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WATER DEVELOPMENT
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PERMITTING
GPS/GIS

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Napa, California 94558
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MEMORANDUM

Date: November 9, 2023

To: Raulton Haye, Napa County Planning, Building, and Environmental Services

From: Matthew S. Bueno, P.E.
Rachel L. Rosasco, E.I.T.



Re: Boisset Wappo Hill Track I ECP
APN 039-040-042
Hydrologic Analysis

This memo transmits the findings of a hydrologic analysis for the above-referenced Track I Erosion Control Plan (ECP). HydroCAD software was used to estimate pre- and post-project runoff from watersheds containing the proposed development areas. The software uses the Natural Resource Conservation Service (NRCS) TR-20 method to calculate runoff. The analysis uses the Type IA 24-hr storm distribution and includes site-specific National Oceanic and Atmospheric Administration (NOAA) point precipitation data for the ranch.

Two (2) watersheds and two (2) subareas were delineated for the hydrologic modeling using 2-foot contours from PPI Engineering and 5-foot contours from Napa County Lidar data. Watershed 1 encompasses approximately 44.7 acres and is divided into four subwatersheds which eventually drain to Outlet 1 located at the ditch running adjacent to Silverado Trail. Watershed 2 is approximately 67.7 acres and is divided into four subwatersheds draining into an existing surface drainage system acting as Outlet 2. Subareas 3 and 4, which are 5.2 and 2.1 acres respectively, were analyzed using a curve number analysis given their relatively small acreage. Please see the attached figures for the location of each watershed and subarea.

Soils within the watersheds were obtained from the NRCS Web Soil Survey and are classified as the following:

Bale clay loam, 0-2% Slopes (Map Unit Symbol 104)
Bale clay loam, 2-5% Slopes (Map Unit Symbol 105)
Boomer gravelly loam, volcanic bedrock, 14-60% Slopes (Map Unit Symbol 109)
Perkins gravelly loam, 5-9% Slopes (Map Unit Symbol 169)
Sobrante loam, 5-30% Slopes (Map Unit Symbol 178)
Sobrante loam, 30-50% Slopes (Map Unit Symbol 179)

The Bale clay loams (104 & 105) are classified as Hydrologic Soil Group (HSG) B. The Boomer gravelly loam (109), Perkins gravelly loam (169), and the Sobrante loams (178 & 179) are classified as HSG C. Additionally, there was a small area with map unit symbol 183 which is water that was modeled using HSG D. Please see the attached figures for soil type delineations within the vicinity of each watershed.

Land use areas were delineated based on a combination of Napa County orthophotos and site visits. A site visit was conducted on September 27, 2023 by Matt Bueno of PPI Engineering to ground truth the orthophotos and determine the existing land use conditions. The land use hydrologic conditions were classified based on the respective covers as poor (less than 50% cover), fair (50%-75% cover), or good (greater than or equal to 75% cover). The HydroCAD software analyzes the land use data along with the corresponding soil HSGs to determine a weighted Curve Number (CN) for runoff calculations. The majority of the property has been historically managed with grazing for fire protection. The pre-project condition of the grassed areas that are proposed to be converted to vineyard and were grazed were classified as Annual Grass in fair condition. The land use classification of Annual Grass is based upon the NRCS Engineering Field Manual Chapter 2, Supplement 1 definition. The wooded areas were classified as Woods in fair or good condition depending on the observed density of the vegetation at the time of the site visit. The post-project condition within the proposed vineyard will be classified as good (based on the proposed cover in the ECP). Please see the attached figures for existing and proposed land use delineations.

The Time of Concentration (Tc) flow paths within each subwatershed of Watersheds 1 and 2 were determined using PPI Engineering and Napa County contours. The flow paths were drafted from the hydrologically most distant point (longest travel time) in the subwatershed to the subwatershed outlet per NRCS standards. The subwatersheds for each overall watershed routed through internal reaches in the HydroCAD model to the respective outlet. Please see the attached figures for both the pre- and post-project Tc flow paths as well as the internal reaches for the watersheds.

Subareas 3 and 4 were evaluated by comparing pre-project to post-project Curve Numbers. Subareas 3 and 4 are each located on a ridge top at or near the watershed break. A change in curve number is directly correlated to a change in runoff at this small scale. A higher post-project curve number indicates a higher runoff potential. As a result, these two subareas were not modeled as a complete watershed and do not have a Tc flow paths or runoff predictions.

Pre- and post-project runoff calculations from the HydroCAD models for the subwatersheds of Watershed 1 and 2 along with their respective outlets are summarized in Table 1. Runoff was calculated for the 2-, 10-, 50- and 100-year storms respectively for each watershed and for the modeled outlets. In Table 2, the Curve Number analysis for Subareas 3 and 4 is summarized.

Table 1. Individual Watershed Summary

	Runoff (cfs)														
	Watershed 1A			Watershed 1B			Watershed 1C			Watershed 1D			Outlet 1		
	Pre-Project	Post-Project	Increase/Decrease	Pre-Project	Post-Project	Increase/Decrease	Pre-Project	Post-Project	Increase/Decrease	Pre-Project	Post-Project	Increase/Decrease	Pre-Project	Post-Project	Increase/Decrease
2-Year Storm	1.53	1.53	0.00	2.88	2.88	0.00	3.20	3.20	0.00	1.92	1.92	0.00	9.26	9.26	0.00
10-Year Storm	4.94	4.94	0.00	6.76	6.76	0.00	7.45	7.45	0.00	4.35	4.35	0.00	23.23	23.23	0.00
50-Year Storm	9.20	9.20	0.00	11.21	11.21	0.00	12.30	12.30	0.00	7.08	7.08	0.00	39.53	39.53	0.00
100-Year Storm	11.14	11.14	0.00	13.16	13.16	0.00	14.44	14.44	0.00	8.28	8.28	0.00	46.76	46.76	0.00

	Runoff (cfs)														
	Watershed 2A			Watershed 2B			Watershed 2C			Watershed 2D			Outlet 2		
	Pre-Project	Post-Project	Increase/Decrease	Pre-Project	Post-Project	Increase/Decrease	Pre-Project	Post-Project	Increase/Decrease	Pre-Project	Post-Project	Increase/Decrease	Pre-Project	Post-Project	Increase/Decrease
2-Year Storm	2.15	2.17	0.02	4.07	4.07	0.00	2.17	1.91	0.26	5.39	4.99	0.40	9.22	8.08	1.14
10-Year Storm	5.34	5.37	0.03	8.91	8.91	0.00	6.79	6.38	0.41	13.92	13.11	0.81	25.60	23.32	2.28
50-Year Storm	9.07	9.11	0.04	14.33	14.33	0.00	12.50	11.97	0.53	23.99	22.73	1.26	45.45	42.13	3.32
100-Year Storm	10.71	10.77	0.06	16.69	16.69	0.00	15.09	14.52	0.57	28.46	27.03	1.43	54.39	50.67	3.72

Table 2. Curve Number Analysis Summary

	Subarea 3			Subarea 4		
	Pre-Project	Post-Project	Increase/Decrease	Pre-Project	Post-Project	Increase/Decrease
Curve Number	77	77	0	75	75	0

Watershed 1 had no changes in CN or Tc from pre- to post-project in any of the subwatersheds and therefore saw no changes in net runoff.

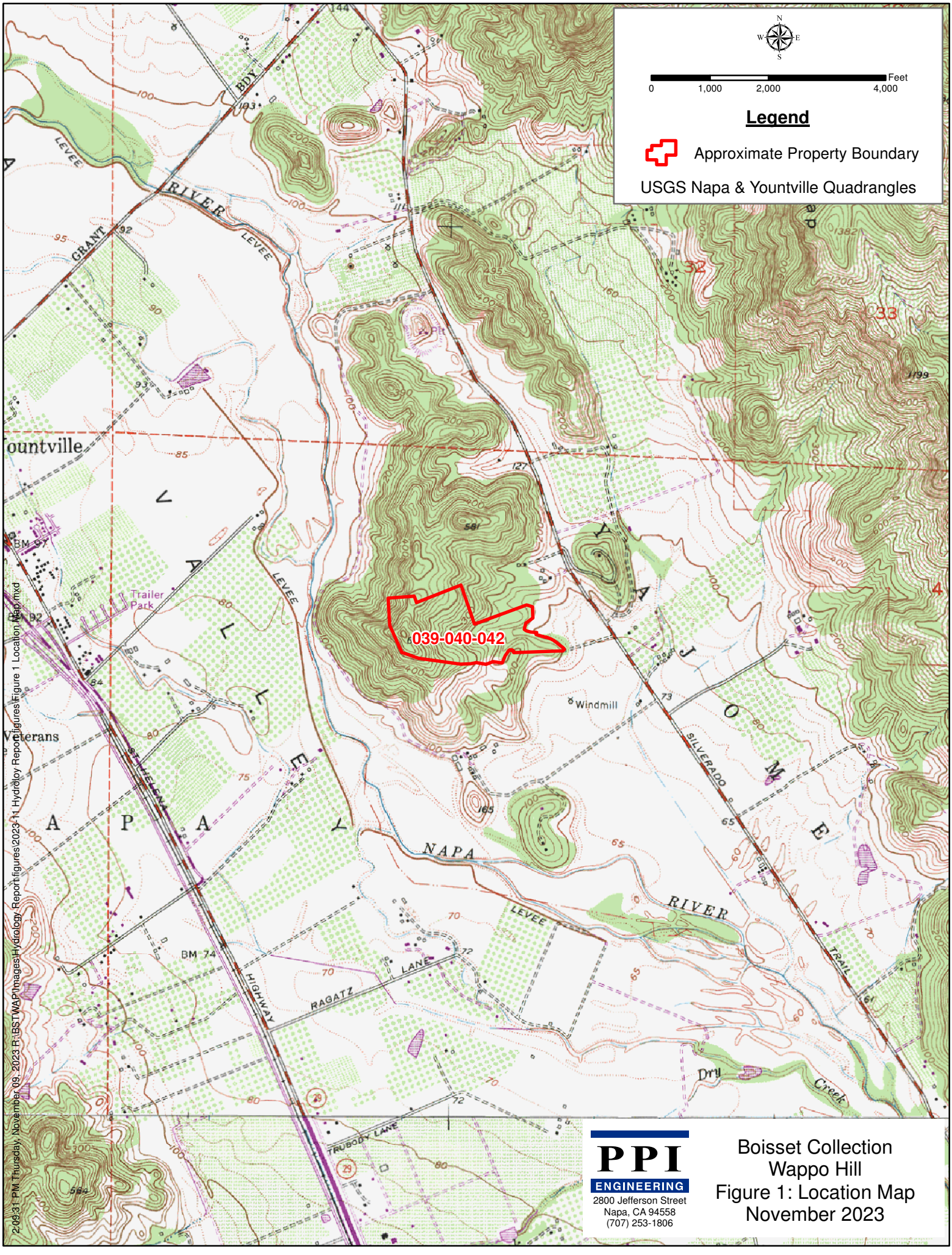
Watershed 2 exhibits a decrease in Tc for subwatershed 2A which results in a slight increase in predicted runoff for this individual subwatershed. A decrease in CN for subwatershed 2C as well as an increase in Tc as a result of a pipe level spreader in subwatershed 2D results in net decreases in these individual subwatersheds. The predicted increase in subwatershed 2A will be offset by the upstream decreases in subwatersheds 2C and 2D. The model results yield a net decrease in runoff at the outlet of watershed 2.

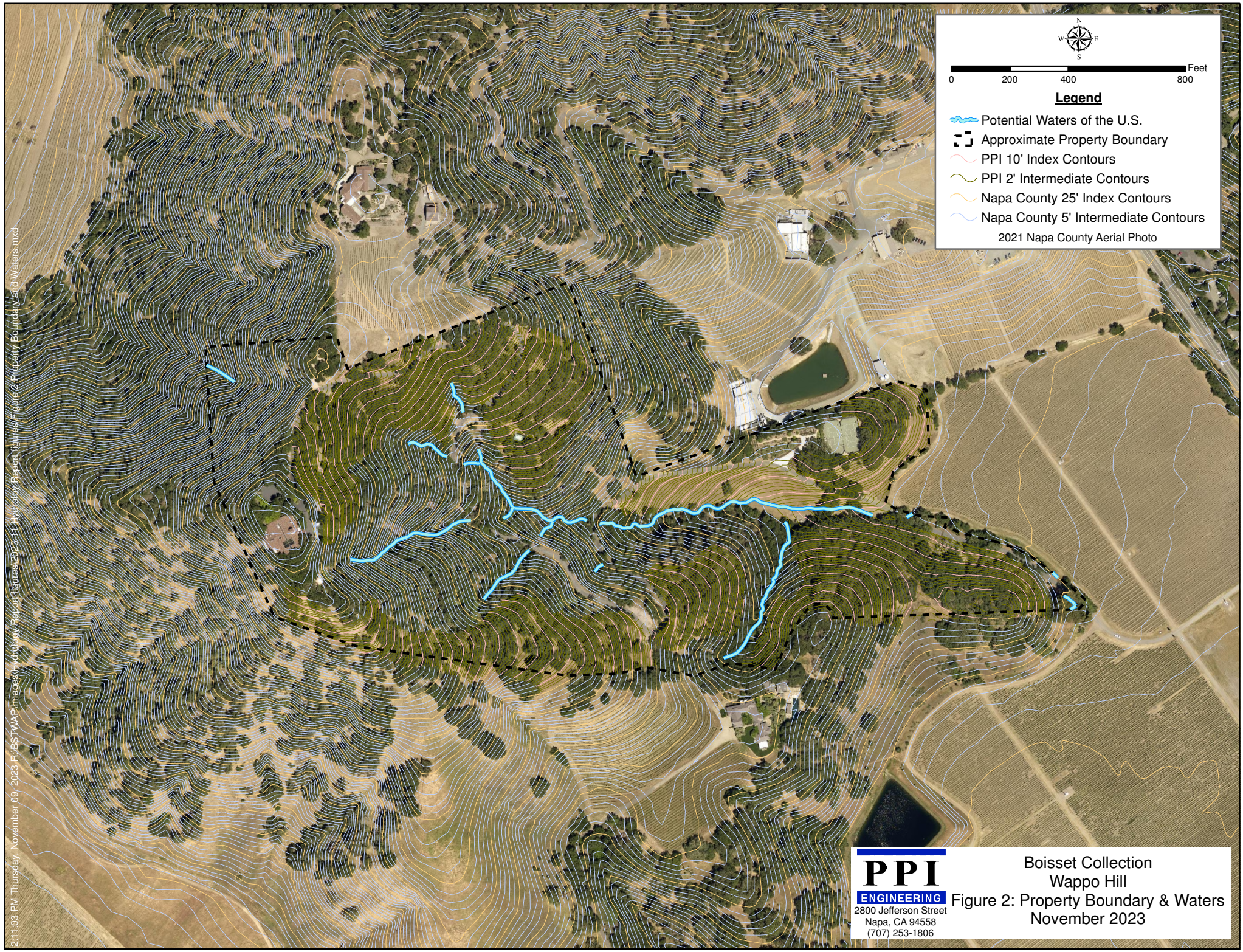
Subareas 3 and 4 saw no change in CN as a part of the Curve Number Analysis and therefore no net changes in runoff are anticipated.

Please see the attached HydroCAD analyses for inputs, details, and summaries of the hydrologic modeling. Based on our analysis, there are no predicted overall net runoff increases, and no negative hydrologic impacts are expected as a result of this project. The project as proposed is in compliance with Napa County's General Plan policy requiring no-net-increase in runoff.

ATTACHMENT A

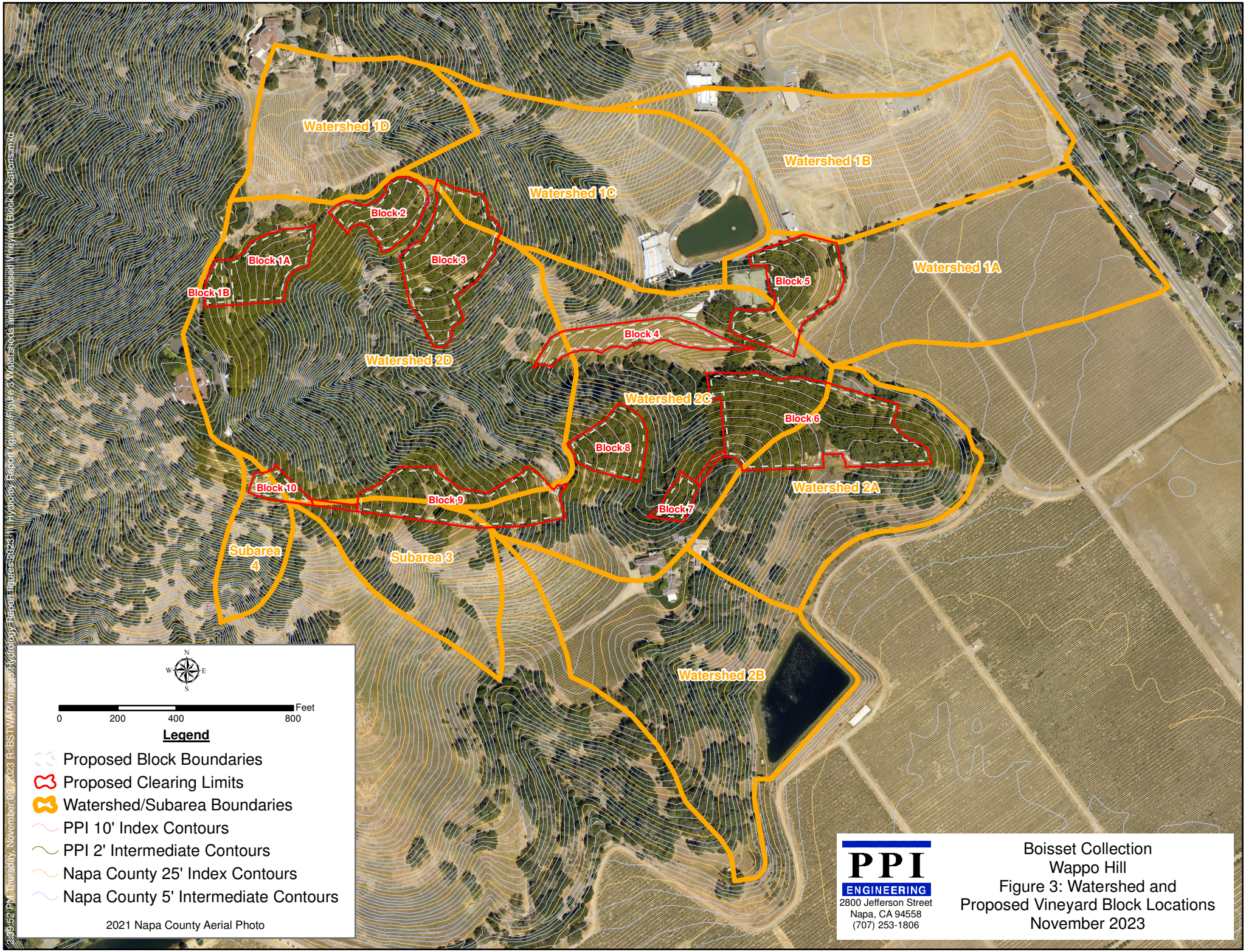
SUPPORTING FIGURES

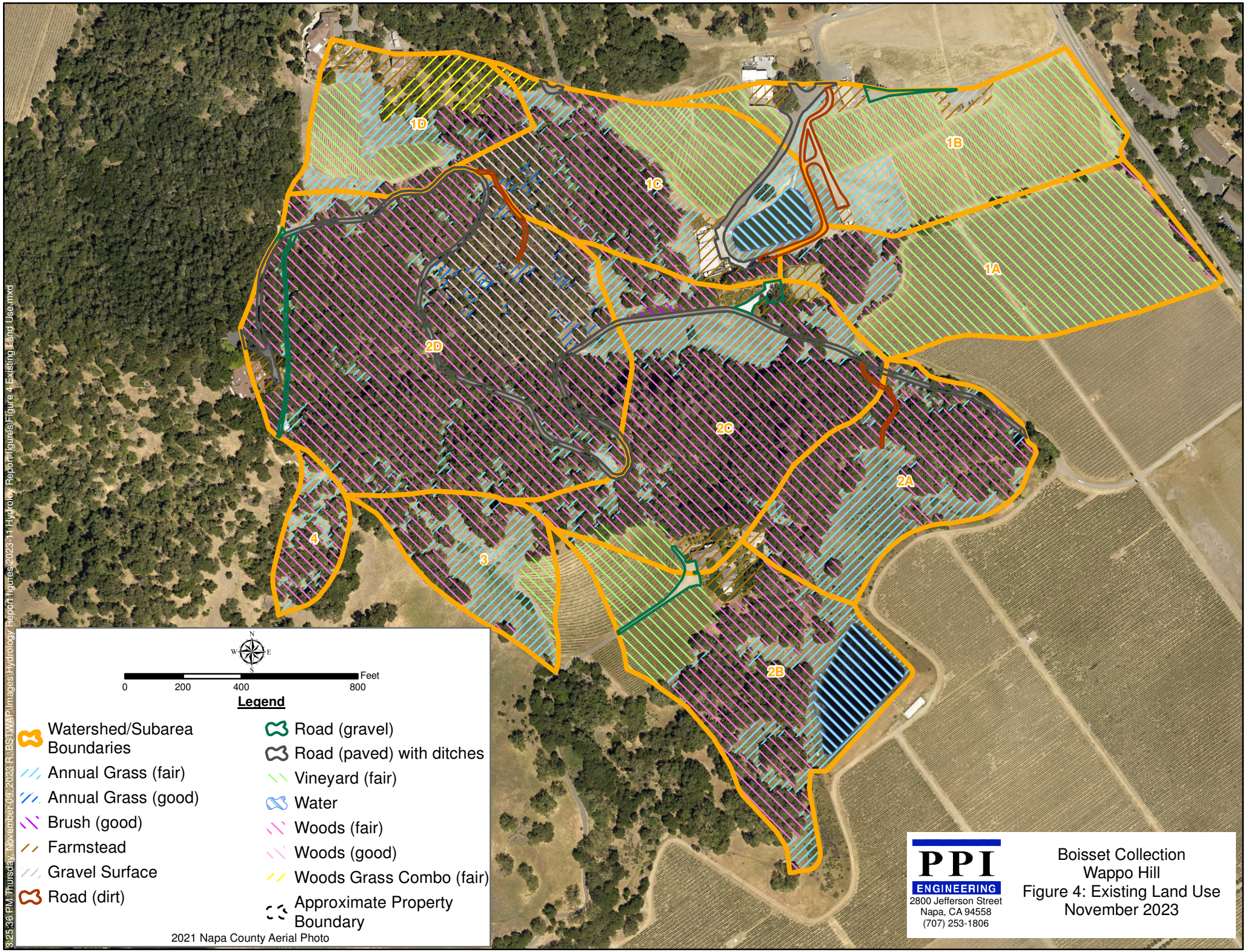

N
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Approximate Property Boundary
USGS Napa & Yountville Quadrangles
039-040-042
RIVER
LEVEE
GRANT
NAPA
RIVER
Windmill
Trailer Park
Veterans
HIGHWAY
RAGATZ
LANE
TRUBODY LANE
SILVERADO
TRAIL
Dry
Creek
BM 74
BM 97
BM 92
Pit
32
33
4
29
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Boisset Collection
Wappo Hill
Figure 1: Location Map
November 2023
2:09:31 PM Thursday, November 09, 2023 R:\BSTWAP\Images\Hydrology Report figures\2023-11 Hydrology Report figures\Figure 1 Location Map.mxd

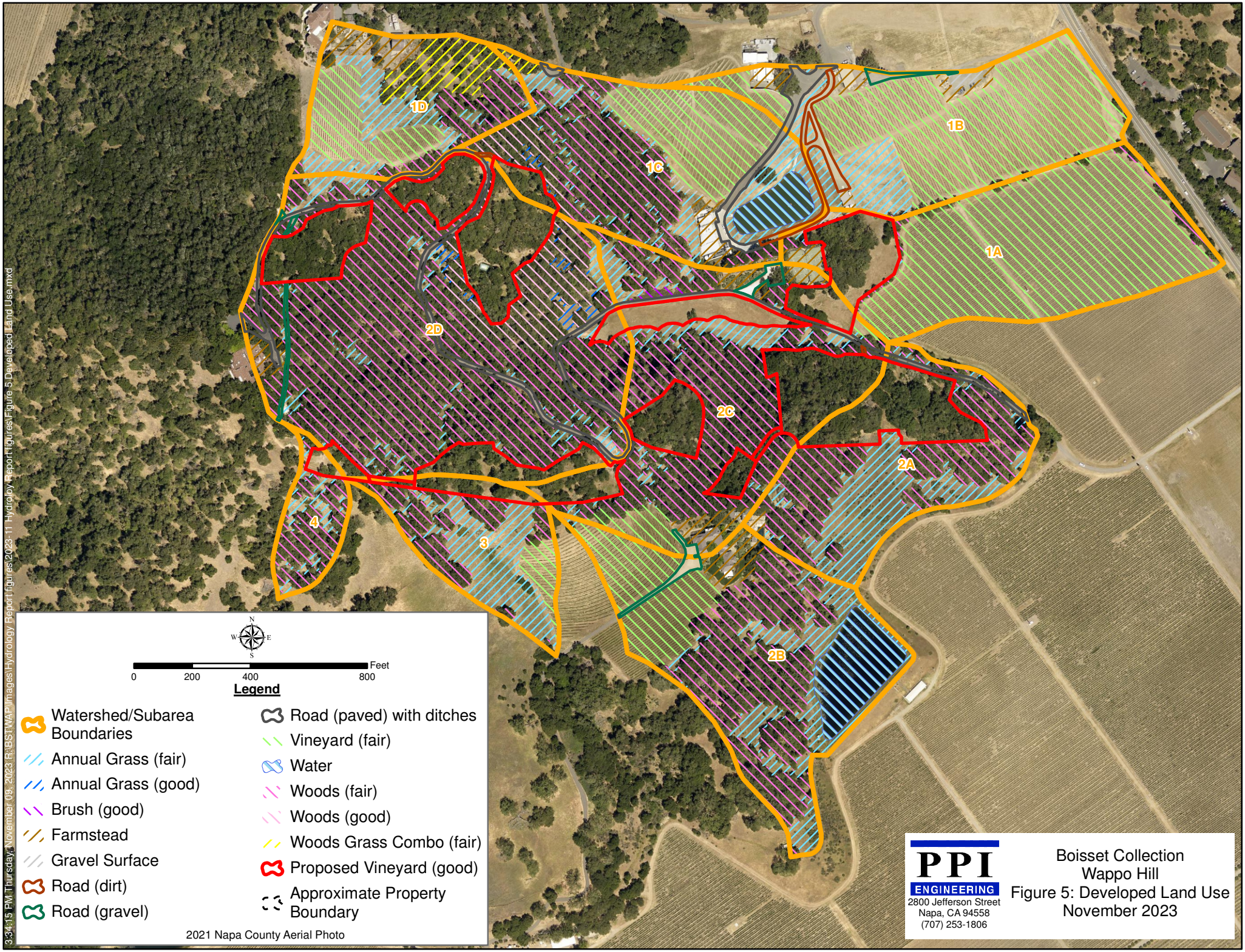


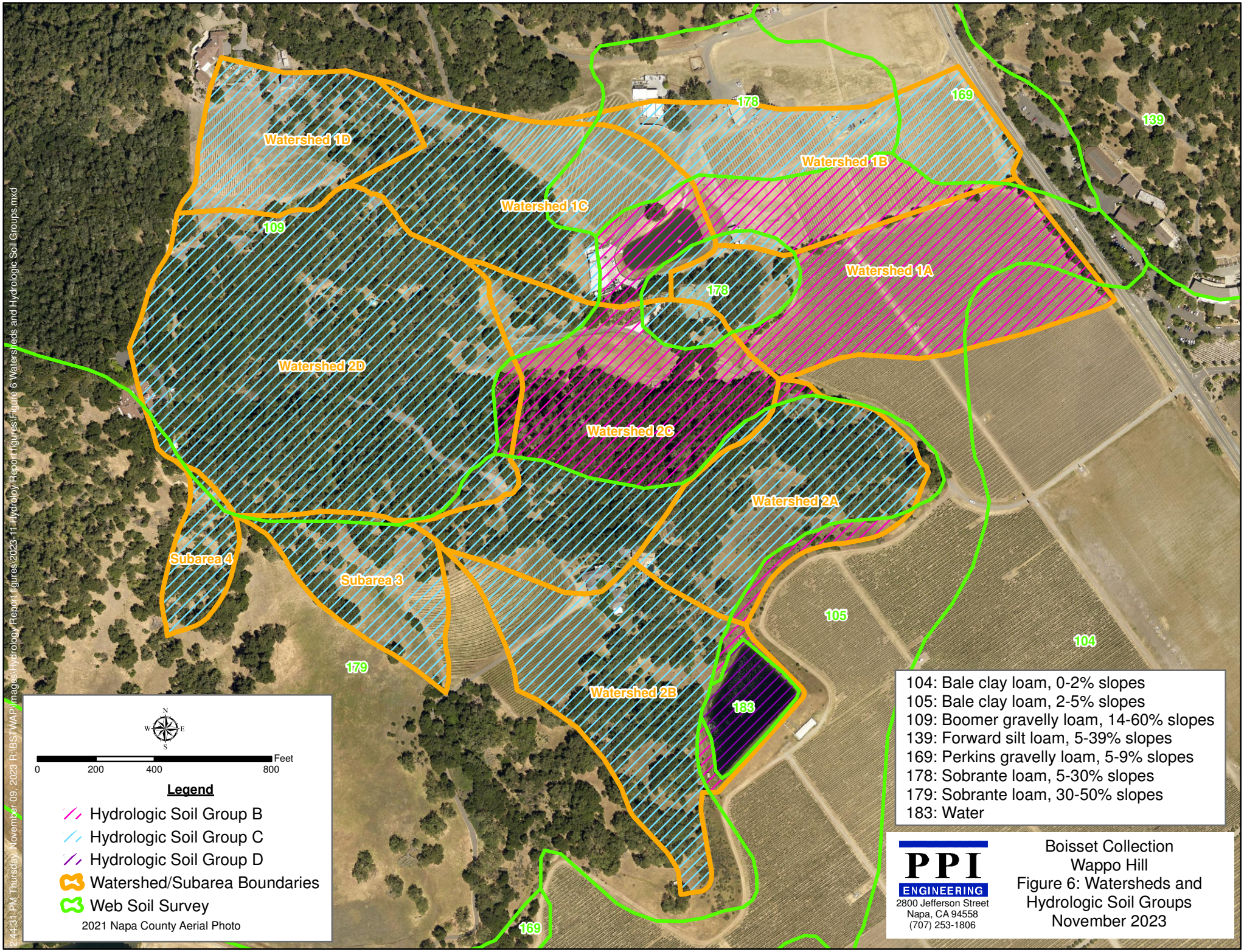
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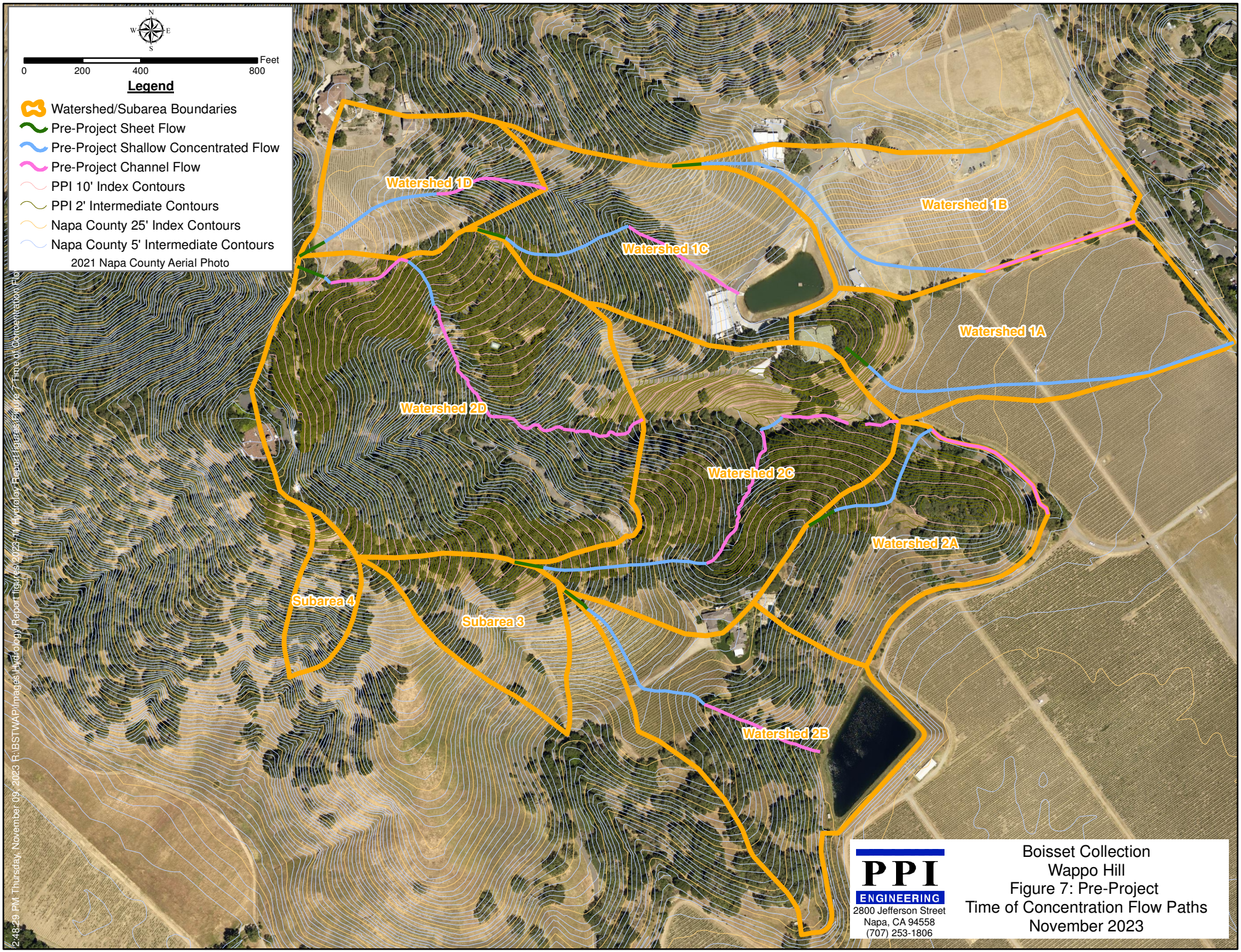
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Wappo Hill
Figure 2: Property Boundary & Waters
November 2023

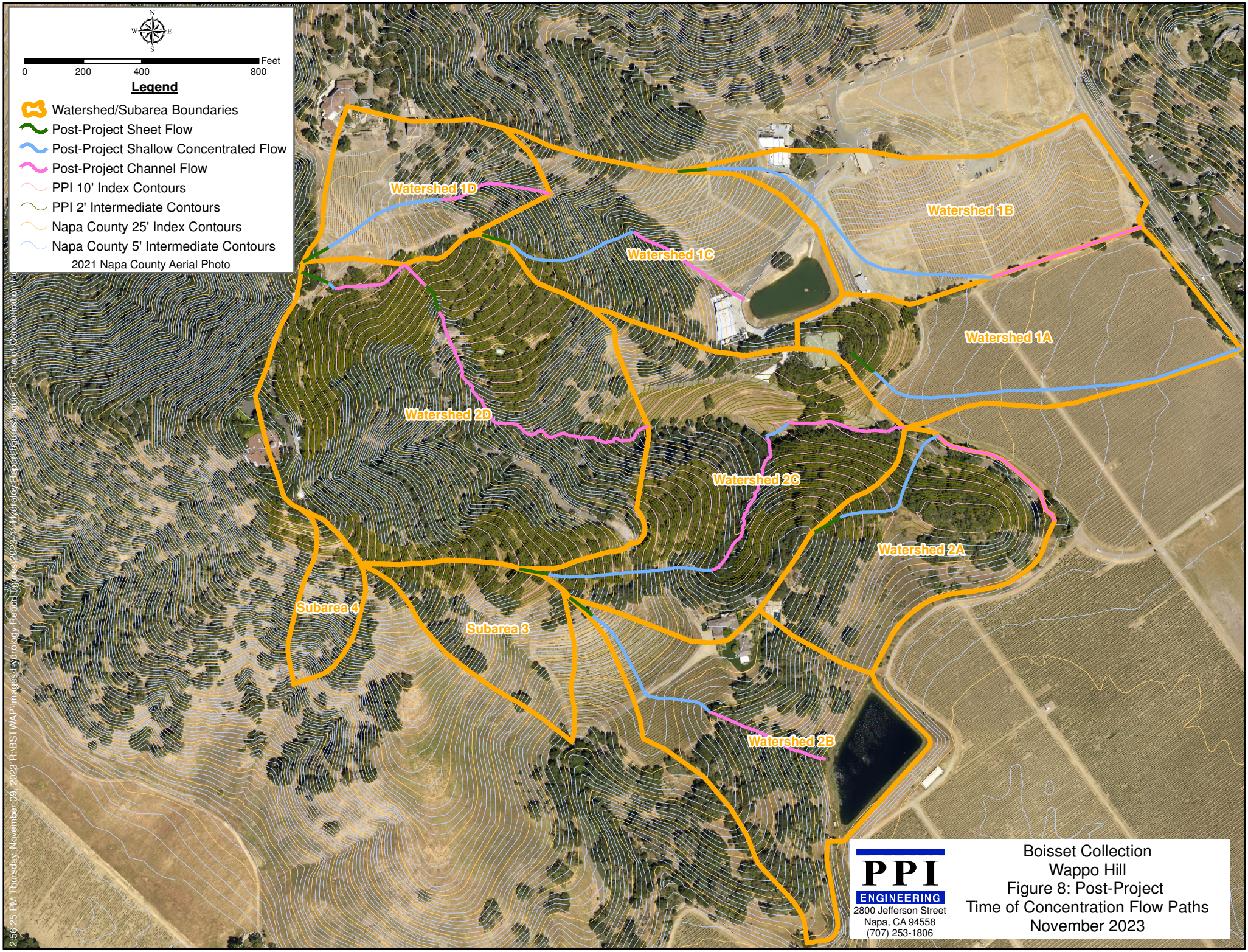

Watershed 1D
Watershed 1B
Watershed 1C
Watershed 1A
Block 2
Block 1A
Block 3
Block 1B
Block 5
Block 4
Watershed 2D
Watershed 2C
Block 6
Block 8
Block 10
Block 9
Block 7
Watershed 2A
Subarea 4
Subarea 3
Watershed 2B
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Feet
Legend
Proposed Block Boundaries
Proposed Clearing Limits
Watershed/Subarea Boundaries
PPI 10' Index Contours
PPI 2' Intermediate Contours
Napa County 25' Index Contours
Napa County 5' Intermediate Contours
2021 Napa County Aerial Photo
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Figure 3: Watershed and
Proposed Vineyard Block Locations
November 2023
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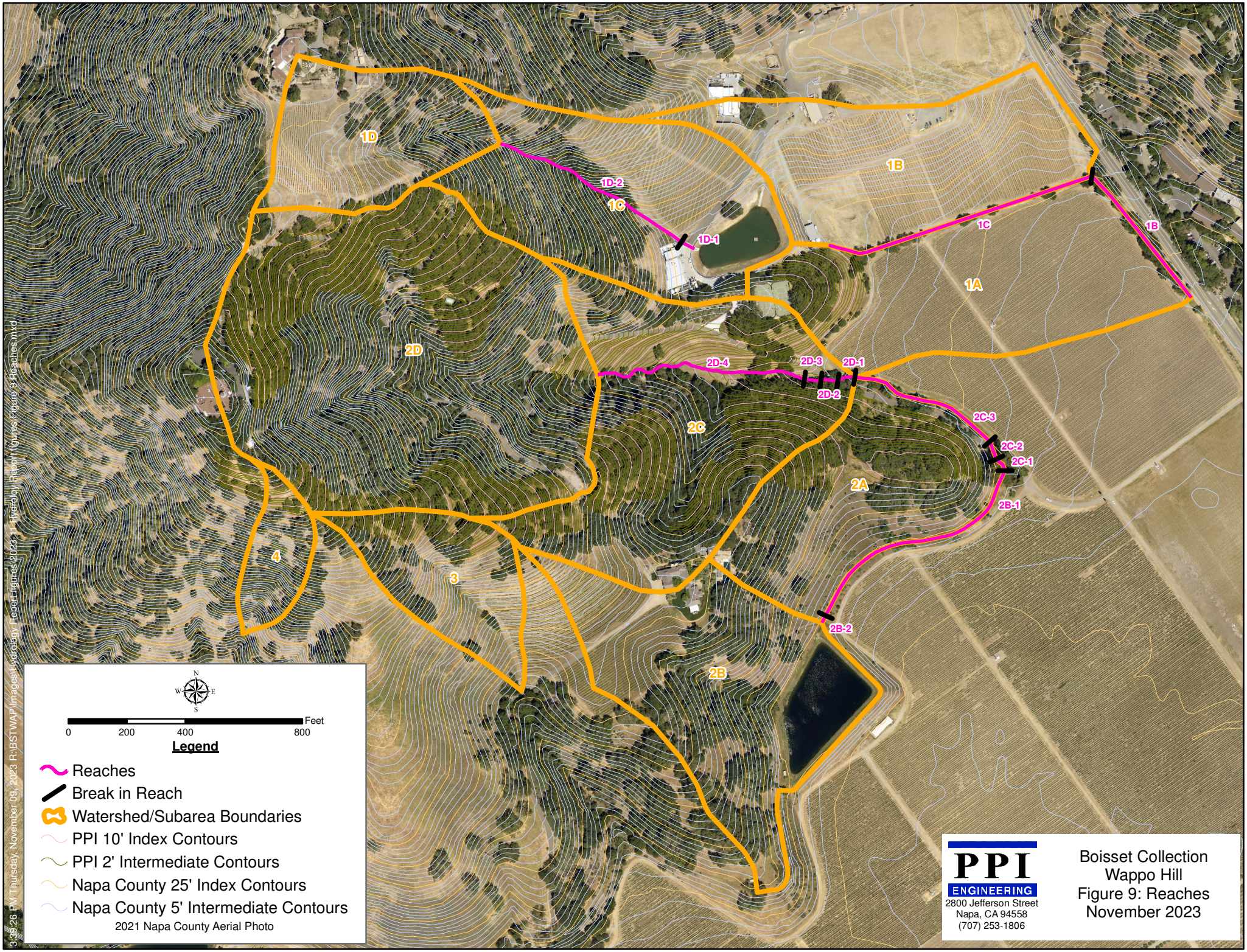

1D
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2D
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Feet
Legend
Watershed/Subarea Boundaries
Annual Grass (fair)
Annual Grass (good)
Brush (good)
Farmstead
Gravel Surface
Road (dirt)
Road (gravel)
Road (paved) with ditches
Vineyard (fair)
Water
Woods (fair)
Woods (good)
Woods Grass Combo (fair)
Approximate Property Boundary
2021 Napa County Aerial Photo
3:25:36 PM Thursday, November 09, 2023 R:\BS1\WAP\Images\Hydrology Report figures\2023-11 Hydrology Report figures\Figure 4 Existing Land Use.mxd
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Figure 4: Existing Land Use
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1D
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Watershed/Subarea Boundaries
Annual Grass (fair)
Annual Grass (good)
Brush (good)
Farmstead
Gravel Surface
Road (dirt)
Road (gravel)
Road (paved) with ditches
Vineyard (fair)
Water
Woods (fair)
Woods (good)
Woods Grass Combo (fair)
Proposed Vineyard (good)
Approximate Property Boundary
2021 Napa County Aerial Photo
3:34:15 PM Thursday, November 09, 2023 R:\BST\WAP\Images\Hydrology Report figures\2023-11 Hydrology Report figures\Figure 5 Developed Land Use.mxd
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Figure 5: Developed Land Use
November 2023


Watershed 1D
Watershed 1C
Watershed 1B
Watershed 1A
Watershed 2D
Watershed 2C
Watershed 2A
Watershed 2B
Subarea 4
Subarea 3
178
169
139
109
178
105
104
179
183
169
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Feet
Legend
Hydrologic Soil Group B
Hydrologic Soil Group C
Hydrologic Soil Group D
Watershed/Subarea Boundaries
Web Soil Survey
2021 Napa County Aerial Photo
104: Bale clay loam, 0-2% slopes
105: Bale clay loam, 2-5% slopes
109: Boomer gravelly loam, 14-60% slopes
139: Forward silt loam, 5-39% slopes
169: Perkins gravelly loam, 5-9% slopes
178: Sobrante loam, 5-30% slopes
179: Sobrante loam, 30-50% slopes
183: Water
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Figure 6: Watersheds and
Hydrologic Soil Groups
November 2023
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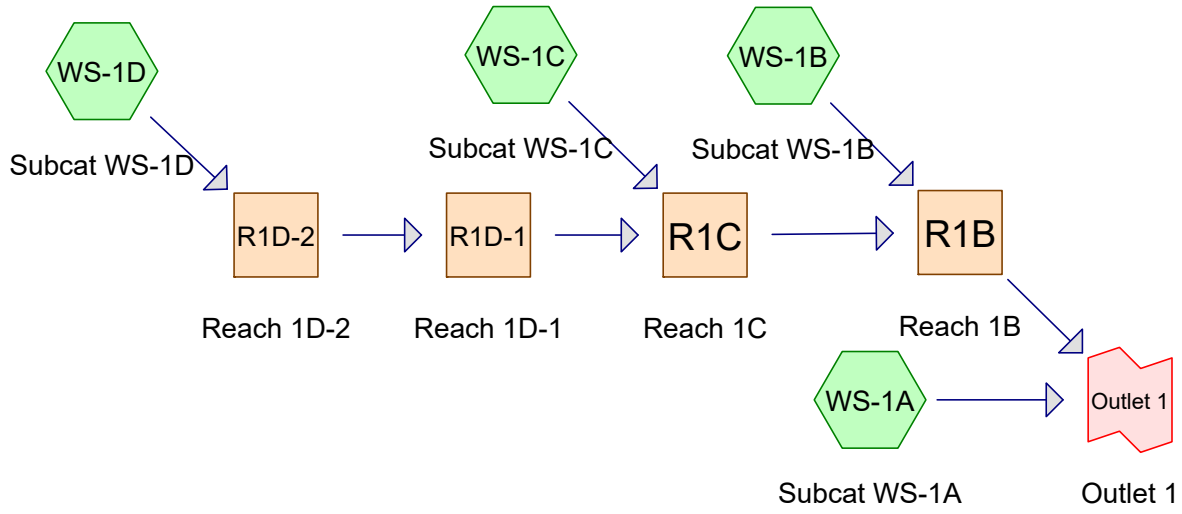

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Watershed/Subarea Boundaries
Pre-Project Sheet Flow
Pre-Project Shallow Concentrated Flow
Pre-Project Channel Flow
PPI 10' Index Contours
PPI 2' Intermediate Contours
Napa County 25' Index Contours
Napa County 5' Intermediate Contours
2021 Napa County Aerial Photo
Watershed 1D
Watershed 1C
Watershed 1B
Watershed 1A
Watershed 2D
Watershed 2C
Watershed 2A
Watershed 2B
Subarea 4
Subarea 3
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Figure 7: Pre-Project
Time of Concentration Flow Paths
November 2023

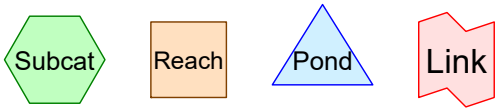

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Legend
Watershed/Subarea Boundaries
Post-Project Sheet Flow
Post-Project Shallow Concentrated Flow
Post-Project Channel Flow
PPI 10' Index Contours
PPI 2' Intermediate Contours
Napa County 25' Index Contours
Napa County 5' Intermediate Contours
2021 Napa County Aerial Photo
Watershed 1D
Watershed 1C
Watershed 1B
Watershed 1A
Watershed 2D
Watershed 2C
Watershed 2A
Watershed 2B
Subarea 4
Subarea 3
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Figure 8: Post-Project
Time of Concentration Flow Paths
November 2023
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1D
1B
1D-2
1C
1D-1
1C
1B
1A
2D
2D-4
2D-3
2D-1
2D-2
2C-3
2C
2C-2
2C-1
2A
2B-1
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2B-2
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Reaches
Break in Reach
Watershed/Subarea Boundaries
PPI 10' Index Contours
PPI 2' Intermediate Contours
Napa County 25' Index Contours
Napa County 5' Intermediate Contours
2021 Napa County Aerial Photo
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Figure 9: Reaches
November 2023

ATTACHMENT B

HYDROCAD ANALYSES





Routing Diagram for Wappo Hill Pre-Project WS1
Prepared by PPI Engineering, Printed 11/9/2023
HydroCAD® 10.20-3c s/n 09429 © 2023 HydroCAD Software Solutions LLC

Summary for Subcatchment WS-1A: Subcat WS-1A

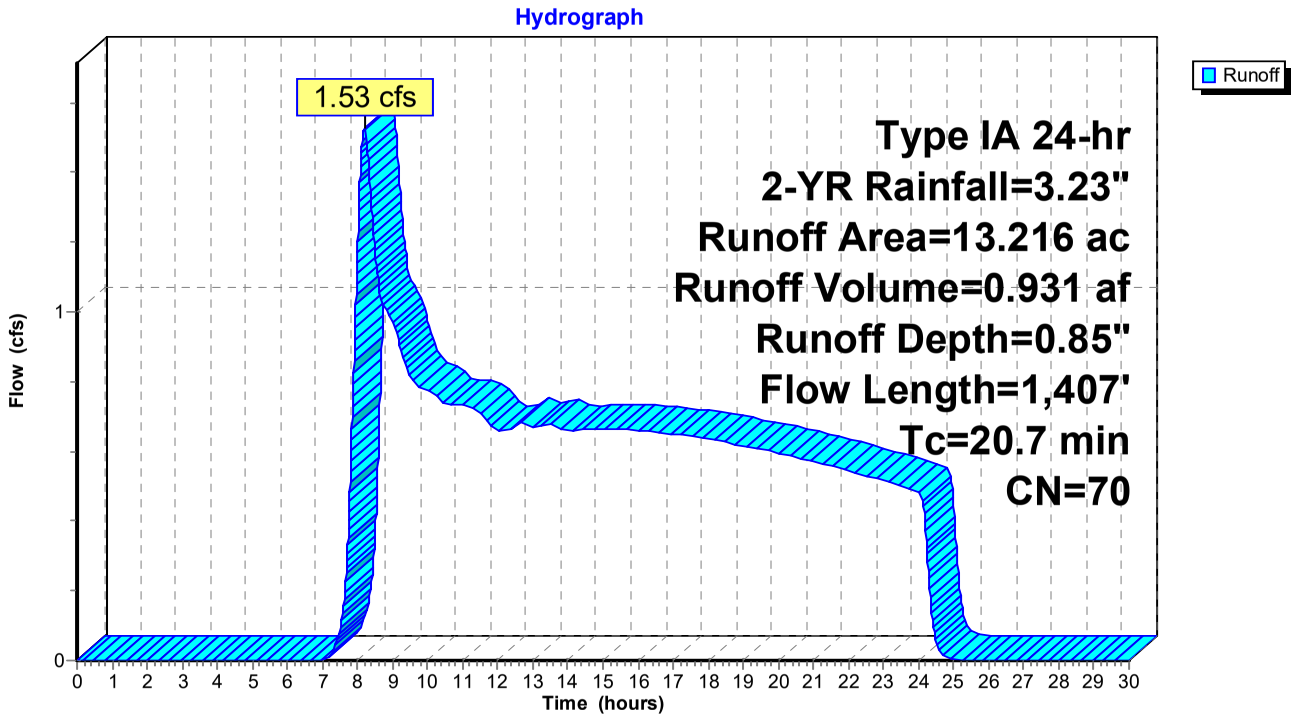
Runoff = 1.53 cfs @ 8.19 hrs, Volume= 0.931 af, Depth= 0.85"
Routed to Link Outlet 1 : Outlet 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-YR Rainfall=3.23"

Area (ac)	CN	Description
0.093	69	Annual Grass, Fair, HSG B
0.460	79	Annual Grass, Fair, HSG C
0.036	87	Dirt roads, HSG C
0.258	82	Farmsteads, HSG C
0.102	96	Gravel surface, HSG C
10.681	69	Vineyard, Fair, HSG B
0.062	79	Vineyard, Fair, HSG C
0.400	60	Woods, Fair, HSG B
1.123	73	Woods, Fair, HSG C
13.216	70	Weighted Average
13.216		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	100	0.2600	0.33		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
15.6	1,307	0.0400	1.40		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
20.7	1,407	Total			

Subcatchment WS-1A: Subcat WS-1A



Summary for Subcatchment WS-1B: Subcat WS-1B

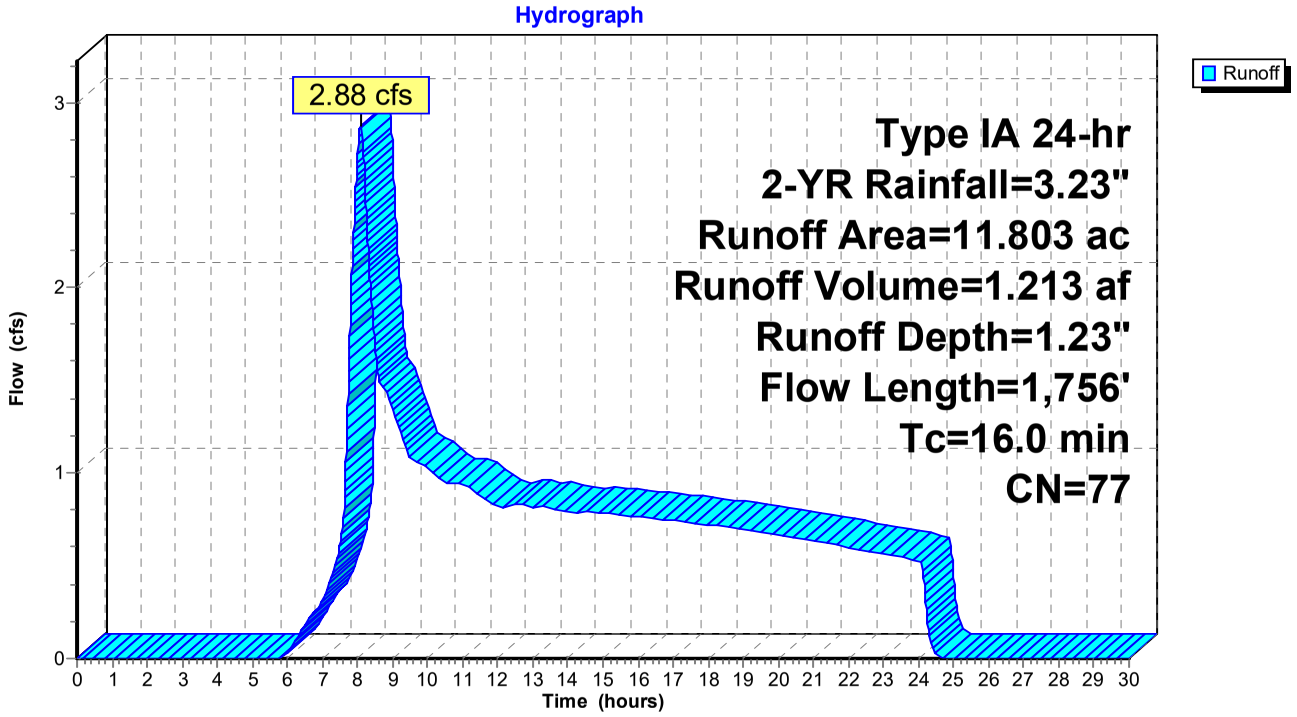
Runoff = 2.88 cfs @ 8.09 hrs, Volume= 1.213 af, Depth= 1.23"
Routed to Reach R1B : Reach 1B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-YR Rainfall=3.23"

Area (ac)	CN	Description
1.132	69	Annual Grass, Fair, HSG B
0.000	79	Annual Grass, Fair, HSG C
0.494	79	Annual Grass, Fair, HSG C
0.184	82	Dirt roads, HSG B
0.154	87	Dirt roads, HSG C
0.018	74	Farmsteads, HSG B
0.769	82	Farmsteads, HSG C
0.107	89	Gravel Roads, HSG C
0.119	96	Gravel surface, HSG C
0.289	92	Paved roads w/open ditches, 50% imp, HSG C
2.743	69	Vineyard, Fair, HSG B
5.779	79	Vineyard, Fair, HSG C
0.005	60	Woods, Fair, HSG B
0.011	73	Woods, Fair, HSG C
11.803	77	Weighted Average
11.659		98.78% Pervious Area
0.144		1.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	100	0.1600	0.27		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
6.9	1,116	0.1500	2.71		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
2.9	540	0.0100	3.08	12.32	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035 Earth, dense weeds
16.0	1,756	Total			

Subcatchment WS-1B: Subcat WS-1B



Summary for Subcatchment WS-1C: Subcat WS-1C

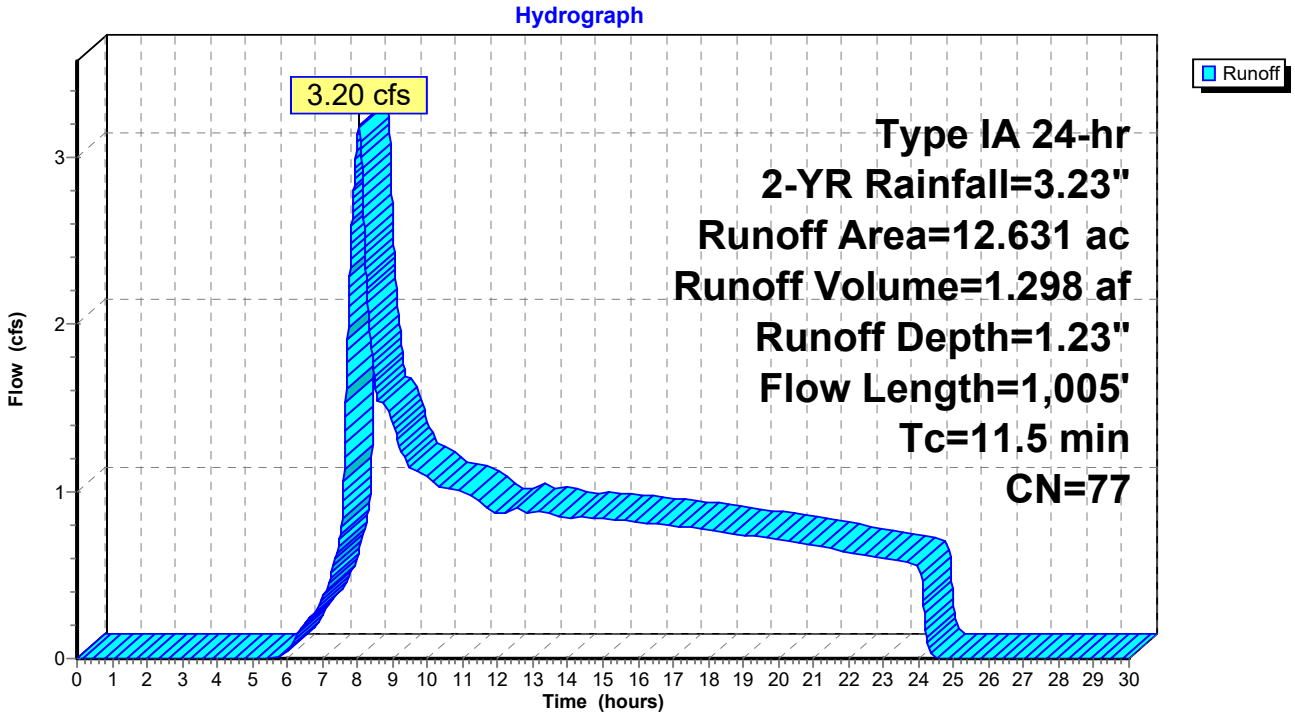
Runoff = 3.20 cfs @ 8.06 hrs, Volume= 1.298 af, Depth= 1.23"
Routed to Reach R1C : Reach 1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-YR Rainfall=3.23"

Area (ac)	CN	Description
0.695	69	Annual Grass, Fair, HSG B
1.363	79	Annual Grass, Fair, HSG C
0.178	75	Annual Grass, Good, HSG C
0.026	82	Dirt roads, HSG B
0.096	87	Dirt roads, HSG C
0.329	74	Farmsteads, HSG B
0.268	82	Farmsteads, HSG C
0.054	96	Gravel surface, HSG C
0.228	89	Paved roads w/open ditches, 50% imp, HSG B
0.120	92	Paved roads w/open ditches, 50% imp, HSG C
0.130	69	Vineyard, Fair, HSG B
3.091	79	Vineyard, Fair, HSG C
0.729	98	Water Surface, HSG B
0.071	98	Water Surface, HSG C
0.061	60	Woods, Fair, HSG B
3.925	73	Woods, Fair, HSG C
1.092	70	Woods, Good, HSG C
0.173	76	Woods/grass comb., Fair, HSG C
12.631	77	Weighted Average
11.657		92.29% Pervious Area
0.974		7.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	100	0.1900	0.19		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.6	145	0.3200	3.96		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.6	313	0.4400	3.32		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.5	397	0.1800	13.07	52.28	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.1	50	0.1200	8.17	6.42	**Pipe Channel, 12" CMP (Assumed)** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
11.5	1,005	Total			

Subcatchment WS-1C: Subcat WS-1C



Summary for Subcatchment WS-1D: Subcat WS-1D

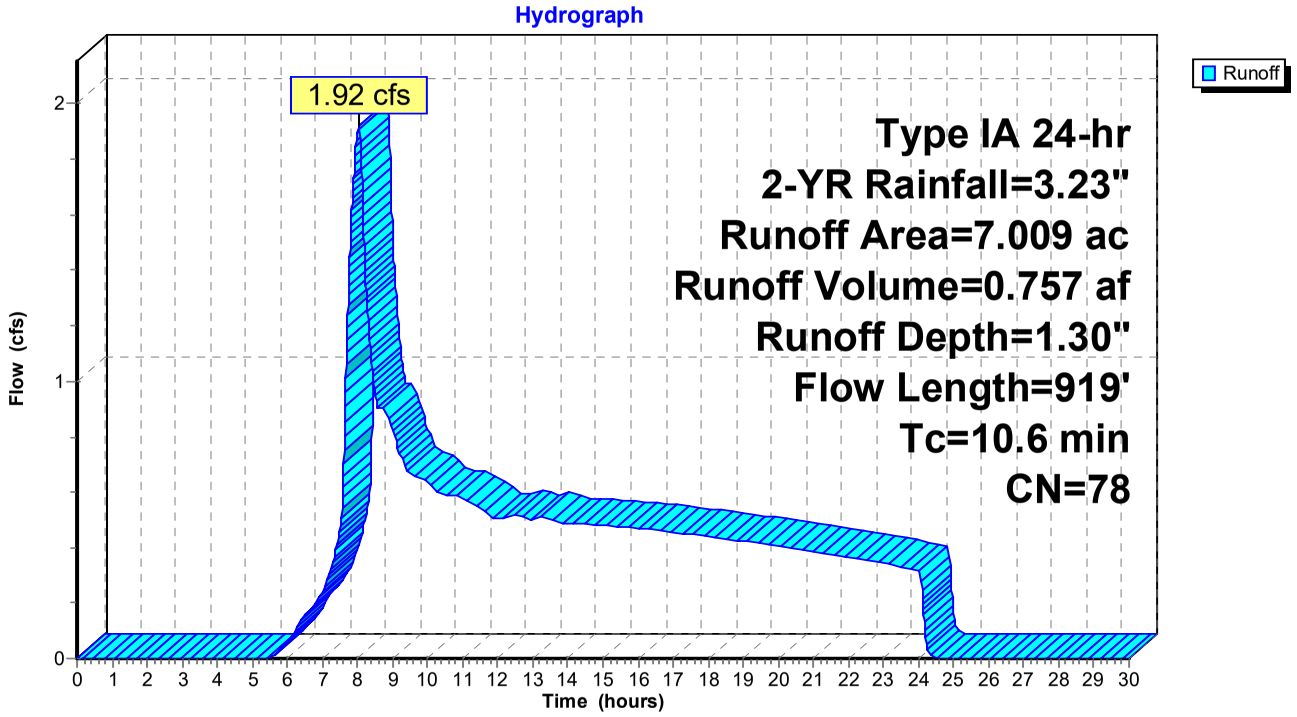
Runoff = 1.92 cfs @ 8.04 hrs, Volume= 0.757 af, Depth= 1.30"
Routed to Reach R1D-2 : Reach 1D-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-YR Rainfall=3.23"

Area (ac)	CN	Description
1.543	79	Annual Grass, Fair, HSG C
0.826	82	Farmsteads, HSG C
1.910	79	Vineyard, Fair, HSG C
1.227	73	Woods, Fair, HSG C
0.027	70	Woods, Good, HSG C
1.476	76	Woods/grass comb., Fair, HSG C
7.009	78	Weighted Average
7.009		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
2.3	428	0.2000	3.13		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.5	391	0.2400	13.93	41.80	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=1.00' D=1.00' Z= 2.0 '/' Top.W=5.00' n= 0.035
10.6	919	Total			

Subcatchment WS-1D: Subcat WS-1D



Summary for Reach R1B: Reach 1B

[65] Warning: Inlet elevation not specified

Inflow Area = 31.443 ac, 3.56% Impervious, Inflow Depth = 1.25" for 2-YR event
Inflow = 7.77 cfs @ 8.14 hrs, Volume= 3.268 af
Outflow = 7.74 cfs @ 8.21 hrs, Volume= 3.268 af, Atten= 0%, Lag= 3.8 min
Routed to Link Outlet 1 : Outlet 1

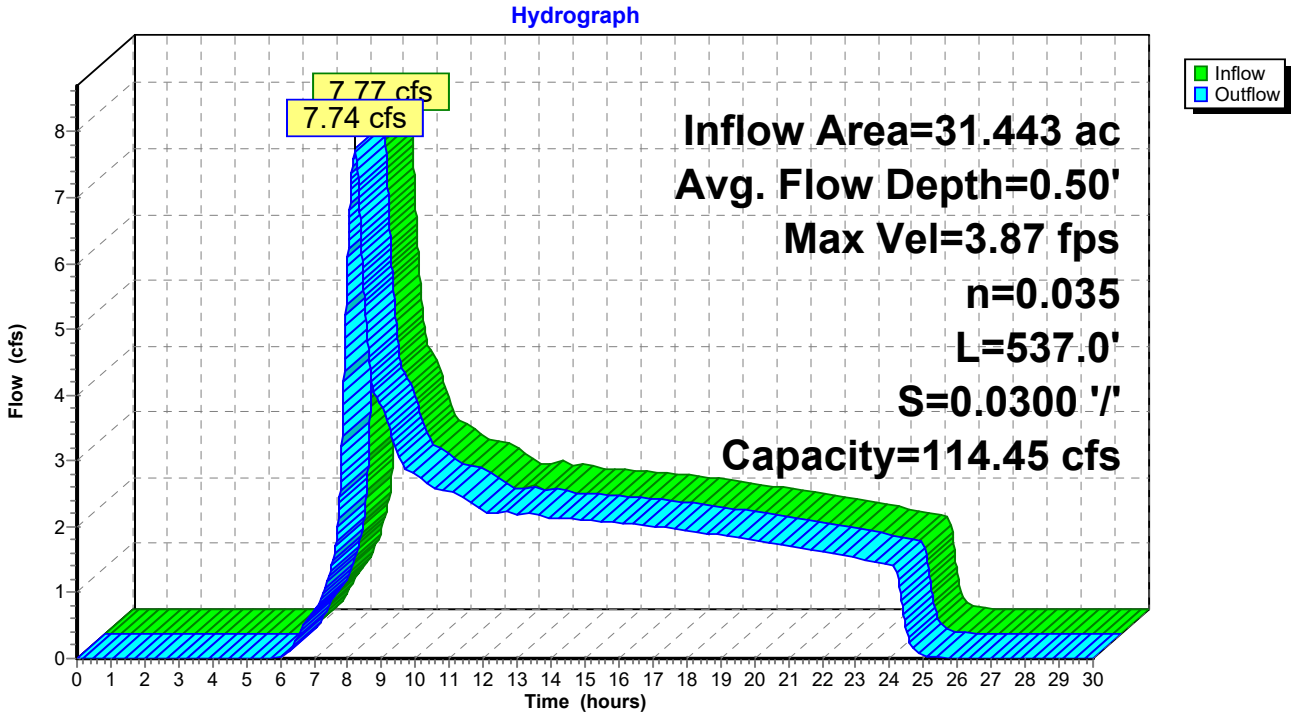
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.87 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 2.05 fps, Avg. Travel Time= 4.4 min

Peak Storage= 1,073 cf @ 8.17 hrs
Average Depth at Peak Storage= 0.50' , Surface Width= 5.00'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 114.45 cfs

3.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 11.00'
Length= 537.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -16.11'



Reach R1B: Reach 1B



Summary for Reach R1C: Reach 1C

[65] Warning: Inlet elevation not specified

Inflow Area = 19.639 ac, 4.96% Impervious, Inflow Depth = 1.26" for 2-YR event
Inflow = 5.09 cfs @ 8.06 hrs, Volume= 2.055 af
Outflow = 5.00 cfs @ 8.18 hrs, Volume= 2.055 af, Atten= 2%, Lag= 6.8 min
Routed to Reach R1B : Reach 1B

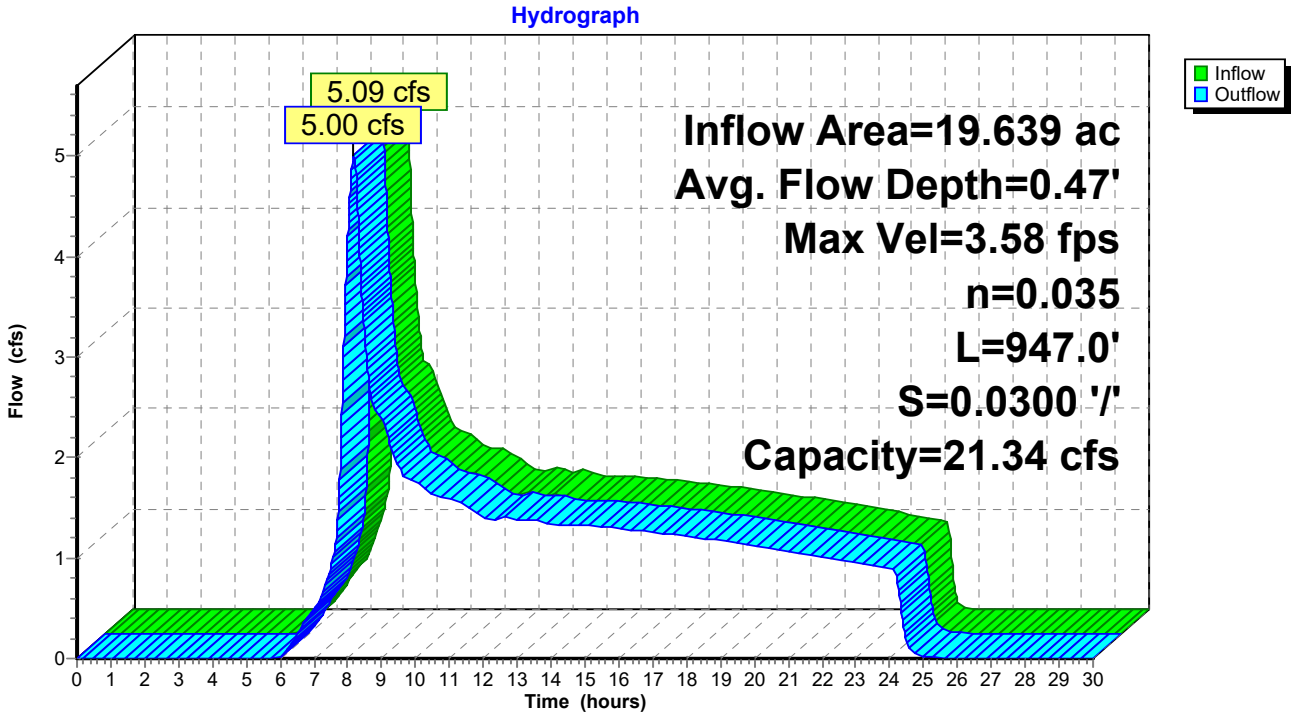
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.58 fps, Min. Travel Time= 4.4 min
Avg. Velocity = 1.88 fps, Avg. Travel Time= 8.4 min

Peak Storage= 1,324 cf @ 8.10 hrs
Average Depth at Peak Storage= 0.47' , Surface Width= 3.90'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 21.34 cfs

2.00' x 1.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 947.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -28.41'



Reach R1C: Reach 1C



Summary for Reach R1D-1: Reach 1D-1

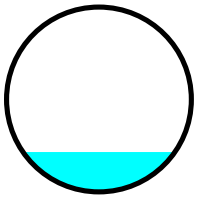
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 7.009 ac, 0.00% Impervious, Inflow Depth = 1.30" for 2-YR event
Inflow = 1.91 cfs @ 8.09 hrs, Volume= 0.757 af
Outflow = 1.91 cfs @ 8.09 hrs, Volume= 0.757 af, Atten= 0%, Lag= 0.2 min
Routed to Reach R1C : Reach 1C

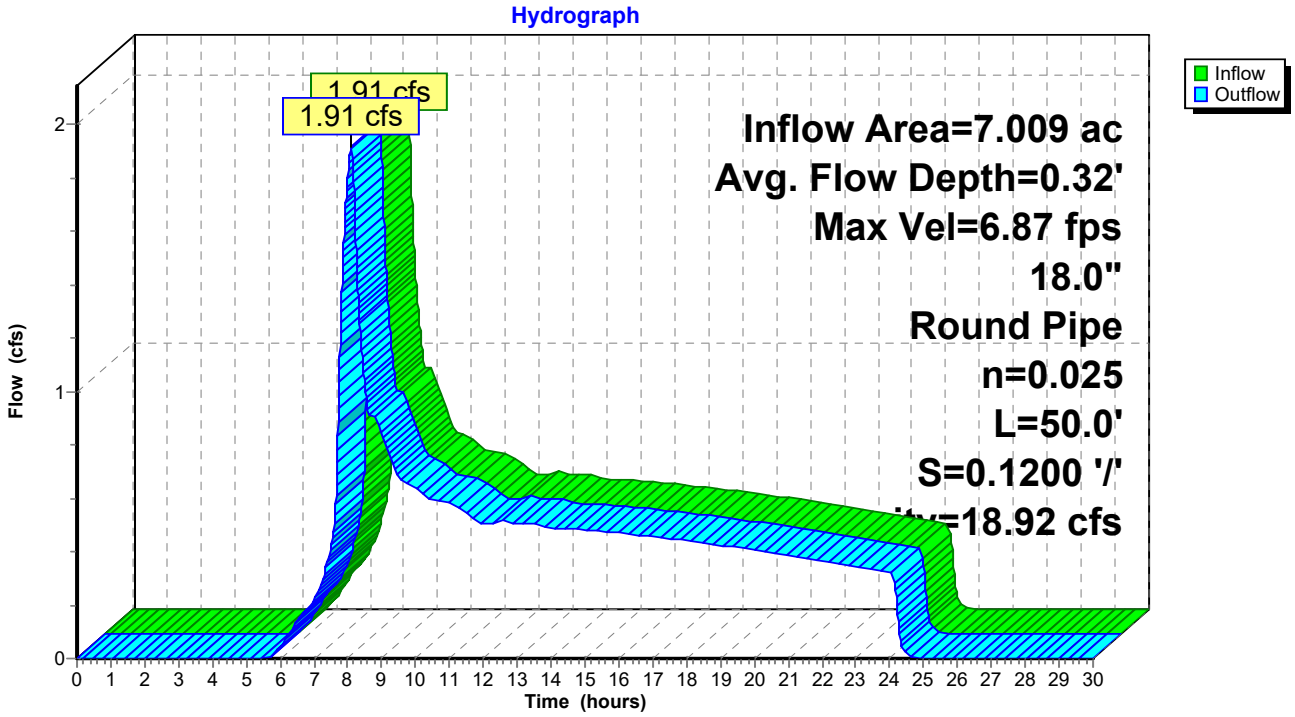
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.87 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.24 fps, Avg. Travel Time= 0.2 min

Peak Storage= 14 cf @ 8.09 hrs
Average Depth at Peak Storage= 0.32' , Surface Width= 1.23'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 18.92 cfs

18.0" Round Pipe
n= 0.025 Corrugated metal
Length= 50.0' Slope= 0.1200 '/'
Inlet Invert= 0.00', Outlet Invert= -6.00'



Reach R1D-1: Reach 1D-1



Summary for Reach R1D-2: Reach 1D-2

[65] Warning: Inlet elevation not specified

Inflow Area = 7.009 ac, 0.00% Impervious, Inflow Depth = 1.30" for 2-YR event
Inflow = 1.92 cfs @ 8.04 hrs, Volume= 0.757 af
Outflow = 1.91 cfs @ 8.09 hrs, Volume= 0.757 af, Atten= 0%, Lag= 3.0 min
Routed to Reach R1D-1 : Reach 1D-1

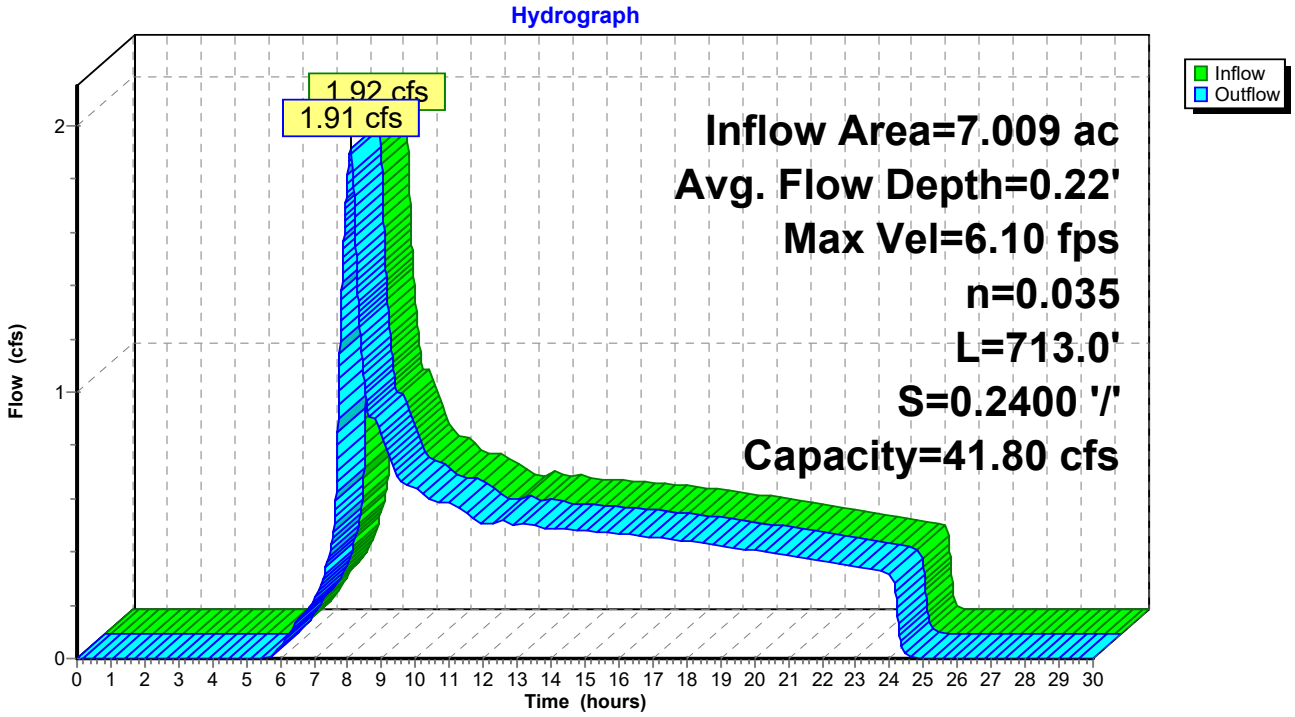
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.10 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 3.68 fps, Avg. Travel Time= 3.2 min

Peak Storage= 224 cf @ 8.06 hrs
Average Depth at Peak Storage= 0.22' , Surface Width= 1.87'
Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 41.80 cfs

1.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 5.00'
Length= 713.0' Slope= 0.2400 '/'
Inlet Invert= 0.00', Outlet Invert= -171.12'



Reach R1D-2: Reach 1D-2

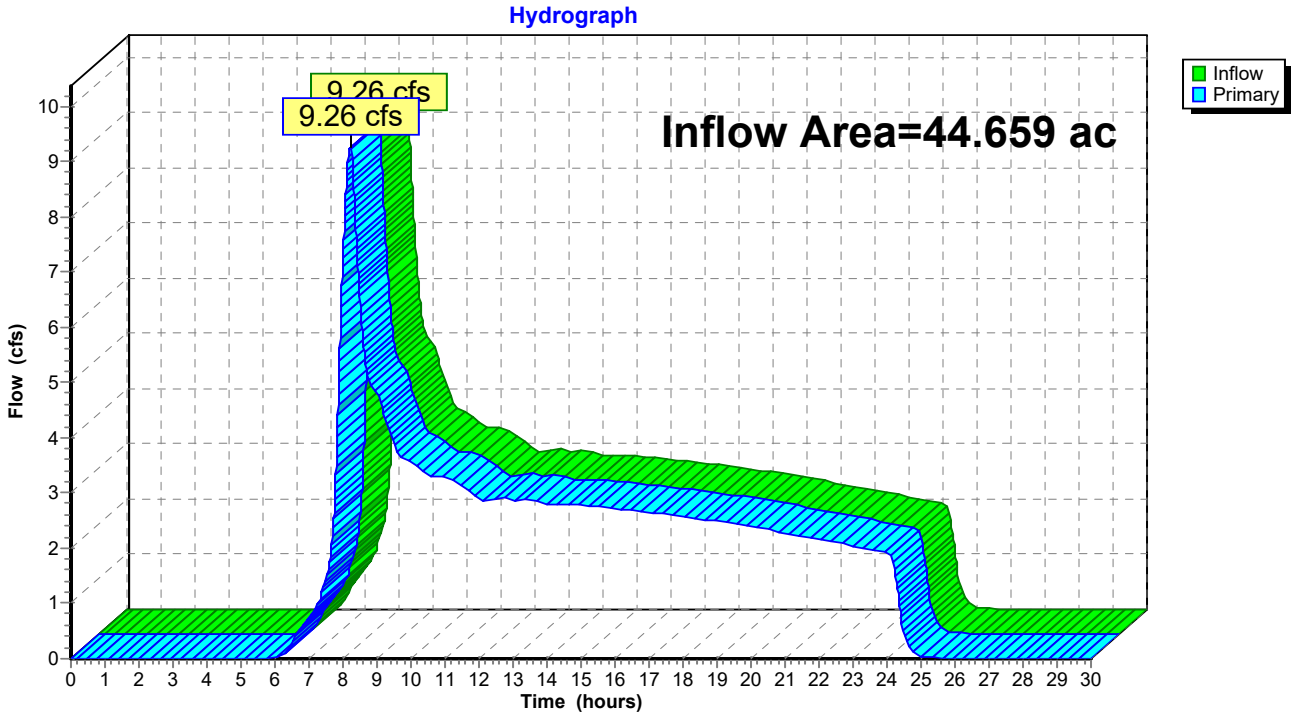


Summary for Link Outlet 1: Outlet 1

Inflow Area = 44.659 ac, 2.50% Impervious, Inflow Depth = 1.13" for 2-YR event
Inflow = 9.26 cfs @ 8.21 hrs, Volume= 4.199 af
Primary = 9.26 cfs @ 8.21 hrs, Volume= 4.199 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Outlet 1: Outlet 1



Summary for Subcatchment WS-1A: Subcat WS-1A

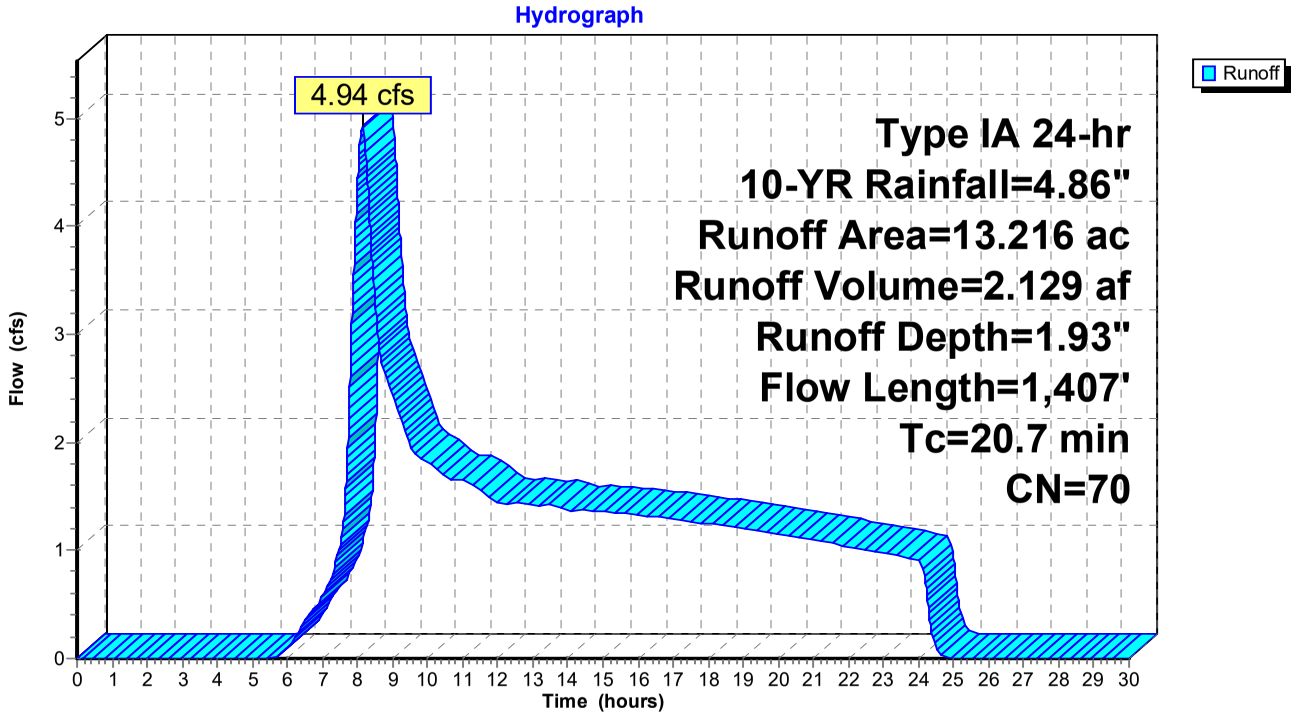
Runoff = 4.94 cfs @ 8.15 hrs, Volume= 2.129 af, Depth= 1.93"
Routed to Link Outlet 1 : Outlet 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-YR Rainfall=4.86"

Area (ac)	CN	Description
0.093	69	Annual Grass, Fair, HSG B
0.460	79	Annual Grass, Fair, HSG C
0.036	87	Dirt roads, HSG C
0.258	82	Farmsteads, HSG C
0.102	96	Gravel surface, HSG C
10.681	69	Vineyard, Fair, HSG B
0.062	79	Vineyard, Fair, HSG C
0.400	60	Woods, Fair, HSG B
1.123	73	Woods, Fair, HSG C
13.216	70	Weighted Average
13.216		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	100	0.2600	0.33		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
15.6	1,307	0.0400	1.40		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
20.7	1,407	Total			

Subcatchment WS-1A: Subcat WS-1A



Summary for Subcatchment WS-1B: Subcat WS-1B

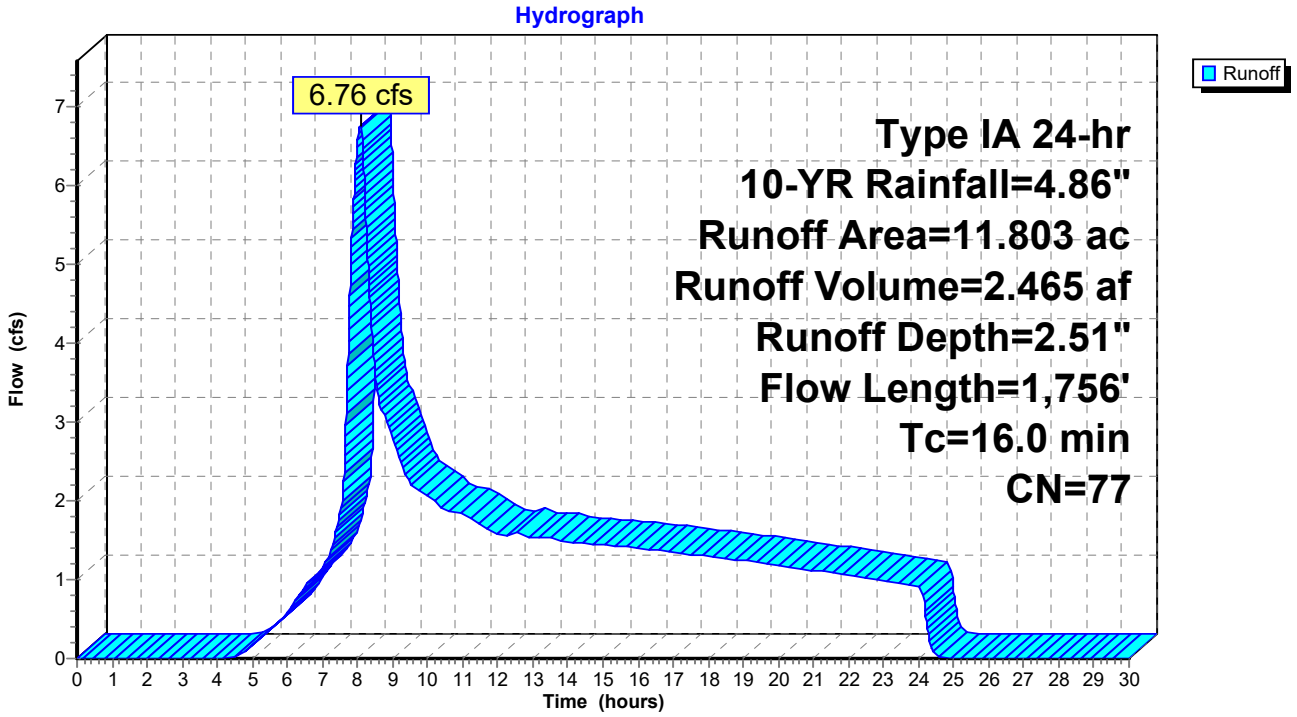
Runoff = 6.76 cfs @ 8.08 hrs, Volume= 2.465 af, Depth= 2.51"
Routed to Reach R1B : Reach 1B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-YR Rainfall=4.86"

Area (ac)	CN	Description
1.132	69	Annual Grass, Fair, HSG B
0.000	79	Annual Grass, Fair, HSG C
0.494	79	Annual Grass, Fair, HSG C
0.184	82	Dirt roads, HSG B
0.154	87	Dirt roads, HSG C
0.018	74	Farmsteads, HSG B
0.769	82	Farmsteads, HSG C
0.107	89	Gravel Roads, HSG C
0.119	96	Gravel surface, HSG C
0.289	92	Paved roads w/open ditches, 50% imp, HSG C
2.743	69	Vineyard, Fair, HSG B
5.779	79	Vineyard, Fair, HSG C
0.005	60	Woods, Fair, HSG B
0.011	73	Woods, Fair, HSG C
11.803	77	Weighted Average
11.659		98.78% Pervious Area
0.144		1.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	100	0.1600	0.27		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
6.9	1,116	0.1500	2.71		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
2.9	540	0.0100	3.08	12.32	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035 Earth, dense weeds
16.0	1,756	Total			

