invert	Avail.Storage	Storage Description			
#1	230.50'	47,673 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)	
230.50	9,198	434.5	0	0	9,198	
234.50	14,864	509.9	47,673	47,673	15,171	

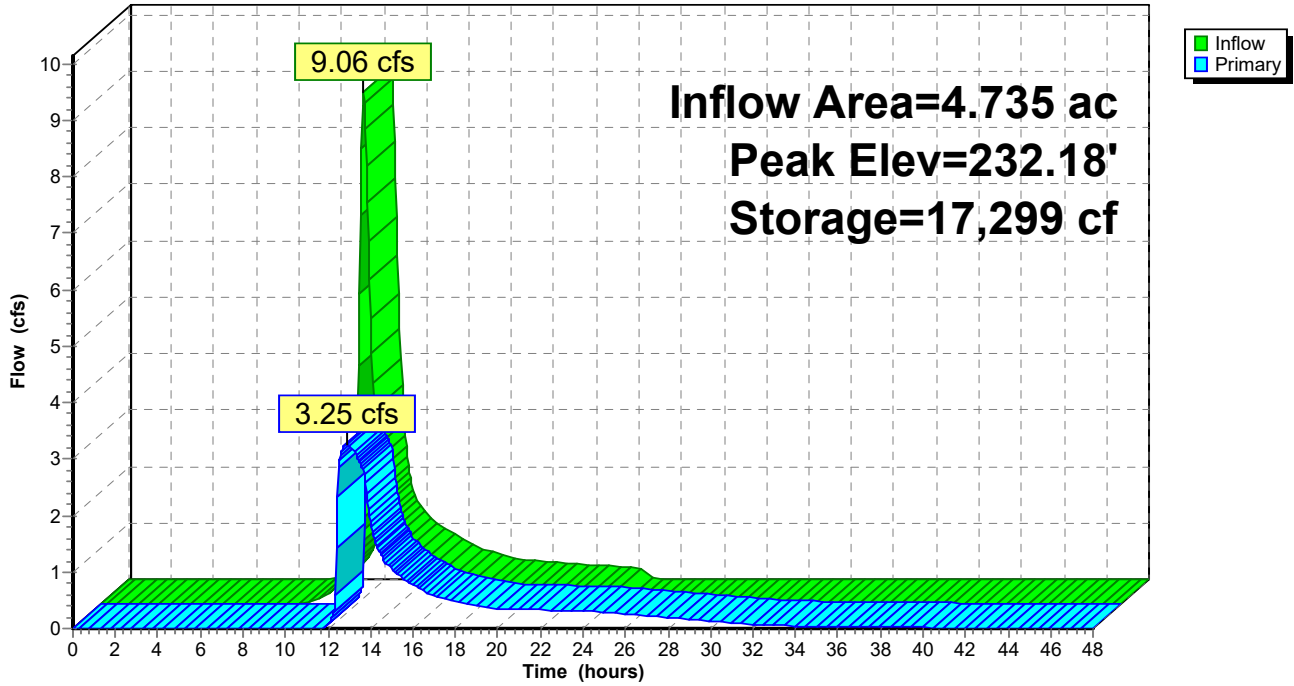
Device	Routing	Invert	Outlet Devices
#1	Primary	230.50'	12.0" Round Culvert L= 30.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 230.50' / 230.00' S= 0.0164 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	230.70'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	231.50'	12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	233.00'	5.0' long x 14.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

Primary OutFlow Max=3.24 cfs @ 12.88 hrs HW=232.18' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Inlet Controls 3.24 cfs @ 4.13 fps)
- 2=Orifice/Grate (Passes < 0.48 cfs potential flow)
- 3=Orifice/Grate (Passes < 3.12 cfs potential flow)
- 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond B-2A: B-2A

Hydrograph



Summary for Pond B-2B: B-2B

Inflow Area = 14.546 ac, 3.93% Impervious, Inflow Depth = 2.59" for 25 YR event
 Inflow = 21.90 cfs @ 12.55 hrs, Volume= 3.139 af
 Outflow = 12.14 cfs @ 12.99 hrs, Volume= 3.016 af, Atten= 45%, Lag= 26.6 min
 Primary = 12.14 cfs @ 12.99 hrs, Volume= 3.016 af

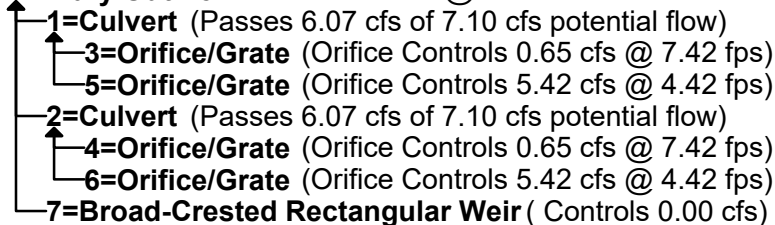
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 230.94' @ 12.99 hrs Surf.Area= 18,235 sf Storage= 43,686 cf

Plug-Flow detention time= 207.5 min calculated for 3.013 af (96% of inflow)
 Center-of-Mass det. time= 187.3 min (1,062.8 - 875.6)

Volume	Invert	Avail.Storage	Storage Description			
#1	228.00'	86,674 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)	
228.00	11,703	750.1	0	0	11,703	
233.00	23,661	844.3	86,674	86,674	24,302	

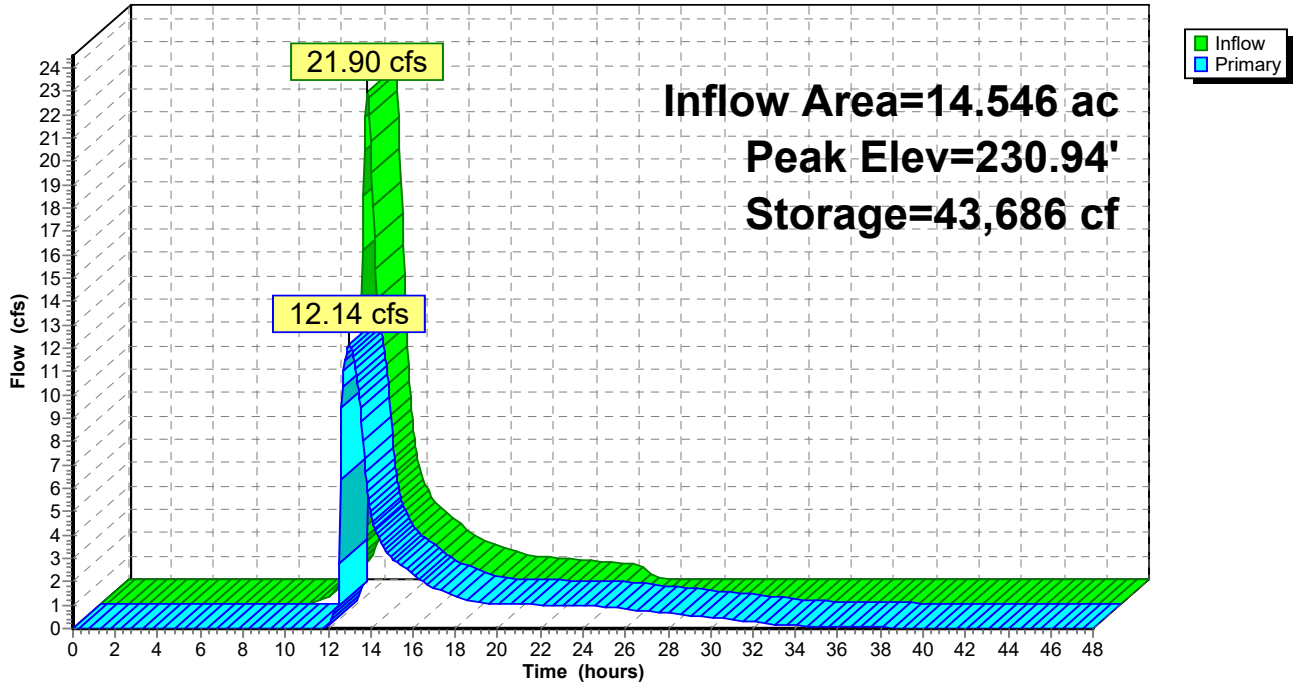
Device	Routing	Invert	Outlet Devices
#1	Primary	228.00'	15.0" Round Culvert L= 36.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 228.00' / 227.50' S= 0.0137 ' S= 0.0137 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Primary	228.00'	15.0" Round Culvert L= 36.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 228.00' / 227.50' S= 0.0137 ' S= 0.0137 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 1	228.40'	4.0" Vert. Orifice/Grate C= 0.600
#4	Device 2	228.40'	4.0" Vert. Orifice/Grate C= 0.600
#5	Device 1	230.10'	15.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Device 2	230.10'	15.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#7	Primary	231.50'	7.0' long x 14.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

Primary OutFlow Max=12.13 cfs @ 12.99 hrs HW=230.94' TW=0.00' (Dynamic Tailwater)



Pond B-2B: B-2B

Hydrograph



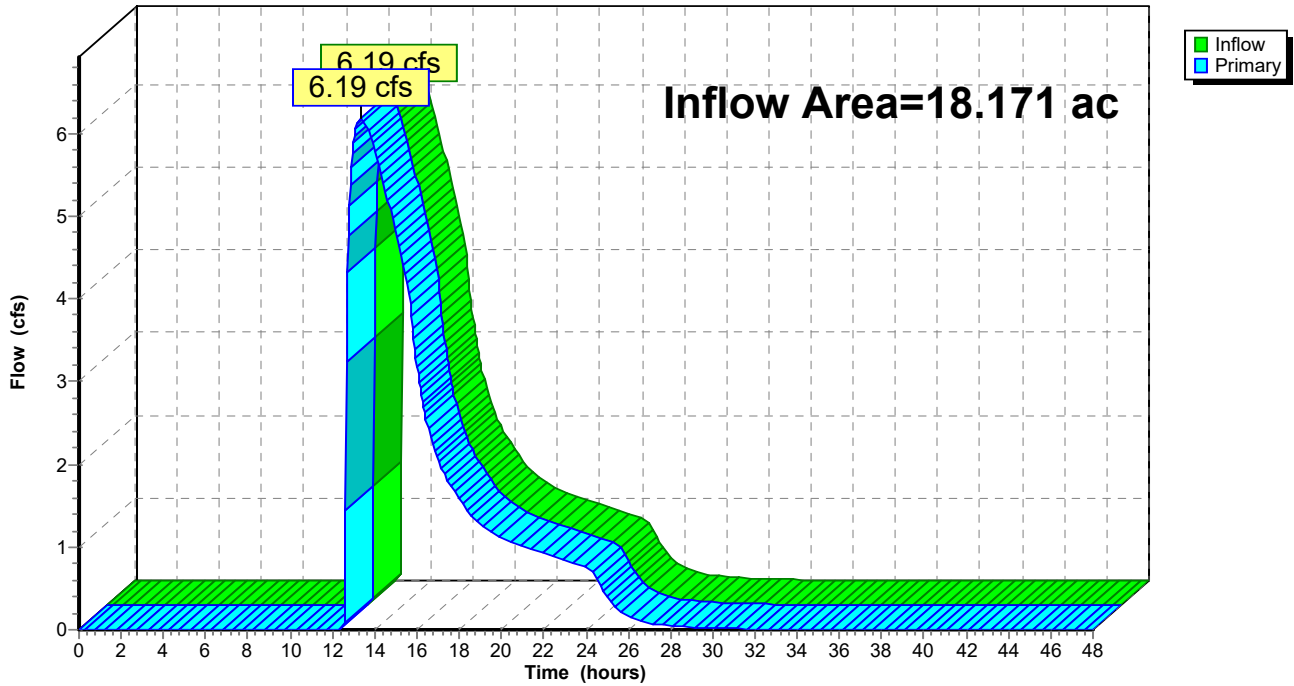
Summary for Link AP-1: AP-1

Inflow Area = 18.171 ac, 2.96% Impervious, Inflow Depth = 1.59" for 25 YR event
Inflow = 6.19 cfs @ 13.35 hrs, Volume= 2.413 af
Primary = 6.19 cfs @ 13.35 hrs, Volume= 2.413 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



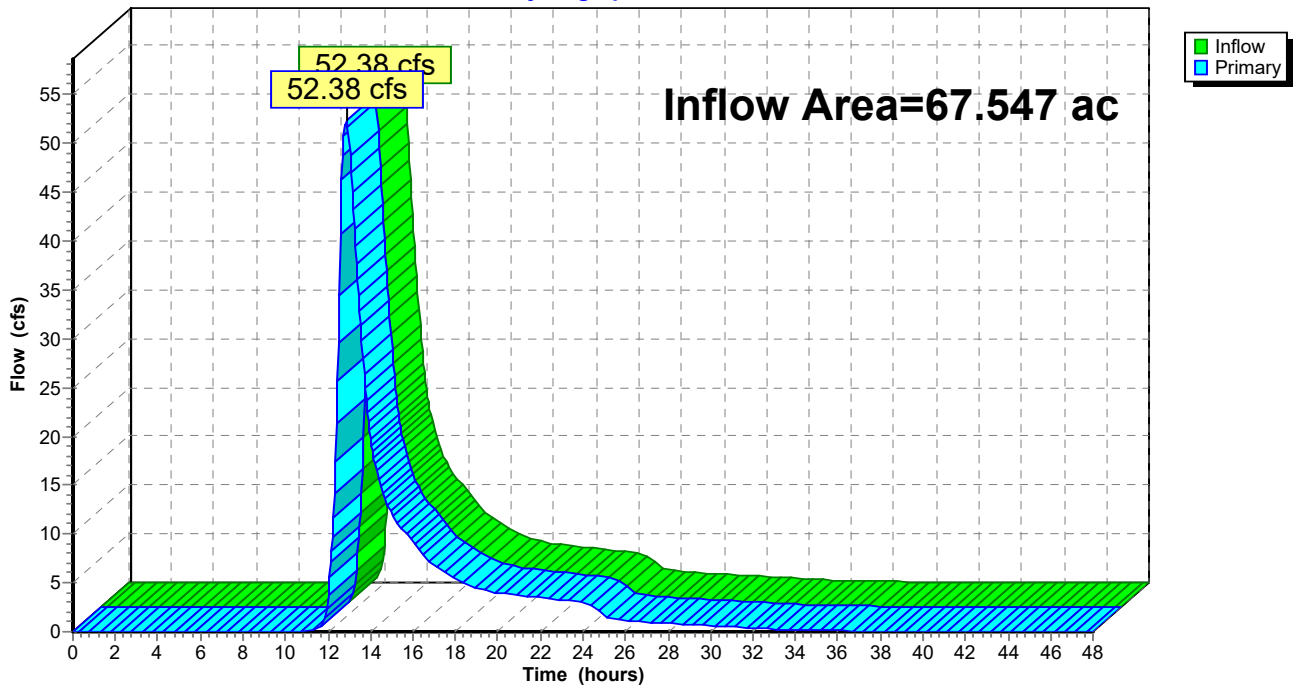
Summary for Link AP-2: AP-2

Inflow Area = 67.547 ac, 1.30% Impervious, Inflow Depth > 2.00" for 25 YR event
Inflow = 52.38 cfs @ 12.87 hrs, Volume= 11.284 af
Primary = 52.38 cfs @ 12.87 hrs, Volume= 11.284 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



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 1S: OFF-1 Runoff Area=46.945 ac 0.00% Impervious Runoff Depth=2.35"
Flow Length=2,873' Tc=56.6 min CN=57 Runoff=49.65 cfs 9.180 af

Subcatchment PDA-1: PDA-1 Runoff Area=18.171 ac 2.96% Impervious Runoff Depth=2.74"
Flow Length=1,252' Tc=31.3 min CN=61 Runoff=31.42 cfs 4.146 af