Subcatchment WS-1B: Subcat WS-1B



Summary for Subcatchment WS-1C: Subcat WS-1C

[47] Hint: Peak is 116% of capacity of segment #5

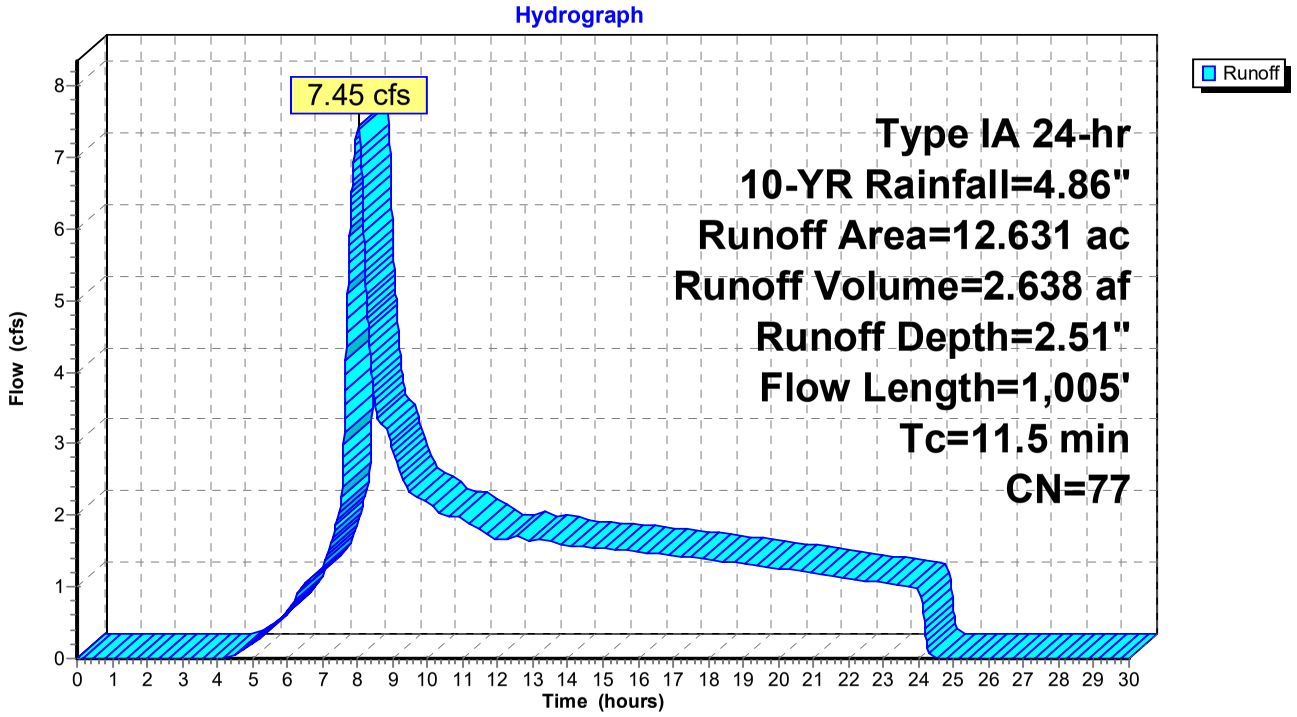
Runoff = 7.45 cfs @ 8.04 hrs, Volume= 2.638 af, Depth= 2.51"
Routed to Reach R1C : Reach 1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-YR Rainfall=4.86"

Area (ac)	CN	Description
0.695	69	Annual Grass, Fair, HSG B
1.363	79	Annual Grass, Fair, HSG C
0.178	75	Annual Grass, Good, HSG C
0.026	82	Dirt roads, HSG B
0.096	87	Dirt roads, HSG C
0.329	74	Farmsteads, HSG B
0.268	82	Farmsteads, HSG C
0.054	96	Gravel surface, HSG C
0.228	89	Paved roads w/open ditches, 50% imp, HSG B
0.120	92	Paved roads w/open ditches, 50% imp, HSG C
0.130	69	Vineyard, Fair, HSG B
3.091	79	Vineyard, Fair, HSG C
0.729	98	Water Surface, HSG B
0.071	98	Water Surface, HSG C
0.061	60	Woods, Fair, HSG B
3.925	73	Woods, Fair, HSG C
1.092	70	Woods, Good, HSG C
0.173	76	Woods/grass comb., Fair, HSG C
12.631	77	Weighted Average
11.657		92.29% Pervious Area
0.974		7.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	100	0.1900	0.19		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.6	145	0.3200	3.96		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.6	313	0.4400	3.32		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.5	397	0.1800	13.07	52.28	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.1	50	0.1200	8.17	6.42	**Pipe Channel, 12" CMP (Assumed)** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
11.5	1,005	Total			

Subcatchment WS-1C: Subcat WS-1C



Summary for Subcatchment WS-1D: Subcat WS-1D

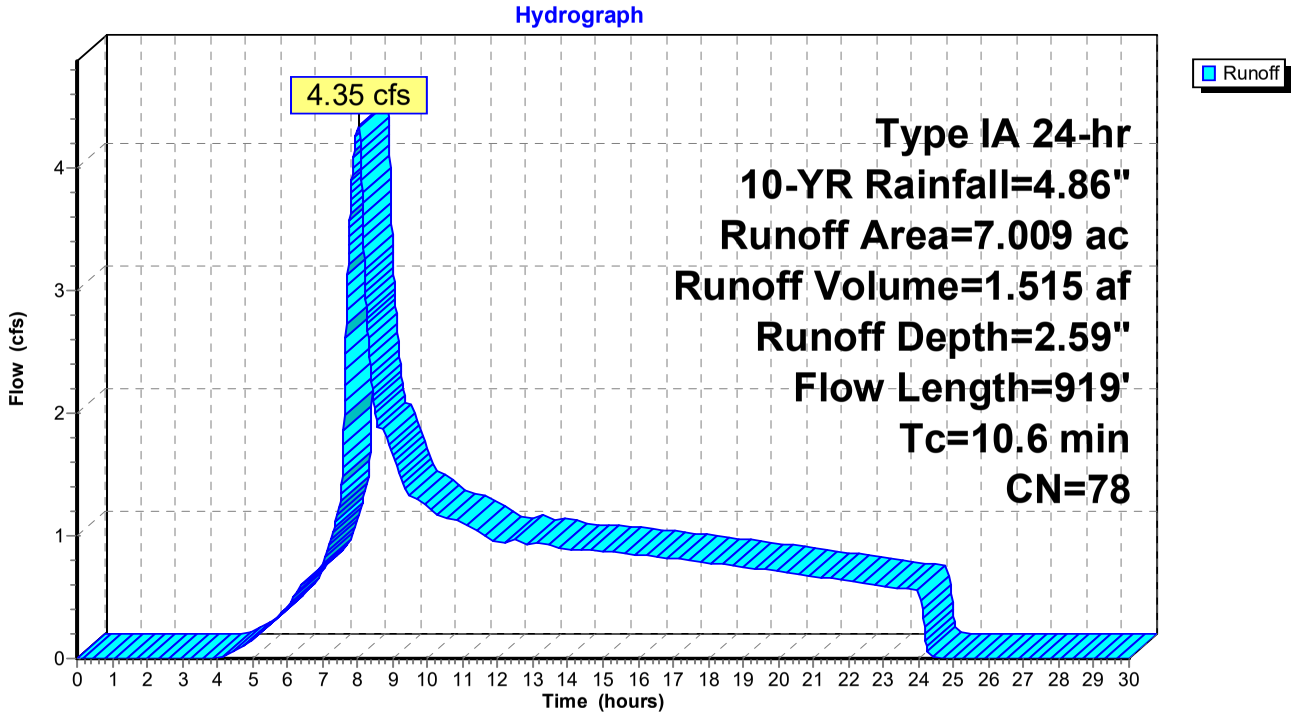
Runoff = 4.35 cfs @ 8.02 hrs, Volume= 1.515 af, Depth= 2.59"
Routed to Reach R1D-2 : Reach 1D-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-YR Rainfall=4.86"

Area (ac)	CN	Description
1.543	79	Annual Grass, Fair, HSG C
0.826	82	Farmsteads, HSG C
1.910	79	Vineyard, Fair, HSG C
1.227	73	Woods, Fair, HSG C
0.027	70	Woods, Good, HSG C
1.476	76	Woods/grass comb., Fair, HSG C
7.009	78	Weighted Average
7.009		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
2.3	428	0.2000	3.13		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.5	391	0.2400	13.93	41.80	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=1.00' D=1.00' Z= 2.0 '/' Top.W=5.00' n= 0.035
10.6	919	Total			

Subcatchment WS-1D: Subcat WS-1D



Summary for Reach R1B: Reach 1B

[65] Warning: Inlet elevation not specified

Inflow Area = 31.443 ac, 3.56% Impervious, Inflow Depth = 2.53" for 10-YR event
Inflow = 18.34 cfs @ 8.11 hrs, Volume= 6.618 af
Outflow = 18.29 cfs @ 8.16 hrs, Volume= 6.618 af, Atten= 0%, Lag= 2.9 min
Routed to Link Outlet 1 : Outlet 1

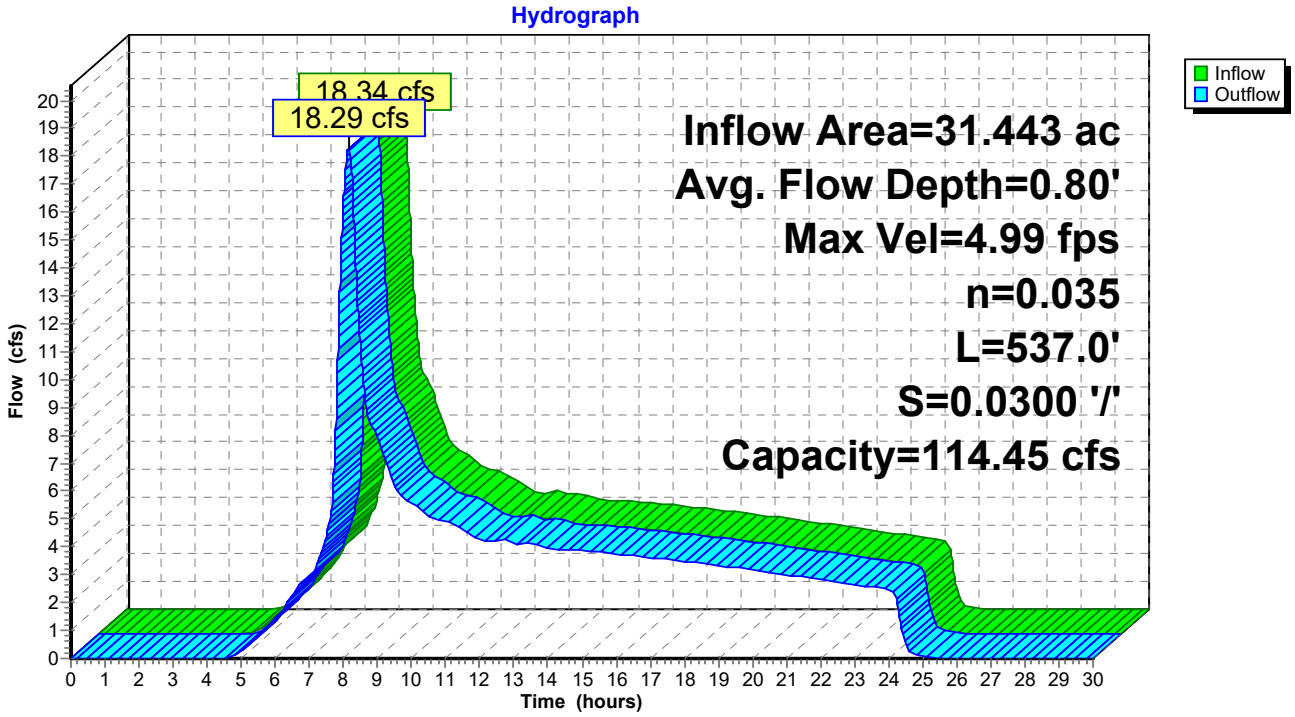
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.99 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 2.50 fps, Avg. Travel Time= 3.6 min

Peak Storage= 1,970 cf @ 8.13 hrs
Average Depth at Peak Storage= 0.80' , Surface Width= 6.19'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 114.45 cfs

3.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 11.00'
Length= 537.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -16.11'



Reach R1B: Reach 1B



Summary for Reach R1C: Reach 1C

[65] Warning: Inlet elevation not specified

Inflow Area = 19.639 ac, 4.96% Impervious, Inflow Depth = 2.54" for 10-YR event
Inflow = 11.77 cfs @ 8.04 hrs, Volume= 4.153 af
Outflow = 11.67 cfs @ 8.13 hrs, Volume= 4.153 af, Atten= 1%, Lag= 5.5 min
Routed to Reach R1B : Reach 1B

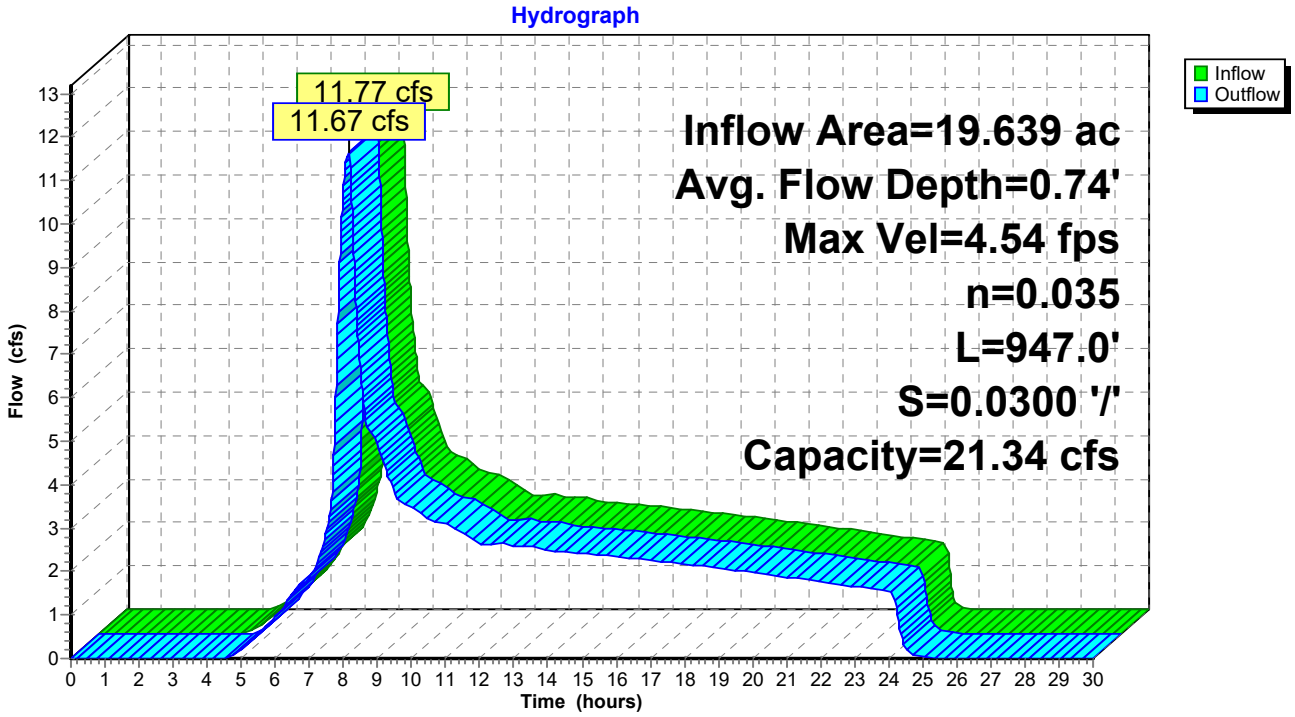
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.54 fps, Min. Travel Time= 3.5 min
Avg. Velocity = 2.28 fps, Avg. Travel Time= 6.9 min

Peak Storage= 2,436 cf @ 8.07 hrs
Average Depth at Peak Storage= 0.74' , Surface Width= 4.96'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 21.34 cfs

2.00' x 1.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 947.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -28.41'



Reach R1C: Reach 1C



Summary for Reach R1D-1: Reach 1D-1

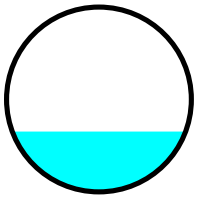
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 7.009 ac, 0.00% Impervious, Inflow Depth = 2.59" for 10-YR event
Inflow = 4.34 cfs @ 8.06 hrs, Volume= 1.515 af
Outflow = 4.34 cfs @ 8.07 hrs, Volume= 1.515 af, Atten= 0%, Lag= 0.2 min
Routed to Reach R1C : Reach 1C

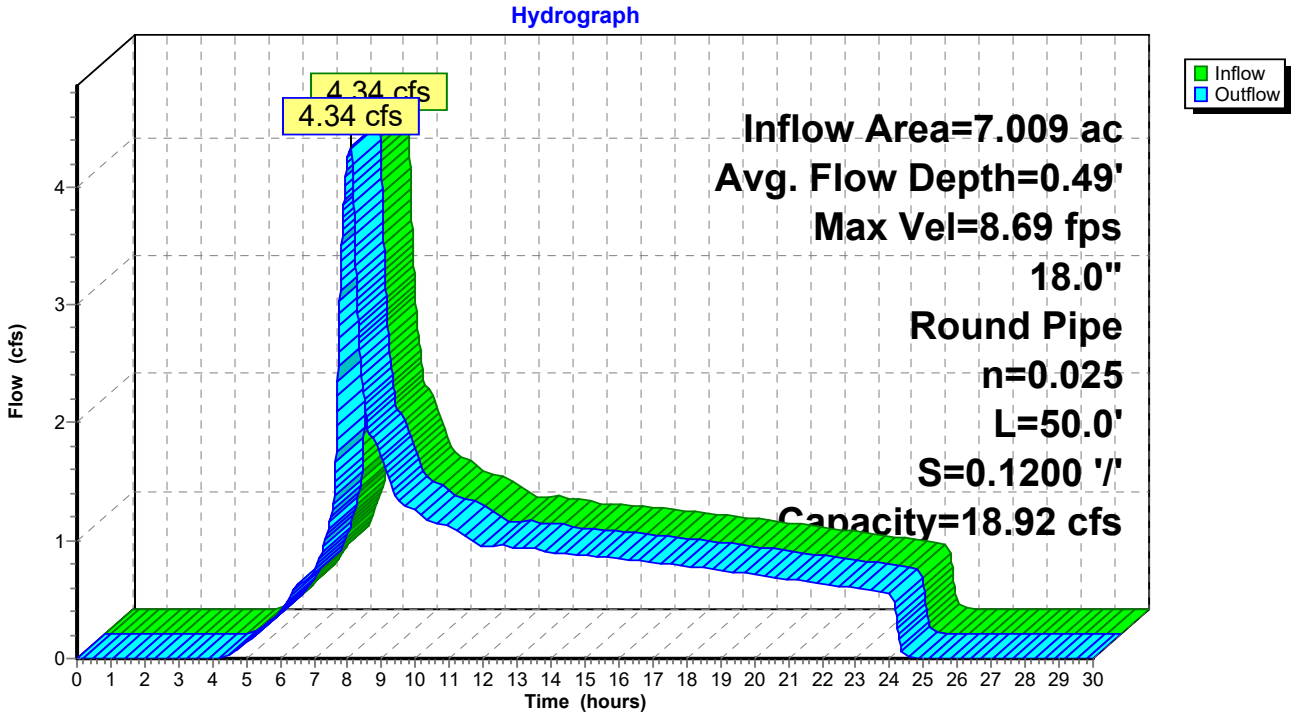
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.69 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.05 fps, Avg. Travel Time= 0.2 min

Peak Storage= 25 cf @ 8.06 hrs
Average Depth at Peak Storage= 0.49' , Surface Width= 1.41'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 18.92 cfs

18.0" Round Pipe
n= 0.025 Corrugated metal
Length= 50.0' Slope= 0.1200 '/'
Inlet Invert= 0.00', Outlet Invert= -6.00'



Reach R1D-1: Reach 1D-1



Summary for Reach R1D-2: Reach 1D-2

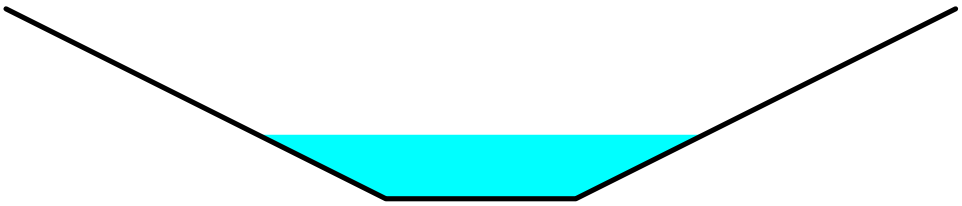
[65] Warning: Inlet elevation not specified

Inflow Area = 7.009 ac, 0.00% Impervious, Inflow Depth = 2.59" for 10-YR event
Inflow = 4.35 cfs @ 8.02 hrs, Volume= 1.515 af
Outflow = 4.34 cfs @ 8.06 hrs, Volume= 1.515 af, Atten= 0%, Lag= 2.5 min
Routed to Reach R1D-1 : Reach 1D-1

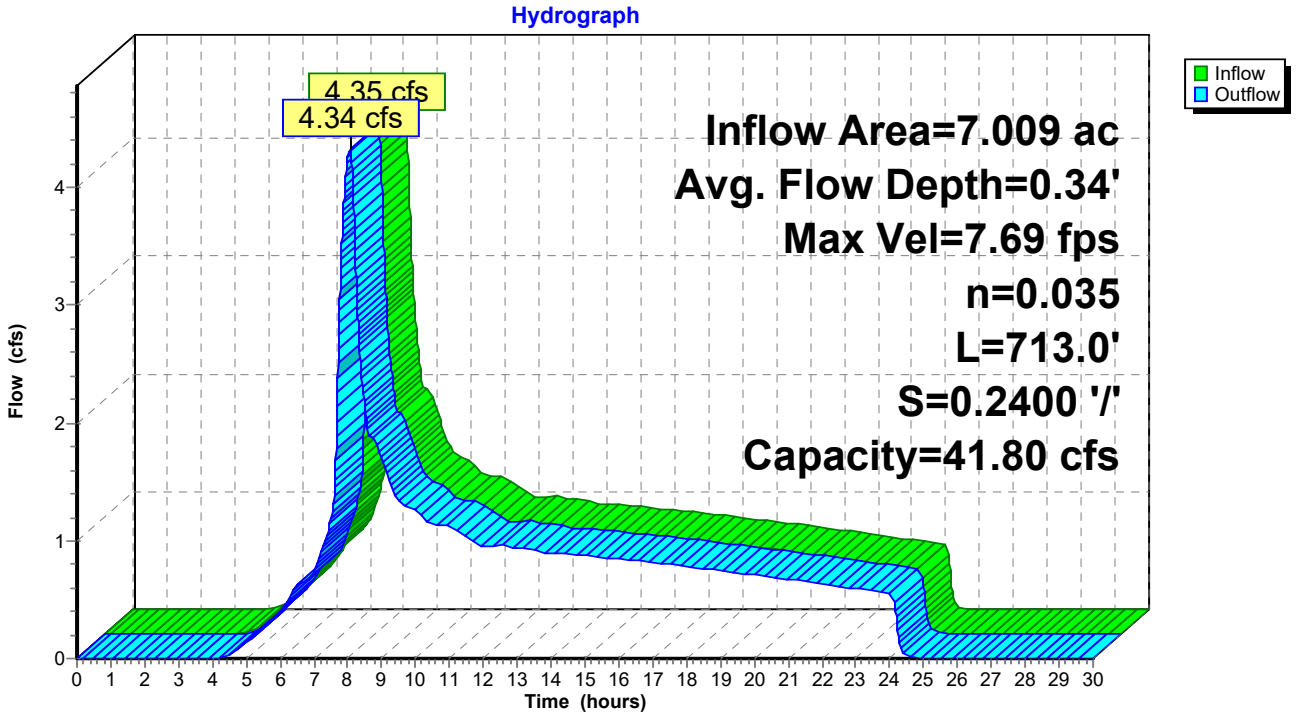
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.69 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 4.44 fps, Avg. Travel Time= 2.7 min

Peak Storage= 402 cf @ 8.04 hrs
Average Depth at Peak Storage= 0.34' , Surface Width= 2.35'
Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 41.80 cfs

1.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 5.00'
Length= 713.0' Slope= 0.2400 '/'
Inlet Invert= 0.00', Outlet Invert= -171.12'



Reach R1D-2: Reach 1D-2

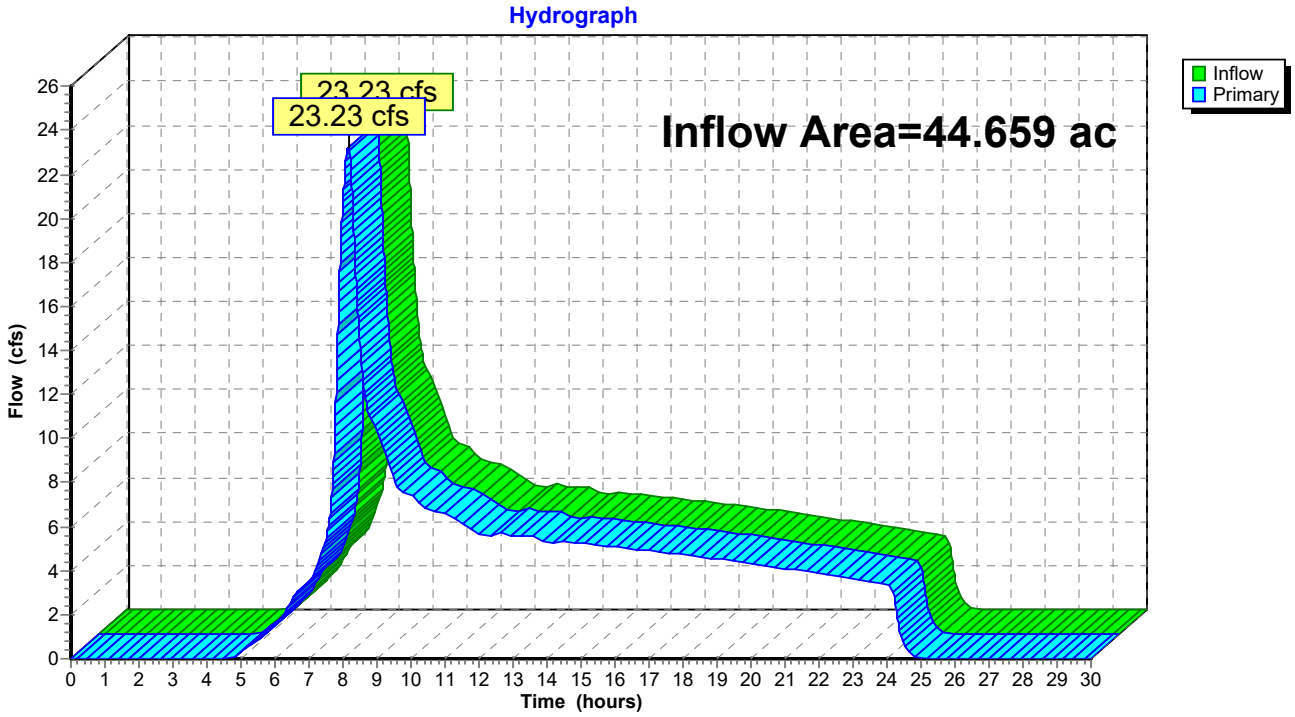


Summary for Link Outlet 1: Outlet 1

Inflow Area = 44.659 ac, 2.50% Impervious, Inflow Depth = 2.35" for 10-YR event
Inflow = 23.23 cfs @ 8.16 hrs, Volume= 8.747 af
Primary = 23.23 cfs @ 8.16 hrs, Volume= 8.747 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Outlet 1: Outlet 1



Summary for Subcatchment WS-1A: Subcat WS-1A

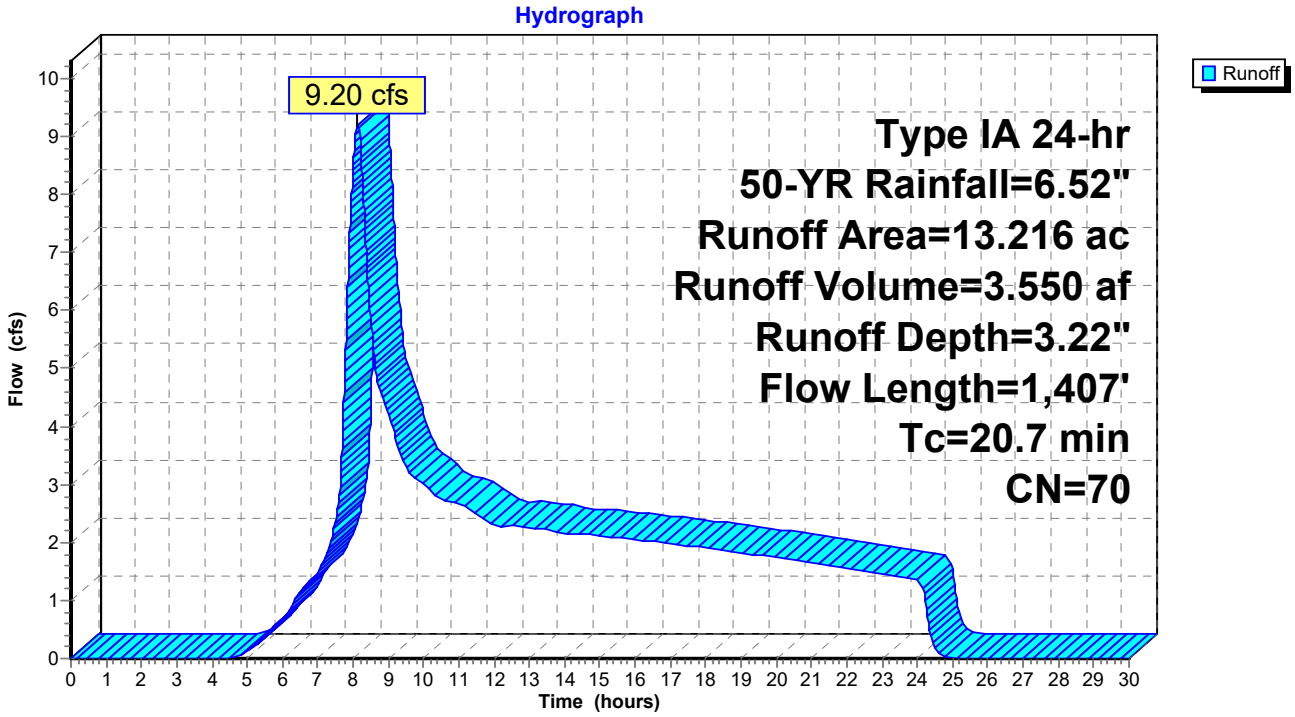
Runoff = 9.20 cfs @ 8.12 hrs, Volume= 3.550 af, Depth= 3.22"
Routed to Link Outlet 1 : Outlet 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50-YR Rainfall=6.52"

Area (ac)	CN	Description
0.093	69	Annual Grass, Fair, HSG B
0.460	79	Annual Grass, Fair, HSG C
0.036	87	Dirt roads, HSG C
0.258	82	Farmsteads, HSG C
0.102	96	Gravel surface, HSG C
10.681	69	Vineyard, Fair, HSG B
0.062	79	Vineyard, Fair, HSG C
0.400	60	Woods, Fair, HSG B
1.123	73	Woods, Fair, HSG C
13.216	70	Weighted Average
13.216		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	100	0.2600	0.33		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
15.6	1,307	0.0400	1.40		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
20.7	1,407	Total			

Subcatchment WS-1A: Subcat WS-1A



Summary for Subcatchment WS-1B: Subcat WS-1B

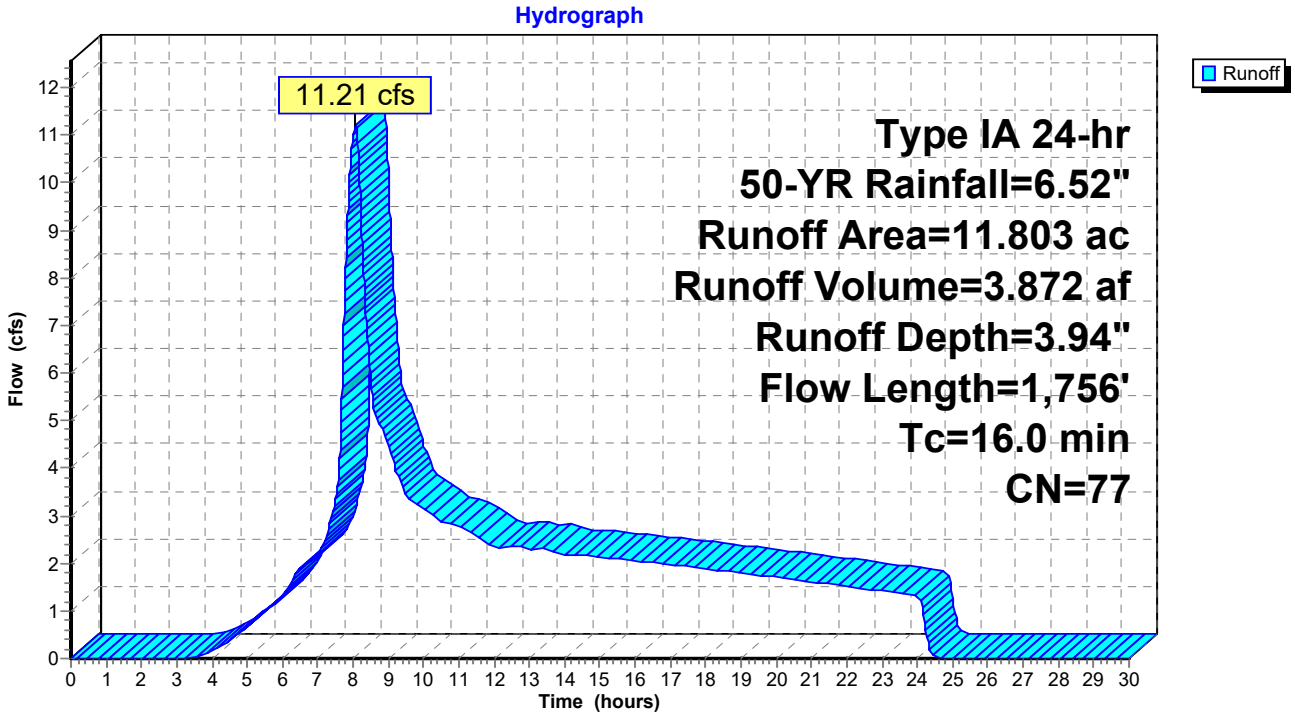
Runoff = 11.21 cfs @ 8.06 hrs, Volume= 3.872 af, Depth= 3.94"
Routed to Reach R1B : Reach 1B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50-YR Rainfall=6.52"

Area (ac)	CN	Description
1.132	69	Annual Grass, Fair, HSG B
0.000	79	Annual Grass, Fair, HSG C
0.494	79	Annual Grass, Fair, HSG C
0.184	82	Dirt roads, HSG B
0.154	87	Dirt roads, HSG C
0.018	74	Farmsteads, HSG B
0.769	82	Farmsteads, HSG C
0.107	89	Gravel Roads, HSG C
0.119	96	Gravel surface, HSG C
0.289	92	Paved roads w/open ditches, 50% imp, HSG C
2.743	69	Vineyard, Fair, HSG B
5.779	79	Vineyard, Fair, HSG C
0.005	60	Woods, Fair, HSG B
0.011	73	Woods, Fair, HSG C
11.803	77	Weighted Average
11.659		98.78% Pervious Area
0.144		1.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	100	0.1600	0.27		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
6.9	1,116	0.1500	2.71		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
2.9	540	0.0100	3.08	12.32	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035 Earth, dense weeds
16.0	1,756	Total			

Subcatchment WS-1B: Subcat WS-1B



Summary for Subcatchment WS-1C: Subcat WS-1C

[47] Hint: Peak is 192% of capacity of segment #5

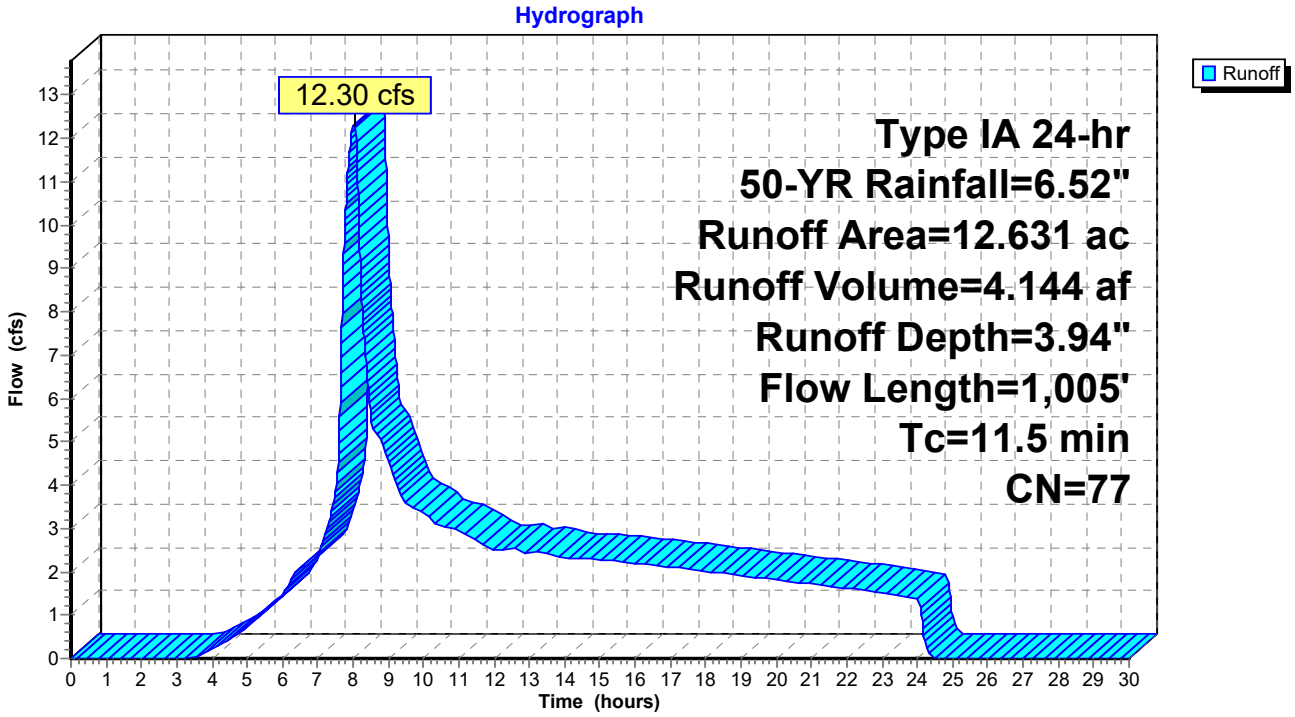
Runoff = 12.30 cfs @ 8.03 hrs, Volume= 4.144 af, Depth= 3.94"
Routed to Reach R1C : Reach 1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50-YR Rainfall=6.52"

Area (ac)	CN	Description
0.695	69	Annual Grass, Fair, HSG B
1.363	79	Annual Grass, Fair, HSG C
0.178	75	Annual Grass, Good, HSG C
0.026	82	Dirt roads, HSG B
0.096	87	Dirt roads, HSG C
0.329	74	Farmsteads, HSG B
0.268	82	Farmsteads, HSG C
0.054	96	Gravel surface, HSG C
0.228	89	Paved roads w/open ditches, 50% imp, HSG B
0.120	92	Paved roads w/open ditches, 50% imp, HSG C
0.130	69	Vineyard, Fair, HSG B
3.091	79	Vineyard, Fair, HSG C
0.729	98	Water Surface, HSG B
0.071	98	Water Surface, HSG C
0.061	60	Woods, Fair, HSG B
3.925	73	Woods, Fair, HSG C
1.092	70	Woods, Good, HSG C
0.173	76	Woods/grass comb., Fair, HSG C
12.631	77	Weighted Average
11.657		92.29% Pervious Area
0.974		7.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	100	0.1900	0.19		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.6	145	0.3200	3.96		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.6	313	0.4400	3.32		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.5	397	0.1800	13.07	52.28	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.1	50	0.1200	8.17	6.42	**Pipe Channel, 12" CMP (Assumed)** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
11.5	1,005	Total			

Subcatchment WS-1C: Subcat WS-1C



Summary for Subcatchment WS-1D: Subcat WS-1D

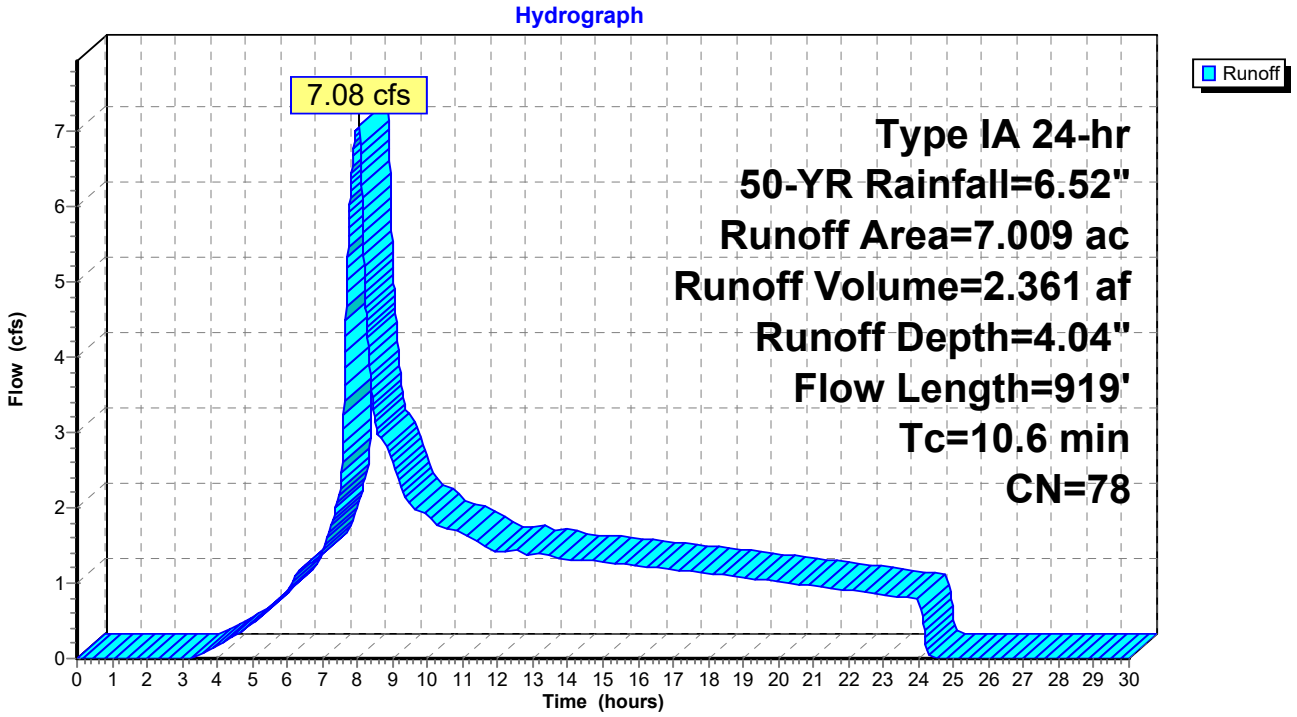
Runoff = 7.08 cfs @ 8.02 hrs, Volume= 2.361 af, Depth= 4.04"
Routed to Reach R1D-2 : Reach 1D-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50-YR Rainfall=6.52"

Area (ac)	CN	Description
1.543	79	Annual Grass, Fair, HSG C
0.826	82	Farmsteads, HSG C
1.910	79	Vineyard, Fair, HSG C
1.227	73	Woods, Fair, HSG C
0.027	70	Woods, Good, HSG C
1.476	76	Woods/grass comb., Fair, HSG C
7.009	78	Weighted Average
7.009		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
2.3	428	0.2000	3.13		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.5	391	0.2400	13.93	41.80	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=1.00' D=1.00' Z= 2.0 '/' Top.W=5.00' n= 0.035
10.6	919	Total			

Subcatchment WS-1D: Subcat WS-1D



Summary for Reach R1B: Reach 1B

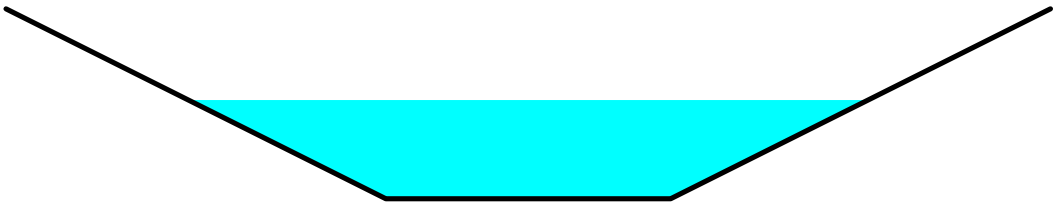
[65] Warning: Inlet elevation not specified

Inflow Area = 31.443 ac, 3.56% Impervious, Inflow Depth = 3.96" for 50-YR event
Inflow = 30.40 cfs @ 8.09 hrs, Volume= 10.377 af
Outflow = 30.34 cfs @ 8.13 hrs, Volume= 10.377 af, Atten= 0%, Lag= 2.6 min
Routed to Link Outlet 1 : Outlet 1

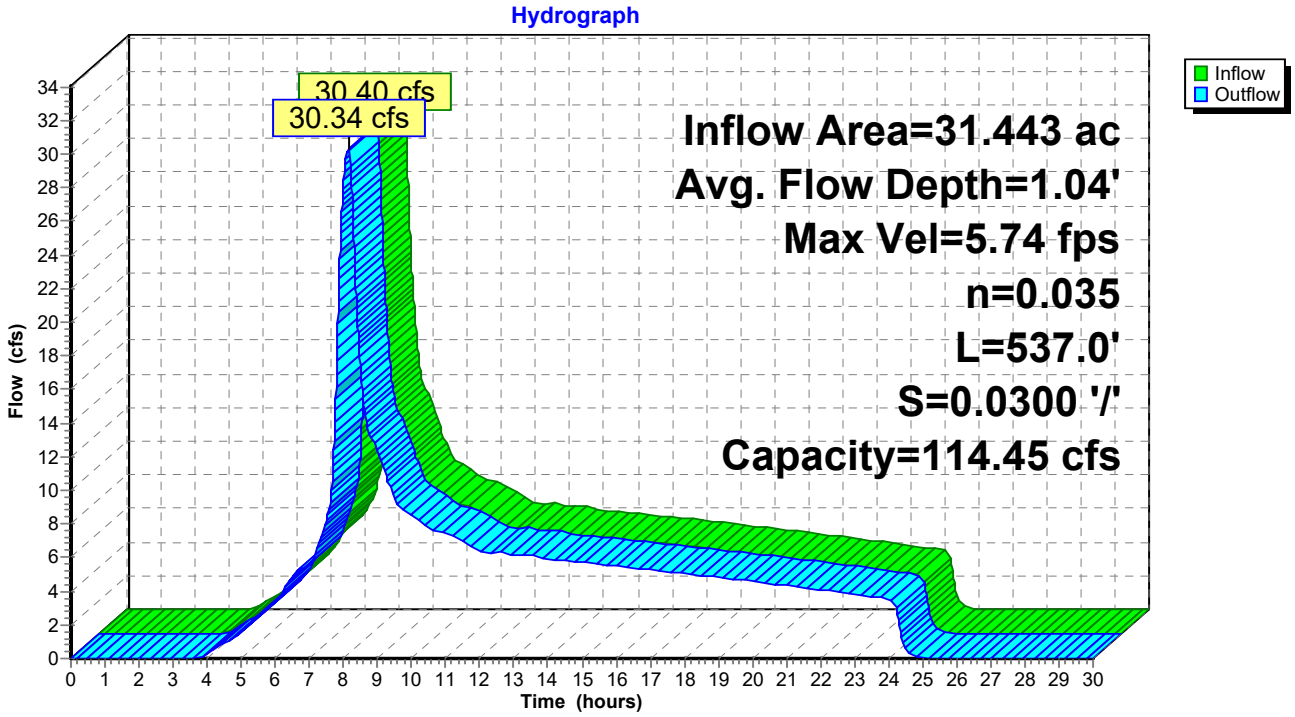
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.74 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 2.83 fps, Avg. Travel Time= 3.2 min

Peak Storage= 2,837 cf @ 8.11 hrs
Average Depth at Peak Storage= 1.04' , Surface Width= 7.16'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 114.45 cfs

3.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 11.00'
Length= 537.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -16.11'



Reach R1B: Reach 1B



Summary for Reach R1C: Reach 1C

[65] Warning: Inlet elevation not specified

Inflow Area = 19.639 ac, 4.96% Impervious, Inflow Depth = 3.97" for 50-YR event
Inflow = 19.37 cfs @ 8.03 hrs, Volume= 6.505 af
Outflow = 19.26 cfs @ 8.11 hrs, Volume= 6.505 af, Atten= 1%, Lag= 4.7 min
Routed to Reach R1B : Reach 1B

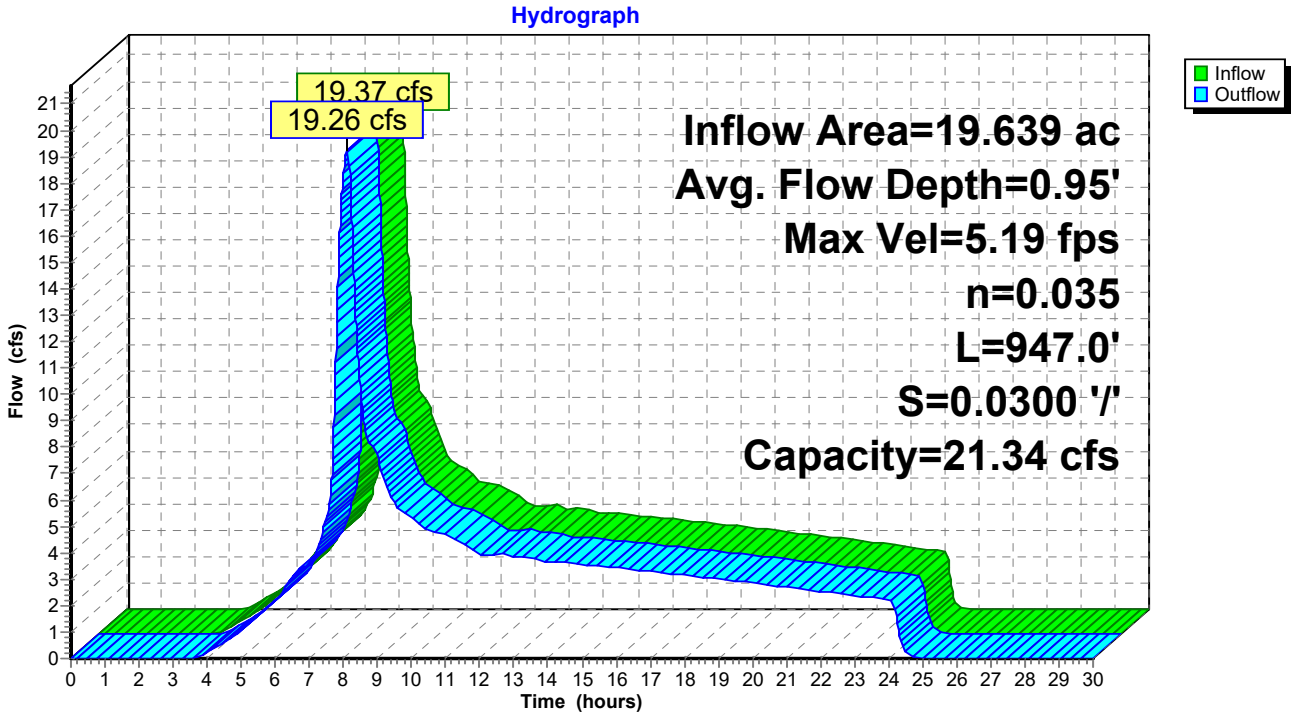
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.19 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 2.57 fps, Avg. Travel Time= 6.1 min

Peak Storage= 3,513 cf @ 8.06 hrs
Average Depth at Peak Storage= 0.95' , Surface Width= 5.80'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 21.34 cfs

2.00' x 1.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 947.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -28.41'



Reach R1C: Reach 1C



Summary for Reach R1D-1: Reach 1D-1

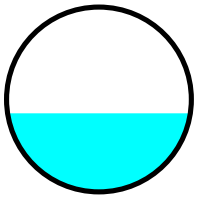
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 7.009 ac, 0.00% Impervious, Inflow Depth = 4.04" for 50-YR event
Inflow = 7.07 cfs @ 8.05 hrs, Volume= 2.361 af
Outflow = 7.07 cfs @ 8.05 hrs, Volume= 2.361 af, Atten= 0%, Lag= 0.1 min
Routed to Reach R1C : Reach 1C

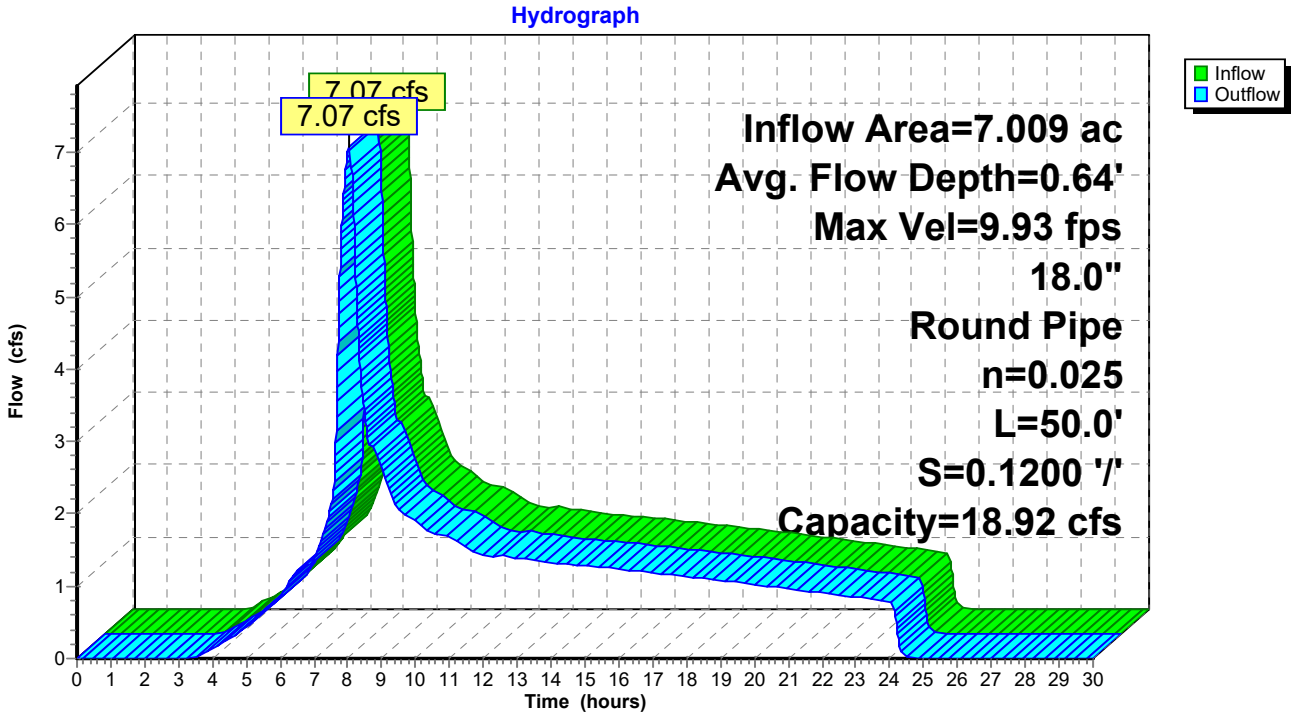
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.93 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.65 fps, Avg. Travel Time= 0.1 min

Peak Storage= 36 cf @ 8.05 hrs
Average Depth at Peak Storage= 0.64' , Surface Width= 1.48'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 18.92 cfs

18.0" Round Pipe
n= 0.025 Corrugated metal
Length= 50.0' Slope= 0.1200 '/'
Inlet Invert= 0.00', Outlet Invert= -6.00'



Reach R1D-1: Reach 1D-1



Summary for Reach R1D-2: Reach 1D-2

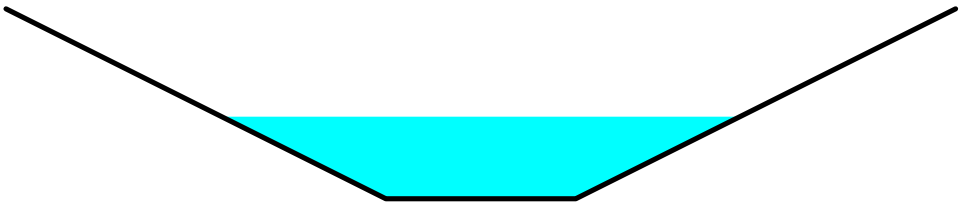
[65] Warning: Inlet elevation not specified

Inflow Area = 7.009 ac, 0.00% Impervious, Inflow Depth = 4.04" for 50-YR event
Inflow = 7.08 cfs @ 8.02 hrs, Volume= 2.361 af
Outflow = 7.07 cfs @ 8.05 hrs, Volume= 2.361 af, Atten= 0%, Lag= 1.6 min
Routed to Reach R1D-1 : Reach 1D-1

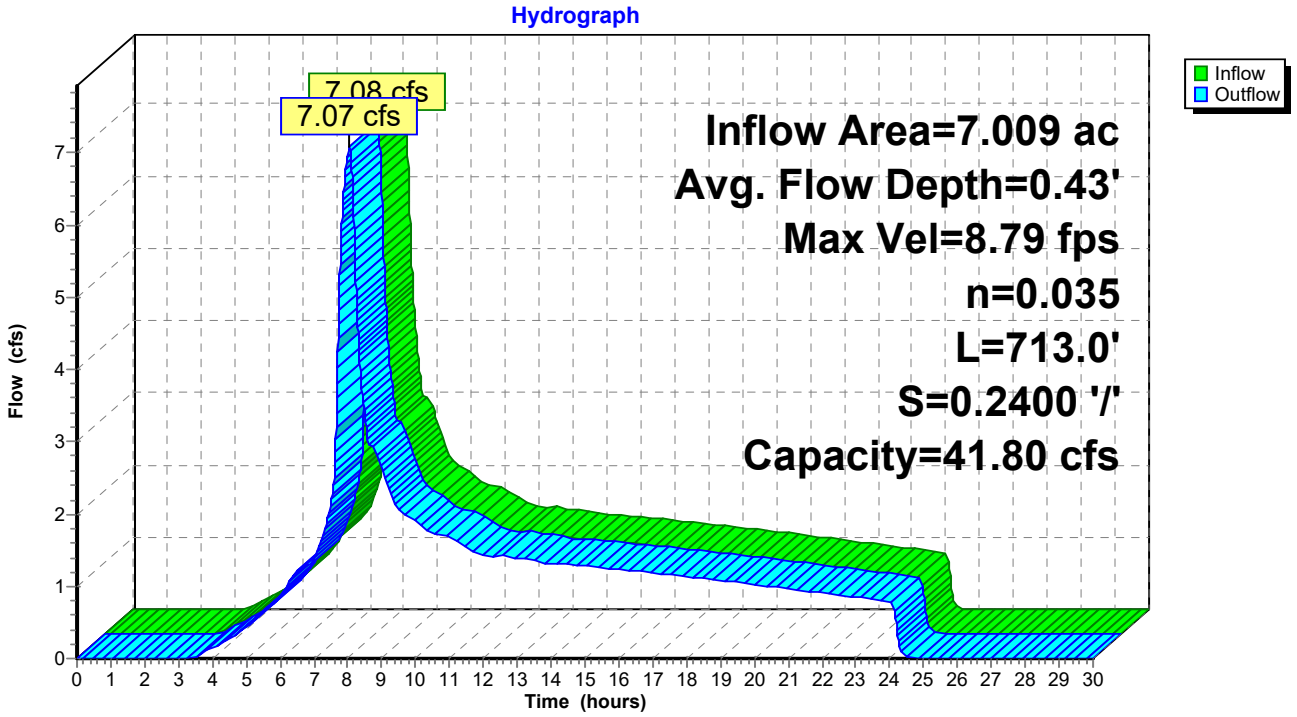
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.79 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 4.99 fps, Avg. Travel Time= 2.4 min

Peak Storage= 574 cf @ 8.02 hrs
Average Depth at Peak Storage= 0.43' , Surface Width= 2.73'
Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 41.80 cfs

1.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 5.00'
Length= 713.0' Slope= 0.2400 '/'
Inlet Invert= 0.00', Outlet Invert= -171.12'



Reach R1D-2: Reach 1D-2

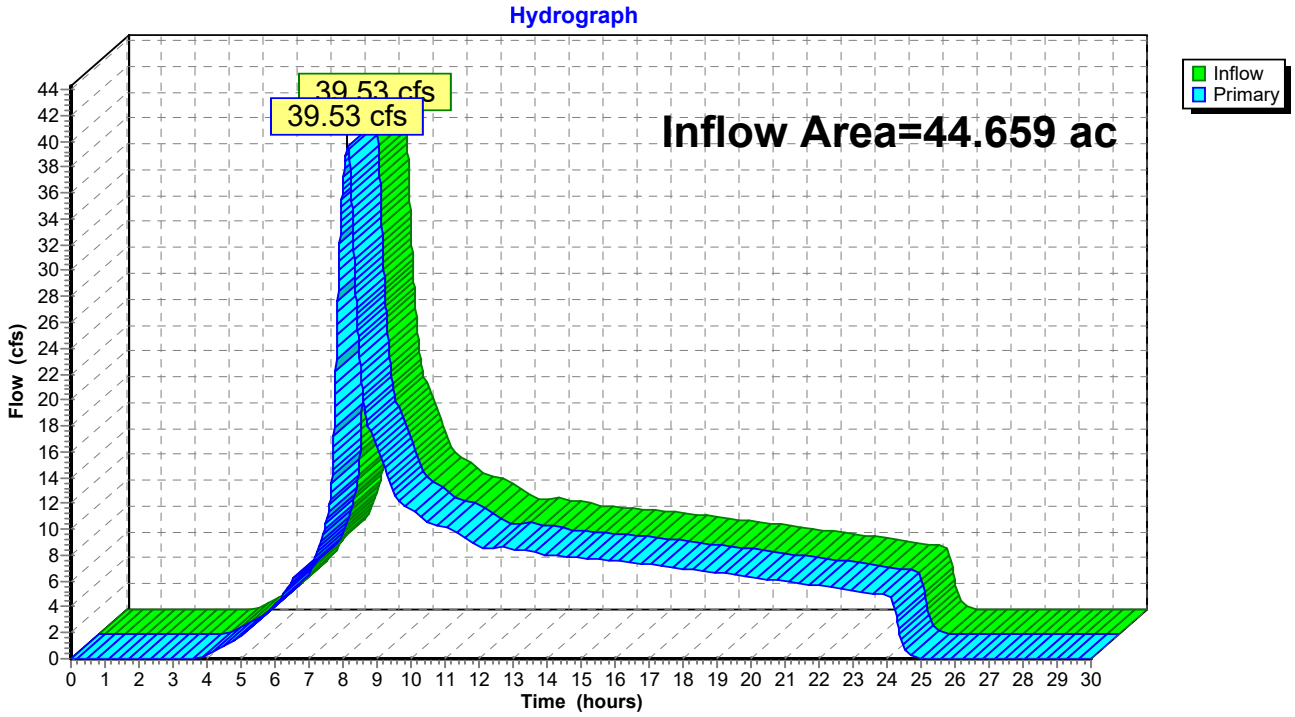


Summary for Link Outlet 1: Outlet 1

Inflow Area = 44.659 ac, 2.50% Impervious, Inflow Depth = 3.74" for 50-YR event
Inflow = 39.53 cfs @ 8.13 hrs, Volume= 13.927 af
Primary = 39.53 cfs @ 8.13 hrs, Volume= 13.927 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Outlet 1: Outlet 1



Summary for Subcatchment WS-1A: Subcat WS-1A

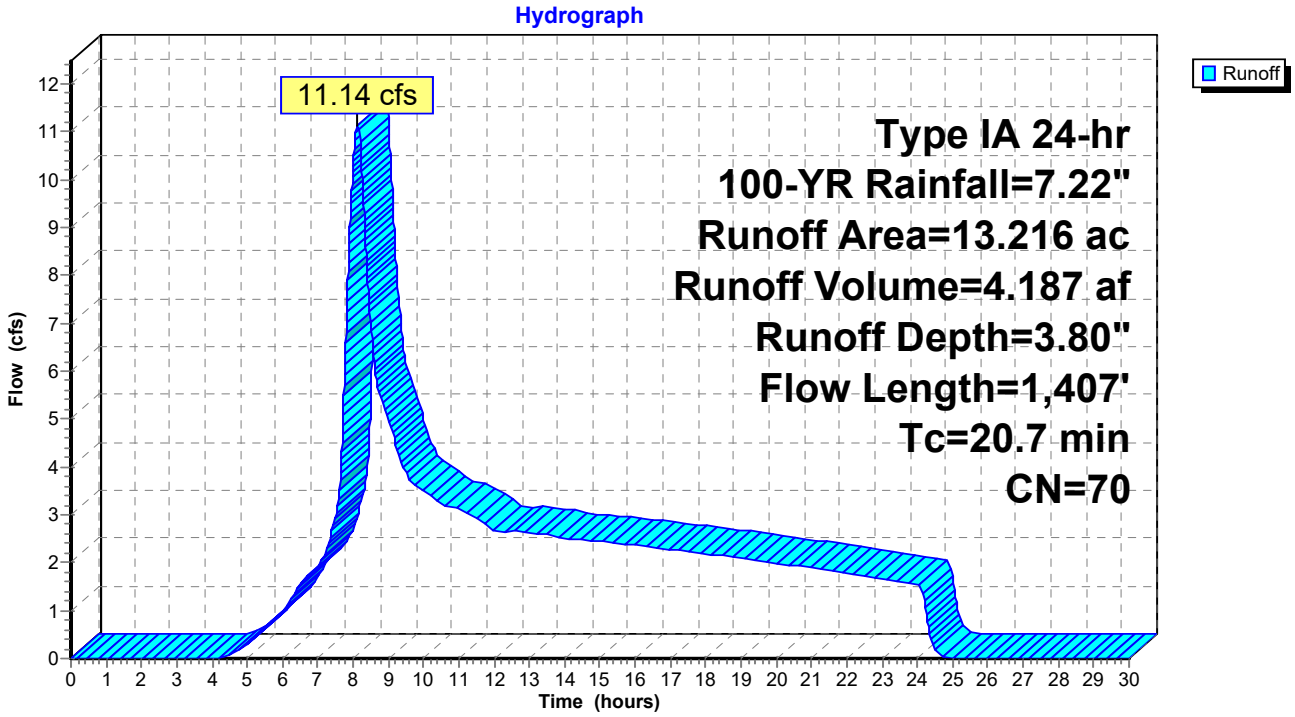
Runoff = 11.14 cfs @ 8.12 hrs, Volume= 4.187 af, Depth= 3.80"
Routed to Link Outlet 1 : Outlet 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-YR Rainfall=7.22"

Area (ac)	CN	Description
0.093	69	Annual Grass, Fair, HSG B
0.460	79	Annual Grass, Fair, HSG C
0.036	87	Dirt roads, HSG C
0.258	82	Farmsteads, HSG C
0.102	96	Gravel surface, HSG C
10.681	69	Vineyard, Fair, HSG B
0.062	79	Vineyard, Fair, HSG C
0.400	60	Woods, Fair, HSG B
1.123	73	Woods, Fair, HSG C
13.216	70	Weighted Average
13.216		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	100	0.2600	0.33		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
15.6	1,307	0.0400	1.40		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
20.7	1,407	Total			

Subcatchment WS-1A: Subcat WS-1A



Summary for Subcatchment WS-1B: Subcat WS-1B

[47] Hint: Peak is 107% of capacity of segment #3

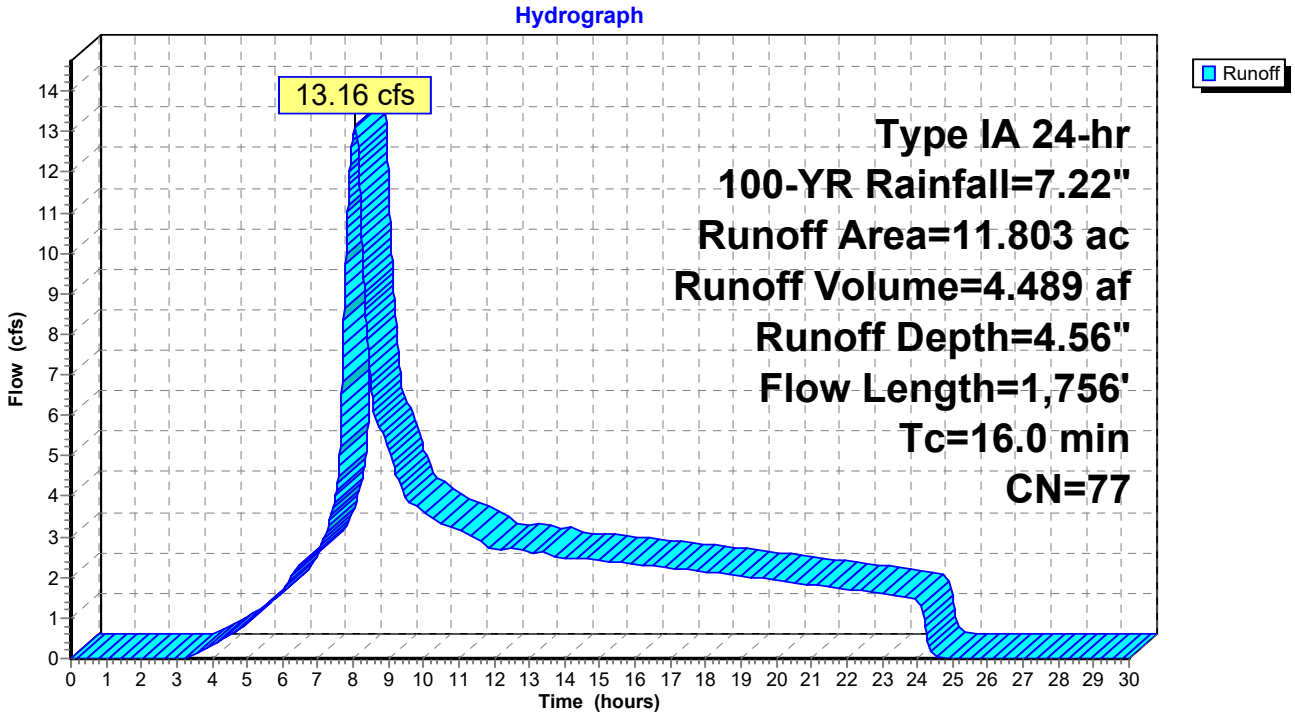
Runoff = 13.16 cfs @ 8.06 hrs, Volume= 4.489 af, Depth= 4.56"
Routed to Reach R1B : Reach 1B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-YR Rainfall=7.22"

Area (ac)	CN	Description
1.132	69	Annual Grass, Fair, HSG B
0.000	79	Annual Grass, Fair, HSG C
0.494	79	Annual Grass, Fair, HSG C
0.184	82	Dirt roads, HSG B
0.154	87	Dirt roads, HSG C
0.018	74	Farmsteads, HSG B
0.769	82	Farmsteads, HSG C
0.107	89	Gravel Roads, HSG C
0.119	96	Gravel surface, HSG C
0.289	92	Paved roads w/open ditches, 50% imp, HSG C
2.743	69	Vineyard, Fair, HSG B
5.779	79	Vineyard, Fair, HSG C
0.005	60	Woods, Fair, HSG B
0.011	73	Woods, Fair, HSG C
11.803	77	Weighted Average
11.659		98.78% Pervious Area
0.144		1.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	100	0.1600	0.27		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
6.9	1,116	0.1500	2.71		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
2.9	540	0.0100	3.08	12.32	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035 Earth, dense weeds
16.0	1,756	Total			

Subcatchment WS-1B: Subcat WS-1B



Summary for Subcatchment WS-1C: Subcat WS-1C

[47] Hint: Peak is 225% of capacity of segment #5

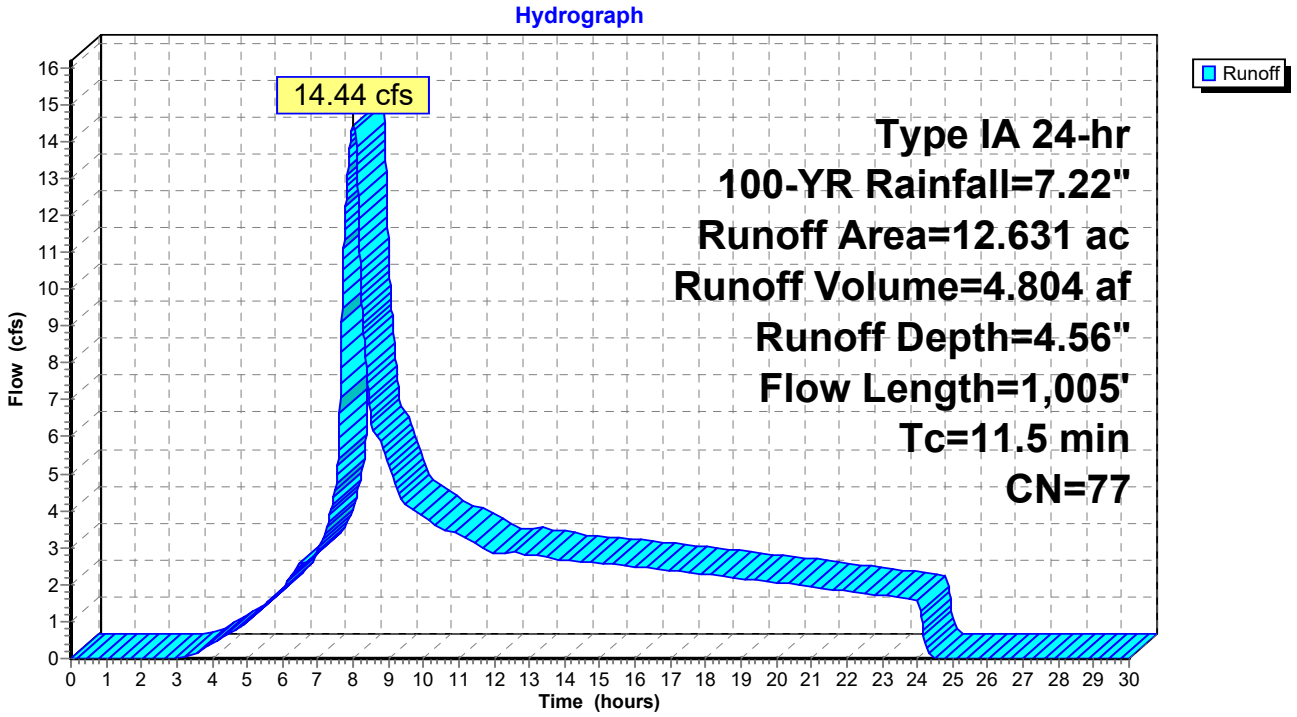
Runoff = 14.44 cfs @ 8.01 hrs, Volume= 4.804 af, Depth= 4.56"
Routed to Reach R1C : Reach 1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-YR Rainfall=7.22"

Area (ac)	CN	Description
0.695	69	Annual Grass, Fair, HSG B
1.363	79	Annual Grass, Fair, HSG C
0.178	75	Annual Grass, Good, HSG C
0.026	82	Dirt roads, HSG B
0.096	87	Dirt roads, HSG C
0.329	74	Farmsteads, HSG B
0.268	82	Farmsteads, HSG C
0.054	96	Gravel surface, HSG C
0.228	89	Paved roads w/open ditches, 50% imp, HSG B
0.120	92	Paved roads w/open ditches, 50% imp, HSG C
0.130	69	Vineyard, Fair, HSG B
3.091	79	Vineyard, Fair, HSG C
0.729	98	Water Surface, HSG B
0.071	98	Water Surface, HSG C
0.061	60	Woods, Fair, HSG B
3.925	73	Woods, Fair, HSG C
1.092	70	Woods, Good, HSG C
0.173	76	Woods/grass comb., Fair, HSG C
12.631	77	Weighted Average
11.657		92.29% Pervious Area
0.974		7.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	100	0.1900	0.19		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.6	145	0.3200	3.96		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.6	313	0.4400	3.32		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.5	397	0.1800	13.07	52.28	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.1	50	0.1200	8.17	6.42	**Pipe Channel, 12" CMP (Assumed)** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
11.5	1,005	Total			

Subcatchment WS-1C: Subcat WS-1C



Summary for Subcatchment WS-1D: Subcat WS-1D

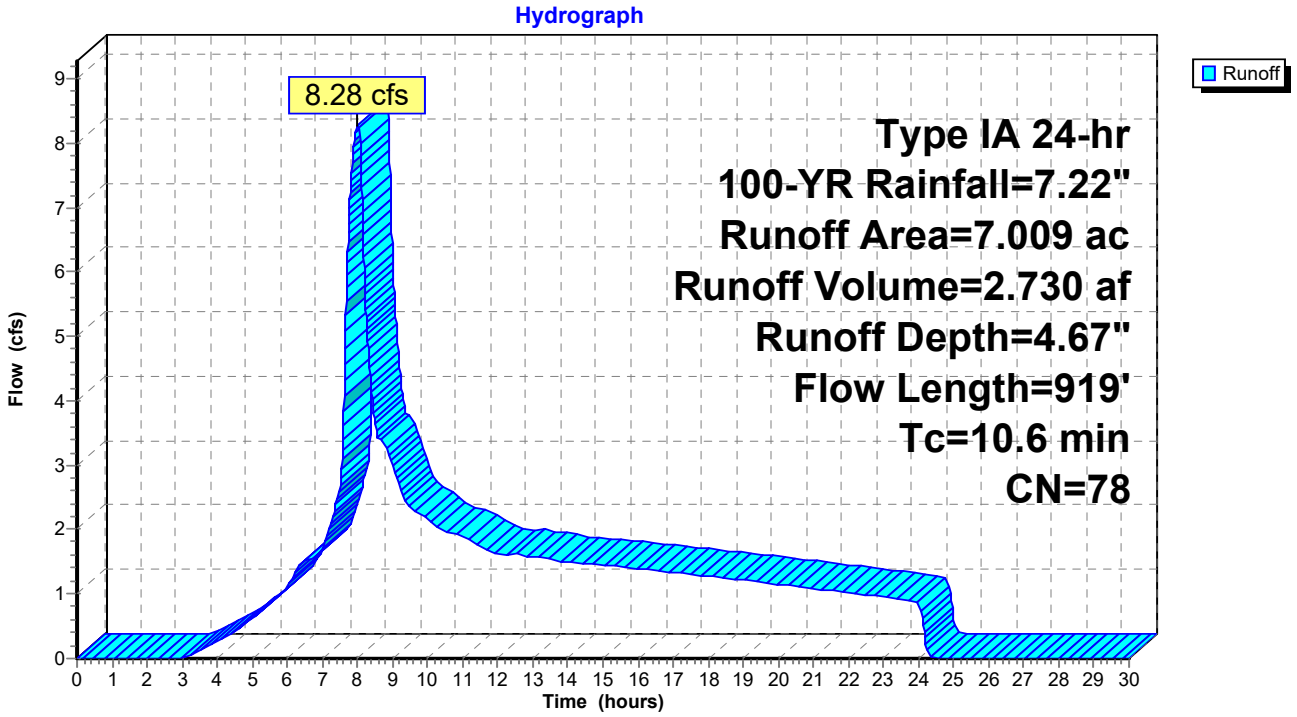
Runoff = 8.28 cfs @ 8.00 hrs, Volume= 2.730 af, Depth= 4.67"
Routed to Reach R1D-2 : Reach 1D-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-YR Rainfall=7.22"

Area (ac)	CN	Description
1.543	79	Annual Grass, Fair, HSG C
0.826	82	Farmsteads, HSG C
1.910	79	Vineyard, Fair, HSG C
1.227	73	Woods, Fair, HSG C
0.027	70	Woods, Good, HSG C
1.476	76	Woods/grass comb., Fair, HSG C
7.009	78	Weighted Average
7.009		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
2.3	428	0.2000	3.13		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.5	391	0.2400	13.93	41.80	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=1.00' D=1.00' Z= 2.0 '/' Top.W=5.00' n= 0.035
10.6	919	Total			

Subcatchment WS-1D: Subcat WS-1D



Summary for Reach R1B: Reach 1B

[65] Warning: Inlet elevation not specified

Inflow Area = 31.443 ac, 3.56% Impervious, Inflow Depth = 4.59" for 100-YR event
Inflow = 35.69 cfs @ 8.09 hrs, Volume= 12.024 af
Outflow = 35.62 cfs @ 8.13 hrs, Volume= 12.024 af, Atten= 0%, Lag= 2.4 min
Routed to Link Outlet 1 : Outlet 1

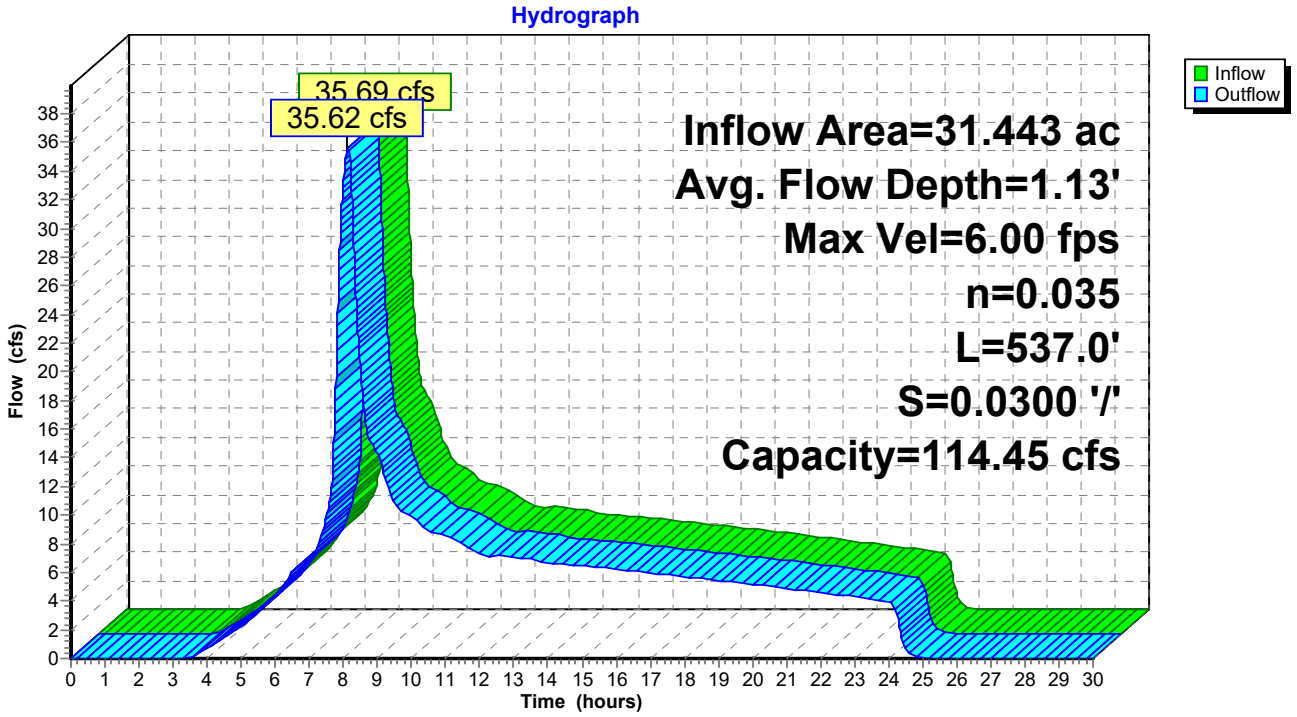
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.00 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 2.94 fps, Avg. Travel Time= 3.0 min

Peak Storage= 3,187 cf @ 8.10 hrs
Average Depth at Peak Storage= 1.13' , Surface Width= 7.52'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 114.45 cfs

3.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 11.00'
Length= 537.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -16.11'



Reach R1B: Reach 1B



Summary for Reach R1C: Reach 1C

[65] Warning: Inlet elevation not specified
[91] Warning: Storage range exceeded by 0.03'
[55] Hint: Peak inflow is 106% of Manning's capacity

Inflow Area = 19.639 ac, 4.96% Impervious, Inflow Depth = 4.60" for 100-YR event
Inflow = 22.69 cfs @ 8.03 hrs, Volume= 7.534 af
Outflow = 22.59 cfs @ 8.10 hrs, Volume= 7.534 af, Atten= 0%, Lag= 4.5 min
Routed to Reach R1B : Reach 1B

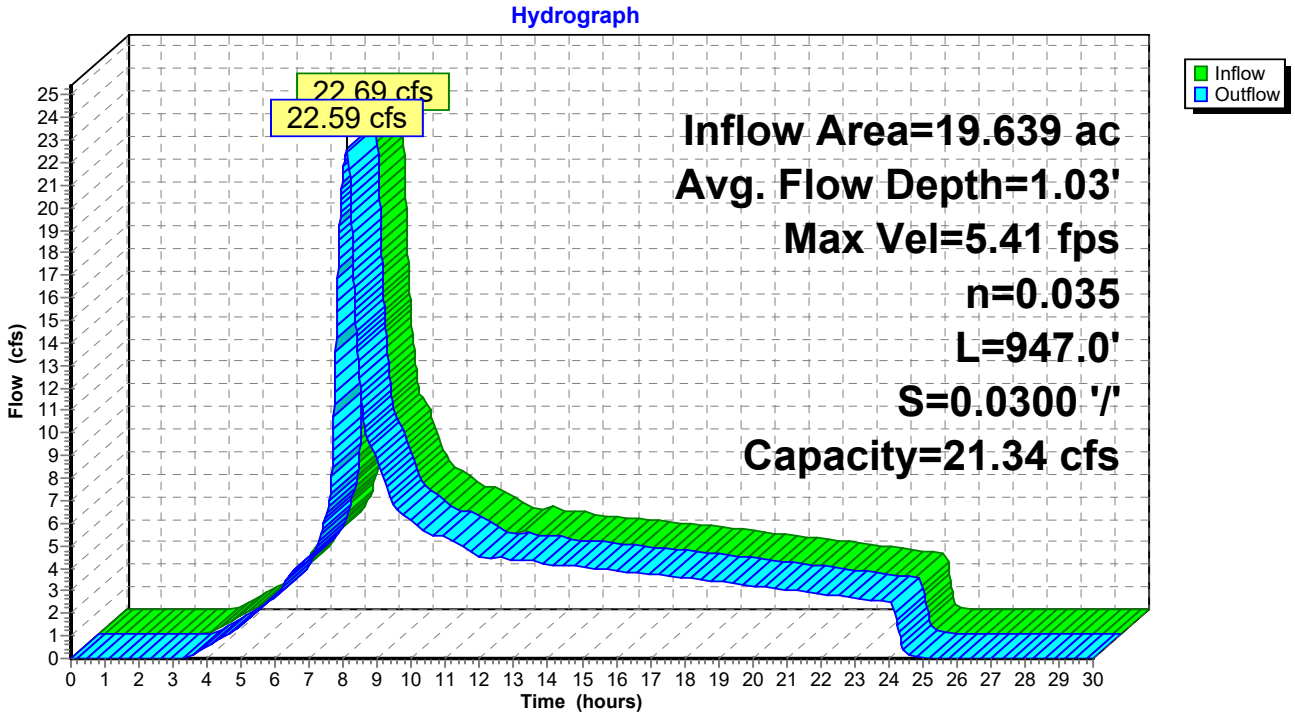
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.41 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 2.68 fps, Avg. Travel Time= 5.9 min

Peak Storage= 3,951 cf @ 8.05 hrs
Average Depth at Peak Storage= 1.03' , Surface Width= 6.12'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 21.34 cfs

2.00' x 1.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 947.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -28.41'



Reach R1C: Reach 1C



Summary for Reach R1D-1: Reach 1D-1

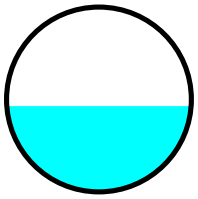
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 7.009 ac, 0.00% Impervious, Inflow Depth = 4.67" for 100-YR event
Inflow = 8.27 cfs @ 8.04 hrs, Volume= 2.730 af
Outflow = 8.27 cfs @ 8.04 hrs, Volume= 2.730 af, Atten= 0%, Lag= 0.1 min
Routed to Reach R1C : Reach 1C

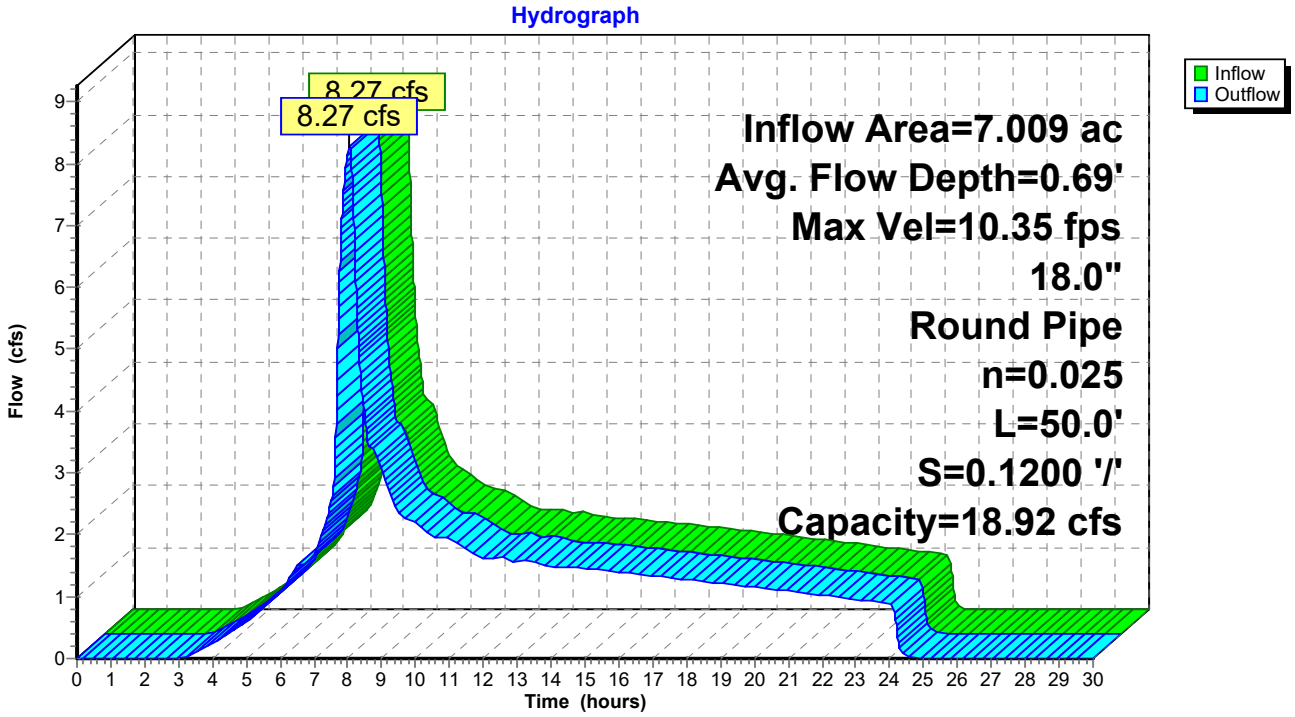
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.35 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.87 fps, Avg. Travel Time= 0.1 min

Peak Storage= 40 cf @ 8.04 hrs
Average Depth at Peak Storage= 0.69' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 18.92 cfs

18.0" Round Pipe
n= 0.025 Corrugated metal
Length= 50.0' Slope= 0.1200 '/'
Inlet Invert= 0.00', Outlet Invert= -6.00'



Reach R1D-1: Reach 1D-1



Summary for Reach R1D-2: Reach 1D-2

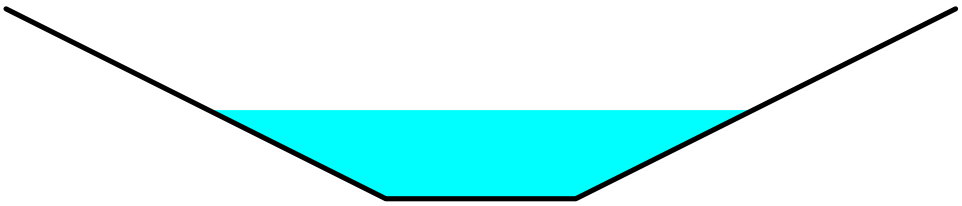
[65] Warning: Inlet elevation not specified

Inflow Area = 7.009 ac, 0.00% Impervious, Inflow Depth = 4.67" for 100-YR event
Inflow = 8.28 cfs @ 8.00 hrs, Volume= 2.730 af
Outflow = 8.27 cfs @ 8.04 hrs, Volume= 2.730 af, Atten= 0%, Lag= 2.4 min
Routed to Reach R1D-1 : Reach 1D-1

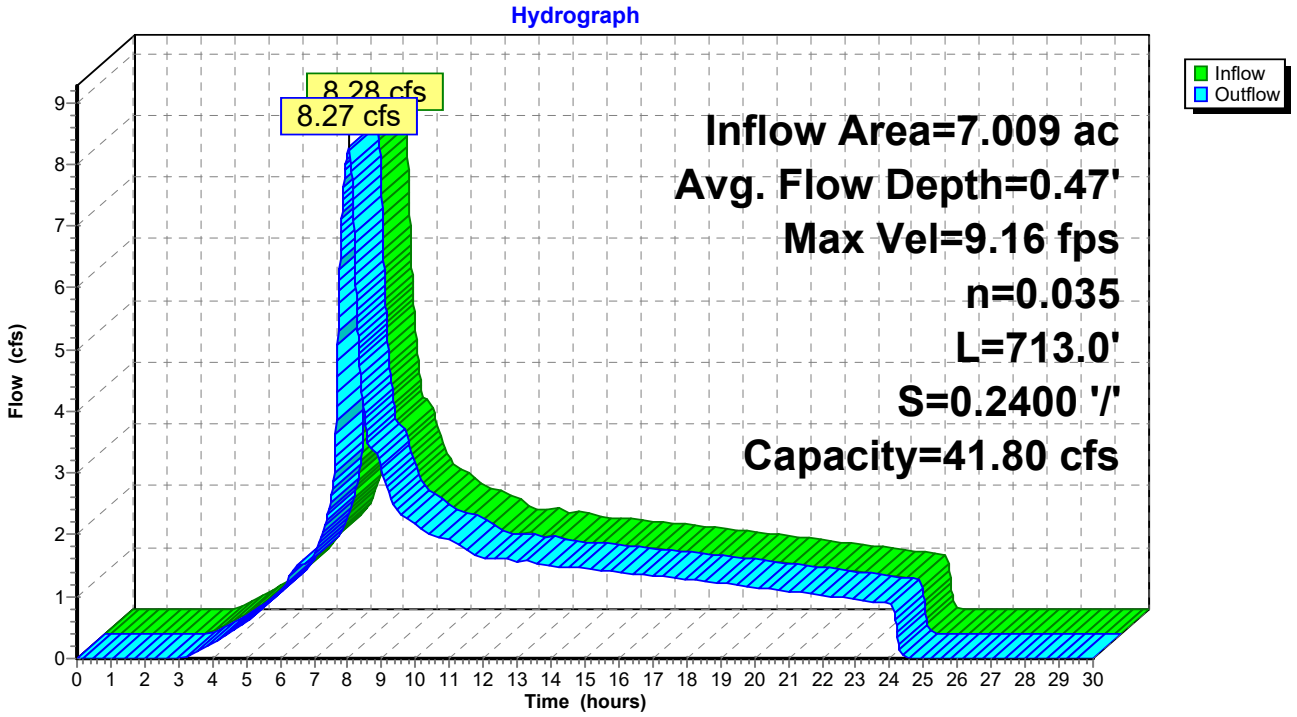
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.16 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 5.19 fps, Avg. Travel Time= 2.3 min

Peak Storage= 644 cf @ 8.02 hrs
Average Depth at Peak Storage= 0.47' , Surface Width= 2.87'
Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 41.80 cfs

1.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 5.00'
Length= 713.0' Slope= 0.2400 '/'
Inlet Invert= 0.00', Outlet Invert= -171.12'



Reach R1D-2: Reach 1D-2

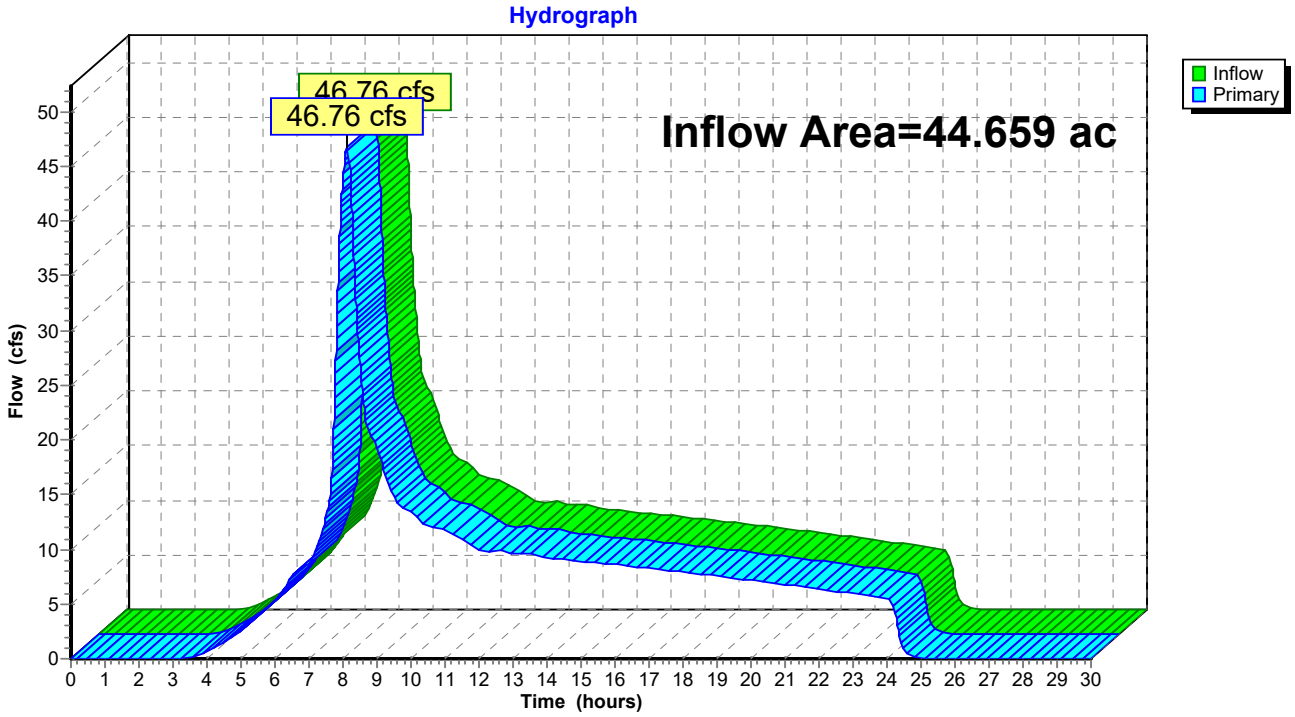


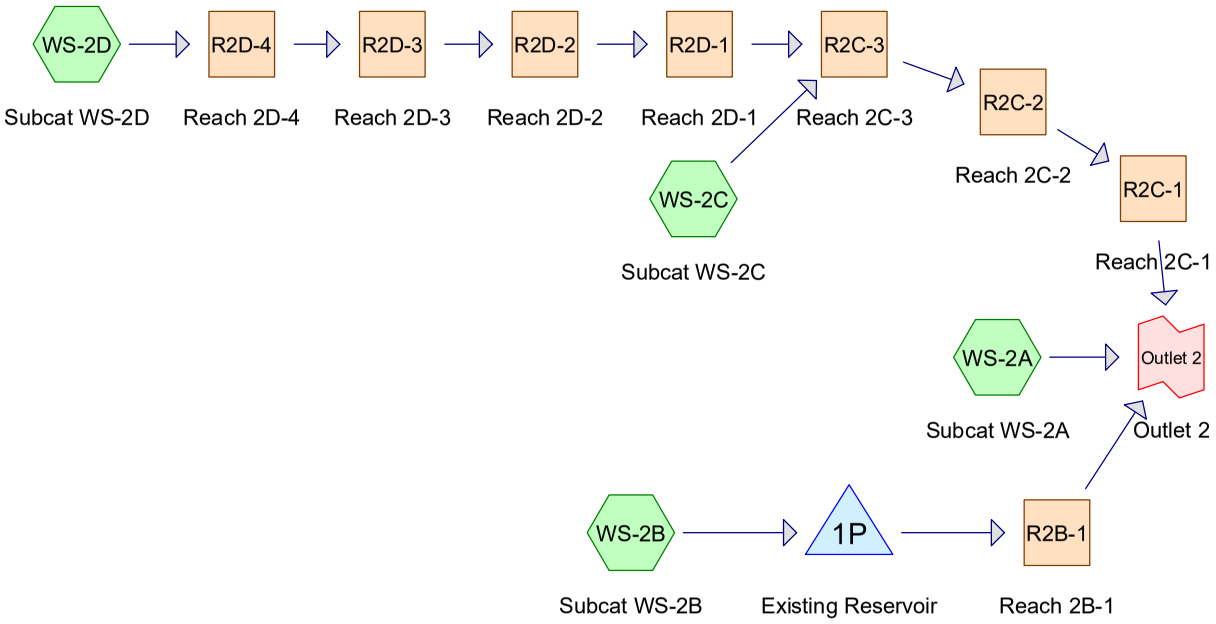
Summary for Link Outlet 1: Outlet 1

Inflow Area = 44.659 ac, 2.50% Impervious, Inflow Depth = 4.36" for 100-YR event
Inflow = 46.76 cfs @ 8.12 hrs, Volume= 16.211 af
Primary = 46.76 cfs @ 8.12 hrs, Volume= 16.211 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Outlet 1: Outlet 1





Subcat Reach Pond Link

Routing Diagram for Wappo Hill Pre-Project WS2
Prepared by PPI Engineering, Printed 11/9/2023
HydroCAD® 10.20-3c s/n 09429 © 2023 HydroCAD Software Solutions LLC

Summary for Subcatchment WS-2A: Subcat WS-2A

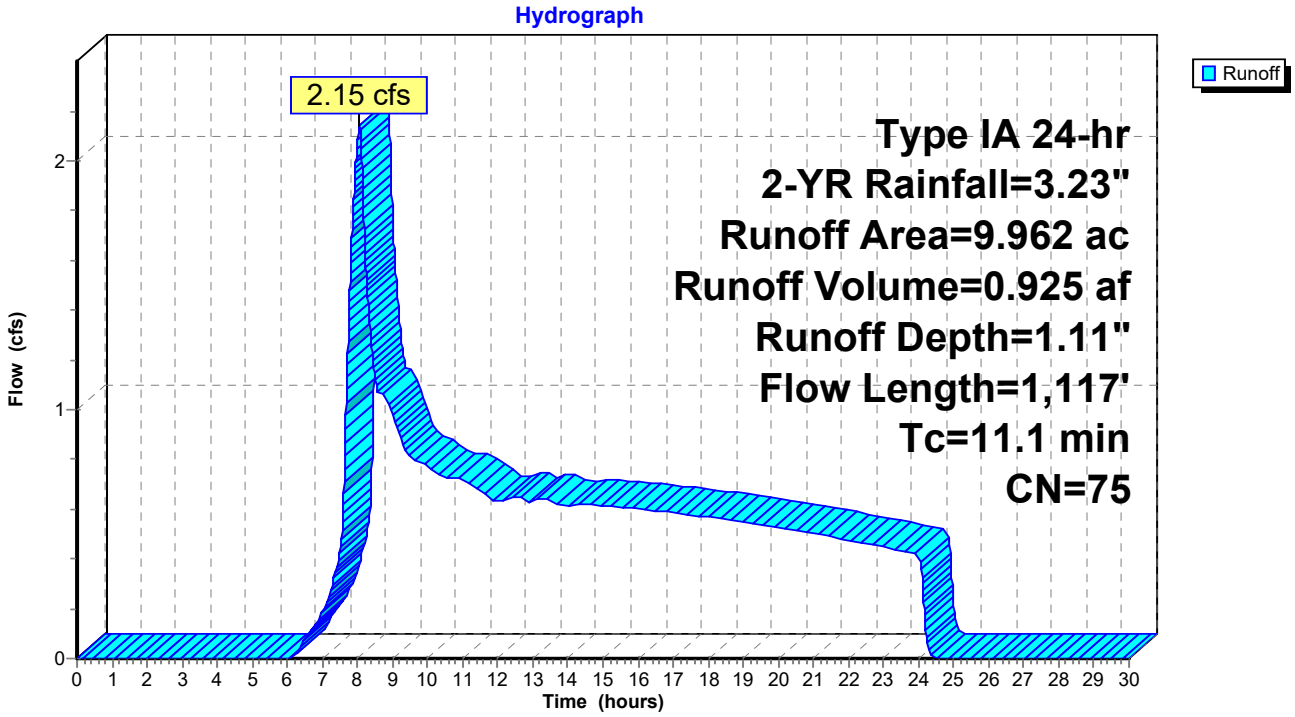
Runoff = 2.15 cfs @ 8.05 hrs, Volume= 0.925 af, Depth= 1.11"
Routed to Link Outlet 2 : Outlet 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-YR Rainfall=3.23"

	Area (ac)	CN	Description
*	0.000	0	, HSG C
	0.832	69	Annual Grass, Fair, HSG B
	2.728	79	Annual Grass, Fair, HSG C
	0.000	82	Dirt roads, HSG B
	0.055	87	Dirt roads, HSG C
	0.124	82	Farmsteads, HSG C
	0.026	89	Paved roads w/open ditches, 50% imp, HSG B
	0.158	92	Paved roads w/open ditches, 50% imp, HSG C
	0.247	60	Woods, Fair, HSG B
	5.793	73	Woods, Fair, HSG C
	9.962	75	Weighted Average
	9.870		99.08% Pervious Area
	0.092		0.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	100	0.2400	0.32		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
2.6	335	0.1900	2.18		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
1.3	158	0.0900	2.10		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.6	409	0.0200	4.36	17.43	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.2	64	0.0200	6.14	30.16	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025 Corrugated metal
0.1	51	0.0600	7.55	30.18	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
11.1	1,117	Total			

Subcatchment WS-2A: Subcat WS-2A



Summary for Subcatchment WS-2B: Subcat WS-2B

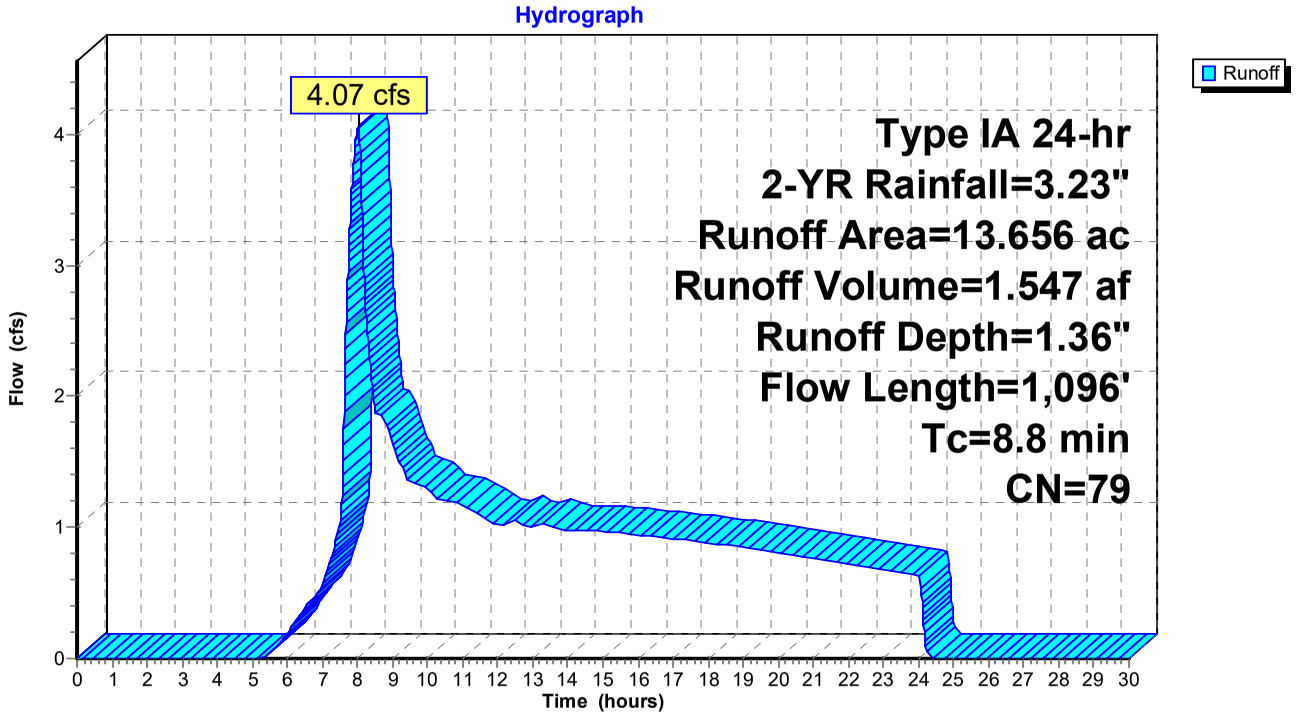
Runoff = 4.07 cfs @ 8.03 hrs, Volume= 1.547 af, Depth= 1.36"
Routed to Pond 1P : Existing Reservoir

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-YR Rainfall=3.23"

Area (ac)	CN	Description
0.661	69	Annual Grass, Fair, HSG B
1.698	79	Annual Grass, Fair, HSG C
0.195	84	Annual Grass, Fair, HSG D
0.668	82	Farmsteads, HSG C
0.149	89	Gravel Roads, HSG C
0.001	92	Paved roads w/open ditches, 50% imp, HSG C
2.792	79	Vineyard, Fair, HSG C
0.032	98	Water Surface, HSG B
0.000	98	Water Surface, HSG C
1.754	98	Water Surface, HSG D
0.050	60	Woods, Fair, HSG B
5.654	73	Woods, Fair, HSG C
0.001	79	Woods, Fair, HSG D
13.656	79	Weighted Average
11.869		86.91% Pervious Area
1.787		13.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.2500	0.32		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
3.1	564	0.1900	3.05		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.5	432	0.2300	14.77	59.09	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
8.8	1,096	Total			

Subcatchment WS-2B: Subcat WS-2B



Summary for Subcatchment WS-2C: Subcat WS-2C

Runoff = 2.17 cfs @ 8.08 hrs, Volume= 1.180 af, Depth= 0.85"
Routed to Reach R2C-3 : Reach 2C-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-YR Rainfall=3.23"

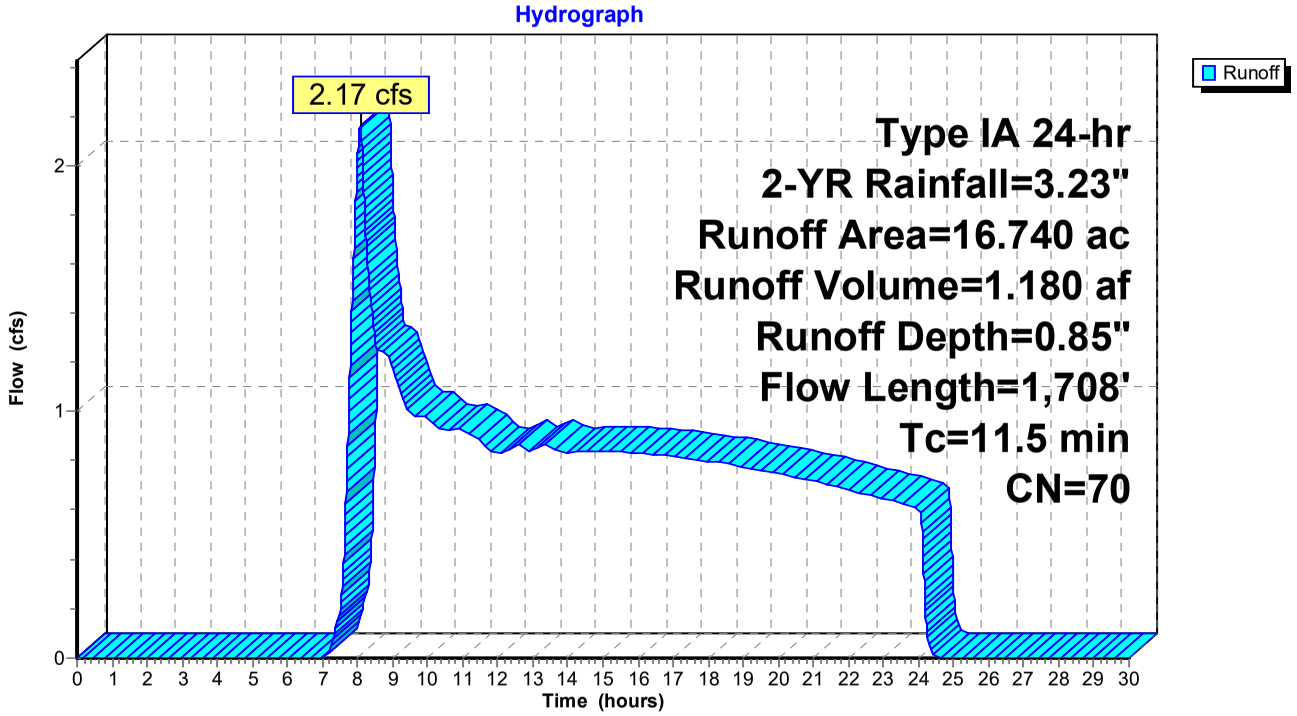
Area (ac)	CN	Description
2.003	69	Annual Grass, Fair, HSG B
1.330	79	Annual Grass, Fair, HSG C
0.115	65	Brush, Good, HSG C
0.025	82	Dirt roads, HSG B
0.001	87	Dirt roads, HSG C
0.199	74	Farmsteads, HSG B
0.908	82	Farmsteads, HSG C
0.037	85	Gravel Roads, HSG B
0.183	89	Gravel Roads, HSG C
0.247	89	Paved roads w/open ditches, 50% imp, HSG B
0.138	92	Paved roads w/open ditches, 50% imp, HSG C
0.090	69	Vineyard, Fair, HSG B
0.695	79	Vineyard, Fair, HSG C
6.132	60	Woods, Fair, HSG B
4.637	73	Woods, Fair, HSG C
16.740	70	Weighted Average
16.547		98.85% Pervious Area
0.193		1.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.1800	0.28		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
1.3	297	0.2800	3.70		**Shallow Concentrated Flow, Shallow - Woodland** Short Grass Pasture Kv= 7.0 fps
1.6	266	0.3200	2.83		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.9	543	0.1100	10.22	40.87	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.8	90	0.0800	1.98		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.6	236	0.0500	6.36	19.08	**Trap/Vee/Rect Channel Flow, Pasture Ditch** Bot.W=1.00' D=1.00' Z= 2.0 '/' Top.W=5.00' n= 0.035
0.1	57	0.0400	18.72	58.82	**Pipe Channel, 24" PVC Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.010 PVC, smooth interior
0.1	57	0.0400	8.69	42.66	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025
0.2	62	0.0200	4.36	17.43	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00'

n= 0.035

11.5	1,708	Total

Subcatchment WS-2C: Subcat WS-2C



Summary for Subcatchment WS-2D: Subcat WS-2D

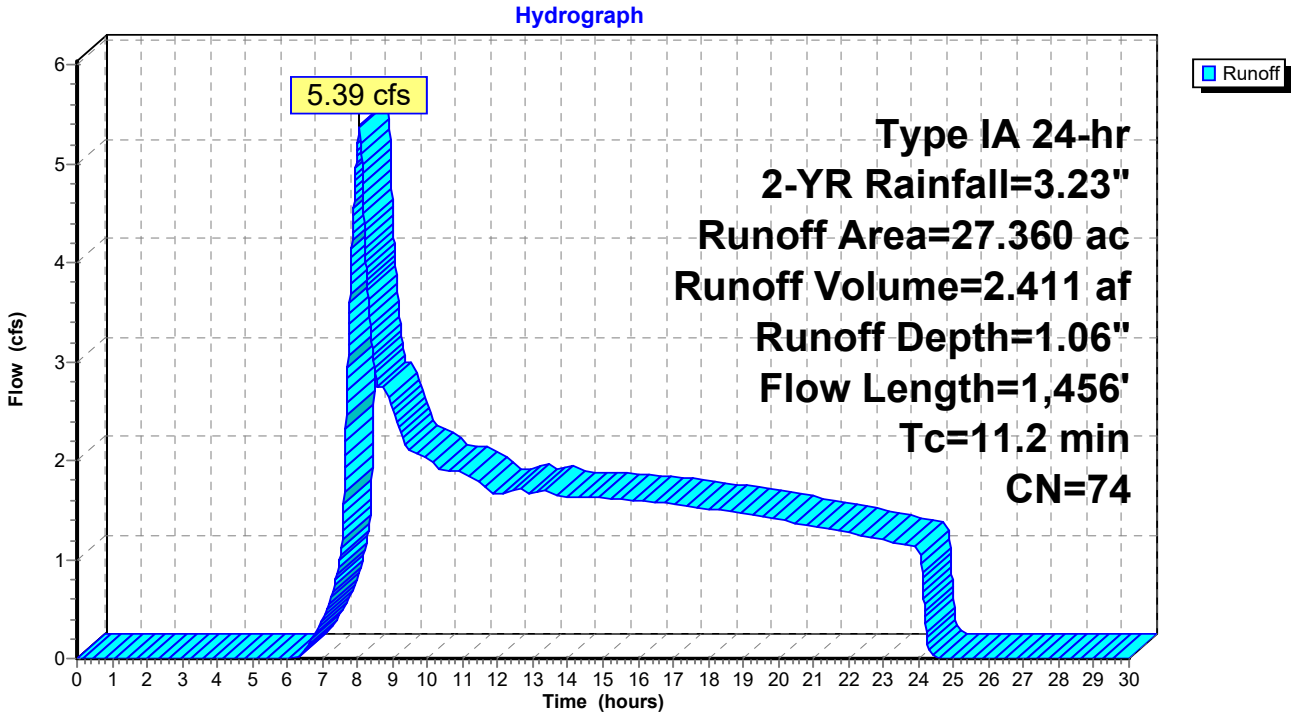
Runoff = 5.39 cfs @ 8.05 hrs, Volume= 2.411 af, Depth= 1.06"
Routed to Reach R2D-4 : Reach 2D-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-YR Rainfall=3.23"

Area (ac)	CN	Description
0.073	69	Annual Grass, Fair, HSG B
2.356	79	Annual Grass, Fair, HSG C
0.715	75	Annual Grass, Good, HSG C
0.073	87	Dirt roads, HSG C
0.320	82	Farmsteads, HSG C
0.174	89	Gravel Roads, HSG C
0.020	89	Paved roads w/open ditches, 50% imp, HSG B
1.171	92	Paved roads w/open ditches, 50% imp, HSG C
0.458	60	Woods, Fair, HSG B
17.774	73	Woods, Fair, HSG C
4.225	70	Woods, Good, HSG C
27.360	74	Weighted Average
26.764		97.82% Pervious Area
0.596		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	87	0.1200	0.16		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.3	41	0.2500	2.50		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.5	267	0.1100	8.23	16.47	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=0.00' D=1.00' Z= 2.0 '/' Top.W=4.00' n= 0.035
0.0	27	0.1500	9.14	7.18	**Pipe Channel, 12" CMP Culvert** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025
0.1	59	0.2500	15.40	61.61	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.1	135	0.3800	23.08	72.52	**Pipe Channel, 24" CMP Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025
0.6	525	0.2000	13.78	55.11	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.0	42	0.2100	19.91	97.74	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025
0.3	273	0.1800	13.07	52.28	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
11.2	1,456	Total			

Subcatchment WS-2D: Subcat WS-2D



Summary for Reach R2B-1: Reach 2B-1

[65] Warning: Inlet elevation not specified

Inflow Area = 13.656 ac, 13.09% Impervious, Inflow Depth > 0.75" for 2-YR event
Inflow = 0.66 cfs @ 23.48 hrs, Volume= 0.851 af
Outflow = 0.66 cfs @ 23.78 hrs, Volume= 0.838 af, Atten= 0%, Lag= 18.4 min
Routed to Link Outlet 2 : Outlet 2

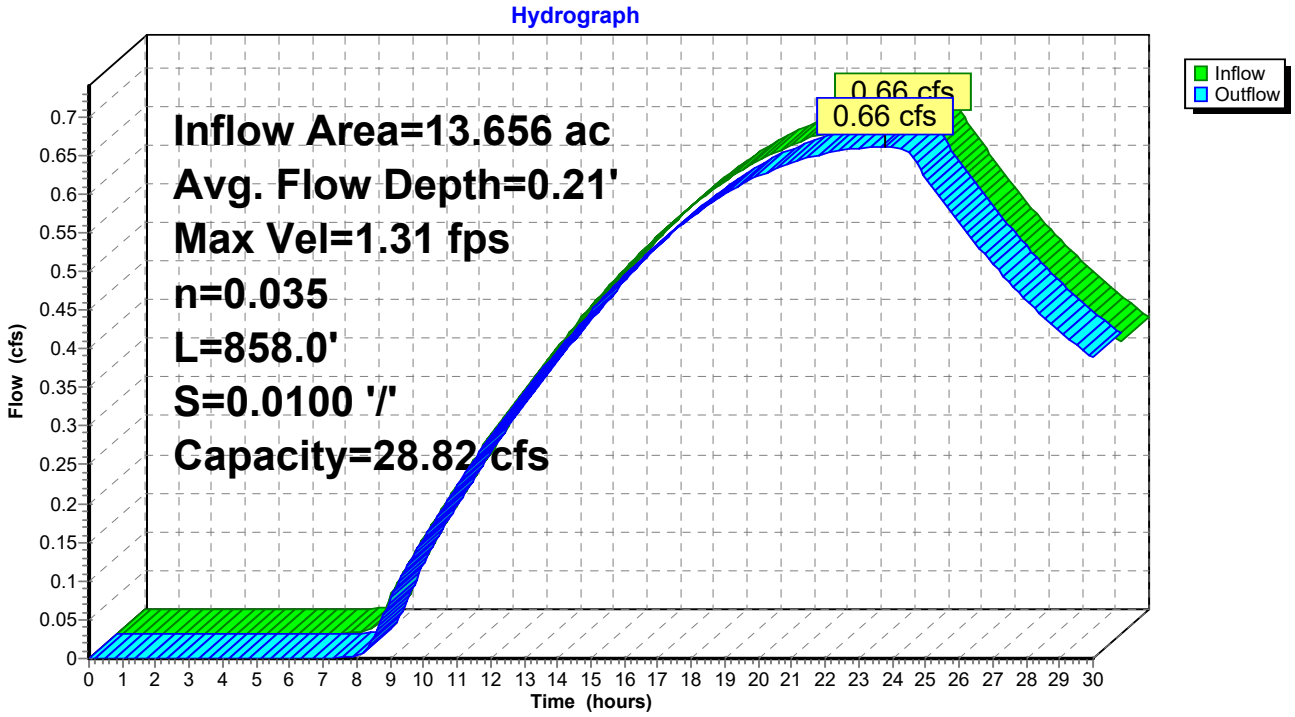
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.31 fps, Min. Travel Time= 10.9 min
Avg. Velocity = 1.06 fps, Avg. Travel Time= 13.5 min

Peak Storage= 432 cf @ 23.60 hrs
Average Depth at Peak Storage= 0.21' , Surface Width= 2.83'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 28.82 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 858.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -8.58'



Reach R2B-1: Reach 2B-1



Summary for Reach R2C-1: Reach 2C-1

[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 0.98" for 2-YR event
Inflow = 7.39 cfs @ 8.18 hrs, Volume= 3.590 af
Outflow = 7.39 cfs @ 8.18 hrs, Volume= 3.590 af, Atten= 0%, Lag= 0.3 min
Routed to Link Outlet 2 : Outlet 2

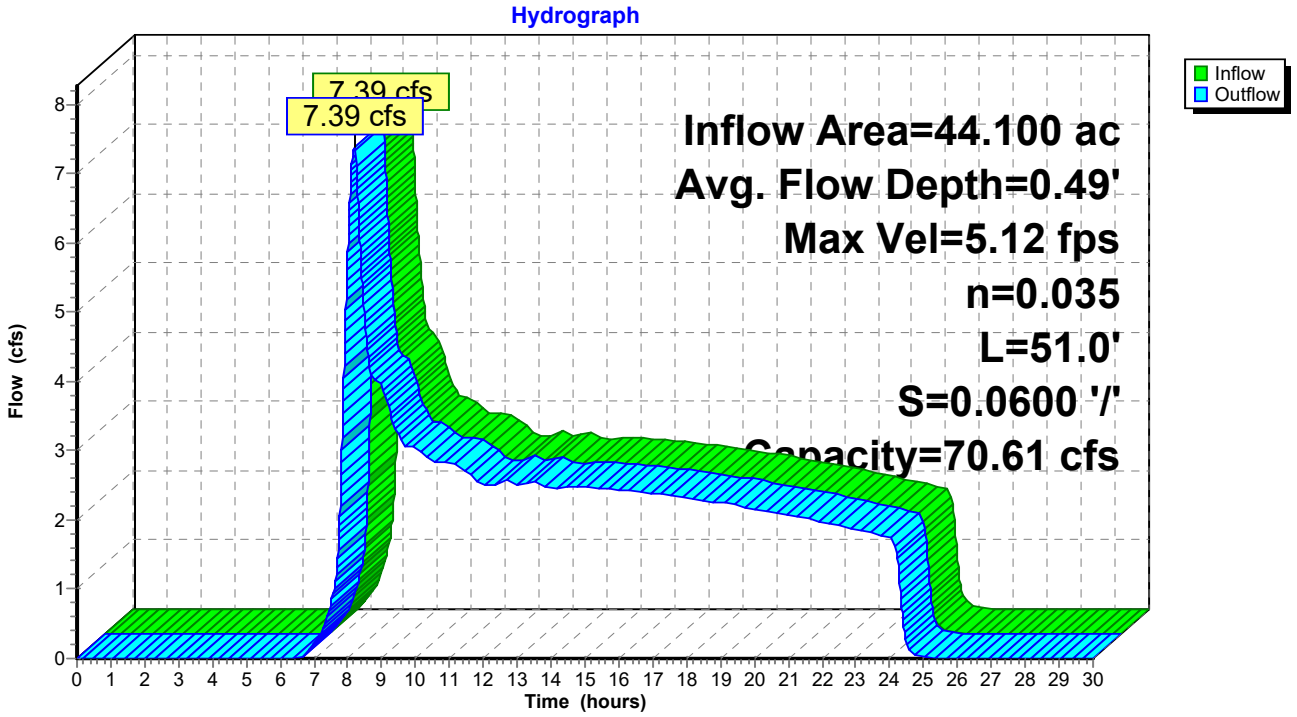
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.12 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.17 fps, Avg. Travel Time= 0.3 min

Peak Storage= 74 cf @ 8.18 hrs
Average Depth at Peak Storage= 0.49' , Surface Width= 3.94'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 70.61 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 51.0' Slope= 0.0600 '/'
Inlet Invert= 0.00', Outlet Invert= -3.06'



Reach R2C-1: Reach 2C-1



Summary for Reach R2C-2: Reach 2C-2

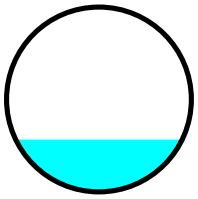
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 0.98" for 2-YR event
Inflow = 7.39 cfs @ 8.17 hrs, Volume= 3.590 af
Outflow = 7.39 cfs @ 8.18 hrs, Volume= 3.590 af, Atten= 0%, Lag= 0.3 min
Routed to Reach R2C-1 : Reach 2C-1

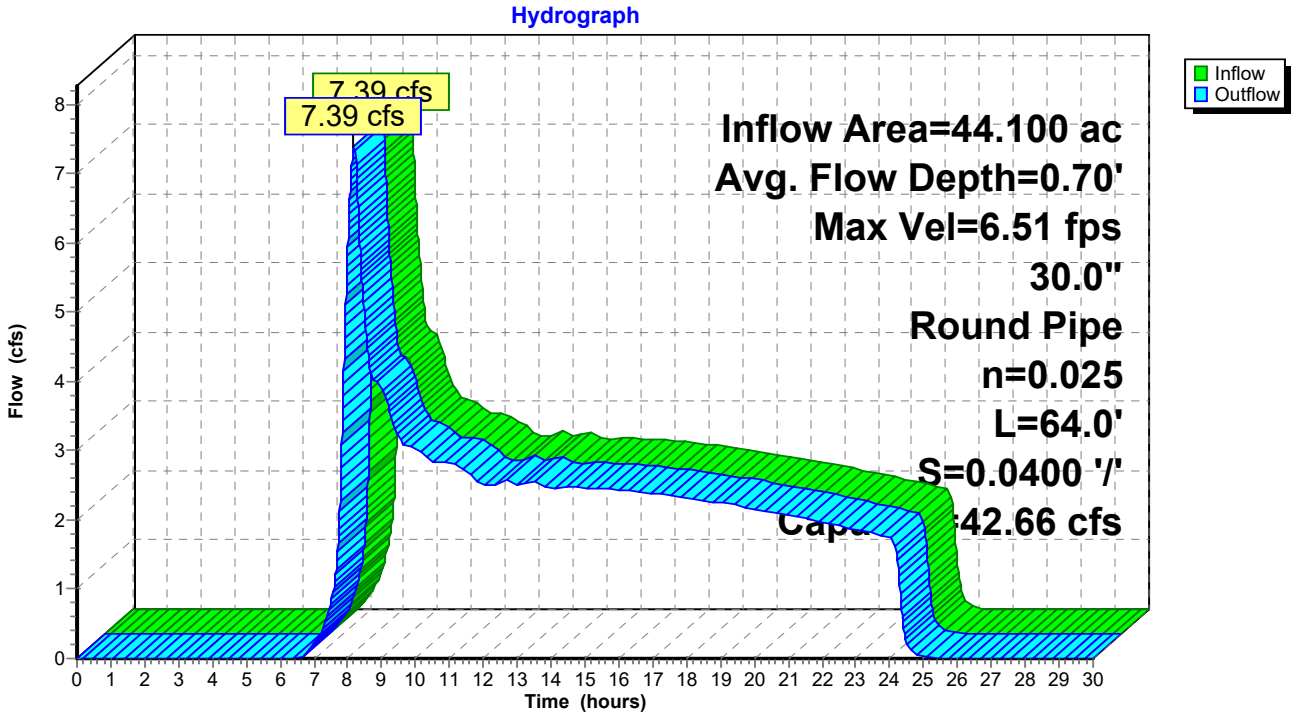
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.51 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 4.11 fps, Avg. Travel Time= 0.3 min

Peak Storage= 73 cf @ 8.18 hrs
Average Depth at Peak Storage= 0.70' , Surface Width= 2.25'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 42.66 cfs

30.0" Round Pipe
n= 0.025 Corrugated metal
Length= 64.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.56'



Reach R2C-2: Reach 2C-2



Summary for Reach R2C-3: Reach 2C-3

[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 0.98" for 2-YR event
Inflow = 7.44 cfs @ 8.11 hrs, Volume= 3.590 af
Outflow = 7.39 cfs @ 8.17 hrs, Volume= 3.590 af, Atten= 1%, Lag= 3.7 min
Routed to Reach R2C-2 : Reach 2C-2

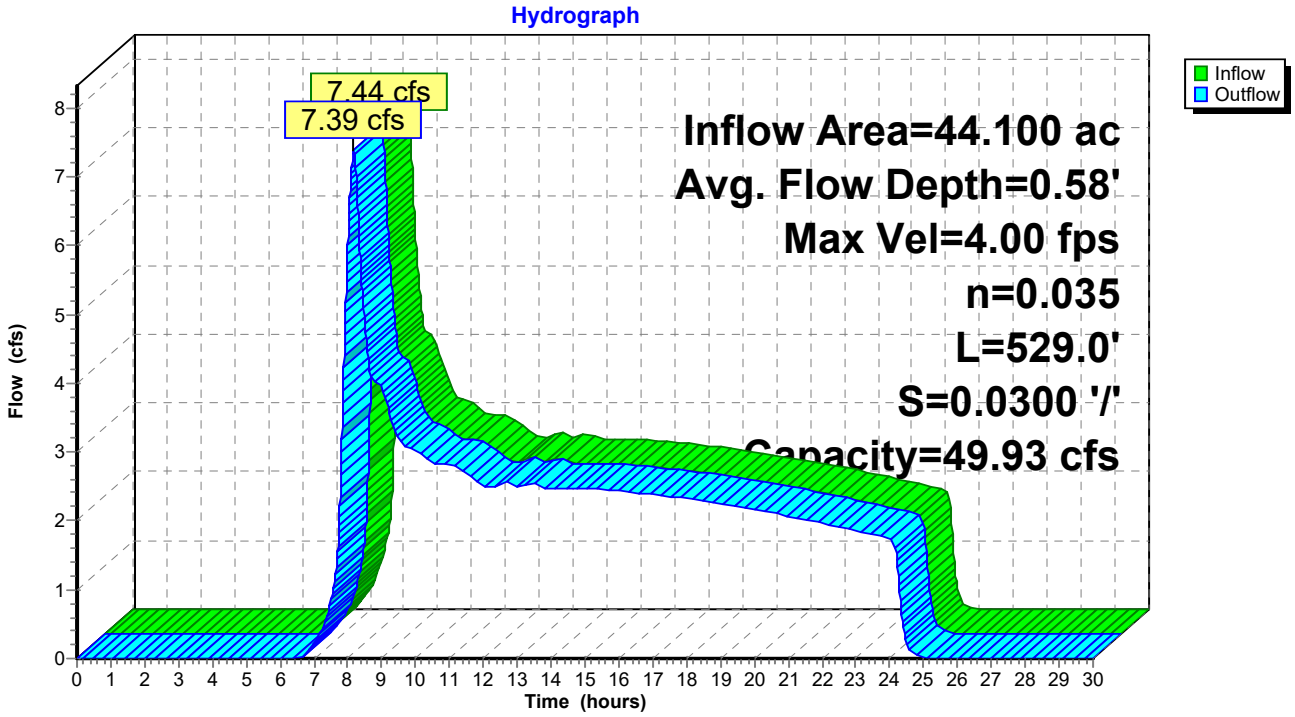
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.00 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 2.48 fps, Avg. Travel Time= 3.6 min

Peak Storage= 978 cf @ 8.14 hrs
Average Depth at Peak Storage= 0.58' , Surface Width= 4.33'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 49.93 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 529.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -15.87'



Reach R2C-3: Reach 2C-3



Summary for Reach R2D-1: Reach 2D-1

[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 1.06" for 2-YR event
Inflow = 5.35 cfs @ 8.13 hrs, Volume= 2.411 af
Outflow = 5.35 cfs @ 8.13 hrs, Volume= 2.411 af, Atten= 0%, Lag= 0.5 min
Routed to Reach R2C-3 : Reach 2C-3

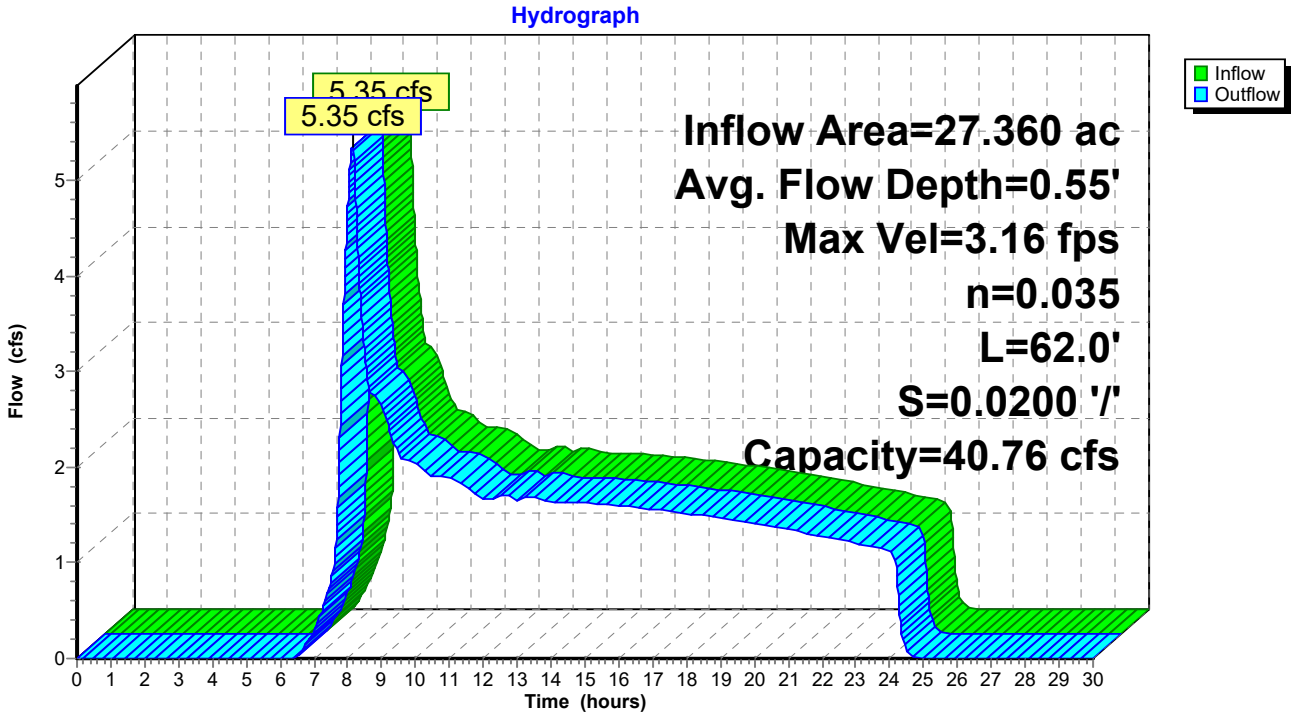
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.16 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.97 fps, Avg. Travel Time= 0.5 min

Peak Storage= 105 cf @ 8.13 hrs
Average Depth at Peak Storage= 0.55' , Surface Width= 4.19'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 40.76 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 62.0' Slope= 0.0200 '/'
Inlet Invert= 0.00', Outlet Invert= -1.24'



Reach R2D-1: Reach 2D-1



Summary for Reach R2D-2: Reach 2D-2

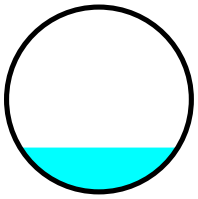
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 1.06" for 2-YR event
Inflow = 5.35 cfs @ 8.12 hrs, Volume= 2.411 af
Outflow = 5.35 cfs @ 8.13 hrs, Volume= 2.411 af, Atten= 0%, Lag= 0.3 min
Routed to Reach R2D-1 : Reach 2D-1

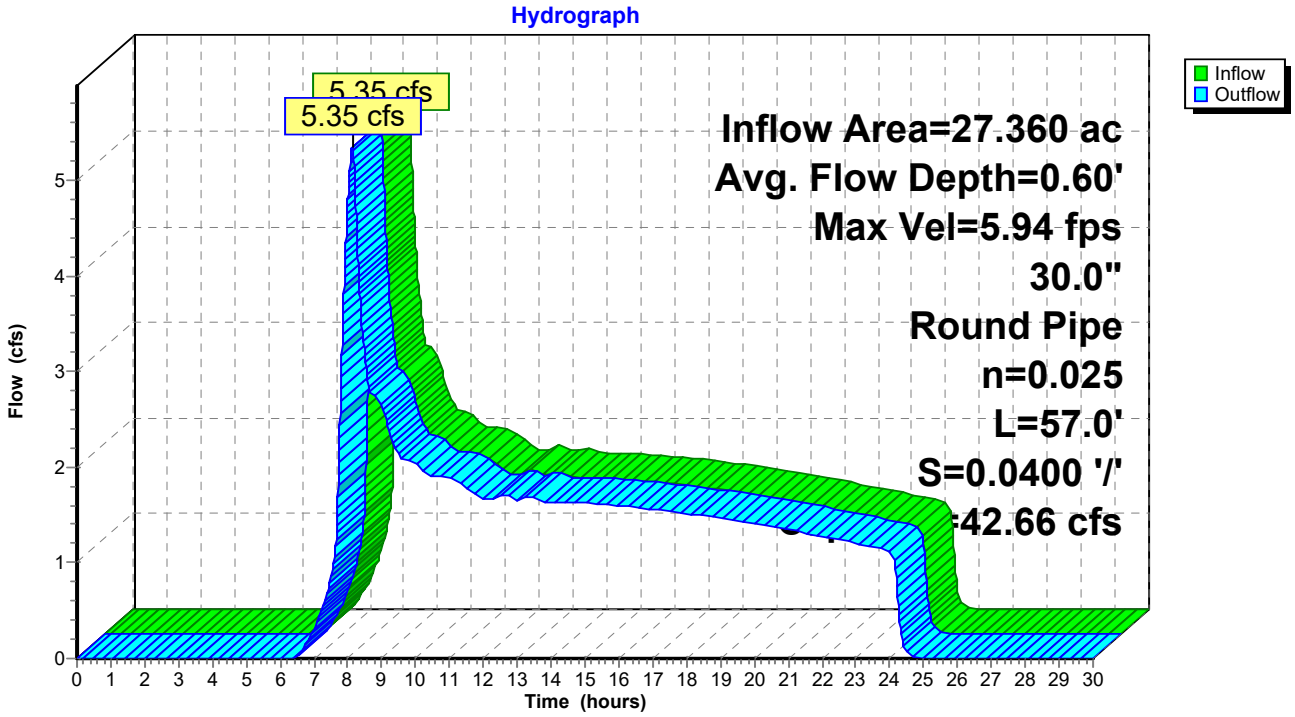
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.94 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.77 fps, Avg. Travel Time= 0.3 min

Peak Storage= 51 cf @ 8.12 hrs
Average Depth at Peak Storage= 0.60' , Surface Width= 2.13'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 42.66 cfs

30.0" Round Pipe
n= 0.025 Corrugated metal
Length= 57.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.28'



Reach R2D-2: Reach 2D-2



Summary for Reach R2D-3: Reach 2D-3

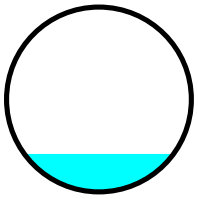
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 1.06" for 2-YR event
Inflow = 5.35 cfs @ 8.12 hrs, Volume= 2.411 af
Outflow = 5.35 cfs @ 8.12 hrs, Volume= 2.411 af, Atten= 0%, Lag= 0.1 min
Routed to Reach R2D-2 : Reach 2D-2

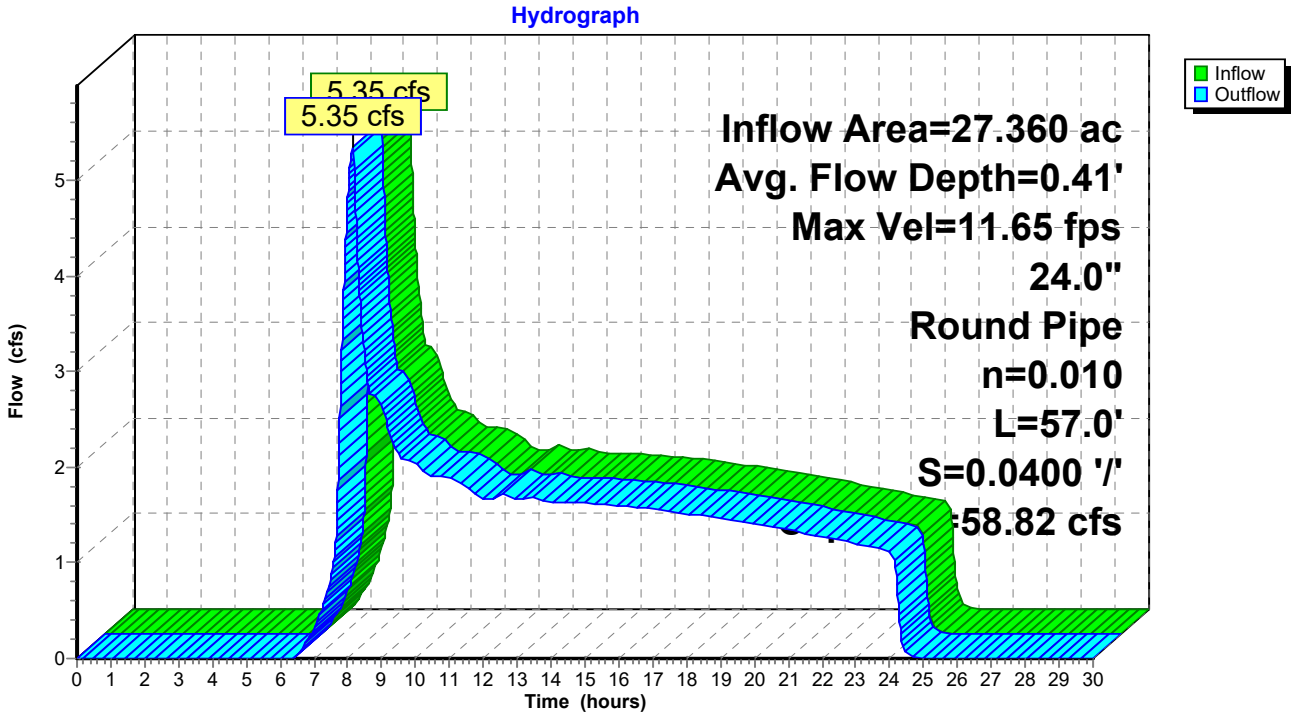
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 11.65 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 7.47 fps, Avg. Travel Time= 0.1 min

Peak Storage= 26 cf @ 8.12 hrs
Average Depth at Peak Storage= 0.41' , Surface Width= 1.61'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 58.82 cfs

24.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 57.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.28'



Reach R2D-3: Reach 2D-3



Summary for Reach R2D-4: Reach 2D-4

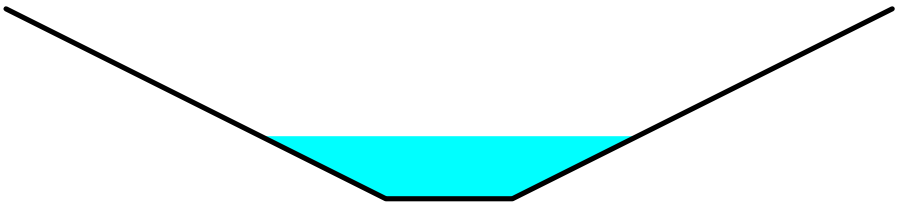
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 1.06" for 2-YR event
Inflow = 5.39 cfs @ 8.05 hrs, Volume= 2.411 af
Outflow = 5.35 cfs @ 8.12 hrs, Volume= 2.411 af, Atten= 1%, Lag= 3.8 min
Routed to Reach R2D-3 : Reach 2D-3

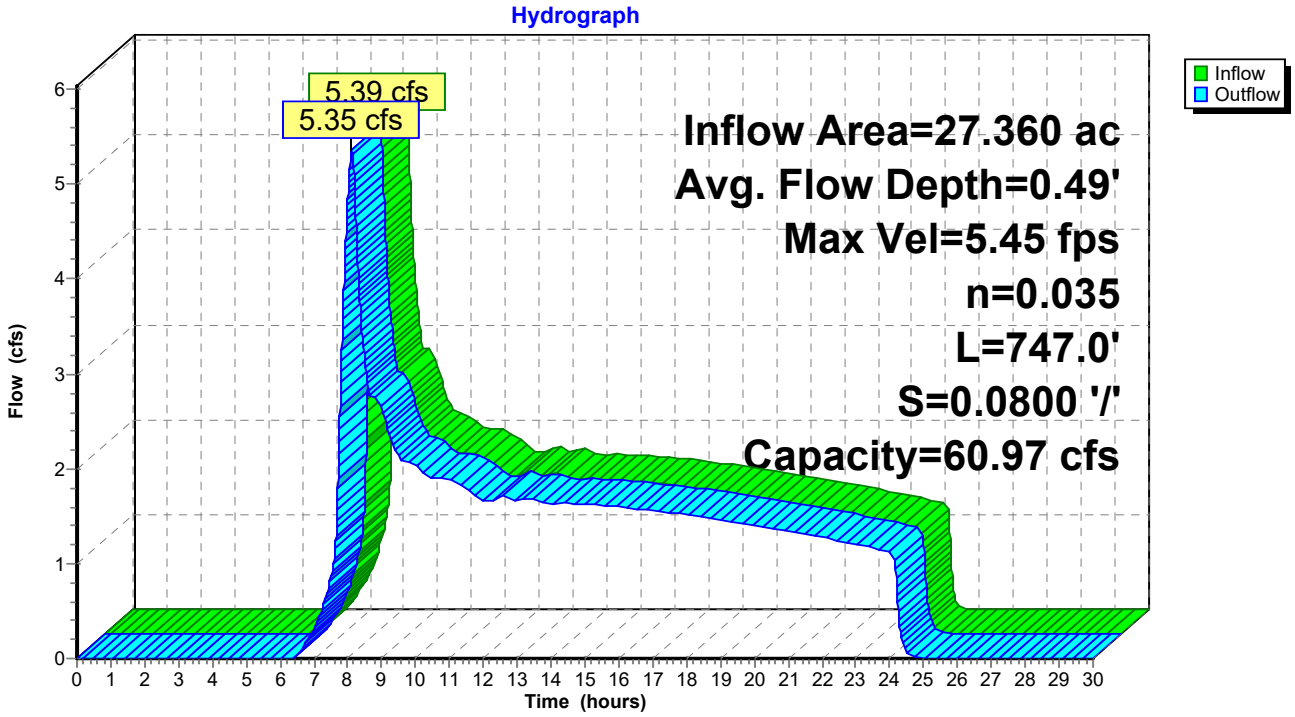
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.45 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 3.54 fps, Avg. Travel Time= 3.5 min

Peak Storage= 733 cf @ 8.08 hrs
Average Depth at Peak Storage= 0.49' , Surface Width= 2.98'
Bank-Full Depth= 1.50' Flow Area= 6.0 sf, Capacity= 60.97 cfs

1.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 747.0' Slope= 0.0800 '/'
Inlet Invert= 0.00', Outlet Invert= -59.76'



Reach R2D-4: Reach 2D-4



Summary for Pond 1P: Existing Reservoir

Inflow Area = 13.656 ac, 13.09% Impervious, Inflow Depth = 1.36" for 2-YR event
Inflow = 4.07 cfs @ 8.03 hrs, Volume= 1.547 af
Outflow = 0.66 cfs @ 23.48 hrs, Volume= 0.851 af, Atten= 84%, Lag= 927.0 min
Primary = 0.66 cfs @ 23.48 hrs, Volume= 0.851 af
Routed to Reach R2B-1 : Reach 2B-1

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Starting Elev= 99.00' Surf.Area= 2.150 ac Storage= 2.075 af
Peak Elev= 99.43' @ 23.48 hrs Surf.Area= 2.215 ac Storage= 3.014 af (0.939 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 397.8 min (1,227.3 - 829.6)

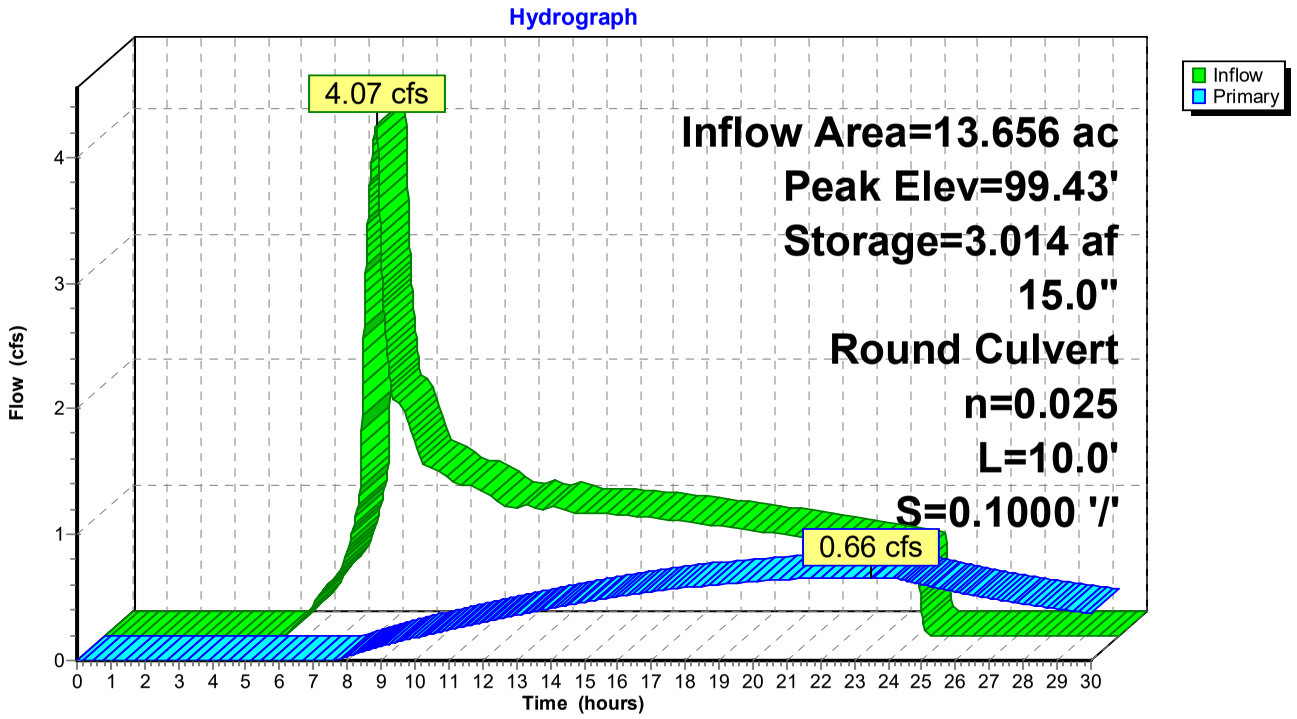
Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	4.300 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
98.00	2.000	0.000	0.000
100.00	2.300	4.300	4.300

Device	Routing	Invert	Outlet Devices
#1	Primary	99.00'	**15.0" Round Culvert** L= 10.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 99.00' / 98.00' S= 0.1000 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=0.66 cfs @ 23.48 hrs HW=99.43' (Free Discharge)
1=Culvert (Inlet Controls 0.66 cfs @ 1.76 fps)

Pond 1P: Existing Reservoir

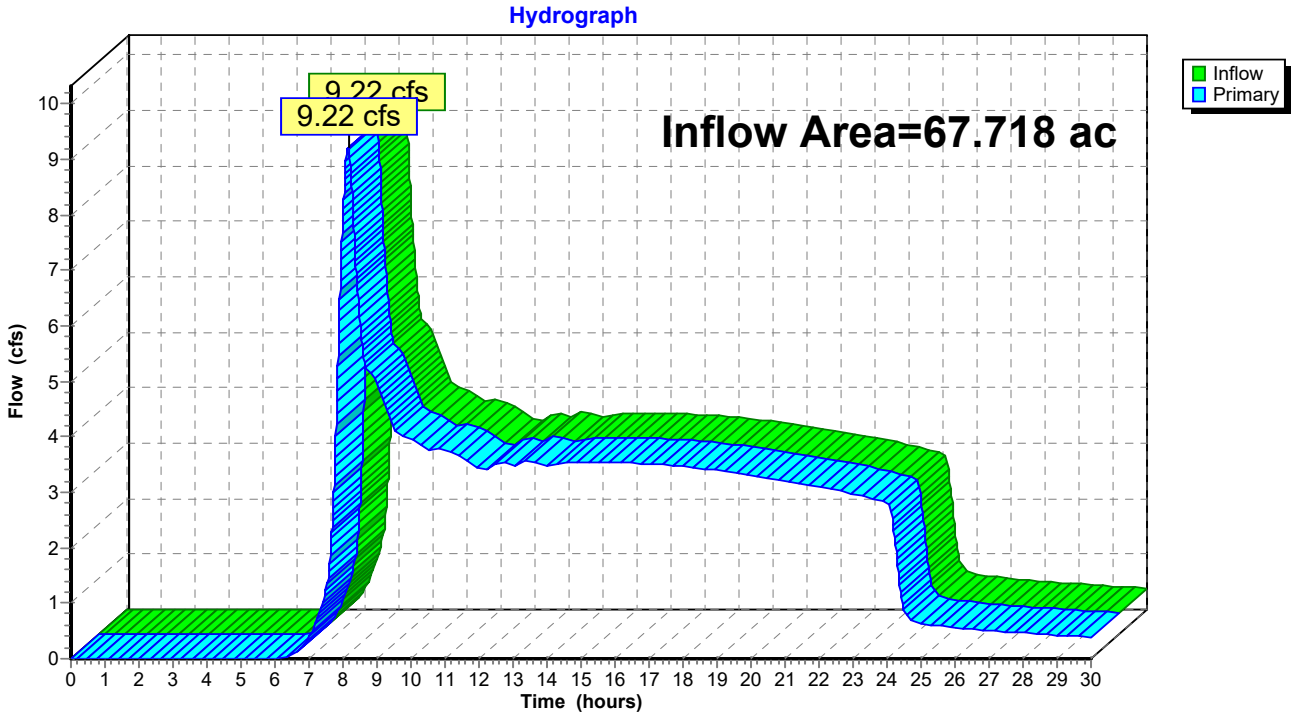


Summary for Link Outlet 2: Outlet 2

Inflow Area = 67.718 ac, 3.94% Impervious, Inflow Depth > 0.95" for 2-YR event
Inflow = 9.22 cfs @ 8.15 hrs, Volume= 5.354 af
Primary = 9.22 cfs @ 8.15 hrs, Volume= 5.354 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Outlet 2: Outlet 2



Summary for Subcatchment WS-2A: Subcat WS-2A

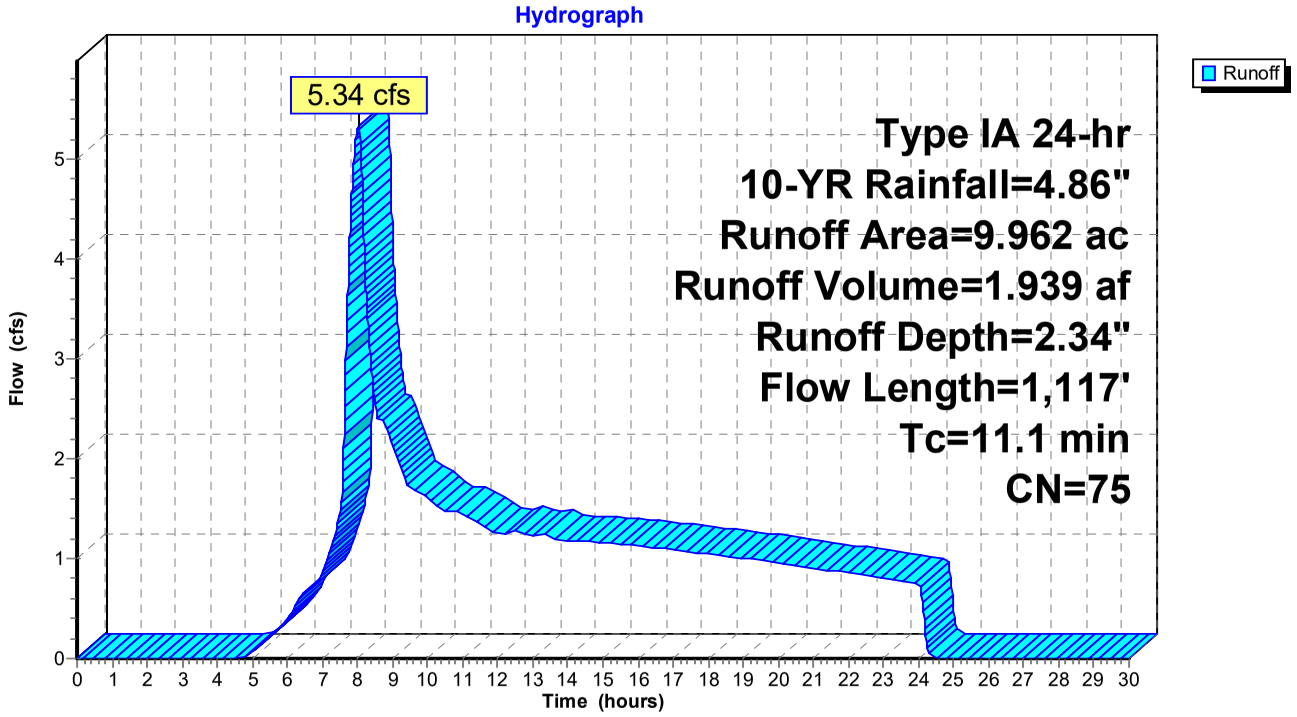
Runoff = 5.34 cfs @ 8.03 hrs, Volume= 1.939 af, Depth= 2.34"
Routed to Link Outlet 2 : Outlet 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-YR Rainfall=4.86"

	Area (ac)	CN	Description
*	0.000	0	, HSG C
	0.832	69	Annual Grass, Fair, HSG B
	2.728	79	Annual Grass, Fair, HSG C
	0.000	82	Dirt roads, HSG B
	0.055	87	Dirt roads, HSG C
	0.124	82	Farmsteads, HSG C
	0.026	89	Paved roads w/open ditches, 50% imp, HSG B
	0.158	92	Paved roads w/open ditches, 50% imp, HSG C
	0.247	60	Woods, Fair, HSG B
	5.793	73	Woods, Fair, HSG C
	9.962	75	Weighted Average
	9.870		99.08% Pervious Area
	0.092		0.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	100	0.2400	0.32		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
2.6	335	0.1900	2.18		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
1.3	158	0.0900	2.10		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.6	409	0.0200	4.36	17.43	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.2	64	0.0200	6.14	30.16	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025 Corrugated metal
0.1	51	0.0600	7.55	30.18	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
11.1	1,117	Total			

Subcatchment WS-2A: Subcat WS-2A



Summary for Subcatchment WS-2B: Subcat WS-2B

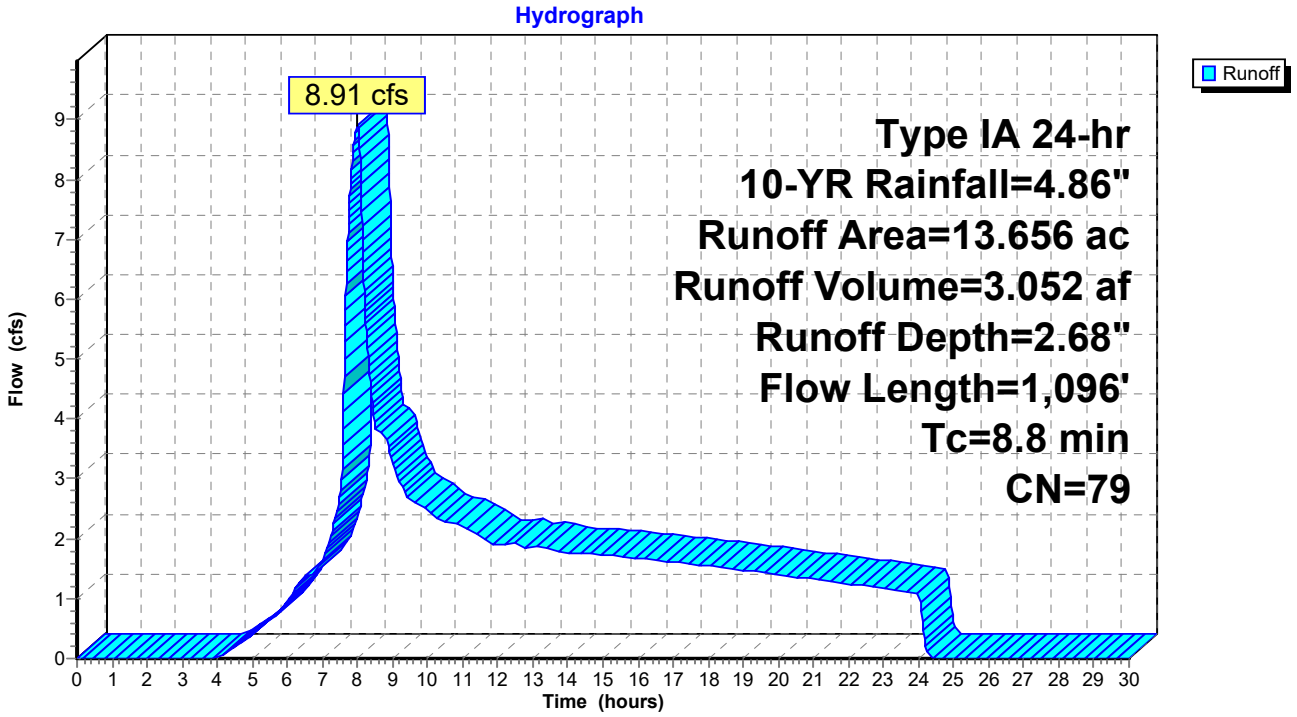
Runoff = 8.91 cfs @ 8.01 hrs, Volume= 3.052 af, Depth= 2.68"
Routed to Pond 1P : Existing Reservoir

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-YR Rainfall=4.86"

Area (ac)	CN	Description
0.661	69	Annual Grass, Fair, HSG B
1.698	79	Annual Grass, Fair, HSG C
0.195	84	Annual Grass, Fair, HSG D
0.668	82	Farmsteads, HSG C
0.149	89	Gravel Roads, HSG C
0.001	92	Paved roads w/open ditches, 50% imp, HSG C
2.792	79	Vineyard, Fair, HSG C
0.032	98	Water Surface, HSG B
0.000	98	Water Surface, HSG C
1.754	98	Water Surface, HSG D
0.050	60	Woods, Fair, HSG B
5.654	73	Woods, Fair, HSG C
0.001	79	Woods, Fair, HSG D
13.656	79	Weighted Average
11.869		86.91% Pervious Area
1.787		13.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.2500	0.32		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
3.1	564	0.1900	3.05		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.5	432	0.2300	14.77	59.09	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
8.8	1,096	Total			

Subcatchment WS-2B: Subcat WS-2B



Summary for Subcatchment WS-2C: Subcat WS-2C

Runoff = 6.79 cfs @ 8.05 hrs, Volume= 2.697 af, Depth= 1.93"
Routed to Reach R2C-3 : Reach 2C-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-YR Rainfall=4.86"

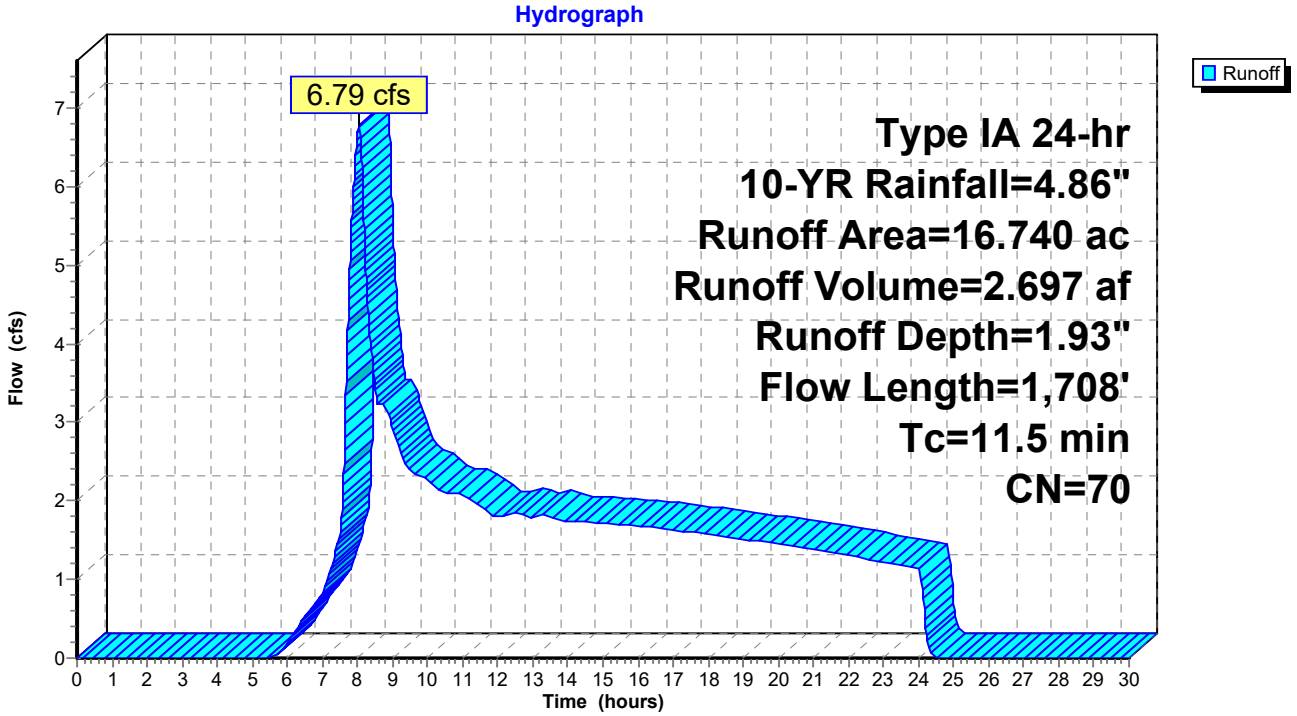
Area (ac)	CN	Description
2.003	69	Annual Grass, Fair, HSG B
1.330	79	Annual Grass, Fair, HSG C
0.115	65	Brush, Good, HSG C
0.025	82	Dirt roads, HSG B
0.001	87	Dirt roads, HSG C
0.199	74	Farmsteads, HSG B
0.908	82	Farmsteads, HSG C
0.037	85	Gravel Roads, HSG B
0.183	89	Gravel Roads, HSG C
0.247	89	Paved roads w/open ditches, 50% imp, HSG B
0.138	92	Paved roads w/open ditches, 50% imp, HSG C
0.090	69	Vineyard, Fair, HSG B
0.695	79	Vineyard, Fair, HSG C
6.132	60	Woods, Fair, HSG B
4.637	73	Woods, Fair, HSG C
16.740	70	Weighted Average
16.547		98.85% Pervious Area
0.193		1.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.1800	0.28		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
1.3	297	0.2800	3.70		**Shallow Concentrated Flow, Shallow - Woodland** Short Grass Pasture Kv= 7.0 fps
1.6	266	0.3200	2.83		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.9	543	0.1100	10.22	40.87	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.8	90	0.0800	1.98		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.6	236	0.0500	6.36	19.08	**Trap/Vee/Rect Channel Flow, Pasture Ditch** Bot.W=1.00' D=1.00' Z= 2.0 '/' Top.W=5.00' n= 0.035
0.1	57	0.0400	18.72	58.82	**Pipe Channel, 24" PVC Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.010 PVC, smooth interior
0.1	57	0.0400	8.69	42.66	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025
0.2	62	0.0200	4.36	17.43	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00'

n= 0.035

11.5	1,708	Total

Subcatchment WS-2C: Subcat WS-2C



Summary for Subcatchment WS-2D: Subcat WS-2D

[47] Hint: Peak is 194% of capacity of segment #4

Runoff = 13.92 cfs @ 8.03 hrs, Volume= 5.137 af, Depth= 2.25"
Routed to Reach R2D-4 : Reach 2D-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-YR Rainfall=4.86"

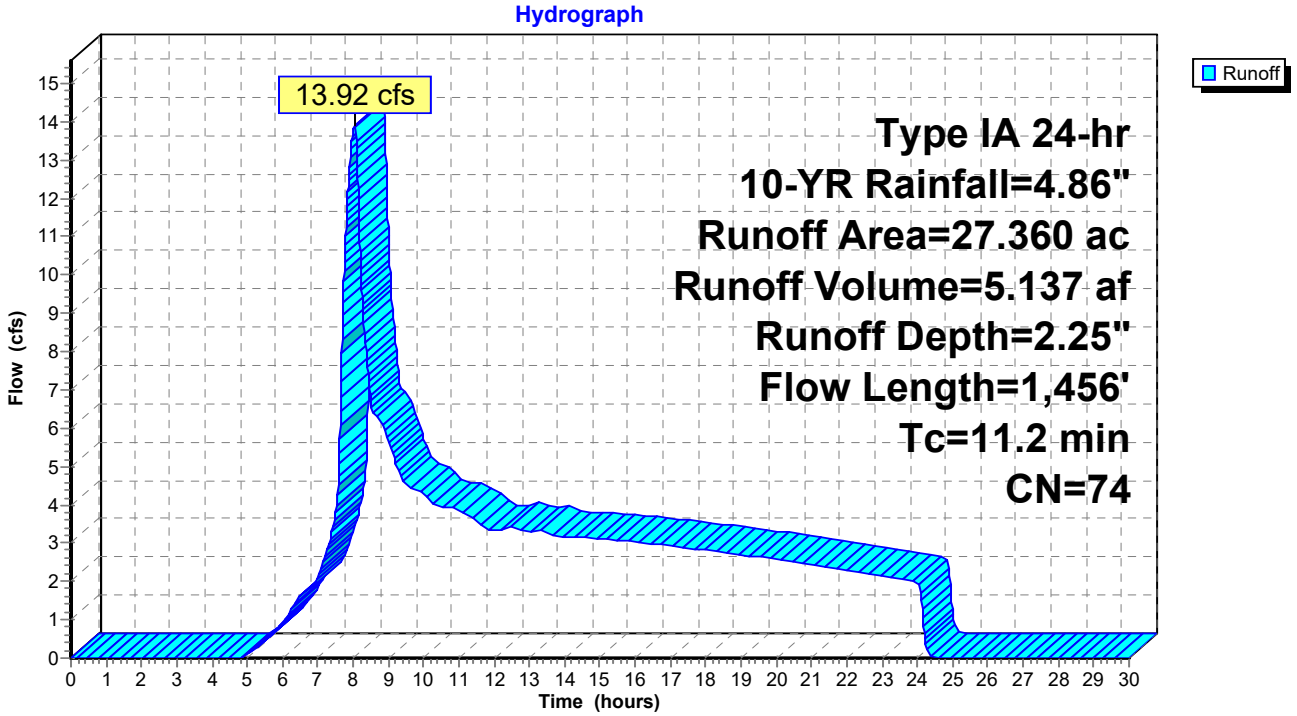
Area (ac)	CN	Description
0.073	69	Annual Grass, Fair, HSG B
2.356	79	Annual Grass, Fair, HSG C
0.715	75	Annual Grass, Good, HSG C
0.073	87	Dirt roads, HSG C
0.320	82	Farmsteads, HSG C
0.174	89	Gravel Roads, HSG C
0.020	89	Paved roads w/open ditches, 50% imp, HSG B
1.171	92	Paved roads w/open ditches, 50% imp, HSG C
0.458	60	Woods, Fair, HSG B
17.774	73	Woods, Fair, HSG C
4.225	70	Woods, Good, HSG C
27.360	74	Weighted Average
26.764		97.82% Pervious Area
0.596		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	87	0.1200	0.16		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.3	41	0.2500	2.50		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.5	267	0.1100	8.23	16.47	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=0.00' D=1.00' Z= 2.0 '/' Top.W=4.00' n= 0.035
0.0	27	0.1500	9.14	7.18	**Pipe Channel, 12" CMP Culvert** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025
0.1	59	0.2500	15.40	61.61	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.1	135	0.3800	23.08	72.52	**Pipe Channel, 24" CMP Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025
0.6	525	0.2000	13.78	55.11	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.0	42	0.2100	19.91	97.74	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025
0.3	273	0.1800	13.07	52.28	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00'

n= 0.035

11.2	1,456	Total

Subcatchment WS-2D: Subcat WS-2D



Summary for Reach R2B-1: Reach 2B-1

[65] Warning: Inlet elevation not specified

Inflow Area = 13.656 ac, 13.09% Impervious, Inflow Depth > 1.85" for 10-YR event
Inflow = 1.46 cfs @ 19.27 hrs, Volume= 2.111 af
Outflow = 1.46 cfs @ 19.51 hrs, Volume= 2.093 af, Atten= 0%, Lag= 14.4 min
Routed to Link Outlet 2 : Outlet 2

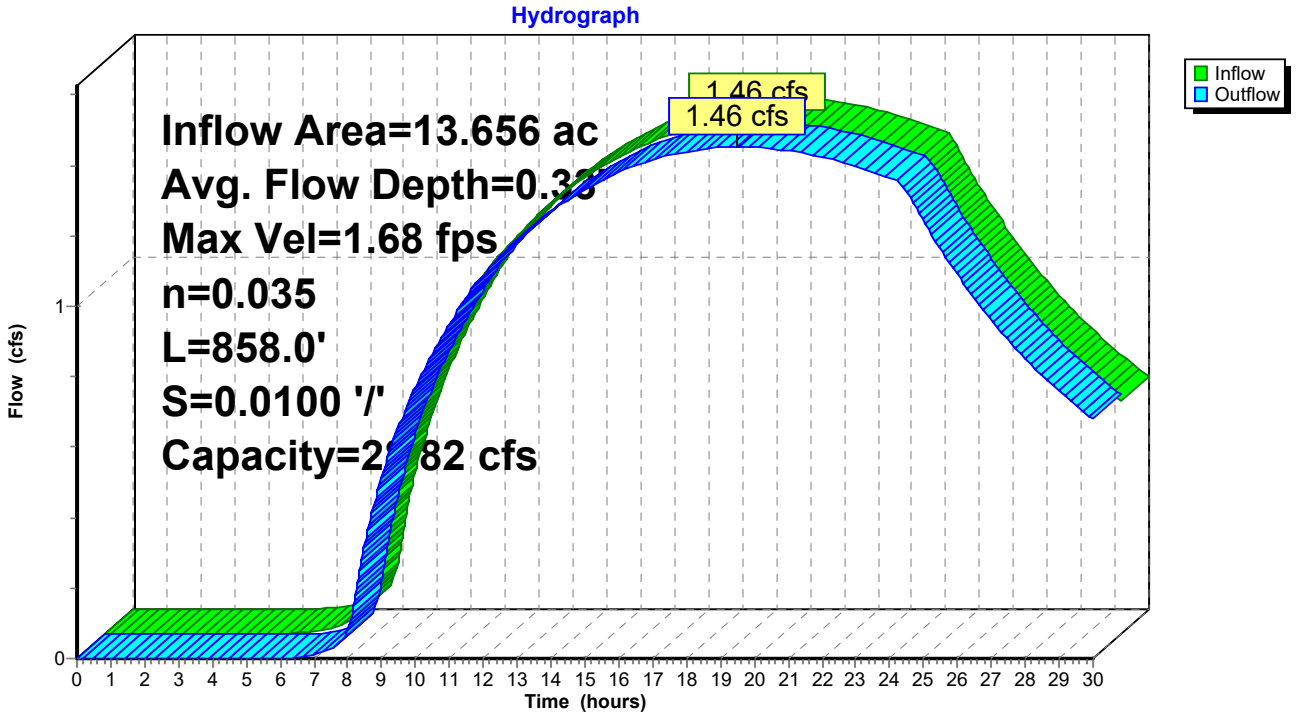
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.68 fps, Min. Travel Time= 8.5 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 10.3 min

Peak Storage= 741 cf @ 19.37 hrs
Average Depth at Peak Storage= 0.33' , Surface Width= 3.30'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 28.82 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 858.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -8.58'



Reach R2B-1: Reach 2B-1



Summary for Reach R2C-1: Reach 2C-1

[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 2.13" for 10-YR event
Inflow = 20.51 cfs @ 8.12 hrs, Volume= 7.834 af
Outflow = 20.50 cfs @ 8.13 hrs, Volume= 7.834 af, Atten= 0%, Lag= 0.2 min
Routed to Link Outlet 2 : Outlet 2

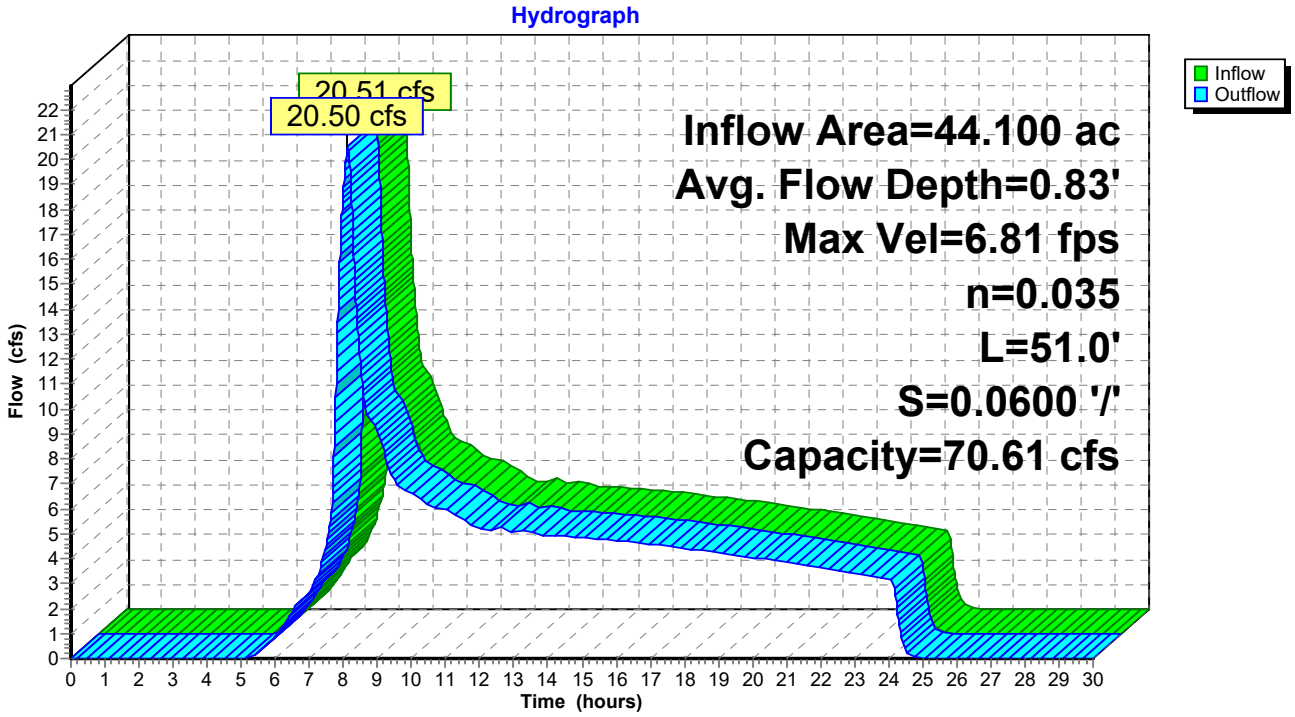
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.81 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.89 fps, Avg. Travel Time= 0.2 min

Peak Storage= 154 cf @ 8.12 hrs
Average Depth at Peak Storage= 0.83' , Surface Width= 5.30'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 70.61 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 51.0' Slope= 0.0600 '/'
Inlet Invert= 0.00', Outlet Invert= -3.06'



Reach R2C-1: Reach 2C-1



Summary for Reach R2C-2: Reach 2C-2

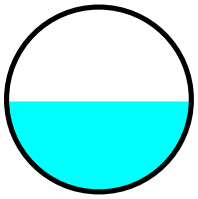
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 2.13" for 10-YR event
Inflow = 20.51 cfs @ 8.12 hrs, Volume= 7.834 af
Outflow = 20.51 cfs @ 8.12 hrs, Volume= 7.834 af, Atten= 0%, Lag= 0.2 min
Routed to Reach R2C-1 : Reach 2C-1

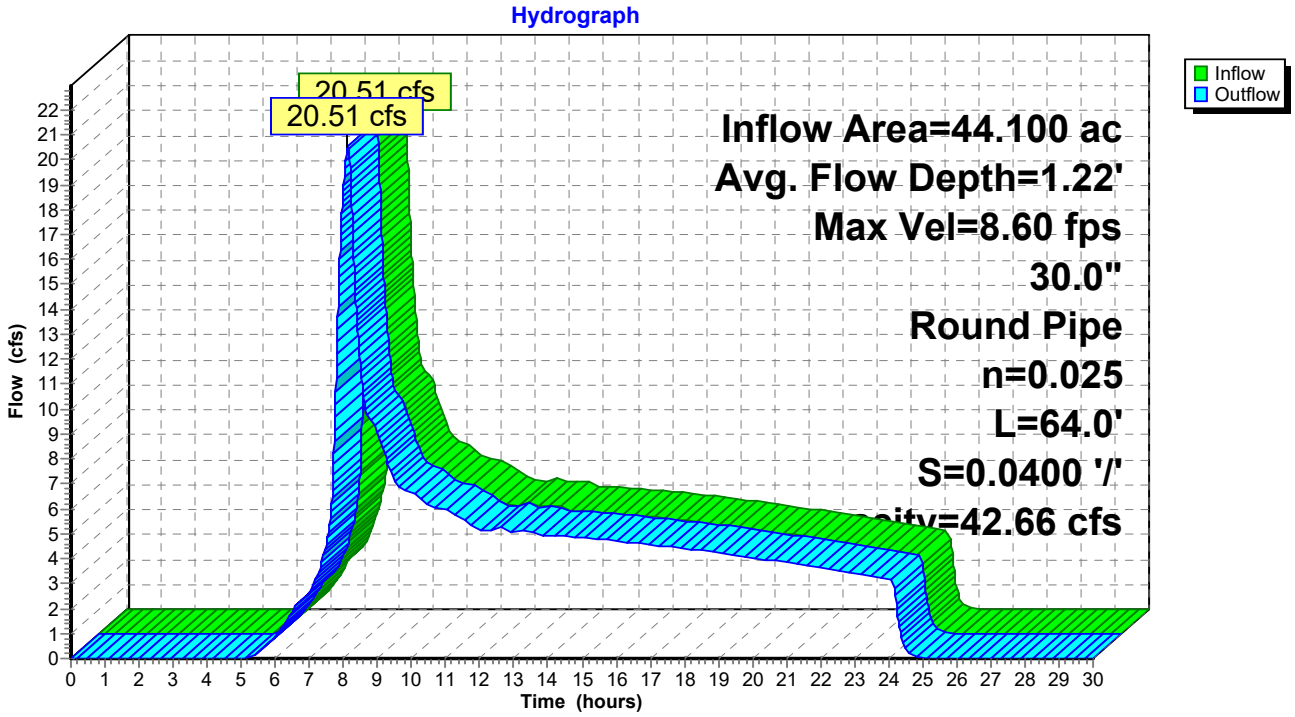
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.60 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.99 fps, Avg. Travel Time= 0.2 min

Peak Storage= 153 cf @ 8.12 hrs
Average Depth at Peak Storage= 1.22' , Surface Width= 2.50'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 42.66 cfs

30.0" Round Pipe
n= 0.025 Corrugated metal
Length= 64.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.56'



Reach R2C-2: Reach 2C-2



Summary for Reach R2C-3: Reach 2C-3

[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 2.13" for 10-YR event
Inflow = 20.57 cfs @ 8.07 hrs, Volume= 7.834 af
Outflow = 20.51 cfs @ 8.12 hrs, Volume= 7.834 af, Atten= 0%, Lag= 2.8 min
Routed to Reach R2C-2 : Reach 2C-2