Subcatchment PDA-2A: PDA-2A Runoff Area=4.735 ac 6.48% Impervious Runoff Depth=3.35"
Flow Length=552' Tc=24.5 min CN=67 Runoff=11.40 cfs 1.321 af

Subcatchment PDA-2B: PDA-2B Runoff Area=14.546 ac 3.93% Impervious Runoff Depth=3.24"
Flow Length=591' Tc=37.9 min CN=66 Runoff=27.68 cfs 3.932 af

Subcatchment PDA-2C: PDA-2C Runoff Area=1.321 ac 0.00% Impervious Runoff Depth=2.64"
Tc=6.0 min CN=60 Runoff=3.90 cfs 0.291 af

Pond B-1: B-1 Peak Elev=228.73' Storage=72,866 cf Inflow=31.42 cfs 4.146 af
Outflow=10.87 cfs 3.318 af

Pond B-2A: B-2A Peak Elev=232.59' Storage=22,053 cf Inflow=11.40 cfs 1.321 af
Outflow=3.76 cfs 1.267 af

Pond B-2B: B-2B Peak Elev=231.45' Storage=53,195 cf Inflow=27.68 cfs 3.932 af
Outflow=15.14 cfs 3.809 af

Link AP-1: AP-1 Inflow=10.87 cfs 3.318 af
Primary=10.87 cfs 3.318 af

Link AP-2: AP-2 Inflow=68.66 cfs 14.546 af
Primary=68.66 cfs 14.546 af

Total Runoff Area = 85.718 ac Runoff Volume = 18.869 af Average Runoff Depth = 2.64"
98.35% Pervious = 84.302 ac 1.65% Impervious = 1.416 ac

Summary for Subcatchment 1S: OFF-1

Runoff = 49.65 cfs @ 12.82 hrs, Volume= 9.180 af, Depth= 2.35"

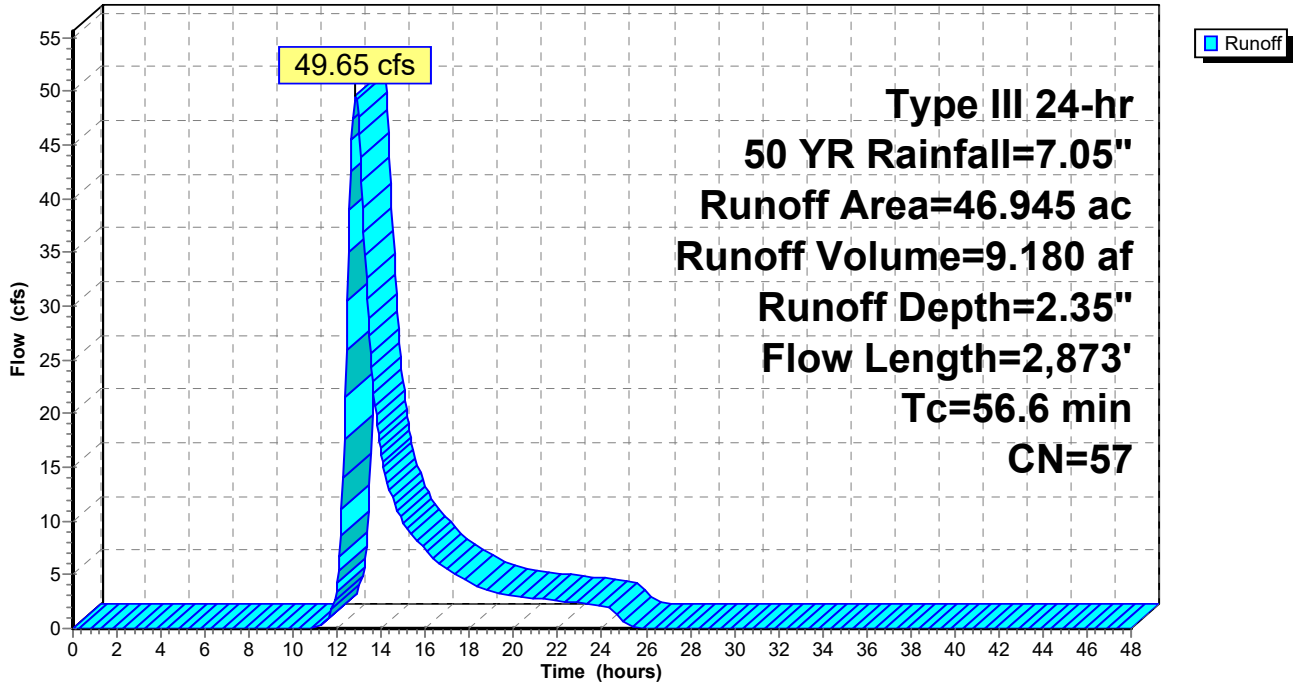
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50 YR Rainfall=7.05"

Area (ac)	CN	Description
32.391	55	Woods, Good, HSG B
0.459	58	Meadow, non-grazed, HSG B
14.095	61	Pasture/grassland/range, Good, HSG B
46.945	57	Weighted Average
46.945		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0211	0.16		Sheet Flow, A-B Cultivated: Residue>20% n= 0.170 P2= 3.18"
14.3	968	0.0158	1.13		Shallow Concentrated Flow, B-C Cultivated Straight Rows Kv= 9.0 fps
3.9	422	0.0411	1.82		Shallow Concentrated Flow, C-D Cultivated Straight Rows Kv= 9.0 fps
15.9	613	0.0166	0.64		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
3.5	384	0.1355	1.84		Shallow Concentrated Flow, E-F Woodland Kv= 5.0 fps
2.0	165	0.0789	1.40		Shallow Concentrated Flow, F-G Woodland Kv= 5.0 fps
6.4	221	0.0133	0.58		Shallow Concentrated Flow, G-H Woodland Kv= 5.0 fps
56.6	2,873	Total			

Subcatchment 1S: OFF-1

Hydrograph



Summary for Subcatchment PDA-1: PDA-1

Runoff = 31.42 cfs @ 12.46 hrs, Volume= 4.146 af, Depth= 2.74"

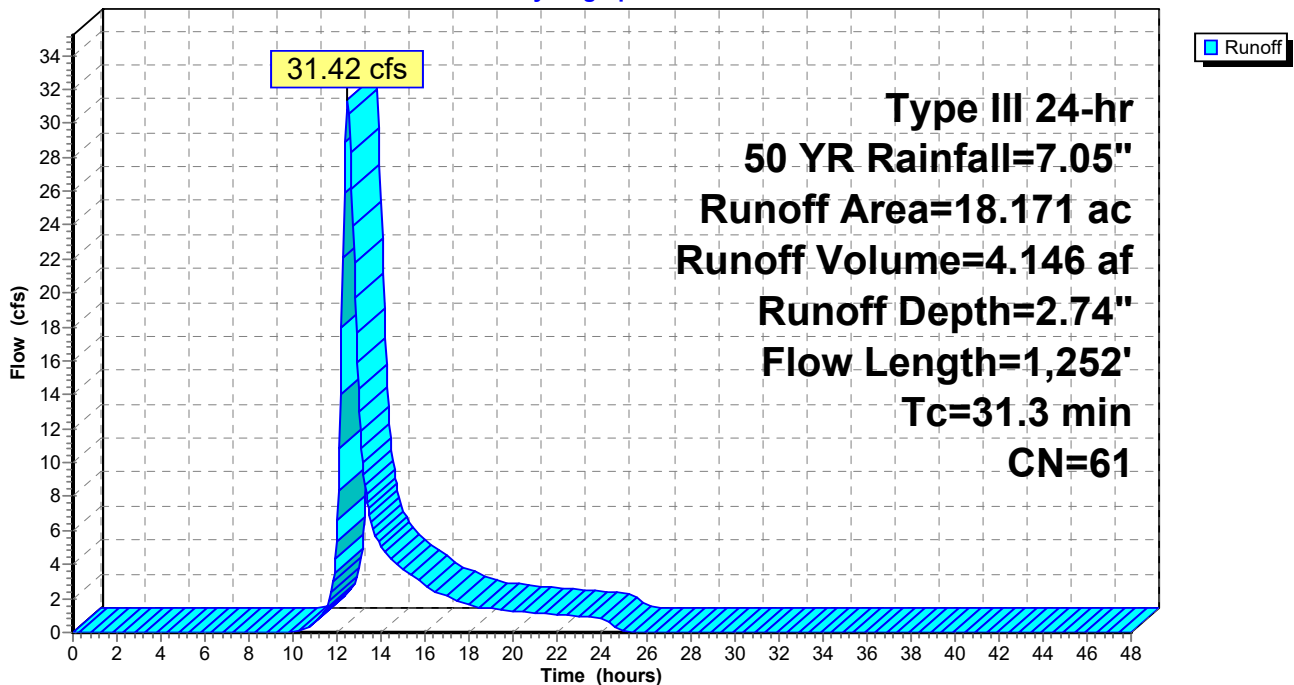
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 YR Rainfall=7.05"

Area (ac)	CN	Description
9.046	55	Woods, Good, HSG B
0.538	98	Water Surface, HSG B
* 8.587	65	Meadow, non-grazed, HSG B-C
18.171	61	Weighted Average
17.633		97.04% Pervious Area
0.538		2.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	100	0.0266	0.09		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.18"
1.6	159	0.1122	1.67		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
10.5	993	0.0504	1.57		Shallow Concentrated Flow, C-D Short Grass Pasture Kv= 7.0 fps
31.3	1,252	Total			

Subcatchment PDA-1: PDA-1

Hydrograph



Summary for Subcatchment PDA-2A: PDA-2A

Runoff = 11.40 cfs @ 12.35 hrs, Volume= 1.321 af, Depth= 3.35"

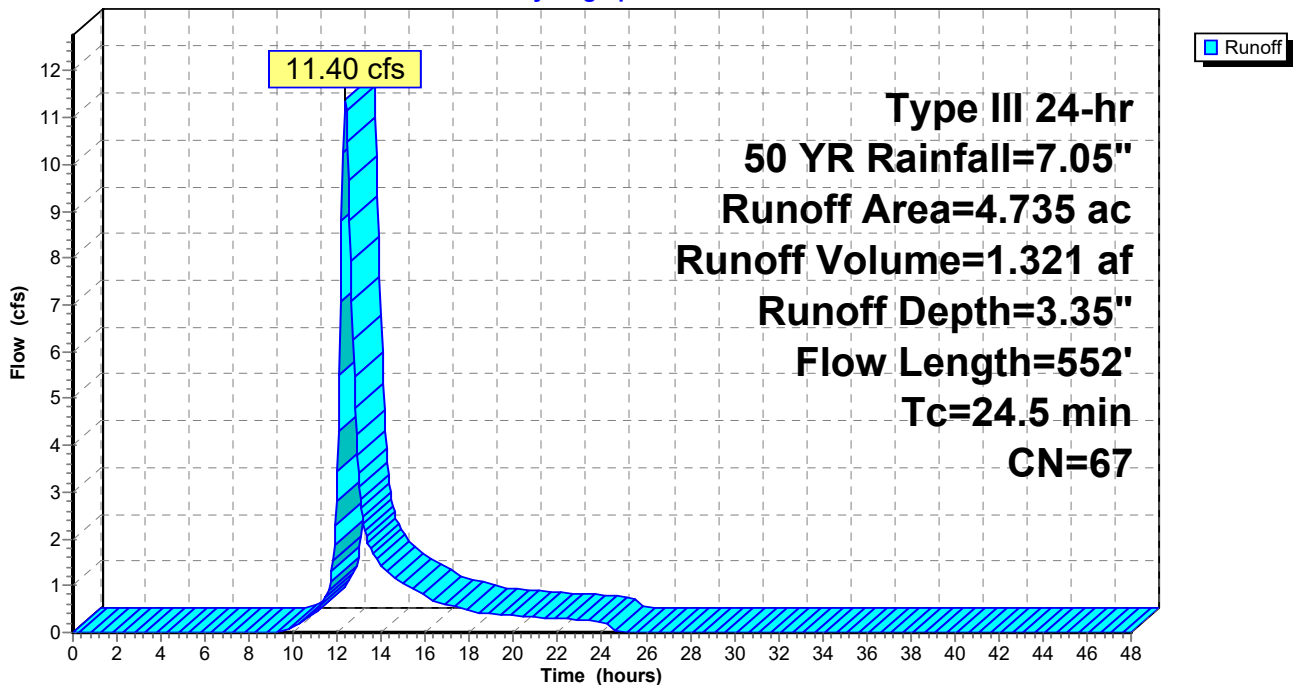
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50 YR Rainfall=7.05"

Area (ac)	CN	Description
0.699	55	Woods, Good, HSG B
0.147	58	Meadow, non-grazed, HSG B
0.307	98	Water Surface, HSG B
* 2.595	65	Meadow, non-grazed, HSG B-C
0.987	71	Meadow, non-grazed, HSG C
4.735	67	Weighted Average
4.428		93.52% Pervious Area
0.307		6.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.9	100	0.0100	0.09		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.18"
5.6	452	0.0376	1.36		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
24.5	552	Total			

Subcatchment PDA-2A: PDA-2A

Hydrograph



Summary for Subcatchment PDA-2B: PDA-2B

Runoff = 27.68 cfs @ 12.54 hrs, Volume= 3.932 af, Depth= 3.24"

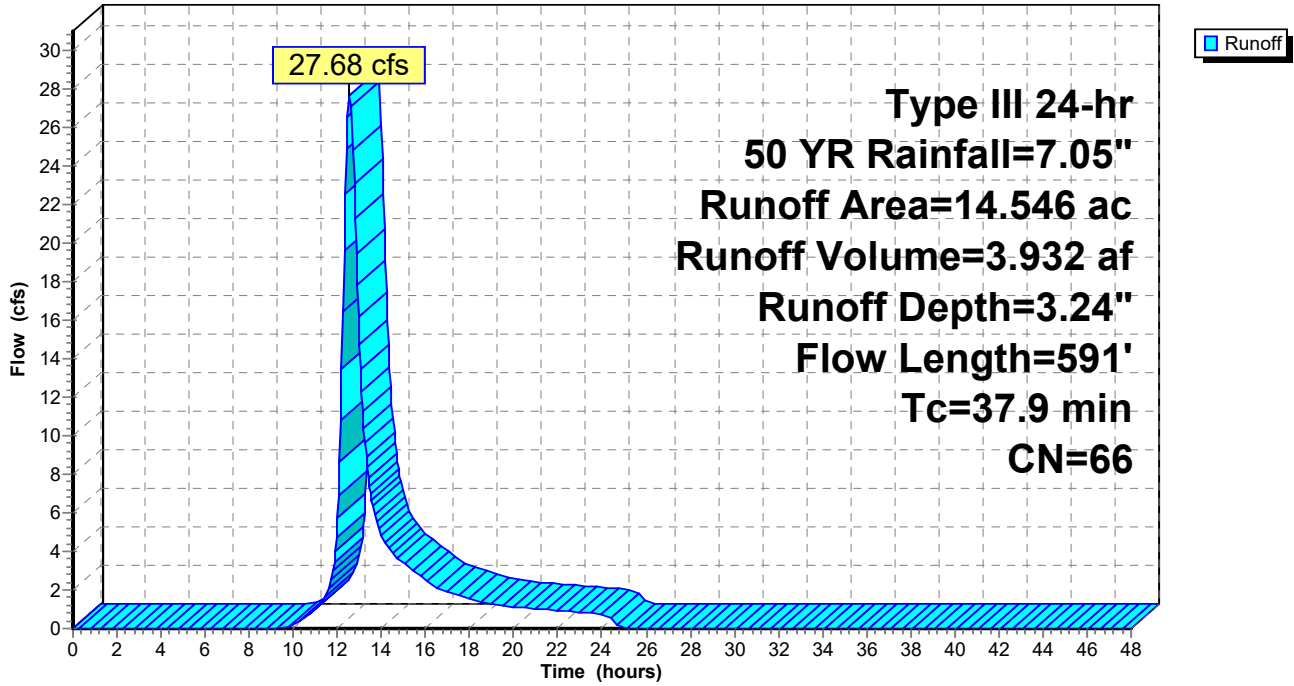
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50 YR Rainfall=7.05"

Area (ac)	CN	Description
1.687	55	Woods, Good, HSG B
0.365	58	Meadow, non-grazed, HSG B
0.404	98	Water Surface, HSG B
* 8.766	65	Meadow, non-grazed, HSG B-C
* 0.076	96	Gravel surface, HSG B-C
* 0.028	98	Unconnected pavement, HSG B-C
0.156	70	Woods, Good, HSG C
2.925	71	Meadow, non-grazed, HSG C
0.139	98	Water Surface, HSG C
14.546	66	Weighted Average
13.975		96.07% Pervious Area
0.571		3.93% Impervious Area
0.028		4.90% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.3	100	0.0040	0.06		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.18"
10.6	491	0.0122	0.77		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
37.9	591	Total			

Subcatchment PDA-2B: PDA-2B

Hydrograph



Summary for Subcatchment PDA-2C: PDA-2C

Runoff = 3.90 cfs @ 12.10 hrs, Volume= 0.291 af, Depth= 2.64"

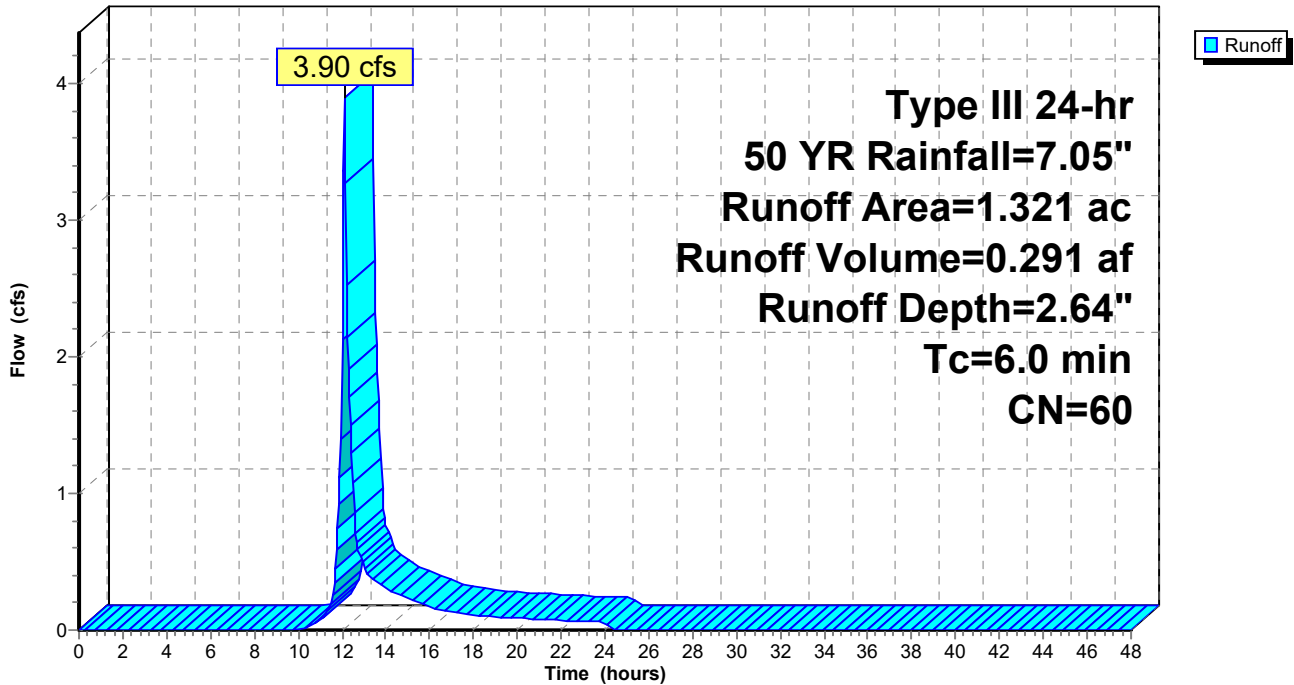
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 50 YR Rainfall=7.05"

Area (ac)	CN	Description
0.845	55	Woods, Good, HSG B
* 0.158	65	Meadow, non-grazed, HSG B-C
0.146	70	Woods, Good, HSG C
0.172	71	Meadow, non-grazed, HSG C
1.321	60	Weighted Average
1.321		100.00% Pervious Area

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

Subcatchment PDA-2C: PDA-2C

Hydrograph



Summary for Pond B-1: B-1

Inflow Area = 18.171 ac, 2.96% Impervious, Inflow Depth = 2.74" for 50 YR event
 Inflow = 31.42 cfs @ 12.46 hrs, Volume= 4.146 af
 Outflow = 10.87 cfs @ 13.11 hrs, Volume= 3.318 af, Atten= 65%, Lag= 38.6 min
 Primary = 10.87 cfs @ 13.11 hrs, Volume= 3.318 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 228.73' @ 13.11 hrs Surf.Area= 22,885 sf Storage= 72,866 cf

Plug-Flow detention time= 177.3 min calculated for 3.318 af (80% of inflow)
 Center-of-Mass det. time= 96.6 min (970.8 - 874.2)

Volume	Invert	Avail.Storage	Storage Description			
#1	225.00'	103,509 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)	
225.00	16,377	551.2	0	0	16,377	
230.00	25,352	645.5	103,509	103,509	25,842	

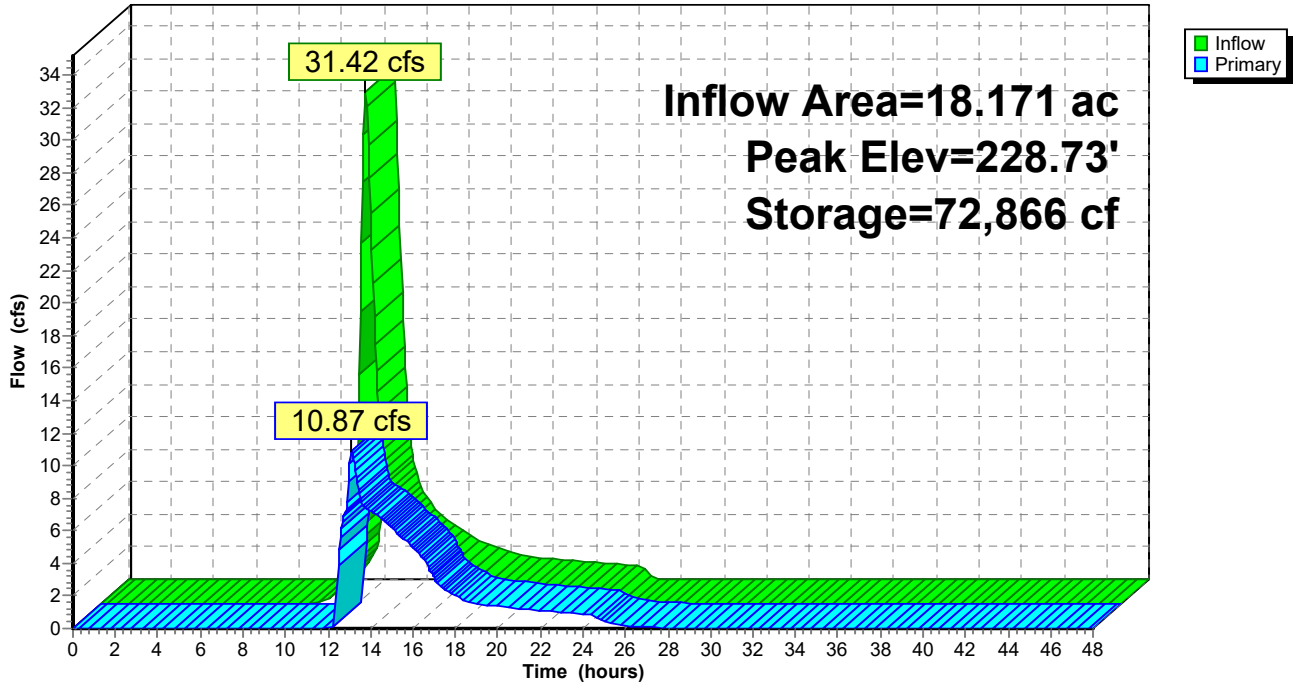
Device	Routing	Invert	Outlet Devices
#1	Primary	225.00'	15.0" Round Culvert L= 40.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 225.00' / 224.50' S= 0.0123 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	227.00'	15.0" Horiz. Orifice/Gate C= 0.600 Limited to weir flow at low heads
#3	Primary	228.60'	25.0' long x 17.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=10.86 cfs @ 13.11 hrs HW=228.73' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 7.77 cfs of 8.22 cfs potential flow)
- 2=Orifice/Gate (Orifice Controls 7.77 cfs @ 6.33 fps)
- 3=Broad-Crested Rectangular Weir (Weir Controls 3.09 cfs @ 0.96 fps)

Pond B-1: B-1

Hydrograph



Summary for Pond B-2A: B-2A

Inflow Area = 4.735 ac, 6.48% Impervious, Inflow Depth = 3.35" for 50 YR event
 Inflow = 11.40 cfs @ 12.35 hrs, Volume= 1.321 af
 Outflow = 3.76 cfs @ 12.90 hrs, Volume= 1.267 af, Atten= 67%, Lag= 33.2 min
 Primary = 3.76 cfs @ 12.90 hrs, Volume= 1.267 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 232.59' @ 12.90 hrs Surf.Area= 11,987 sf Storage= 22,053 cf

Plug-Flow detention time= 195.5 min calculated for 1.265 af (96% of inflow)
 Center-of-Mass det. time= 174.2 min (1,028.5 - 854.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	230.50'	47,673 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)
230.50	9,198	434.5	0	0	9,198
234.50	14,864	509.9	47,673	47,673	15,171

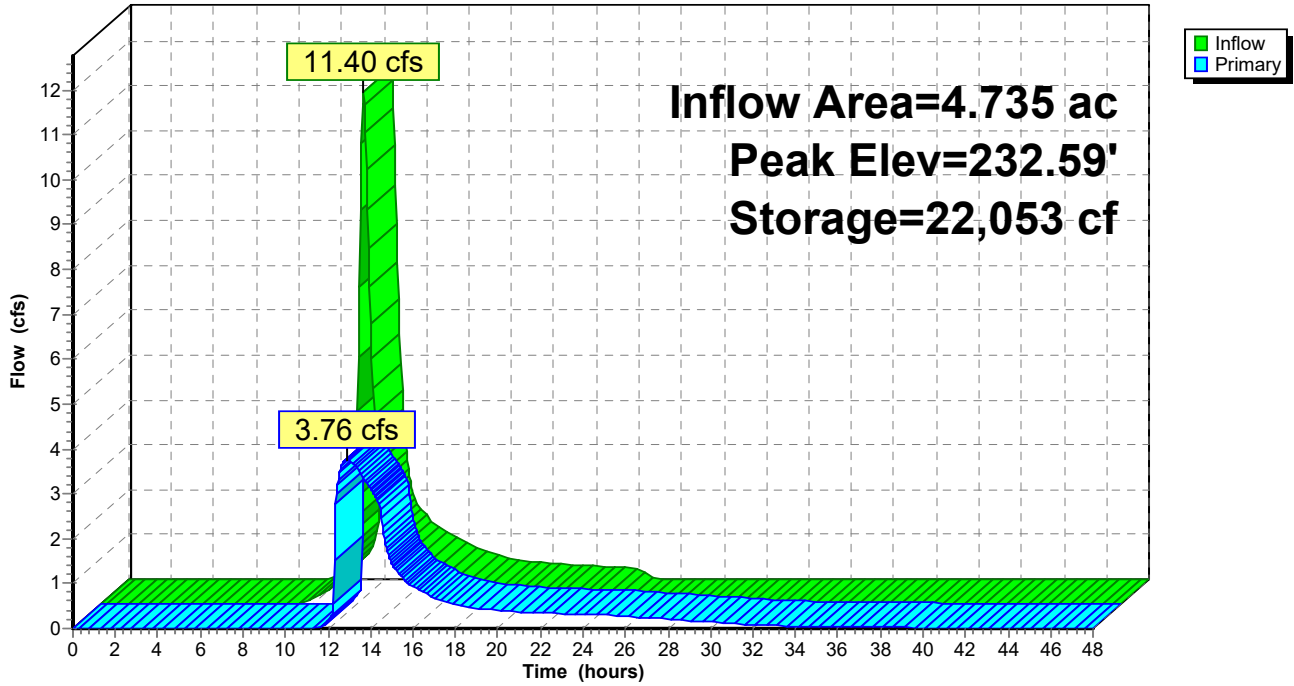
Device	Routing	Invert	Outlet Devices
#1	Primary	230.50'	12.0" Round Culvert L= 30.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 230.50' / 230.00' S= 0.0164 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	230.70'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	231.50'	12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	233.00'	5.0' long x 14.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

Primary OutFlow Max=3.76 cfs @ 12.90 hrs HW=232.59' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Inlet Controls 3.76 cfs @ 4.79 fps)
- 2=Orifice/Grate (Passes < 0.55 cfs potential flow)
- 3=Orifice/Grate (Passes < 3.94 cfs potential flow)
- 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond B-2A: B-2A

Hydrograph



Summary for Pond B-2B: B-2B

Inflow Area = 14.546 ac, 3.93% Impervious, Inflow Depth = 3.24" for 50 YR event
 Inflow = 27.68 cfs @ 12.54 hrs, Volume= 3.932 af
 Outflow = 15.14 cfs @ 12.99 hrs, Volume= 3.809 af, Atten= 45%, Lag= 26.8 min
 Primary = 15.14 cfs @ 12.99 hrs, Volume= 3.809 af

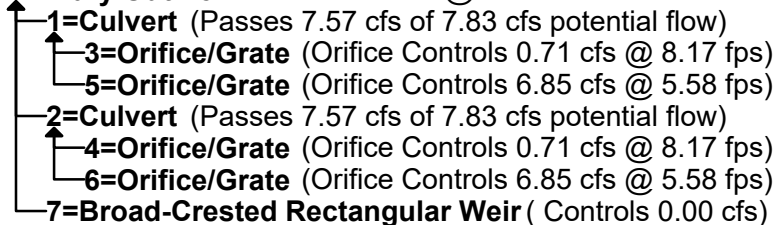
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 231.45' @ 12.99 hrs Surf.Area= 19,499 sf Storage= 53,195 cf

Plug-Flow detention time= 178.3 min calculated for 3.805 af (97% of inflow)
 Center-of-Mass det. time= 161.9 min (1,030.9 - 869.0)

Volume	Invert	Avail.Storage	Storage Description		
#1	228.00'	86,674 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)
228.00	11,703	750.1	0	0	11,703
233.00	23,661	844.3	86,674	86,674	24,302