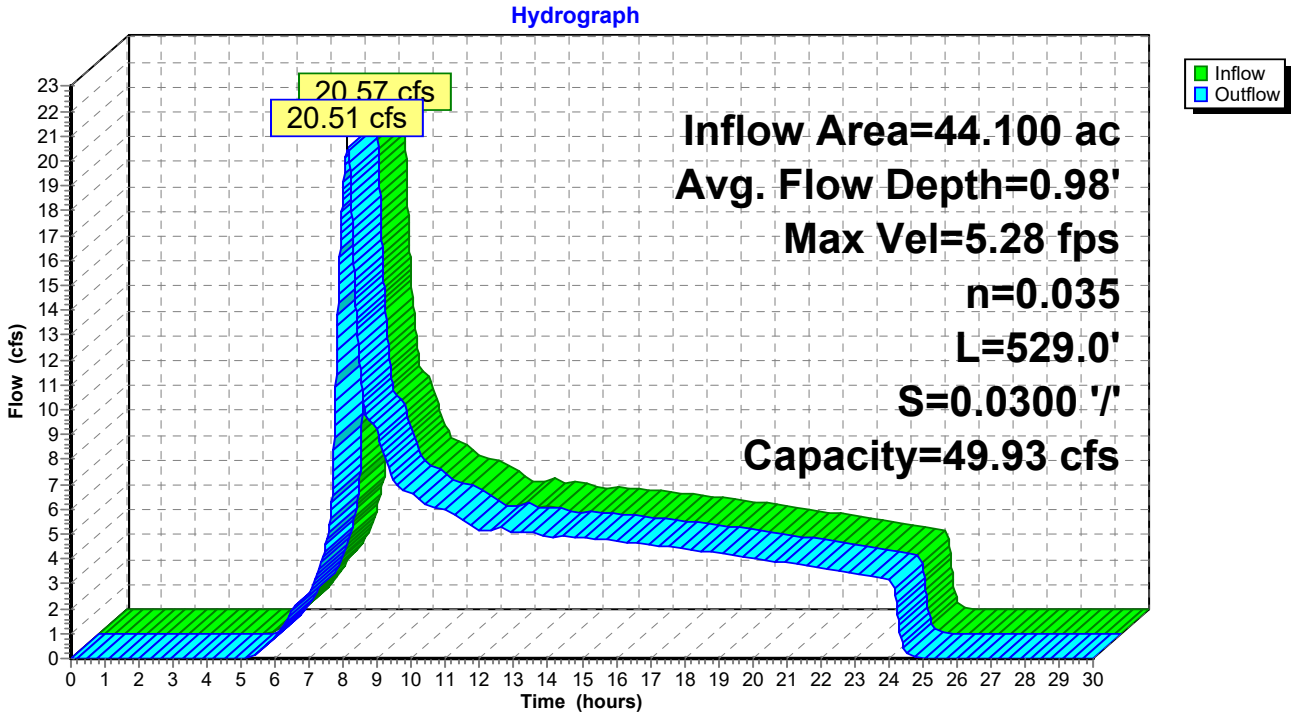
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.28 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 3.03 fps, Avg. Travel Time= 2.9 min

Peak Storage= 2,055 cf @ 8.09 hrs
Average Depth at Peak Storage= 0.98' , Surface Width= 5.92'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 49.93 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 529.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -15.87'



Reach R2C-3: Reach 2C-3



Summary for Reach R2D-1: Reach 2D-1

[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 2.25" for 10-YR event
Inflow = 13.88 cfs @ 8.09 hrs, Volume= 5.137 af
Outflow = 13.87 cfs @ 8.10 hrs, Volume= 5.137 af, Atten= 0%, Lag= 0.4 min
Routed to Reach R2C-3 : Reach 2C-3

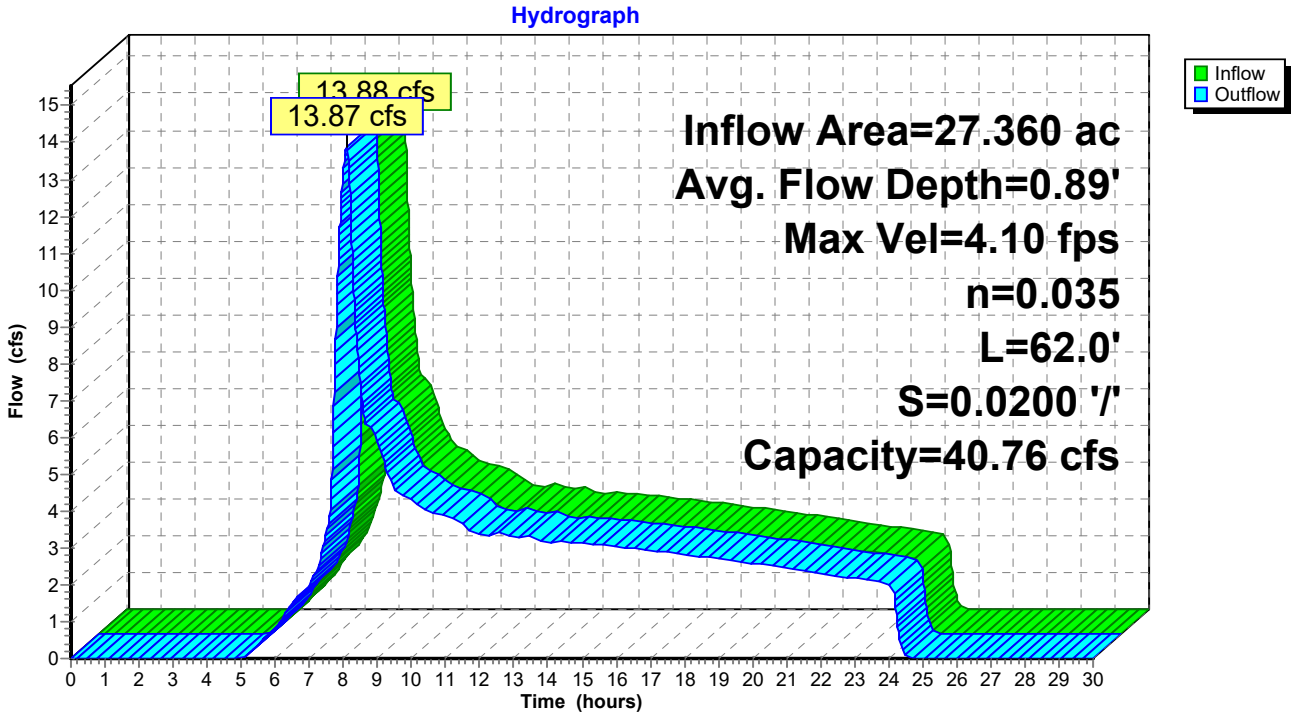
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.10 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.39 fps, Avg. Travel Time= 0.4 min

Peak Storage= 210 cf @ 8.09 hrs
Average Depth at Peak Storage= 0.89' , Surface Width= 5.57'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 40.76 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 62.0' Slope= 0.0200 '/'
Inlet Invert= 0.00', Outlet Invert= -1.24'



Reach R2D-1: Reach 2D-1



Summary for Reach R2D-2: Reach 2D-2

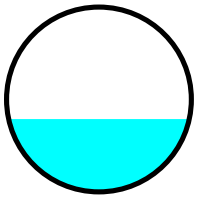
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 2.25" for 10-YR event
Inflow = 13.88 cfs @ 8.09 hrs, Volume= 5.137 af
Outflow = 13.88 cfs @ 8.09 hrs, Volume= 5.137 af, Atten= 0%, Lag= 0.2 min
Routed to Reach R2D-1 : Reach 2D-1

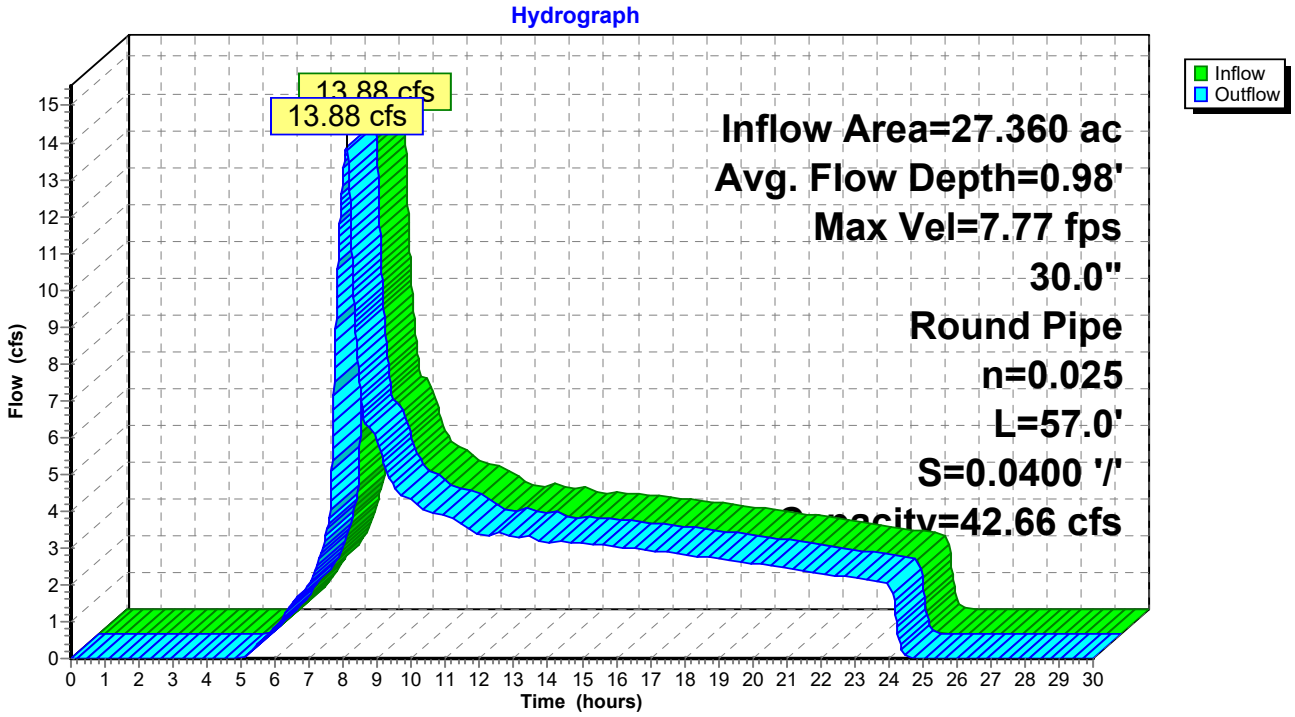
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.77 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.56 fps, Avg. Travel Time= 0.2 min

Peak Storage= 102 cf @ 8.09 hrs
Average Depth at Peak Storage= 0.98' , Surface Width= 2.44'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 42.66 cfs

30.0" Round Pipe
n= 0.025 Corrugated metal
Length= 57.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.28'



Reach R2D-2: Reach 2D-2



Summary for Reach R2D-3: Reach 2D-3

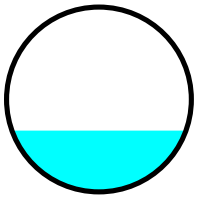
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 2.25" for 10-YR event
Inflow = 13.88 cfs @ 8.09 hrs, Volume= 5.137 af
Outflow = 13.88 cfs @ 8.09 hrs, Volume= 5.137 af, Atten= 0%, Lag= 0.1 min
Routed to Reach R2D-2 : Reach 2D-2

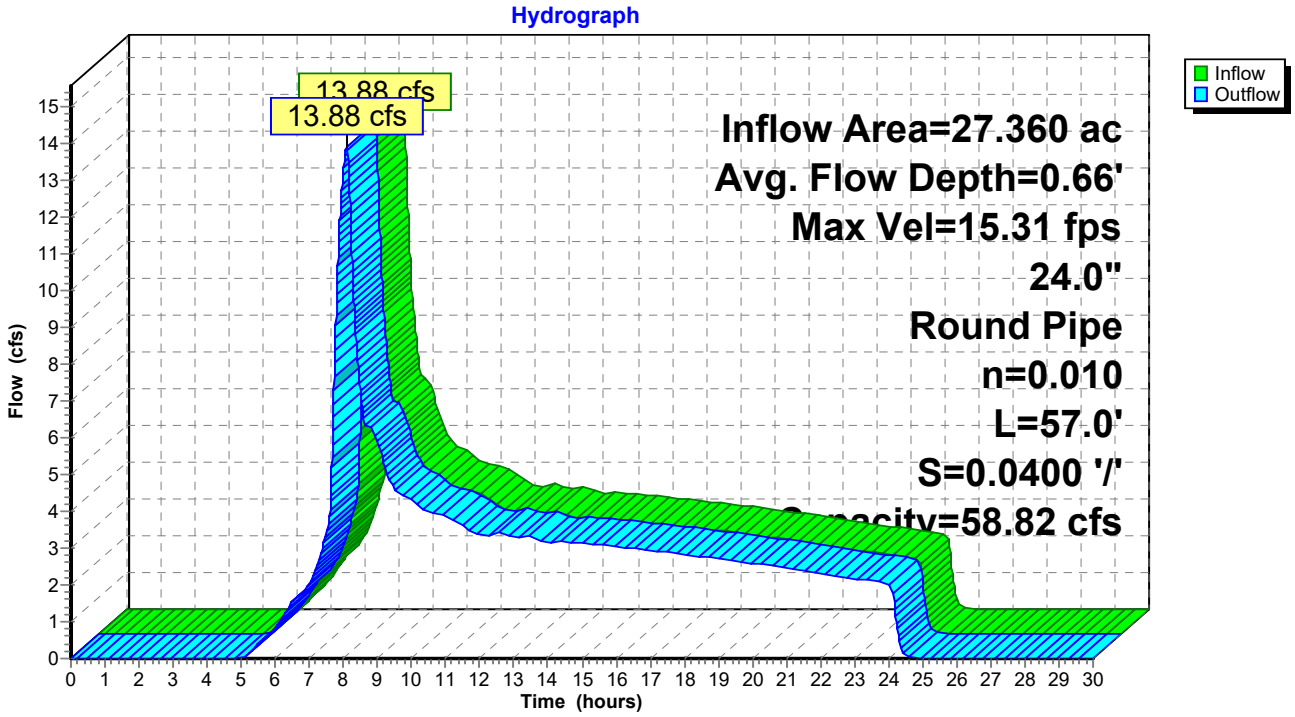
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 15.31 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 9.03 fps, Avg. Travel Time= 0.1 min

Peak Storage= 52 cf @ 8.09 hrs
Average Depth at Peak Storage= 0.66' , Surface Width= 1.88'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 58.82 cfs

24.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 57.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.28'



Reach R2D-3: Reach 2D-3



Summary for Reach R2D-4: Reach 2D-4

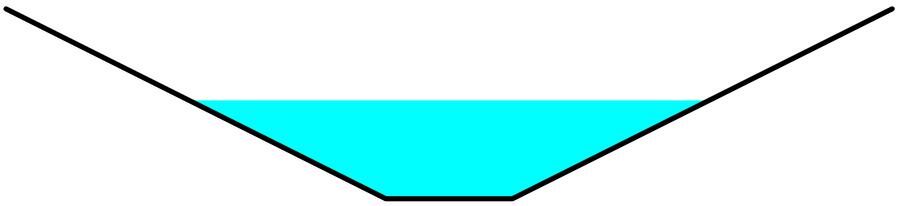
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 2.25" for 10-YR event
Inflow = 13.92 cfs @ 8.03 hrs, Volume= 5.137 af
Outflow = 13.88 cfs @ 8.09 hrs, Volume= 5.137 af, Atten= 0%, Lag= 3.1 min
Routed to Reach R2D-3 : Reach 2D-3

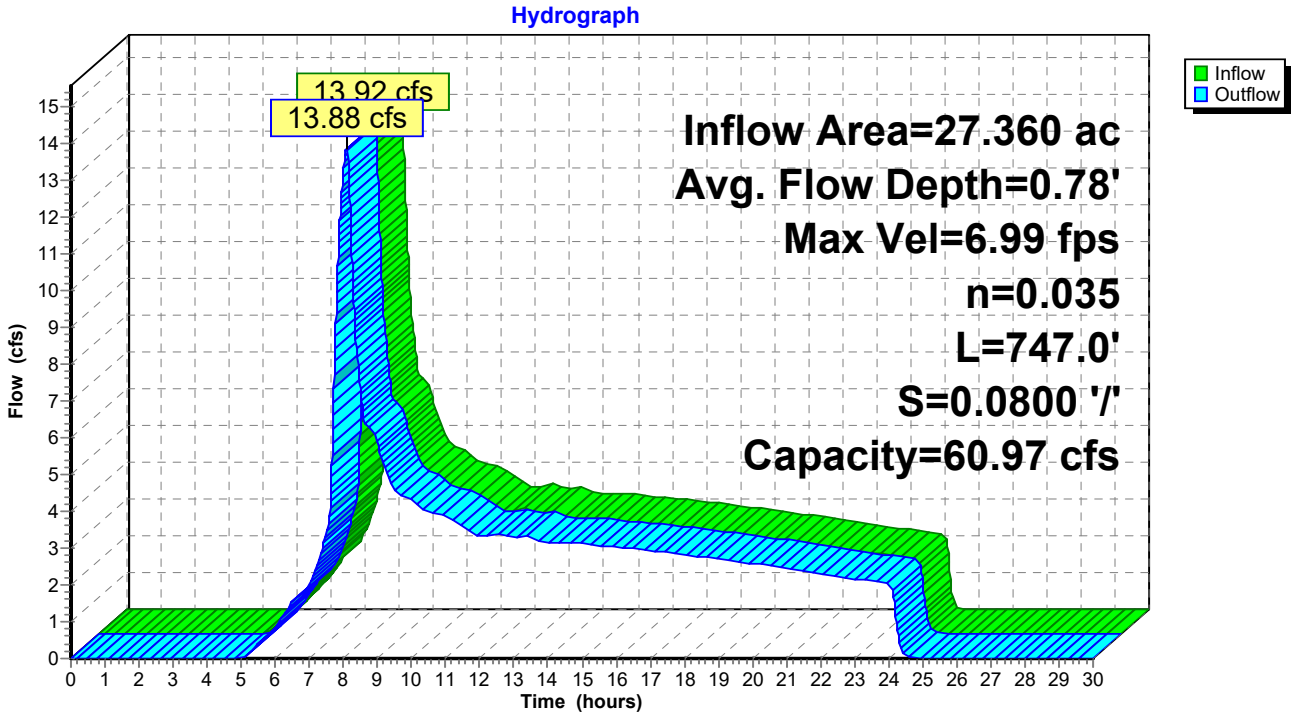
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.99 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 4.23 fps, Avg. Travel Time= 2.9 min

Peak Storage= 1,484 cf @ 8.06 hrs
Average Depth at Peak Storage= 0.78' , Surface Width= 4.11'
Bank-Full Depth= 1.50' Flow Area= 6.0 sf, Capacity= 60.97 cfs

1.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 747.0' Slope= 0.0800 '/'
Inlet Invert= 0.00', Outlet Invert= -59.76'



Reach R2D-4: Reach 2D-4



Summary for Pond 1P: Existing Reservoir

Inflow Area = 13.656 ac, 13.09% Impervious, Inflow Depth = 2.68" for 10-YR event
Inflow = 8.91 cfs @ 8.01 hrs, Volume= 3.052 af
Outflow = 1.46 cfs @ 19.27 hrs, Volume= 2.111 af, Atten= 84%, Lag= 675.6 min
Primary = 1.46 cfs @ 19.27 hrs, Volume= 2.111 af
Routed to Reach R2B-1 : Reach 2B-1

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Starting Elev= 99.00' Surf.Area= 2.150 ac Storage= 2.075 af
Peak Elev= 99.67' @ 19.27 hrs Surf.Area= 2.250 ac Storage= 3.539 af (1.464 af above start)

Plug-Flow detention time= 1,481.6 min calculated for 0.036 af (1% of inflow)
Center-of-Mass det. time= 357.1 min (1,144.6 - 787.5)

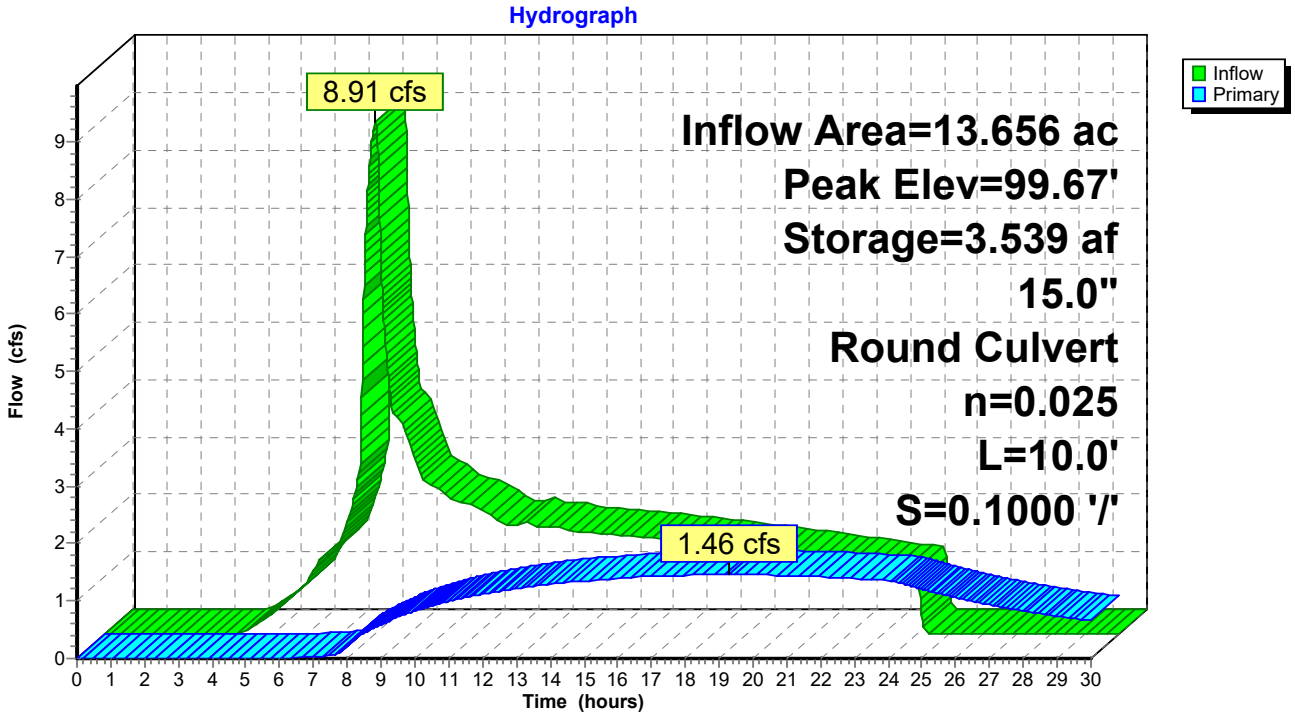
Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	4.300 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
98.00	2.000	0.000	0.000
100.00	2.300	4.300	4.300

Device	Routing	Invert	Outlet Devices
#1	Primary	99.00'	**15.0" Round Culvert** L= 10.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 99.00' / 98.00' S= 0.1000 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=1.46 cfs @ 19.27 hrs HW=99.67' (Free Discharge)
1=Culvert (Inlet Controls 1.46 cfs @ 2.19 fps)

Pond 1P: Existing Reservoir

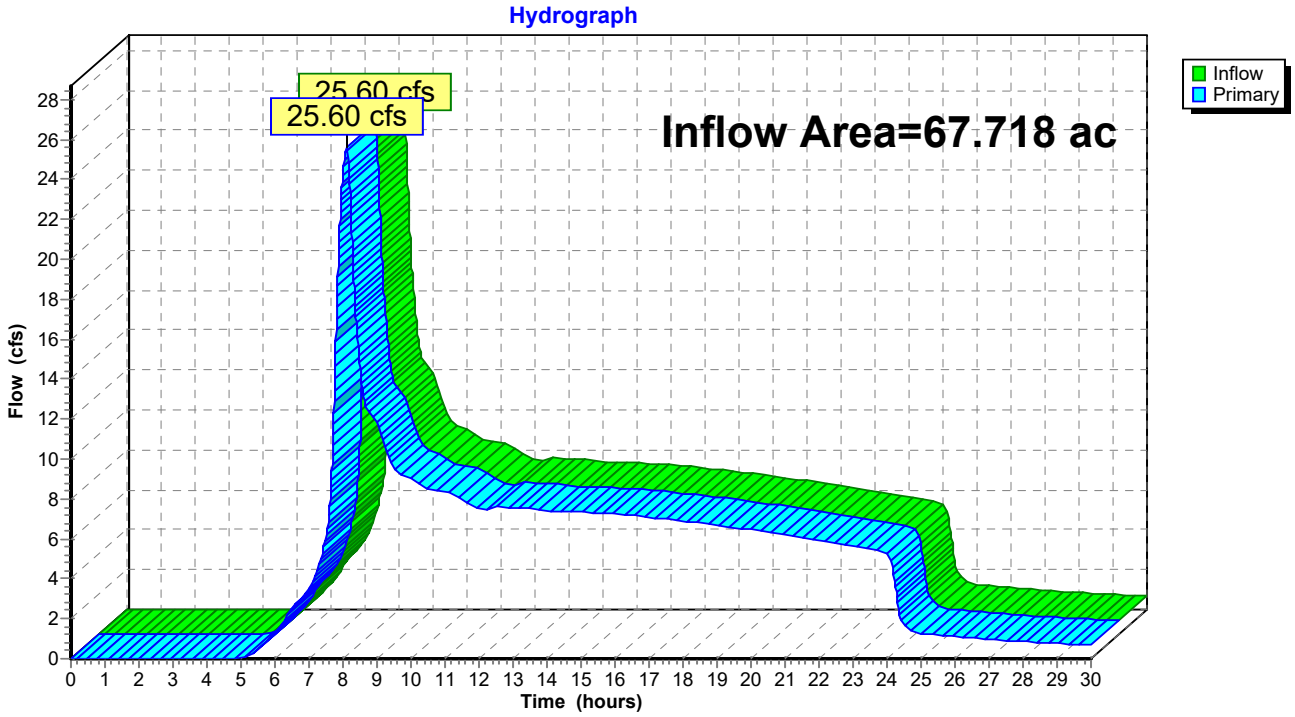


Summary for Link Outlet 2: Outlet 2

Inflow Area = 67.718 ac, 3.94% Impervious, Inflow Depth > 2.10" for 10-YR event
Inflow = 25.60 cfs @ 8.10 hrs, Volume= 11.866 af
Primary = 25.60 cfs @ 8.10 hrs, Volume= 11.866 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Outlet 2: Outlet 2



Summary for Subcatchment WS-2A: Subcat WS-2A

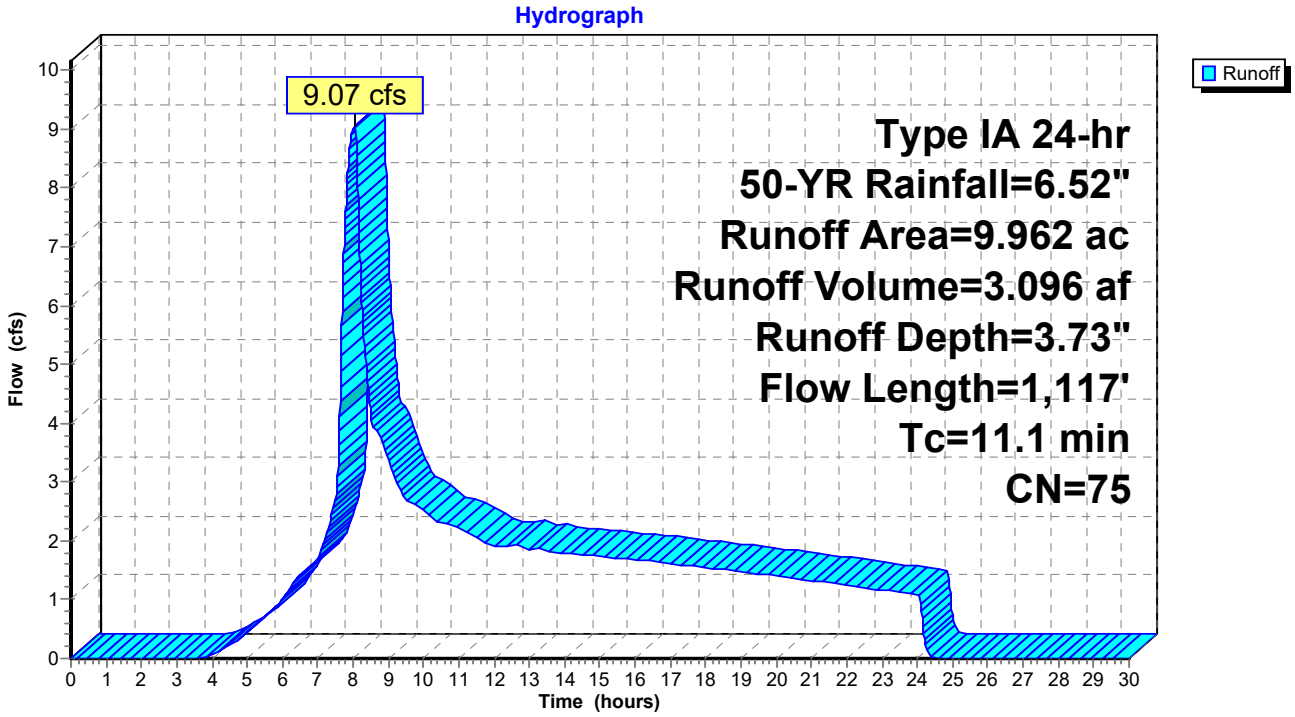
Runoff = 9.07 cfs @ 8.03 hrs, Volume= 3.096 af, Depth= 3.73"
Routed to Link Outlet 2 : Outlet 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50-YR Rainfall=6.52"

	Area (ac)	CN	Description
*	0.000	0	, HSG C
	0.832	69	Annual Grass, Fair, HSG B
	2.728	79	Annual Grass, Fair, HSG C
	0.000	82	Dirt roads, HSG B
	0.055	87	Dirt roads, HSG C
	0.124	82	Farmsteads, HSG C
	0.026	89	Paved roads w/open ditches, 50% imp, HSG B
	0.158	92	Paved roads w/open ditches, 50% imp, HSG C
	0.247	60	Woods, Fair, HSG B
	5.793	73	Woods, Fair, HSG C
	9.962	75	Weighted Average
	9.870		99.08% Pervious Area
	0.092		0.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	100	0.2400	0.32		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
2.6	335	0.1900	2.18		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
1.3	158	0.0900	2.10		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.6	409	0.0200	4.36	17.43	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.2	64	0.0200	6.14	30.16	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025 Corrugated metal
0.1	51	0.0600	7.55	30.18	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
11.1	1,117	Total			

Subcatchment WS-2A: Subcat WS-2A



Summary for Subcatchment WS-2B: Subcat WS-2B

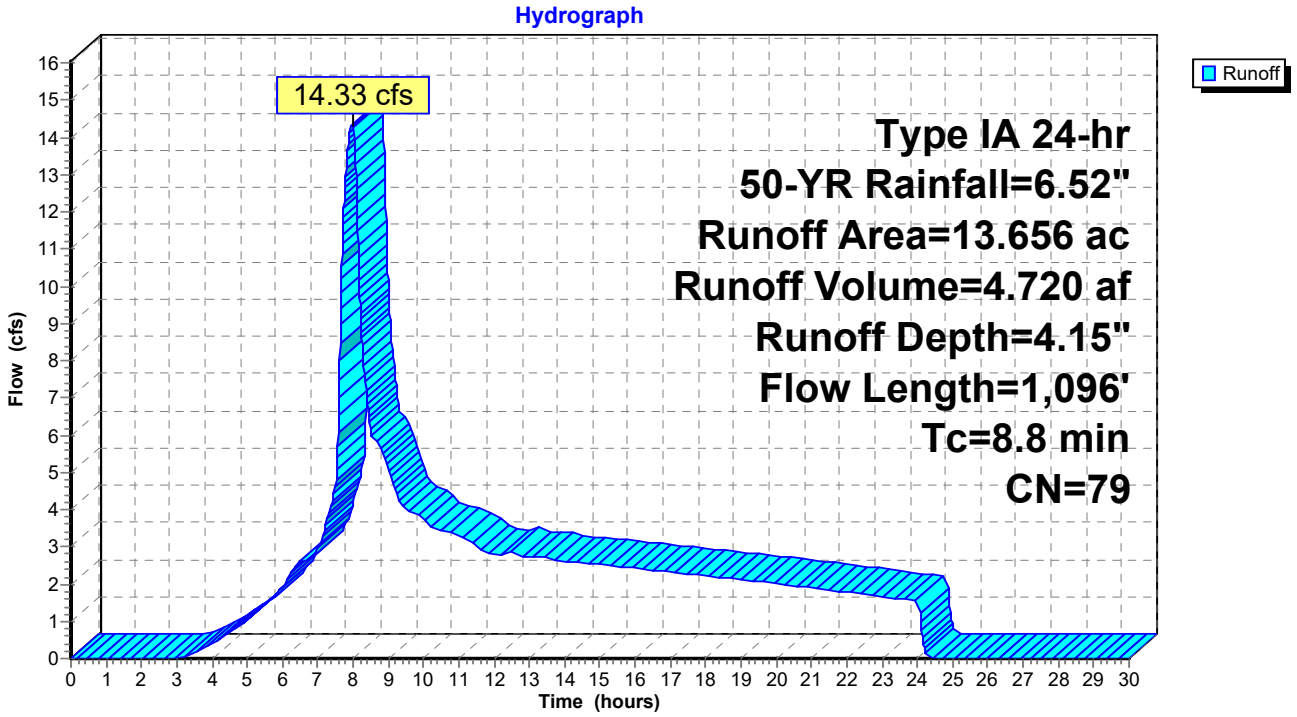
Runoff = 14.33 cfs @ 7.99 hrs, Volume= 4.720 af, Depth= 4.15"
Routed to Pond 1P : Existing Reservoir

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50-YR Rainfall=6.52"

Area (ac)	CN	Description
0.661	69	Annual Grass, Fair, HSG B
1.698	79	Annual Grass, Fair, HSG C
0.195	84	Annual Grass, Fair, HSG D
0.668	82	Farmsteads, HSG C
0.149	89	Gravel Roads, HSG C
0.001	92	Paved roads w/open ditches, 50% imp, HSG C
2.792	79	Vineyard, Fair, HSG C
0.032	98	Water Surface, HSG B
0.000	98	Water Surface, HSG C
1.754	98	Water Surface, HSG D
0.050	60	Woods, Fair, HSG B
5.654	73	Woods, Fair, HSG C
0.001	79	Woods, Fair, HSG D
13.656	79	Weighted Average
11.869		86.91% Pervious Area
1.787		13.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.2500	0.32		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
3.1	564	0.1900	3.05		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.5	432	0.2300	14.77	59.09	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
8.8	1,096	Total			

Subcatchment WS-2B: Subcat WS-2B



Summary for Subcatchment WS-2C: Subcat WS-2C

Runoff = 12.50 cfs @ 8.04 hrs, Volume= 4.497 af, Depth= 3.22"
Routed to Reach R2C-3 : Reach 2C-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50-YR Rainfall=6.52"

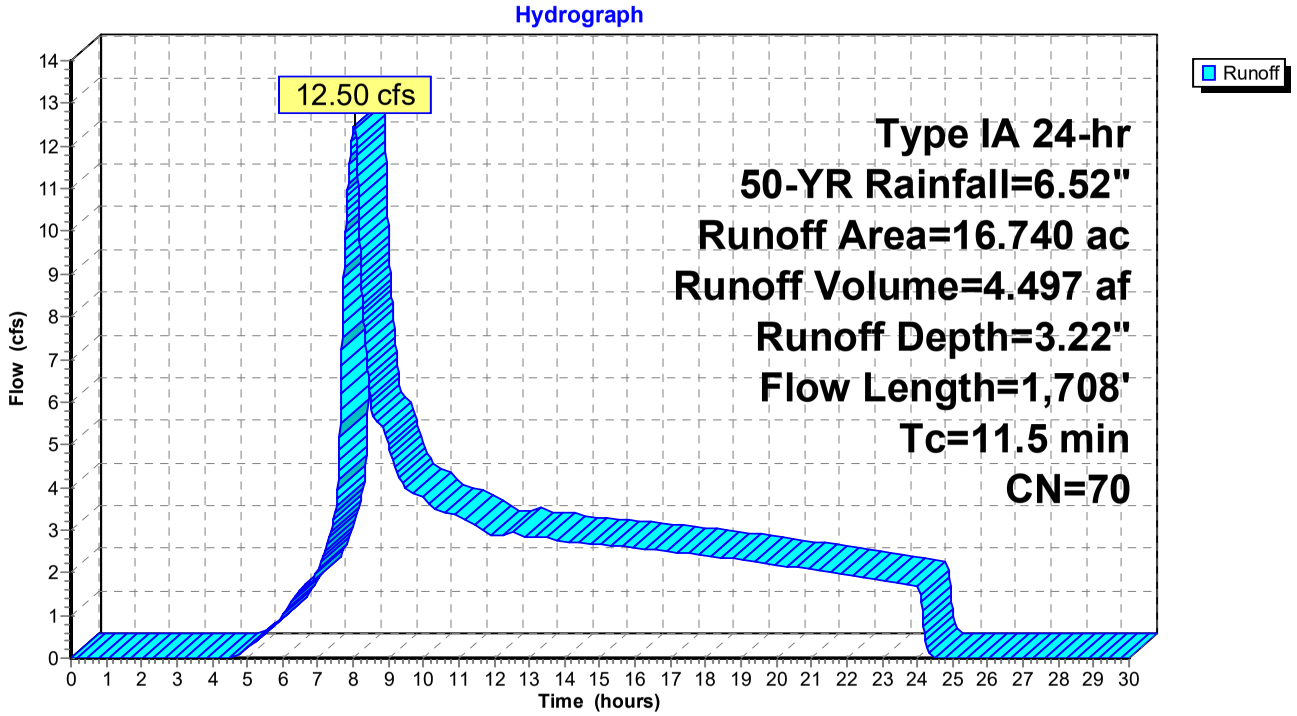
Area (ac)	CN	Description
2.003	69	Annual Grass, Fair, HSG B
1.330	79	Annual Grass, Fair, HSG C
0.115	65	Brush, Good, HSG C
0.025	82	Dirt roads, HSG B
0.001	87	Dirt roads, HSG C
0.199	74	Farmsteads, HSG B
0.908	82	Farmsteads, HSG C
0.037	85	Gravel Roads, HSG B
0.183	89	Gravel Roads, HSG C
0.247	89	Paved roads w/open ditches, 50% imp, HSG B
0.138	92	Paved roads w/open ditches, 50% imp, HSG C
0.090	69	Vineyard, Fair, HSG B
0.695	79	Vineyard, Fair, HSG C
6.132	60	Woods, Fair, HSG B
4.637	73	Woods, Fair, HSG C
16.740	70	Weighted Average
16.547		98.85% Pervious Area
0.193		1.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.1800	0.28		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
1.3	297	0.2800	3.70		**Shallow Concentrated Flow, Shallow - Woodland** Short Grass Pasture Kv= 7.0 fps
1.6	266	0.3200	2.83		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.9	543	0.1100	10.22	40.87	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.8	90	0.0800	1.98		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.6	236	0.0500	6.36	19.08	**Trap/Vee/Rect Channel Flow, Pasture Ditch** Bot.W=1.00' D=1.00' Z= 2.0 '/' Top.W=5.00' n= 0.035
0.1	57	0.0400	18.72	58.82	**Pipe Channel, 24" PVC Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.010 PVC, smooth interior
0.1	57	0.0400	8.69	42.66	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025
0.2	62	0.0200	4.36	17.43	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00'

n= 0.035

11.5	1,708	Total

Subcatchment WS-2C: Subcat WS-2C



Summary for Subcatchment WS-2D: Subcat WS-2D

[47] Hint: Peak is 146% of capacity of segment #3
[47] Hint: Peak is 334% of capacity of segment #4

Runoff = 23.99 cfs @ 8.03 hrs, Volume= 8.269 af, Depth= 3.63"
Routed to Reach R2D-4 : Reach 2D-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50-YR Rainfall=6.52"

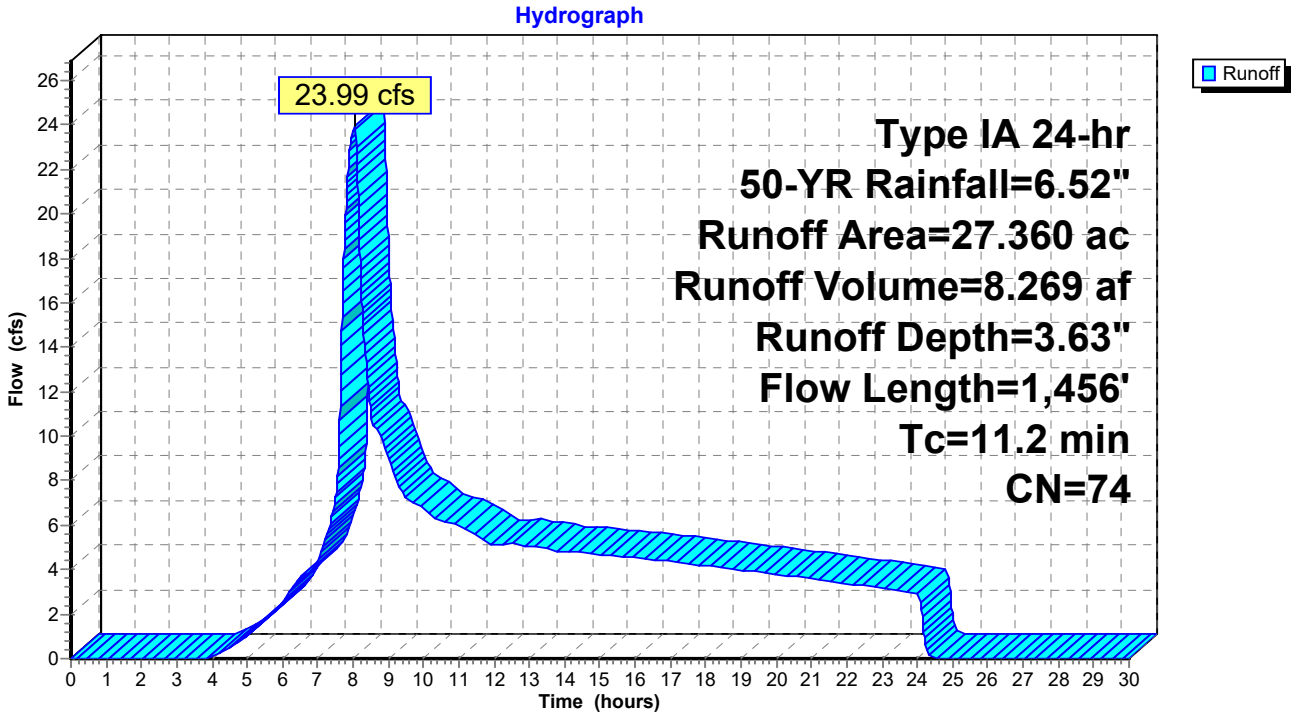
Area (ac)	CN	Description
0.073	69	Annual Grass, Fair, HSG B
2.356	79	Annual Grass, Fair, HSG C
0.715	75	Annual Grass, Good, HSG C
0.073	87	Dirt roads, HSG C
0.320	82	Farmsteads, HSG C
0.174	89	Gravel Roads, HSG C
0.020	89	Paved roads w/open ditches, 50% imp, HSG B
1.171	92	Paved roads w/open ditches, 50% imp, HSG C
0.458	60	Woods, Fair, HSG B
17.774	73	Woods, Fair, HSG C
4.225	70	Woods, Good, HSG C
27.360	74	Weighted Average
26.764		97.82% Pervious Area
0.596		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	87	0.1200	0.16		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.3	41	0.2500	2.50		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.5	267	0.1100	8.23	16.47	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=0.00' D=1.00' Z= 2.0 '/' Top.W=4.00' n= 0.035
0.0	27	0.1500	9.14	7.18	**Pipe Channel, 12" CMP Culvert** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025
0.1	59	0.2500	15.40	61.61	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.1	135	0.3800	23.08	72.52	**Pipe Channel, 24" CMP Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025
0.6	525	0.2000	13.78	55.11	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.0	42	0.2100	19.91	97.74	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025
0.3	273	0.1800	13.07	52.28	**Trap/Vee/Rect Channel Flow, Stream**

Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00'
n= 0.035

11.2	1,456	Total

Subcatchment WS-2D: Subcat WS-2D



Summary for Reach R2B-1: Reach 2B-1

[65] Warning: Inlet elevation not specified

Inflow Area = 13.656 ac, 13.09% Impervious, Inflow Depth > 3.16" for 50-YR event
Inflow = 2.40 cfs @ 16.29 hrs, Volume= 3.595 af
Outflow = 2.40 cfs @ 16.50 hrs, Volume= 3.573 af, Atten= 0%, Lag= 12.5 min
Routed to Link Outlet 2 : Outlet 2

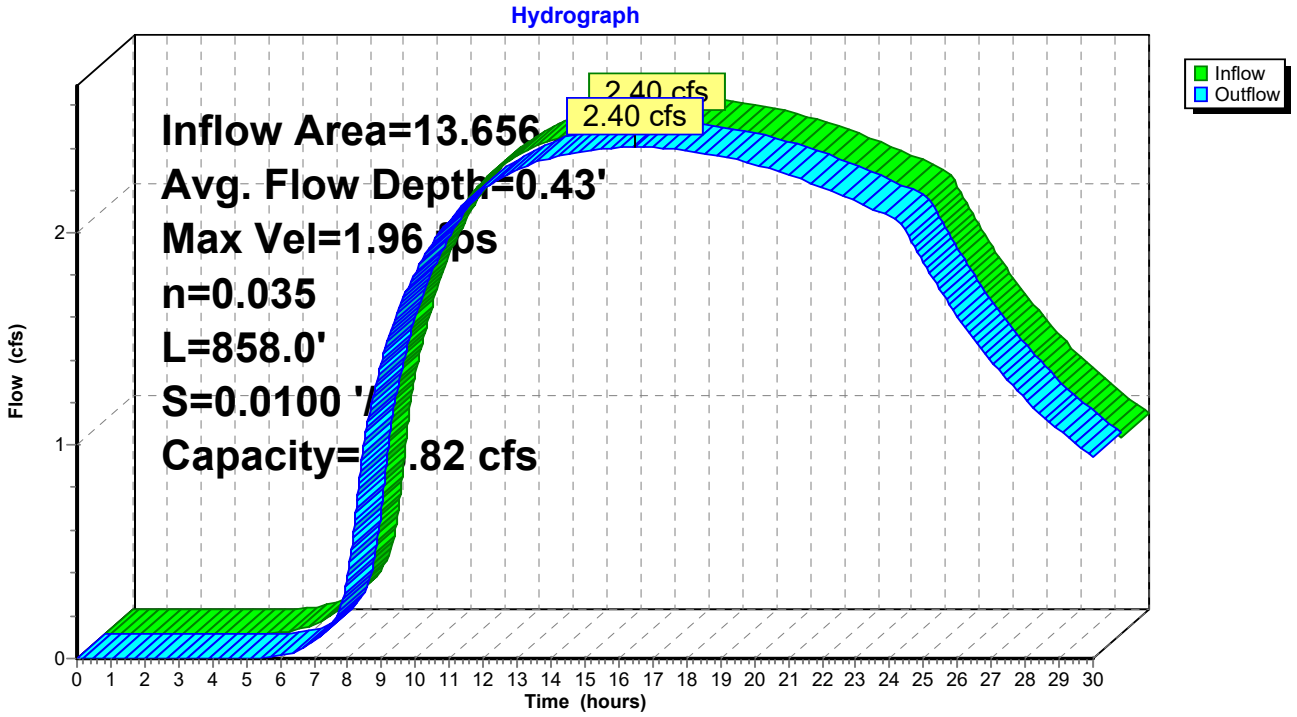
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.96 fps, Min. Travel Time= 7.3 min
Avg. Velocity = 1.60 fps, Avg. Travel Time= 8.9 min

Peak Storage= 1,052 cf @ 16.38 hrs
Average Depth at Peak Storage= 0.43' , Surface Width= 3.72'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 28.82 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 858.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -8.58'



Reach R2B-1: Reach 2B-1



Summary for Reach R2C-1: Reach 2C-1

[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 3.47" for 50-YR event
Inflow = 36.27 cfs @ 8.10 hrs, Volume= 12.766 af
Outflow = 36.26 cfs @ 8.10 hrs, Volume= 12.766 af, Atten= 0%, Lag= 0.2 min
Routed to Link Outlet 2 : Outlet 2

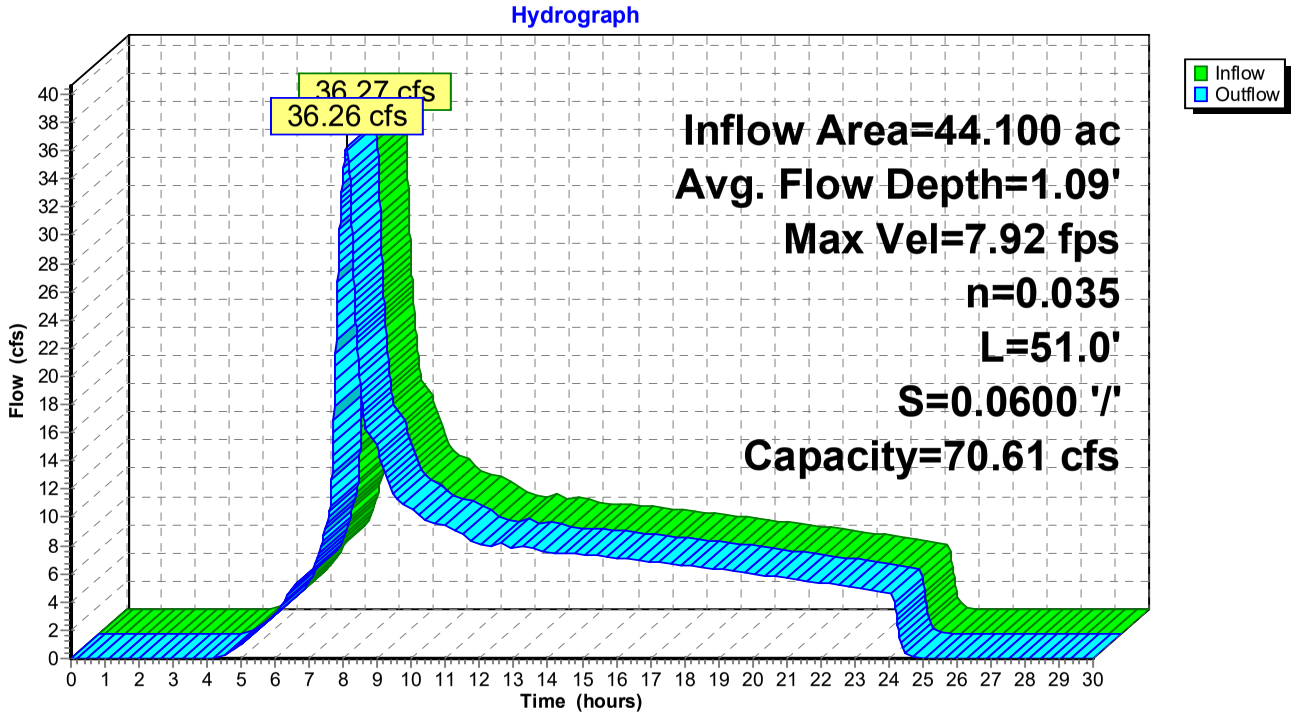
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.92 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.40 fps, Avg. Travel Time= 0.2 min

Peak Storage= 234 cf @ 8.10 hrs
Average Depth at Peak Storage= 1.09' , Surface Width= 6.37'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 70.61 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 51.0' Slope= 0.0600 '/'
Inlet Invert= 0.00', Outlet Invert= -3.06'



Reach R2C-1: Reach 2C-1



Summary for Reach R2C-2: Reach 2C-2

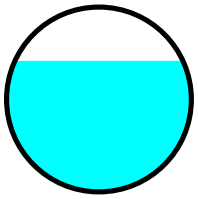
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 3.47" for 50-YR event
Inflow = 36.27 cfs @ 8.10 hrs, Volume= 12.766 af
Outflow = 36.27 cfs @ 8.10 hrs, Volume= 12.766 af, Atten= 0%, Lag= 0.2 min
Routed to Reach R2C-1 : Reach 2C-1

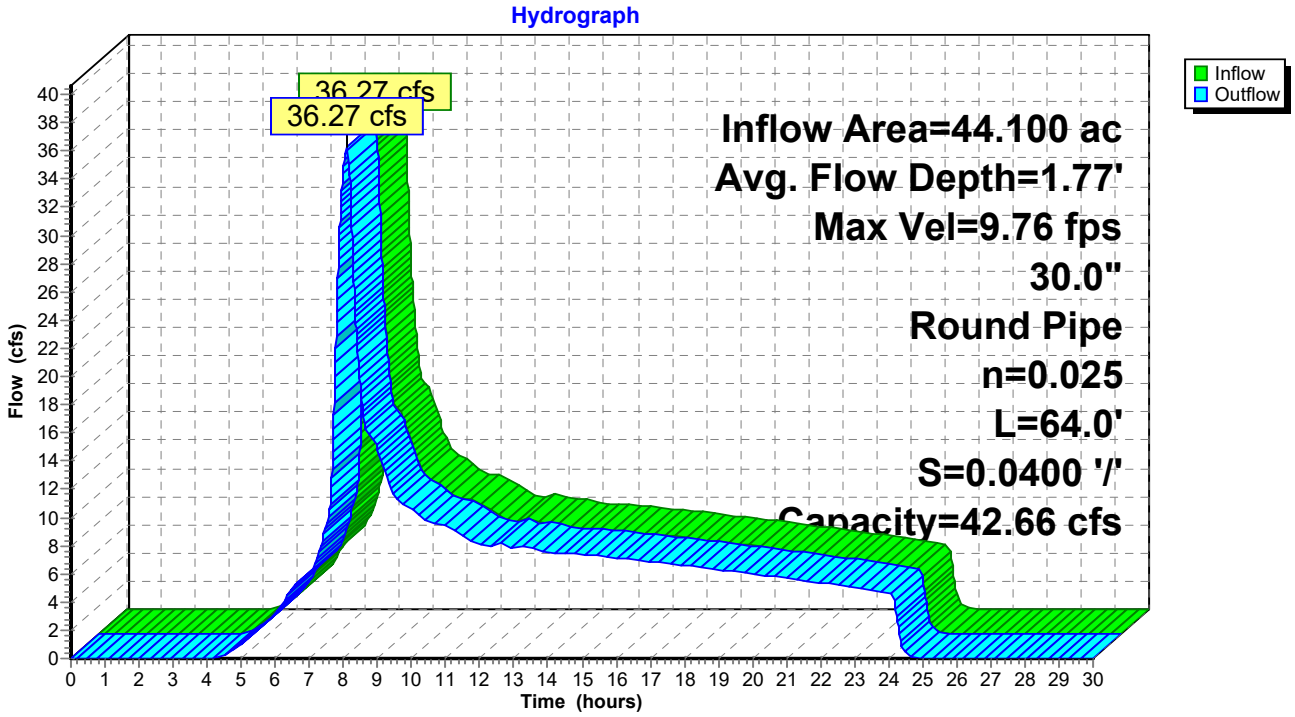
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.76 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.62 fps, Avg. Travel Time= 0.2 min

Peak Storage= 238 cf @ 8.10 hrs
Average Depth at Peak Storage= 1.77' , Surface Width= 2.27'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 42.66 cfs

30.0" Round Pipe
n= 0.025 Corrugated metal
Length= 64.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.56'



Reach R2C-2: Reach 2C-2



Summary for Reach R2C-3: Reach 2C-3

[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 3.47" for 50-YR event
Inflow = 36.34 cfs @ 8.06 hrs, Volume= 12.766 af
Outflow = 36.27 cfs @ 8.10 hrs, Volume= 12.766 af, Atten= 0%, Lag= 2.3 min
Routed to Reach R2C-2 : Reach 2C-2

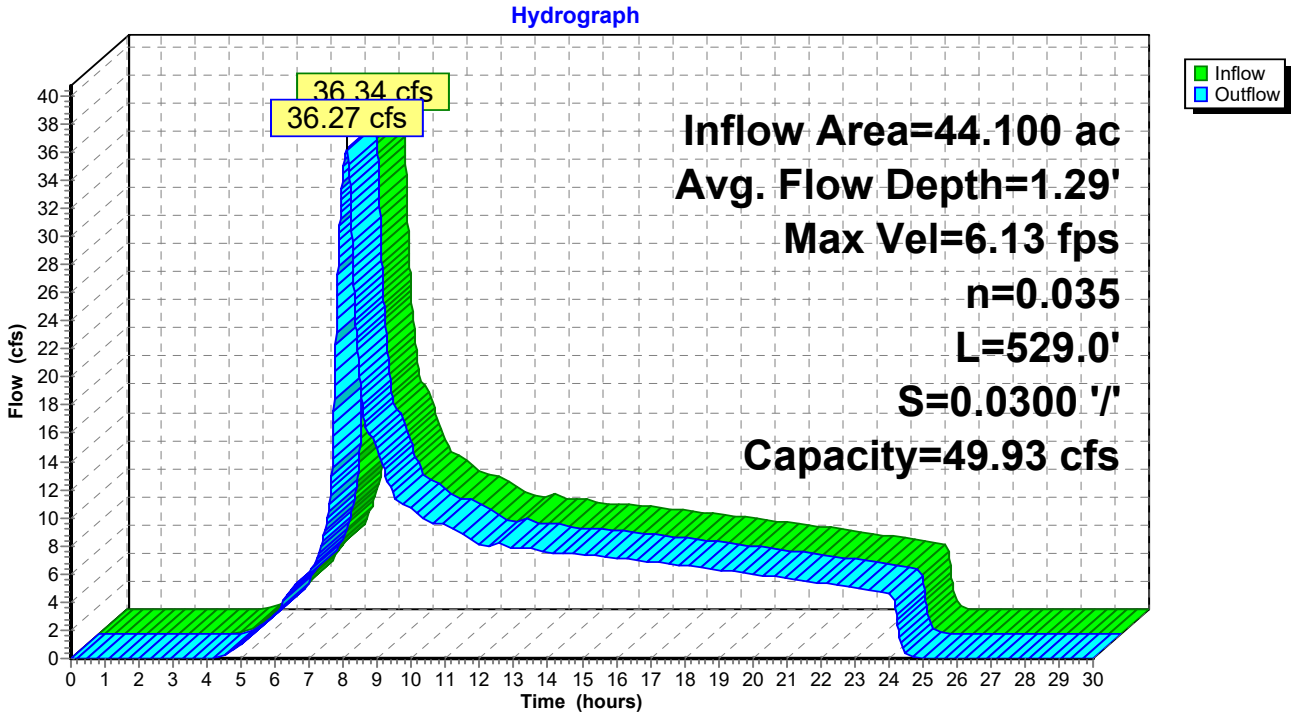
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.13 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 3.42 fps, Avg. Travel Time= 2.6 min

Peak Storage= 3,130 cf @ 8.07 hrs
Average Depth at Peak Storage= 1.29' , Surface Width= 7.17'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 49.93 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 529.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -15.87'



Reach R2C-3: Reach 2C-3



Summary for Reach R2D-1: Reach 2D-1

[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 3.63" for 50-YR event
Inflow = 23.94 cfs @ 8.07 hrs, Volume= 8.269 af
Outflow = 23.93 cfs @ 8.08 hrs, Volume= 8.269 af, Atten= 0%, Lag= 0.4 min
Routed to Reach R2C-3 : Reach 2C-3

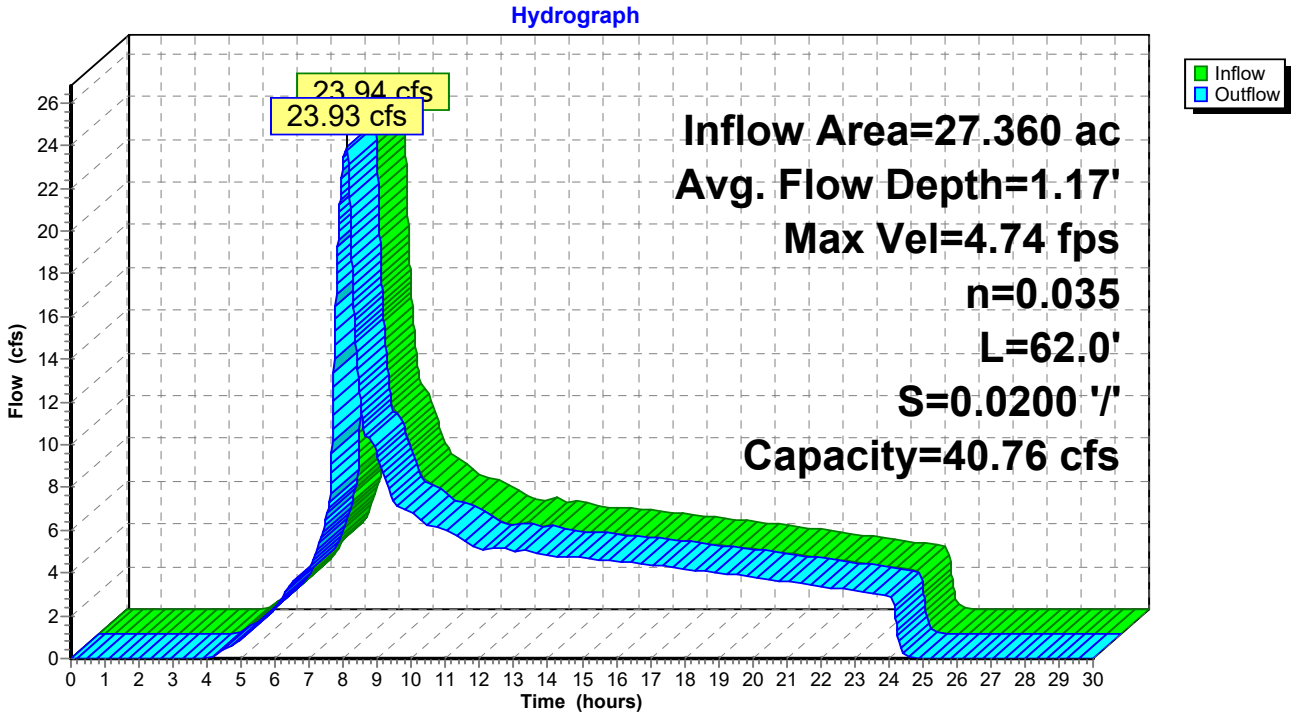
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.74 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.69 fps, Avg. Travel Time= 0.4 min

Peak Storage= 313 cf @ 8.07 hrs
Average Depth at Peak Storage= 1.17' , Surface Width= 6.67'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 40.76 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 62.0' Slope= 0.0200 '/'
Inlet Invert= 0.00', Outlet Invert= -1.24'



Reach R2D-1: Reach 2D-1



Summary for Reach R2D-2: Reach 2D-2

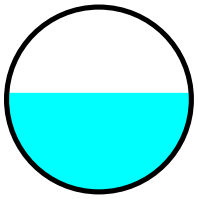
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 3.63" for 50-YR event
Inflow = 23.94 cfs @ 8.07 hrs, Volume= 8.269 af
Outflow = 23.94 cfs @ 8.07 hrs, Volume= 8.269 af, Atten= 0%, Lag= 0.2 min
Routed to Reach R2D-1 : Reach 2D-1

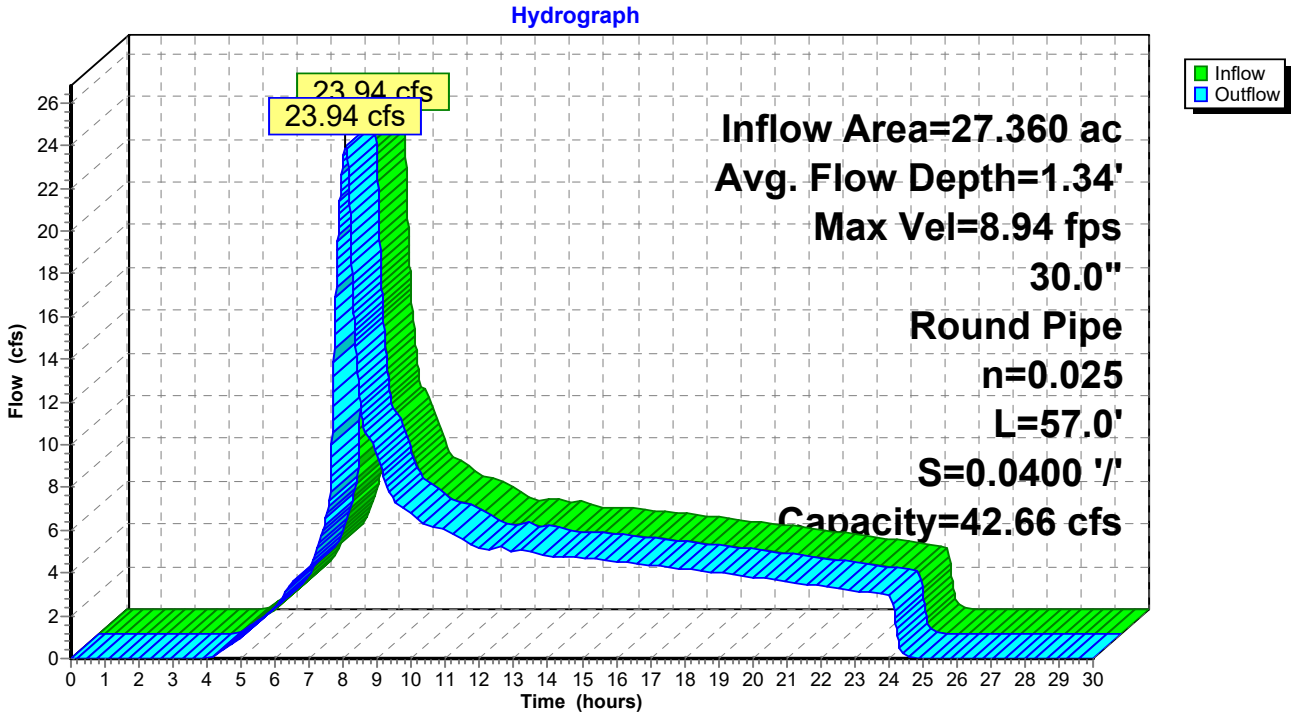
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.94 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.13 fps, Avg. Travel Time= 0.2 min

Peak Storage= 153 cf @ 8.07 hrs
Average Depth at Peak Storage= 1.34' , Surface Width= 2.49'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 42.66 cfs

30.0" Round Pipe
n= 0.025 Corrugated metal
Length= 57.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.28'



Reach R2D-2: Reach 2D-2



Summary for Reach R2D-3: Reach 2D-3

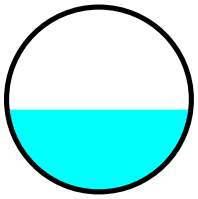
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 3.63" for 50-YR event
Inflow = 23.94 cfs @ 8.07 hrs, Volume= 8.269 af
Outflow = 23.94 cfs @ 8.07 hrs, Volume= 8.269 af, Atten= 0%, Lag= 0.1 min
Routed to Reach R2D-2 : Reach 2D-2

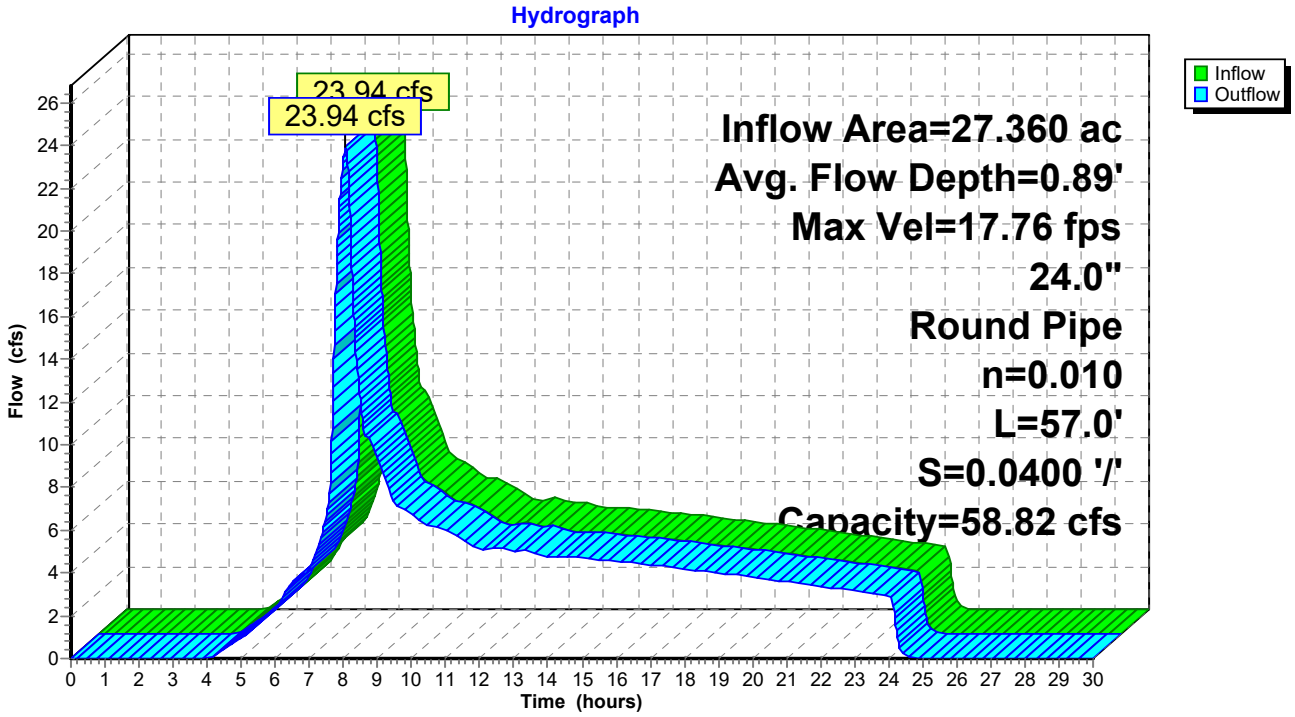
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 17.76 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 10.17 fps, Avg. Travel Time= 0.1 min

Peak Storage= 77 cf @ 8.07 hrs
Average Depth at Peak Storage= 0.89' , Surface Width= 1.99'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 58.82 cfs

24.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 57.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.28'



Reach R2D-3: Reach 2D-3



Summary for Reach R2D-4: Reach 2D-4

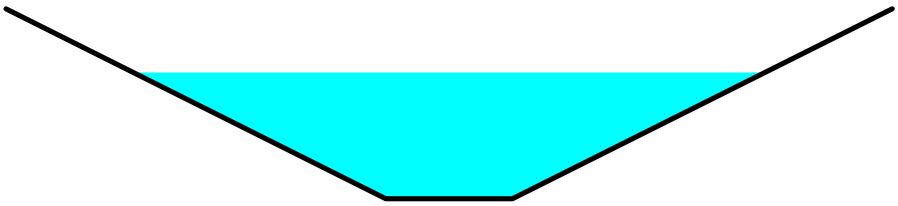
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 3.63" for 50-YR event
Inflow = 23.99 cfs @ 8.03 hrs, Volume= 8.269 af
Outflow = 23.94 cfs @ 8.07 hrs, Volume= 8.269 af, Atten= 0%, Lag= 2.4 min
Routed to Reach R2D-3 : Reach 2D-3

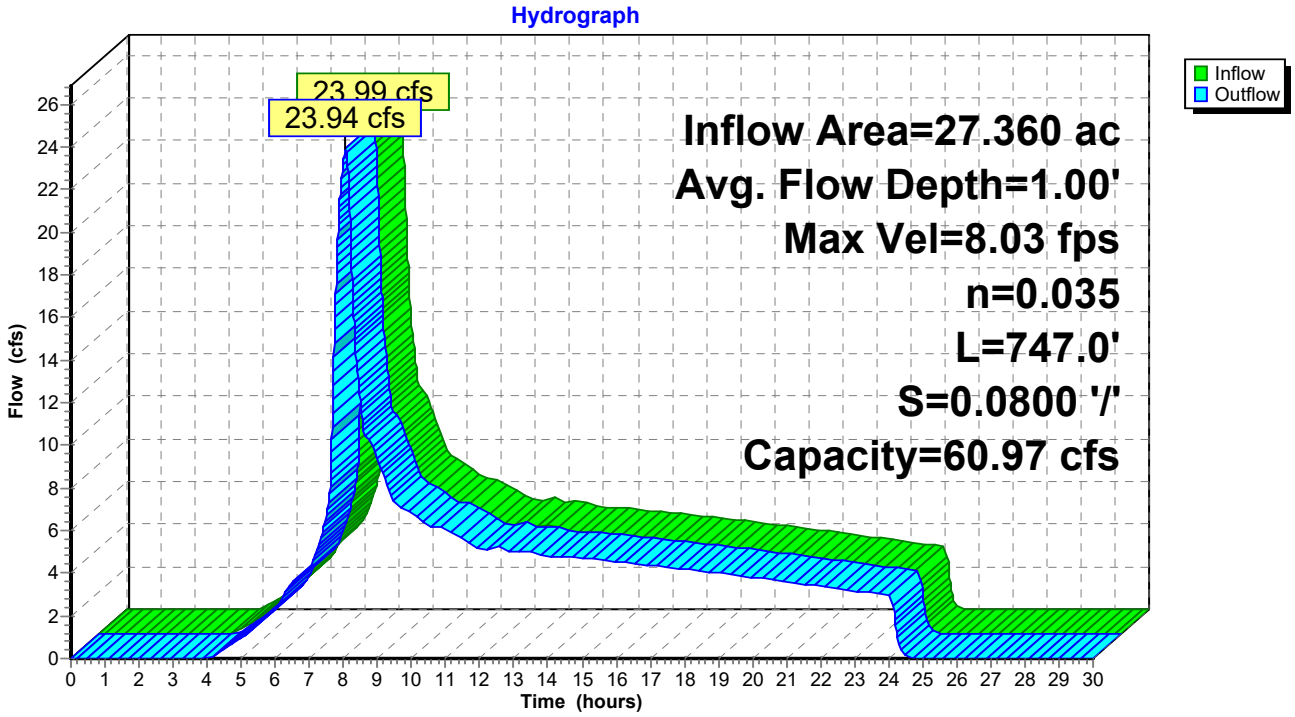
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.03 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 4.72 fps, Avg. Travel Time= 2.6 min

Peak Storage= 2,228 cf @ 8.04 hrs
Average Depth at Peak Storage= 1.00' , Surface Width= 4.99'
Bank-Full Depth= 1.50' Flow Area= 6.0 sf, Capacity= 60.97 cfs

1.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 747.0' Slope= 0.0800 '/'
Inlet Invert= 0.00', Outlet Invert= -59.76'



Reach R2D-4: Reach 2D-4



Summary for Pond 1P: Existing Reservoir

Inflow Area = 13.656 ac, 13.09% Impervious, Inflow Depth = 4.15" for 50-YR event
Inflow = 14.33 cfs @ 7.99 hrs, Volume= 4.720 af
Outflow = 2.40 cfs @ 16.29 hrs, Volume= 3.595 af, Atten= 83%, Lag= 497.9 min
Primary = 2.40 cfs @ 16.29 hrs, Volume= 3.595 af
Routed to Reach R2B-1 : Reach 2B-1

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Starting Elev= 99.00' Surf.Area= 2.150 ac Storage= 2.075 af
Peak Elev= 99.90' @ 16.29 hrs Surf.Area= 2.285 ac Storage= 4.065 af (1.990 af above start)

Plug-Flow detention time= 992.0 min calculated for 1.520 af (32% of inflow)
Center-of-Mass det. time= 332.6 min (1,094.8 - 762.3)

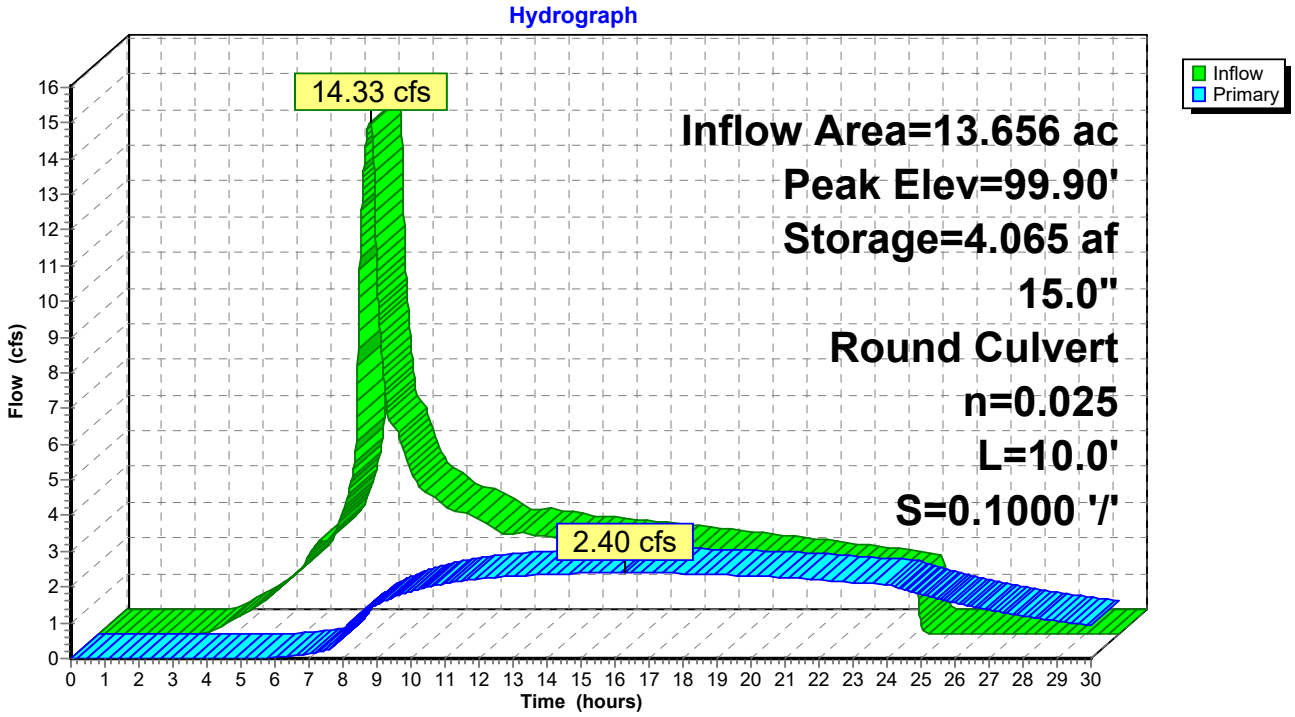
Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	4.300 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
98.00	2.000	0.000	0.000
100.00	2.300	4.300	4.300

Device	Routing	Invert	Outlet Devices
#1	Primary	99.00'	**15.0" Round Culvert** L= 10.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 99.00' / 98.00' S= 0.1000 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=2.40 cfs @ 16.29 hrs HW=99.90' (Free Discharge)
1=Culvert (Inlet Controls 2.40 cfs @ 2.55 fps)

Pond 1P: Existing Reservoir

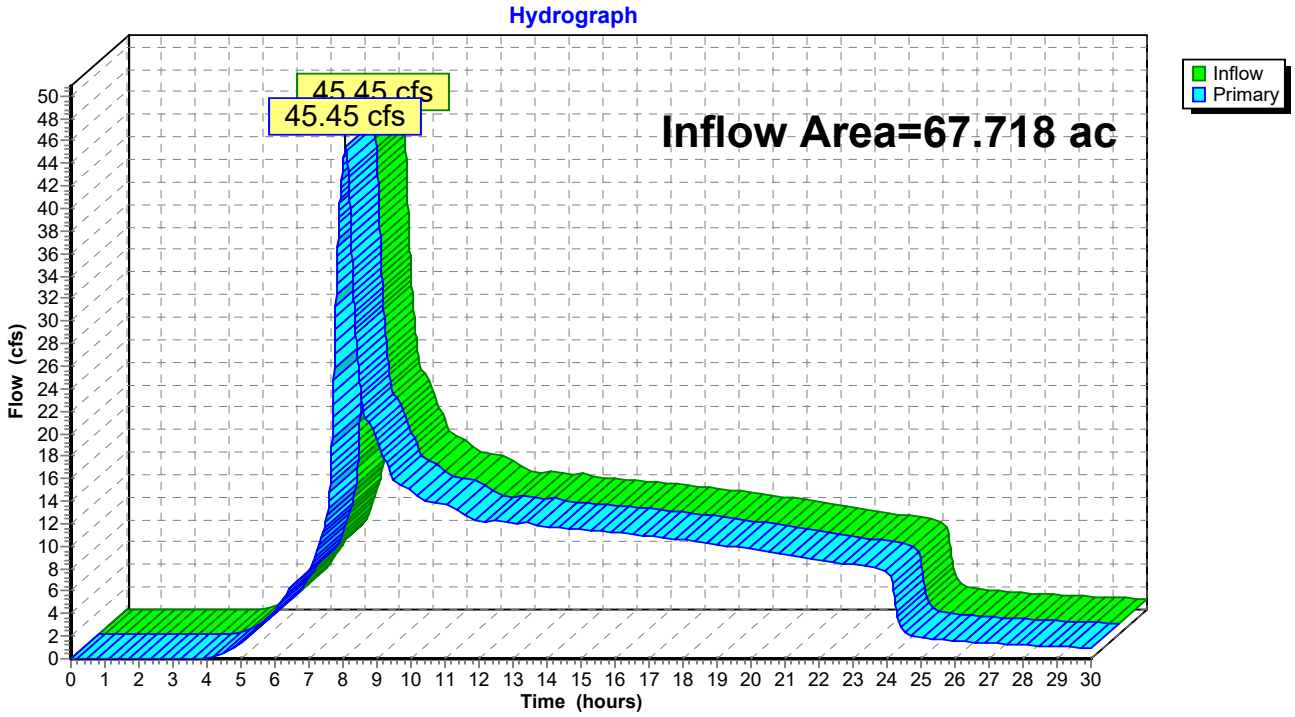


Summary for Link Outlet 2: Outlet 2

Inflow Area = 67.718 ac, 3.94% Impervious, Inflow Depth > 3.44" for 50-YR event
Inflow = 45.45 cfs @ 8.08 hrs, Volume= 19.435 af
Primary = 45.45 cfs @ 8.08 hrs, Volume= 19.435 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Outlet 2: Outlet 2



Summary for Subcatchment WS-2A: Subcat WS-2A

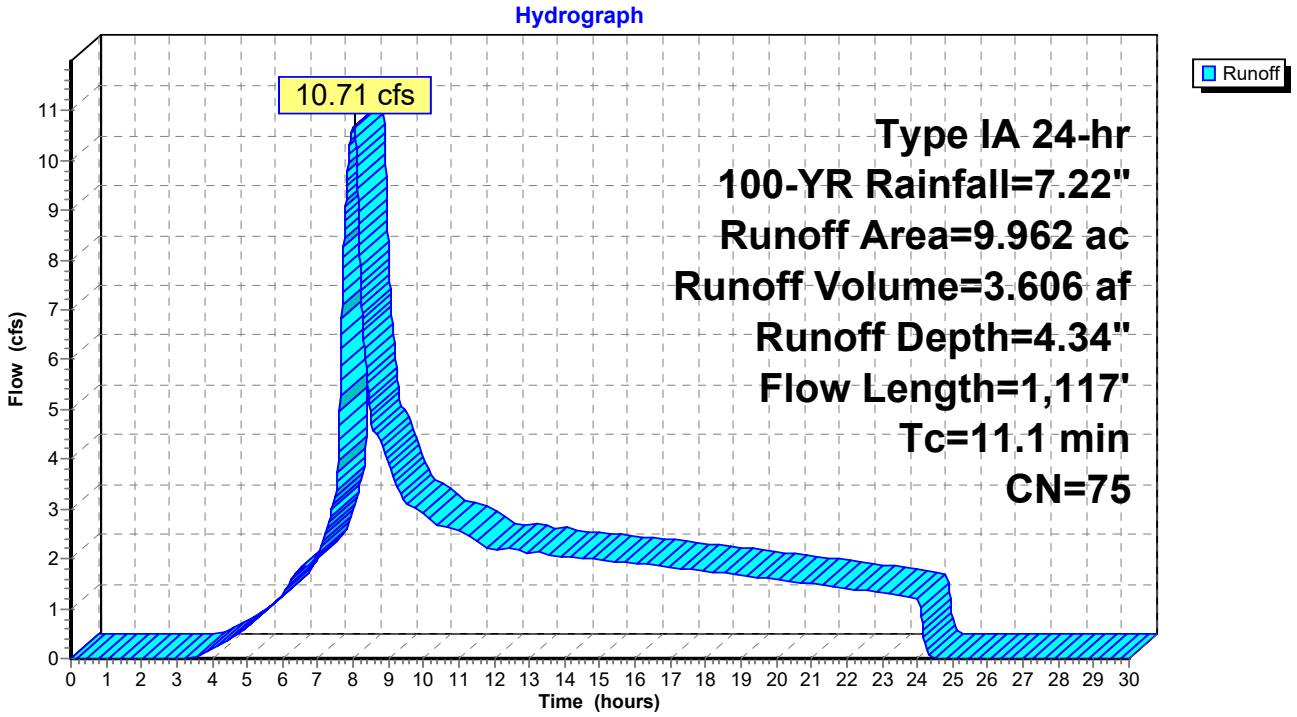
Runoff = 10.71 cfs @ 8.03 hrs, Volume= 3.606 af, Depth= 4.34"
Routed to Link Outlet 2 : Outlet 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-YR Rainfall=7.22"

	Area (ac)	CN	Description
*	0.000	0	, HSG C
	0.832	69	Annual Grass, Fair, HSG B
	2.728	79	Annual Grass, Fair, HSG C
	0.000	82	Dirt roads, HSG B
	0.055	87	Dirt roads, HSG C
	0.124	82	Farmsteads, HSG C
	0.026	89	Paved roads w/open ditches, 50% imp, HSG B
	0.158	92	Paved roads w/open ditches, 50% imp, HSG C
	0.247	60	Woods, Fair, HSG B
	5.793	73	Woods, Fair, HSG C
	9.962	75	Weighted Average
	9.870		99.08% Pervious Area
	0.092		0.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	100	0.2400	0.32		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
2.6	335	0.1900	2.18		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
1.3	158	0.0900	2.10		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.6	409	0.0200	4.36	17.43	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.2	64	0.0200	6.14	30.16	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025 Corrugated metal
0.1	51	0.0600	7.55	30.18	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
11.1	1,117	Total			

Subcatchment WS-2A: Subcat WS-2A



Summary for Subcatchment WS-2B: Subcat WS-2B

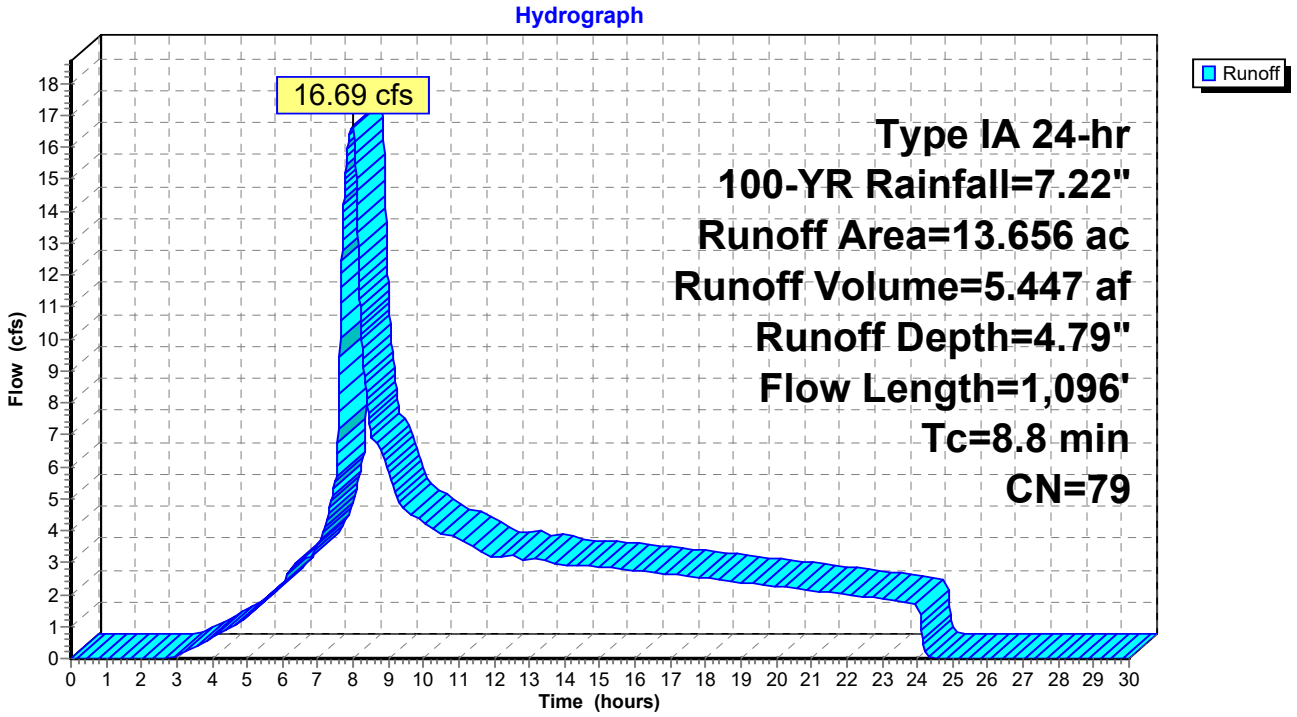
Runoff = 16.69 cfs @ 7.97 hrs, Volume= 5.447 af, Depth= 4.79"
Routed to Pond 1P : Existing Reservoir

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-YR Rainfall=7.22"

Area (ac)	CN	Description
0.661	69	Annual Grass, Fair, HSG B
1.698	79	Annual Grass, Fair, HSG C
0.195	84	Annual Grass, Fair, HSG D
0.668	82	Farmsteads, HSG C
0.149	89	Gravel Roads, HSG C
0.001	92	Paved roads w/open ditches, 50% imp, HSG C
2.792	79	Vineyard, Fair, HSG C
0.032	98	Water Surface, HSG B
0.000	98	Water Surface, HSG C
1.754	98	Water Surface, HSG D
0.050	60	Woods, Fair, HSG B
5.654	73	Woods, Fair, HSG C
0.001	79	Woods, Fair, HSG D
13.656	79	Weighted Average
11.869		86.91% Pervious Area
1.787		13.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.2500	0.32		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
3.1	564	0.1900	3.05		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.5	432	0.2300	14.77	59.09	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
8.8	1,096	Total			

Subcatchment WS-2B: Subcat WS-2B



Summary for Subcatchment WS-2C: Subcat WS-2C

Runoff = 15.09 cfs @ 8.04 hrs, Volume= 5.304 af, Depth= 3.80"
Routed to Reach R2C-3 : Reach 2C-3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-YR Rainfall=7.22"

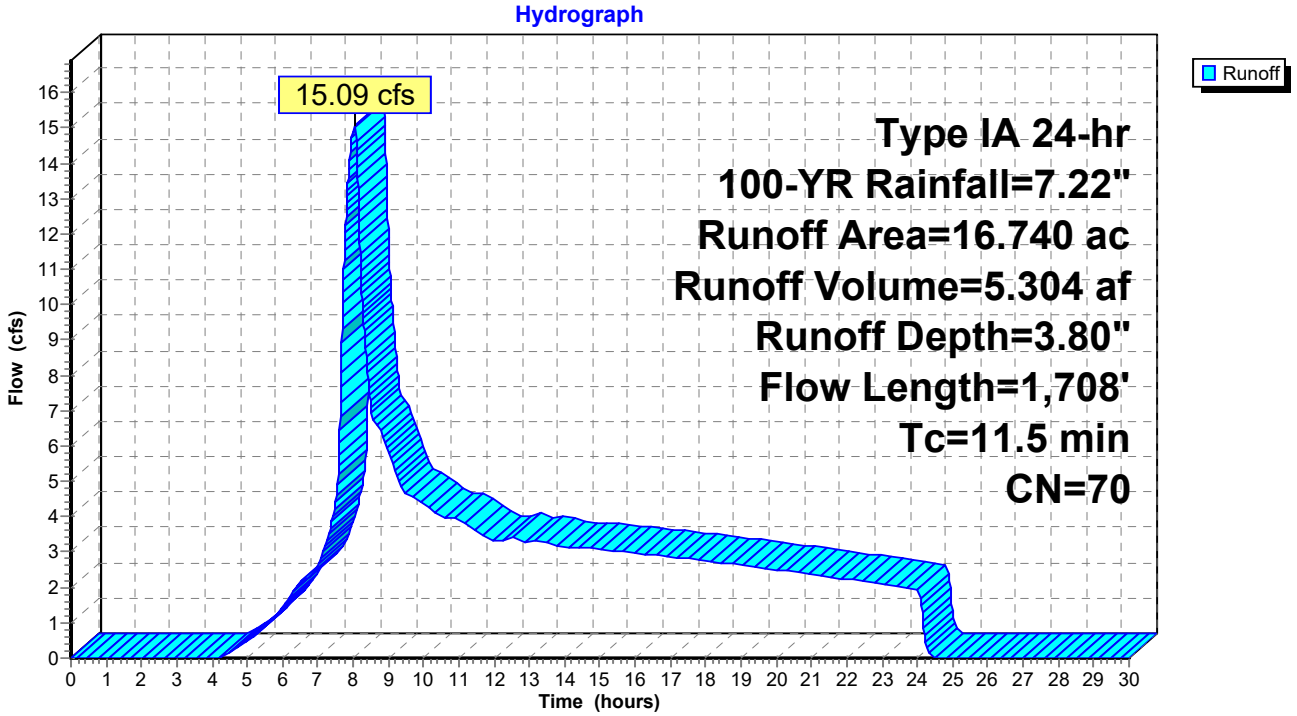
Area (ac)	CN	Description
2.003	69	Annual Grass, Fair, HSG B
1.330	79	Annual Grass, Fair, HSG C
0.115	65	Brush, Good, HSG C
0.025	82	Dirt roads, HSG B
0.001	87	Dirt roads, HSG C
0.199	74	Farmsteads, HSG B
0.908	82	Farmsteads, HSG C
0.037	85	Gravel Roads, HSG B
0.183	89	Gravel Roads, HSG C
0.247	89	Paved roads w/open ditches, 50% imp, HSG B
0.138	92	Paved roads w/open ditches, 50% imp, HSG C
0.090	69	Vineyard, Fair, HSG B
0.695	79	Vineyard, Fair, HSG C
6.132	60	Woods, Fair, HSG B
4.637	73	Woods, Fair, HSG C
16.740	70	Weighted Average
16.547		98.85% Pervious Area
0.193		1.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.1800	0.28		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
1.3	297	0.2800	3.70		**Shallow Concentrated Flow, Shallow - Woodland** Short Grass Pasture Kv= 7.0 fps
1.6	266	0.3200	2.83		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.9	543	0.1100	10.22	40.87	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.8	90	0.0800	1.98		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.6	236	0.0500	6.36	19.08	**Trap/Vee/Rect Channel Flow, Pasture Ditch** Bot.W=1.00' D=1.00' Z= 2.0 '/' Top.W=5.00' n= 0.035
0.1	57	0.0400	18.72	58.82	**Pipe Channel, 24" PVC Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.010 PVC, smooth interior
0.1	57	0.0400	8.69	42.66	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025
0.2	62	0.0200	4.36	17.43	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00'

n= 0.035

11.5	1,708	Total

Subcatchment WS-2C: Subcat WS-2C



Summary for Subcatchment WS-2D: Subcat WS-2D

[47] Hint: Peak is 173% of capacity of segment #3
[47] Hint: Peak is 397% of capacity of segment #4

Runoff = 28.46 cfs @ 8.02 hrs, Volume= 9.654 af, Depth= 4.23"
Routed to Reach R2D-4 : Reach 2D-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-YR Rainfall=7.22"

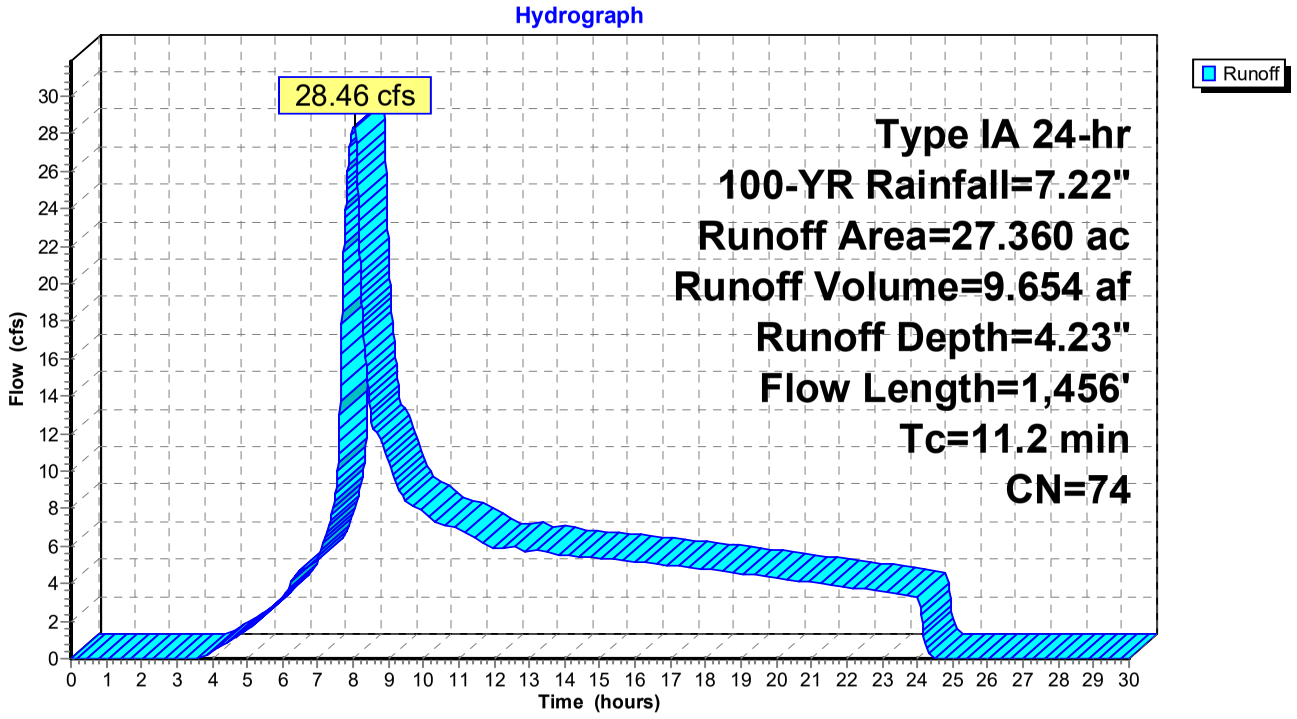
Area (ac)	CN	Description
0.073	69	Annual Grass, Fair, HSG B
2.356	79	Annual Grass, Fair, HSG C
0.715	75	Annual Grass, Good, HSG C
0.073	87	Dirt roads, HSG C
0.320	82	Farmsteads, HSG C
0.174	89	Gravel Roads, HSG C
0.020	89	Paved roads w/open ditches, 50% imp, HSG B
1.171	92	Paved roads w/open ditches, 50% imp, HSG C
0.458	60	Woods, Fair, HSG B
17.774	73	Woods, Fair, HSG C
4.225	70	Woods, Good, HSG C
27.360	74	Weighted Average
26.764		97.82% Pervious Area
0.596		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.3	87	0.1200	0.16		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.3	41	0.2500	2.50		**Shallow Concentrated Flow, Shallow** Woodland Kv= 5.0 fps
0.5	267	0.1100	8.23	16.47	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=0.00' D=1.00' Z= 2.0 '/' Top.W=4.00' n= 0.035
0.0	27	0.1500	9.14	7.18	**Pipe Channel, 12" CMP Culvert** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025
0.1	59	0.2500	15.40	61.61	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.1	135	0.3800	23.08	72.52	**Pipe Channel, 24" CMP Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025
0.6	525	0.2000	13.78	55.11	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.0	42	0.2100	19.91	97.74	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025
0.3	273	0.1800	13.07	52.28	**Trap/Vee/Rect Channel Flow, Stream**

Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00'
n= 0.035

11.2	1,456	Total

Subcatchment WS-2D: Subcat WS-2D



Summary for Reach R2B-1: Reach 2B-1

[65] Warning: Inlet elevation not specified

Inflow Area = 13.656 ac, 13.09% Impervious, Inflow Depth > 3.74" for 100-YR event
Inflow = 2.83 cfs @ 15.27 hrs, Volume= 4.251 af
Outflow = 2.83 cfs @ 15.47 hrs, Volume= 4.228 af, Atten= 0%, Lag= 11.9 min
Routed to Link Outlet 2 : Outlet 2

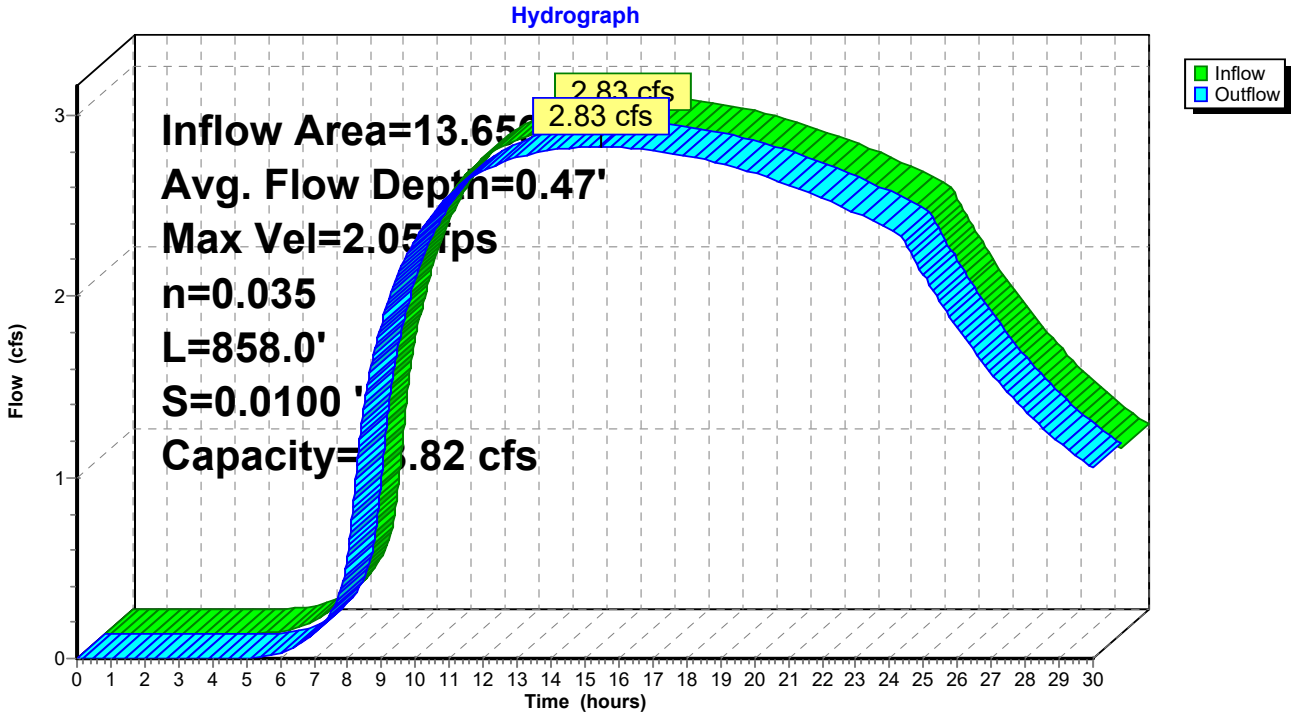
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.05 fps, Min. Travel Time= 7.0 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 8.5 min

Peak Storage= 1,182 cf @ 15.36 hrs
Average Depth at Peak Storage= 0.47' , Surface Width= 3.88'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 28.82 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 858.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -8.58'



Reach R2B-1: Reach 2B-1



Summary for Reach R2C-1: Reach 2C-1

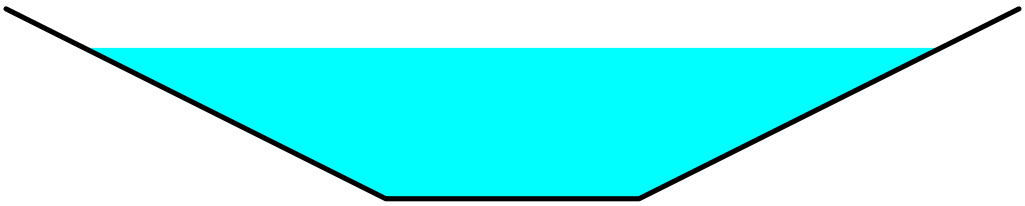
[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 4.07" for 100-YR event
Inflow = 43.34 cfs @ 8.09 hrs, Volume= 14.958 af
Outflow = 43.33 cfs @ 8.10 hrs, Volume= 14.958 af, Atten= 0%, Lag= 0.2 min
Routed to Link Outlet 2 : Outlet 2

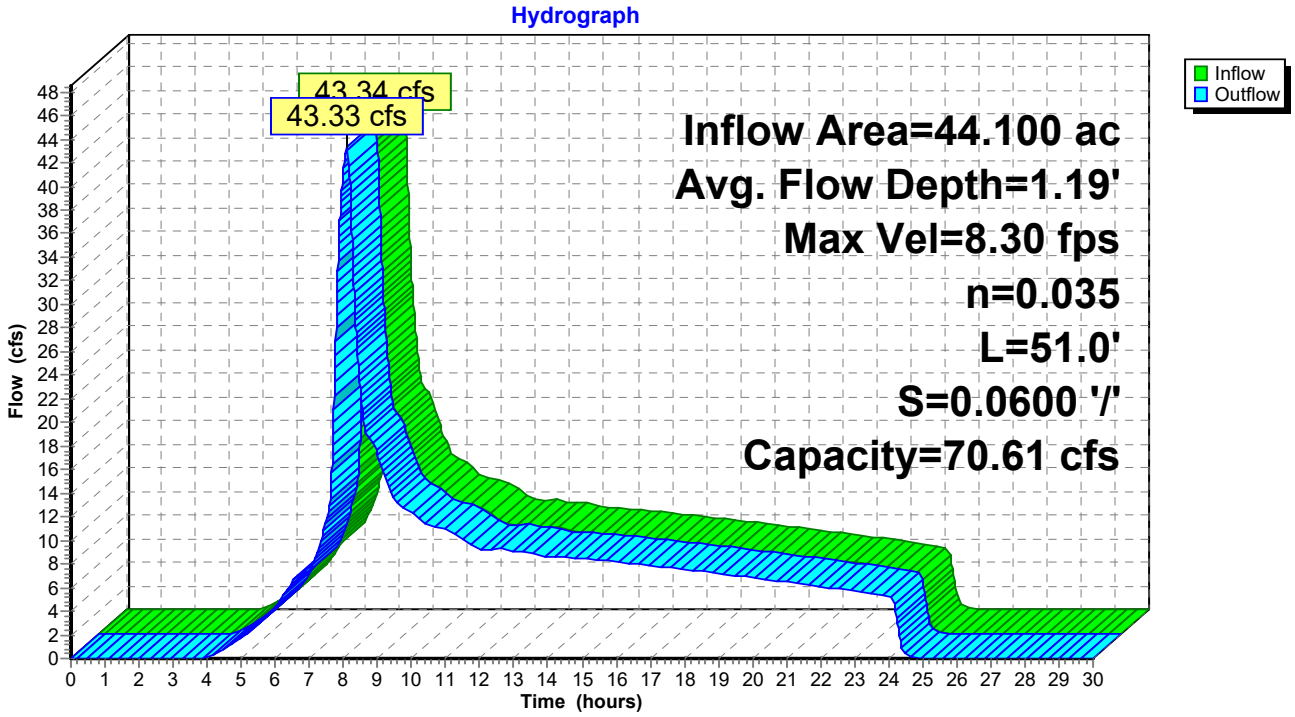
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.30 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.58 fps, Avg. Travel Time= 0.2 min

Peak Storage= 266 cf @ 8.09 hrs
Average Depth at Peak Storage= 1.19' , Surface Width= 6.77'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 70.61 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 51.0' Slope= 0.0600 '/'
Inlet Invert= 0.00', Outlet Invert= -3.06'



Reach R2C-1: Reach 2C-1



Summary for Reach R2C-2: Reach 2C-2

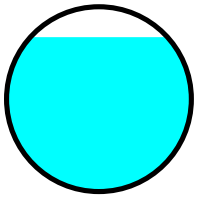
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified
[55] Hint: Peak inflow is 102% of Manning's capacity

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 4.07" for 100-YR event
Inflow = 43.34 cfs @ 8.09 hrs, Volume= 14.958 af
Outflow = 43.34 cfs @ 8.09 hrs, Volume= 14.958 af, Atten= 0%, Lag= 0.2 min
Routed to Reach R2C-1 : Reach 2C-1

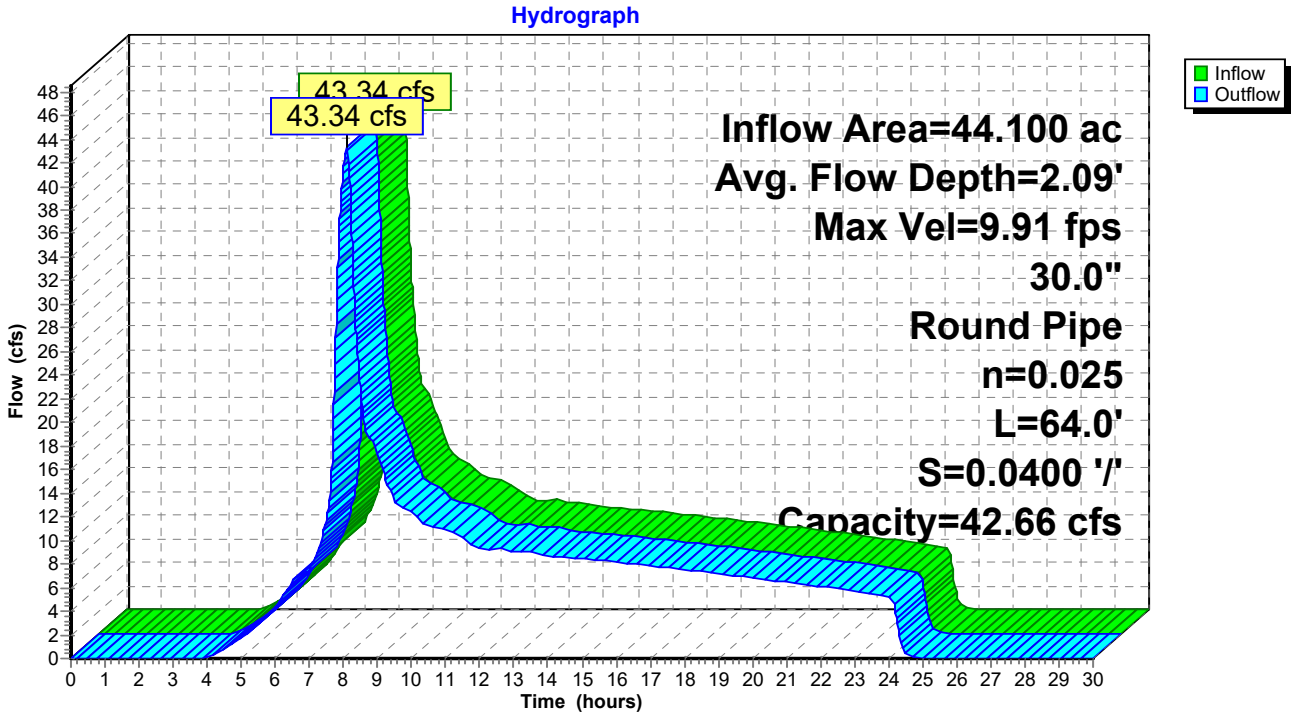
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.91 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.85 fps, Avg. Travel Time= 0.2 min

Peak Storage= 280 cf @ 8.09 hrs
Average Depth at Peak Storage= 2.09' , Surface Width= 1.86'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 42.66 cfs

30.0" Round Pipe
n= 0.025 Corrugated metal
Length= 64.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.56'



Reach R2C-2: Reach 2C-2



Summary for Reach R2C-3: Reach 2C-3

[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 4.07" for 100-YR event
Inflow = 43.40 cfs @ 8.05 hrs, Volume= 14.958 af
Outflow = 43.34 cfs @ 8.09 hrs, Volume= 14.958 af, Atten= 0%, Lag= 2.1 min
Routed to Reach R2C-2 : Reach 2C-2

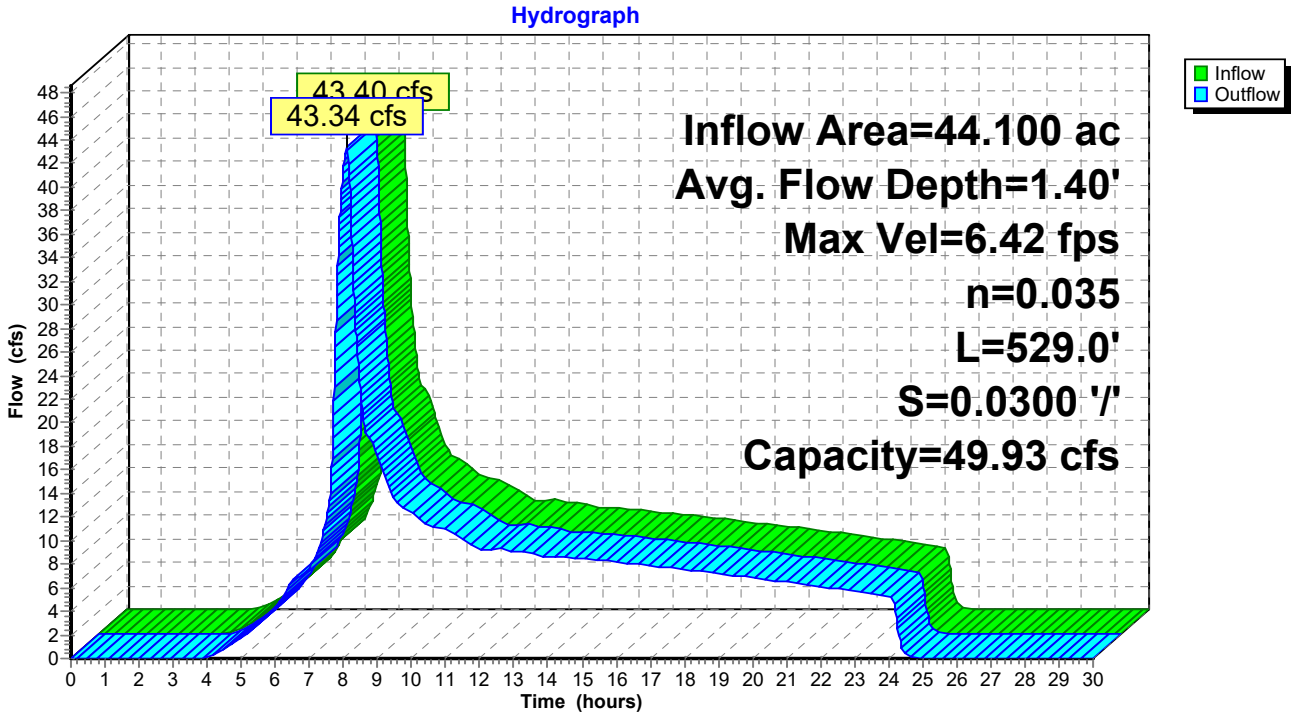
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.42 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 3.55 fps, Avg. Travel Time= 2.5 min

Peak Storage= 3,572 cf @ 8.07 hrs
Average Depth at Peak Storage= 1.40' , Surface Width= 7.62'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 49.93 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 529.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -15.87'



Reach R2C-3: Reach 2C-3



Summary for Reach R2D-1: Reach 2D-1

[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 4.23" for 100-YR event
Inflow = 28.41 cfs @ 8.07 hrs, Volume= 9.654 af
Outflow = 28.41 cfs @ 8.07 hrs, Volume= 9.654 af, Atten= 0%, Lag= 0.3 min
Routed to Reach R2C-3 : Reach 2C-3

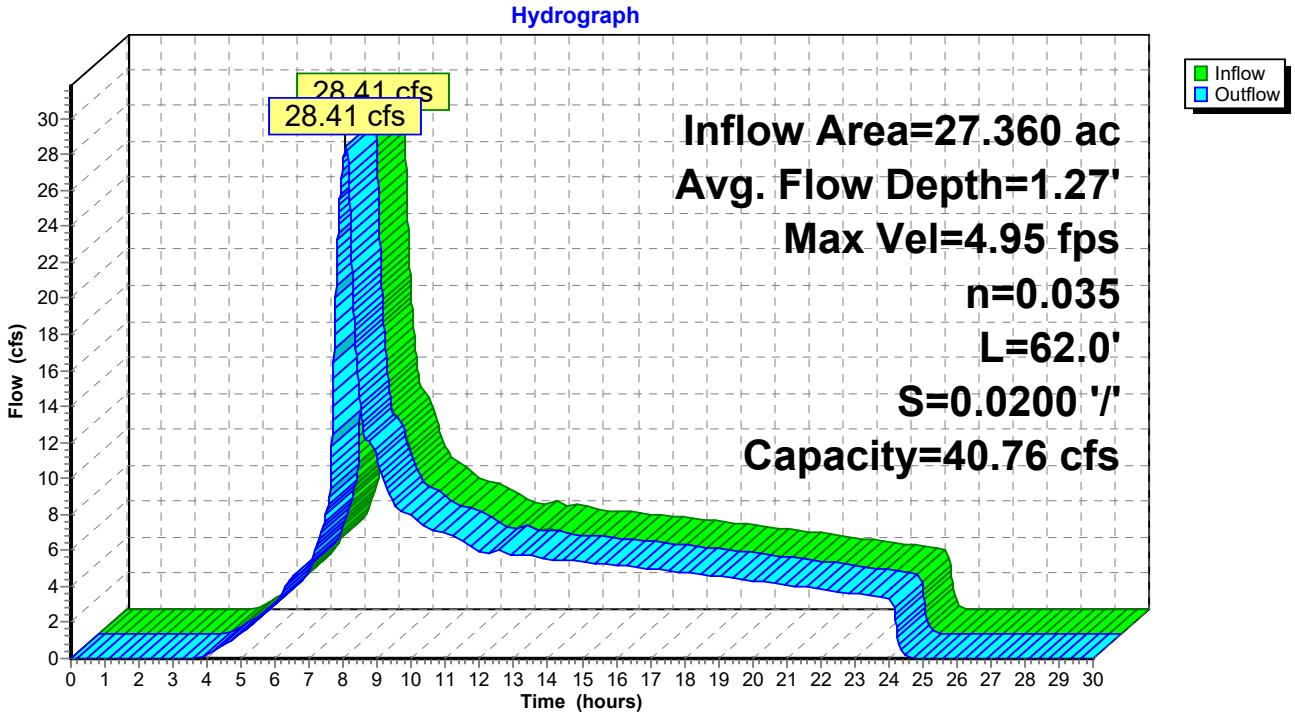
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.95 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.80 fps, Avg. Travel Time= 0.4 min

Peak Storage= 356 cf @ 8.07 hrs
Average Depth at Peak Storage= 1.27' , Surface Width= 7.06'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 40.76 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 62.0' Slope= 0.0200 '/'
Inlet Invert= 0.00', Outlet Invert= -1.24'



Reach R2D-1: Reach 2D-1



Summary for Reach R2D-2: Reach 2D-2

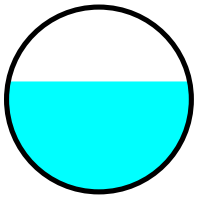
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 4.23" for 100-YR event
Inflow = 28.42 cfs @ 8.06 hrs, Volume= 9.654 af
Outflow = 28.41 cfs @ 8.07 hrs, Volume= 9.654 af, Atten= 0%, Lag= 0.2 min
Routed to Reach R2D-1 : Reach 2D-1

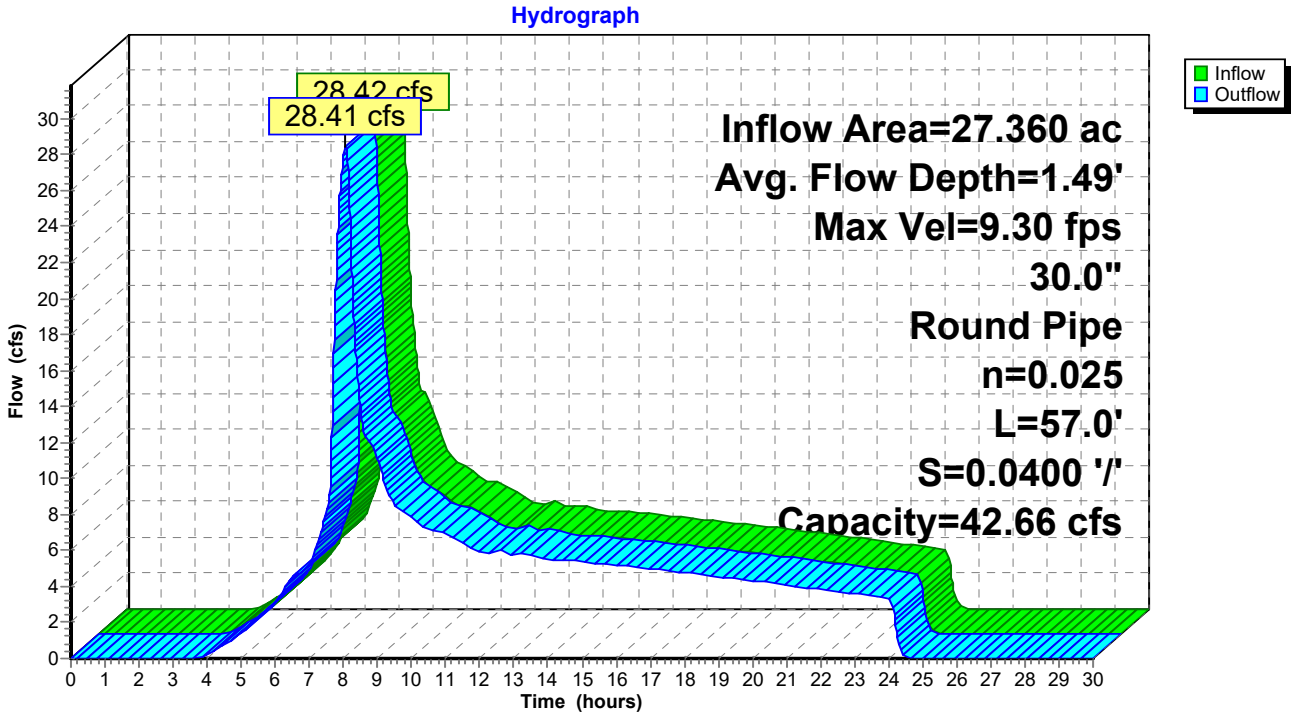
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.30 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.34 fps, Avg. Travel Time= 0.2 min

Peak Storage= 174 cf @ 8.06 hrs
Average Depth at Peak Storage= 1.49' , Surface Width= 2.45'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 42.66 cfs

30.0" Round Pipe
n= 0.025 Corrugated metal
Length= 57.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.28'



Reach R2D-2: Reach 2D-2



Summary for Reach R2D-3: Reach 2D-3

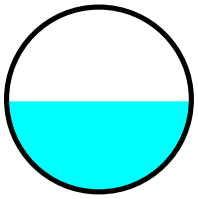
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 4.23" for 100-YR event
Inflow = 28.42 cfs @ 8.06 hrs, Volume= 9.654 af
Outflow = 28.42 cfs @ 8.06 hrs, Volume= 9.654 af, Atten= 0%, Lag= 0.1 min
Routed to Reach R2D-2 : Reach 2D-2

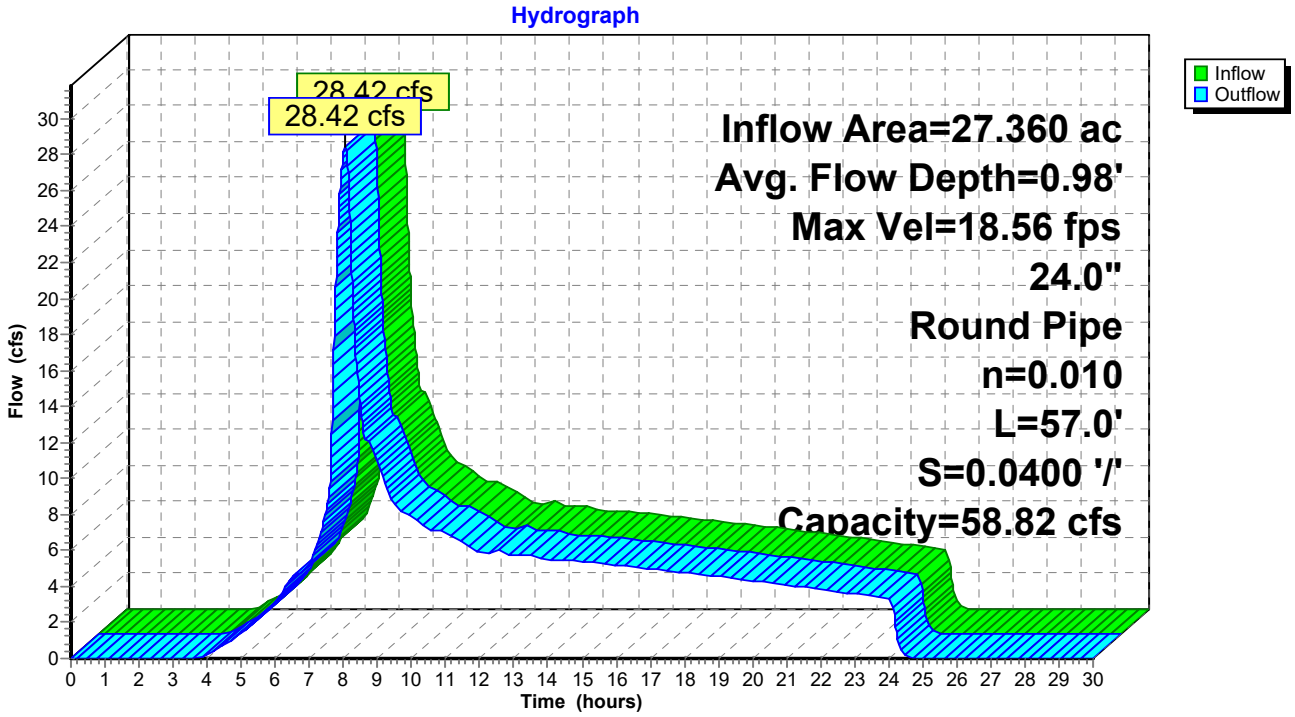
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 18.56 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 10.59 fps, Avg. Travel Time= 0.1 min

Peak Storage= 87 cf @ 8.06 hrs
Average Depth at Peak Storage= 0.98' , Surface Width= 2.00'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 58.82 cfs

24.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 57.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.28'



Reach R2D-3: Reach 2D-3



Summary for Reach R2D-4: Reach 2D-4

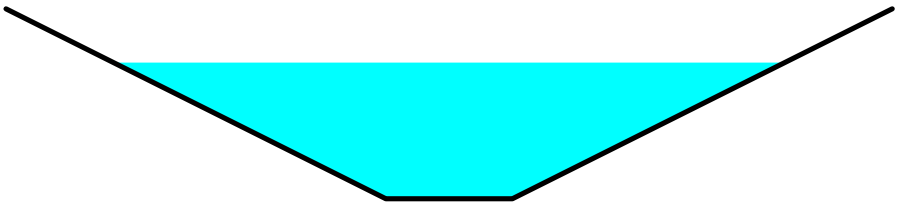
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 4.23" for 100-YR event
Inflow = 28.46 cfs @ 8.02 hrs, Volume= 9.654 af
Outflow = 28.42 cfs @ 8.06 hrs, Volume= 9.654 af, Atten= 0%, Lag= 2.2 min
Routed to Reach R2D-3 : Reach 2D-3

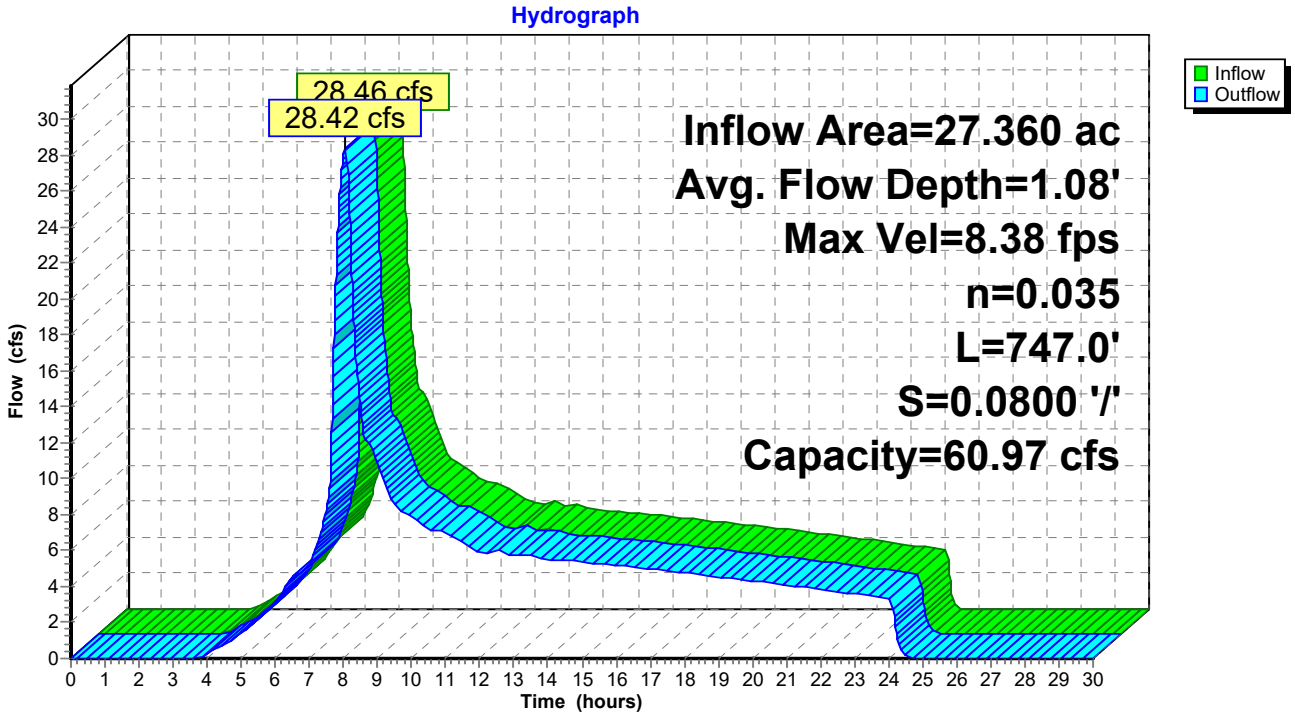
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.38 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 4.90 fps, Avg. Travel Time= 2.5 min

Peak Storage= 2,532 cf @ 8.04 hrs
Average Depth at Peak Storage= 1.08' , Surface Width= 5.30'
Bank-Full Depth= 1.50' Flow Area= 6.0 sf, Capacity= 60.97 cfs

1.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 747.0' Slope= 0.0800 '/'
Inlet Invert= 0.00', Outlet Invert= -59.76'



Reach R2D-4: Reach 2D-4



Summary for Pond 1P: Existing Reservoir

Inflow Area = 13.656 ac, 13.09% Impervious, Inflow Depth = 4.79" for 100-YR event
Inflow = 16.69 cfs @ 7.97 hrs, Volume= 5.447 af
Outflow = 2.83 cfs @ 15.27 hrs, Volume= 4.251 af, Atten= 83%, Lag= 438.1 min
Primary = 2.83 cfs @ 15.27 hrs, Volume= 4.251 af
Routed to Reach R2B-1 : Reach 2B-1

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Starting Elev= 99.00' Surf.Area= 2.150 ac Storage= 2.075 af
Peak Elev= 100.00' @ 15.27 hrs Surf.Area= 2.300 ac Storage= 4.299 af (2.224 af above start)

Plug-Flow detention time= 911.2 min calculated for 2.175 af (40% of inflow)
Center-of-Mass det. time= 326.6 min (1,080.9 - 754.3)

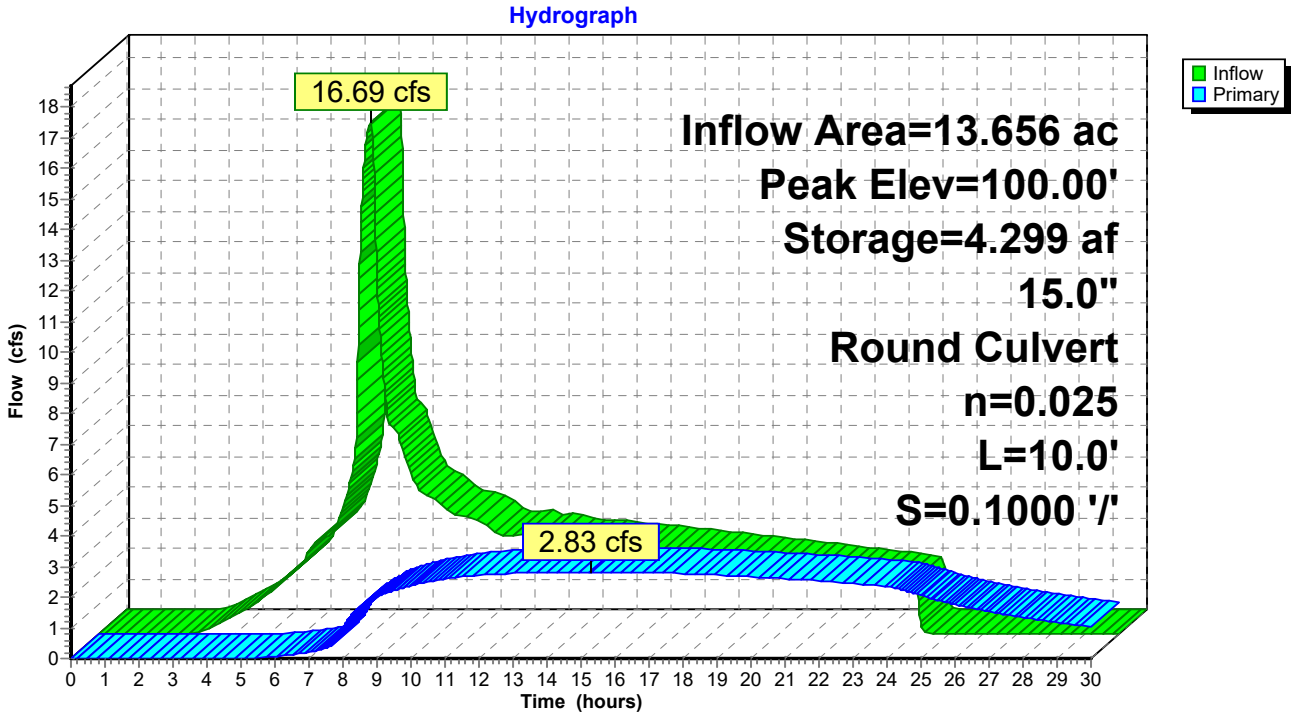
Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	4.300 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
98.00	2.000	0.000	0.000
100.00	2.300	4.300	4.300

Device	Routing	Invert	Outlet Devices
#1	Primary	99.00'	**15.0" Round Culvert** L= 10.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 99.00' / 98.00' S= 0.1000 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=2.83 cfs @ 15.27 hrs HW=100.00' (Free Discharge)
1=Culvert (Inlet Controls 2.83 cfs @ 2.69 fps)

Pond 1P: Existing Reservoir

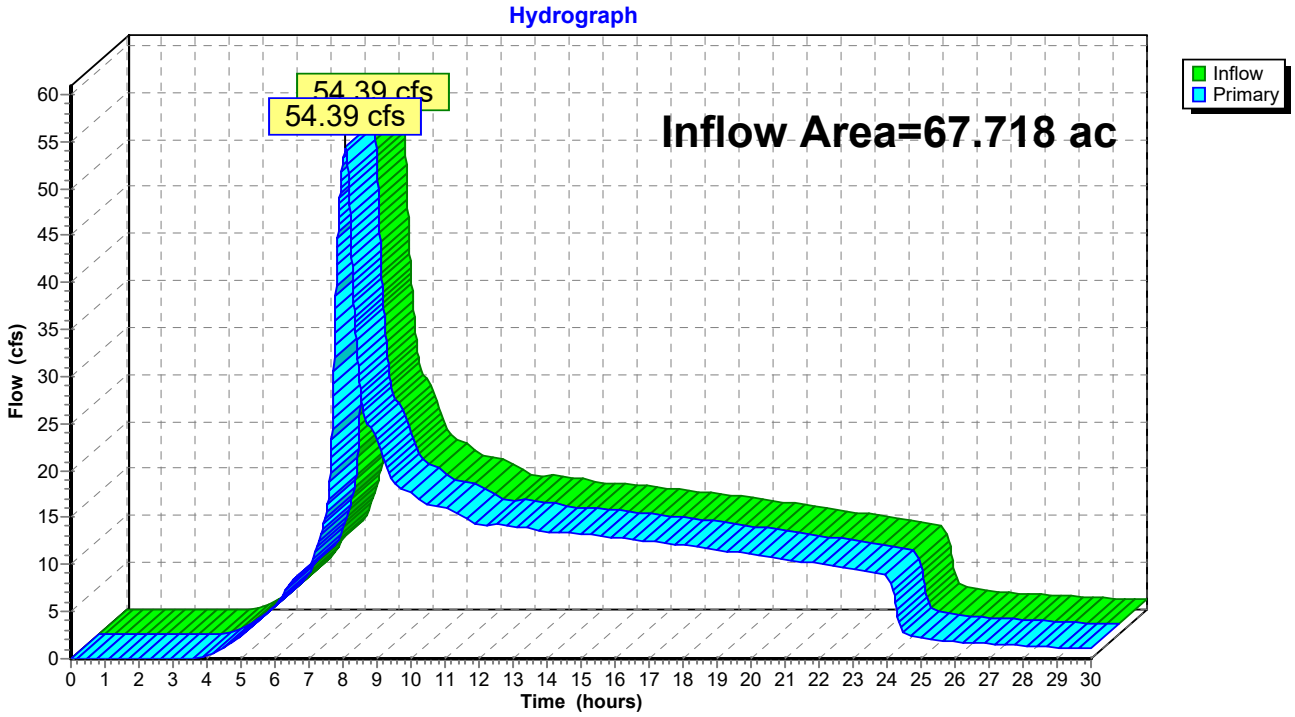


Summary for Link Outlet 2: Outlet 2

Inflow Area = 67.718 ac, 3.94% Impervious, Inflow Depth > 4.04" for 100-YR event
Inflow = 54.39 cfs @ 8.08 hrs, Volume= 22.792 af
Primary = 54.39 cfs @ 8.08 hrs, Volume= 22.792 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Outlet 2: Outlet 2





Subarea 3

Subcat Reach Pond Link

Routing Diagram for Wappo Hill Pre-Project WS3-4
Prepared by PPI Engineering, Printed 11/9/2023
HydroCAD® 10.20-3c s/n 09429 © 2023 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.552	79	Annual Grass, Fair, HSG C (WS-3)
0.561	79	Vineyard, Fair, HSG C (WS-3)
2.094	73	Woods, Fair, HSG C (WS-3)
5.208	**77**	**TOTAL AREA**



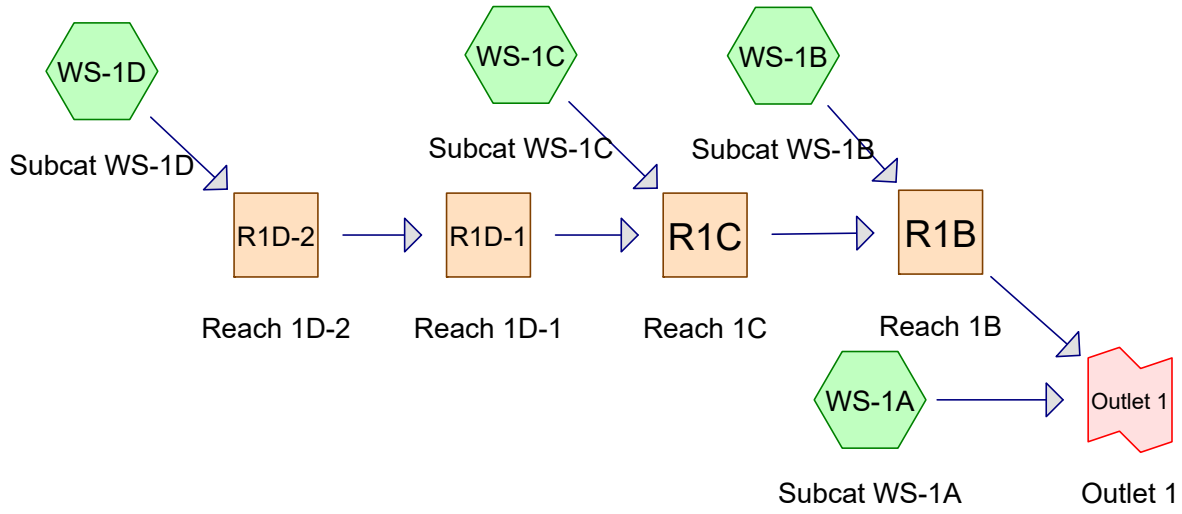
Subarea 4

Subcat Reach Pond Link

Routing Diagram for Wappo Hill Pre-Project WS3-4
Prepared by PPI Engineering, Printed 11/9/2023
HydroCAD® 10.20-3c s/n 09429 © 2023 HydroCAD Software Solutions LLC

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.679	79	Annual Grass, Fair, HSG C (WS-4)
1.462	73	Woods, Fair, HSG C (WS-4)
2.142	**75**	**TOTAL AREA**



Subcat Reach Pond Link

Routing Diagram for Wappo Hill Post-Project WS1
Prepared by PPI Engineering, Printed 11/9/2023
HydroCAD® 10.20-3c s/n 09429 © 2023 HydroCAD Software Solutions LLC

Summary for Subcatchment WS-1A: Subcat WS-1A

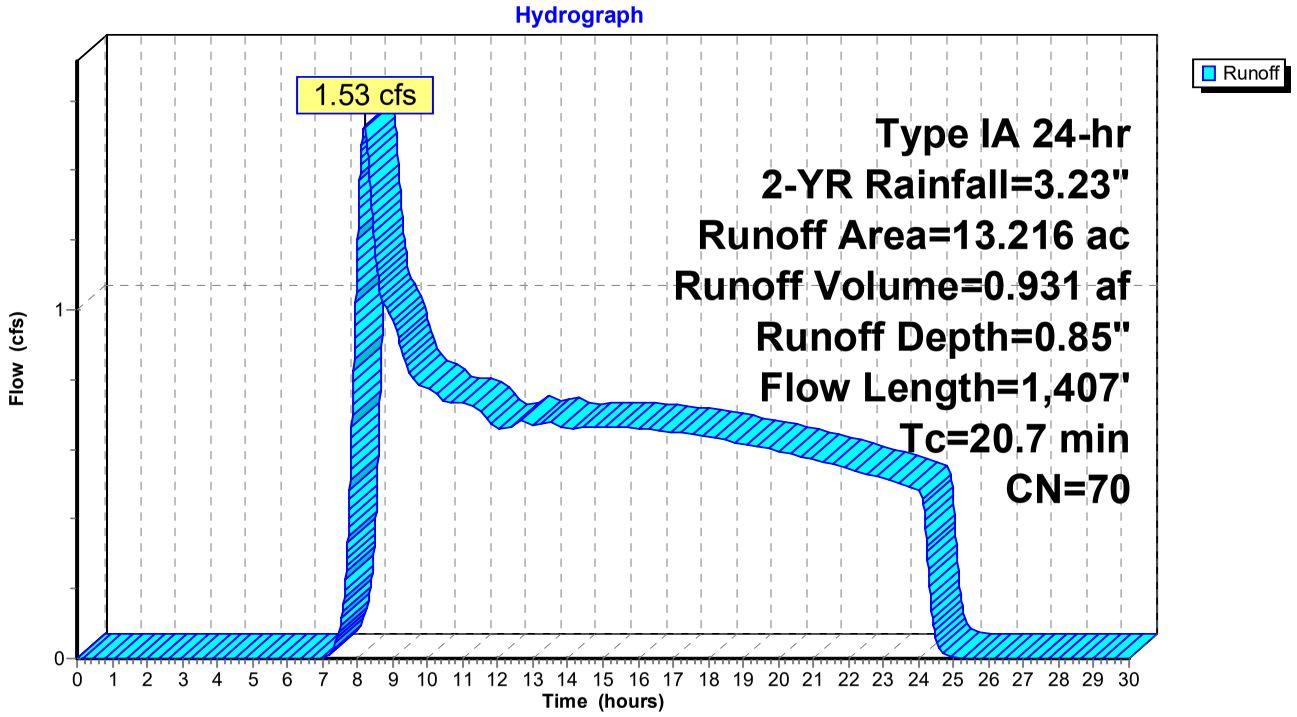
Runoff = 1.53 cfs @ 8.19 hrs, Volume= 0.931 af, Depth= 0.85"
Routed to Link Outlet 1 : Outlet 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-YR Rainfall=3.23"

Area (ac)	CN	Description
0.012	69	Annual Grass, Fair, HSG B
0.045	79	Annual Grass, Fair, HSG C
0.036	87	Dirt roads, HSG C
0.246	82	Farmsteads, HSG C
0.091	96	Gravel surface, HSG C
10.681	69	Vineyard, Fair, HSG B
0.062	79	Vineyard, Fair, HSG C
0.099	61	Vineyard, Good, HSG B
1.392	75	Vineyard, Good, HSG C
0.382	60	Woods, Fair, HSG B
0.170	73	Woods, Fair, HSG C
13.216	70	Weighted Average
13.216		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	100	0.2600	0.33		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
15.6	1,307	0.0400	1.40		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
20.7	1,407	Total			

Subcatchment WS-1A: Subcat WS-1A



Summary for Subcatchment WS-1B: Subcat WS-1B

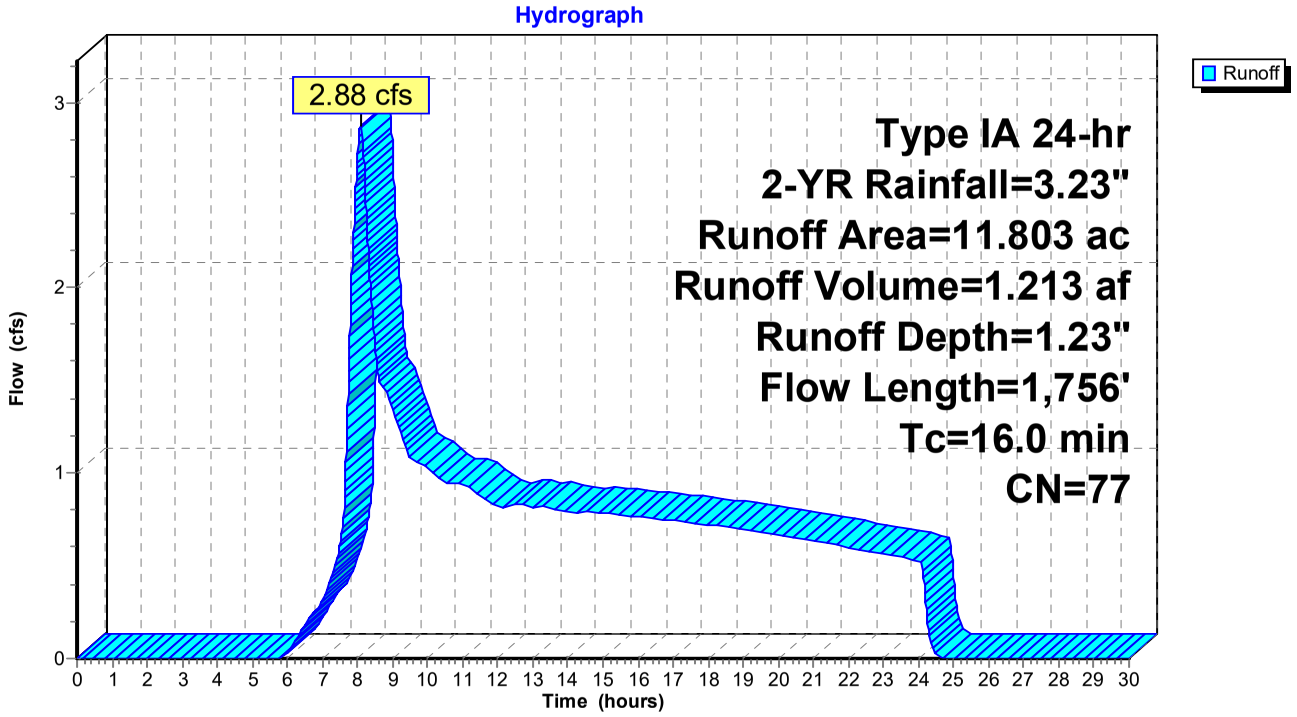
Runoff = 2.88 cfs @ 8.09 hrs, Volume= 1.213 af, Depth= 1.23"
Routed to Reach R1B : Reach 1B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-YR Rainfall=3.23"

Area (ac)	CN	Description
1.132	69	Annual Grass, Fair, HSG B
0.000	79	Annual Grass, Fair, HSG C
0.494	79	Annual Grass, Fair, HSG C
0.184	82	Dirt roads, HSG B
0.154	87	Dirt roads, HSG C
0.018	74	Farmsteads, HSG B
0.769	82	Farmsteads, HSG C
0.107	89	Gravel Roads, HSG C
0.119	96	Gravel surface, HSG C
0.289	92	Paved roads w/open ditches, 50% imp, HSG C
2.743	69	Vineyard, Fair, HSG B
5.779	79	Vineyard, Fair, HSG C
0.005	60	Woods, Fair, HSG B
0.011	73	Woods, Fair, HSG C
11.803	77	Weighted Average
11.659		98.78% Pervious Area
0.144		1.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	100	0.1600	0.27		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
6.9	1,116	0.1500	2.71		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
2.9	540	0.0100	3.08	12.32	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035 Earth, dense weeds
16.0	1,756	Total			

Subcatchment WS-1B: Subcat WS-1B



Summary for Subcatchment WS-1C: Subcat WS-1C

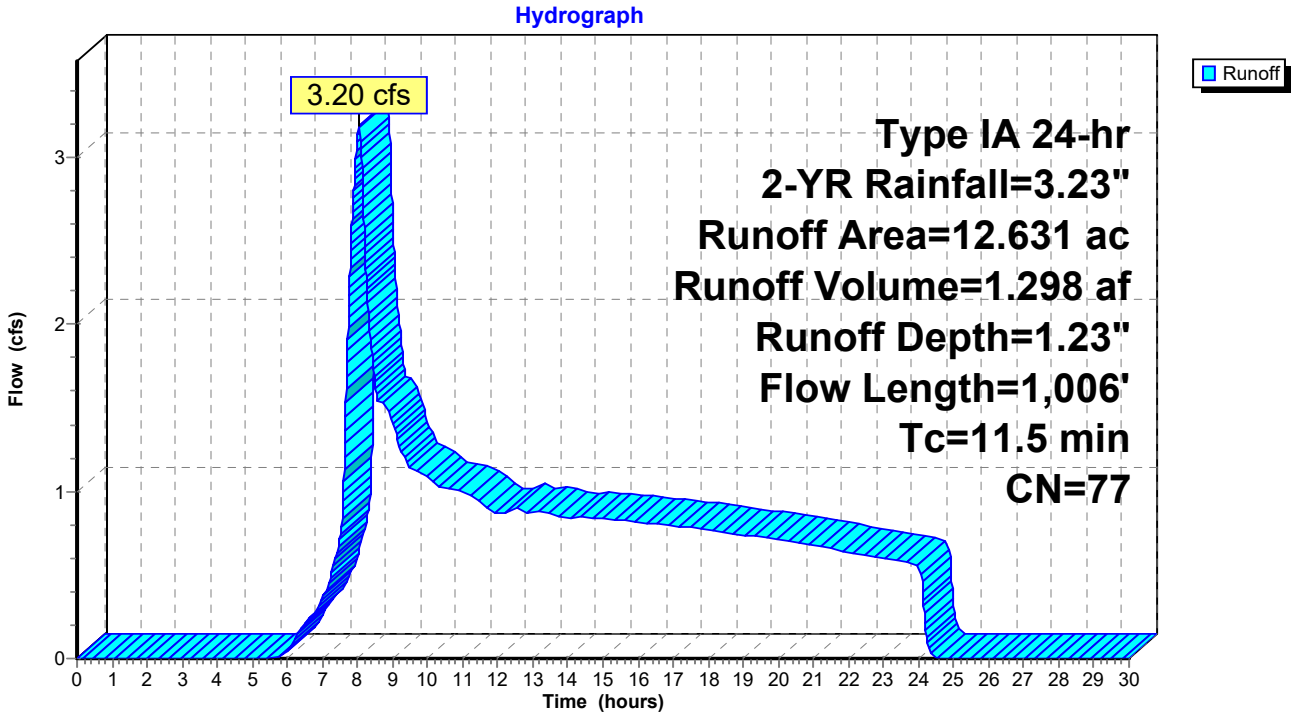
Runoff = 3.20 cfs @ 8.06 hrs, Volume= 1.298 af, Depth= 1.23"
Routed to Reach R1C : Reach 1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-YR Rainfall=3.23"

Area (ac)	CN	Description
0.695	69	Annual Grass, Fair, HSG B
1.363	79	Annual Grass, Fair, HSG C
0.107	75	Annual Grass, Good, HSG C
0.026	82	Dirt roads, HSG B
0.089	87	Dirt roads, HSG C
0.329	74	Farmsteads, HSG B
0.268	82	Farmsteads, HSG C
0.054	96	Gravel surface, HSG C
0.228	89	Paved roads w/open ditches, 50% imp, HSG B
0.120	92	Paved roads w/open ditches, 50% imp, HSG C
0.130	69	Vineyard, Fair, HSG B
3.091	79	Vineyard, Fair, HSG C
0.376	75	Vineyard, Good, HSG C
0.729	98	Water Surface, HSG B
0.071	98	Water Surface, HSG C
0.061	60	Woods, Fair, HSG B
3.925	73	Woods, Fair, HSG C
0.795	70	Woods, Good, HSG C
0.173	76	Woods/grass comb., Fair, HSG C
12.631	77	Weighted Average
11.657		92.29% Pervious Area
0.974		7.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	100	0.1900	0.19		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.8	179	0.3100	3.90		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.4	280	0.4600	3.39		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.5	397	0.1800	13.07	52.28	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.1	50	0.1200	8.17	6.42	**Pipe Channel, 12" CMP (Assumed)** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
11.5	1,006	Total			

Subcatchment WS-1C: Subcat WS-1C



Summary for Subcatchment WS-1D: Subcat WS-1D

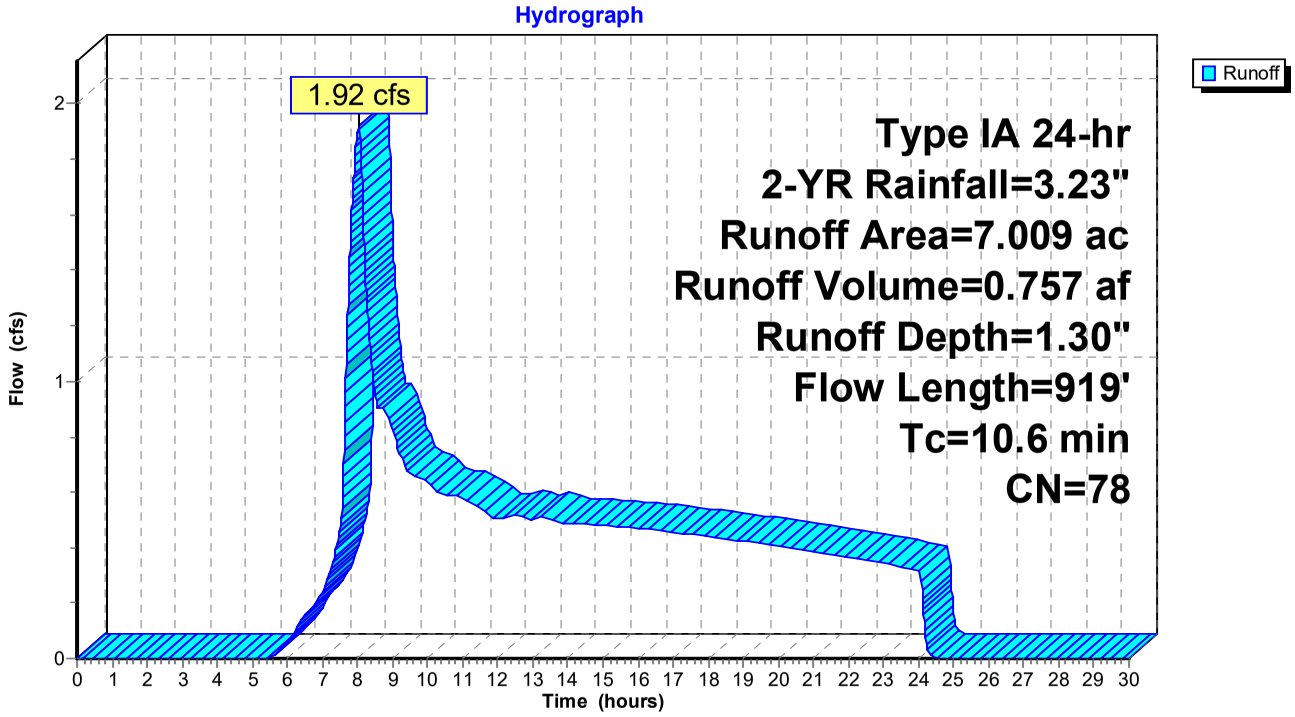
Runoff = 1.92 cfs @ 8.04 hrs, Volume= 0.757 af, Depth= 1.30"
Routed to Reach R1D-2 : Reach 1D-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-YR Rainfall=3.23"

Area (ac)	CN	Description
1.543	79	Annual Grass, Fair, HSG C
0.826	82	Farmsteads, HSG C
1.910	79	Vineyard, Fair, HSG C
1.227	73	Woods, Fair, HSG C
0.027	70	Woods, Good, HSG C
1.476	76	Woods/grass comb., Fair, HSG C
7.009	78	Weighted Average
7.009		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
2.3	428	0.2000	3.13		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.5	391	0.2400	13.93	41.80	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=1.00' D=1.00' Z= 2.0 '/' Top.W=5.00' n= 0.035
10.6	919	Total			

Subcatchment WS-1D: Subcat WS-1D



Summary for Reach R1B: Reach 1B

[65] Warning: Inlet elevation not specified

Inflow Area = 31.443 ac, 3.56% Impervious, Inflow Depth = 1.25" for 2-YR event
Inflow = 7.77 cfs @ 8.14 hrs, Volume= 3.268 af
Outflow = 7.74 cfs @ 8.21 hrs, Volume= 3.268 af, Atten= 0%, Lag= 3.8 min
Routed to Link Outlet 1 : Outlet 1

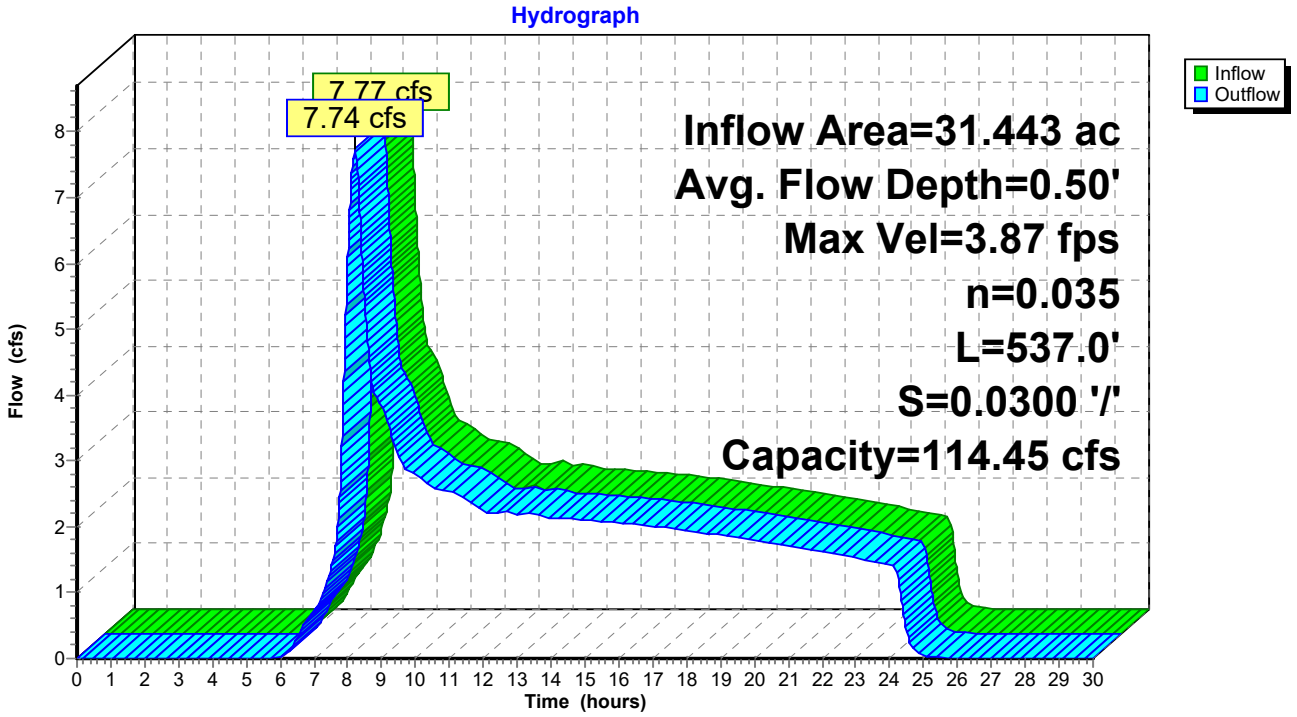
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.87 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 2.05 fps, Avg. Travel Time= 4.4 min

Peak Storage= 1,073 cf @ 8.17 hrs
Average Depth at Peak Storage= 0.50' , Surface Width= 5.00'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 114.45 cfs

3.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 11.00'
Length= 537.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -16.11'



Reach R1B: Reach 1B



Summary for Reach R1C: Reach 1C

[65] Warning: Inlet elevation not specified

Inflow Area = 19.639 ac, 4.96% Impervious, Inflow Depth = 1.26" for 2-YR event
Inflow = 5.09 cfs @ 8.06 hrs, Volume= 2.055 af
Outflow = 5.00 cfs @ 8.18 hrs, Volume= 2.055 af, Atten= 2%, Lag= 6.8 min
Routed to Reach R1B : Reach 1B

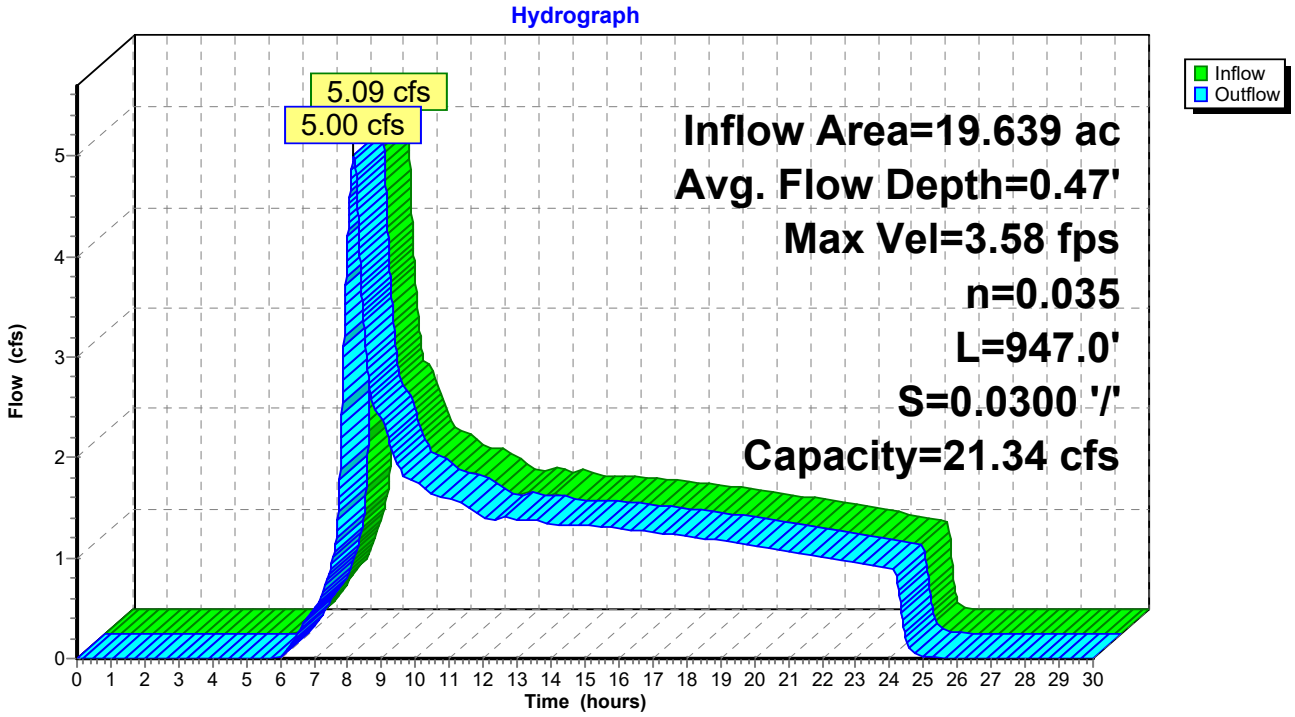
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.58 fps, Min. Travel Time= 4.4 min
Avg. Velocity = 1.88 fps, Avg. Travel Time= 8.4 min

Peak Storage= 1,324 cf @ 8.10 hrs
Average Depth at Peak Storage= 0.47' , Surface Width= 3.90'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 21.34 cfs

2.00' x 1.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 947.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -28.41'



Reach R1C: Reach 1C



Summary for Reach R1D-1: Reach 1D-1

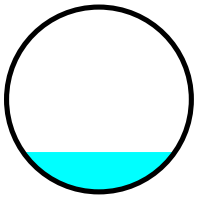
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 7.009 ac, 0.00% Impervious, Inflow Depth = 1.30" for 2-YR event
Inflow = 1.91 cfs @ 8.09 hrs, Volume= 0.757 af
Outflow = 1.91 cfs @ 8.09 hrs, Volume= 0.757 af, Atten= 0%, Lag= 0.2 min
Routed to Reach R1C : Reach 1C

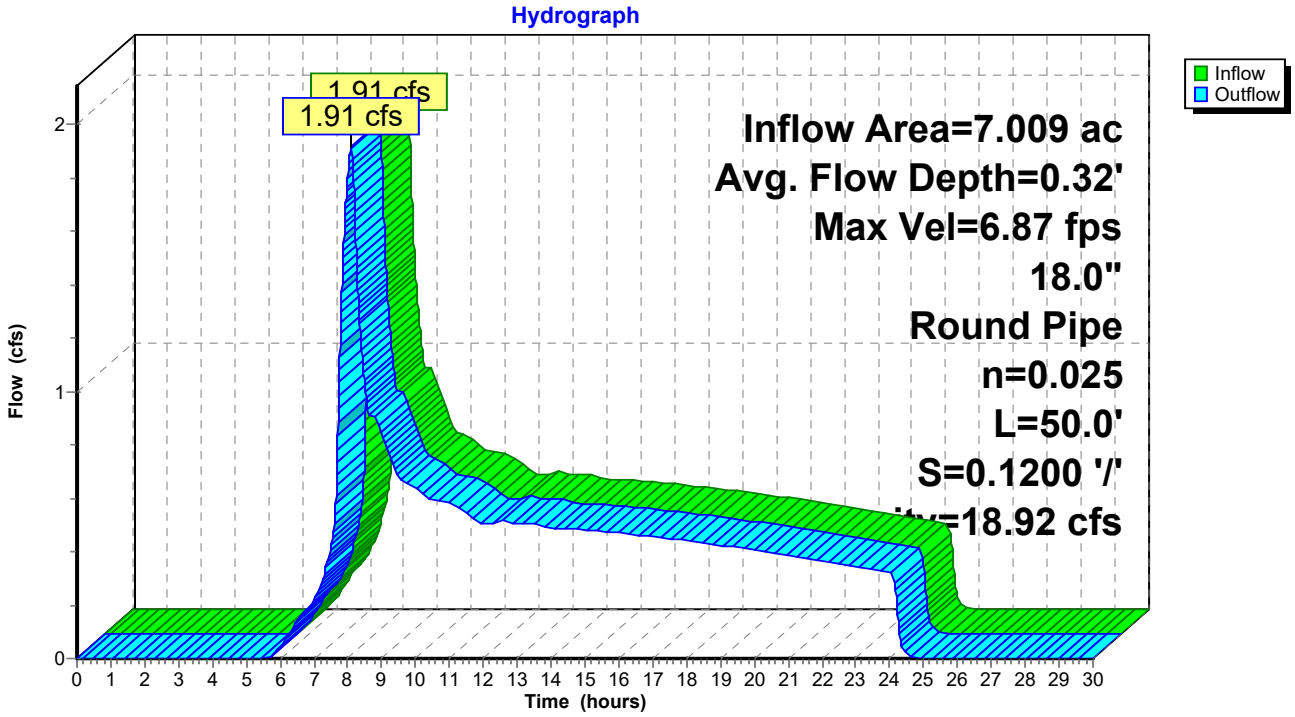
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.87 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.24 fps, Avg. Travel Time= 0.2 min

Peak Storage= 14 cf @ 8.09 hrs
Average Depth at Peak Storage= 0.32' , Surface Width= 1.23'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 18.92 cfs

18.0" Round Pipe
n= 0.025 Corrugated metal
Length= 50.0' Slope= 0.1200 '/'
Inlet Invert= 0.00', Outlet Invert= -6.00'



Reach R1D-1: Reach 1D-1



Summary for Reach R1D-2: Reach 1D-2

[65] Warning: Inlet elevation not specified

Inflow Area = 7.009 ac, 0.00% Impervious, Inflow Depth = 1.30" for 2-YR event
Inflow = 1.92 cfs @ 8.04 hrs, Volume= 0.757 af
Outflow = 1.91 cfs @ 8.09 hrs, Volume= 0.757 af, Atten= 0%, Lag= 3.0 min
Routed to Reach R1D-1 : Reach 1D-1

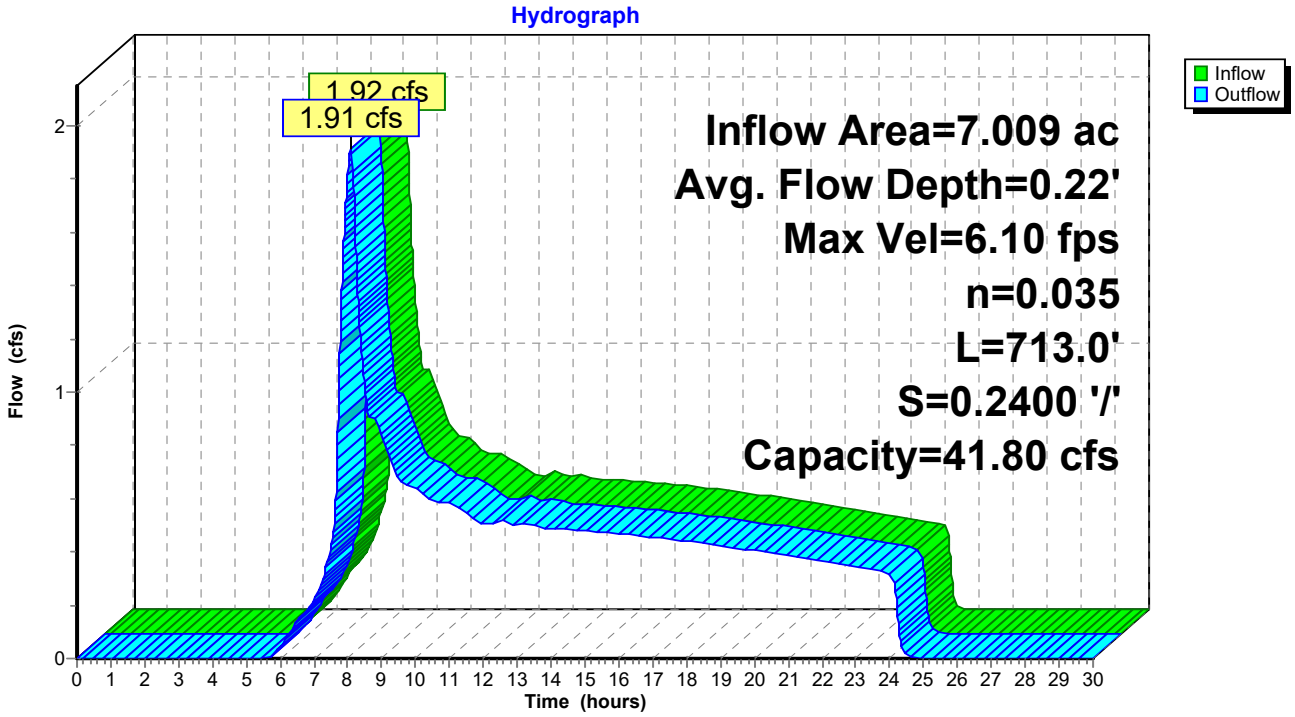
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.10 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 3.68 fps, Avg. Travel Time= 3.2 min

Peak Storage= 224 cf @ 8.06 hrs
Average Depth at Peak Storage= 0.22' , Surface Width= 1.87'
Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 41.80 cfs

1.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 5.00'
Length= 713.0' Slope= 0.2400 '/'
Inlet Invert= 0.00', Outlet Invert= -171.12'



Reach R1D-2: Reach 1D-2

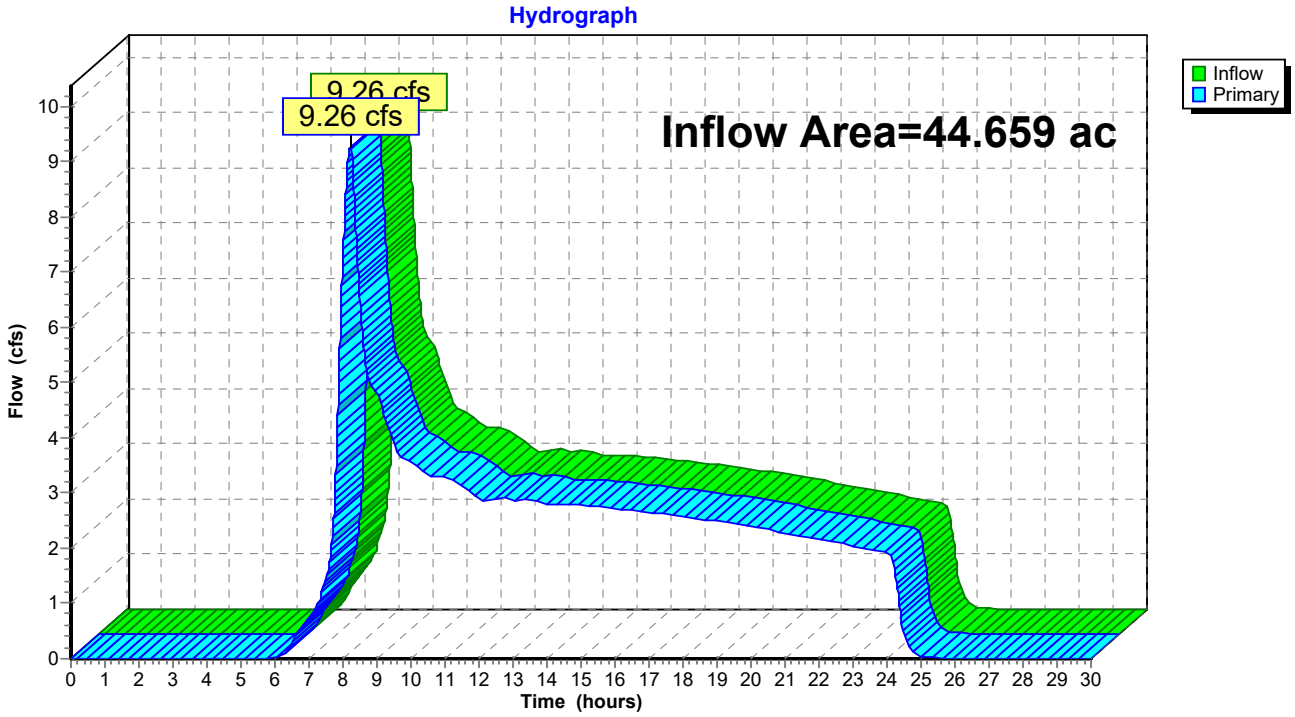


Summary for Link Outlet 1: Outlet 1

Inflow Area = 44.659 ac, 2.50% Impervious, Inflow Depth = 1.13" for 2-YR event
Inflow = 9.26 cfs @ 8.21 hrs, Volume= 4.199 af
Primary = 9.26 cfs @ 8.21 hrs, Volume= 4.199 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Outlet 1: Outlet 1



Summary for Subcatchment WS-1A: Subcat WS-1A

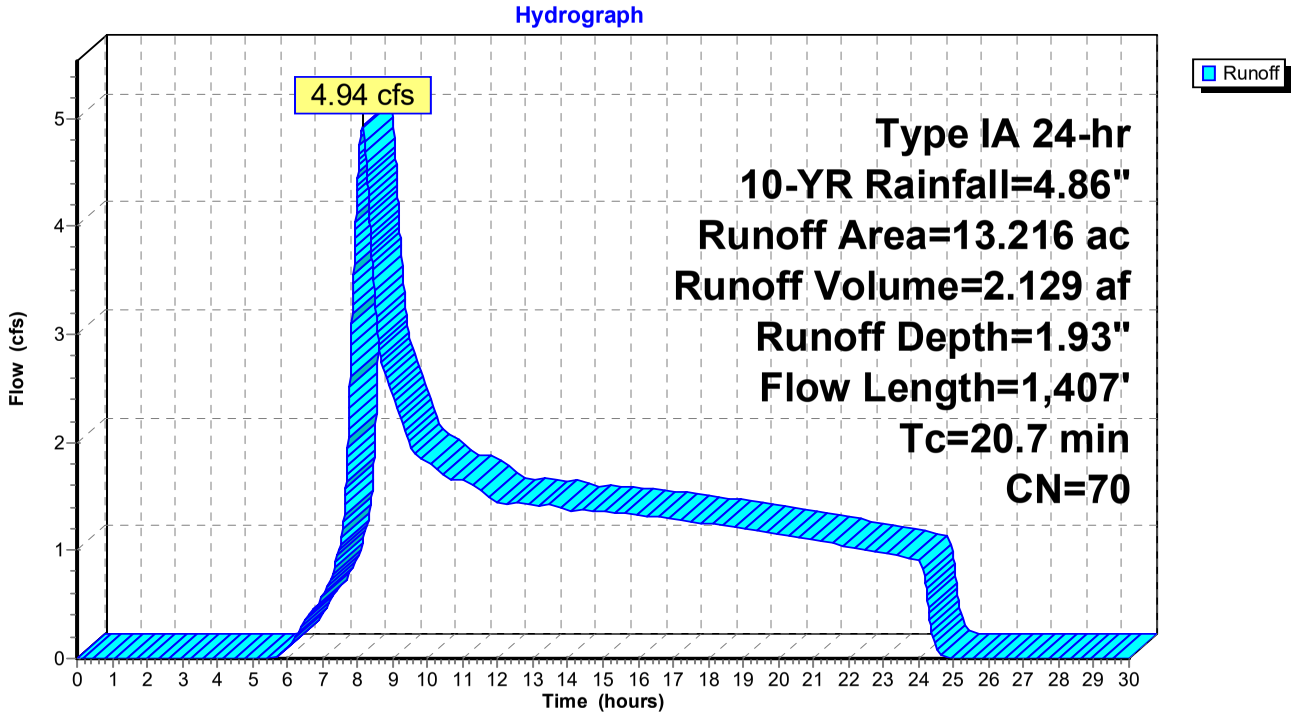
Runoff = 4.94 cfs @ 8.15 hrs, Volume= 2.129 af, Depth= 1.93"
Routed to Link Outlet 1 : Outlet 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-YR Rainfall=4.86"

Area (ac)	CN	Description
0.012	69	Annual Grass, Fair, HSG B
0.045	79	Annual Grass, Fair, HSG C
0.036	87	Dirt roads, HSG C
0.246	82	Farmsteads, HSG C
0.091	96	Gravel surface, HSG C
10.681	69	Vineyard, Fair, HSG B
0.062	79	Vineyard, Fair, HSG C
0.099	61	Vineyard, Good, HSG B
1.392	75	Vineyard, Good, HSG C
0.382	60	Woods, Fair, HSG B
0.170	73	Woods, Fair, HSG C
13.216	70	Weighted Average
13.216		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	100	0.2600	0.33		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
15.6	1,307	0.0400	1.40		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
20.7	1,407	Total			

Subcatchment WS-1A: Subcat WS-1A



Summary for Subcatchment WS-1B: Subcat WS-1B

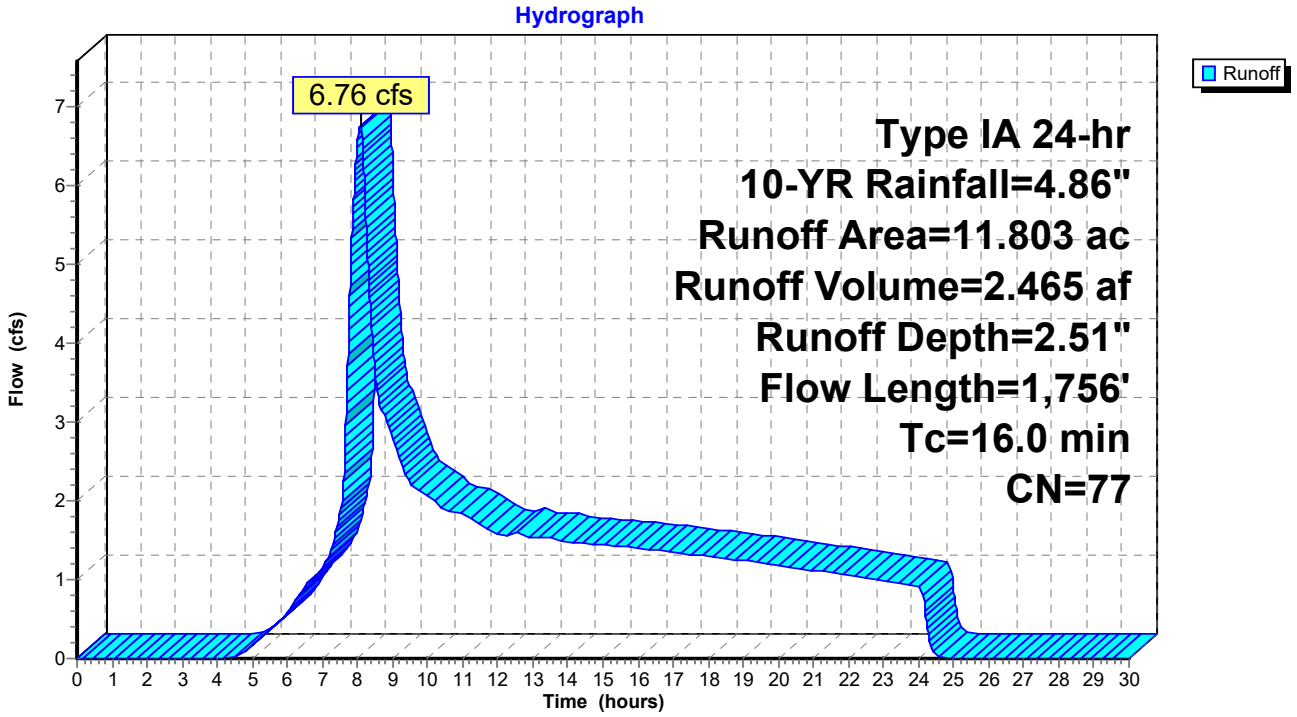
Runoff = 6.76 cfs @ 8.08 hrs, Volume= 2.465 af, Depth= 2.51"
Routed to Reach R1B : Reach 1B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-YR Rainfall=4.86"

Area (ac)	CN	Description
1.132	69	Annual Grass, Fair, HSG B
0.000	79	Annual Grass, Fair, HSG C
0.494	79	Annual Grass, Fair, HSG C
0.184	82	Dirt roads, HSG B
0.154	87	Dirt roads, HSG C
0.018	74	Farmsteads, HSG B
0.769	82	Farmsteads, HSG C
0.107	89	Gravel Roads, HSG C
0.119	96	Gravel surface, HSG C
0.289	92	Paved roads w/open ditches, 50% imp, HSG C
2.743	69	Vineyard, Fair, HSG B
5.779	79	Vineyard, Fair, HSG C
0.005	60	Woods, Fair, HSG B
0.011	73	Woods, Fair, HSG C
11.803	77	Weighted Average
11.659		98.78% Pervious Area
0.144		1.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	100	0.1600	0.27		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
6.9	1,116	0.1500	2.71		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
2.9	540	0.0100	3.08	12.32	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035 Earth, dense weeds
16.0	1,756	Total			