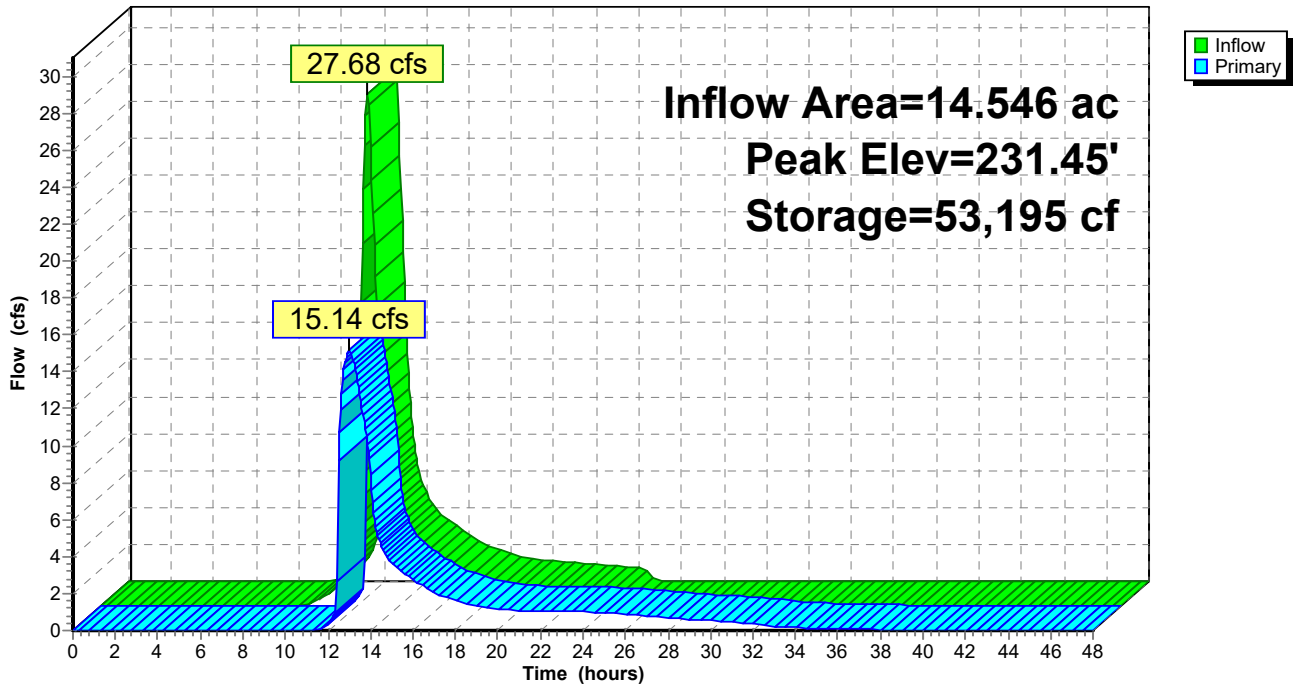
Device	Routing	Invert	Outlet Devices
#1	Primary	228.00'	15.0" Round Culvert L= 36.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 228.00' / 227.50' S= 0.0137 ' S= 0.0137 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Primary	228.00'	15.0" Round Culvert L= 36.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 228.00' / 227.50' S= 0.0137 ' S= 0.0137 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 1	228.40'	4.0" Vert. Orifice/Grate C= 0.600
#4	Device 2	228.40'	4.0" Vert. Orifice/Grate C= 0.600
#5	Device 1	230.10'	15.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Device 2	230.10'	15.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#7	Primary	231.50'	7.0' long x 14.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

Primary OutFlow Max=15.13 cfs @ 12.99 hrs HW=231.44' TW=0.00' (Dynamic Tailwater)



Pond B-2B: B-2B

Hydrograph



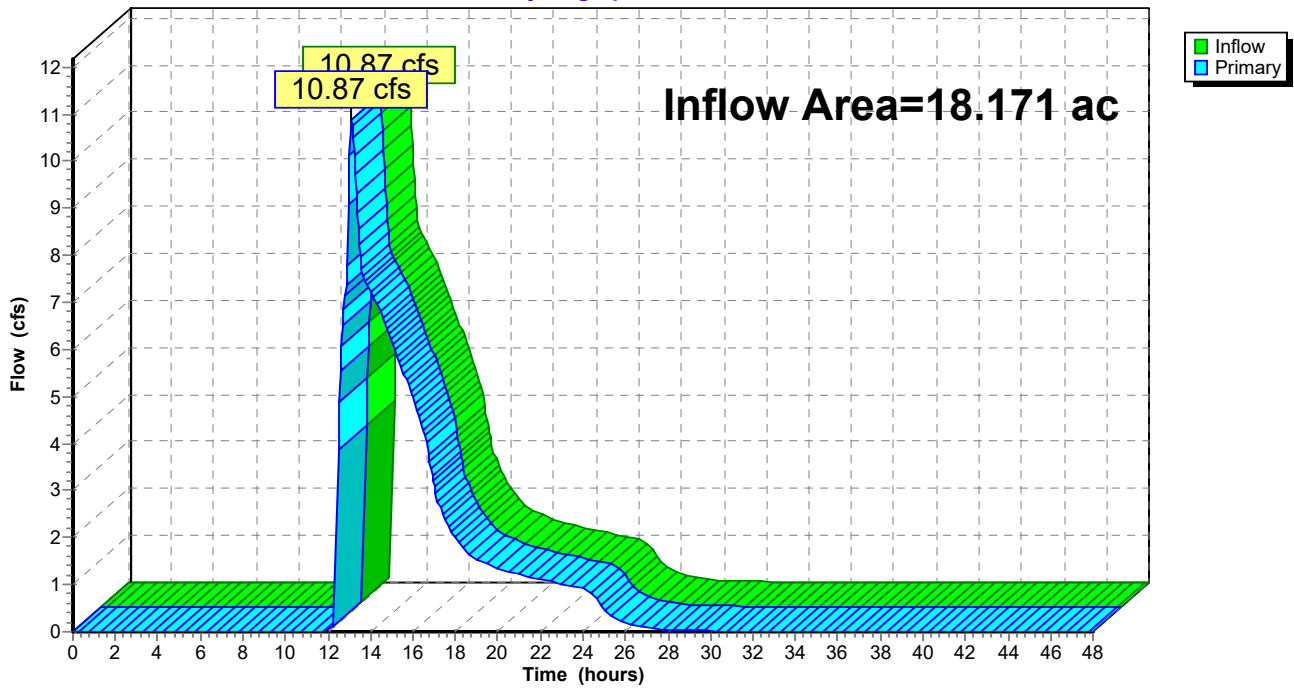
Summary for Link AP-1: AP-1

Inflow Area = 18.171 ac, 2.96% Impervious, Inflow Depth = 2.19" for 50 YR event
Inflow = 10.87 cfs @ 13.11 hrs, Volume= 3.318 af
Primary = 10.87 cfs @ 13.11 hrs, Volume= 3.318 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



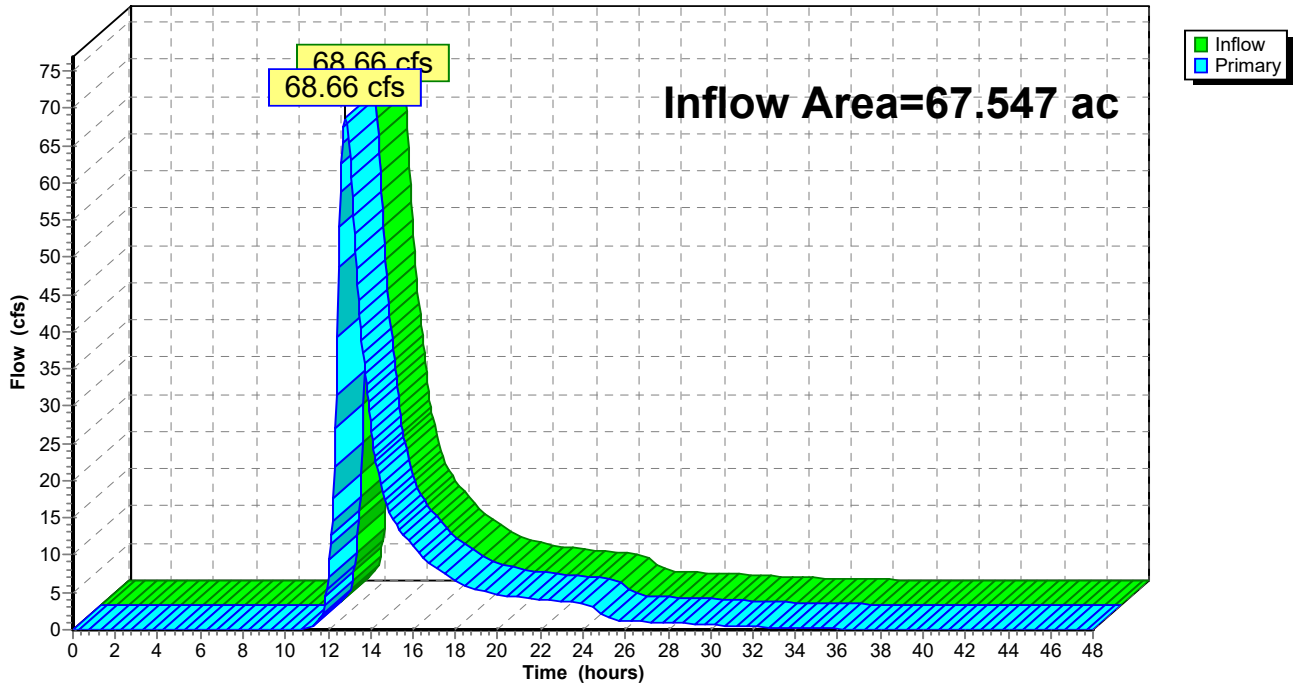
Summary for Link AP-2: AP-2

Inflow Area = 67.547 ac, 1.30% Impervious, Inflow Depth > 2.58" for 50 YR event
Inflow = 68.66 cfs @ 12.84 hrs, Volume= 14.546 af
Primary = 68.66 cfs @ 12.84 hrs, Volume= 14.546 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



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 1S: OFF-1 Runoff Area=46.945 ac 0.00% Impervious Runoff Depth=3.00"
Flow Length=2,873' Tc=56.6 min CN=57 Runoff=64.73 cfs 11.717 af

Subcatchment PDA-1: PDA-1 Runoff Area=18.171 ac 2.96% Impervious Runoff Depth=3.44"
Flow Length=1,252' Tc=31.3 min CN=61 Runoff=39.92 cfs 5.205 af

Subcatchment PDA-2A: PDA-2A Runoff Area=4.735 ac 6.48% Impervious Runoff Depth=4.11"
Flow Length=552' Tc=24.5 min CN=67 Runoff=14.07 cfs 1.623 af

Subcatchment PDA-2B: PDA-2B Runoff Area=14.546 ac 3.93% Impervious Runoff Depth=4.00"
Flow Length=591' Tc=37.9 min CN=66 Runoff=34.32 cfs 4.848 af

Subcatchment PDA-2C: PDA-2C Runoff Area=1.321 ac 0.00% Impervious Runoff Depth=3.33"
Tc=6.0 min CN=60 Runoff=4.98 cfs 0.366 af

Pond B-1: B-1 Peak Elev=228.98' Storage=78,764 cf Inflow=39.92 cfs 5.205 af
Outflow=24.37 cfs 4.376 af

Pond B-2A: B-2A Peak Elev=233.06' Storage=27,856 cf Inflow=14.07 cfs 1.623 af
Outflow=4.47 cfs 1.569 af

Pond B-2B: B-2B Peak Elev=231.90' Storage=62,405 cf Inflow=34.32 cfs 4.848 af
Outflow=21.71 cfs 4.725 af

Link AP-1: AP-1 Inflow=24.37 cfs 4.376 af
Primary=24.37 cfs 4.376 af

Link AP-2: AP-2 Inflow=91.01 cfs 18.376 af
Primary=91.01 cfs 18.376 af

Total Runoff Area = 85.718 ac Runoff Volume = 23.759 af Average Runoff Depth = 3.33"
98.35% Pervious = 84.302 ac 1.65% Impervious = 1.416 ac

Summary for Subcatchment 1S: OFF-1

Runoff = 64.73 cfs @ 12.81 hrs, Volume= 11.717 af, Depth= 3.00"

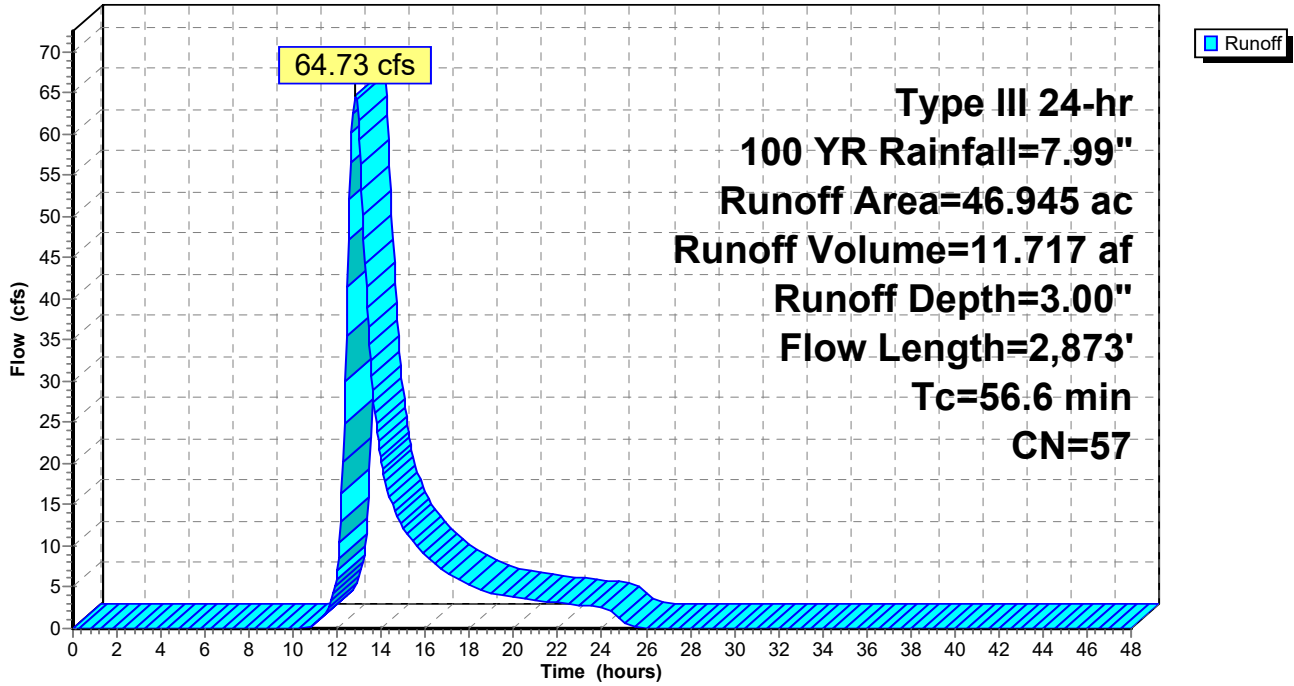
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100 YR Rainfall=7.99"

Area (ac)	CN	Description
32.391	55	Woods, Good, HSG B
0.459	58	Meadow, non-grazed, HSG B
14.095	61	Pasture/grassland/range, Good, HSG B
46.945	57	Weighted Average
46.945		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0211	0.16		Sheet Flow, A-B Cultivated: Residue>20% n= 0.170 P2= 3.18"
14.3	968	0.0158	1.13		Shallow Concentrated Flow, B-C Cultivated Straight Rows Kv= 9.0 fps
3.9	422	0.0411	1.82		Shallow Concentrated Flow, C-D Cultivated Straight Rows Kv= 9.0 fps
15.9	613	0.0166	0.64		Shallow Concentrated Flow, D-E Woodland Kv= 5.0 fps
3.5	384	0.1355	1.84		Shallow Concentrated Flow, E-F Woodland Kv= 5.0 fps
2.0	165	0.0789	1.40		Shallow Concentrated Flow, F-G Woodland Kv= 5.0 fps
6.4	221	0.0133	0.58		Shallow Concentrated Flow, G-H Woodland Kv= 5.0 fps
56.6	2,873	Total			

Subcatchment 1S: OFF-1

Hydrograph



Summary for Subcatchment PDA-1: PDA-1

Runoff = 39.92 cfs @ 12.45 hrs, Volume= 5.205 af, Depth= 3.44"