Subcatchment WS-1B: Subcat WS-1B



Summary for Subcatchment WS-1C: Subcat WS-1C

[47] Hint: Peak is 116% of capacity of segment #5

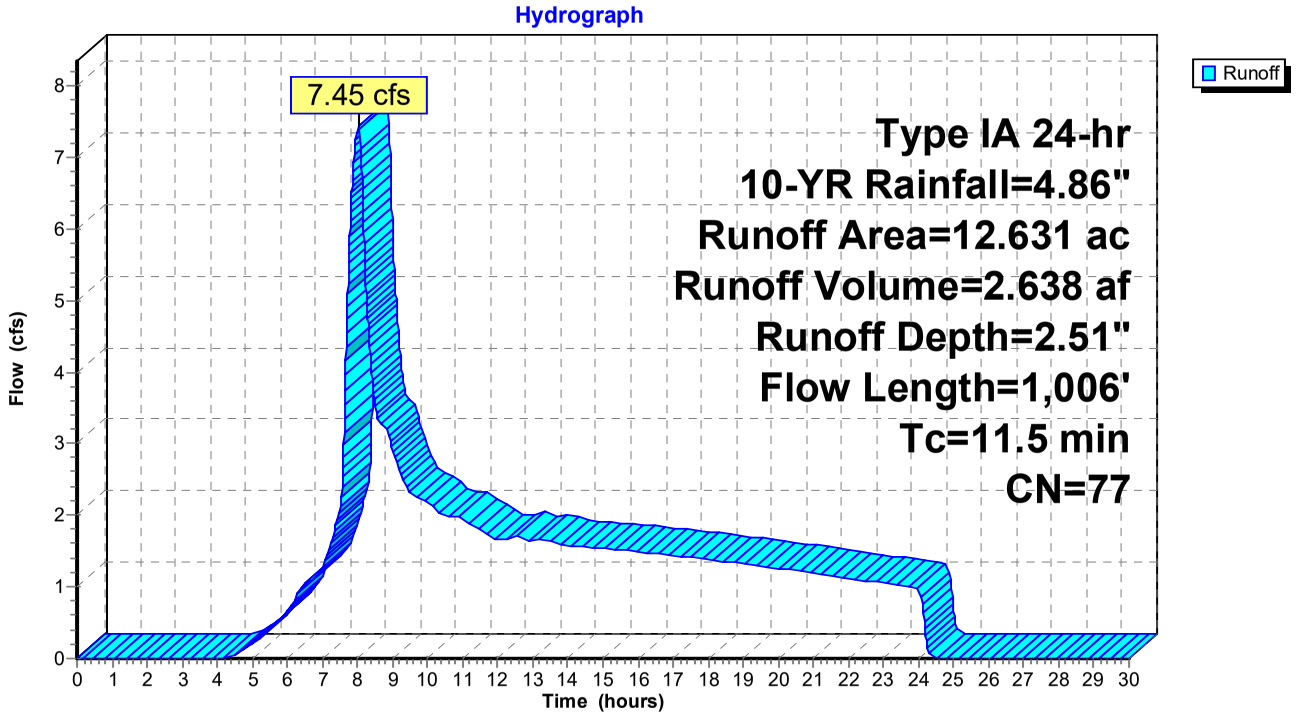
Runoff = 7.45 cfs @ 8.04 hrs, Volume= 2.638 af, Depth= 2.51"
Routed to Reach R1C : Reach 1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-YR Rainfall=4.86"

Area (ac)	CN	Description
0.695	69	Annual Grass, Fair, HSG B
1.363	79	Annual Grass, Fair, HSG C
0.107	75	Annual Grass, Good, HSG C
0.026	82	Dirt roads, HSG B
0.089	87	Dirt roads, HSG C
0.329	74	Farmsteads, HSG B
0.268	82	Farmsteads, HSG C
0.054	96	Gravel surface, HSG C
0.228	89	Paved roads w/open ditches, 50% imp, HSG B
0.120	92	Paved roads w/open ditches, 50% imp, HSG C
0.130	69	Vineyard, Fair, HSG B
3.091	79	Vineyard, Fair, HSG C
0.376	75	Vineyard, Good, HSG C
0.729	98	Water Surface, HSG B
0.071	98	Water Surface, HSG C
0.061	60	Woods, Fair, HSG B
3.925	73	Woods, Fair, HSG C
0.795	70	Woods, Good, HSG C
0.173	76	Woods/grass comb., Fair, HSG C
12.631	77	Weighted Average
11.657		92.29% Pervious Area
0.974		7.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	100	0.1900	0.19		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.8	179	0.3100	3.90		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.4	280	0.4600	3.39		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.5	397	0.1800	13.07	52.28	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.1	50	0.1200	8.17	6.42	**Pipe Channel, 12" CMP (Assumed)** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
11.5	1,006	Total			

Subcatchment WS-1C: Subcat WS-1C



Summary for Subcatchment WS-1D: Subcat WS-1D

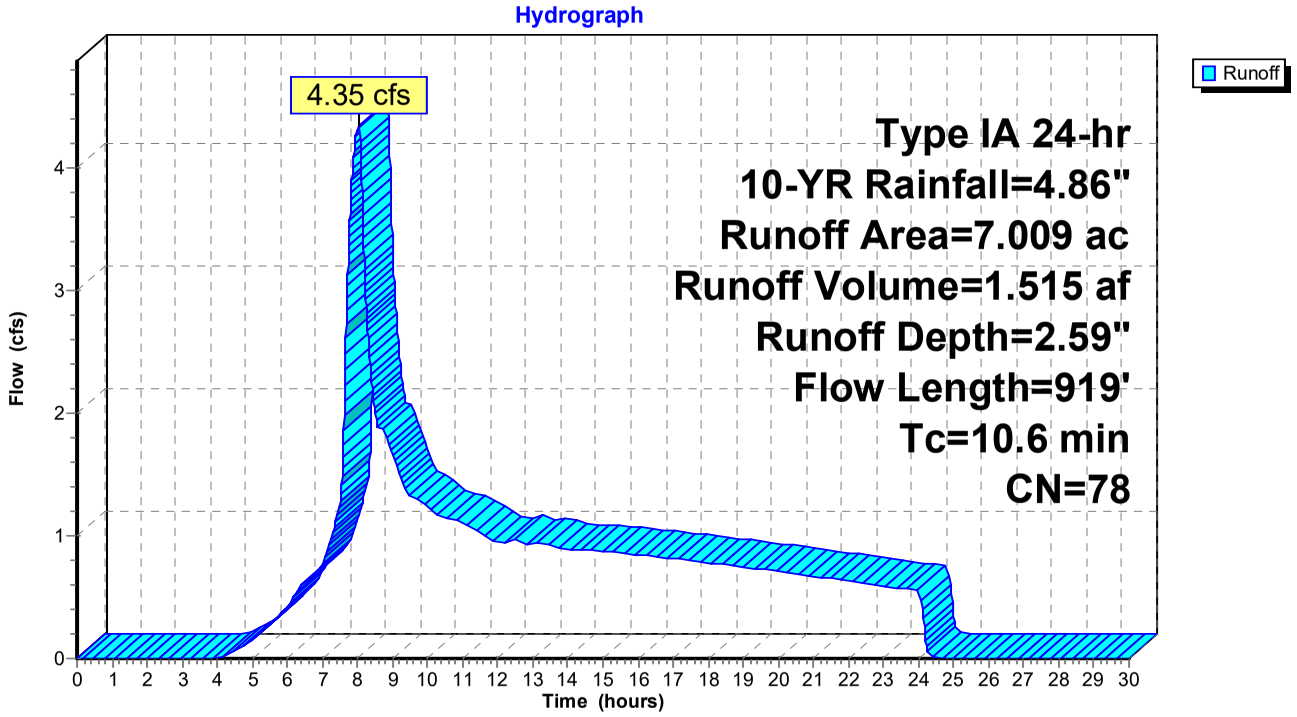
Runoff = 4.35 cfs @ 8.02 hrs, Volume= 1.515 af, Depth= 2.59"
Routed to Reach R1D-2 : Reach 1D-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-YR Rainfall=4.86"

Area (ac)	CN	Description
1.543	79	Annual Grass, Fair, HSG C
0.826	82	Farmsteads, HSG C
1.910	79	Vineyard, Fair, HSG C
1.227	73	Woods, Fair, HSG C
0.027	70	Woods, Good, HSG C
1.476	76	Woods/grass comb., Fair, HSG C
7.009	78	Weighted Average
7.009		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
2.3	428	0.2000	3.13		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.5	391	0.2400	13.93	41.80	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=1.00' D=1.00' Z= 2.0 '/' Top.W=5.00' n= 0.035
10.6	919	Total			

Subcatchment WS-1D: Subcat WS-1D



Summary for Reach R1B: Reach 1B

[65] Warning: Inlet elevation not specified

Inflow Area = 31.443 ac, 3.56% Impervious, Inflow Depth = 2.53" for 10-YR event
Inflow = 18.34 cfs @ 8.11 hrs, Volume= 6.618 af
Outflow = 18.29 cfs @ 8.16 hrs, Volume= 6.618 af, Atten= 0%, Lag= 2.9 min
Routed to Link Outlet 1 : Outlet 1

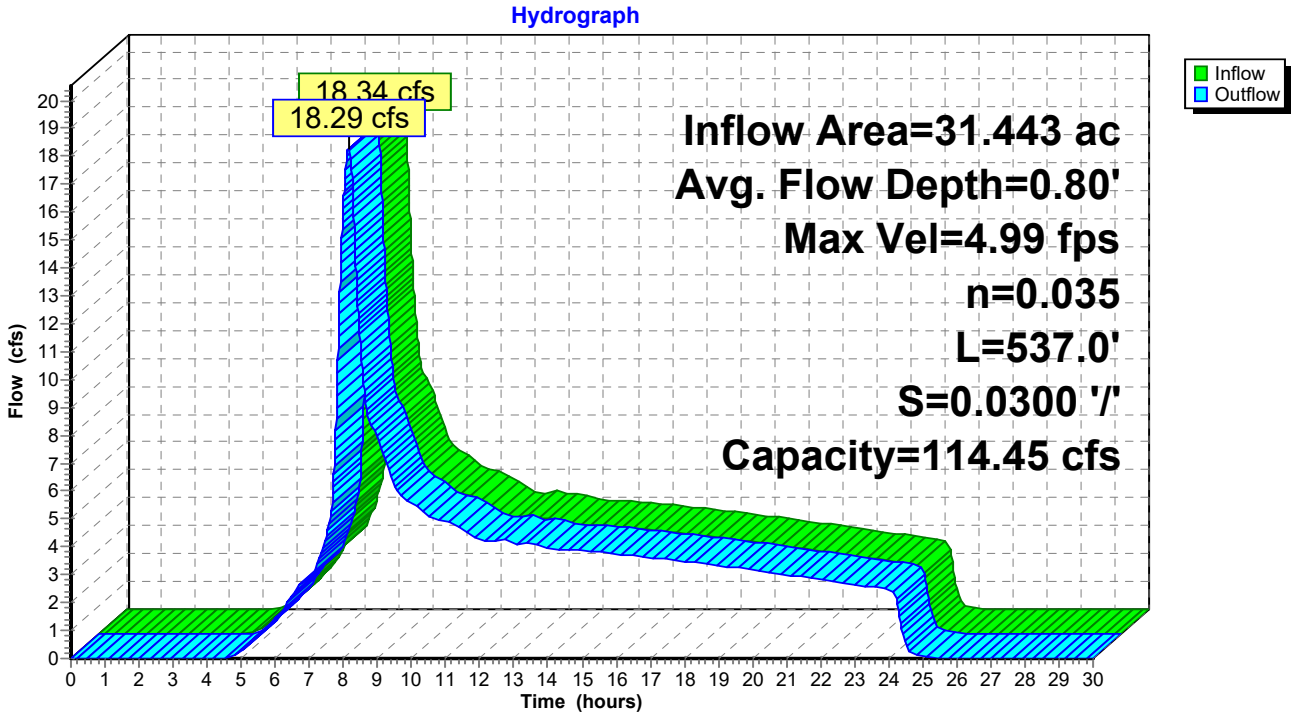
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.99 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 2.50 fps, Avg. Travel Time= 3.6 min

Peak Storage= 1,970 cf @ 8.13 hrs
Average Depth at Peak Storage= 0.80' , Surface Width= 6.19'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 114.45 cfs

3.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 11.00'
Length= 537.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -16.11'



Reach R1B: Reach 1B



Summary for Reach R1C: Reach 1C

[65] Warning: Inlet elevation not specified

Inflow Area = 19.639 ac, 4.96% Impervious, Inflow Depth = 2.54" for 10-YR event
Inflow = 11.77 cfs @ 8.04 hrs, Volume= 4.153 af
Outflow = 11.67 cfs @ 8.13 hrs, Volume= 4.153 af, Atten= 1%, Lag= 5.5 min
Routed to Reach R1B : Reach 1B

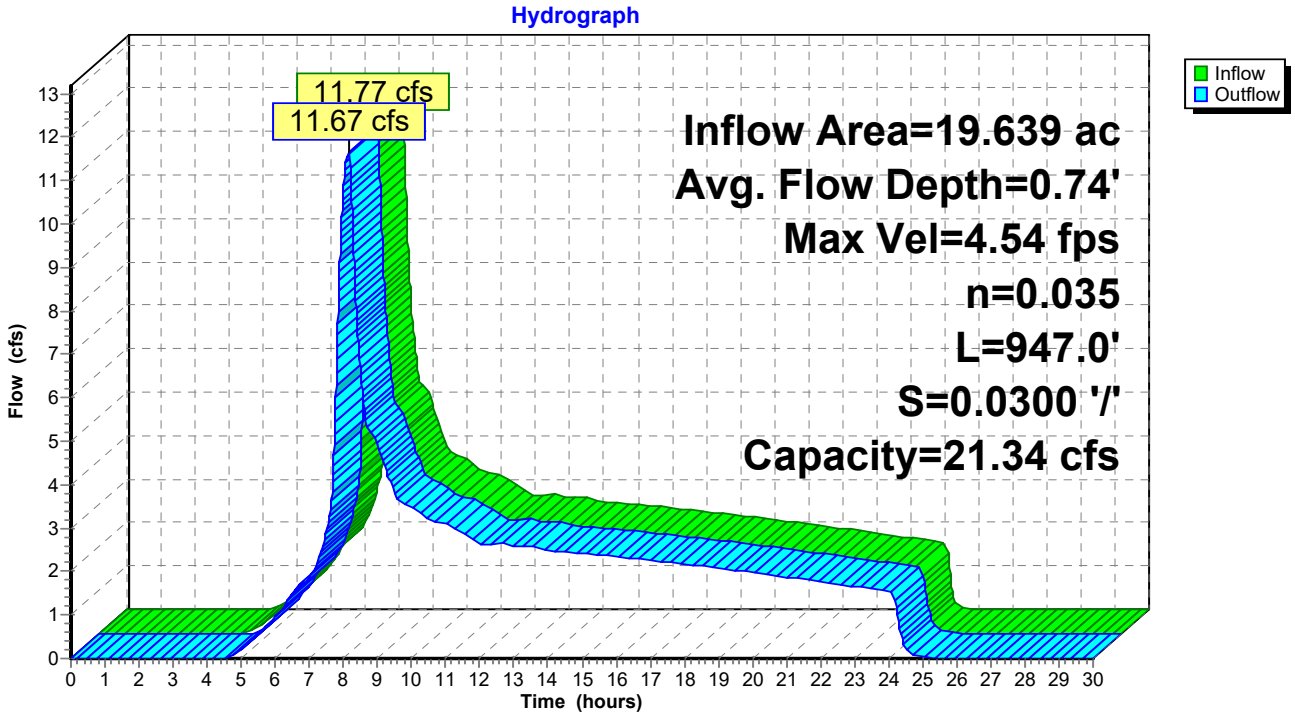
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.54 fps, Min. Travel Time= 3.5 min
Avg. Velocity = 2.28 fps, Avg. Travel Time= 6.9 min

Peak Storage= 2,436 cf @ 8.07 hrs
Average Depth at Peak Storage= 0.74' , Surface Width= 4.96'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 21.34 cfs

2.00' x 1.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 947.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -28.41'



Reach R1C: Reach 1C



Summary for Reach R1D-1: Reach 1D-1

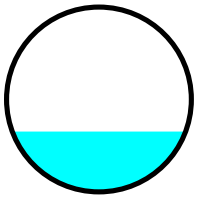
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 7.009 ac, 0.00% Impervious, Inflow Depth = 2.59" for 10-YR event
Inflow = 4.34 cfs @ 8.06 hrs, Volume= 1.515 af
Outflow = 4.34 cfs @ 8.07 hrs, Volume= 1.515 af, Atten= 0%, Lag= 0.2 min
Routed to Reach R1C : Reach 1C

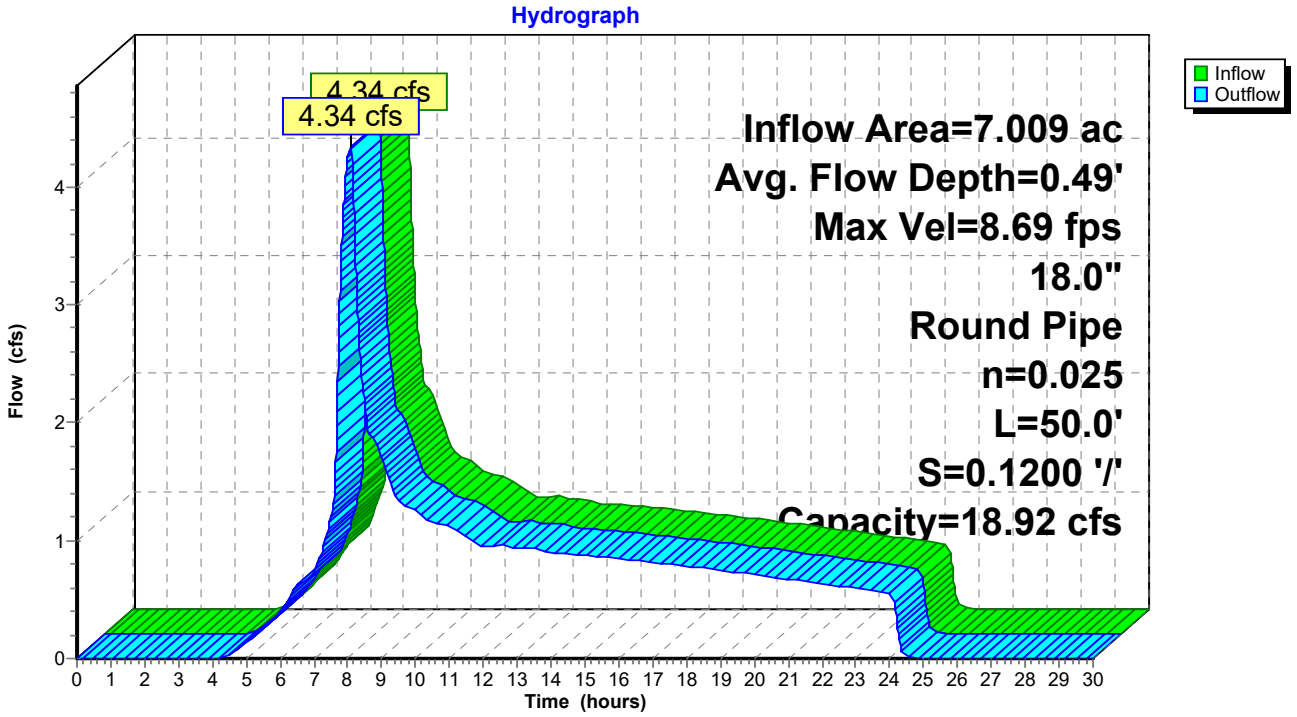
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.69 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.05 fps, Avg. Travel Time= 0.2 min

Peak Storage= 25 cf @ 8.06 hrs
Average Depth at Peak Storage= 0.49' , Surface Width= 1.41'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 18.92 cfs

18.0" Round Pipe
n= 0.025 Corrugated metal
Length= 50.0' Slope= 0.1200 '/'
Inlet Invert= 0.00', Outlet Invert= -6.00'



Reach R1D-1: Reach 1D-1



Summary for Reach R1D-2: Reach 1D-2

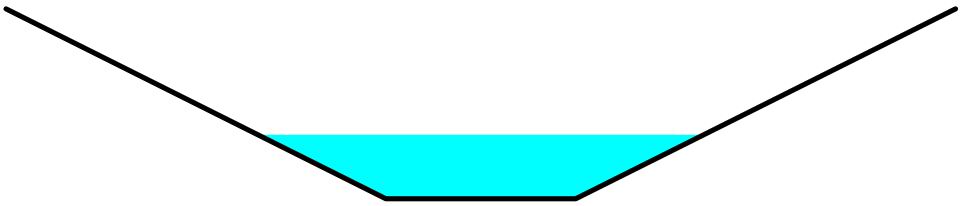
[65] Warning: Inlet elevation not specified

Inflow Area = 7.009 ac, 0.00% Impervious, Inflow Depth = 2.59" for 10-YR event
Inflow = 4.35 cfs @ 8.02 hrs, Volume= 1.515 af
Outflow = 4.34 cfs @ 8.06 hrs, Volume= 1.515 af, Atten= 0%, Lag= 2.5 min
Routed to Reach R1D-1 : Reach 1D-1

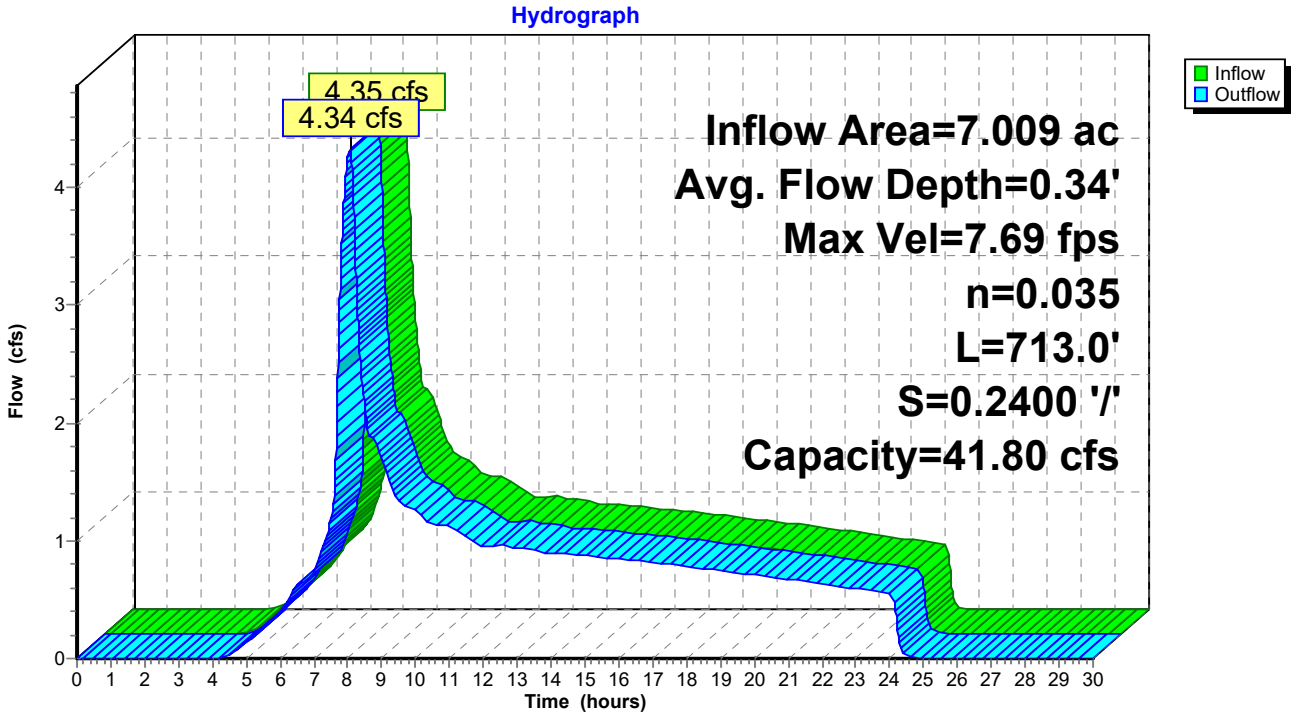
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.69 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 4.44 fps, Avg. Travel Time= 2.7 min

Peak Storage= 402 cf @ 8.04 hrs
Average Depth at Peak Storage= 0.34' , Surface Width= 2.35'
Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 41.80 cfs

1.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 5.00'
Length= 713.0' Slope= 0.2400 '/'
Inlet Invert= 0.00', Outlet Invert= -171.12'



Reach R1D-2: Reach 1D-2

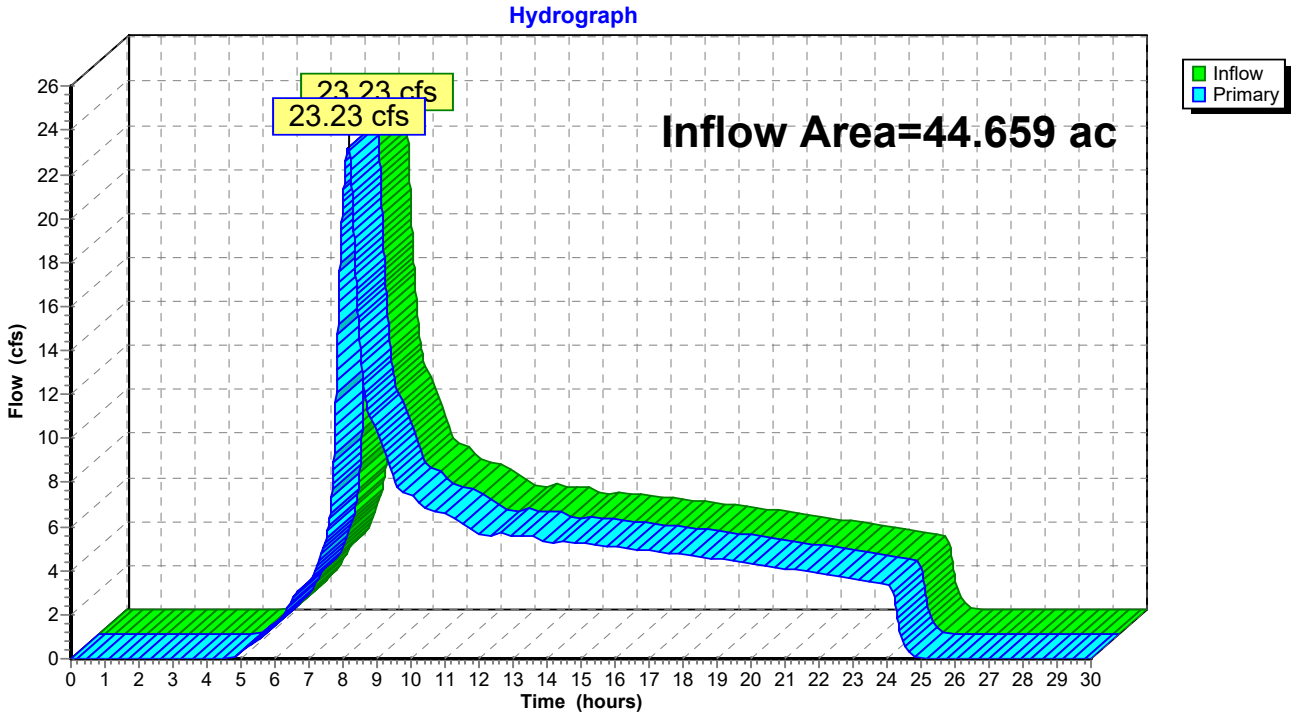


Summary for Link Outlet 1: Outlet 1

Inflow Area = 44.659 ac, 2.50% Impervious, Inflow Depth = 2.35" for 10-YR event
Inflow = 23.23 cfs @ 8.16 hrs, Volume= 8.747 af
Primary = 23.23 cfs @ 8.16 hrs, Volume= 8.747 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Outlet 1: Outlet 1



Summary for Subcatchment WS-1A: Subcat WS-1A

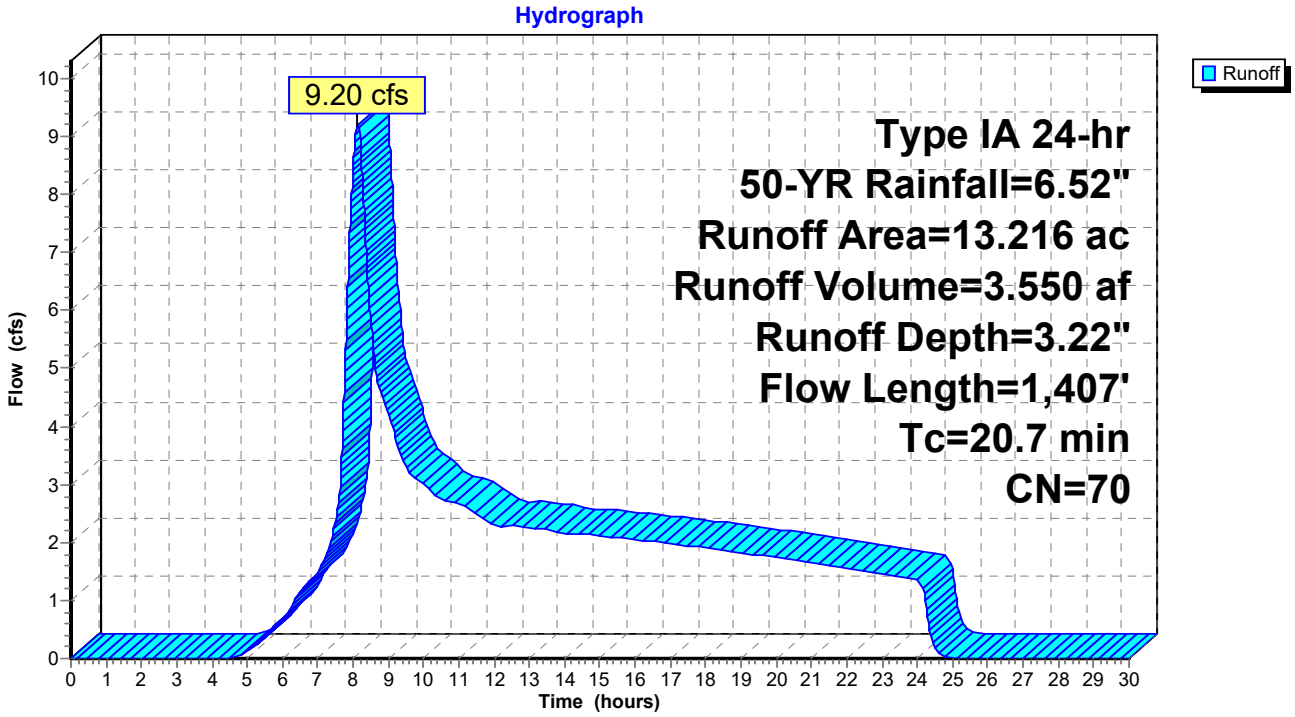
Runoff = 9.20 cfs @ 8.12 hrs, Volume= 3.550 af, Depth= 3.22"
Routed to Link Outlet 1 : Outlet 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50-YR Rainfall=6.52"

Area (ac)	CN	Description
0.012	69	Annual Grass, Fair, HSG B
0.045	79	Annual Grass, Fair, HSG C
0.036	87	Dirt roads, HSG C
0.246	82	Farmsteads, HSG C
0.091	96	Gravel surface, HSG C
10.681	69	Vineyard, Fair, HSG B
0.062	79	Vineyard, Fair, HSG C
0.099	61	Vineyard, Good, HSG B
1.392	75	Vineyard, Good, HSG C
0.382	60	Woods, Fair, HSG B
0.170	73	Woods, Fair, HSG C
13.216	70	Weighted Average
13.216		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	100	0.2600	0.33		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
15.6	1,307	0.0400	1.40		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
20.7	1,407	Total			

Subcatchment WS-1A: Subcat WS-1A



Summary for Subcatchment WS-1B: Subcat WS-1B

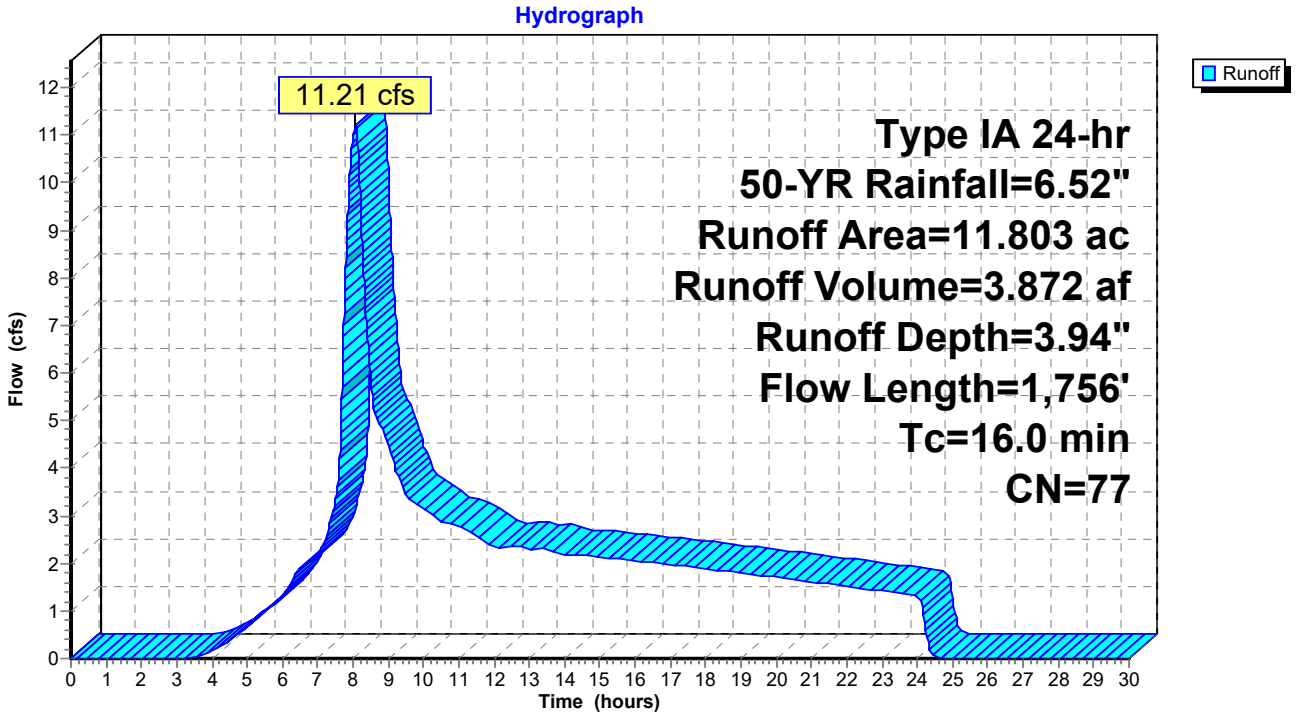
Runoff = 11.21 cfs @ 8.06 hrs, Volume= 3.872 af, Depth= 3.94"
Routed to Reach R1B : Reach 1B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50-YR Rainfall=6.52"

Area (ac)	CN	Description
1.132	69	Annual Grass, Fair, HSG B
0.000	79	Annual Grass, Fair, HSG C
0.494	79	Annual Grass, Fair, HSG C
0.184	82	Dirt roads, HSG B
0.154	87	Dirt roads, HSG C
0.018	74	Farmsteads, HSG B
0.769	82	Farmsteads, HSG C
0.107	89	Gravel Roads, HSG C
0.119	96	Gravel surface, HSG C
0.289	92	Paved roads w/open ditches, 50% imp, HSG C
2.743	69	Vineyard, Fair, HSG B
5.779	79	Vineyard, Fair, HSG C
0.005	60	Woods, Fair, HSG B
0.011	73	Woods, Fair, HSG C
11.803	77	Weighted Average
11.659		98.78% Pervious Area
0.144		1.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	100	0.1600	0.27		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
6.9	1,116	0.1500	2.71		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
2.9	540	0.0100	3.08	12.32	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035 Earth, dense weeds
16.0	1,756	Total			

Subcatchment WS-1B: Subcat WS-1B



Summary for Subcatchment WS-1C: Subcat WS-1C

[47] Hint: Peak is 192% of capacity of segment #5

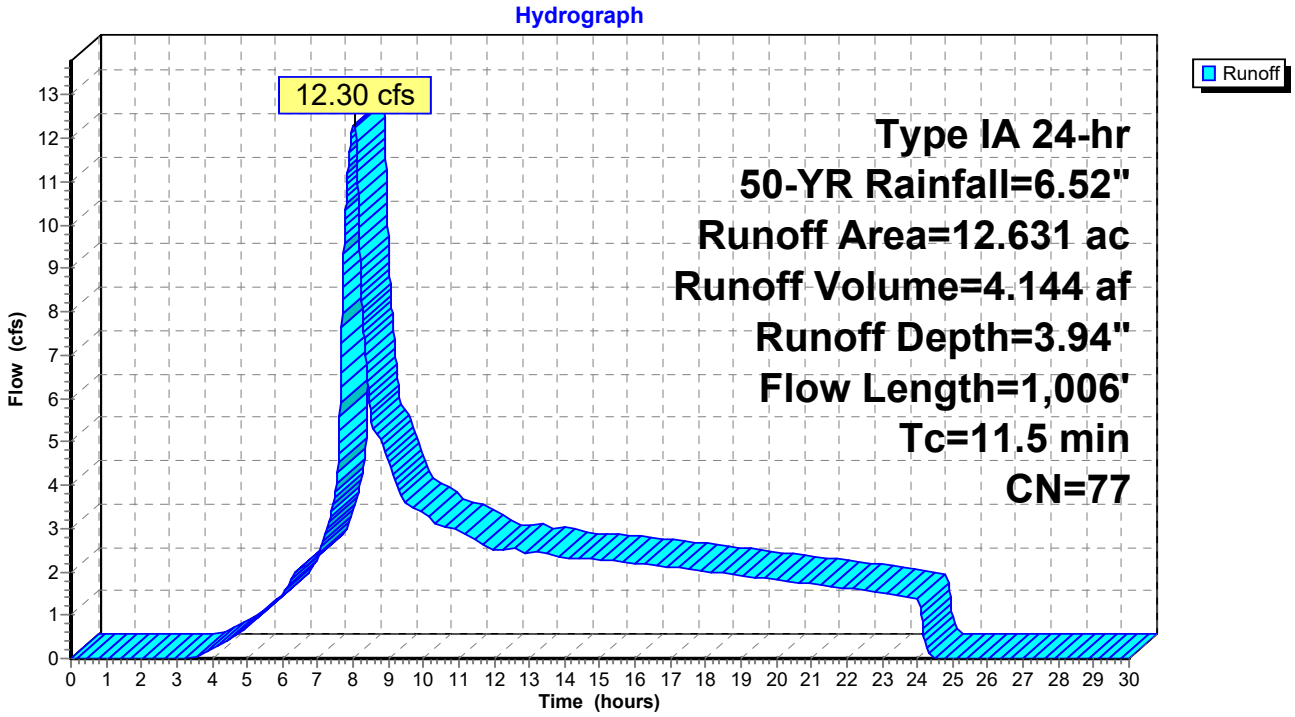
Runoff = 12.30 cfs @ 8.03 hrs, Volume= 4.144 af, Depth= 3.94"
Routed to Reach R1C : Reach 1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50-YR Rainfall=6.52"

Area (ac)	CN	Description
0.695	69	Annual Grass, Fair, HSG B
1.363	79	Annual Grass, Fair, HSG C
0.107	75	Annual Grass, Good, HSG C
0.026	82	Dirt roads, HSG B
0.089	87	Dirt roads, HSG C
0.329	74	Farmsteads, HSG B
0.268	82	Farmsteads, HSG C
0.054	96	Gravel surface, HSG C
0.228	89	Paved roads w/open ditches, 50% imp, HSG B
0.120	92	Paved roads w/open ditches, 50% imp, HSG C
0.130	69	Vineyard, Fair, HSG B
3.091	79	Vineyard, Fair, HSG C
0.376	75	Vineyard, Good, HSG C
0.729	98	Water Surface, HSG B
0.071	98	Water Surface, HSG C
0.061	60	Woods, Fair, HSG B
3.925	73	Woods, Fair, HSG C
0.795	70	Woods, Good, HSG C
0.173	76	Woods/grass comb., Fair, HSG C
12.631	77	Weighted Average
11.657		92.29% Pervious Area
0.974		7.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	100	0.1900	0.19		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.8	179	0.3100	3.90		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.4	280	0.4600	3.39		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.5	397	0.1800	13.07	52.28	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.1	50	0.1200	8.17	6.42	**Pipe Channel, 12" CMP (Assumed)** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
11.5	1,006	Total			

Subcatchment WS-1C: Subcat WS-1C



Summary for Subcatchment WS-1D: Subcat WS-1D

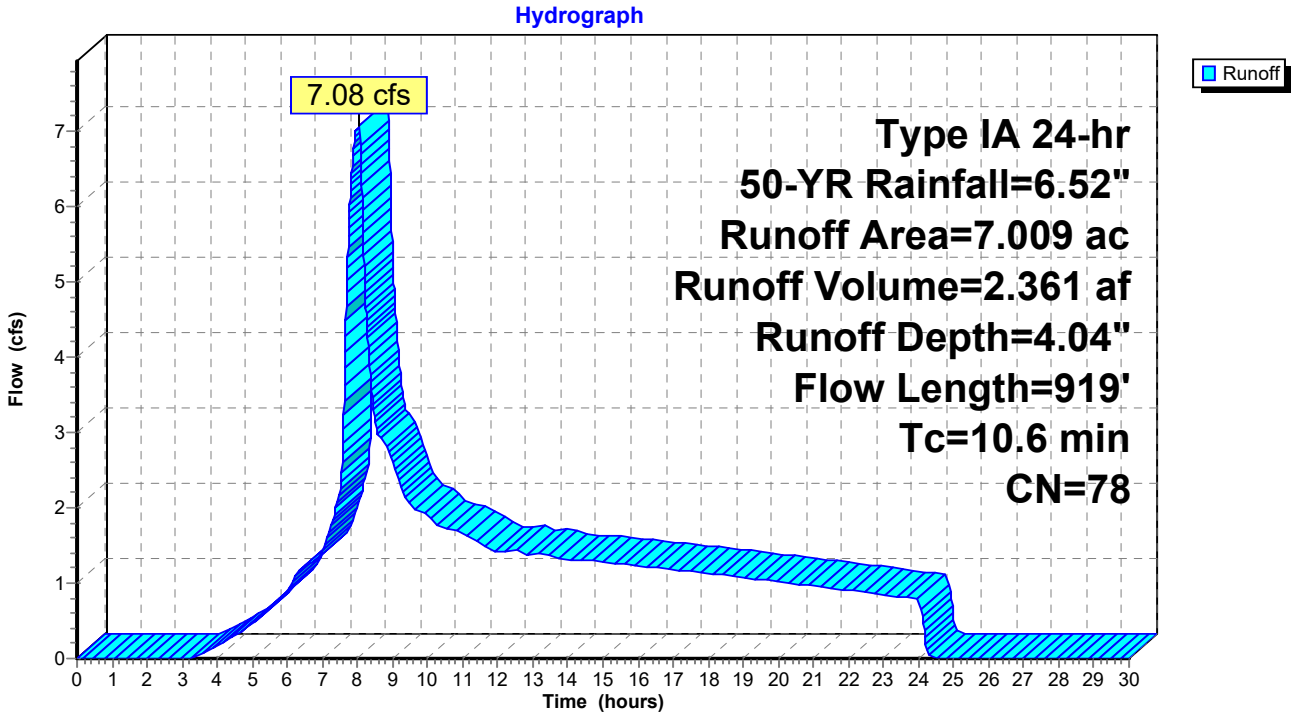
Runoff = 7.08 cfs @ 8.02 hrs, Volume= 2.361 af, Depth= 4.04"
Routed to Reach R1D-2 : Reach 1D-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50-YR Rainfall=6.52"

Area (ac)	CN	Description
1.543	79	Annual Grass, Fair, HSG C
0.826	82	Farmsteads, HSG C
1.910	79	Vineyard, Fair, HSG C
1.227	73	Woods, Fair, HSG C
0.027	70	Woods, Good, HSG C
1.476	76	Woods/grass comb., Fair, HSG C
7.009	78	Weighted Average
7.009		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
2.3	428	0.2000	3.13		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.5	391	0.2400	13.93	41.80	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=1.00' D=1.00' Z= 2.0 '/' Top.W=5.00' n= 0.035
10.6	919	Total			

Subcatchment WS-1D: Subcat WS-1D



Summary for Reach R1B: Reach 1B

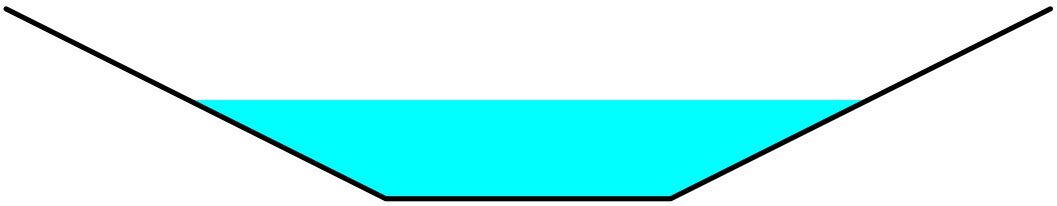
[65] Warning: Inlet elevation not specified

Inflow Area = 31.443 ac, 3.56% Impervious, Inflow Depth = 3.96" for 50-YR event
Inflow = 30.40 cfs @ 8.09 hrs, Volume= 10.377 af
Outflow = 30.34 cfs @ 8.13 hrs, Volume= 10.377 af, Atten= 0%, Lag= 2.6 min
Routed to Link Outlet 1 : Outlet 1

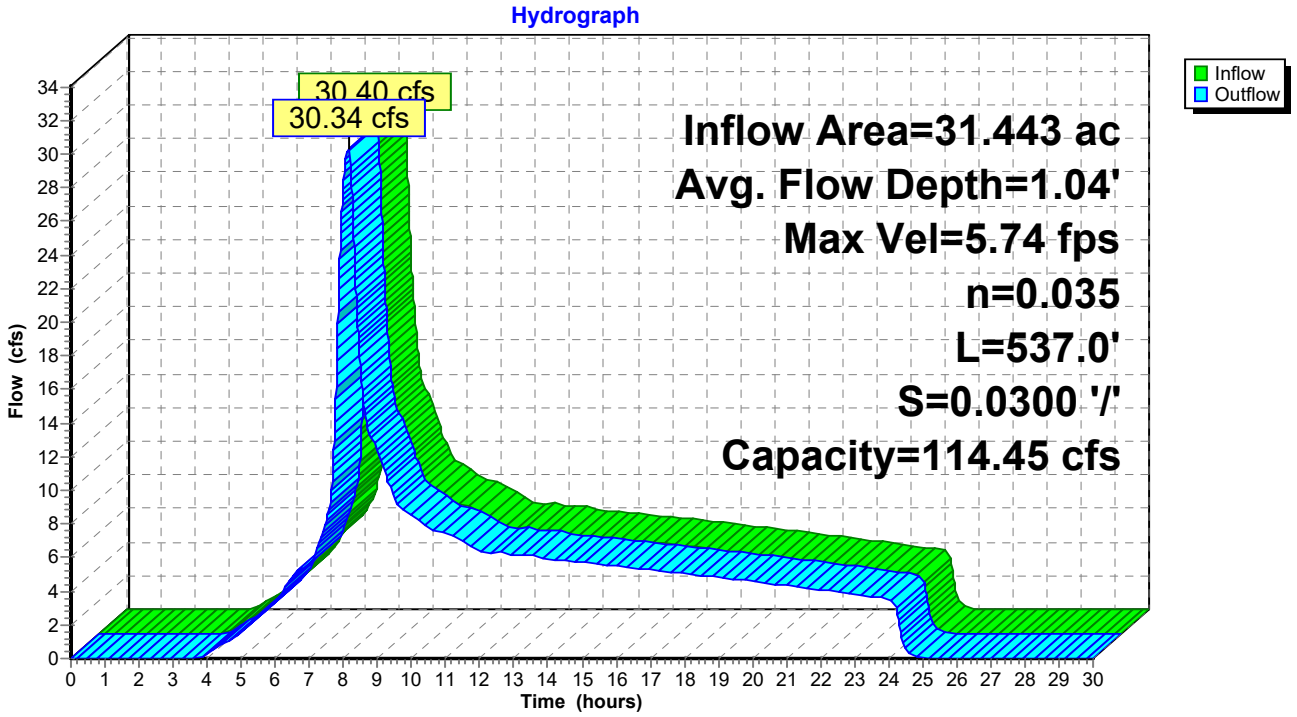
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.74 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 2.83 fps, Avg. Travel Time= 3.2 min

Peak Storage= 2,837 cf @ 8.11 hrs
Average Depth at Peak Storage= 1.04' , Surface Width= 7.16'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 114.45 cfs

3.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 11.00'
Length= 537.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -16.11'



Reach R1B: Reach 1B



Summary for Reach R1C: Reach 1C

[65] Warning: Inlet elevation not specified

Inflow Area = 19.639 ac, 4.96% Impervious, Inflow Depth = 3.97" for 50-YR event
Inflow = 19.37 cfs @ 8.03 hrs, Volume= 6.505 af
Outflow = 19.26 cfs @ 8.11 hrs, Volume= 6.505 af, Atten= 1%, Lag= 4.7 min
Routed to Reach R1B : Reach 1B

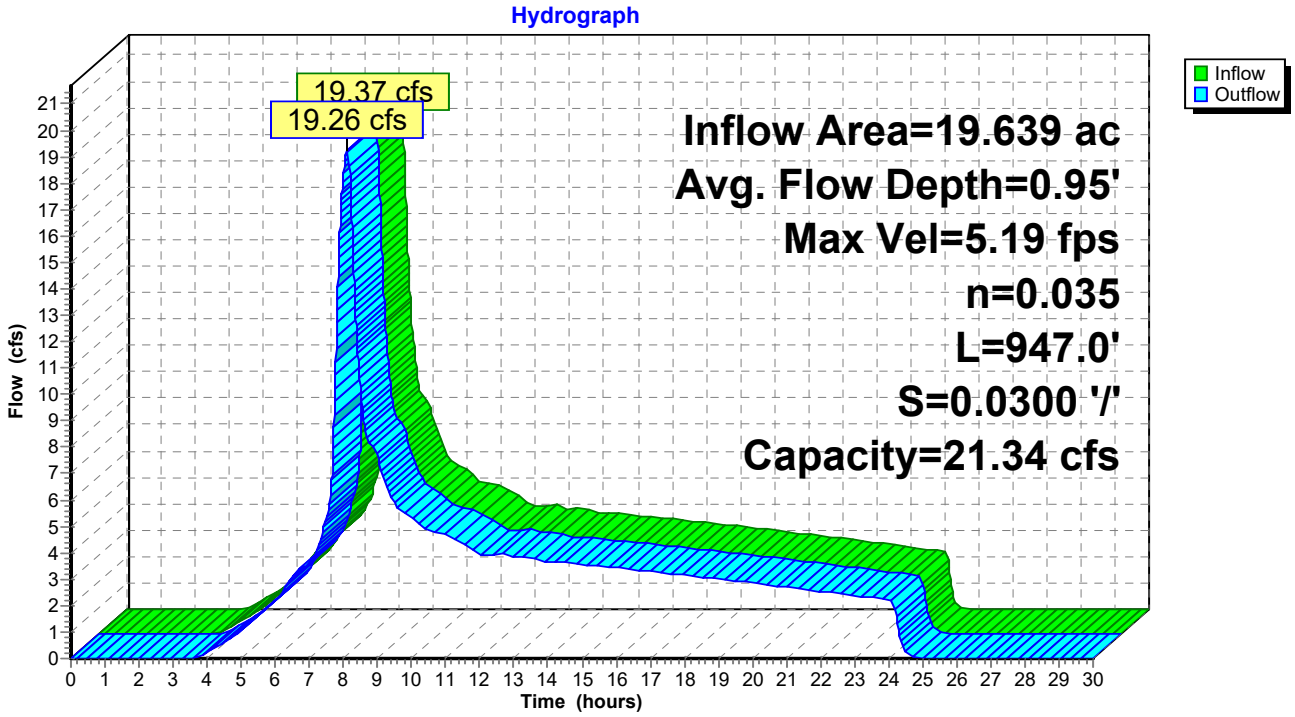
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.19 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 2.57 fps, Avg. Travel Time= 6.1 min

Peak Storage= 3,513 cf @ 8.06 hrs
Average Depth at Peak Storage= 0.95' , Surface Width= 5.80'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 21.34 cfs

2.00' x 1.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 947.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -28.41'



Reach R1C: Reach 1C



Summary for Reach R1D-1: Reach 1D-1

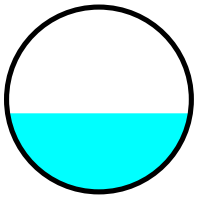
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 7.009 ac, 0.00% Impervious, Inflow Depth = 4.04" for 50-YR event
Inflow = 7.07 cfs @ 8.05 hrs, Volume= 2.361 af
Outflow = 7.07 cfs @ 8.05 hrs, Volume= 2.361 af, Atten= 0%, Lag= 0.1 min
Routed to Reach R1C : Reach 1C

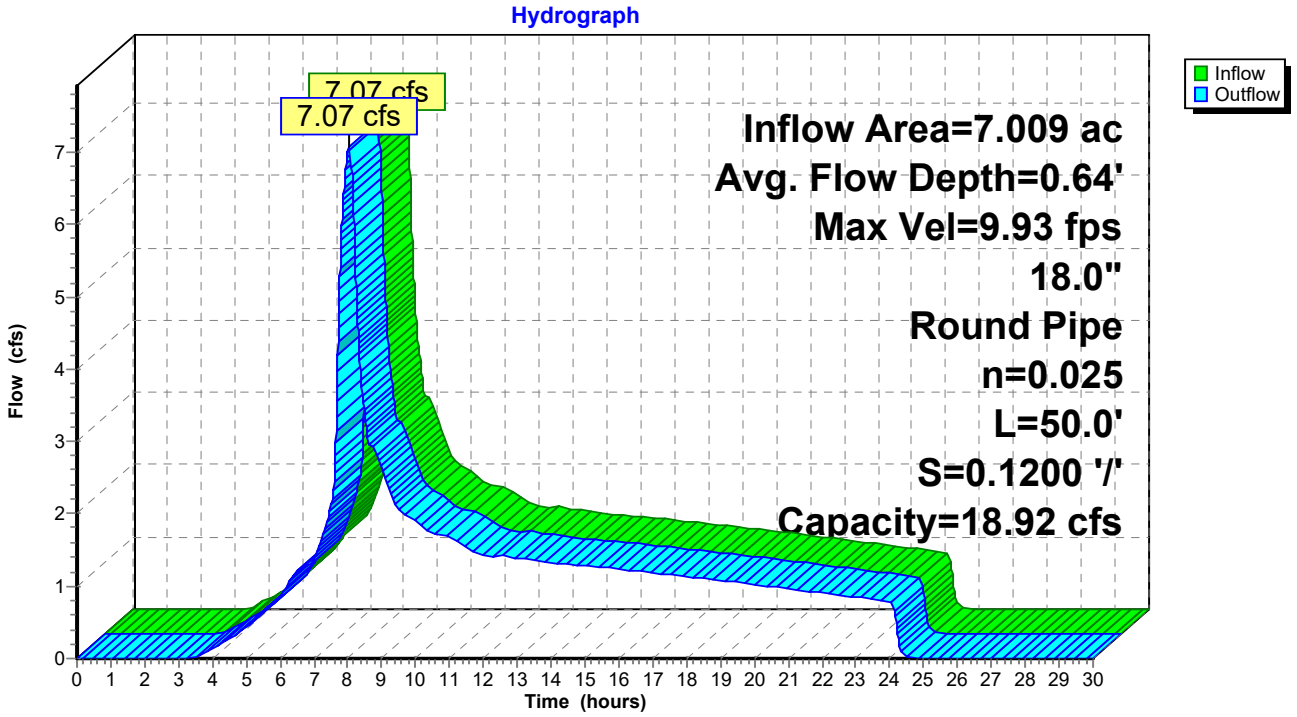
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.93 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.65 fps, Avg. Travel Time= 0.1 min

Peak Storage= 36 cf @ 8.05 hrs
Average Depth at Peak Storage= 0.64' , Surface Width= 1.48'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 18.92 cfs

18.0" Round Pipe
n= 0.025 Corrugated metal
Length= 50.0' Slope= 0.1200 '/'
Inlet Invert= 0.00', Outlet Invert= -6.00'



Reach R1D-1: Reach 1D-1



Summary for Reach R1D-2: Reach 1D-2

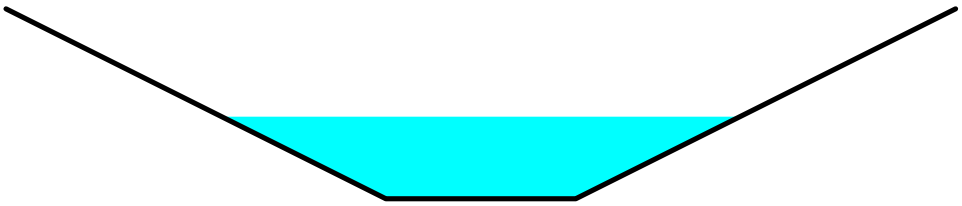
[65] Warning: Inlet elevation not specified

Inflow Area = 7.009 ac, 0.00% Impervious, Inflow Depth = 4.04" for 50-YR event
Inflow = 7.08 cfs @ 8.02 hrs, Volume= 2.361 af
Outflow = 7.07 cfs @ 8.05 hrs, Volume= 2.361 af, Atten= 0%, Lag= 1.6 min
Routed to Reach R1D-1 : Reach 1D-1

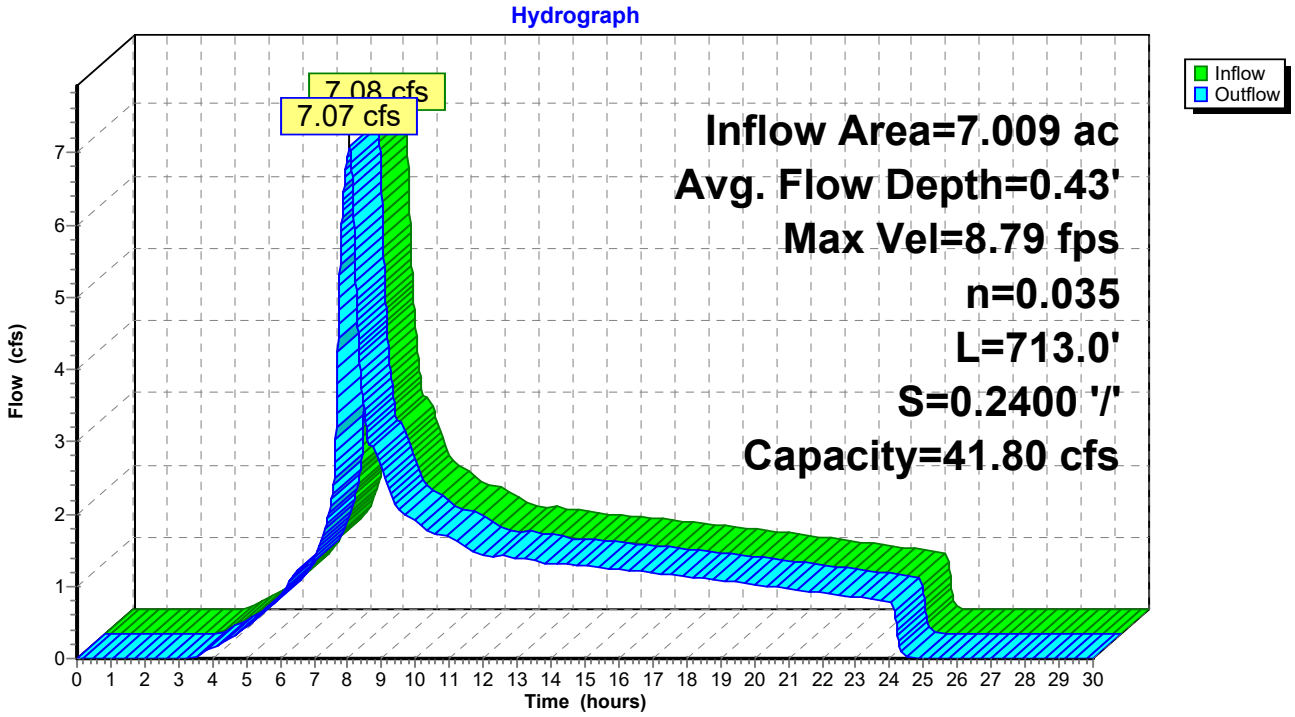
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.79 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 4.99 fps, Avg. Travel Time= 2.4 min

Peak Storage= 574 cf @ 8.02 hrs
Average Depth at Peak Storage= 0.43' , Surface Width= 2.73'
Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 41.80 cfs

1.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 5.00'
Length= 713.0' Slope= 0.2400 '/'
Inlet Invert= 0.00', Outlet Invert= -171.12'



Reach R1D-2: Reach 1D-2

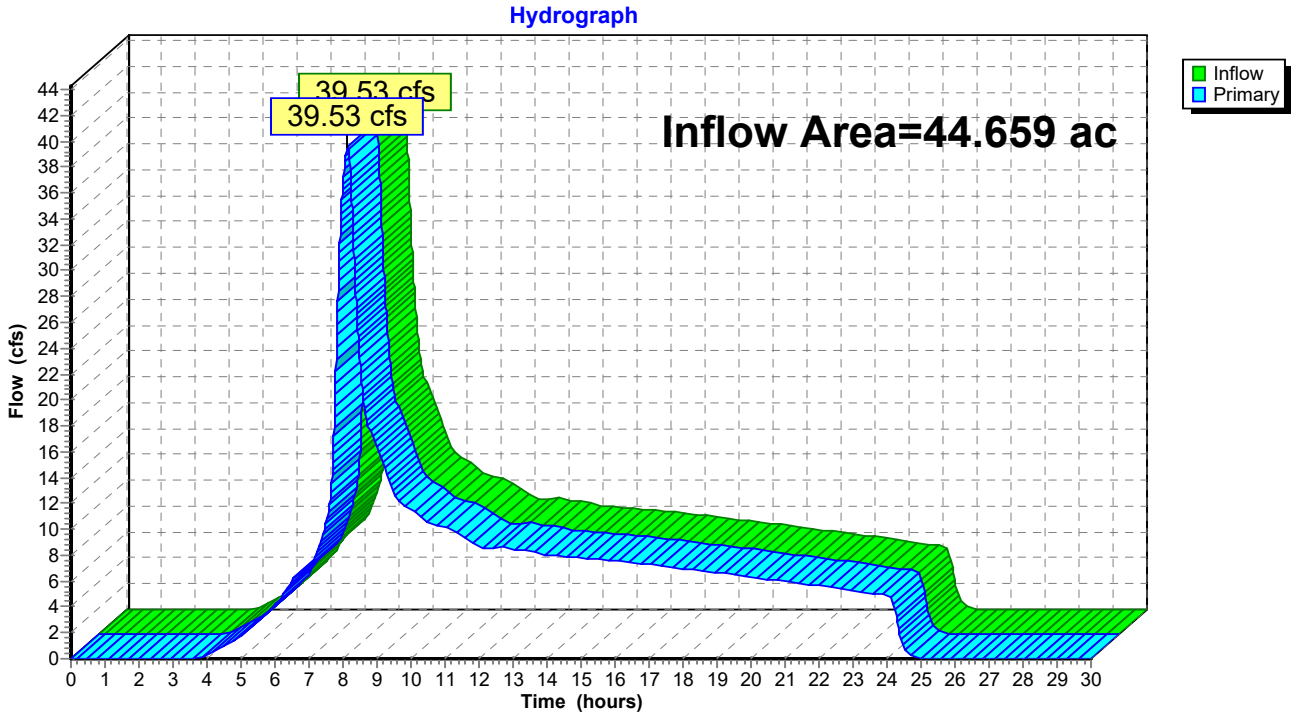


Summary for Link Outlet 1: Outlet 1

Inflow Area = 44.659 ac, 2.50% Impervious, Inflow Depth = 3.74" for 50-YR event
Inflow = 39.53 cfs @ 8.13 hrs, Volume= 13.927 af
Primary = 39.53 cfs @ 8.13 hrs, Volume= 13.927 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Outlet 1: Outlet 1



Summary for Subcatchment WS-1A: Subcat WS-1A

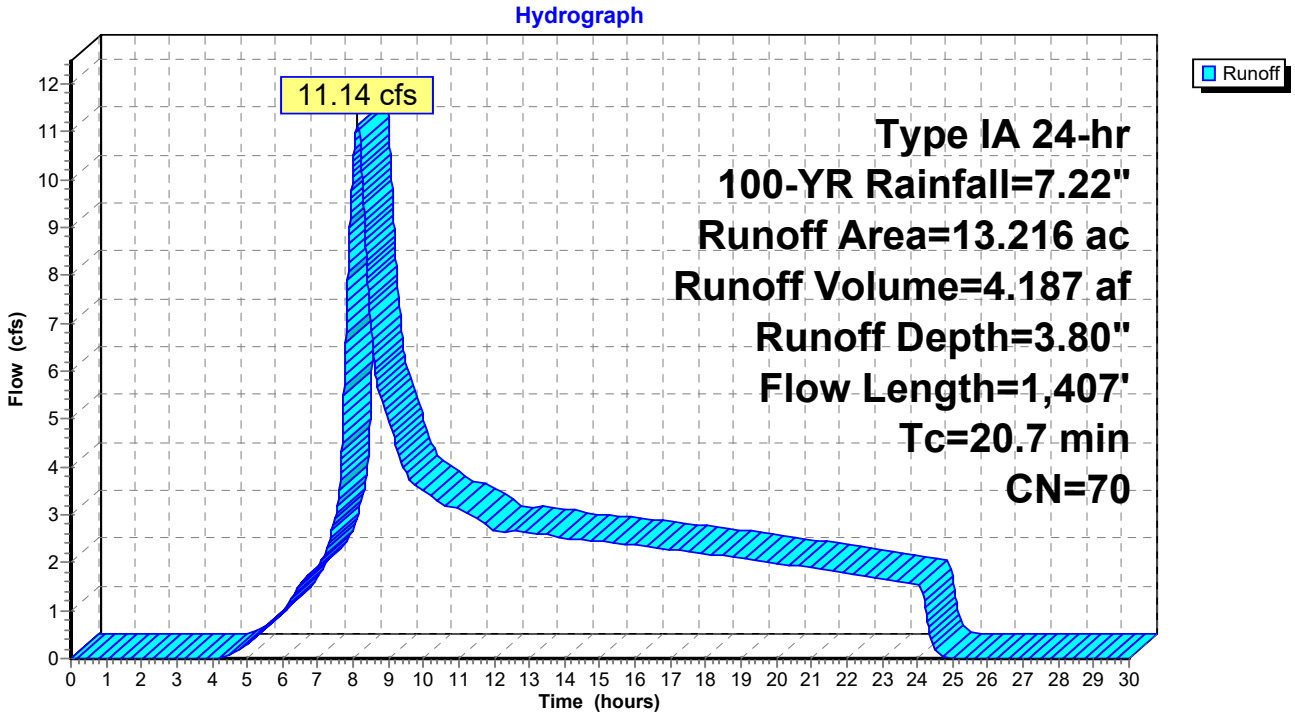
Runoff = 11.14 cfs @ 8.12 hrs, Volume= 4.187 af, Depth= 3.80"
Routed to Link Outlet 1 : Outlet 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-YR Rainfall=7.22"

Area (ac)	CN	Description
0.012	69	Annual Grass, Fair, HSG B
0.045	79	Annual Grass, Fair, HSG C
0.036	87	Dirt roads, HSG C
0.246	82	Farmsteads, HSG C
0.091	96	Gravel surface, HSG C
10.681	69	Vineyard, Fair, HSG B
0.062	79	Vineyard, Fair, HSG C
0.099	61	Vineyard, Good, HSG B
1.392	75	Vineyard, Good, HSG C
0.382	60	Woods, Fair, HSG B
0.170	73	Woods, Fair, HSG C
13.216	70	Weighted Average
13.216		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	100	0.2600	0.33		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
15.6	1,307	0.0400	1.40		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
20.7	1,407	Total			

Subcatchment WS-1A: Subcat WS-1A



Summary for Subcatchment WS-1B: Subcat WS-1B

[47] Hint: Peak is 107% of capacity of segment #3

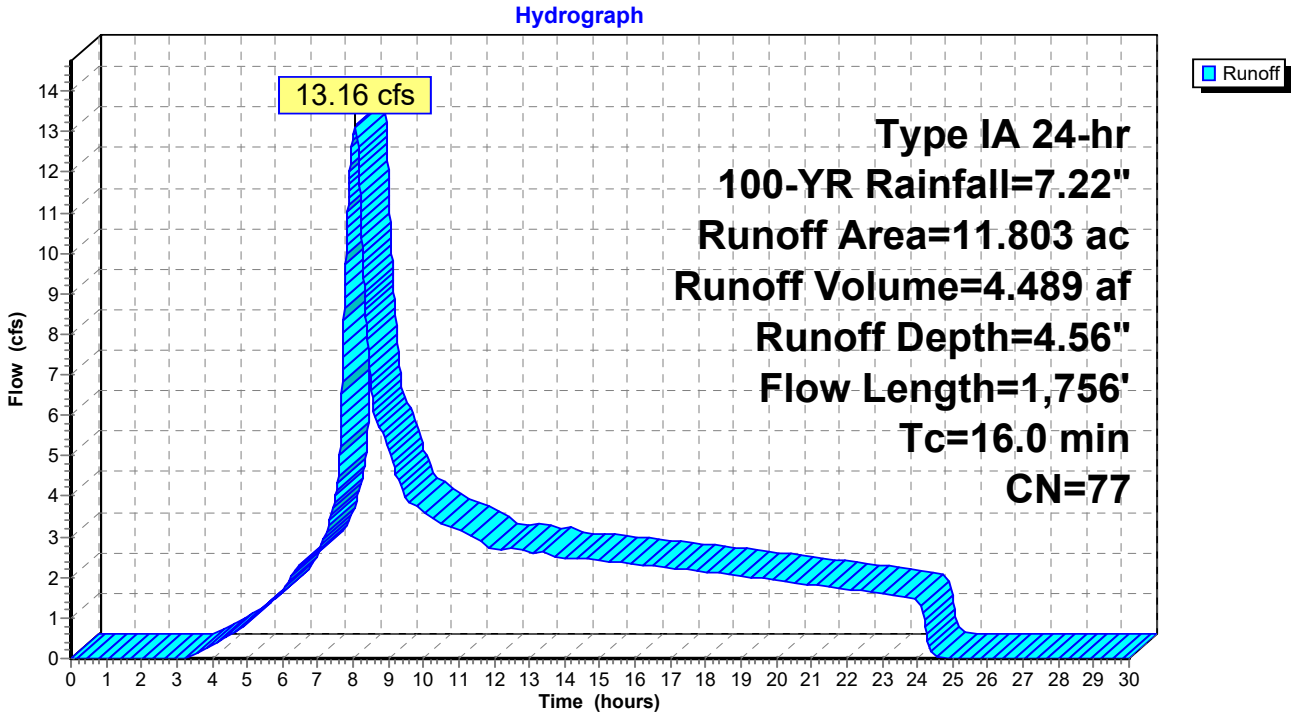
Runoff = 13.16 cfs @ 8.06 hrs, Volume= 4.489 af, Depth= 4.56"
Routed to Reach R1B : Reach 1B

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-YR Rainfall=7.22"

Area (ac)	CN	Description
1.132	69	Annual Grass, Fair, HSG B
0.000	79	Annual Grass, Fair, HSG C
0.494	79	Annual Grass, Fair, HSG C
0.184	82	Dirt roads, HSG B
0.154	87	Dirt roads, HSG C
0.018	74	Farmsteads, HSG B
0.769	82	Farmsteads, HSG C
0.107	89	Gravel Roads, HSG C
0.119	96	Gravel surface, HSG C
0.289	92	Paved roads w/open ditches, 50% imp, HSG C
2.743	69	Vineyard, Fair, HSG B
5.779	79	Vineyard, Fair, HSG C
0.005	60	Woods, Fair, HSG B
0.011	73	Woods, Fair, HSG C
11.803	77	Weighted Average
11.659		98.78% Pervious Area
0.144		1.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	100	0.1600	0.27		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
6.9	1,116	0.1500	2.71		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
2.9	540	0.0100	3.08	12.32	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035 Earth, dense weeds
16.0	1,756	Total			

Subcatchment WS-1B: Subcat WS-1B



Summary for Subcatchment WS-1C: Subcat WS-1C

[47] Hint: Peak is 225% of capacity of segment #5

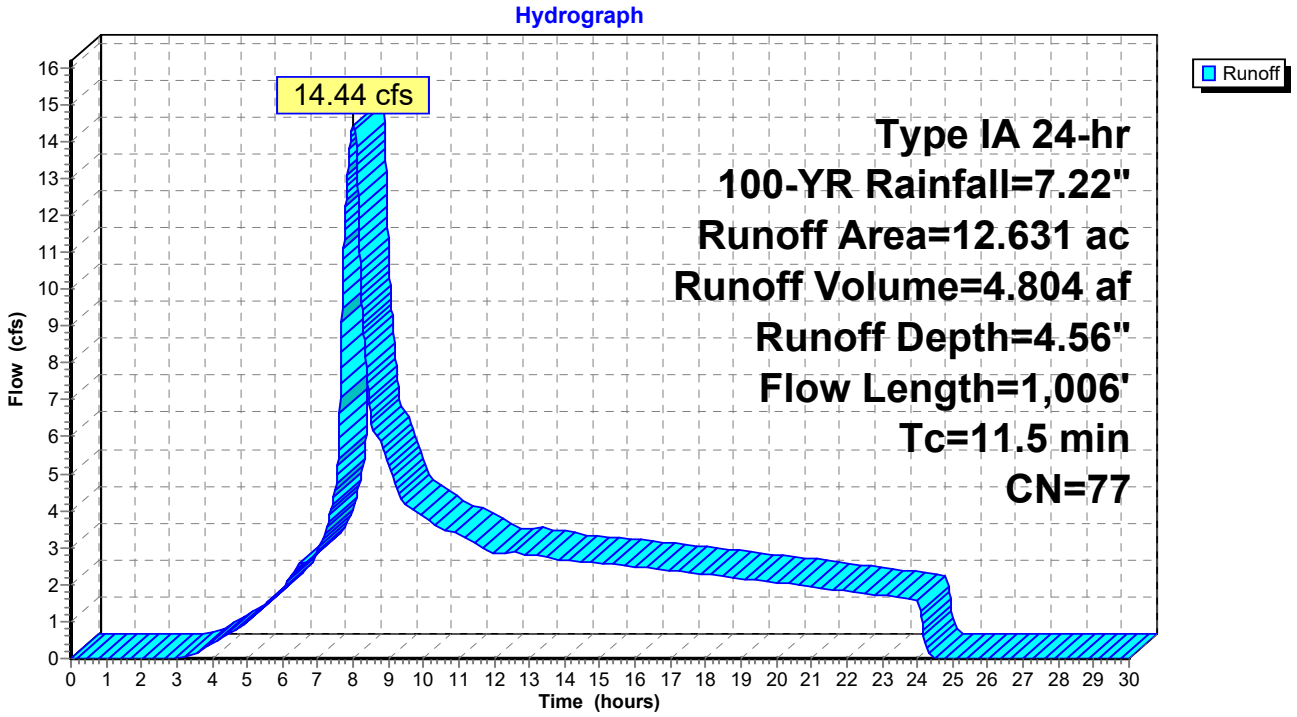
Runoff = 14.44 cfs @ 8.01 hrs, Volume= 4.804 af, Depth= 4.56"
Routed to Reach R1C : Reach 1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-YR Rainfall=7.22"

Area (ac)	CN	Description
0.695	69	Annual Grass, Fair, HSG B
1.363	79	Annual Grass, Fair, HSG C
0.107	75	Annual Grass, Good, HSG C
0.026	82	Dirt roads, HSG B
0.089	87	Dirt roads, HSG C
0.329	74	Farmsteads, HSG B
0.268	82	Farmsteads, HSG C
0.054	96	Gravel surface, HSG C
0.228	89	Paved roads w/open ditches, 50% imp, HSG B
0.120	92	Paved roads w/open ditches, 50% imp, HSG C
0.130	69	Vineyard, Fair, HSG B
3.091	79	Vineyard, Fair, HSG C
0.376	75	Vineyard, Good, HSG C
0.729	98	Water Surface, HSG B
0.071	98	Water Surface, HSG C
0.061	60	Woods, Fair, HSG B
3.925	73	Woods, Fair, HSG C
0.795	70	Woods, Good, HSG C
0.173	76	Woods/grass comb., Fair, HSG C
12.631	77	Weighted Average
11.657		92.29% Pervious Area
0.974		7.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	100	0.1900	0.19		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.8	179	0.3100	3.90		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.4	280	0.4600	3.39		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.5	397	0.1800	13.07	52.28	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.1	50	0.1200	8.17	6.42	**Pipe Channel, 12" CMP (Assumed)** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.025 Corrugated metal
11.5	1,006	Total			

Subcatchment WS-1C: Subcat WS-1C



Summary for Subcatchment WS-1D: Subcat WS-1D

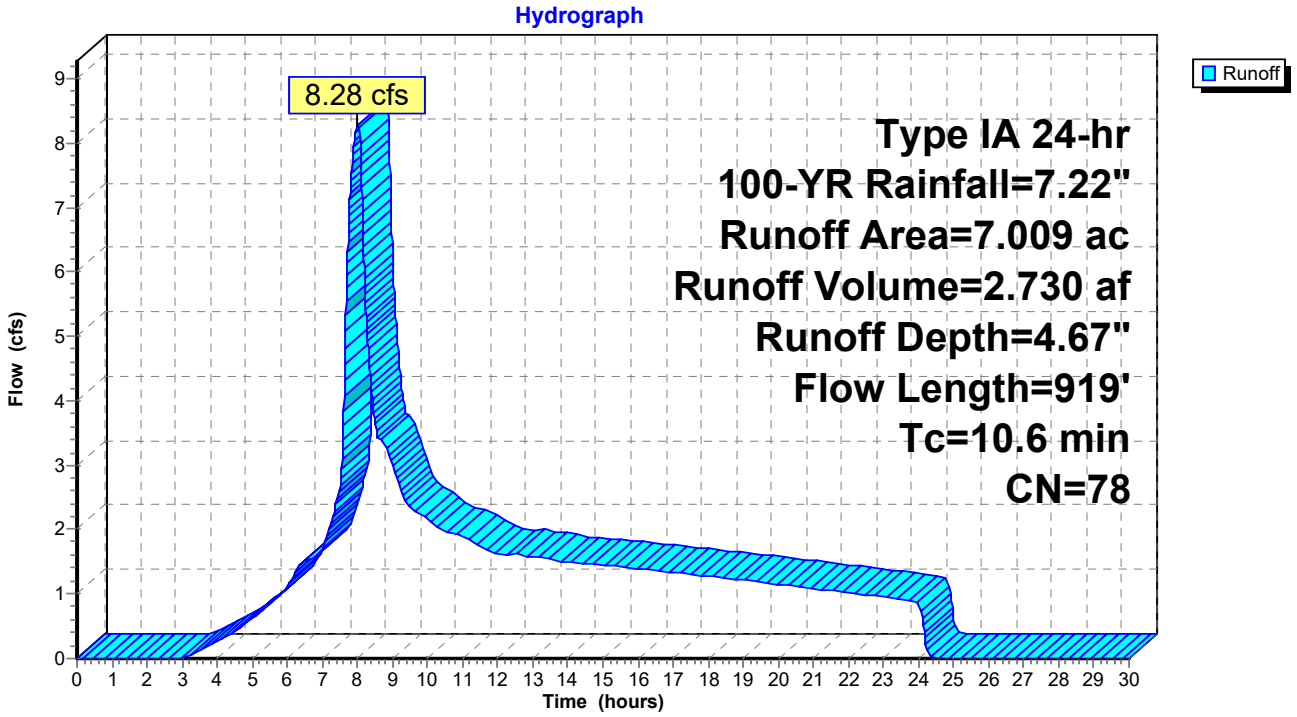
Runoff = 8.28 cfs @ 8.00 hrs, Volume= 2.730 af, Depth= 4.67"
Routed to Reach R1D-2 : Reach 1D-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-YR Rainfall=7.22"

Area (ac)	CN	Description
1.543	79	Annual Grass, Fair, HSG C
0.826	82	Farmsteads, HSG C
1.910	79	Vineyard, Fair, HSG C
1.227	73	Woods, Fair, HSG C
0.027	70	Woods, Good, HSG C
1.476	76	Woods/grass comb., Fair, HSG C
7.009	78	Weighted Average
7.009		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.8	100	0.0900	0.21		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
2.3	428	0.2000	3.13		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.5	391	0.2400	13.93	41.80	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=1.00' D=1.00' Z= 2.0 '/' Top.W=5.00' n= 0.035
10.6	919	Total			

Subcatchment WS-1D: Subcat WS-1D



Summary for Reach R1B: Reach 1B

[65] Warning: Inlet elevation not specified

Inflow Area = 31.443 ac, 3.56% Impervious, Inflow Depth = 4.59" for 100-YR event
Inflow = 35.69 cfs @ 8.09 hrs, Volume= 12.024 af
Outflow = 35.62 cfs @ 8.13 hrs, Volume= 12.024 af, Atten= 0%, Lag= 2.4 min
Routed to Link Outlet 1 : Outlet 1

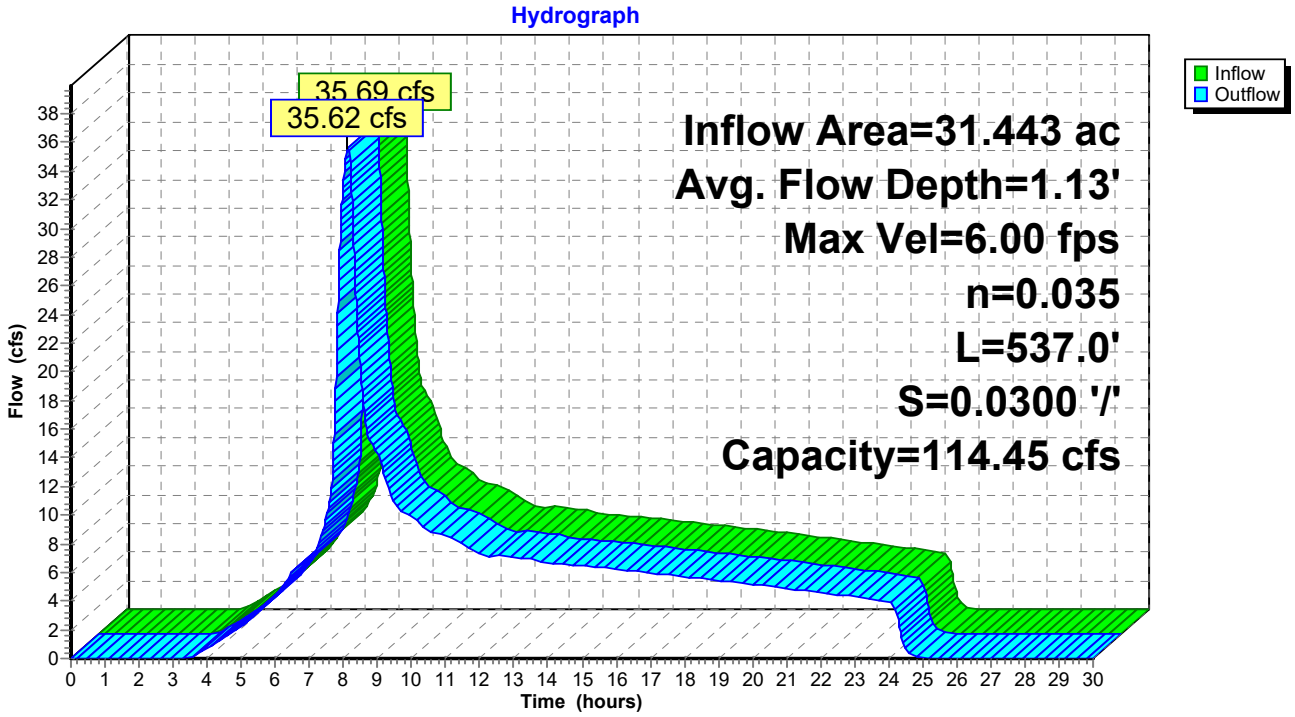
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.00 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 2.94 fps, Avg. Travel Time= 3.0 min

Peak Storage= 3,187 cf @ 8.10 hrs
Average Depth at Peak Storage= 1.13' , Surface Width= 7.52'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 114.45 cfs

3.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 11.00'
Length= 537.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -16.11'



Reach R1B: Reach 1B



Summary for Reach R1C: Reach 1C

[65] Warning: Inlet elevation not specified
[91] Warning: Storage range exceeded by 0.03'
[55] Hint: Peak inflow is 106% of Manning's capacity

Inflow Area = 19.639 ac, 4.96% Impervious, Inflow Depth = 4.60" for 100-YR event
Inflow = 22.69 cfs @ 8.03 hrs, Volume= 7.534 af
Outflow = 22.59 cfs @ 8.10 hrs, Volume= 7.534 af, Atten= 0%, Lag= 4.5 min
Routed to Reach R1B : Reach 1B

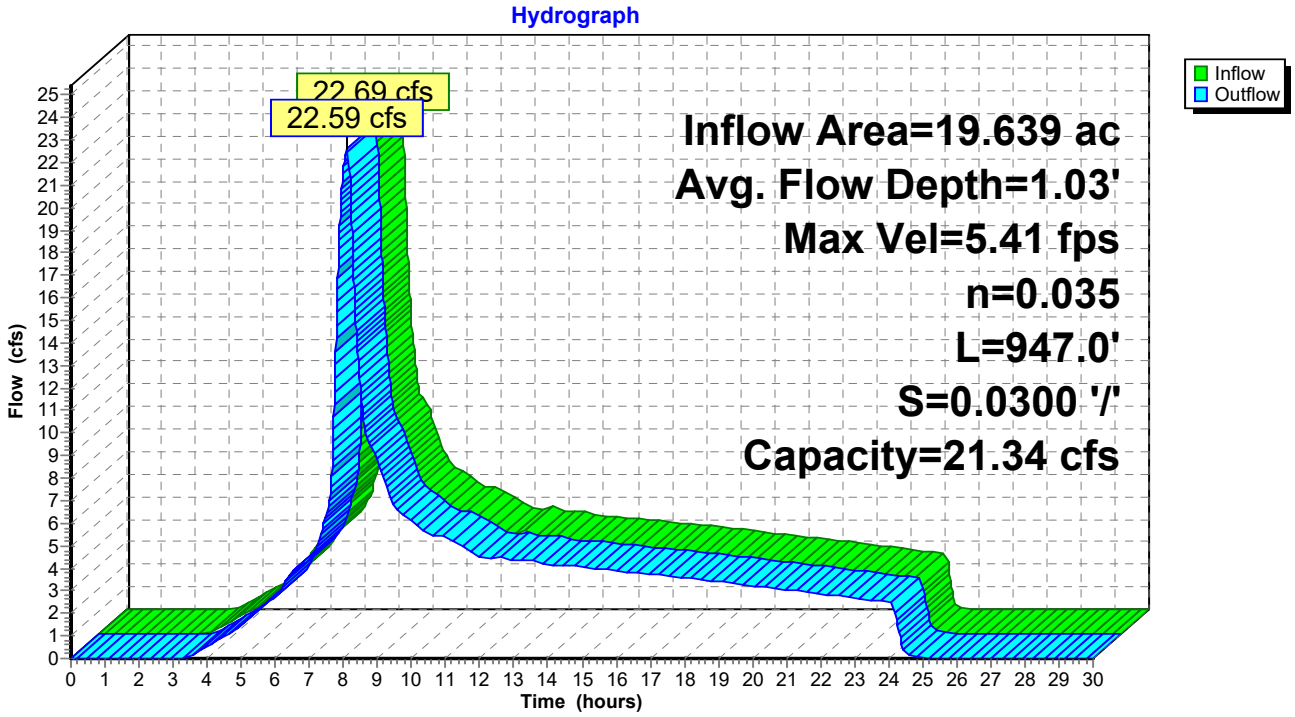
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.41 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 2.68 fps, Avg. Travel Time= 5.9 min

Peak Storage= 3,951 cf @ 8.05 hrs
Average Depth at Peak Storage= 1.03' , Surface Width= 6.12'
Bank-Full Depth= 1.00' Flow Area= 4.0 sf, Capacity= 21.34 cfs

2.00' x 1.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 947.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -28.41'



Reach R1C: Reach 1C



Summary for Reach R1D-1: Reach 1D-1

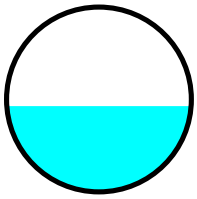
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 7.009 ac, 0.00% Impervious, Inflow Depth = 4.67" for 100-YR event
Inflow = 8.27 cfs @ 8.04 hrs, Volume= 2.730 af
Outflow = 8.27 cfs @ 8.04 hrs, Volume= 2.730 af, Atten= 0%, Lag= 0.1 min
Routed to Reach R1C : Reach 1C

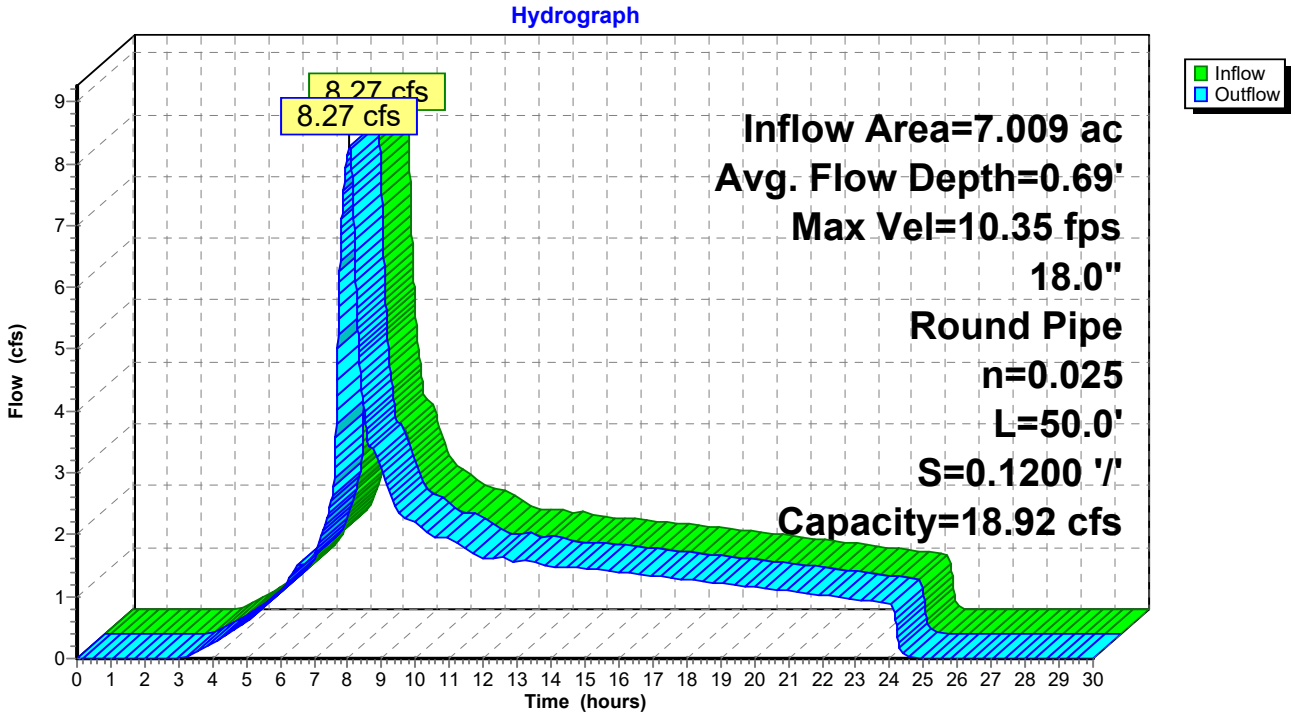
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 10.35 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.87 fps, Avg. Travel Time= 0.1 min

Peak Storage= 40 cf @ 8.04 hrs
Average Depth at Peak Storage= 0.69' , Surface Width= 1.50'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 18.92 cfs

18.0" Round Pipe
n= 0.025 Corrugated metal
Length= 50.0' Slope= 0.1200 '/'
Inlet Invert= 0.00', Outlet Invert= -6.00'



Reach R1D-1: Reach 1D-1



Summary for Reach R1D-2: Reach 1D-2

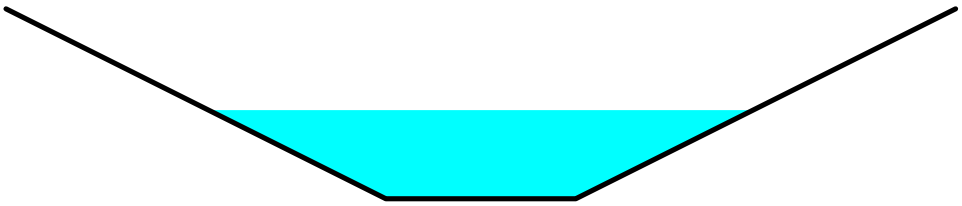
[65] Warning: Inlet elevation not specified

Inflow Area = 7.009 ac, 0.00% Impervious, Inflow Depth = 4.67" for 100-YR event
Inflow = 8.28 cfs @ 8.00 hrs, Volume= 2.730 af
Outflow = 8.27 cfs @ 8.04 hrs, Volume= 2.730 af, Atten= 0%, Lag= 2.4 min
Routed to Reach R1D-1 : Reach 1D-1