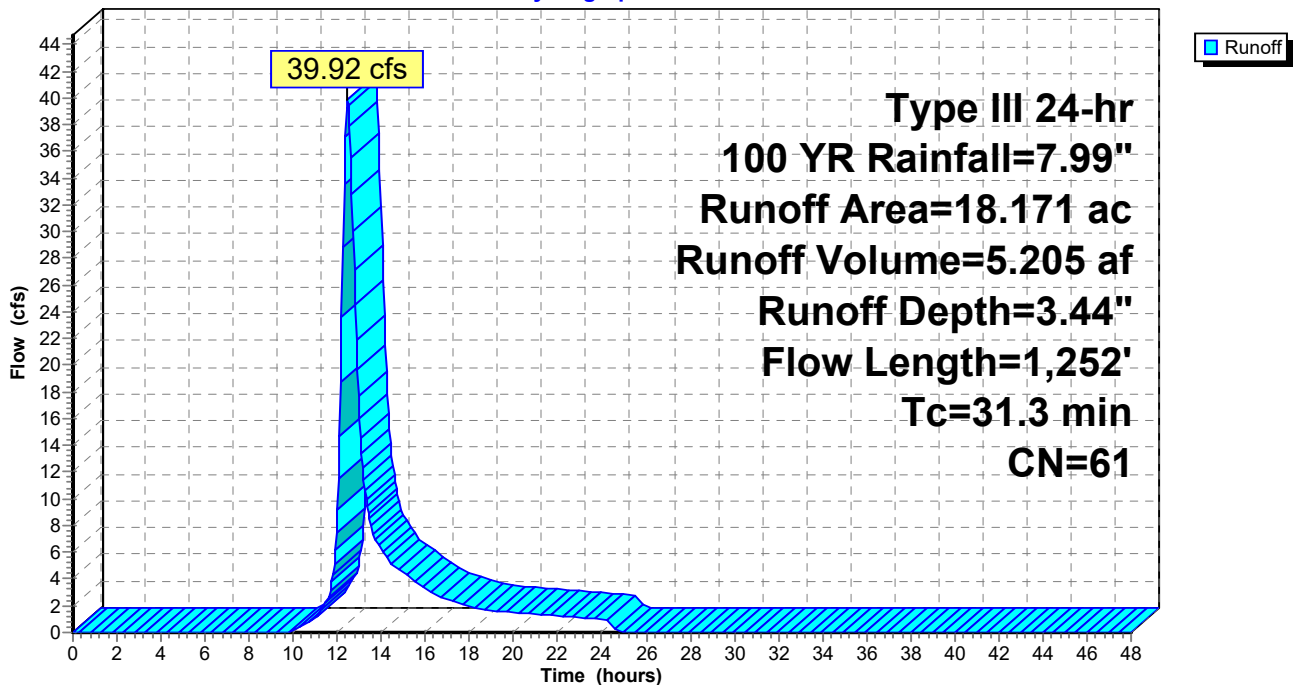
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=7.99"

Area (ac)	CN	Description
9.046	55	Woods, Good, HSG B
0.538	98	Water Surface, HSG B
* 8.587	65	Meadow, non-grazed, HSG B-C
18.171	61	Weighted Average
17.633		97.04% Pervious Area
0.538		2.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	100	0.0266	0.09		Sheet Flow, A-B Woods: Light underbrush n= 0.400 P2= 3.18"
1.6	159	0.1122	1.67		Shallow Concentrated Flow, B-C Woodland Kv= 5.0 fps
10.5	993	0.0504	1.57		Shallow Concentrated Flow, C-D Short Grass Pasture Kv= 7.0 fps
31.3	1,252	Total			

Subcatchment PDA-1: PDA-1

Hydrograph



Summary for Subcatchment PDA-2A: PDA-2A

Runoff = 14.07 cfs @ 12.35 hrs, Volume= 1.623 af, Depth= 4.11"

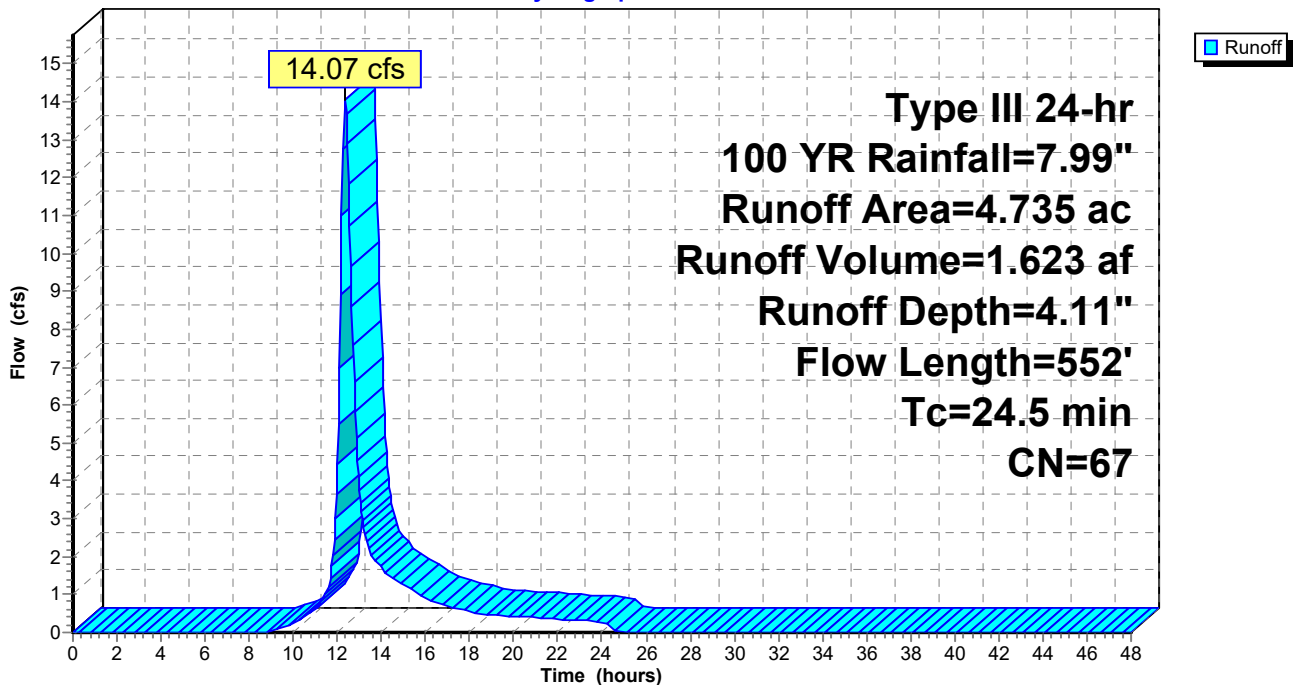
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100 YR Rainfall=7.99"

Area (ac)	CN	Description
0.699	55	Woods, Good, HSG B
0.147	58	Meadow, non-grazed, HSG B
0.307	98	Water Surface, HSG B
* 2.595	65	Meadow, non-grazed, HSG B-C
0.987	71	Meadow, non-grazed, HSG C
4.735	67	Weighted Average
4.428		93.52% Pervious Area
0.307		6.48% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.9	100	0.0100	0.09		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.18"
5.6	452	0.0376	1.36		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
24.5	552	Total			

Subcatchment PDA-2A: PDA-2A

Hydrograph



Summary for Subcatchment PDA-2B: PDA-2B

Runoff = 34.32 cfs @ 12.53 hrs, Volume= 4.848 af, Depth= 4.00"

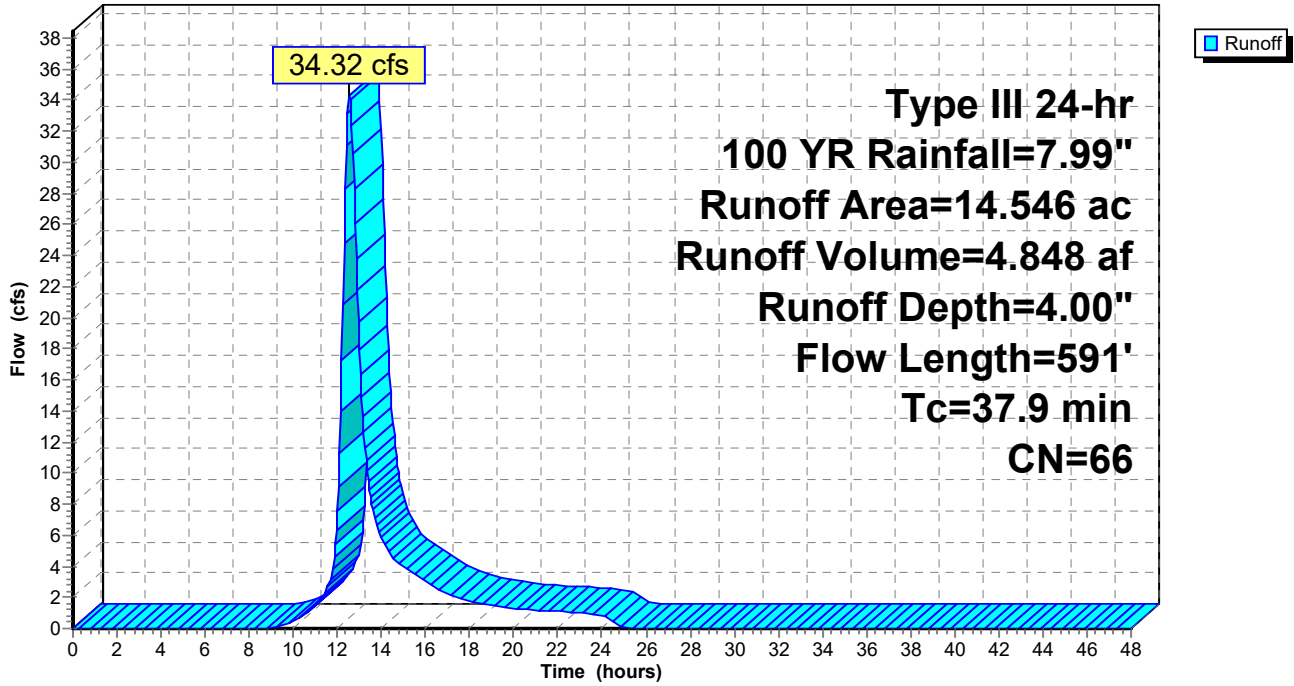
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Type III 24-hr 100 YR Rainfall=7.99"

Area (ac)	CN	Description
1.687	55	Woods, Good, HSG B
0.365	58	Meadow, non-grazed, HSG B
0.404	98	Water Surface, HSG B
* 8.766	65	Meadow, non-grazed, HSG B-C
* 0.076	96	Gravel surface, HSG B-C
* 0.028	98	Unconnected pavement, HSG B-C
0.156	70	Woods, Good, HSG C
2.925	71	Meadow, non-grazed, HSG C
0.139	98	Water Surface, HSG C
14.546	66	Weighted Average
13.975		96.07% Pervious Area
0.571		3.93% Impervious Area
0.028		4.90% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.3	100	0.0040	0.06		Sheet Flow, A-B Grass: Dense n= 0.240 P2= 3.18"
10.6	491	0.0122	0.77		Shallow Concentrated Flow, B-C Short Grass Pasture Kv= 7.0 fps
37.9	591	Total			

Subcatchment PDA-2B: PDA-2B

Hydrograph



Summary for Subcatchment PDA-2C: PDA-2C

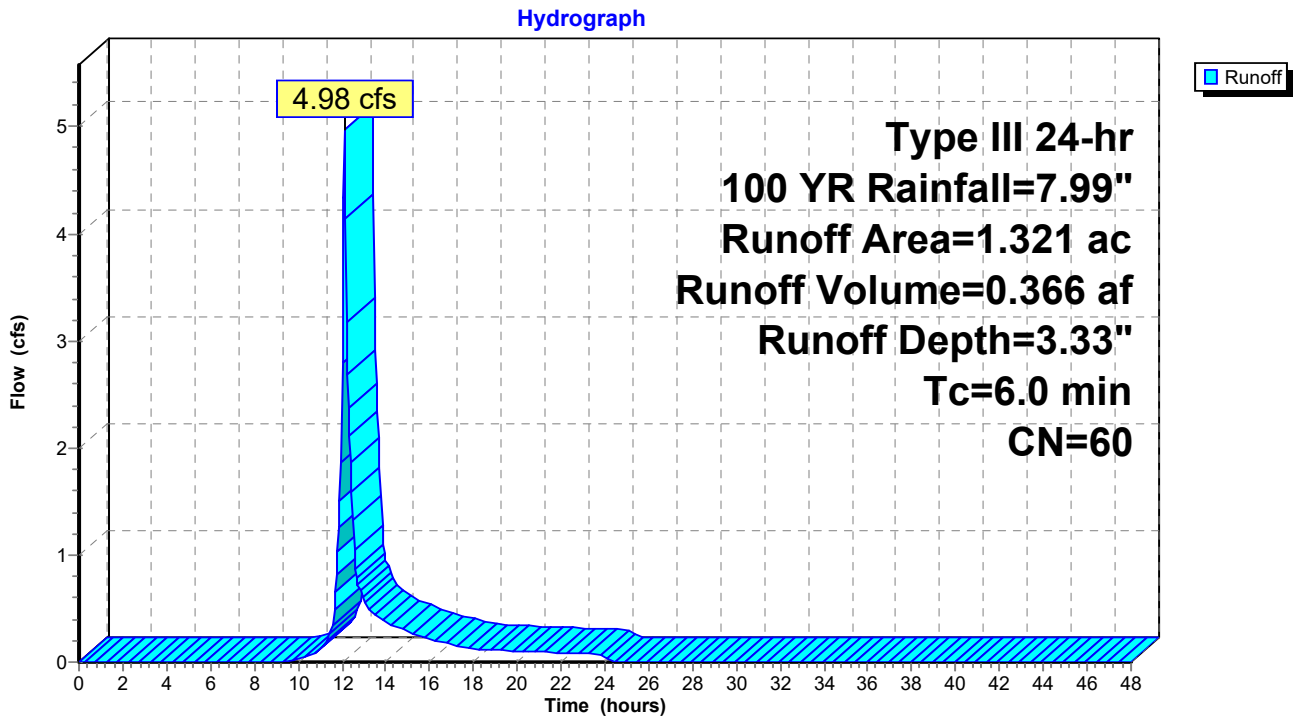
Runoff = 4.98 cfs @ 12.10 hrs, Volume= 0.366 af, Depth= 3.33"

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=7.99"

Area (ac)	CN	Description
0.845	55	Woods, Good, HSG B
* 0.158	65	Meadow, non-grazed, HSG B-C
0.146	70	Woods, Good, HSG C
0.172	71	Meadow, non-grazed, HSG C
1.321	60	Weighted Average
1.321		100.00% Pervious Area

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

Subcatchment PDA-2C: PDA-2C



Summary for Pond B-1: B-1

Inflow Area = 18.171 ac, 2.96% Impervious, Inflow Depth = 3.44" for 100 YR event
 Inflow = 39.92 cfs @ 12.45 hrs, Volume= 5.205 af
 Outflow = 24.37 cfs @ 12.81 hrs, Volume= 4.376 af, Atten= 39%, Lag= 21.3 min
 Primary = 24.37 cfs @ 12.81 hrs, Volume= 4.376 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 228.98' @ 12.81 hrs Surf.Area= 23,370 sf Storage= 78,764 cf

Plug-Flow detention time= 150.2 min calculated for 4.372 af (84% of inflow)
 Center-of-Mass det. time= 82.4 min (949.9 - 867.5)

Volume	Invert	Avail.Storage	Storage Description			
#1	225.00'	103,509 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)	
225.00	16,377	551.2	0	0	16,377	
230.00	25,352	645.5	103,509	103,509	25,842	

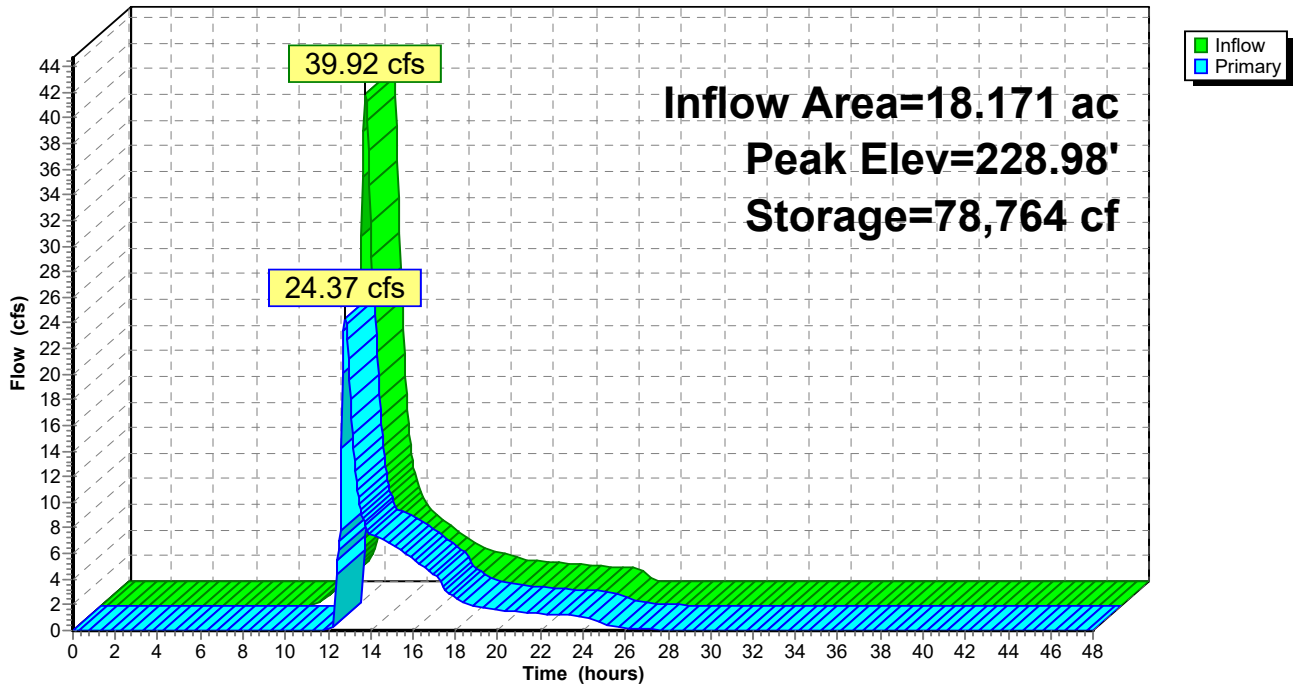
Device	Routing	Invert	Outlet Devices
#1	Primary	225.00'	15.0" Round Culvert L= 40.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 225.00' / 224.50' S= 0.0123 ' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Device 1	227.00'	15.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	228.60'	25.0' long x 17.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=24.27 cfs @ 12.81 hrs HW=228.98' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 8.32 cfs of 8.55 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 8.32 cfs @ 6.78 fps)
- 3=Broad-Crested Rectangular Weir (Weir Controls 15.95 cfs @ 1.67 fps)

Pond B-1: B-1

Hydrograph



Summary for Pond B-2A: B-2A

Inflow Area = 4.735 ac, 6.48% Impervious, Inflow Depth = 4.11" for 100 YR event
 Inflow = 14.07 cfs @ 12.35 hrs, Volume= 1.623 af
 Outflow = 4.47 cfs @ 12.91 hrs, Volume= 1.569 af, Atten= 68%, Lag= 33.9 min
 Primary = 4.47 cfs @ 12.91 hrs, Volume= 1.569 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 233.06' @ 12.91 hrs Surf.Area= 12,667 sf Storage= 27,856 cf

Plug-Flow detention time= 177.0 min calculated for 1.567 af (97% of inflow)
 Center-of-Mass det. time= 159.4 min (1,007.8 - 848.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	230.50'	47,673 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)
230.50	9,198	434.5	0	0	9,198
234.50	14,864	509.9	47,673	47,673	15,171

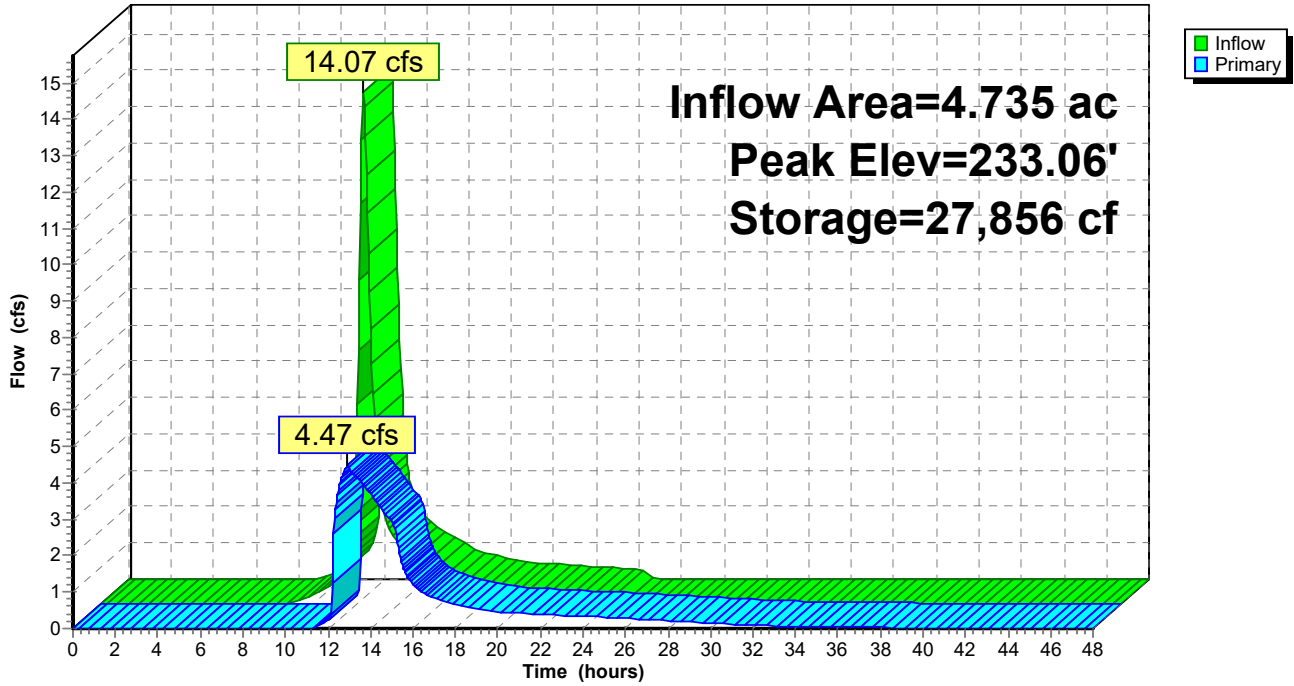
Device	Routing	Invert	Outlet Devices
#1	Primary	230.50'	12.0" Round Culvert L= 30.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 230.50' / 230.00' S= 0.0164 ' S Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	230.70'	4.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	231.50'	12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#4	Primary	233.00'	5.0' long x 14.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

Primary OutFlow Max=4.47 cfs @ 12.91 hrs HW=233.06' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Inlet Controls 4.28 cfs @ 5.45 fps)
- 2=Orifice/Grate (Passes < 0.62 cfs potential flow)
- 3=Orifice/Grate (Passes < 4.72 cfs potential flow)
- 4=Broad-Crested Rectangular Weir (Weir Controls 0.19 cfs @ 0.64 fps)

Pond B-2A: B-2A

Hydrograph



Summary for Pond B-2B: B-2B

Inflow Area = 14.546 ac, 3.93% Impervious, Inflow Depth = 4.00" for 100 YR event
 Inflow = 34.32 cfs @ 12.53 hrs, Volume= 4.848 af
 Outflow = 21.71 cfs @ 12.90 hrs, Volume= 4.725 af, Atten= 37%, Lag= 22.2 min
 Primary = 21.71 cfs @ 12.90 hrs, Volume= 4.725 af

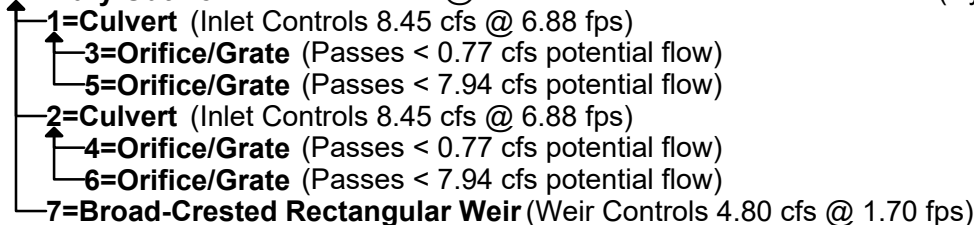
Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
 Peak Elev= 231.90' @ 12.90 hrs Surf.Area= 20,685 sf Storage= 62,405 cf

Plug-Flow detention time= 155.2 min calculated for 4.725 af (97% of inflow)
 Center-of-Mass det. time= 140.5 min (1,003.4 - 862.9)

Volume	Invert	Avail.Storage	Storage Description		
#1	228.00'	86,674 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)
228.00	11,703	750.1	0	0	11,703
233.00	23,661	844.3	86,674	86,674	24,302

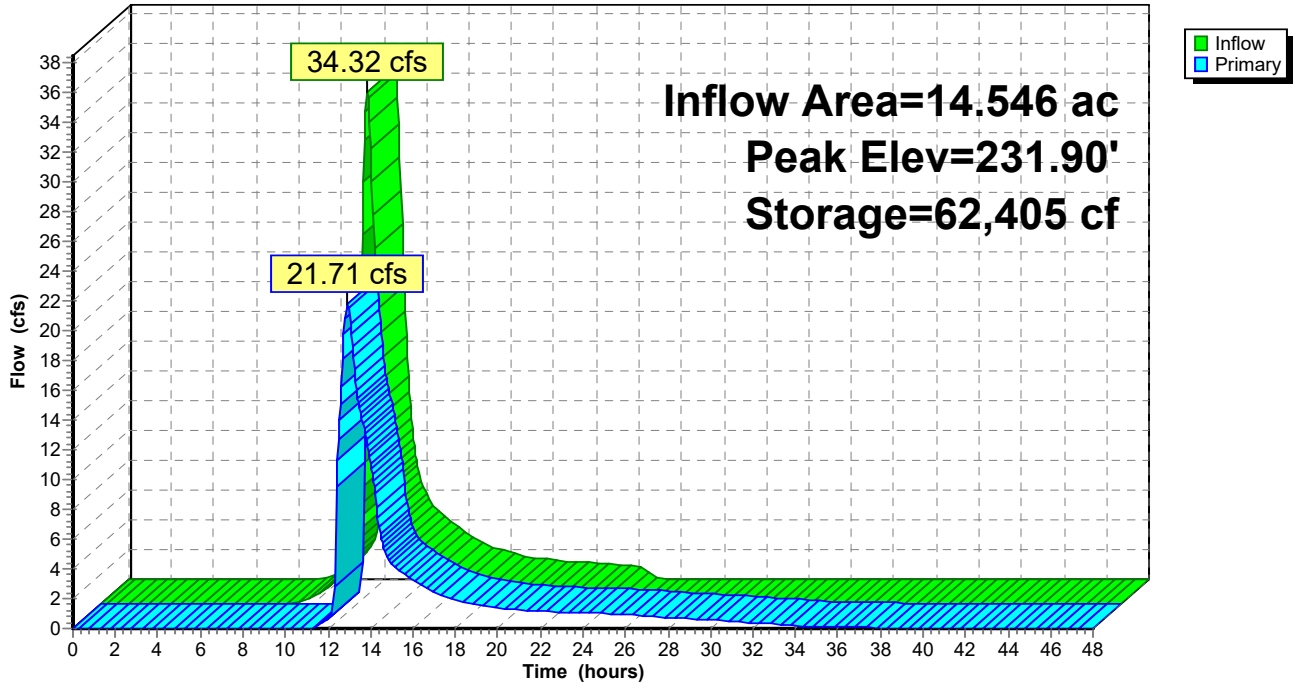
Device	Routing	Invert	Outlet Devices
#1	Primary	228.00'	15.0" Round Culvert L= 36.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 228.00' / 227.50' S= 0.0137 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#2	Primary	228.00'	15.0" Round Culvert L= 36.5' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 228.00' / 227.50' S= 0.0137 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 1	228.40'	4.0" Vert. Orifice/Grate C= 0.600
#4	Device 2	228.40'	4.0" Vert. Orifice/Grate C= 0.600
#5	Device 1	230.10'	15.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#6	Device 2	230.10'	15.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#7	Primary	231.50'	7.0' long x 14.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

Primary OutFlow Max=21.70 cfs @ 12.90 hrs HW=231.90' TW=0.00' (Dynamic Tailwater)



Pond B-2B: B-2B

Hydrograph



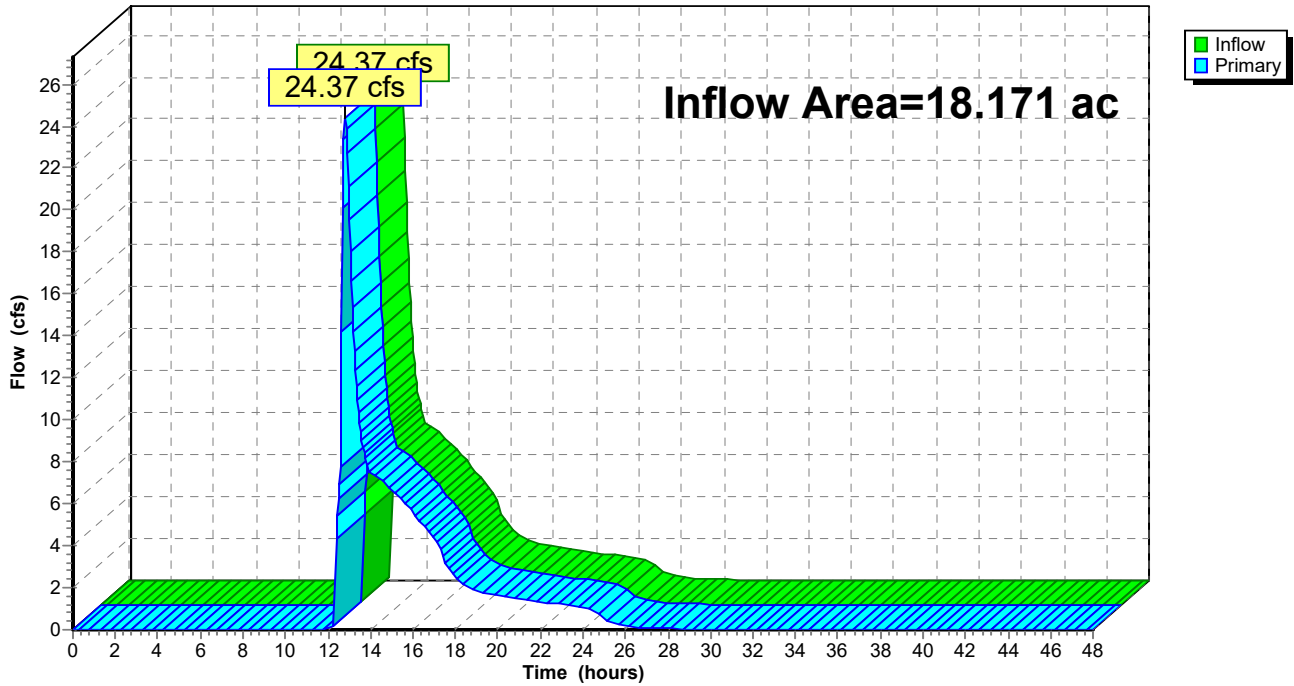
Summary for Link AP-1: AP-1

Inflow Area = 18.171 ac, 2.96% Impervious, Inflow Depth = 2.89" for 100 YR event
Inflow = 24.37 cfs @ 12.81 hrs, Volume= 4.376 af
Primary = 24.37 cfs @ 12.81 hrs, Volume= 4.376 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