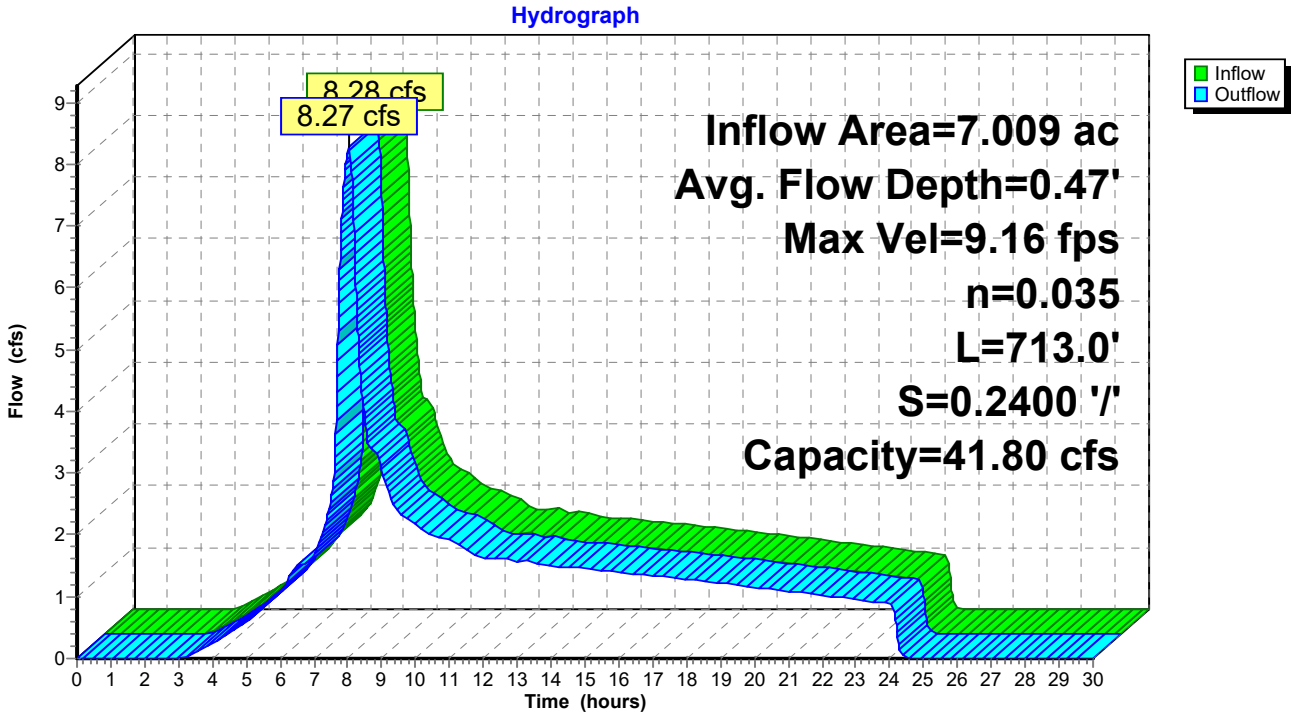
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.16 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 5.19 fps, Avg. Travel Time= 2.3 min

Peak Storage= 644 cf @ 8.02 hrs
Average Depth at Peak Storage= 0.47' , Surface Width= 2.87'
Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 41.80 cfs

1.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 2.0 '/' Top Width= 5.00'
Length= 713.0' Slope= 0.2400 '/'
Inlet Invert= 0.00', Outlet Invert= -171.12'



Reach R1D-2: Reach 1D-2

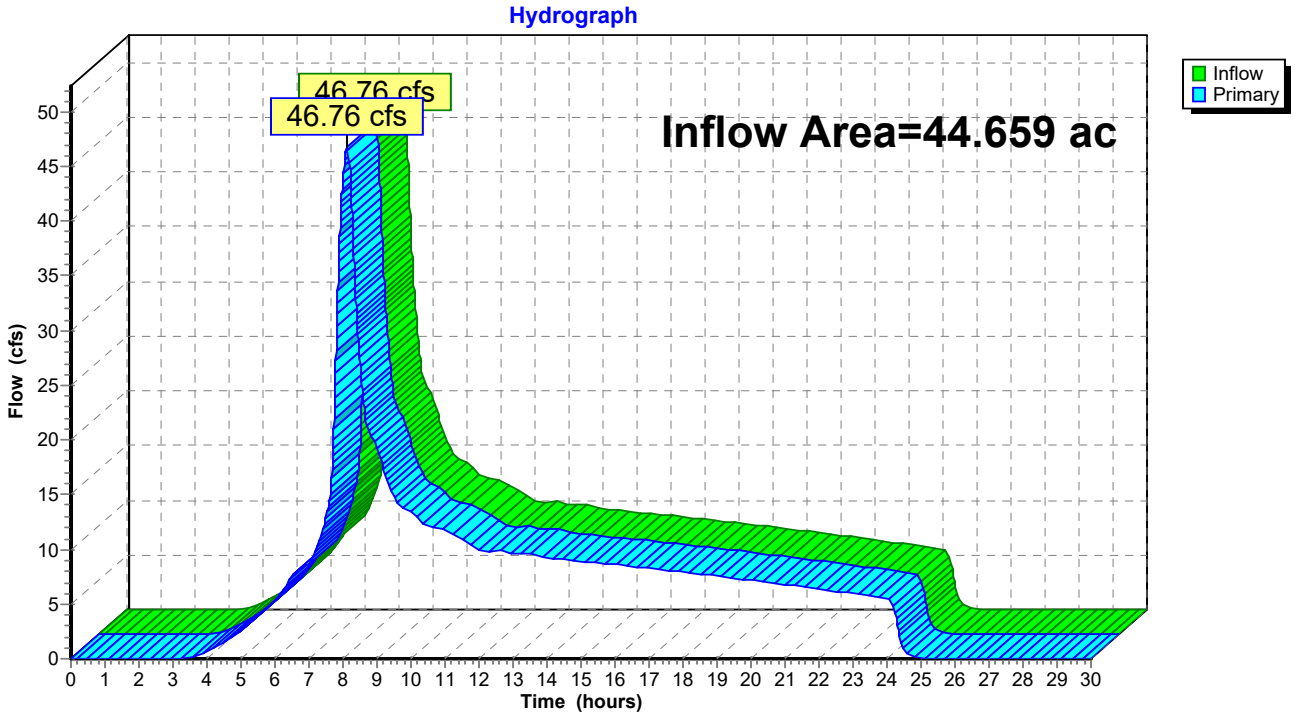


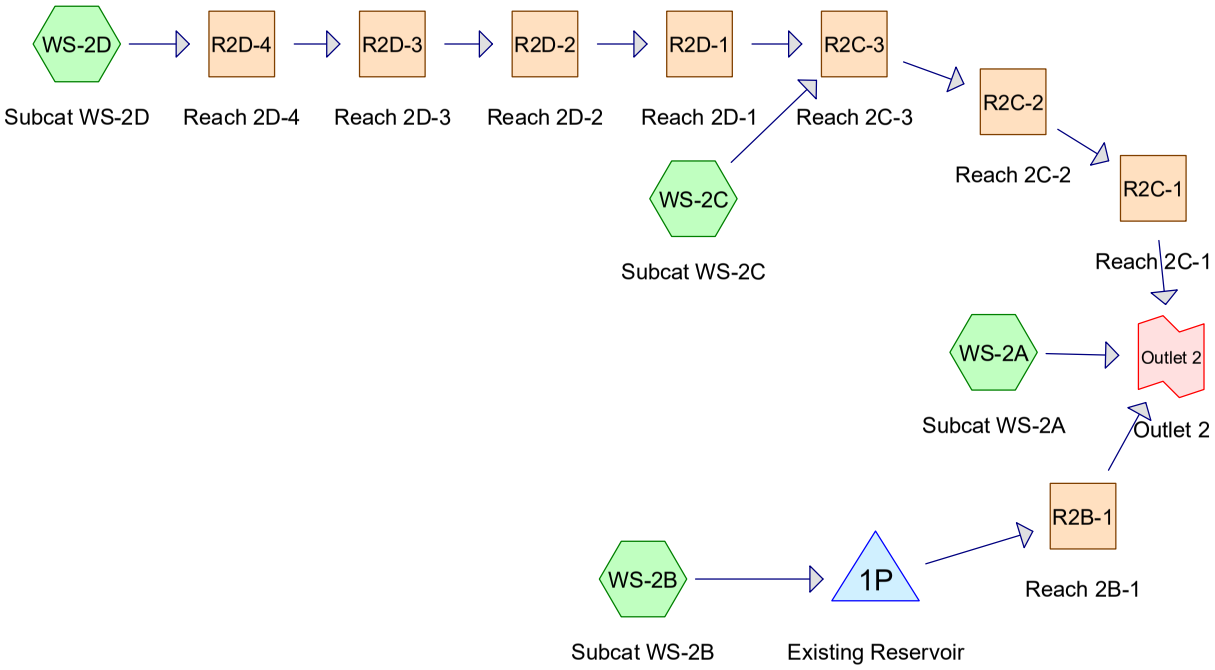
Summary for Link Outlet 1: Outlet 1

Inflow Area = 44.659 ac, 2.50% Impervious, Inflow Depth = 4.36" for 100-YR event
Inflow = 46.76 cfs @ 8.12 hrs, Volume= 16.211 af
Primary = 46.76 cfs @ 8.12 hrs, Volume= 16.211 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Outlet 1: Outlet 1





Subcat Reach Pond Link

Routing Diagram for Wappo Hill Post-Project WS2
Prepared by PPI Engineering, Printed 11/9/2023
HydroCAD® 10.20-3c s/n 09429 © 2023 HydroCAD Software Solutions LLC

Summary for Subcatchment WS-2A: Subcat WS-2A

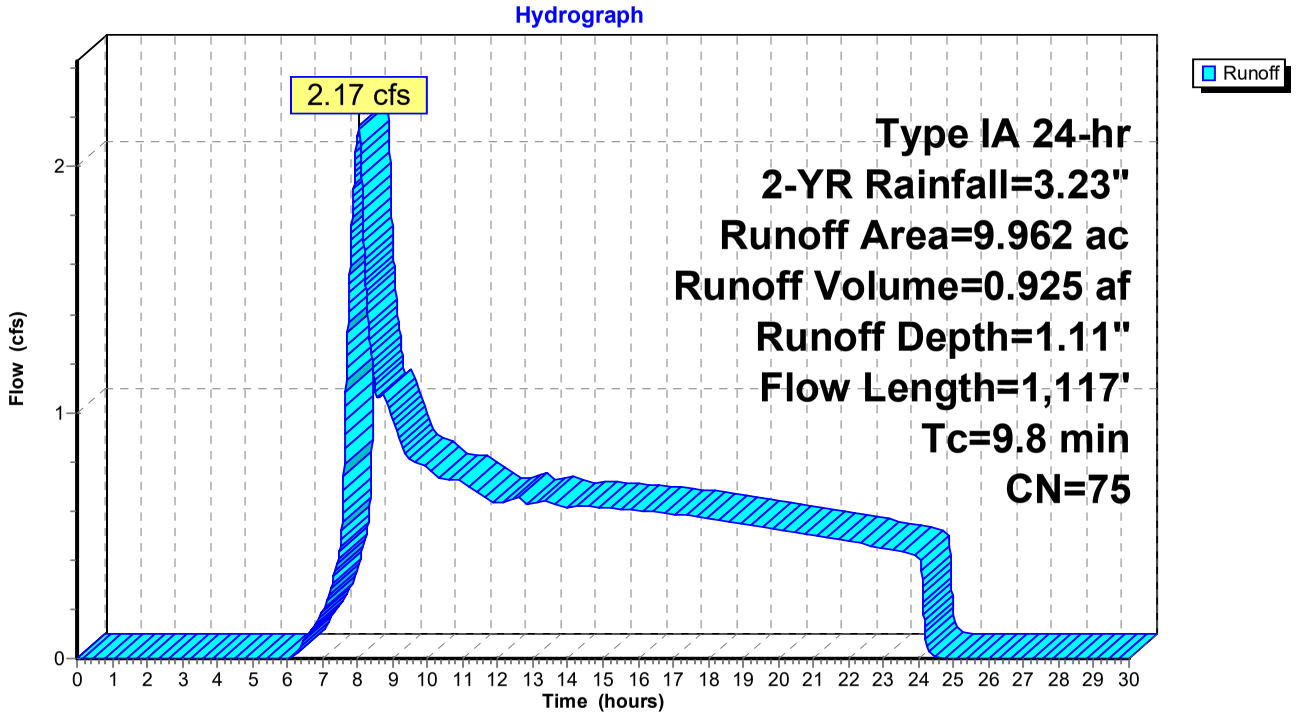
Runoff = 2.17 cfs @ 8.04 hrs, Volume= 0.925 af, Depth= 1.11"
Routed to Link Outlet 2 : Outlet 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-YR Rainfall=3.23"

Area (ac)	CN	Description
0.831	69	Annual Grass, Fair, HSG B
2.406	79	Annual Grass, Fair, HSG C
0.000	87	Dirt roads, HSG C
0.124	82	Farmsteads, HSG C
0.026	89	Paved roads w/open ditches, 50% imp, HSG B
0.158	92	Paved roads w/open ditches, 50% imp, HSG C
0.018	61	Vineyard, Good, HSG B
2.274	75	Vineyard, Good, HSG C
0.230	60	Woods, Fair, HSG B
3.896	73	Woods, Fair, HSG C
9.962	75	Weighted Average
9.870		99.08% Pervious Area
0.092		0.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	100	0.2600	0.33		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
2.8	493	0.1700	2.89		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.6	409	0.0200	4.36	17.43	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.2	64	0.0200	6.14	30.16	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025
0.1	51	0.0600	7.55	30.18	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
9.8	1,117	Total			

Subcatchment WS-2A: Subcat WS-2A



Summary for Subcatchment WS-2B: Subcat WS-2B

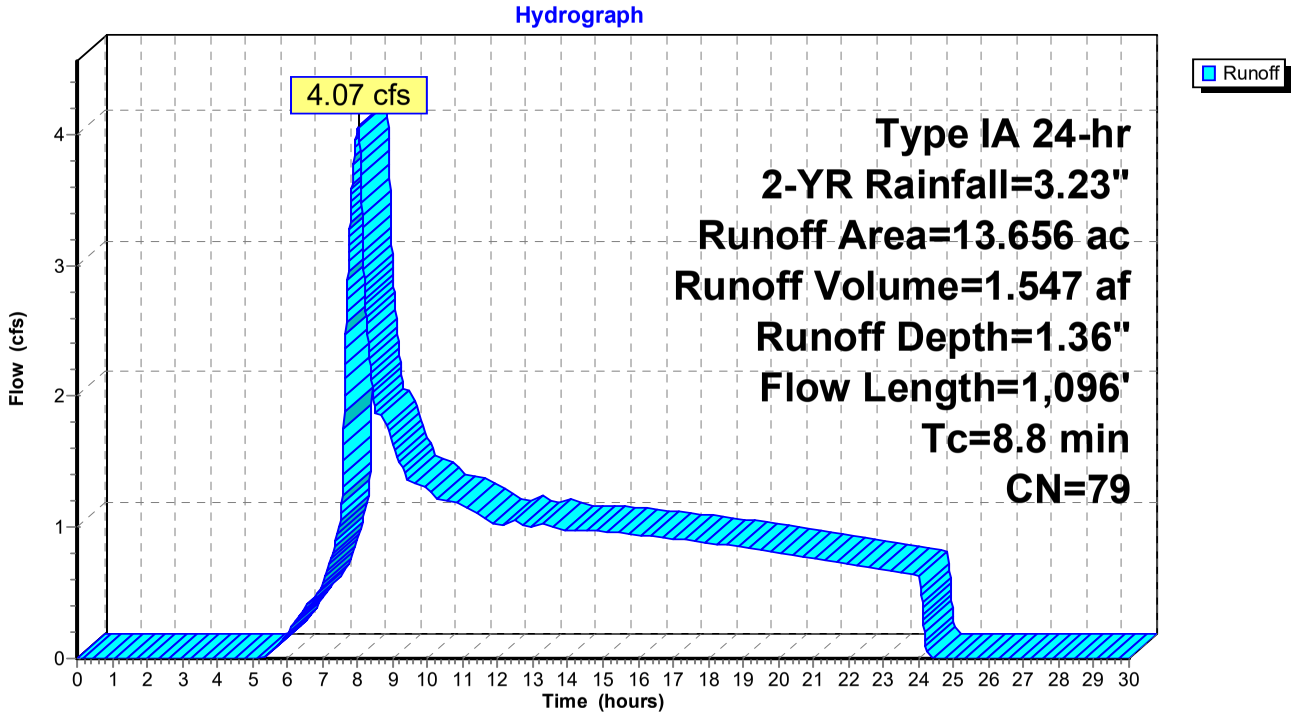
Runoff = 4.07 cfs @ 8.03 hrs, Volume= 1.547 af, Depth= 1.36"
Routed to Pond 1P : Existing Reservoir

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-YR Rainfall=3.23"

Area (ac)	CN	Description
0.661	69	Annual Grass, Fair, HSG B
1.698	79	Annual Grass, Fair, HSG C
0.195	84	Annual Grass, Fair, HSG D
0.668	82	Farmsteads, HSG C
0.149	89	Gravel Roads, HSG C
0.001	92	Paved roads w/open ditches, 50% imp, HSG C
2.792	79	Vineyard, Fair, HSG C
0.032	98	Water Surface, HSG B
0.000	98	Water Surface, HSG C
1.754	98	Water Surface, HSG D
0.050	60	Woods, Fair, HSG B
5.654	73	Woods, Fair, HSG C
0.001	79	Woods, Fair, HSG D
13.656	79	Weighted Average
11.869		86.91% Pervious Area
1.787		13.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.2500	0.32		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
3.1	564	0.1900	3.05		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.5	432	0.2300	14.77	59.09	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
8.8	1,096	Total			

Subcatchment WS-2B: Subcat WS-2B



Summary for Subcatchment WS-2C: Subcat WS-2C

Runoff = 1.91 cfs @ 8.08 hrs, Volume= 1.111 af, Depth= 0.80"
Routed to Reach R2C-3 : Reach 2C-3

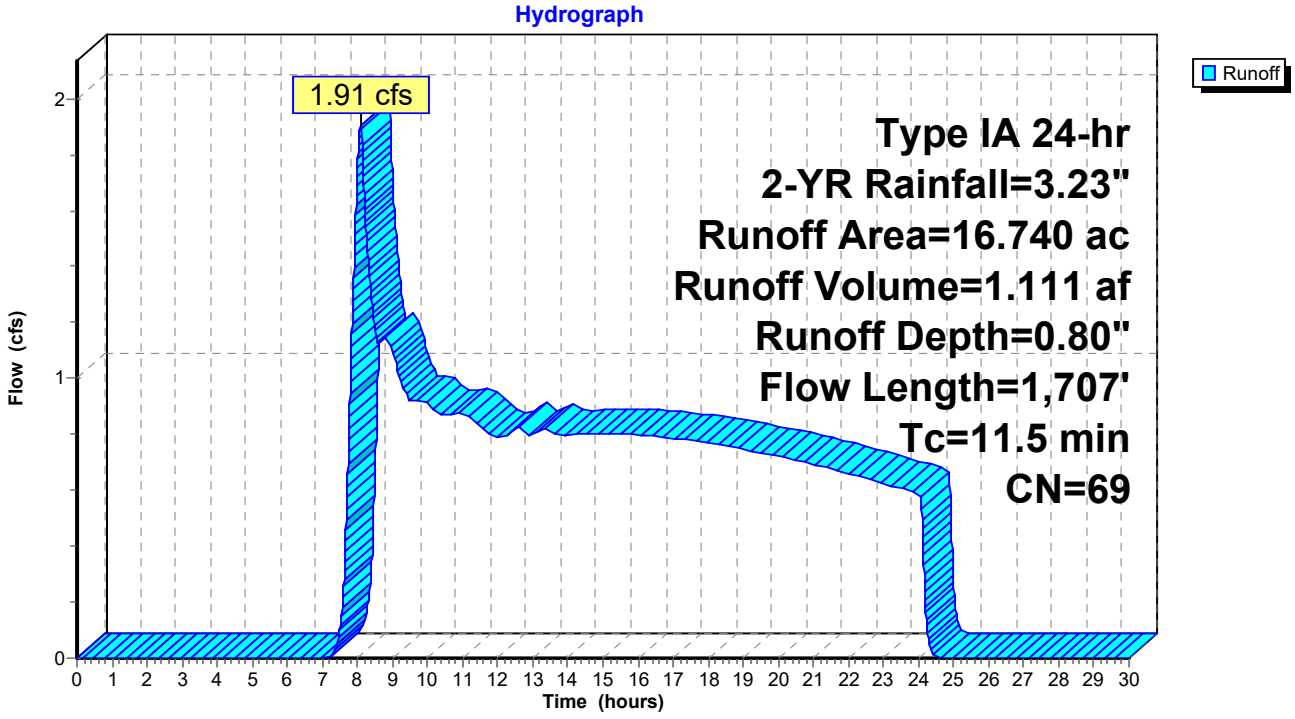
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-YR Rainfall=3.23"

	Area (ac)	CN	Description
*	0.000	0	, HSG B
	0.959	69	Annual Grass, Fair, HSG B
	0.796	79	Annual Grass, Fair, HSG C
	0.115	65	Brush, Good, HSG C
	0.006	82	Dirt roads, HSG B
	0.199	74	Farmsteads, HSG B
	0.905	82	Farmsteads, HSG C
	0.036	85	Gravel Roads, HSG B
	0.180	89	Gravel Roads, HSG C
	0.247	89	Paved roads w/open ditches, 50% imp, HSG B
	0.138	92	Paved roads w/open ditches, 50% imp, HSG C
	0.090	69	Vineyard, Fair, HSG B
	0.695	79	Vineyard, Fair, HSG C
	3.478	61	Vineyard, Good, HSG B
	2.125	75	Vineyard, Good, HSG C
	3.716	60	Woods, Fair, HSG B
	3.053	73	Woods, Fair, HSG C
	16.740	69	Weighted Average
	16.547		98.85% Pervious Area
	0.193		1.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.1800	0.28		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
1.3	296	0.2800	3.70		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.6	266	0.3200	2.83		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.9	543	0.1100	10.22	40.87	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.8	90	0.0800	1.98		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.6	236	0.0500	6.36	19.08	**Trap/Vee/Rect Channel Flow, Pasture Ditch** Bot.W=1.00' D=1.00' Z= 2.0 '/' Top.W=5.00' n= 0.035
0.1	57	0.0400	18.72	58.82	**Pipe Channel, 24" PVC Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.010 PVC, smooth interior
0.1	57	0.0400	8.69	42.66	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025

0.2	62	0.0200	4.36	17.43	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
11.5	1,707	Total			

Subcatchment WS-2C: Subcat WS-2C



Summary for Subcatchment WS-2D: Subcat WS-2D

Runoff = 4.99 cfs @ 8.13 hrs, Volume= 2.411 af, Depth= 1.06"
Routed to Reach R2D-4 : Reach 2D-4

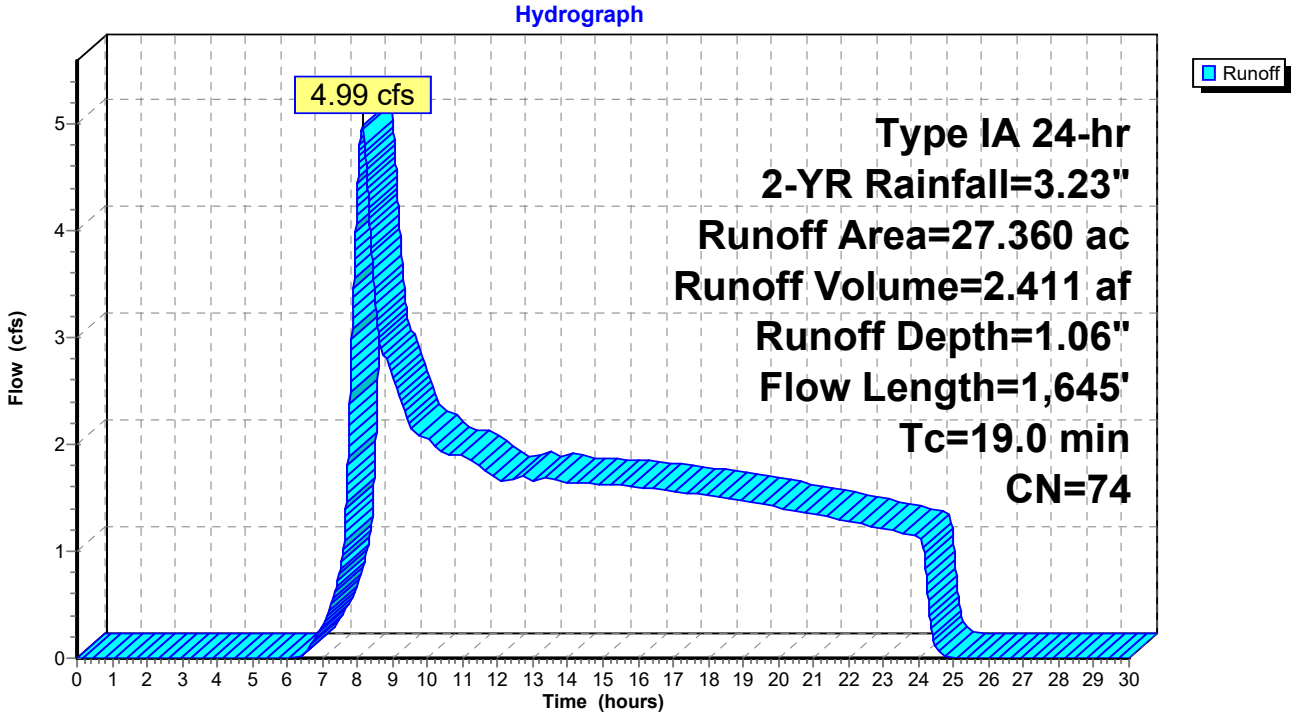
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-YR Rainfall=3.23"

	Area (ac)	CN	Description
*	0.000	0	, HSG C
	0.031	69	Annual Grass, Fair, HSG B
	1.714	79	Annual Grass, Fair, HSG C
	0.420	75	Annual Grass, Good, HSG C
	0.320	82	Farmsteads, HSG C
	0.141	89	Gravel Roads, HSG C
	0.020	89	Paved roads w/open ditches, 50% imp, HSG B
	1.171	92	Paved roads w/open ditches, 50% imp, HSG C
	0.046	61	Vineyard, Good, HSG B
	6.048	75	Vineyard, Good, HSG C
	0.455	60	Woods, Fair, HSG B
	14.511	73	Woods, Fair, HSG C
	2.483	70	Woods, Good, HSG C
	27.360	74	Weighted Average
	26.764		97.82% Pervious Area
	0.596		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.1200	0.16		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.3	41	0.2500	2.50		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.5	267	0.1100	8.23	16.47	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=0.00' D=1.00' Z= 2.0 '/' Top.W=4.00' n= 0.035
0.1	104	0.3400	34.39	27.01	**Pipe Channel, 12" DW Pipe** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PPI Dual Walled CPP
6.6	100	0.3800	0.25		**Sheet Flow, Sheet - Post Pipe Level Spreader** Woods: Light underbrush n= 0.400 P2= 3.23"
0.1	58	0.2500	15.40	61.61	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.1	135	0.3800	23.08	72.52	**Pipe Channel, 24" CMP Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025
0.6	525	0.2000	13.78	55.11	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.0	42	0.2100	19.91	97.74	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025

0.3	273	0.1800	13.07	52.28	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
19.0	1,645	Total			

Subcatchment WS-2D: Subcat WS-2D



Summary for Reach R2B-1: Reach 2B-1

[65] Warning: Inlet elevation not specified

Inflow Area = 13.656 ac, 13.09% Impervious, Inflow Depth > 0.75" for 2-YR event
Inflow = 0.66 cfs @ 23.48 hrs, Volume= 0.851 af
Outflow = 0.66 cfs @ 23.78 hrs, Volume= 0.838 af, Atten= 0%, Lag= 18.4 min
Routed to Link Outlet 2 : Outlet 2

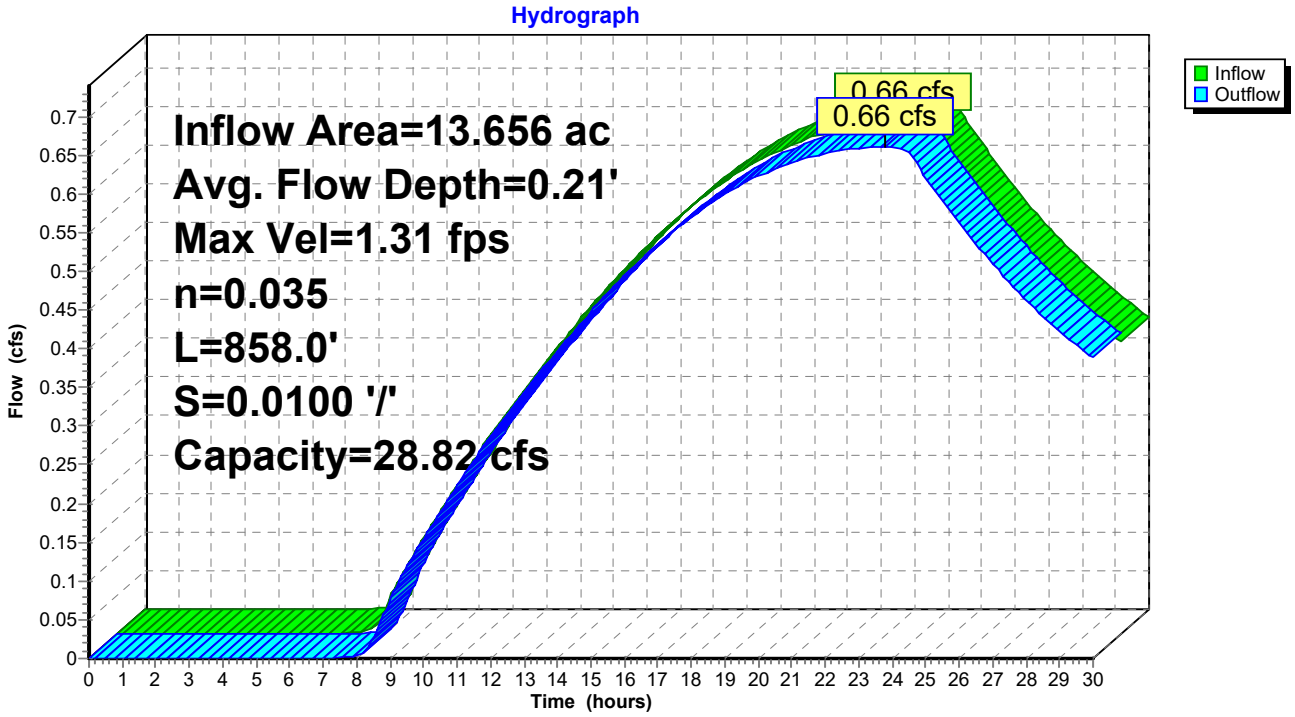
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.31 fps, Min. Travel Time= 10.9 min
Avg. Velocity = 1.06 fps, Avg. Travel Time= 13.5 min

Peak Storage= 432 cf @ 23.60 hrs
Average Depth at Peak Storage= 0.21' , Surface Width= 2.83'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 28.82 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 858.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -8.58'



Reach R2B-1: Reach 2B-1



Summary for Reach R2C-1: Reach 2C-1

[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 0.96" for 2-YR event
Inflow = 6.55 cfs @ 8.25 hrs, Volume= 3.522 af
Outflow = 6.55 cfs @ 8.26 hrs, Volume= 3.522 af, Atten= 0%, Lag= 0.3 min
Routed to Link Outlet 2 : Outlet 2

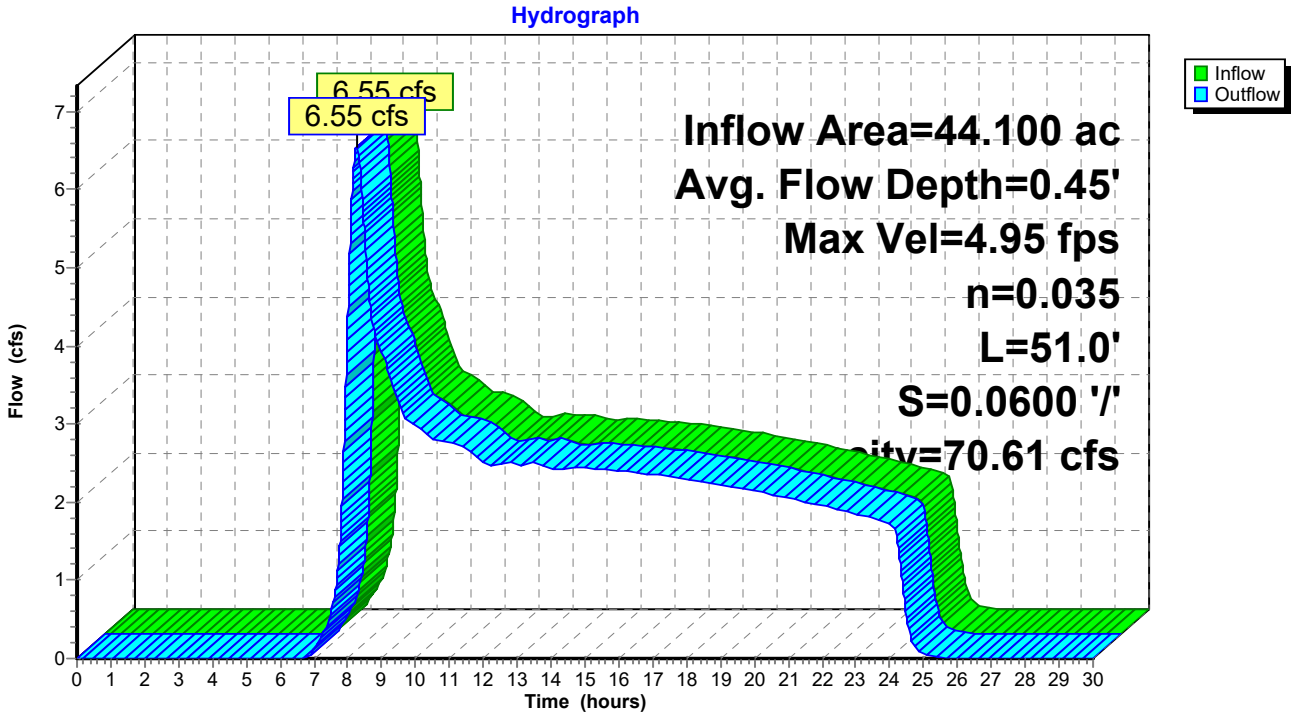
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.95 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.13 fps, Avg. Travel Time= 0.3 min

Peak Storage= 68 cf @ 8.26 hrs
Average Depth at Peak Storage= 0.45' , Surface Width= 3.82'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 70.61 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 51.0' Slope= 0.0600 '/'
Inlet Invert= 0.00', Outlet Invert= -3.06'



Reach R2C-1: Reach 2C-1



Summary for Reach R2C-2: Reach 2C-2

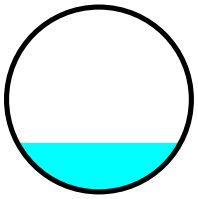
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 0.96" for 2-YR event
Inflow = 6.55 cfs @ 8.25 hrs, Volume= 3.522 af
Outflow = 6.55 cfs @ 8.25 hrs, Volume= 3.522 af, Atten= 0%, Lag= 0.3 min
Routed to Reach R2C-1 : Reach 2C-1

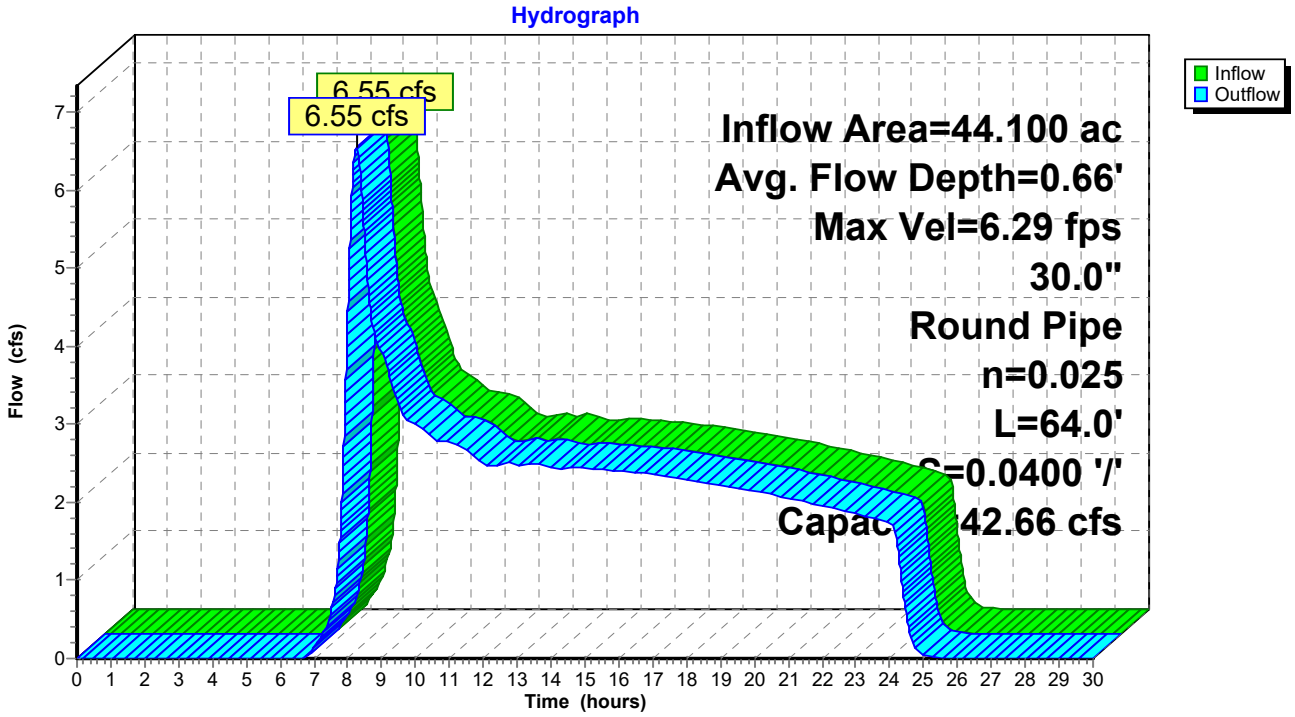
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.29 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 4.06 fps, Avg. Travel Time= 0.3 min

Peak Storage= 67 cf @ 8.25 hrs
Average Depth at Peak Storage= 0.66' , Surface Width= 2.21'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 42.66 cfs

30.0" Round Pipe
n= 0.025 Corrugated metal
Length= 64.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.56'



Reach R2C-2: Reach 2C-2



Summary for Reach R2C-3: Reach 2C-3

[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 0.96" for 2-YR event
Inflow = 6.57 cfs @ 8.19 hrs, Volume= 3.522 af
Outflow = 6.55 cfs @ 8.25 hrs, Volume= 3.522 af, Atten= 0%, Lag= 3.8 min
Routed to Reach R2C-2 : Reach 2C-2

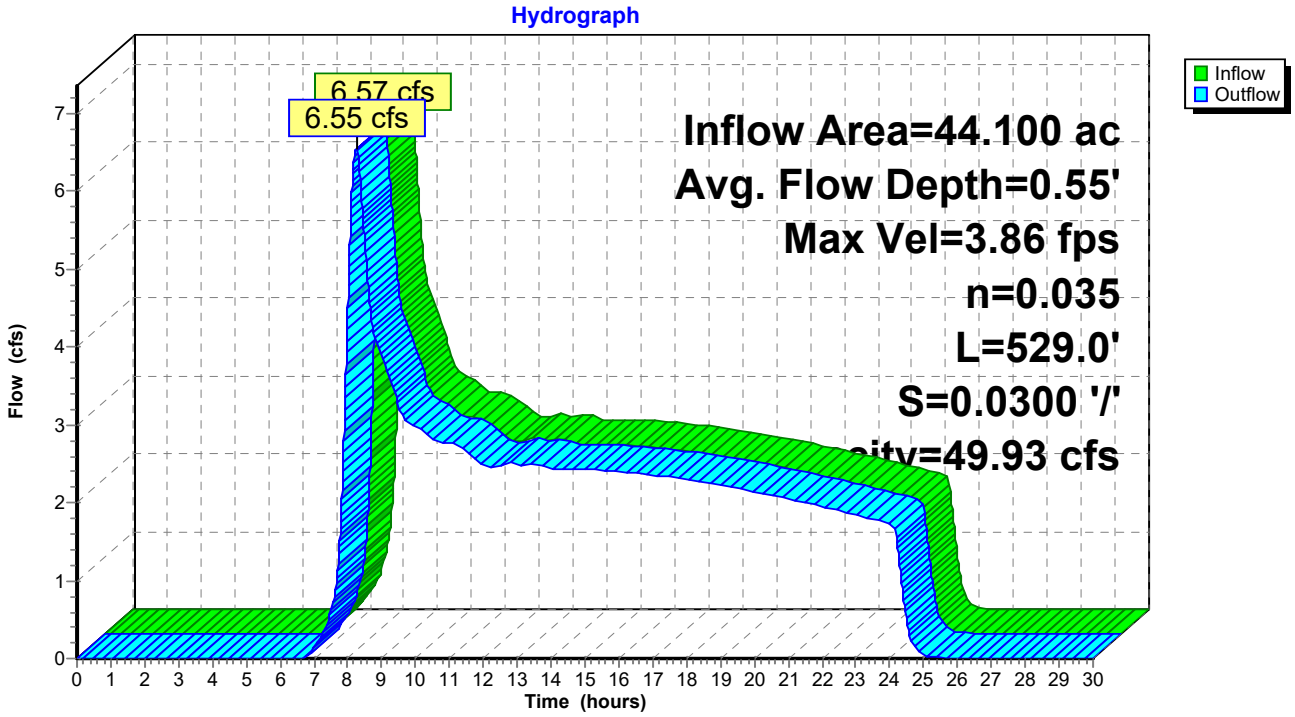
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.86 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 2.45 fps, Avg. Travel Time= 3.6 min

Peak Storage= 897 cf @ 8.21 hrs
Average Depth at Peak Storage= 0.55' , Surface Width= 4.19'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 49.93 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 529.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -15.87'



Reach R2C-3: Reach 2C-3



Summary for Reach R2D-1: Reach 2D-1

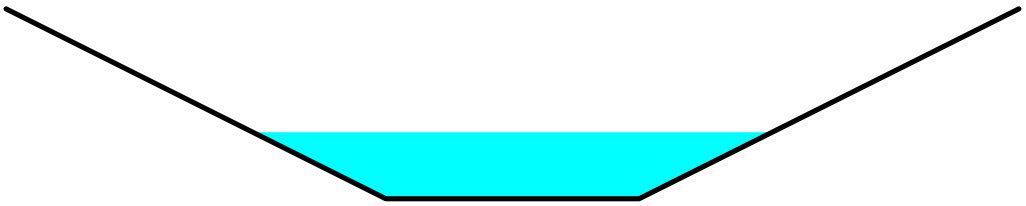
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 1.06" for 2-YR event
Inflow = 4.96 cfs @ 8.22 hrs, Volume= 2.411 af
Outflow = 4.95 cfs @ 8.23 hrs, Volume= 2.411 af, Atten= 0%, Lag= 0.6 min
Routed to Reach R2C-3 : Reach 2C-3

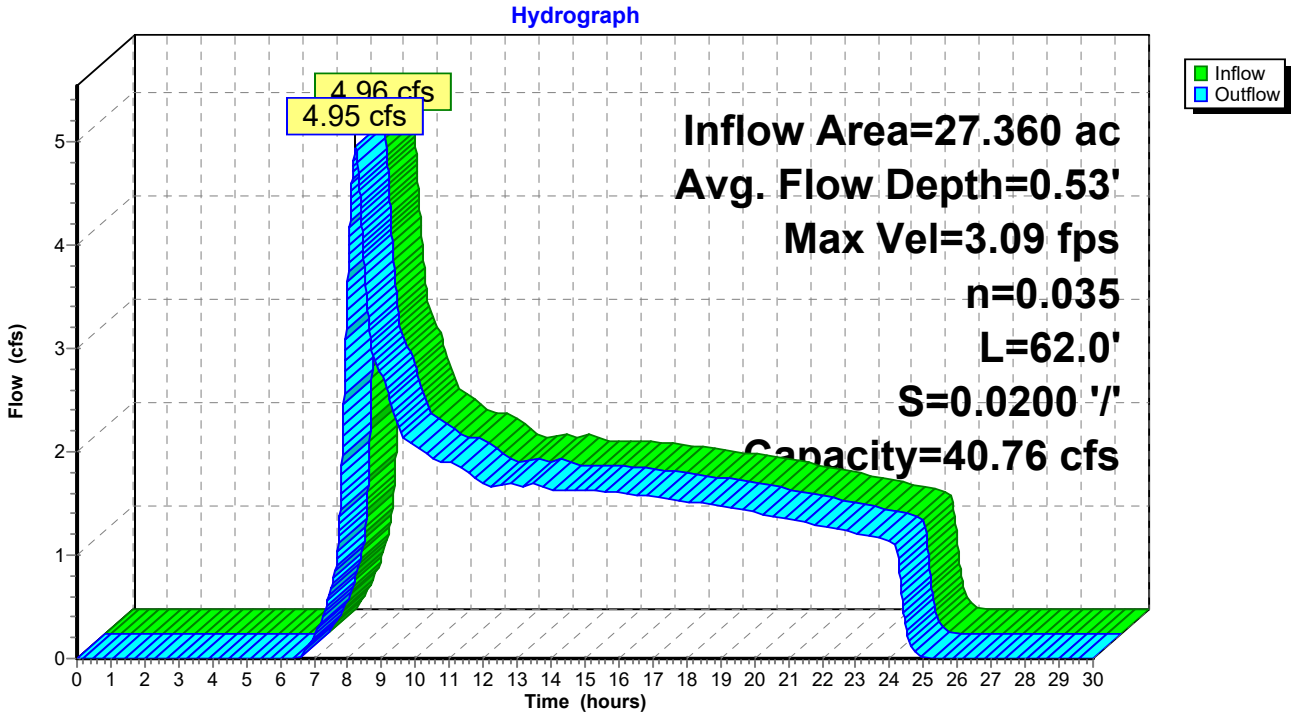
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.09 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 1.95 fps, Avg. Travel Time= 0.5 min

Peak Storage= 99 cf @ 8.22 hrs
Average Depth at Peak Storage= 0.53' , Surface Width= 4.10'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 40.76 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 62.0' Slope= 0.0200 '/'
Inlet Invert= 0.00', Outlet Invert= -1.24'



Reach R2D-1: Reach 2D-1



Summary for Reach R2D-2: Reach 2D-2

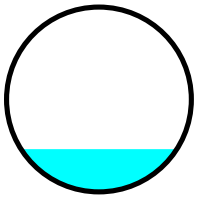
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 1.06" for 2-YR event
Inflow = 4.96 cfs @ 8.21 hrs, Volume= 2.411 af
Outflow = 4.96 cfs @ 8.22 hrs, Volume= 2.411 af, Atten= 0%, Lag= 0.3 min
Routed to Reach R2D-1 : Reach 2D-1

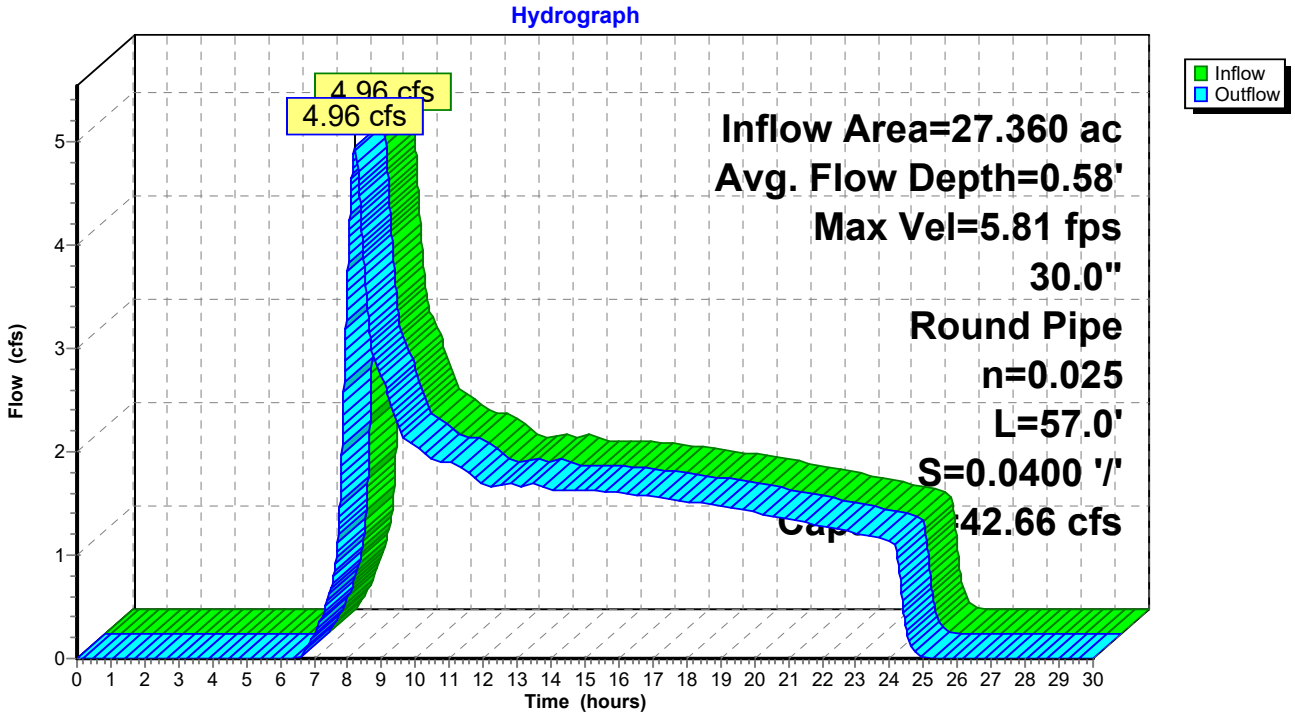
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.81 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.75 fps, Avg. Travel Time= 0.3 min

Peak Storage= 49 cf @ 8.21 hrs
Average Depth at Peak Storage= 0.58' , Surface Width= 2.10'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 42.66 cfs

30.0" Round Pipe
n= 0.025 Corrugated metal
Length= 57.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.28'



Reach R2D-2: Reach 2D-2



Summary for Reach R2D-3: Reach 2D-3

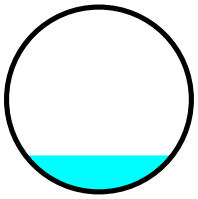
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 1.06" for 2-YR event
Inflow = 4.96 cfs @ 8.21 hrs, Volume= 2.411 af
Outflow = 4.96 cfs @ 8.21 hrs, Volume= 2.411 af, Atten= 0%, Lag= 0.1 min
Routed to Reach R2D-2 : Reach 2D-2

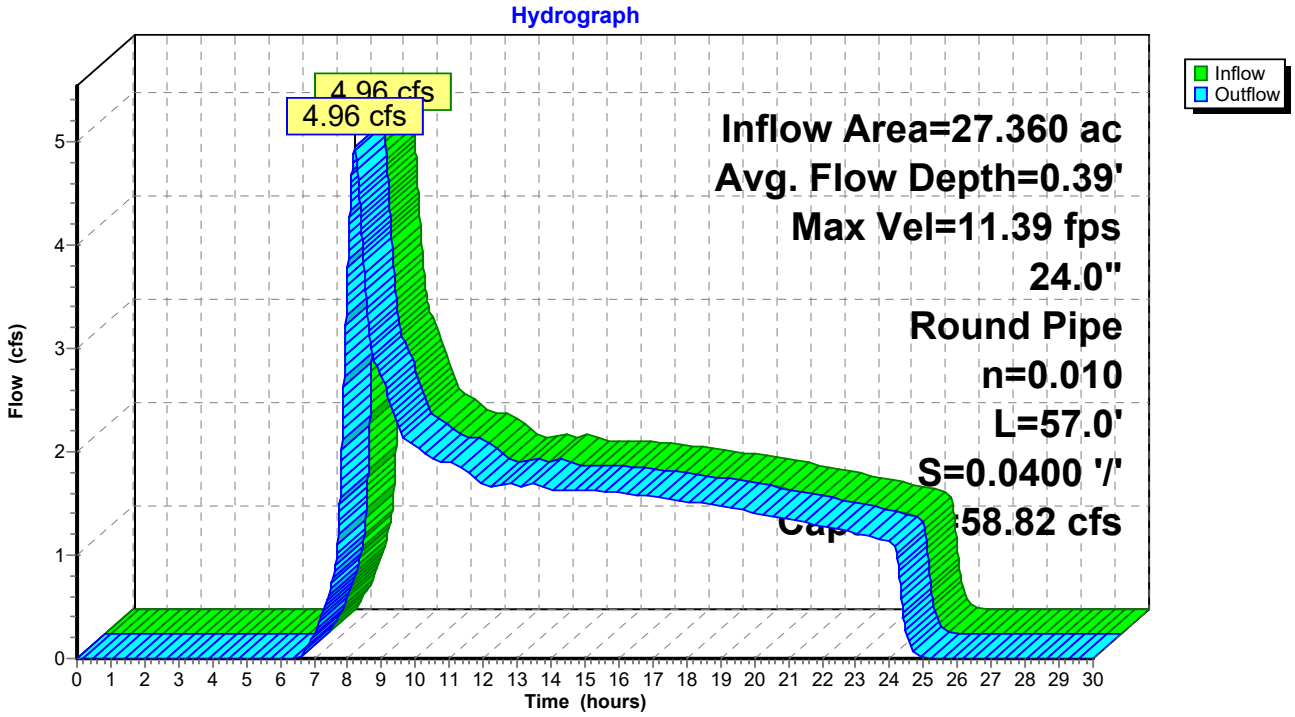
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 11.39 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 7.42 fps, Avg. Travel Time= 0.1 min

Peak Storage= 25 cf @ 8.21 hrs
Average Depth at Peak Storage= 0.39' , Surface Width= 1.59'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 58.82 cfs

24.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 57.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.28'



Reach R2D-3: Reach 2D-3



Summary for Reach R2D-4: Reach 2D-4

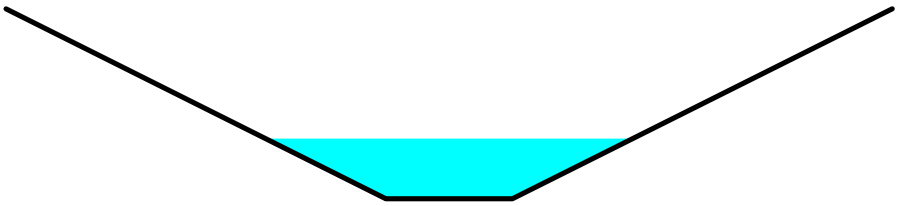
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 1.06" for 2-YR event
Inflow = 4.99 cfs @ 8.13 hrs, Volume= 2.411 af
Outflow = 4.96 cfs @ 8.21 hrs, Volume= 2.411 af, Atten= 1%, Lag= 4.5 min
Routed to Reach R2D-3 : Reach 2D-3

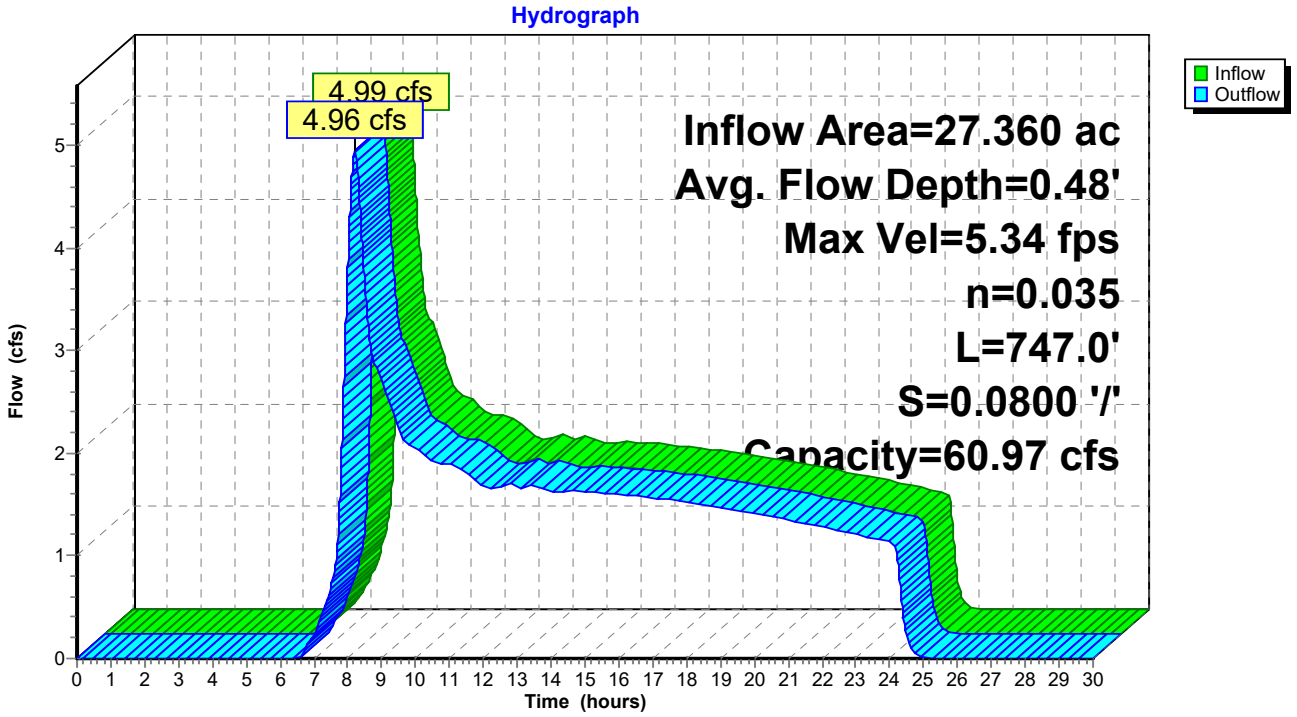
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.34 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 3.52 fps, Avg. Travel Time= 3.5 min

Peak Storage= 693 cf @ 8.17 hrs
Average Depth at Peak Storage= 0.48' , Surface Width= 2.90'
Bank-Full Depth= 1.50' Flow Area= 6.0 sf, Capacity= 60.97 cfs

1.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 747.0' Slope= 0.0800 '/'
Inlet Invert= 0.00', Outlet Invert= -59.76'



Reach R2D-4: Reach 2D-4



Summary for Pond 1P: Existing Reservoir

Inflow Area = 13.656 ac, 13.09% Impervious, Inflow Depth = 1.36" for 2-YR event
Inflow = 4.07 cfs @ 8.03 hrs, Volume= 1.547 af
Outflow = 0.66 cfs @ 23.48 hrs, Volume= 0.851 af, Atten= 84%, Lag= 927.0 min
Primary = 0.66 cfs @ 23.48 hrs, Volume= 0.851 af
Routed to Reach R2B-1 : Reach 2B-1

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Starting Elev= 99.00' Surf.Area= 2.150 ac Storage= 2.075 af
Peak Elev= 99.43' @ 23.48 hrs Surf.Area= 2.215 ac Storage= 3.014 af (0.939 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 397.8 min (1,227.3 - 829.6)

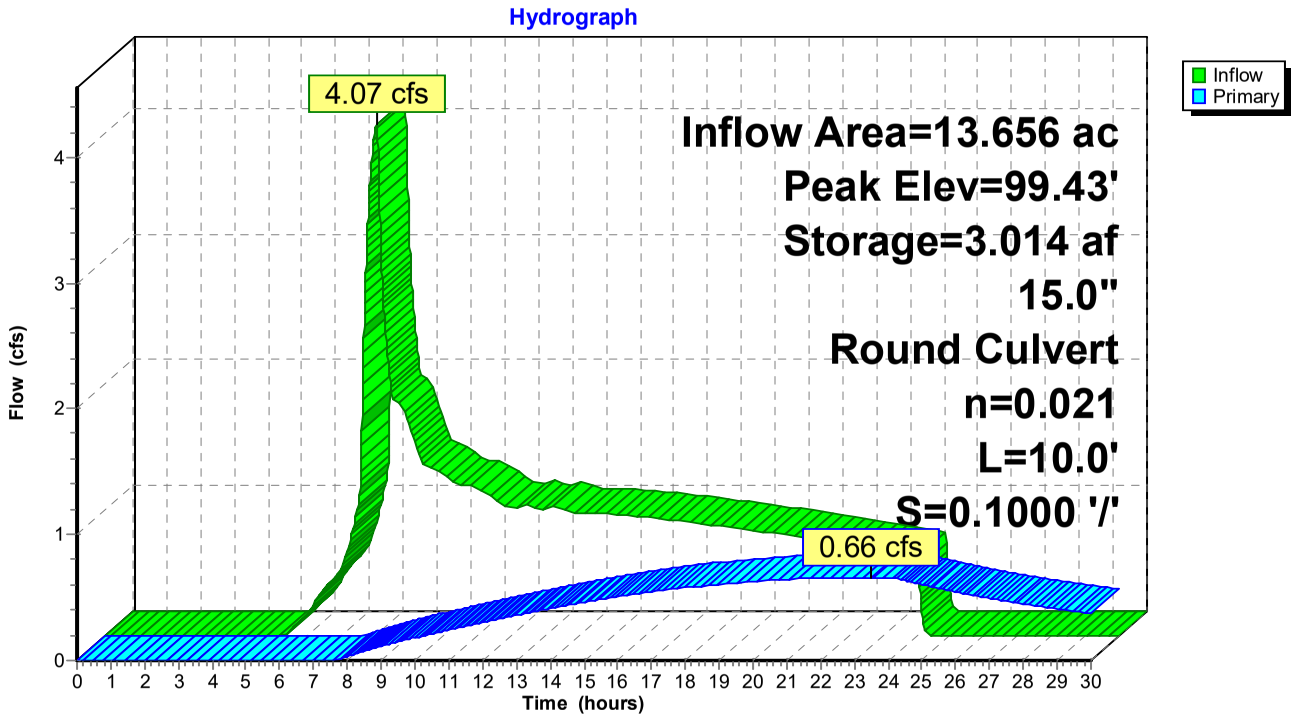
Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	4.300 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
98.00	2.000	0.000	0.000
100.00	2.300	4.300	4.300

Device	Routing	Invert	Outlet Devices
#1	Primary	99.00'	**15.0" Round Culvert** L= 10.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 99.00' / 98.00' S= 0.1000 '/' Cc= 0.900 n= 0.021 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=0.66 cfs @ 23.48 hrs HW=99.43' (Free Discharge)
1=Culvert (Inlet Controls 0.66 cfs @ 1.76 fps)

Pond 1P: Existing Reservoir

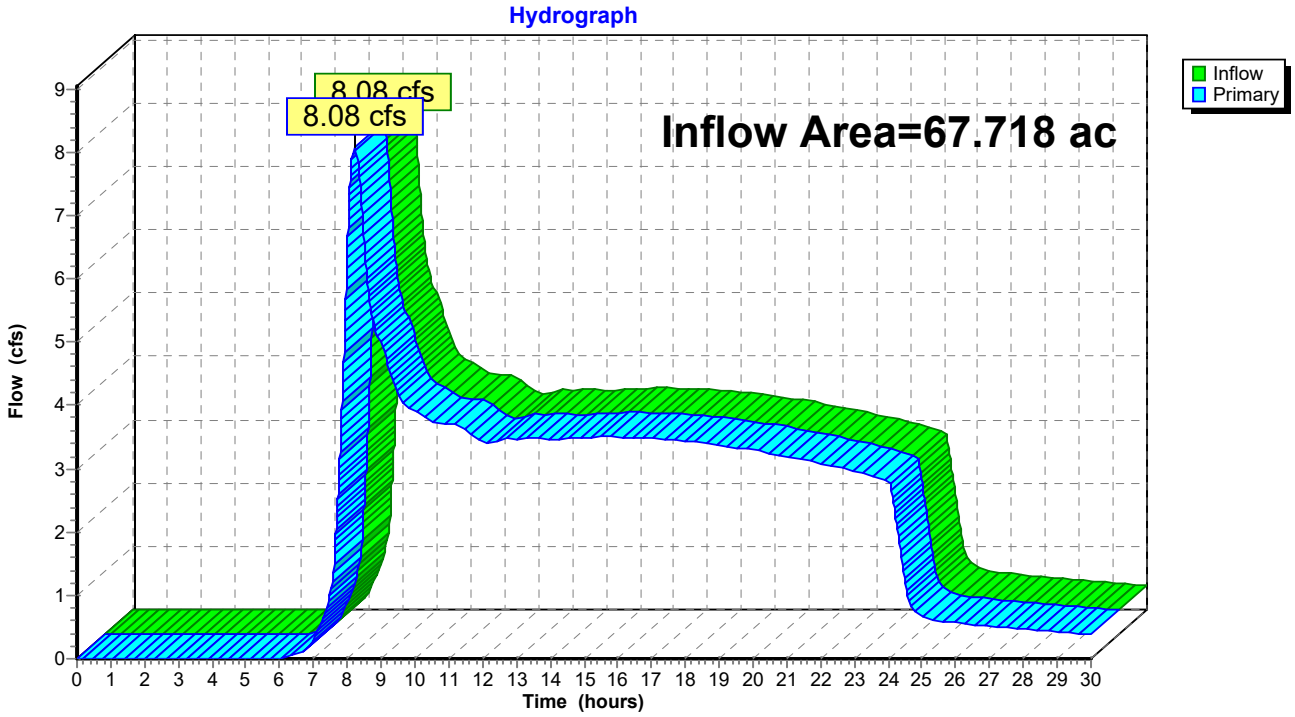


Summary for Link Outlet 2: Outlet 2

Inflow Area = 67.718 ac, 3.94% Impervious, Inflow Depth > 0.94" for 2-YR event
Inflow = 8.08 cfs @ 8.22 hrs, Volume= 5.285 af
Primary = 8.08 cfs @ 8.22 hrs, Volume= 5.285 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Outlet 2: Outlet 2



Summary for Subcatchment WS-2A: Subcat WS-2A

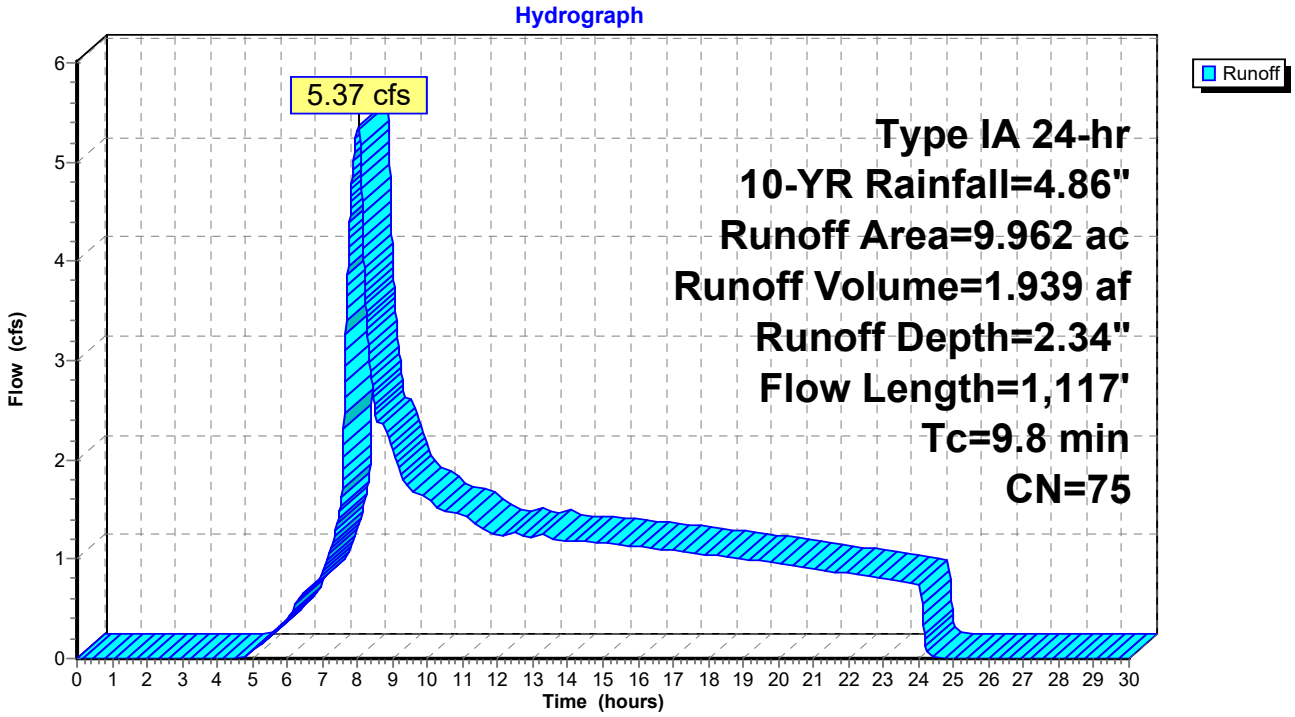
Runoff = 5.37 cfs @ 8.02 hrs, Volume= 1.939 af, Depth= 2.34"
Routed to Link Outlet 2 : Outlet 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-YR Rainfall=4.86"

Area (ac)	CN	Description
0.831	69	Annual Grass, Fair, HSG B
2.406	79	Annual Grass, Fair, HSG C
0.000	87	Dirt roads, HSG C
0.124	82	Farmsteads, HSG C
0.026	89	Paved roads w/open ditches, 50% imp, HSG B
0.158	92	Paved roads w/open ditches, 50% imp, HSG C
0.018	61	Vineyard, Good, HSG B
2.274	75	Vineyard, Good, HSG C
0.230	60	Woods, Fair, HSG B
3.896	73	Woods, Fair, HSG C
9.962	75	Weighted Average
9.870		99.08% Pervious Area
0.092		0.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	100	0.2600	0.33		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
2.8	493	0.1700	2.89		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.6	409	0.0200	4.36	17.43	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.2	64	0.0200	6.14	30.16	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025
0.1	51	0.0600	7.55	30.18	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
9.8	1,117	Total			

Subcatchment WS-2A: Subcat WS-2A



Summary for Subcatchment WS-2B: Subcat WS-2B

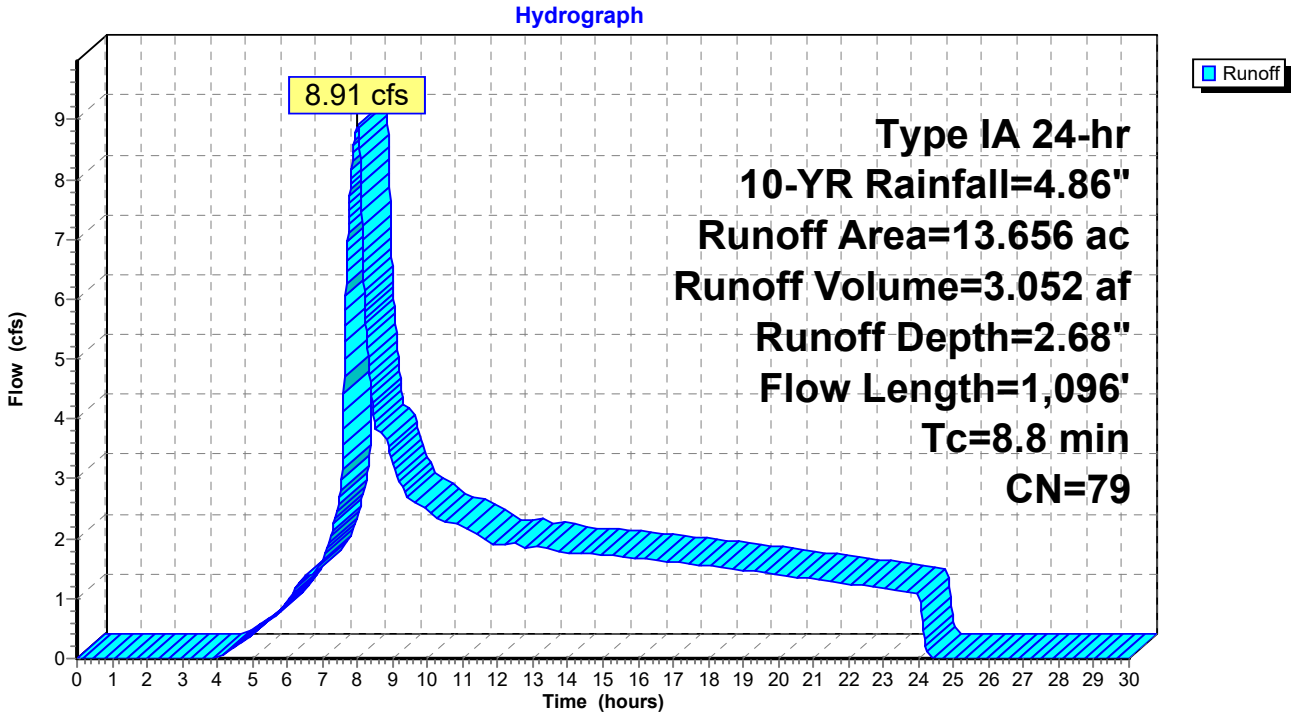
Runoff = 8.91 cfs @ 8.01 hrs, Volume= 3.052 af, Depth= 2.68"
Routed to Pond 1P : Existing Reservoir

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-YR Rainfall=4.86"

Area (ac)	CN	Description
0.661	69	Annual Grass, Fair, HSG B
1.698	79	Annual Grass, Fair, HSG C
0.195	84	Annual Grass, Fair, HSG D
0.668	82	Farmsteads, HSG C
0.149	89	Gravel Roads, HSG C
0.001	92	Paved roads w/open ditches, 50% imp, HSG C
2.792	79	Vineyard, Fair, HSG C
0.032	98	Water Surface, HSG B
0.000	98	Water Surface, HSG C
1.754	98	Water Surface, HSG D
0.050	60	Woods, Fair, HSG B
5.654	73	Woods, Fair, HSG C
0.001	79	Woods, Fair, HSG D
13.656	79	Weighted Average
11.869		86.91% Pervious Area
1.787		13.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.2500	0.32		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
3.1	564	0.1900	3.05		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.5	432	0.2300	14.77	59.09	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
8.8	1,096	Total			

Subcatchment WS-2B: Subcat WS-2B



Summary for Subcatchment WS-2C: Subcat WS-2C

Runoff = 6.38 cfs @ 8.06 hrs, Volume= 2.589 af, Depth= 1.86"
Routed to Reach R2C-3 : Reach 2C-3

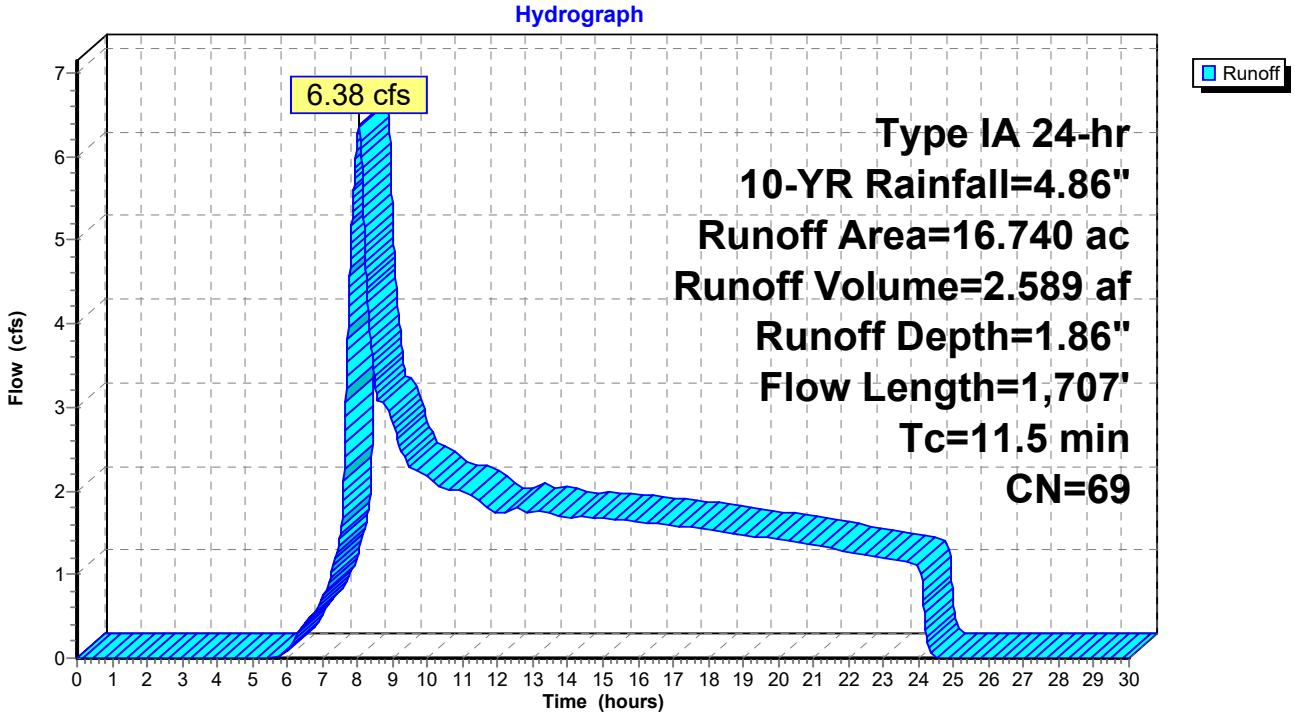
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-YR Rainfall=4.86"

	Area (ac)	CN	Description
*	0.000	0	, HSG B
	0.959	69	Annual Grass, Fair, HSG B
	0.796	79	Annual Grass, Fair, HSG C
	0.115	65	Brush, Good, HSG C
	0.006	82	Dirt roads, HSG B
	0.199	74	Farmsteads, HSG B
	0.905	82	Farmsteads, HSG C
	0.036	85	Gravel Roads, HSG B
	0.180	89	Gravel Roads, HSG C
	0.247	89	Paved roads w/open ditches, 50% imp, HSG B
	0.138	92	Paved roads w/open ditches, 50% imp, HSG C
	0.090	69	Vineyard, Fair, HSG B
	0.695	79	Vineyard, Fair, HSG C
	3.478	61	Vineyard, Good, HSG B
	2.125	75	Vineyard, Good, HSG C
	3.716	60	Woods, Fair, HSG B
	3.053	73	Woods, Fair, HSG C
	16.740	69	Weighted Average
	16.547		98.85% Pervious Area
	0.193		1.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.1800	0.28		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
1.3	296	0.2800	3.70		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.6	266	0.3200	2.83		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.9	543	0.1100	10.22	40.87	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.8	90	0.0800	1.98		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.6	236	0.0500	6.36	19.08	**Trap/Vee/Rect Channel Flow, Pasture Ditch** Bot.W=1.00' D=1.00' Z= 2.0 '/' Top.W=5.00' n= 0.035
0.1	57	0.0400	18.72	58.82	**Pipe Channel, 24" PVC Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.010 PVC, smooth interior
0.1	57	0.0400	8.69	42.66	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025

0.2	62	0.0200	4.36	17.43	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
11.5	1,707	Total			

Subcatchment WS-2C: Subcat WS-2C



Summary for Subcatchment WS-2D: Subcat WS-2D

Runoff = 13.11 cfs @ 8.12 hrs, Volume= 5.137 af, Depth= 2.25"
Routed to Reach R2D-4 : Reach 2D-4

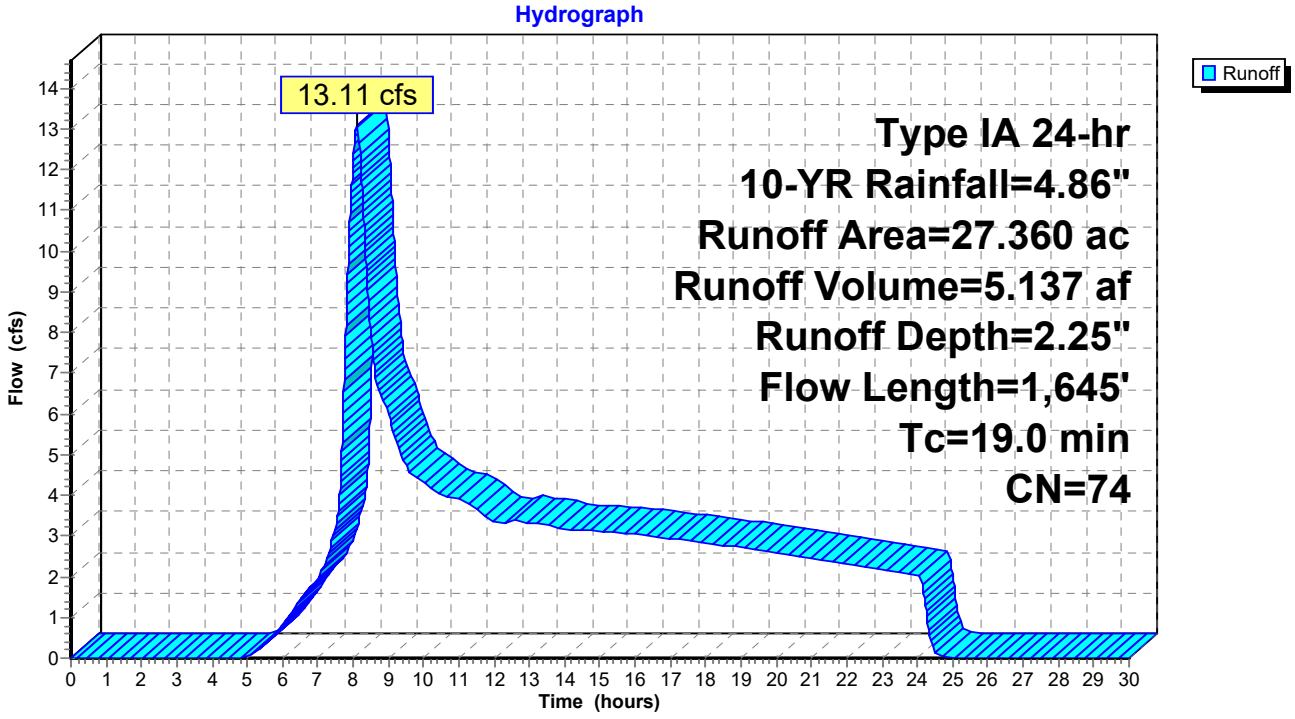
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-YR Rainfall=4.86"

	Area (ac)	CN	Description
*	0.000	0	, HSG C
	0.031	69	Annual Grass, Fair, HSG B
	1.714	79	Annual Grass, Fair, HSG C
	0.420	75	Annual Grass, Good, HSG C
	0.320	82	Farmsteads, HSG C
	0.141	89	Gravel Roads, HSG C
	0.020	89	Paved roads w/open ditches, 50% imp, HSG B
	1.171	92	Paved roads w/open ditches, 50% imp, HSG C
	0.046	61	Vineyard, Good, HSG B
	6.048	75	Vineyard, Good, HSG C
	0.455	60	Woods, Fair, HSG B
	14.511	73	Woods, Fair, HSG C
	2.483	70	Woods, Good, HSG C
	27.360	74	Weighted Average
	26.764		97.82% Pervious Area
	0.596		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.1200	0.16		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.3	41	0.2500	2.50		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.5	267	0.1100	8.23	16.47	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=0.00' D=1.00' Z= 2.0 '/' Top.W=4.00' n= 0.035
0.1	104	0.3400	34.39	27.01	**Pipe Channel, 12" DW Pipe** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PPI Dual Walled CPP
6.6	100	0.3800	0.25		**Sheet Flow, Sheet - Post Pipe Level Spreader** Woods: Light underbrush n= 0.400 P2= 3.23"
0.1	58	0.2500	15.40	61.61	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.1	135	0.3800	23.08	72.52	**Pipe Channel, 24" CMP Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025
0.6	525	0.2000	13.78	55.11	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.0	42	0.2100	19.91	97.74	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025

0.3	273	0.1800	13.07	52.28	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
19.0	1,645	Total			

Subcatchment WS-2D: Subcat WS-2D



Summary for Reach R2B-1: Reach 2B-1

[65] Warning: Inlet elevation not specified

Inflow Area = 13.656 ac, 13.09% Impervious, Inflow Depth > 1.85" for 10-YR event
Inflow = 1.46 cfs @ 19.27 hrs, Volume= 2.111 af
Outflow = 1.46 cfs @ 19.51 hrs, Volume= 2.093 af, Atten= 0%, Lag= 14.4 min
Routed to Link Outlet 2 : Outlet 2

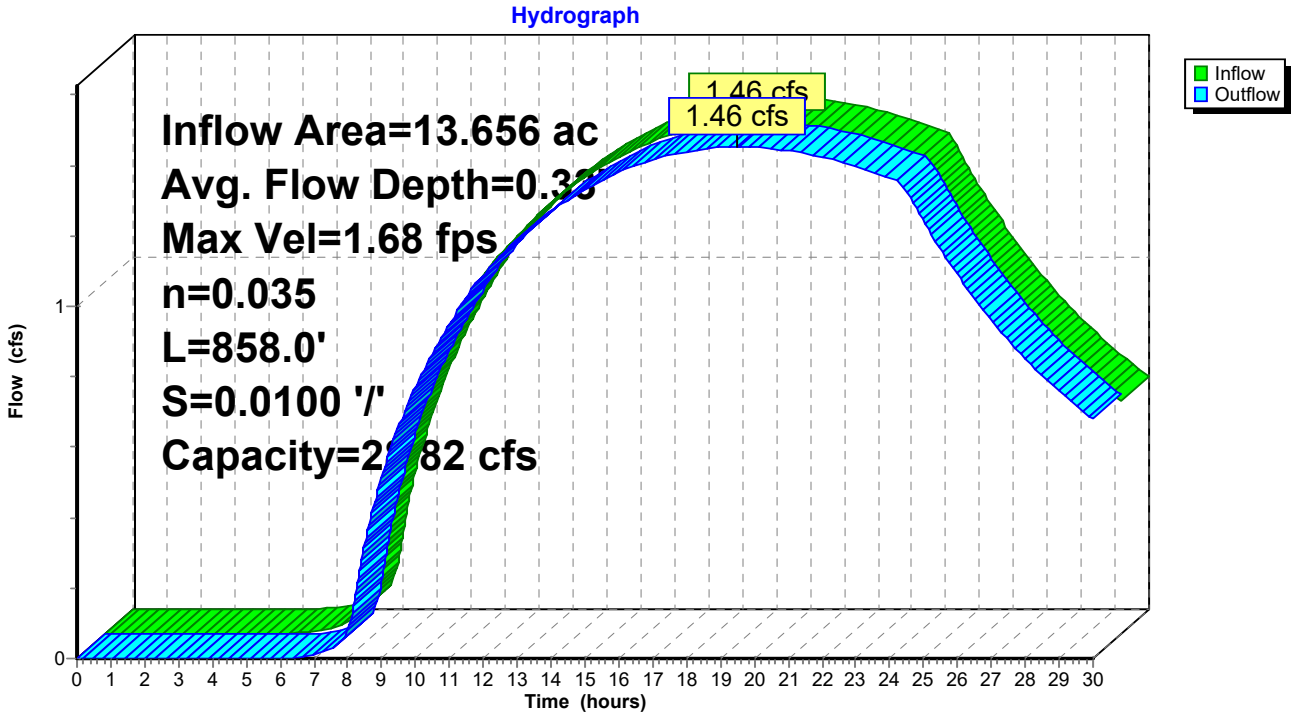
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.68 fps, Min. Travel Time= 8.5 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 10.3 min

Peak Storage= 741 cf @ 19.37 hrs
Average Depth at Peak Storage= 0.33' , Surface Width= 3.30'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 28.82 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 858.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -8.58'



Reach R2B-1: Reach 2B-1



Summary for Reach R2C-1: Reach 2C-1

[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 2.10" for 10-YR event
Inflow = 18.74 cfs @ 8.16 hrs, Volume= 7.726 af
Outflow = 18.74 cfs @ 8.17 hrs, Volume= 7.726 af, Atten= 0%, Lag= 0.2 min
Routed to Link Outlet 2 : Outlet 2

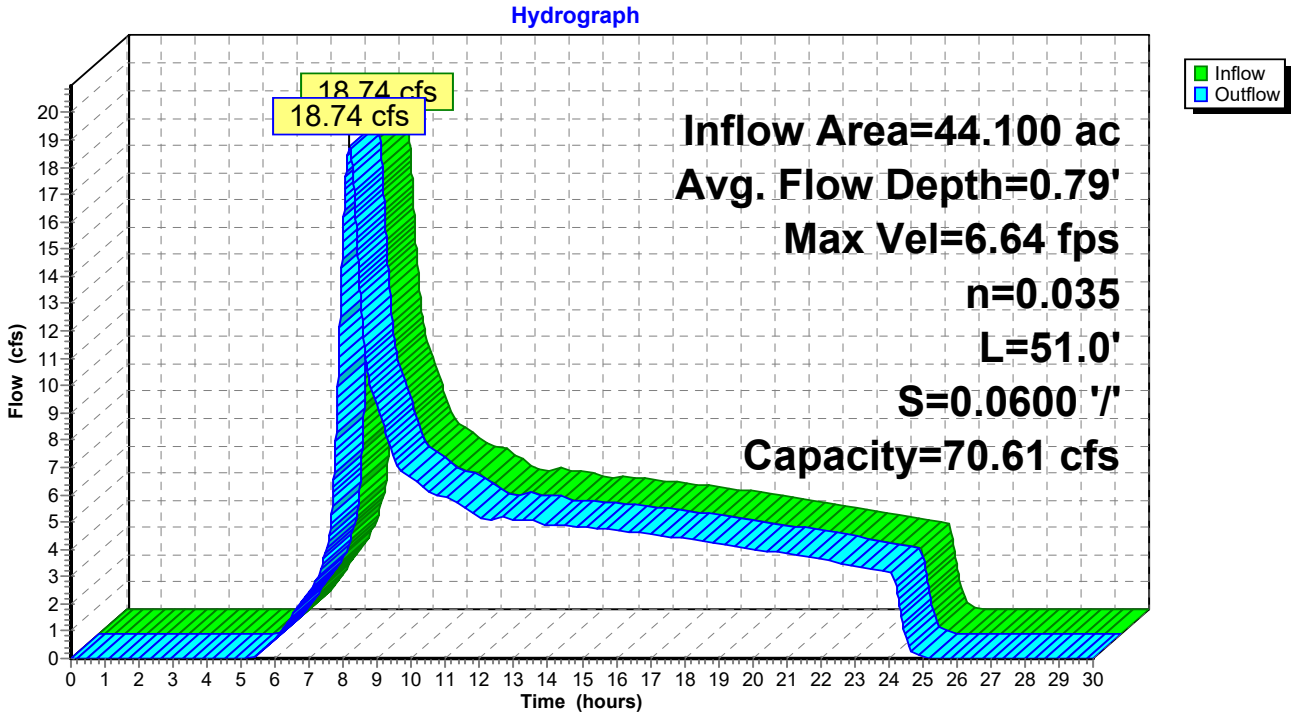
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.64 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 3.84 fps, Avg. Travel Time= 0.2 min

Peak Storage= 144 cf @ 8.17 hrs
Average Depth at Peak Storage= 0.79' , Surface Width= 5.15'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 70.61 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 51.0' Slope= 0.0600 '/'
Inlet Invert= 0.00', Outlet Invert= -3.06'



Reach R2C-1: Reach 2C-1



Summary for Reach R2C-2: Reach 2C-2

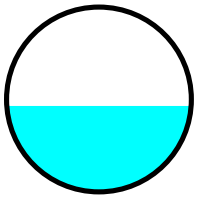
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 2.10" for 10-YR event
Inflow = 18.74 cfs @ 8.16 hrs, Volume= 7.726 af
Outflow = 18.74 cfs @ 8.16 hrs, Volume= 7.726 af, Atten= 0%, Lag= 0.2 min
Routed to Reach R2C-1 : Reach 2C-1

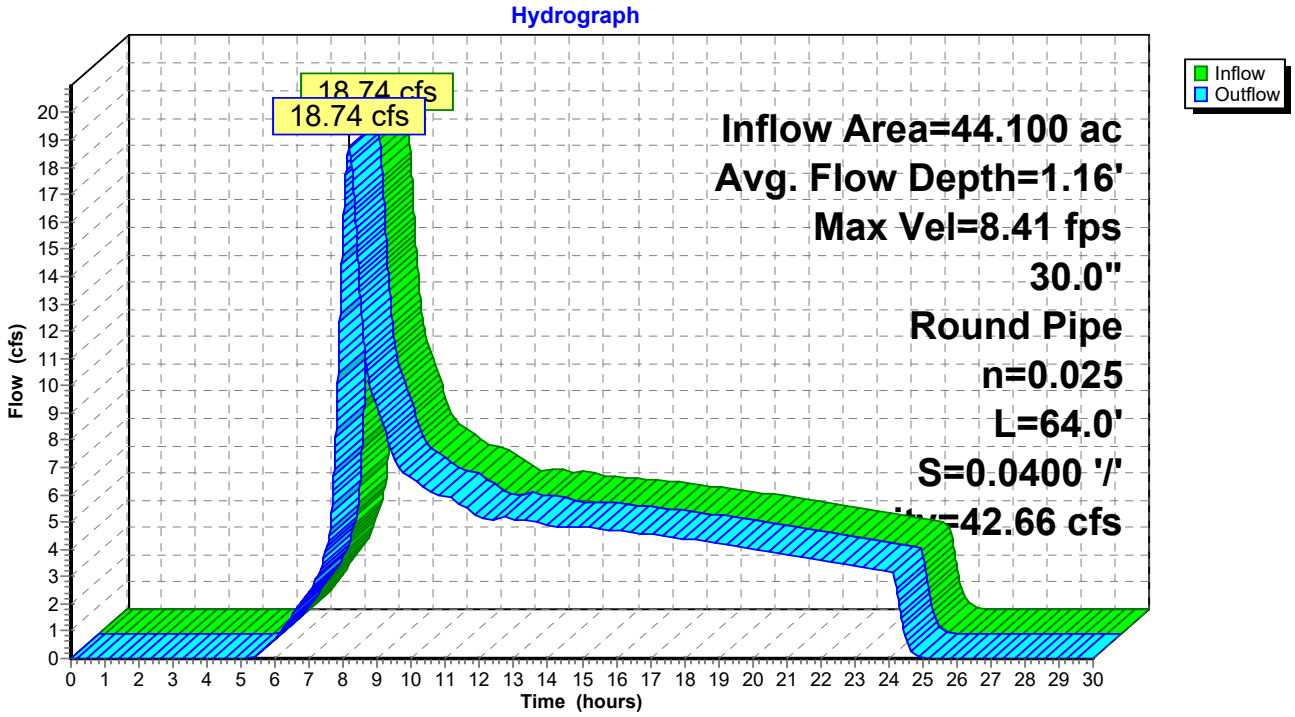
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.41 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.94 fps, Avg. Travel Time= 0.2 min