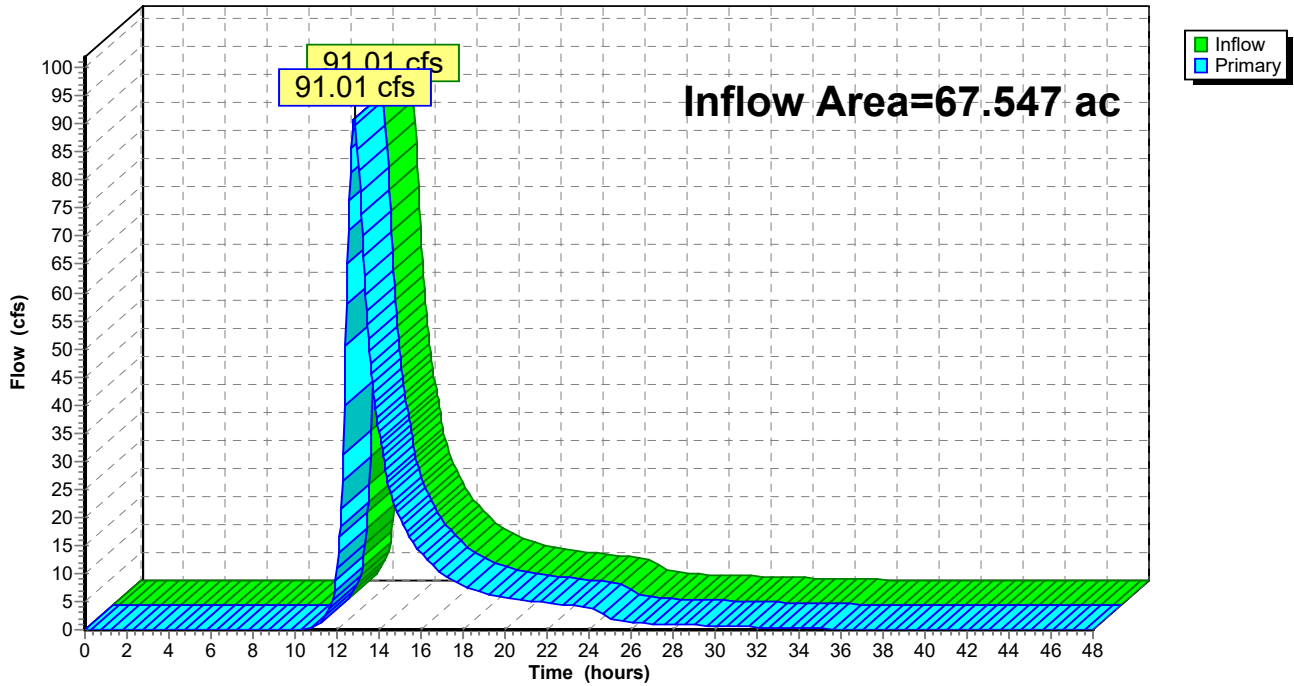
Summary for Link AP-2: AP-2

Inflow Area = 67.547 ac, 1.30% Impervious, Inflow Depth > 3.26" for 100 YR event
Inflow = 91.01 cfs @ 12.84 hrs, Volume= 18.376 af
Primary = 91.01 cfs @ 12.84 hrs, Volume= 18.376 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



APPENDIX D: NOAA ATLAS 14 PRECIPITATION FREQUENCY TABLE



NOAA Atlas 14, Volume 10, Version 3
 Location name: Town of Ellington, Connecticut,
 USA*

Latitude: 41.9362°, Longitude: -72.5031°
 Elevation: 256.74 ft**

* source: ESRI Maps
 ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps & aerials](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.335 (0.256-0.438)	0.405 (0.309-0.529)	0.519 (0.395-0.681)	0.614 (0.465-0.810)	0.744 (0.548-1.03)	0.842 (0.609-1.19)	0.945 (0.665-1.38)	1.06 (0.709-1.58)	1.23 (0.792-1.90)	1.36 (0.860-2.15)
10-min	0.475 (0.363-0.620)	0.573 (0.438-0.750)	0.734 (0.560-0.964)	0.869 (0.659-1.15)	1.05 (0.776-1.45)	1.19 (0.862-1.68)	1.34 (0.943-1.96)	1.50 (1.01-2.25)	1.74 (1.12-2.69)	1.93 (1.22-3.04)
15-min	0.558 (0.427-0.729)	0.675 (0.515-0.882)	0.865 (0.659-1.14)	1.02 (0.775-1.35)	1.24 (0.913-1.71)	1.40 (1.01-1.98)	1.58 (1.11-2.30)	1.77 (1.18-2.64)	2.04 (1.32-3.16)	2.27 (1.43-3.58)
30-min	0.754 (0.577-0.986)	0.913 (0.698-1.20)	1.17 (0.893-1.54)	1.39 (1.05-1.83)	1.69 (1.24-2.32)	1.91 (1.38-2.69)	2.14 (1.51-3.13)	2.40 (1.61-3.60)	2.78 (1.80-4.30)	3.09 (1.95-4.87)
60-min	0.951 (0.727-1.24)	1.15 (0.880-1.51)	1.48 (1.13-1.94)	1.76 (1.33-2.32)	2.13 (1.57-2.94)	2.41 (1.74-3.40)	2.71 (1.91-3.96)	3.04 (2.04-4.55)	3.52 (2.27-5.45)	3.91 (2.47-6.17)
2-hr	1.22 (0.936-1.58)	1.47 (1.13-1.91)	1.88 (1.44-2.45)	2.22 (1.69-2.91)	2.68 (1.99-3.69)	3.03 (2.21-4.26)	3.40 (2.42-4.98)	3.84 (2.58-5.72)	4.50 (2.92-6.93)	5.06 (3.21-7.95)
3-hr	1.40 (1.08-1.82)	1.69 (1.30-2.19)	2.15 (1.66-2.81)	2.55 (1.94-3.33)	3.08 (2.29-4.23)	3.48 (2.54-4.89)	3.91 (2.80-5.73)	4.43 (2.98-6.57)	5.23 (3.40-8.03)	5.92 (3.77-9.26)
6-hr	1.76 (1.37-2.27)	2.13 (1.65-2.76)	2.75 (2.12-3.56)	3.25 (2.49-4.23)	3.95 (2.96-5.41)	4.46 (3.29-6.26)	5.02 (3.63-7.37)	5.73 (3.87-8.45)	6.83 (4.45-10.4)	7.79 (4.97-12.1)
12-hr	2.17 (1.69-2.79)	2.67 (2.08-3.42)	3.47 (2.69-4.47)	4.14 (3.19-5.36)	5.06 (3.81-6.90)	5.74 (4.25-8.02)	6.48 (4.71-9.47)	7.42 (5.03-10.9)	8.91 (5.82-13.5)	10.2 (6.53-15.8)
24-hr	2.56 (2.00-3.26)	3.18 (2.48-4.06)	4.19 (3.27-5.37)	5.04 (3.91-6.49)	6.20 (4.69-8.42)	7.05 (5.25-9.82)	7.99 (5.84-11.7)	9.20 (6.25-13.4)	11.1 (7.29-16.8)	12.8 (8.23-19.7)
2-day	2.88 (2.26-3.65)	3.62 (2.84-4.59)	4.83 (3.78-6.15)	5.83 (4.54-7.47)	7.21 (5.49-9.76)	8.21 (6.16-11.4)	9.34 (6.89-13.6)	10.8 (7.37-15.7)	13.2 (8.68-19.8)	15.4 (9.88-23.4)
3-day	3.14 (2.48-3.97)	3.94 (3.11-4.99)	5.26 (4.14-6.69)	6.36 (4.97-8.12)	7.87 (6.01-10.6)	8.96 (6.74-12.4)	10.2 (7.54-14.8)	11.8 (8.07-17.1)	14.5 (9.52-21.6)	16.8 (10.8-25.6)
4-day	3.37 (2.67-4.26)	4.23 (3.35-5.35)	5.64 (4.44-7.15)	6.81 (5.33-8.67)	8.41 (6.44-11.3)	9.58 (7.22-13.2)	10.9 (8.06-15.8)	12.6 (8.63-18.2)	15.4 (10.2-23.0)	17.9 (11.6-27.2)
7-day	4.03 (3.20-5.06)	5.00 (3.97-6.29)	6.59 (5.21-8.31)	7.90 (6.22-10.0)	9.72 (7.46-13.0)	11.0 (8.34-15.2)	12.5 (9.27-18.0)	14.4 (9.90-20.7)	17.5 (11.6-26.0)	20.3 (13.1-30.6)
10-day	4.68 (3.73-5.87)	5.72 (4.55-7.17)	7.40 (5.87-9.32)	8.80 (6.94-11.1)	10.7 (8.24-14.3)	12.1 (9.17-16.6)	13.7 (10.1-19.5)	15.7 (10.8-22.4)	18.8 (12.5-27.8)	21.6 (14.0-32.5)
20-day	6.74 (5.40-8.40)	7.84 (6.27-9.78)	9.64 (7.68-12.1)	11.1 (8.82-14.0)	13.2 (10.1-17.3)	14.7 (11.1-19.8)	16.3 (12.0-22.8)	18.3 (12.6-25.9)	21.2 (14.1-31.0)	23.6 (15.3-35.3)
30-day	8.48 (6.81-10.5)	9.60 (7.71-11.9)	11.4 (9.15-14.3)	13.0 (10.3-16.3)	15.1 (11.6-19.6)	16.7 (12.6-22.2)	18.3 (13.4-25.2)	20.1 (14.0-28.4)	22.7 (15.2-33.1)	24.8 (16.1-36.9)
45-day	10.6 (8.58-13.2)	11.8 (9.50-14.6)	13.7 (11.0-17.0)	15.3 (12.2-19.1)	17.4 (13.4-22.5)	19.1 (14.4-25.2)	20.8 (15.1-28.2)	22.4 (15.6-31.5)	24.6 (16.5-35.8)	26.3 (17.1-39.0)
60-day	12.5 (10.1-15.4)	13.7 (11.0-16.9)	15.6 (12.5-19.4)	17.2 (13.8-21.5)	19.4 (15.0-25.0)	21.2 (15.9-27.7)	22.9 (16.6-30.8)	24.4 (17.1-34.2)	26.4 (17.7-38.2)	27.7 (18.1-41.0)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

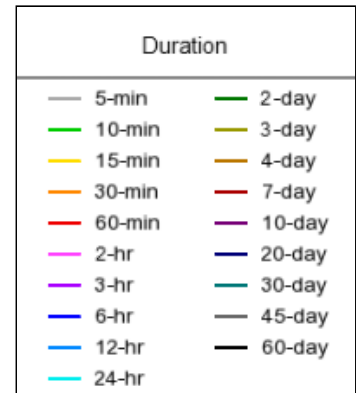
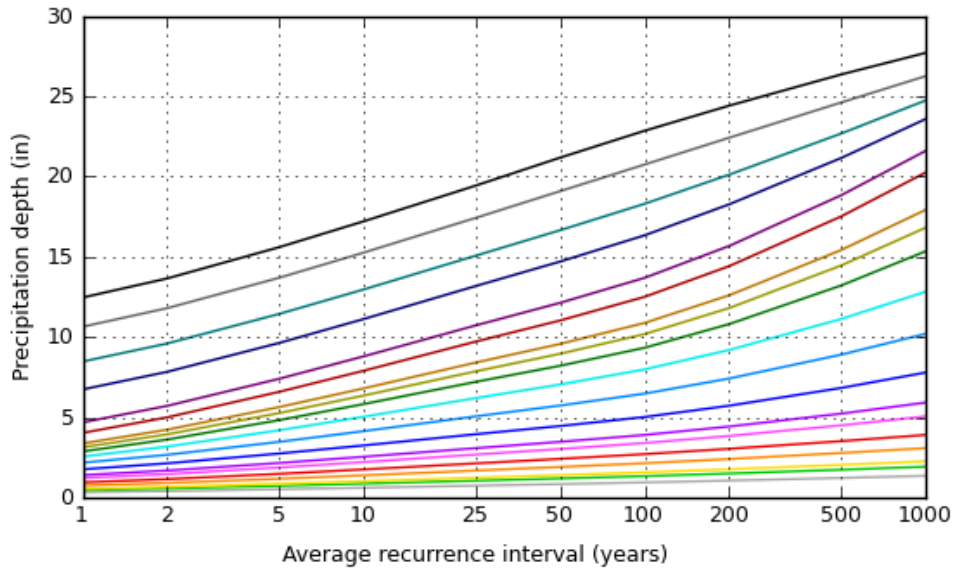
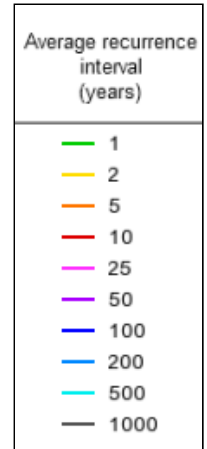
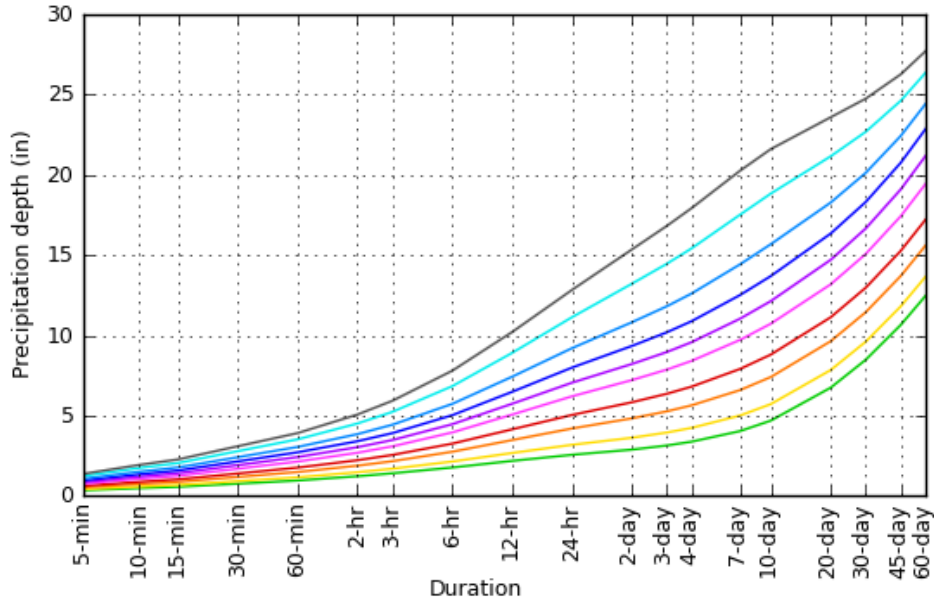
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

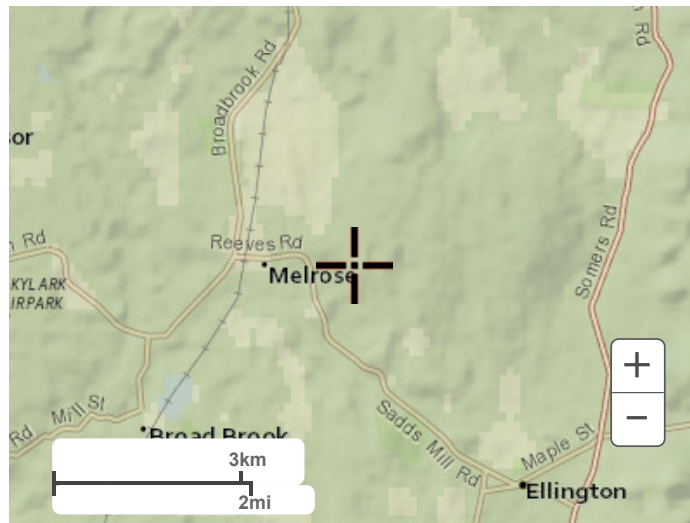
PDS-based depth-duration-frequency (DDF) curves
 Latitude: 41.9362°, Longitude: -72.5031°



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Maps & aeriels

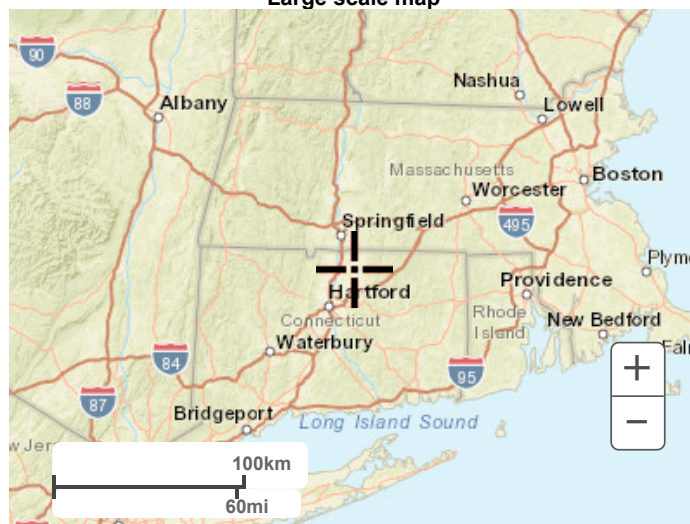
Small scale terrain



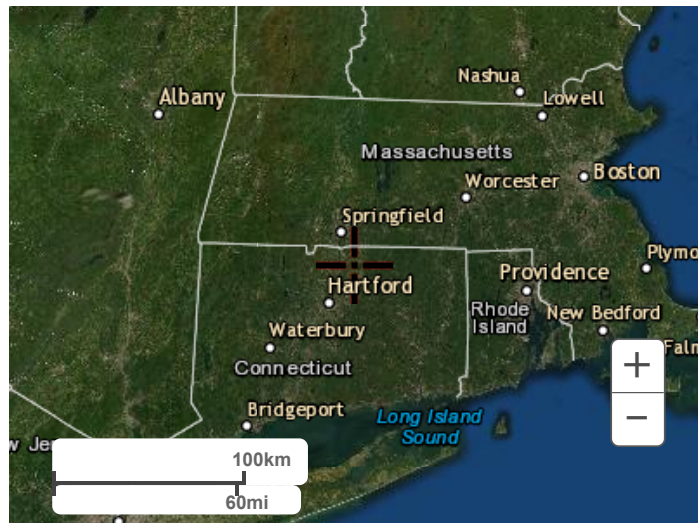
Large scale terrain



Large scale map



Large scale aerial



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1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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APPENDIX E: ADDITIONAL CALCULATIONS

SEDIMENT BASIN SIZING
FOR
ELLINGTON SOLAR
277 SADDS MILL RD, ELLINGTON, CT

	TSB-1	TSB-2A	TSB-2B
DA (acre)	18.171	4.735	14.546
DA (square mile)	0.028	0.007	0.023
A (construction areas)(ton/ac/yr)	50	50	50
DR	80%	81%	80%
TE	0.8	0.8	0.8
γ (sand) (lbs/cf)	65	65	65
Sediment Volume Calcs:			
Req. Volume Dry (acre-ft/yr)	0.41	0.11	0.33
Req. Volume Dry (cf)	17,891	4,720	14,322
Req. Volume Wet (Dry x 2) (cf)	35,782	9,440	28,644
Residence Volume Calcs:			
SCS Runoff Volume (in), Vr (from HydroCAD)	1.00	1.00	1.00
Q10 (cfs) (from HydroCAD)	8.82	9.26	9.26
Q10/DA	0.49	1.96	0.64
Qo/Qi (Figure SB-13)	0.130	0.034	0.110
Qo (max over spillway)	1.15	0.31	1.02
Release Rate (csm)	40.39	42.56	44.82
V5 (in) (Figure DB-6)	0.50	0.48	0.44
Vs (acre-ft)	0.76	0.19	0.53
Vs (cf)	33,106	8,250	23,233
Volumes Required:			
Sediment Wet Volume (cf)	35,782	9,440	28,644
Residence Volume (10 YR Storm) (cf)	33,106	8,250	23,233
Total Volume Required (cf)	68,888	17,690	51,877
Volumes Provided:			
Sediment Wet Volume (cf)	36,058	9,836	29,188
Residence Volume (10 YR Storm) (cf)	33,873	17,277	25,060
Total Volume Provided (cf)	69,931	27,113	54,248

Stage-Area-Storage for Pond B-1: B-1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
225.00	16,377	0	227.65	20,890	49,258
225.05	16,457	821	227.70	20,981	50,305
225.10	16,537	1,646	227.75	21,072	51,356
225.15	16,618	2,475	227.80	21,162	52,412
225.20	16,698	3,307	227.85	21,253	53,473
225.25	16,779	4,144	227.90	21,345	54,538
225.30	16,860	4,985	227.95	21,436	55,607
225.35	16,942	5,830	228.00	21,528	56,681
225.40	17,023	6,680	228.05	21,619	57,760
225.45	17,105	7,533	228.10	21,711	58,843
225.50	17,187	8,390	228.15	21,804	59,931
225.55	17,269	9,251	228.20	21,896	61,023
225.60	17,351	10,117	228.25	21,989	62,121
225.65	17,433	10,987	228.30	22,081	63,222
225.70	17,516	11,860	228.35	22,174	64,329
225.75	17,599	12,738	228.40	22,267	65,440
225.80	17,682	13,620	228.45	22,361	66,555
225.85	17,765	14,506	228.50	22,454	67,676
225.90	17,848	15,397	228.55	22,548	68,801
225.95	17,932	16,291	228.60	22,642	69,931
226.00	18,016	17,190	228.65	22,736	71,065
226.05	18,100	18,093	228.70	22,831	72,204
226.10	18,184	19,000	228.75	22,925	73,348
226.15	18,268	19,911	228.80	23,020	74,497
226.20	18,353	20,827	228.85	23,115	75,650
226.25	18,438	21,746	228.90	23,210	76,808
226.30	18,523	22,670	228.95	23,305	77,971
226.35	18,608	23,599	229.00	23,401	79,139
226.40	18,693	24,531	229.05	23,496	80,311
226.45	18,779	25,468	229.10	23,592	81,488
226.50	18,864	26,409	229.15	23,688	82,670
226.55	18,950	27,354	229.20	23,785	83,857
226.60	19,036	28,304	229.25	23,881	85,049
226.65	19,123	29,258	229.30	23,978	86,245
226.70	19,209	30,216	229.35	24,075	87,447
226.75	19,296	31,179	229.40	24,172	88,653
226.80	19,383	32,146	229.45	24,269	89,864
226.85	19,470	33,117	229.50	24,367	91,080
226.90	19,557	34,093	229.55	24,464	92,301
226.95	19,645	35,073	229.60	24,562	93,526
227.00	19,733	36,058	229.65	24,660	94,757
227.05	19,821	37,046	229.70	24,758	95,992
227.10	19,909	38,040	229.75	24,857	97,233
227.15	19,997	39,037	229.80	24,955	98,478
227.20	20,085	40,039	229.85	25,054	99,728
227.25	20,174	41,046	229.90	25,153	100,983
227.30	20,263	42,057	229.95	25,253	102,244
227.35	20,352	43,072	230.00	25,352	103,509
227.40	20,441	44,092			
227.45	20,531	45,116			
227.50	20,620	46,145			
227.55	20,710	47,178			
227.60	20,800	48,216			

Stage-Area-Storage for Pond B-2A: B-2A

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
230.50	9,198	0	233.15	12,800	29,017
230.55	9,260	461	233.20	12,874	29,659
230.60	9,323	926	233.25	12,948	30,304
230.65	9,386	1,394	233.30	13,022	30,953
230.70	9,449	1,865	233.35	13,096	31,606
230.75	9,512	2,339	233.40	13,171	32,263
230.80	9,576	2,816	233.45	13,246	32,923
230.85	9,640	3,296	233.50	13,321	33,588
230.90	9,704	3,780	233.55	13,396	34,256
230.95	9,768	4,267	233.60	13,471	34,927
231.00	9,832	4,757	233.65	13,547	35,603
231.05	9,897	5,250	233.70	13,623	36,282
231.10	9,962	5,746	233.75	13,699	36,965
231.15	10,027	6,246	233.80	13,775	37,652
231.20	10,092	6,749	233.85	13,851	38,342
231.25	10,157	7,255	233.90	13,928	39,037
231.30	10,223	7,765	233.95	14,005	39,735
231.35	10,289	8,278	234.00	14,082	40,437
231.40	10,355	8,794	234.05	14,159	41,143
231.45	10,421	9,313	234.10	14,237	41,853
231.50	10,488	9,836	234.15	14,314	42,567
231.55	10,554	10,362	234.20	14,392	43,285
231.60	10,621	10,891	234.25	14,470	44,006
231.65	10,688	11,424	234.30	14,549	44,732
231.70	10,756	11,960	234.35	14,627	45,461
231.75	10,823	12,500	234.40	14,706	46,194
231.80	10,891	13,042	234.45	14,785	46,932
231.85	10,959	13,589	234.50	14,864	47,673
231.90	11,027	14,138			
231.95	11,096	14,691			
232.00	11,164	15,248			
232.05	11,233	15,808			
232.10	11,302	16,371			
232.15	11,371	16,938			
232.20	11,441	17,508			
232.25	11,510	18,082			
232.30	11,580	18,659			
232.35	11,650	19,240			
232.40	11,721	19,824			
232.45	11,791	20,412			
232.50	11,862	21,003			
232.55	11,933	21,598			
232.60	12,004	22,197			
232.65	12,075	22,799			
232.70	12,147	23,404			
232.75	12,219	24,013			
232.80	12,291	24,626			
232.85	12,363	25,242			
232.90	12,435	25,862			
232.95	12,508	26,486			
233.00	12,581	27,113			
233.05	12,654	27,744			
233.10	12,727	28,379			

Stage-Area-Storage for Pond B-2B: B-2B

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
228.00	11,703	0	230.65	17,522	38,464
228.05	11,802	588	230.70	17,643	39,344
228.10	11,901	1,180	230.75	17,764	40,229
228.15	12,001	1,778	230.80	17,886	41,120
228.20	12,101	2,380	230.85	18,008	42,017
228.25	12,202	2,988	230.90	18,131	42,921
228.30	12,303	3,601	230.95	18,254	43,831
228.35	12,404	4,218	231.00	18,378	44,746
228.40	12,506	4,841	231.05	18,502	45,668
228.45	12,609	5,469	231.10	18,626	46,597
228.50	12,711	6,102	231.15	18,751	47,531
228.55	12,814	6,740	231.20	18,876	48,472
228.60	12,918	7,383	231.25	19,002	49,419
228.65	13,022	8,032	231.30	19,128	50,372
228.70	13,126	8,685	231.35	19,254	51,331
228.75	13,231	9,344	231.40	19,381	52,297
228.80	13,336	10,009	231.45	19,508	53,269
228.85	13,442	10,678	231.50	19,636	54,248
228.90	13,548	11,353	231.55	19,764	55,233
228.95	13,654	12,033	231.60	19,893	56,225
229.00	13,761	12,718	231.65	20,022	57,222
229.05	13,869	13,409	231.70	20,151	58,227
229.10	13,976	14,105	231.75	20,281	59,238
229.15	14,084	14,807	231.80	20,411	60,255
229.20	14,193	15,514	231.85	20,542	61,279
229.25	14,302	16,226	231.90	20,673	62,309
229.30	14,411	16,944	231.95	20,804	63,346
229.35	14,521	17,667	232.00	20,936	64,389
229.40	14,631	18,396	232.05	21,068	65,440
229.45	14,742	19,130	232.10	21,201	66,496
229.50	14,853	19,870	232.15	21,334	67,560
229.55	14,964	20,616	232.20	21,468	68,630
229.60	15,076	21,367	232.25	21,602	69,706
229.65	15,189	22,123	232.30	21,736	70,790
229.70	15,301	22,885	232.35	21,871	71,880
229.75	15,414	23,653	232.40	22,006	72,977
229.80	15,528	24,427	232.45	22,142	74,081
229.85	15,642	25,206	232.50	22,278	75,191
229.90	15,756	25,991	232.55	22,414	76,308
229.95	15,871	26,782	232.60	22,551	77,433
230.00	15,986	27,578	232.65	22,688	78,564
230.05	16,102	28,380	232.70	22,826	79,701
230.10	16,218	29,188	232.75	22,964	80,846
230.15	16,334	30,002	232.80	23,103	81,998
230.20	16,451	30,822	232.85	23,242	83,156
230.25	16,569	31,647	232.90	23,381	84,322
230.30	16,686	32,479	232.95	23,521	85,495
230.35	16,804	33,316	233.00	23,661	86,674
230.40	16,923	34,159			
230.45	17,042	35,008			
230.50	17,161	35,863			
230.55	17,281	36,724			
230.60	17,401	37,591			

SEDIMENT REMOVAL EFFICIENCY PER DRAINAGE AREA
FOR
ELLINGTON SOLAR
277 SADDS MILL RD, ELLINGTON, CT

TSS Removal Calculations for PDA-1A				
"A"	"B"	"C"	"D"	"E"
Proposed Sediment Removal BMP	TSS Removal Rate	Starting TSS Load	Amount Removed (D*E)	Remaining Load (C-D)
Compost Filter Sock	40%	100%	40%	60%
Sediment Basin w/ Baffles	85%	60%	51%	9%

Total TSS Removal for PDA-1A = 91%

TSS Removal Calculations for PDA-1B				
"A"	"B"	"C"	"D"	"E"
Proposed Sediment Removal BMP	TSS Removal Rate	Starting TSS Load	Amount Removed (D*E)	Remaining Load (C-D)
Compost Filter Sock	40%	100%	40%	60%
Sediment Basin w/ Baffles	85%	60%	51%	9%

Total TSS Removal for PDA-1B = 91%

TSS Removal Calculations for PDA-2A				
"A"	"B"	"C"	"D"	"E"
Proposed Sediment Removal BMP	TSS Removal Rate	Starting TSS Load	Amount Removed (D*E)	Remaining Load (C-D)
Compost Filter Sock	40%	100%	40%	60%
Sediment Basin w/ Baffles	85%	60%	51%	9%

Total TSS Removal for PDA-2A = 91%

WATER QUALITY VOLUME CALCULATIONS
FOR
ELLINGTON SOLAR
277 SADDIS MILL RD, ELLINGTON, CT

$$WQV = \frac{(1")(R)(A)}{12}$$

$$V = WQV + ((P)(A_b)/12)$$

where: WQV = water quality volume (ac-ft) V =required basin storage volume (ac-ft)
 R = volumetric runoff coefficient WQV =Water Quality Volume (ac-ft)
 $= 0.05+0.009(I)$ P = design water quality precipitation (in)
 I = percent impervious cover A_b =basin surface area (ac)
 A = site area in acres

	Area (ac)	Pervious (ac)	Imperv. (ac)	I	R	WQV (ac-ft)	P (in)	Ab (ac)	V (ac-ft)	Total V Req. (cf)	V Provided (cf)
Overall Site	85.72	85.69	0.03	0%	0.05	0.36	n/a	n/a	n/a	15,647.60	-
B-1	18.17	18.17	-	0%	0.05	0.08	1	0.266531	0.10	4,265.49	4,985.00
B-2A	4.73	4.73	-	0%	0.05	0.02	1	0.266531	0.04	1,826.87	1,865.00
B-2B	14.55	14.52	0.03	0%	0.05	0.06	1	0.266531	0.08	3,697.60	4,841.00

Overall Total V Required = 9,789.96 cf

Overall Total V Provided = 11,691.00 cf