Peak Storage= 143 cf @ 8.16 hrs
Average Depth at Peak Storage= 1.16' , Surface Width= 2.49'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 42.66 cfs

30.0" Round Pipe
n= 0.025 Corrugated metal
Length= 64.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.56'



Reach R2C-2: Reach 2C-2



Summary for Reach R2C-3: Reach 2C-3

[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 2.10" for 10-YR event
Inflow = 18.80 cfs @ 8.11 hrs, Volume= 7.726 af
Outflow = 18.74 cfs @ 8.16 hrs, Volume= 7.726 af, Atten= 0%, Lag= 3.0 min
Routed to Reach R2C-2 : Reach 2C-2

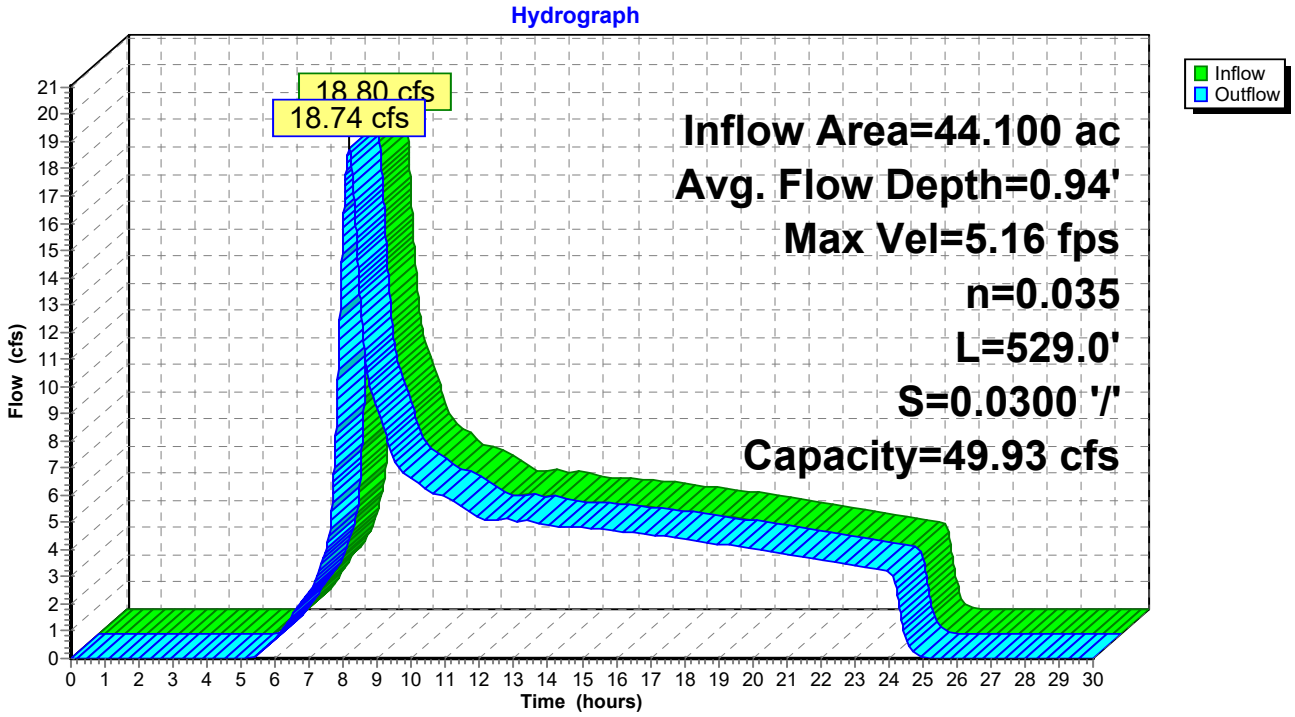
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.16 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 2.99 fps, Avg. Travel Time= 2.9 min

Peak Storage= 1,924 cf @ 8.13 hrs
Average Depth at Peak Storage= 0.94' , Surface Width= 5.75'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 49.93 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 529.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -15.87'



Reach R2C-3: Reach 2C-3



Summary for Reach R2D-1: Reach 2D-1

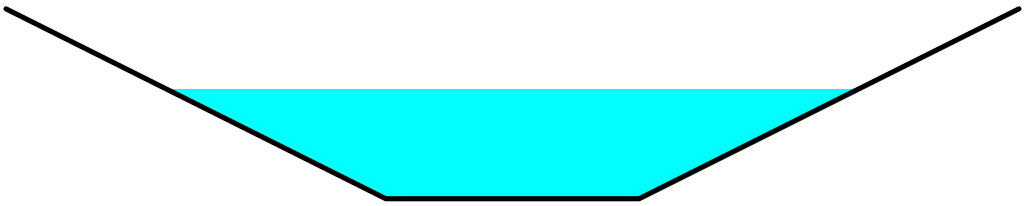
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 2.25" for 10-YR event
Inflow = 13.07 cfs @ 8.17 hrs, Volume= 5.137 af
Outflow = 13.06 cfs @ 8.18 hrs, Volume= 5.137 af, Atten= 0%, Lag= 0.4 min
Routed to Reach R2C-3 : Reach 2C-3

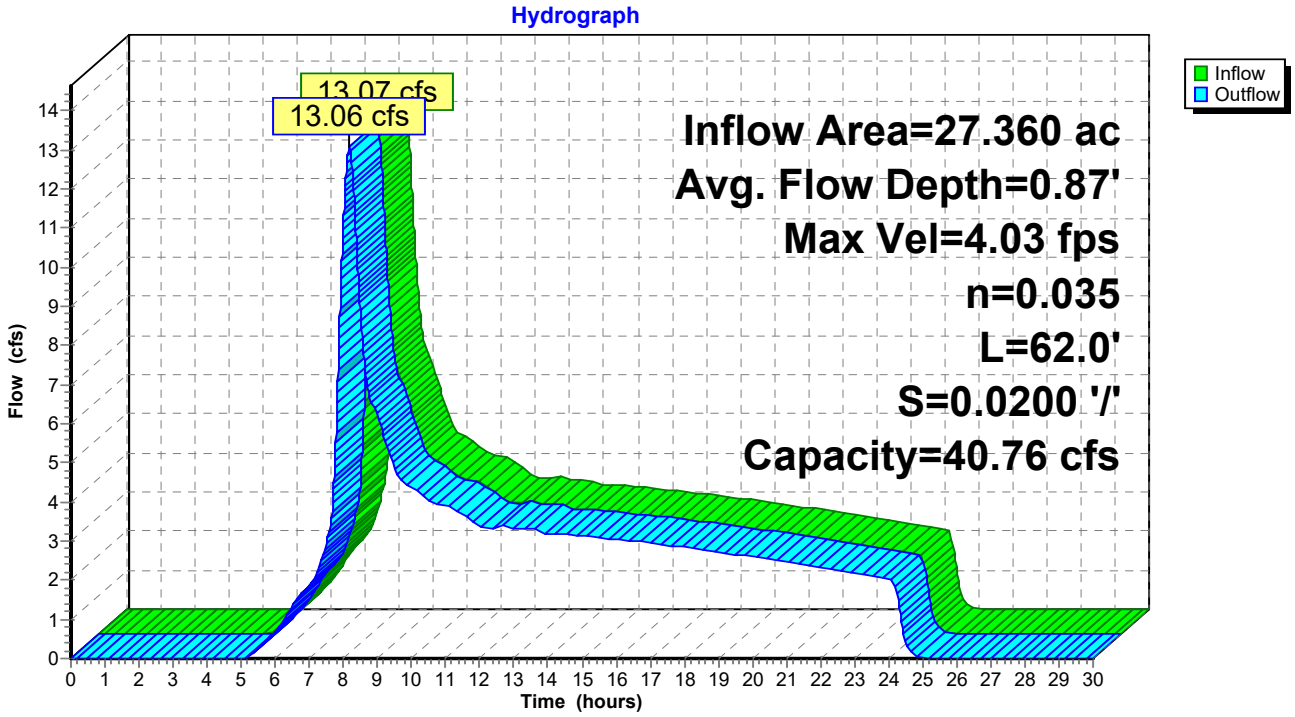
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.03 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.37 fps, Avg. Travel Time= 0.4 min

Peak Storage= 201 cf @ 8.17 hrs
Average Depth at Peak Storage= 0.87' , Surface Width= 5.47'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 40.76 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 62.0' Slope= 0.0200 '/'
Inlet Invert= 0.00', Outlet Invert= -1.24'



Reach R2D-1: Reach 2D-1



Summary for Reach R2D-2: Reach 2D-2

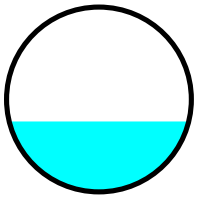
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 2.25" for 10-YR event
Inflow = 13.07 cfs @ 8.17 hrs, Volume= 5.137 af
Outflow = 13.07 cfs @ 8.17 hrs, Volume= 5.137 af, Atten= 0%, Lag= 0.2 min
Routed to Reach R2D-1 : Reach 2D-1

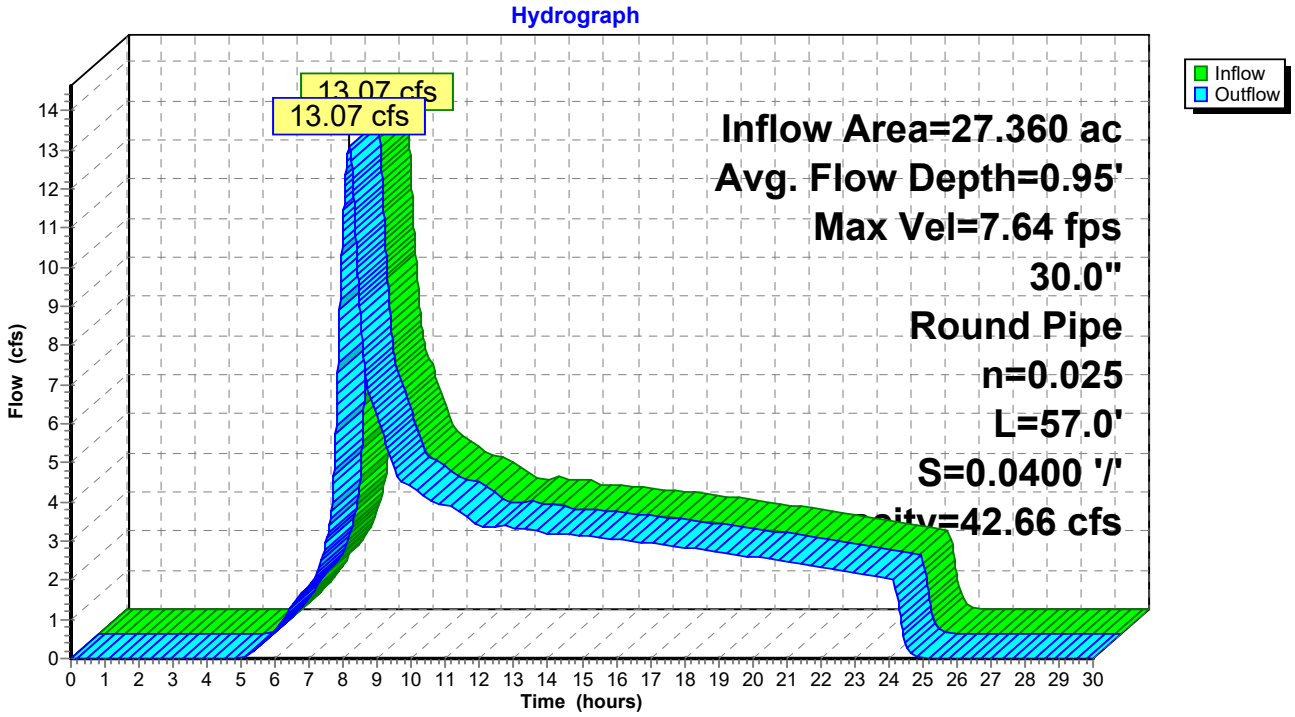
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.64 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.52 fps, Avg. Travel Time= 0.2 min

Peak Storage= 97 cf @ 8.17 hrs
Average Depth at Peak Storage= 0.95' , Surface Width= 2.43'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 42.66 cfs

30.0" Round Pipe
n= 0.025 Corrugated metal
Length= 57.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.28'



Reach R2D-2: Reach 2D-2



Summary for Reach R2D-3: Reach 2D-3

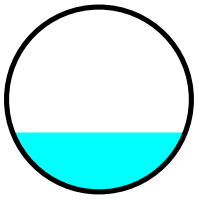
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 2.25" for 10-YR event
Inflow = 13.07 cfs @ 8.17 hrs, Volume= 5.137 af
Outflow = 13.07 cfs @ 8.17 hrs, Volume= 5.137 af, Atten= 0%, Lag= 0.1 min
Routed to Reach R2D-2 : Reach 2D-2

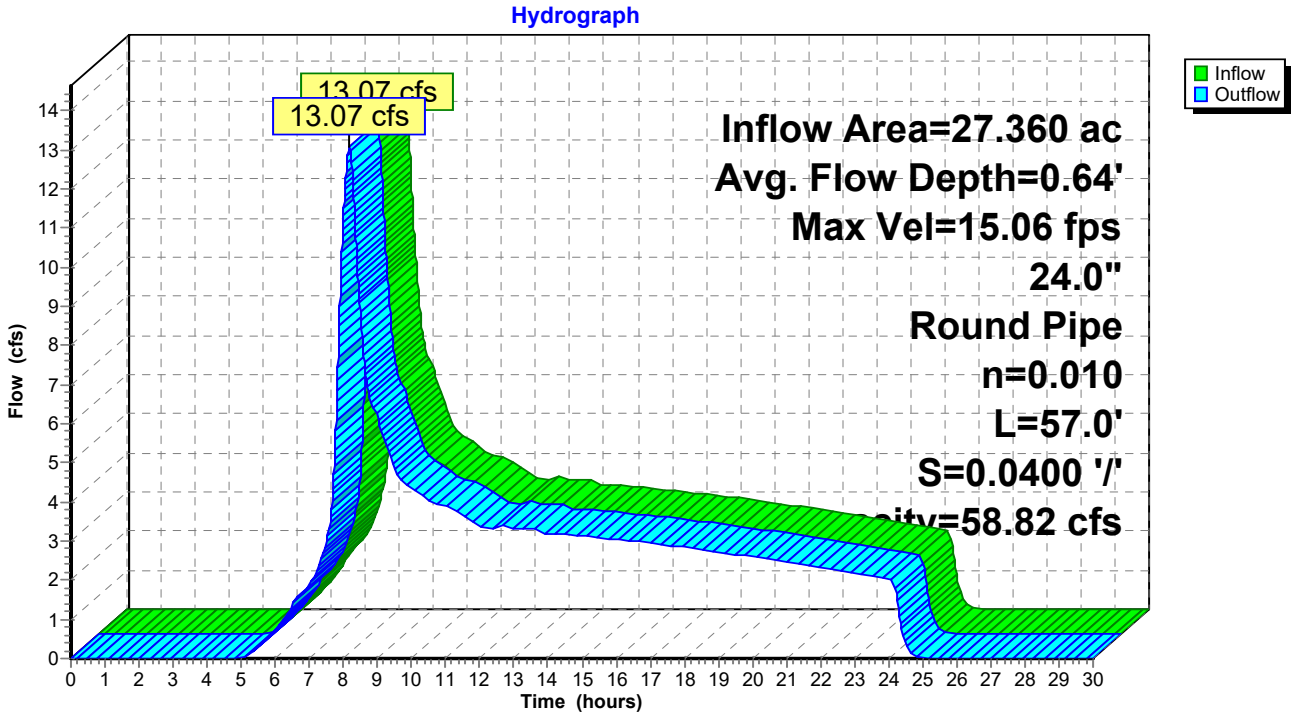
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 15.06 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 8.96 fps, Avg. Travel Time= 0.1 min

Peak Storage= 49 cf @ 8.17 hrs
Average Depth at Peak Storage= 0.64' , Surface Width= 1.87'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 58.82 cfs

24.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 57.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.28'



Reach R2D-3: Reach 2D-3



Summary for Reach R2D-4: Reach 2D-4

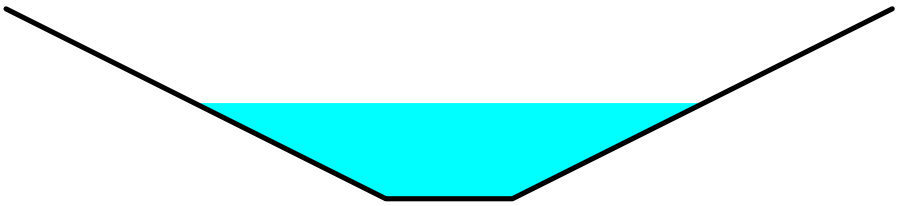
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 2.25" for 10-YR event
Inflow = 13.11 cfs @ 8.12 hrs, Volume= 5.137 af
Outflow = 13.07 cfs @ 8.17 hrs, Volume= 5.137 af, Atten= 0%, Lag= 2.8 min
Routed to Reach R2D-3 : Reach 2D-3

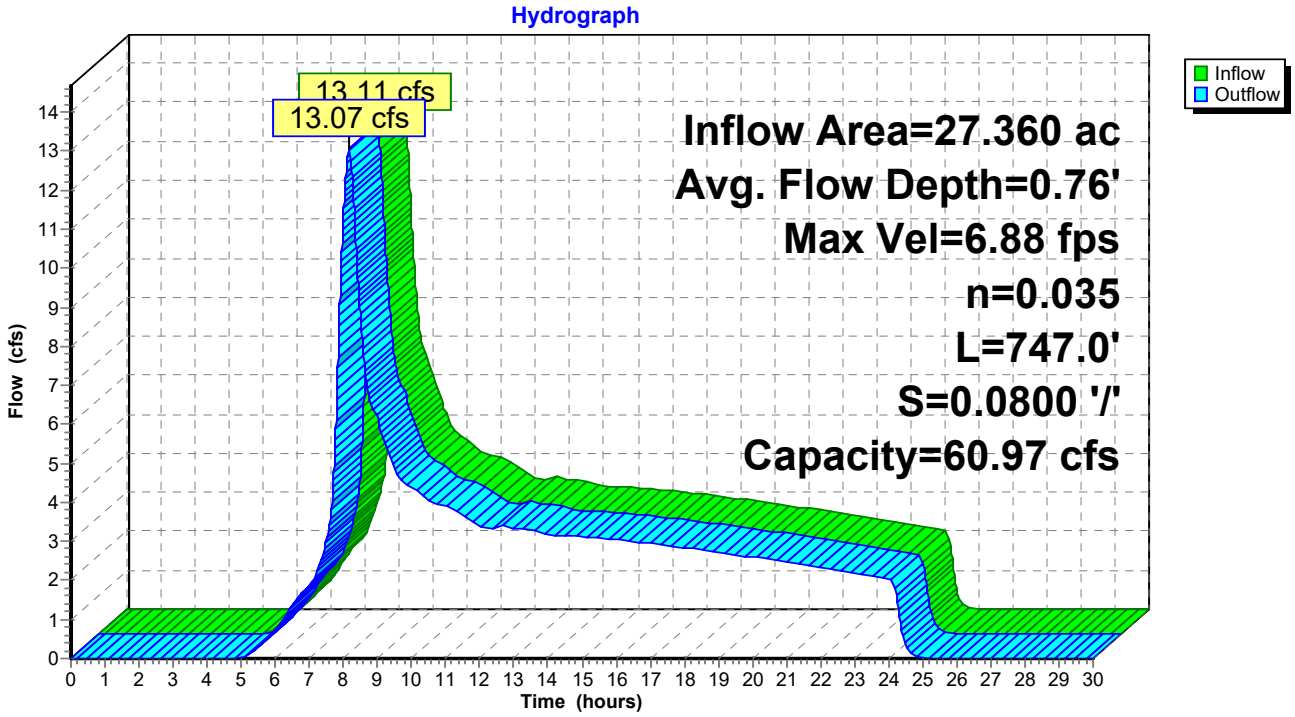
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.88 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 4.20 fps, Avg. Travel Time= 3.0 min

Peak Storage= 1,419 cf @ 8.14 hrs
Average Depth at Peak Storage= 0.76' , Surface Width= 4.02'
Bank-Full Depth= 1.50' Flow Area= 6.0 sf, Capacity= 60.97 cfs

1.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 747.0' Slope= 0.0800 '/'
Inlet Invert= 0.00', Outlet Invert= -59.76'



Reach R2D-4: Reach 2D-4



Summary for Pond 1P: Existing Reservoir

Inflow Area = 13.656 ac, 13.09% Impervious, Inflow Depth = 2.68" for 10-YR event
Inflow = 8.91 cfs @ 8.01 hrs, Volume= 3.052 af
Outflow = 1.46 cfs @ 19.27 hrs, Volume= 2.111 af, Atten= 84%, Lag= 675.6 min
Primary = 1.46 cfs @ 19.27 hrs, Volume= 2.111 af
Routed to Reach R2B-1 : Reach 2B-1

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Starting Elev= 99.00' Surf.Area= 2.150 ac Storage= 2.075 af
Peak Elev= 99.67' @ 19.27 hrs Surf.Area= 2.250 ac Storage= 3.539 af (1.464 af above start)

Plug-Flow detention time= 1,481.6 min calculated for 0.036 af (1% of inflow)
Center-of-Mass det. time= 357.1 min (1,144.6 - 787.5)

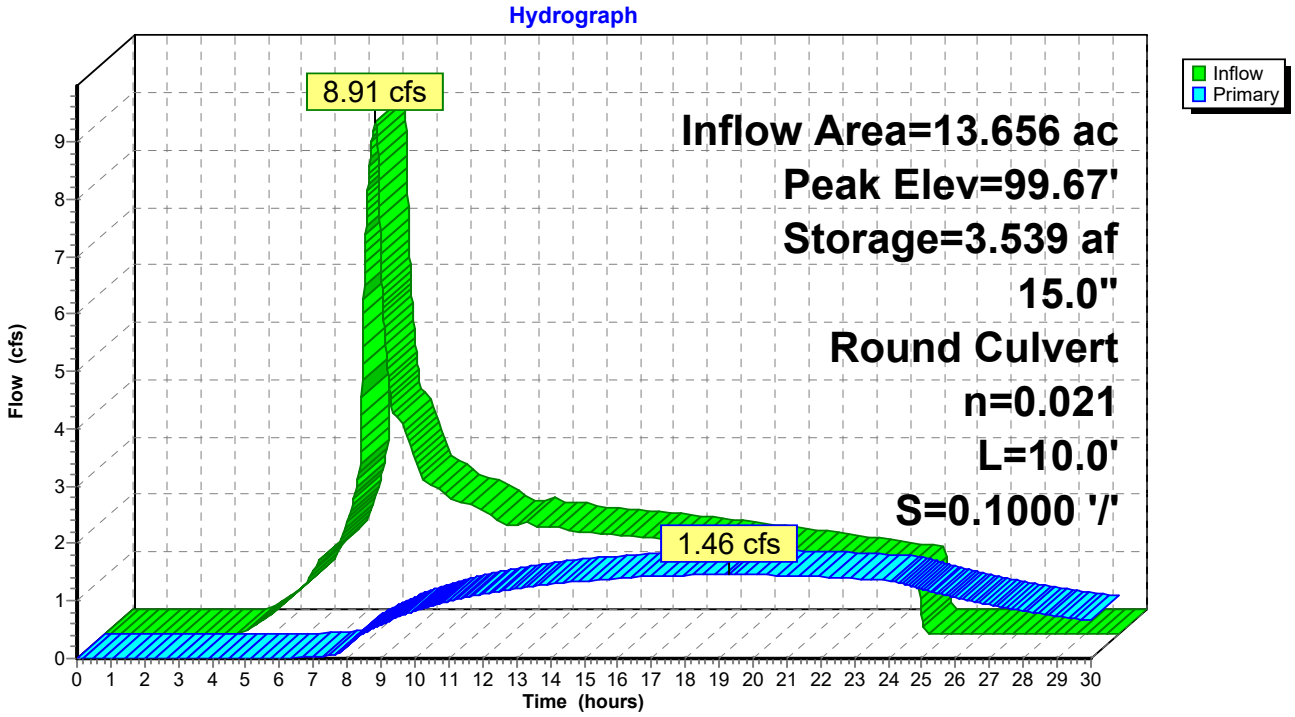
Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	4.300 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
98.00	2.000	0.000	0.000
100.00	2.300	4.300	4.300

Device	Routing	Invert	Outlet Devices
#1	Primary	99.00'	**15.0" Round Culvert** L= 10.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 99.00' / 98.00' S= 0.1000 '/' Cc= 0.900 n= 0.021 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=1.46 cfs @ 19.27 hrs HW=99.67' (Free Discharge)
1=Culvert (Inlet Controls 1.46 cfs @ 2.19 fps)

Pond 1P: Existing Reservoir

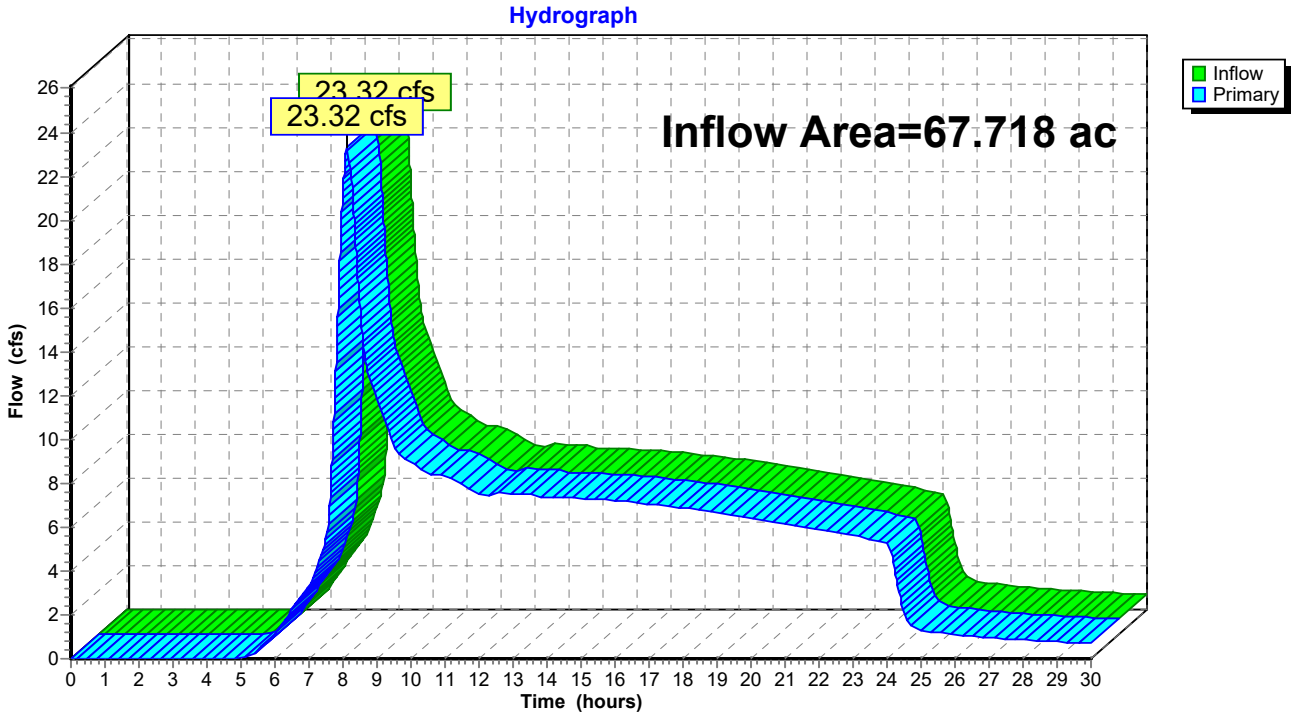


Summary for Link Outlet 2: Outlet 2

Inflow Area = 67.718 ac, 3.94% Impervious, Inflow Depth > 2.08" for 10-YR event
Inflow = 23.32 cfs @ 8.12 hrs, Volume= 11.759 af
Primary = 23.32 cfs @ 8.12 hrs, Volume= 11.759 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Outlet 2: Outlet 2



Summary for Subcatchment WS-2A: Subcat WS-2A

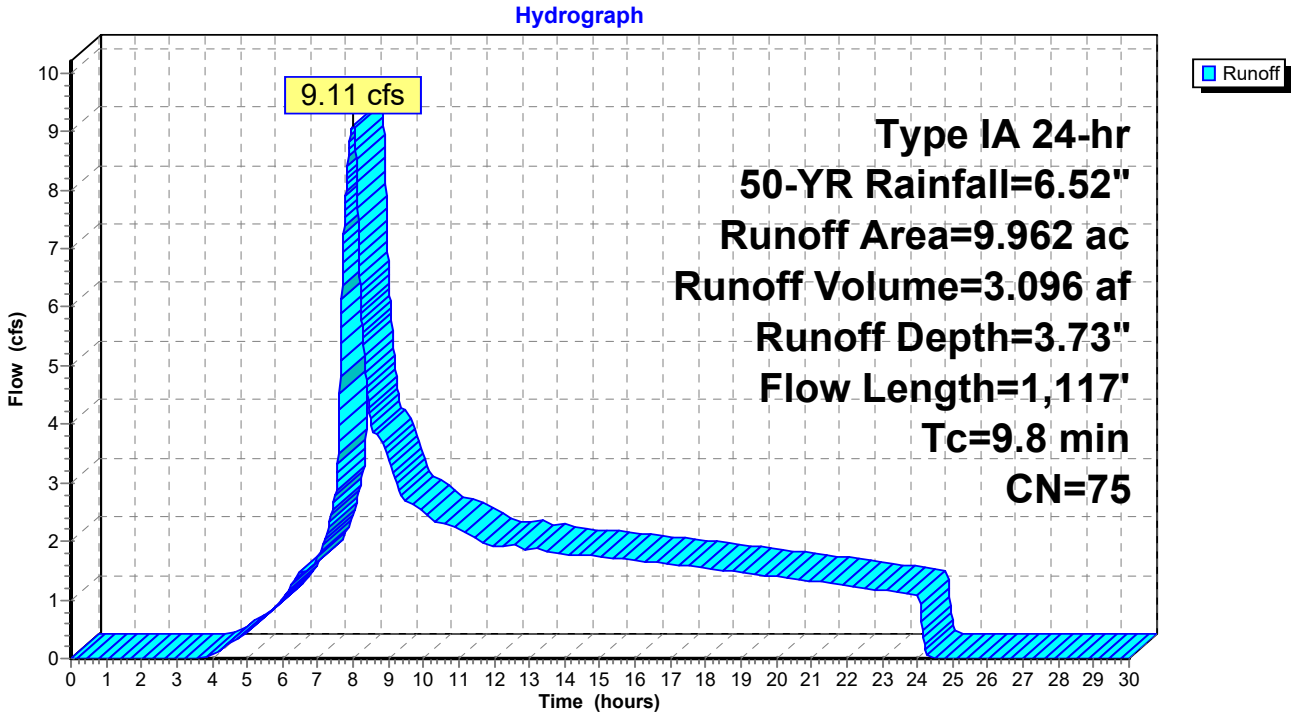
Runoff = 9.11 cfs @ 8.01 hrs, Volume= 3.096 af, Depth= 3.73"
Routed to Link Outlet 2 : Outlet 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50-YR Rainfall=6.52"

Area (ac)	CN	Description
0.831	69	Annual Grass, Fair, HSG B
2.406	79	Annual Grass, Fair, HSG C
0.000	87	Dirt roads, HSG C
0.124	82	Farmsteads, HSG C
0.026	89	Paved roads w/open ditches, 50% imp, HSG B
0.158	92	Paved roads w/open ditches, 50% imp, HSG C
0.018	61	Vineyard, Good, HSG B
2.274	75	Vineyard, Good, HSG C
0.230	60	Woods, Fair, HSG B
3.896	73	Woods, Fair, HSG C
9.962	75	Weighted Average
9.870		99.08% Pervious Area
0.092		0.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	100	0.2600	0.33		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
2.8	493	0.1700	2.89		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.6	409	0.0200	4.36	17.43	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.2	64	0.0200	6.14	30.16	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025
0.1	51	0.0600	7.55	30.18	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
9.8	1,117	Total			

Subcatchment WS-2A: Subcat WS-2A



Summary for Subcatchment WS-2B: Subcat WS-2B

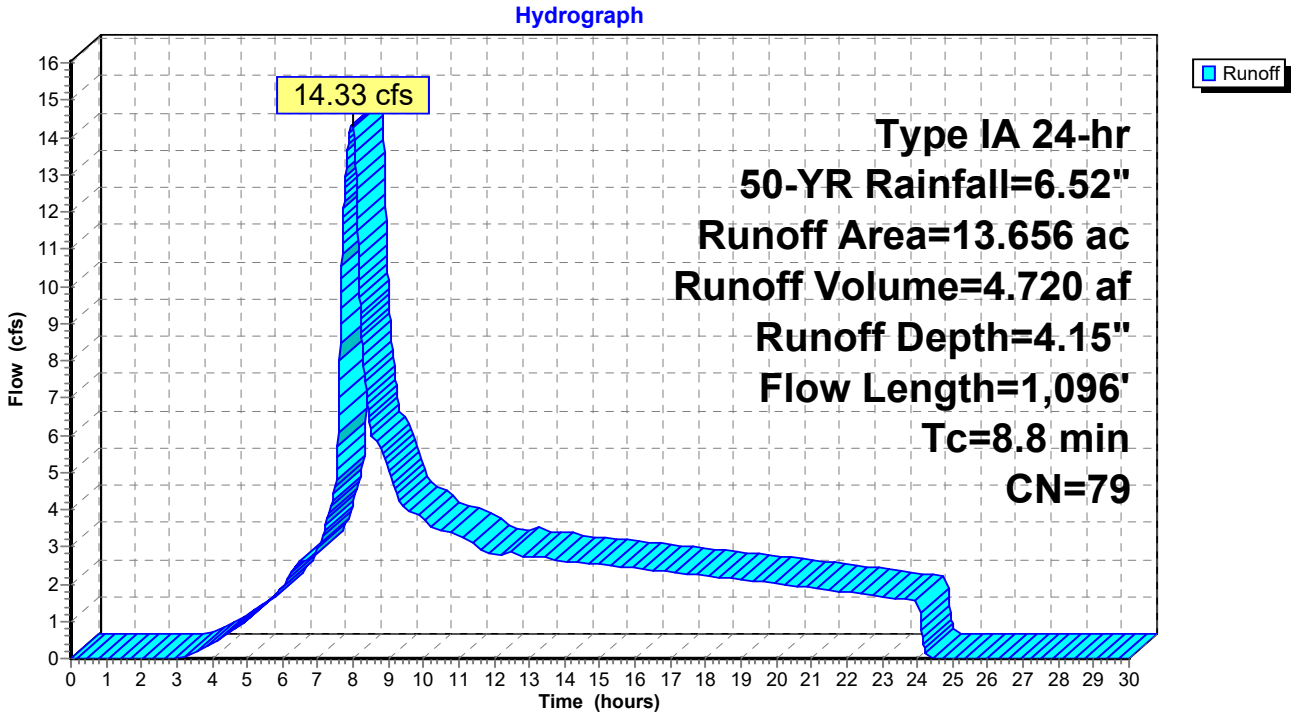
Runoff = 14.33 cfs @ 7.99 hrs, Volume= 4.720 af, Depth= 4.15"
Routed to Pond 1P : Existing Reservoir

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50-YR Rainfall=6.52"

Area (ac)	CN	Description
0.661	69	Annual Grass, Fair, HSG B
1.698	79	Annual Grass, Fair, HSG C
0.195	84	Annual Grass, Fair, HSG D
0.668	82	Farmsteads, HSG C
0.149	89	Gravel Roads, HSG C
0.001	92	Paved roads w/open ditches, 50% imp, HSG C
2.792	79	Vineyard, Fair, HSG C
0.032	98	Water Surface, HSG B
0.000	98	Water Surface, HSG C
1.754	98	Water Surface, HSG D
0.050	60	Woods, Fair, HSG B
5.654	73	Woods, Fair, HSG C
0.001	79	Woods, Fair, HSG D
13.656	79	Weighted Average
11.869		86.91% Pervious Area
1.787		13.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.2500	0.32		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
3.1	564	0.1900	3.05		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.5	432	0.2300	14.77	59.09	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
8.8	1,096	Total			

Subcatchment WS-2B: Subcat WS-2B



Summary for Subcatchment WS-2C: Subcat WS-2C

Runoff = 11.97 cfs @ 8.04 hrs, Volume= 4.358 af, Depth= 3.12"
Routed to Reach R2C-3 : Reach 2C-3

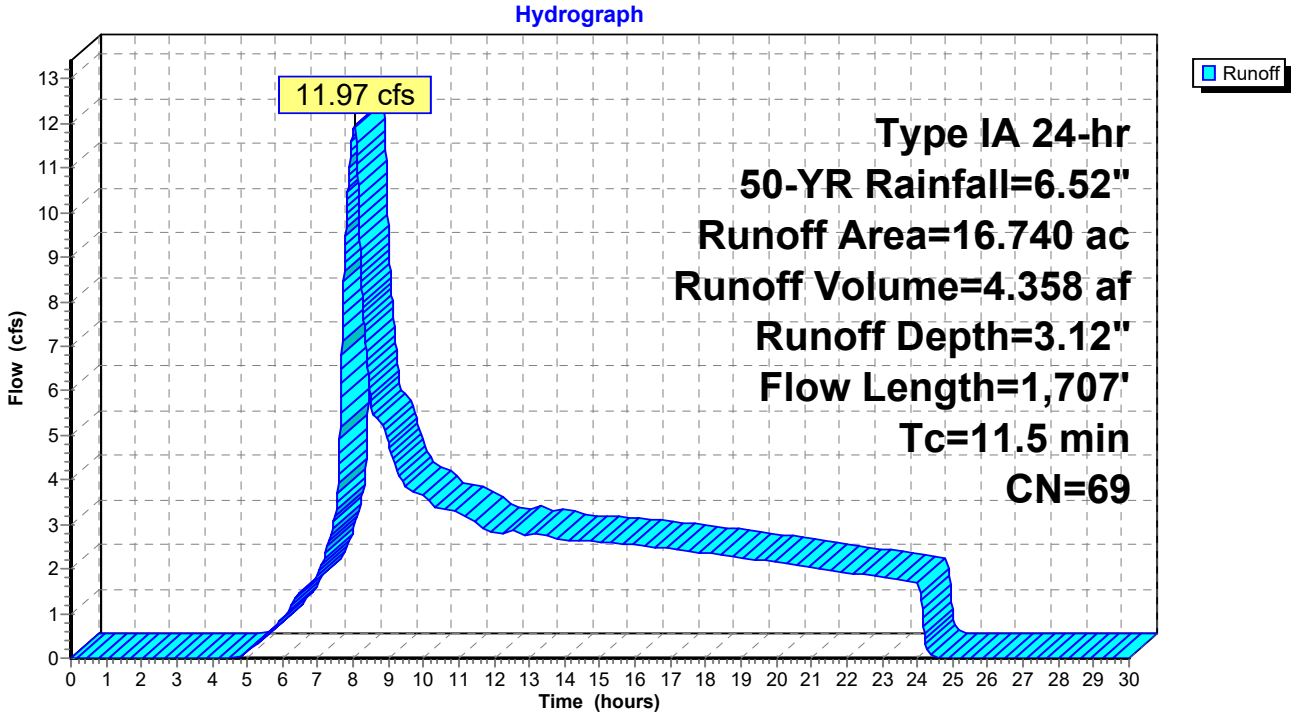
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50-YR Rainfall=6.52"

	Area (ac)	CN	Description
*	0.000	0	, HSG B
	0.959	69	Annual Grass, Fair, HSG B
	0.796	79	Annual Grass, Fair, HSG C
	0.115	65	Brush, Good, HSG C
	0.006	82	Dirt roads, HSG B
	0.199	74	Farmsteads, HSG B
	0.905	82	Farmsteads, HSG C
	0.036	85	Gravel Roads, HSG B
	0.180	89	Gravel Roads, HSG C
	0.247	89	Paved roads w/open ditches, 50% imp, HSG B
	0.138	92	Paved roads w/open ditches, 50% imp, HSG C
	0.090	69	Vineyard, Fair, HSG B
	0.695	79	Vineyard, Fair, HSG C
	3.478	61	Vineyard, Good, HSG B
	2.125	75	Vineyard, Good, HSG C
	3.716	60	Woods, Fair, HSG B
	3.053	73	Woods, Fair, HSG C
	16.740	69	Weighted Average
	16.547		98.85% Pervious Area
	0.193		1.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.1800	0.28		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
1.3	296	0.2800	3.70		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.6	266	0.3200	2.83		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.9	543	0.1100	10.22	40.87	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.8	90	0.0800	1.98		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.6	236	0.0500	6.36	19.08	**Trap/Vee/Rect Channel Flow, Pasture Ditch** Bot.W=1.00' D=1.00' Z= 2.0 '/' Top.W=5.00' n= 0.035
0.1	57	0.0400	18.72	58.82	**Pipe Channel, 24" PVC Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.010 PVC, smooth interior
0.1	57	0.0400	8.69	42.66	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025

0.2	62	0.0200	4.36	17.43	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
11.5	1,707	Total			

Subcatchment WS-2C: Subcat WS-2C



Summary for Subcatchment WS-2D: Subcat WS-2D

[47] Hint: Peak is 138% of capacity of segment #3

Runoff = 22.73 cfs @ 8.10 hrs, Volume= 8.269 af, Depth= 3.63"
Routed to Reach R2D-4 : Reach 2D-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50-YR Rainfall=6.52"

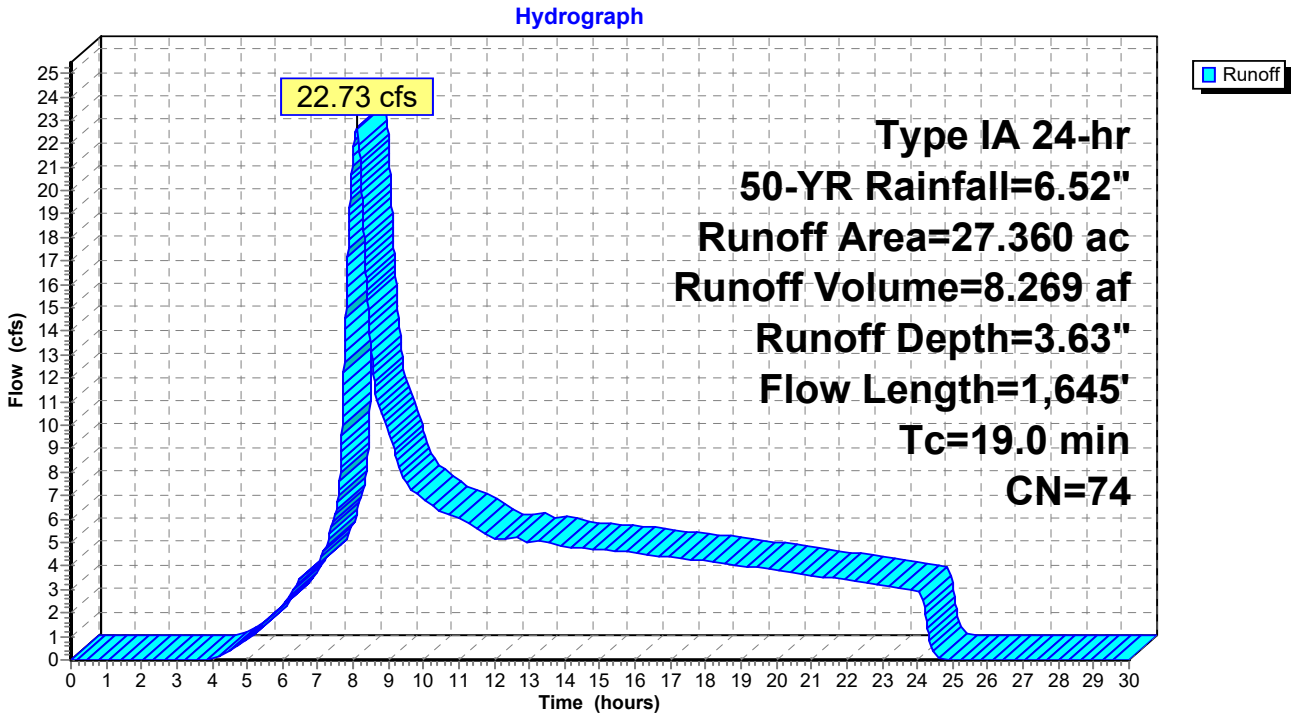
	Area (ac)	CN	Description
*	0.000	0	, HSG C
	0.031	69	Annual Grass, Fair, HSG B
	1.714	79	Annual Grass, Fair, HSG C
	0.420	75	Annual Grass, Good, HSG C
	0.320	82	Farmsteads, HSG C
	0.141	89	Gravel Roads, HSG C
	0.020	89	Paved roads w/open ditches, 50% imp, HSG B
	1.171	92	Paved roads w/open ditches, 50% imp, HSG C
	0.046	61	Vineyard, Good, HSG B
	6.048	75	Vineyard, Good, HSG C
	0.455	60	Woods, Fair, HSG B
	14.511	73	Woods, Fair, HSG C
	2.483	70	Woods, Good, HSG C
	27.360	74	Weighted Average
	26.764		97.82% Pervious Area
	0.596		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.1200	0.16		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.3	41	0.2500	2.50		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.5	267	0.1100	8.23	16.47	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=0.00' D=1.00' Z= 2.0 '/' Top.W=4.00' n= 0.035
0.1	104	0.3400	34.39	27.01	**Pipe Channel, 12" DW Pipe** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PPI Dual Walled CPP
6.6	100	0.3800	0.25		**Sheet Flow, Sheet - Post Pipe Level Spreader** Woods: Light underbrush n= 0.400 P2= 3.23"
0.1	58	0.2500	15.40	61.61	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.1	135	0.3800	23.08	72.52	**Pipe Channel, 24" CMP Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025
0.6	525	0.2000	13.78	55.11	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.0	42	0.2100	19.91	97.74	**Pipe Channel, 30" CMP Culvert**

30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63'

					n= 0.025
0.3	273	0.1800	13.07	52.28	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
19.0	1,645	Total			

Subcatchment WS-2D: Subcat WS-2D



Summary for Reach R2B-1: Reach 2B-1

[65] Warning: Inlet elevation not specified

Inflow Area = 13.656 ac, 13.09% Impervious, Inflow Depth > 3.16" for 50-YR event
Inflow = 2.40 cfs @ 16.29 hrs, Volume= 3.595 af
Outflow = 2.40 cfs @ 16.50 hrs, Volume= 3.573 af, Atten= 0%, Lag= 12.5 min
Routed to Link Outlet 2 : Outlet 2

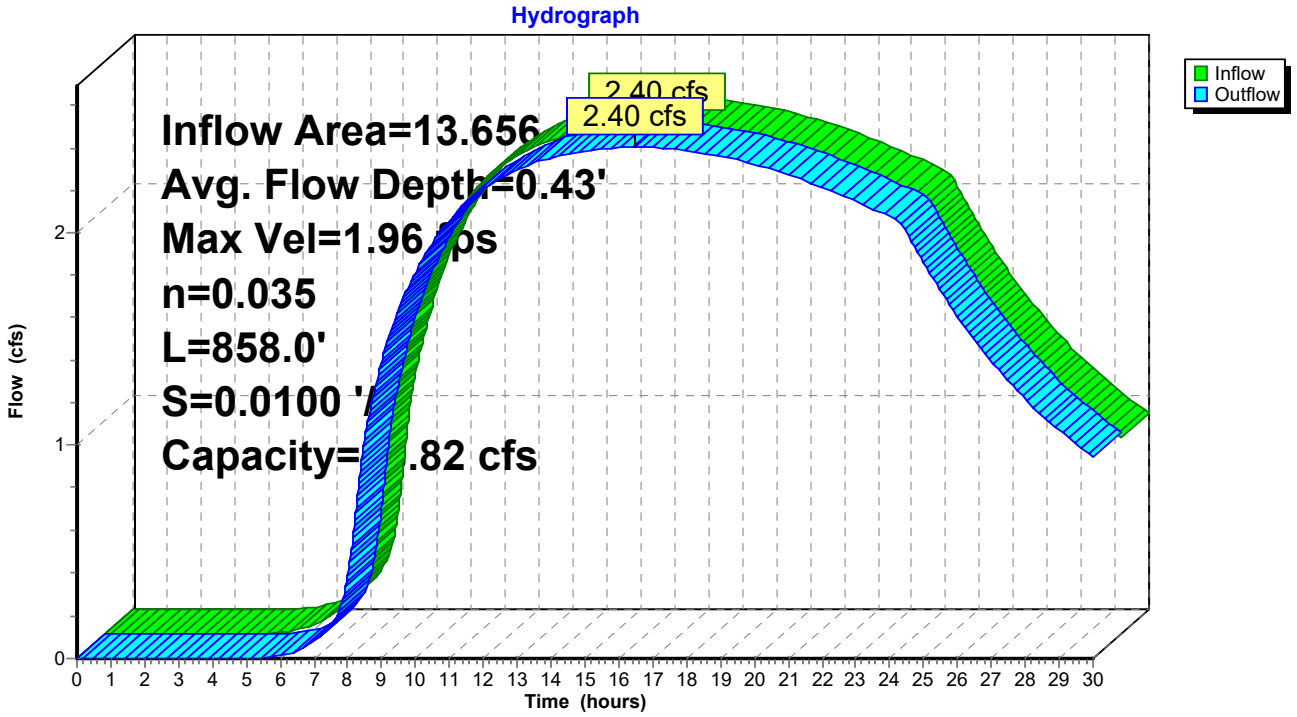
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.96 fps, Min. Travel Time= 7.3 min
Avg. Velocity = 1.60 fps, Avg. Travel Time= 8.9 min

Peak Storage= 1,052 cf @ 16.38 hrs
Average Depth at Peak Storage= 0.43' , Surface Width= 3.72'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 28.82 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 858.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -8.58'



Reach R2B-1: Reach 2B-1



Summary for Reach R2C-1: Reach 2C-1

[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 3.44" for 50-YR event
Inflow = 33.67 cfs @ 8.14 hrs, Volume= 12.627 af
Outflow = 33.67 cfs @ 8.14 hrs, Volume= 12.627 af, Atten= 0%, Lag= 0.2 min
Routed to Link Outlet 2 : Outlet 2

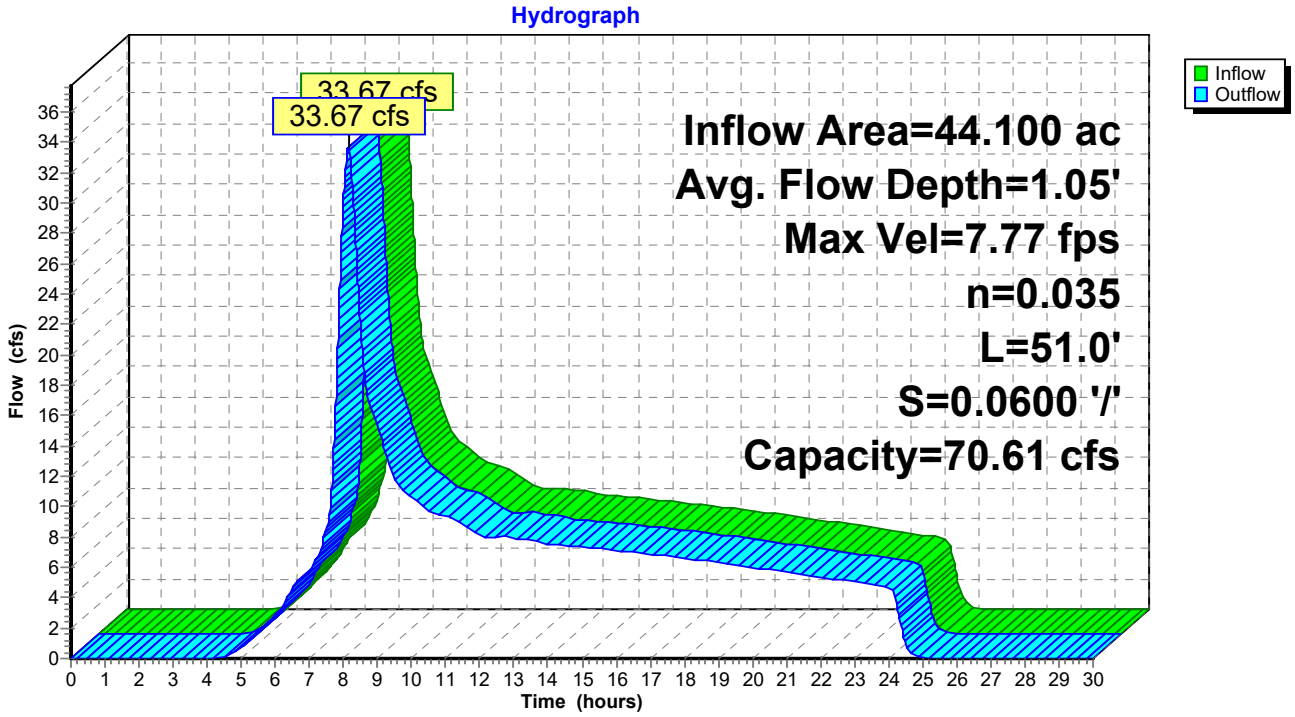
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.77 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.35 fps, Avg. Travel Time= 0.2 min

Peak Storage= 221 cf @ 8.14 hrs
Average Depth at Peak Storage= 1.05' , Surface Width= 6.22'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 70.61 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 51.0' Slope= 0.0600 '/'
Inlet Invert= 0.00', Outlet Invert= -3.06'



Reach R2C-1: Reach 2C-1



Summary for Reach R2C-2: Reach 2C-2

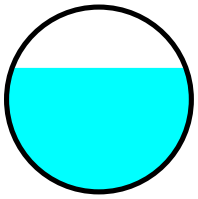
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 3.44" for 50-YR event
Inflow = 33.67 cfs @ 8.13 hrs, Volume= 12.627 af
Outflow = 33.67 cfs @ 8.14 hrs, Volume= 12.627 af, Atten= 0%, Lag= 0.2 min
Routed to Reach R2C-1 : Reach 2C-1

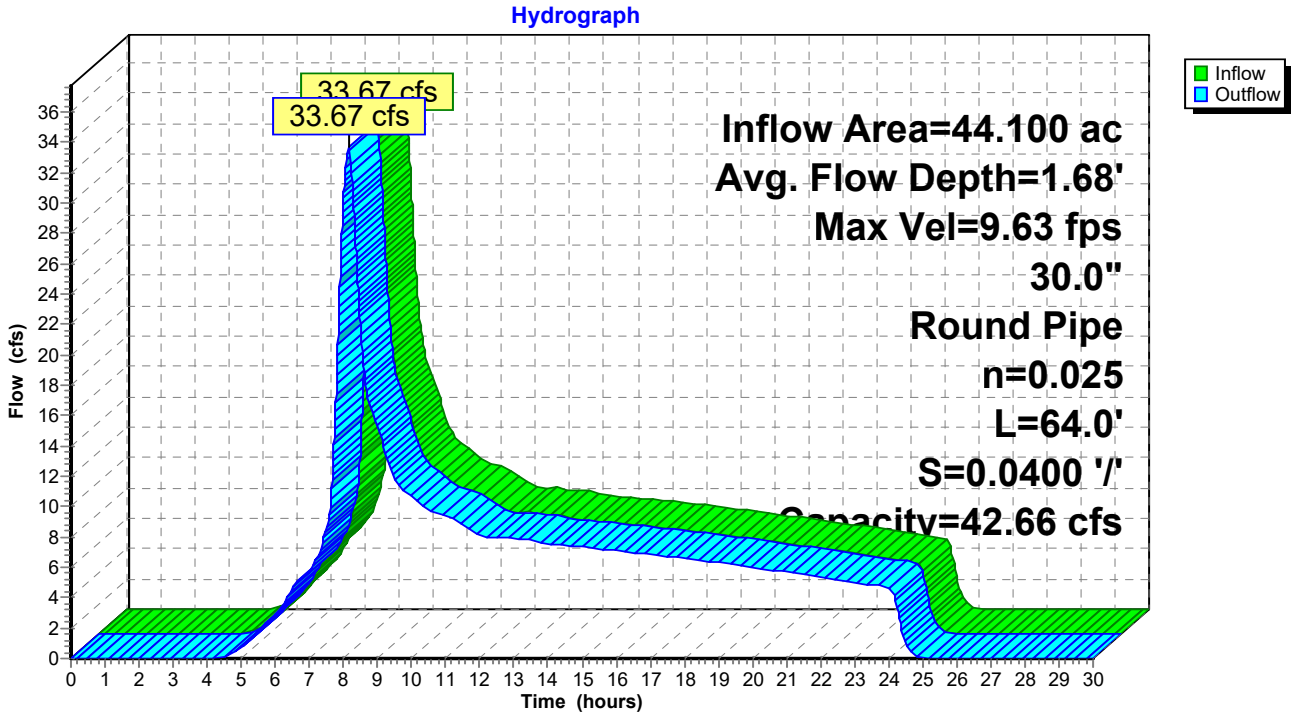
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.63 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.57 fps, Avg. Travel Time= 0.2 min

Peak Storage= 224 cf @ 8.13 hrs
Average Depth at Peak Storage= 1.68' , Surface Width= 2.35'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 42.66 cfs

30.0" Round Pipe
n= 0.025 Corrugated metal
Length= 64.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.56'



Reach R2C-2: Reach 2C-2



Summary for Reach R2C-3: Reach 2C-3

[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 3.44" for 50-YR event
Inflow = 33.77 cfs @ 8.09 hrs, Volume= 12.627 af
Outflow = 33.67 cfs @ 8.13 hrs, Volume= 12.627 af, Atten= 0%, Lag= 2.6 min
Routed to Reach R2C-2 : Reach 2C-2

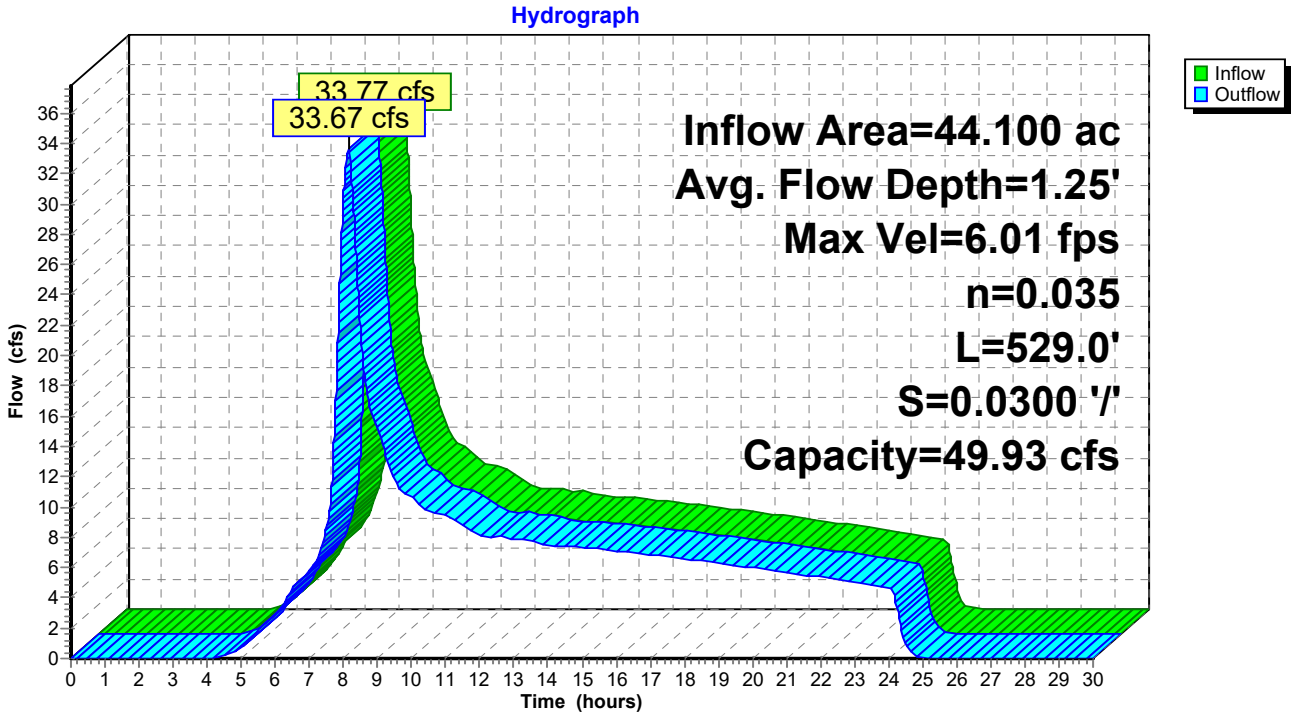
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.01 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 3.38 fps, Avg. Travel Time= 2.6 min

Peak Storage= 2,963 cf @ 8.11 hrs
Average Depth at Peak Storage= 1.25' , Surface Width= 6.99'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 49.93 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 529.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -15.87'



Reach R2C-3: Reach 2C-3



Summary for Reach R2D-1: Reach 2D-1

[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 3.63" for 50-YR event
Inflow = 22.68 cfs @ 8.15 hrs, Volume= 8.269 af
Outflow = 22.68 cfs @ 8.16 hrs, Volume= 8.269 af, Atten= 0%, Lag= 0.4 min
Routed to Reach R2C-3 : Reach 2C-3

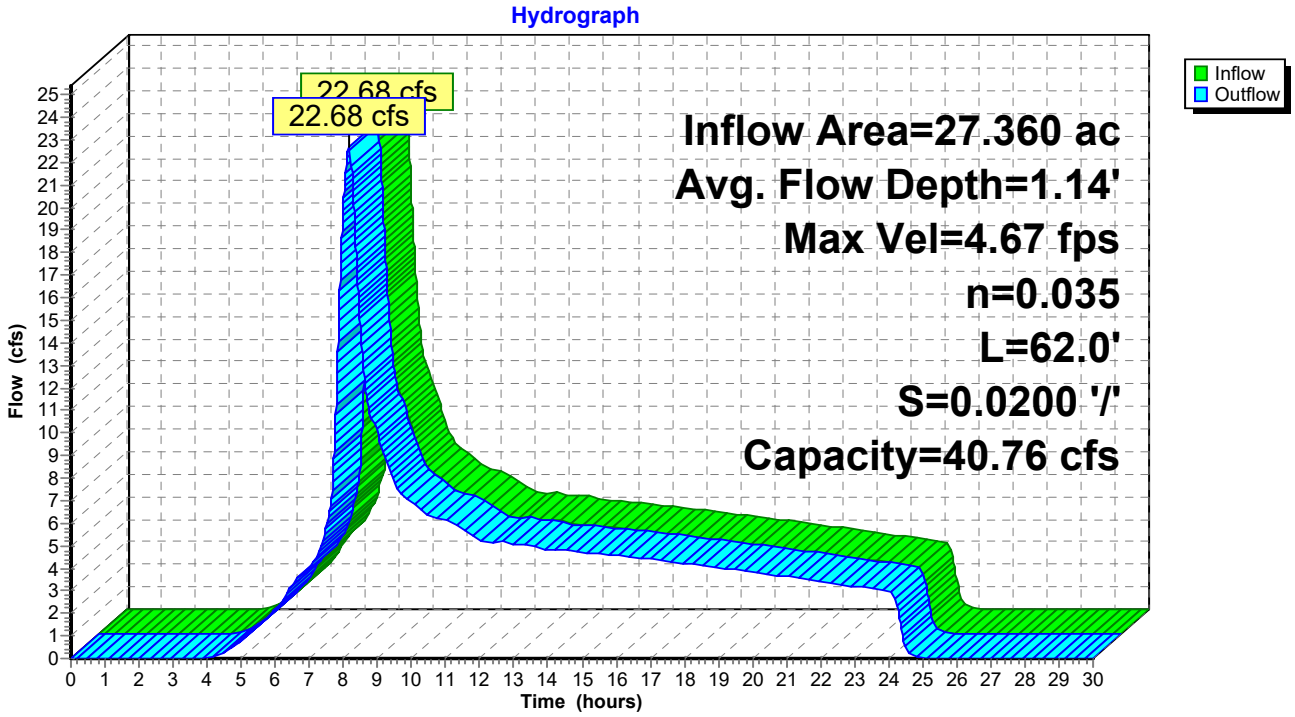
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.67 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.67 fps, Avg. Travel Time= 0.4 min

Peak Storage= 301 cf @ 8.16 hrs
Average Depth at Peak Storage= 1.14' , Surface Width= 6.55'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 40.76 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 62.0' Slope= 0.0200 '/'
Inlet Invert= 0.00', Outlet Invert= -1.24'



Reach R2D-1: Reach 2D-1



Summary for Reach R2D-2: Reach 2D-2

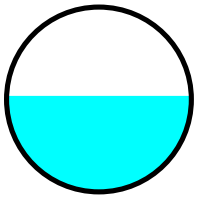
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 3.63" for 50-YR event
Inflow = 22.68 cfs @ 8.15 hrs, Volume= 8.269 af
Outflow = 22.68 cfs @ 8.15 hrs, Volume= 8.269 af, Atten= 0%, Lag= 0.2 min
Routed to Reach R2D-1 : Reach 2D-1

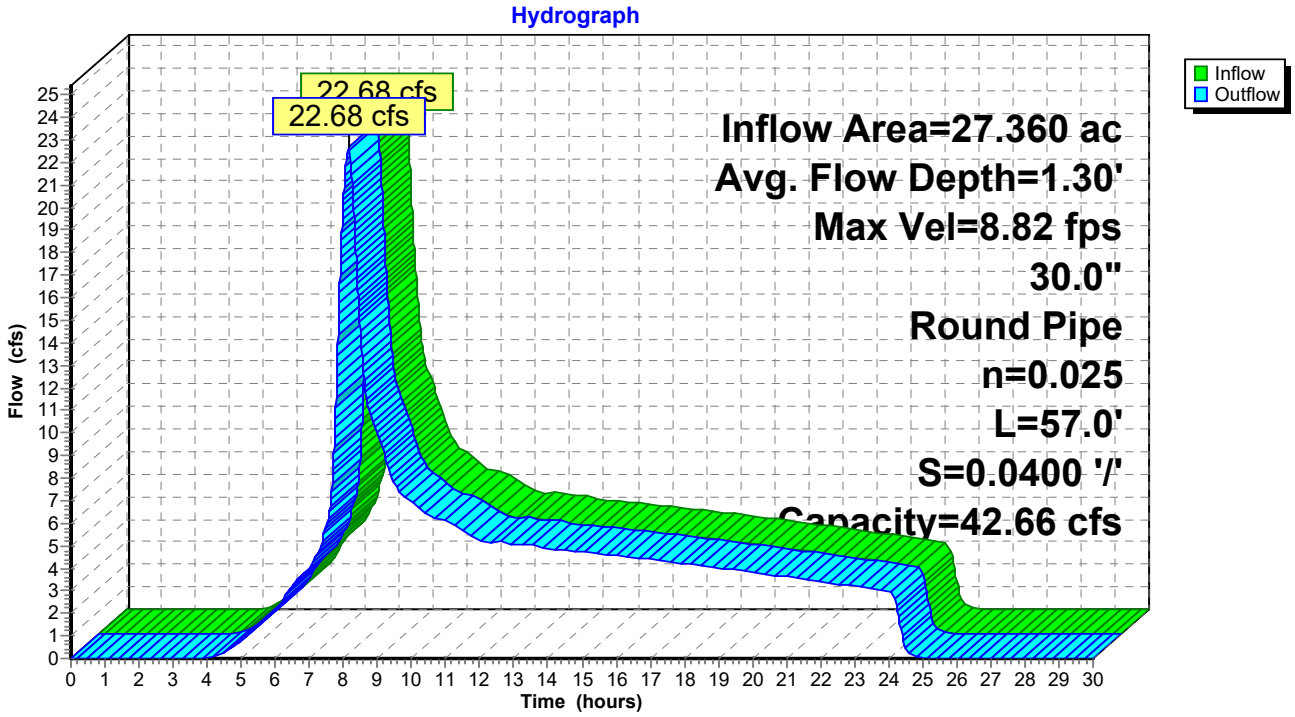
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.82 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.09 fps, Avg. Travel Time= 0.2 min

Peak Storage= 147 cf @ 8.15 hrs
Average Depth at Peak Storage= 1.30' , Surface Width= 2.50'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 42.66 cfs

30.0" Round Pipe
n= 0.025 Corrugated metal
Length= 57.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.28'



Reach R2D-2: Reach 2D-2



Summary for Reach R2D-3: Reach 2D-3

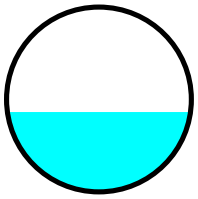
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 3.63" for 50-YR event
Inflow = 22.68 cfs @ 8.15 hrs, Volume= 8.269 af
Outflow = 22.68 cfs @ 8.15 hrs, Volume= 8.269 af, Atten= 0%, Lag= 0.1 min
Routed to Reach R2D-2 : Reach 2D-2

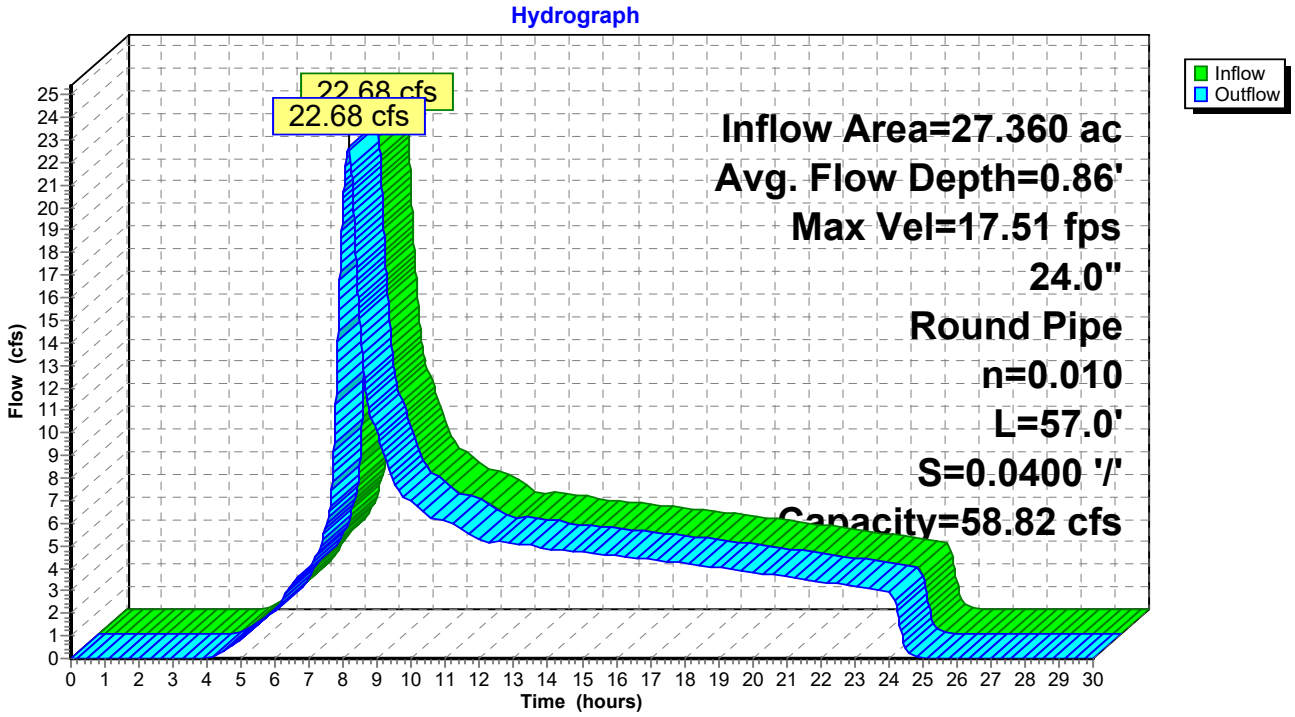
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 17.51 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 10.10 fps, Avg. Travel Time= 0.1 min

Peak Storage= 74 cf @ 8.15 hrs
Average Depth at Peak Storage= 0.86' , Surface Width= 1.98'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 58.82 cfs

24.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 57.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.28'



Reach R2D-3: Reach 2D-3



Summary for Reach R2D-4: Reach 2D-4

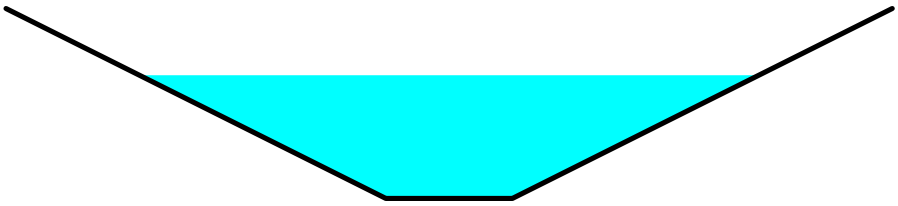
[65] Warning: Inlet elevation not specified
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=1)

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 3.63" for 50-YR event
Inflow = 22.73 cfs @ 8.10 hrs, Volume= 8.269 af
Outflow = 22.68 cfs @ 8.15 hrs, Volume= 8.269 af, Atten= 0%, Lag= 3.1 min
Routed to Reach R2D-3 : Reach 2D-3

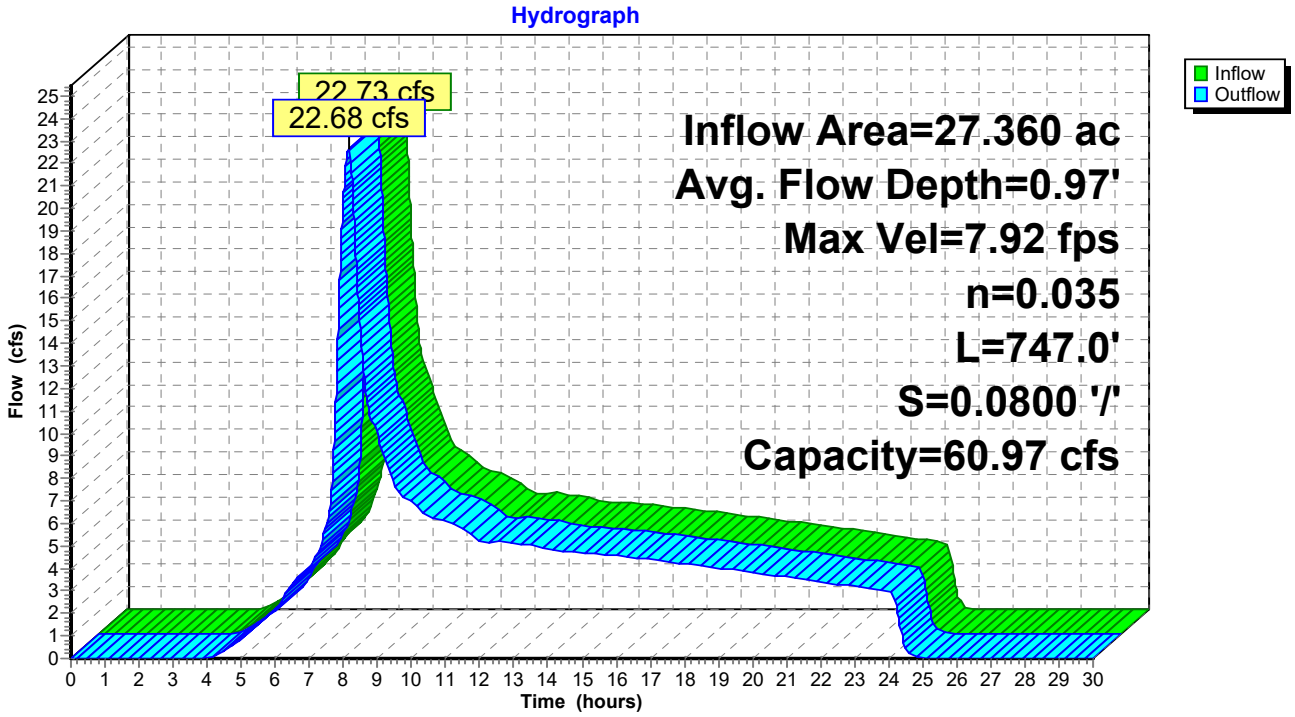
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 7.92 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 4.69 fps, Avg. Travel Time= 2.7 min

Peak Storage= 2,140 cf @ 8.12 hrs
Average Depth at Peak Storage= 0.97' , Surface Width= 4.89'
Bank-Full Depth= 1.50' Flow Area= 6.0 sf, Capacity= 60.97 cfs

1.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 747.0' Slope= 0.0800 '/'
Inlet Invert= 0.00', Outlet Invert= -59.76'



Reach R2D-4: Reach 2D-4



Summary for Pond 1P: Existing Reservoir

Inflow Area = 13.656 ac, 13.09% Impervious, Inflow Depth = 4.15" for 50-YR event
Inflow = 14.33 cfs @ 7.99 hrs, Volume= 4.720 af
Outflow = 2.40 cfs @ 16.29 hrs, Volume= 3.595 af, Atten= 83%, Lag= 497.9 min
Primary = 2.40 cfs @ 16.29 hrs, Volume= 3.595 af
Routed to Reach R2B-1 : Reach 2B-1

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Starting Elev= 99.00' Surf.Area= 2.150 ac Storage= 2.075 af
Peak Elev= 99.90' @ 16.29 hrs Surf.Area= 2.285 ac Storage= 4.065 af (1.990 af above start)

Plug-Flow detention time= 992.0 min calculated for 1.520 af (32% of inflow)
Center-of-Mass det. time= 332.6 min (1,094.8 - 762.3)

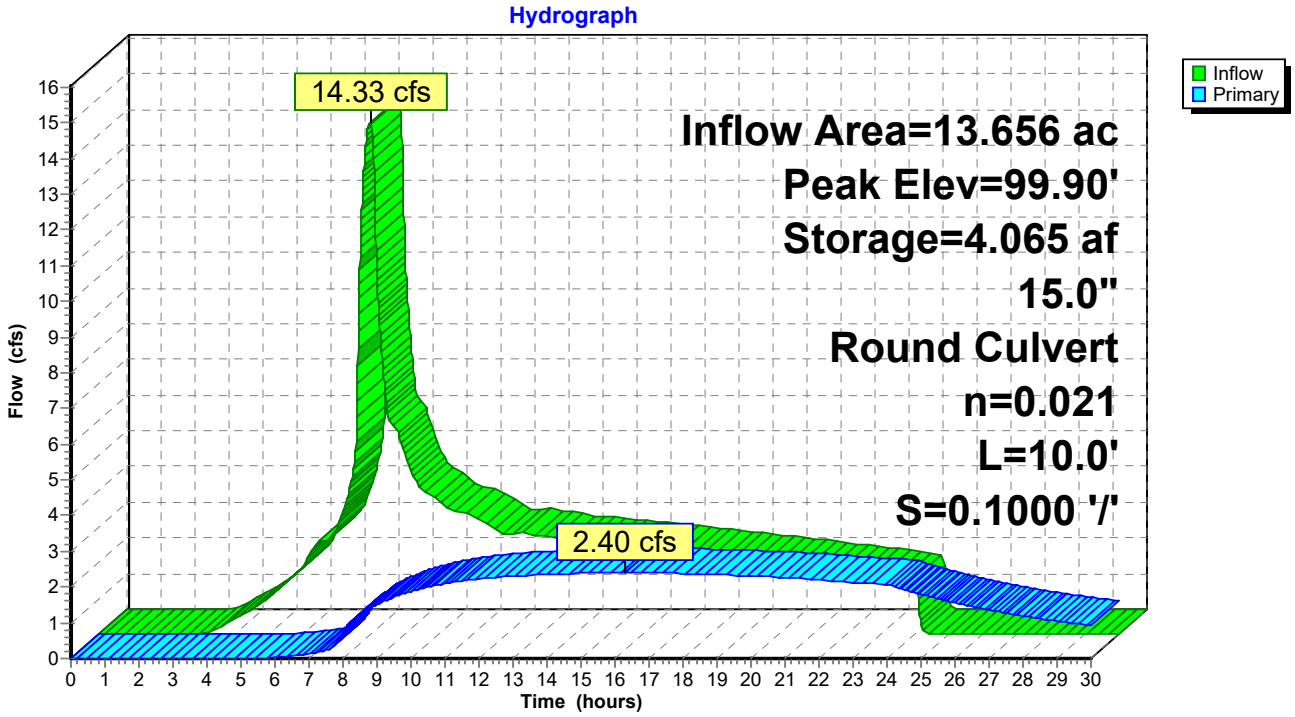
Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	4.300 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
98.00	2.000	0.000	0.000
100.00	2.300	4.300	4.300

Device	Routing	Invert	Outlet Devices
#1	Primary	99.00'	**15.0" Round Culvert** L= 10.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 99.00' / 98.00' S= 0.1000 '/' Cc= 0.900 n= 0.021 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=2.40 cfs @ 16.29 hrs HW=99.90' (Free Discharge)
1=Culvert (Inlet Controls 2.40 cfs @ 2.55 fps)

Pond 1P: Existing Reservoir

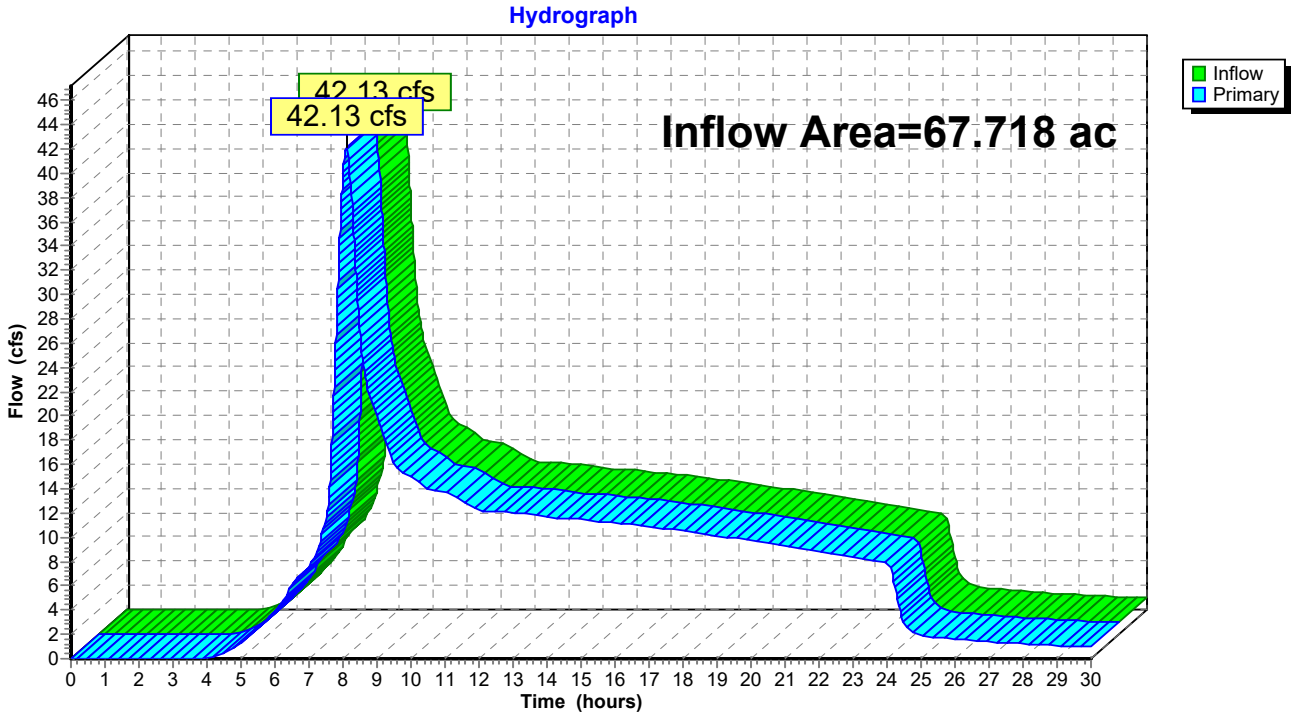


Summary for Link Outlet 2: Outlet 2

Inflow Area = 67.718 ac, 3.94% Impervious, Inflow Depth > 3.42" for 50-YR event
Inflow = 42.13 cfs @ 8.10 hrs, Volume= 19.297 af
Primary = 42.13 cfs @ 8.10 hrs, Volume= 19.297 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Outlet 2: Outlet 2



Summary for Subcatchment WS-2A: Subcat WS-2A

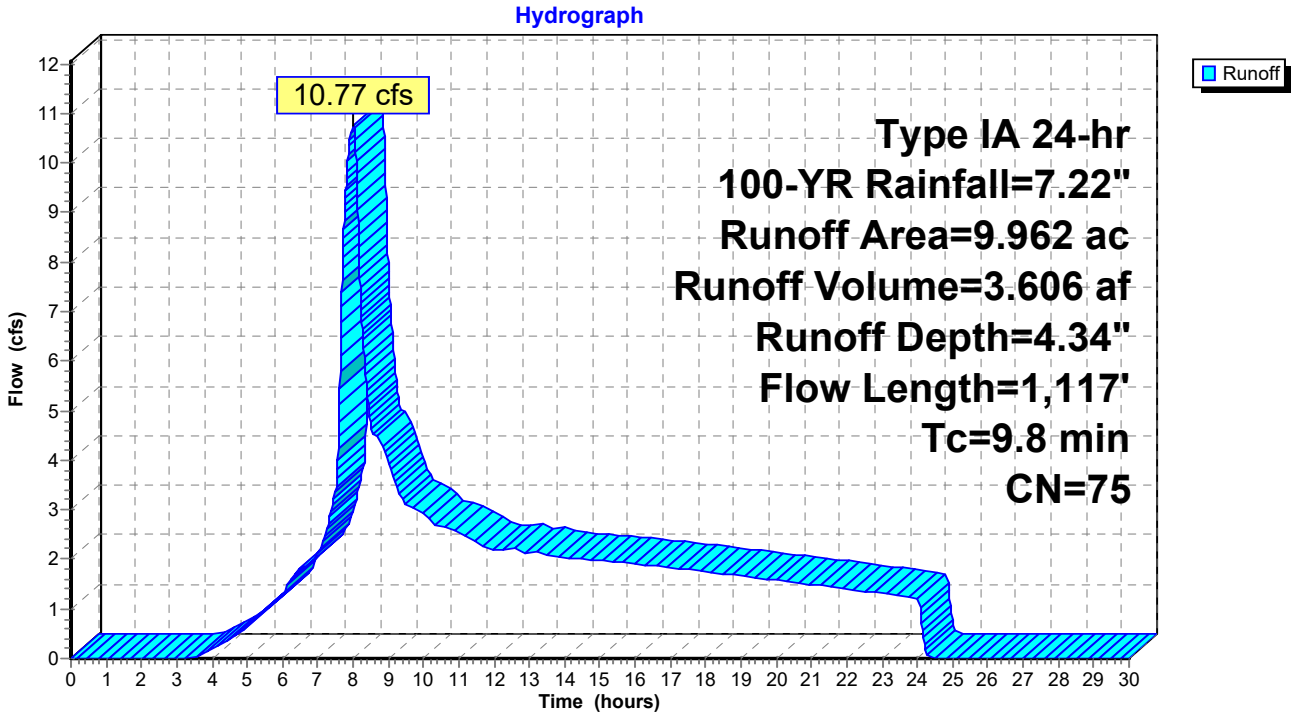
Runoff = 10.77 cfs @ 8.00 hrs, Volume= 3.606 af, Depth= 4.34"
Routed to Link Outlet 2 : Outlet 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-YR Rainfall=7.22"

Area (ac)	CN	Description
0.831	69	Annual Grass, Fair, HSG B
2.406	79	Annual Grass, Fair, HSG C
0.000	87	Dirt roads, HSG C
0.124	82	Farmsteads, HSG C
0.026	89	Paved roads w/open ditches, 50% imp, HSG B
0.158	92	Paved roads w/open ditches, 50% imp, HSG C
0.018	61	Vineyard, Good, HSG B
2.274	75	Vineyard, Good, HSG C
0.230	60	Woods, Fair, HSG B
3.896	73	Woods, Fair, HSG C
9.962	75	Weighted Average
9.870		99.08% Pervious Area
0.092		0.92% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	100	0.2600	0.33		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
2.8	493	0.1700	2.89		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.6	409	0.0200	4.36	17.43	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.2	64	0.0200	6.14	30.16	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025
0.1	51	0.0600	7.55	30.18	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
9.8	1,117	Total			

Subcatchment WS-2A: Subcat WS-2A



Summary for Subcatchment WS-2B: Subcat WS-2B

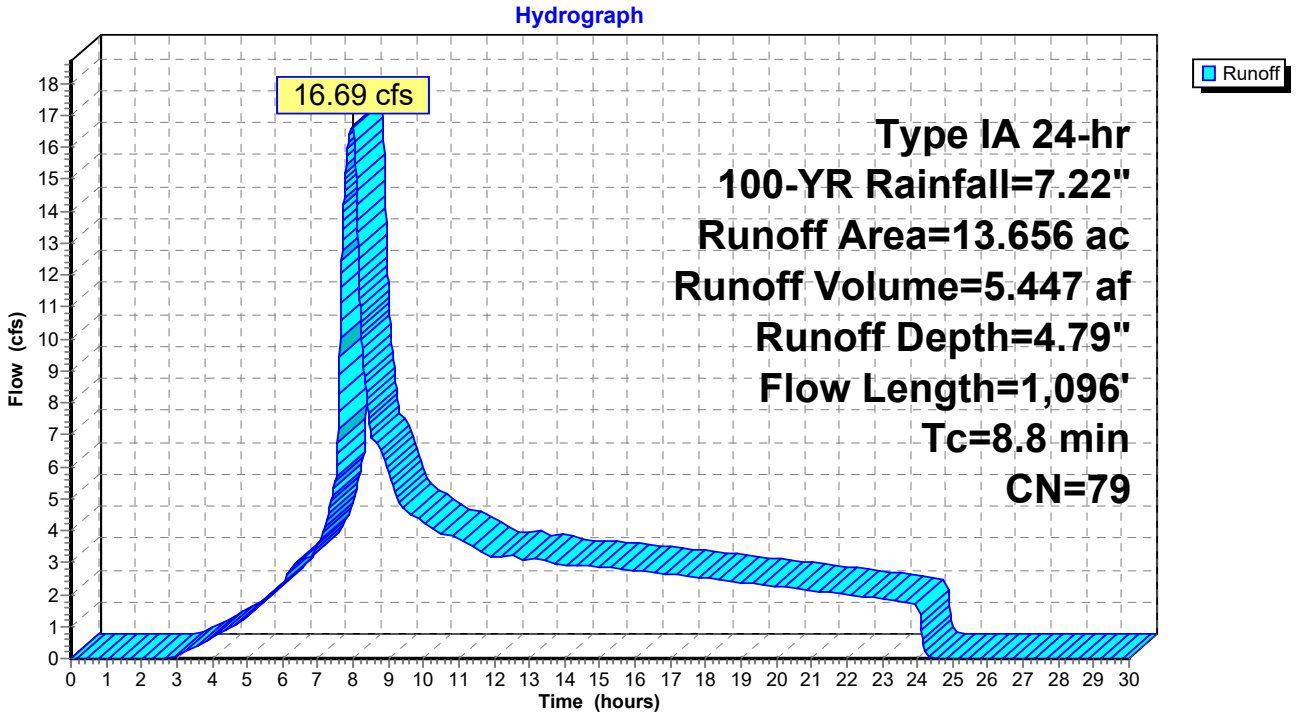
Runoff = 16.69 cfs @ 7.97 hrs, Volume= 5.447 af, Depth= 4.79"
Routed to Pond 1P : Existing Reservoir

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-YR Rainfall=7.22"

Area (ac)	CN	Description
0.661	69	Annual Grass, Fair, HSG B
1.698	79	Annual Grass, Fair, HSG C
0.195	84	Annual Grass, Fair, HSG D
0.668	82	Farmsteads, HSG C
0.149	89	Gravel Roads, HSG C
0.001	92	Paved roads w/open ditches, 50% imp, HSG C
2.792	79	Vineyard, Fair, HSG C
0.032	98	Water Surface, HSG B
0.000	98	Water Surface, HSG C
1.754	98	Water Surface, HSG D
0.050	60	Woods, Fair, HSG B
5.654	73	Woods, Fair, HSG C
0.001	79	Woods, Fair, HSG D
13.656	79	Weighted Average
11.869		86.91% Pervious Area
1.787		13.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	100	0.2500	0.32		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
3.1	564	0.1900	3.05		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.5	432	0.2300	14.77	59.09	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
8.8	1,096	Total			

Subcatchment WS-2B: Subcat WS-2B



Summary for Subcatchment WS-2C: Subcat WS-2C

Runoff = 14.52 cfs @ 8.04 hrs, Volume= 5.155 af, Depth= 3.70"
Routed to Reach R2C-3 : Reach 2C-3

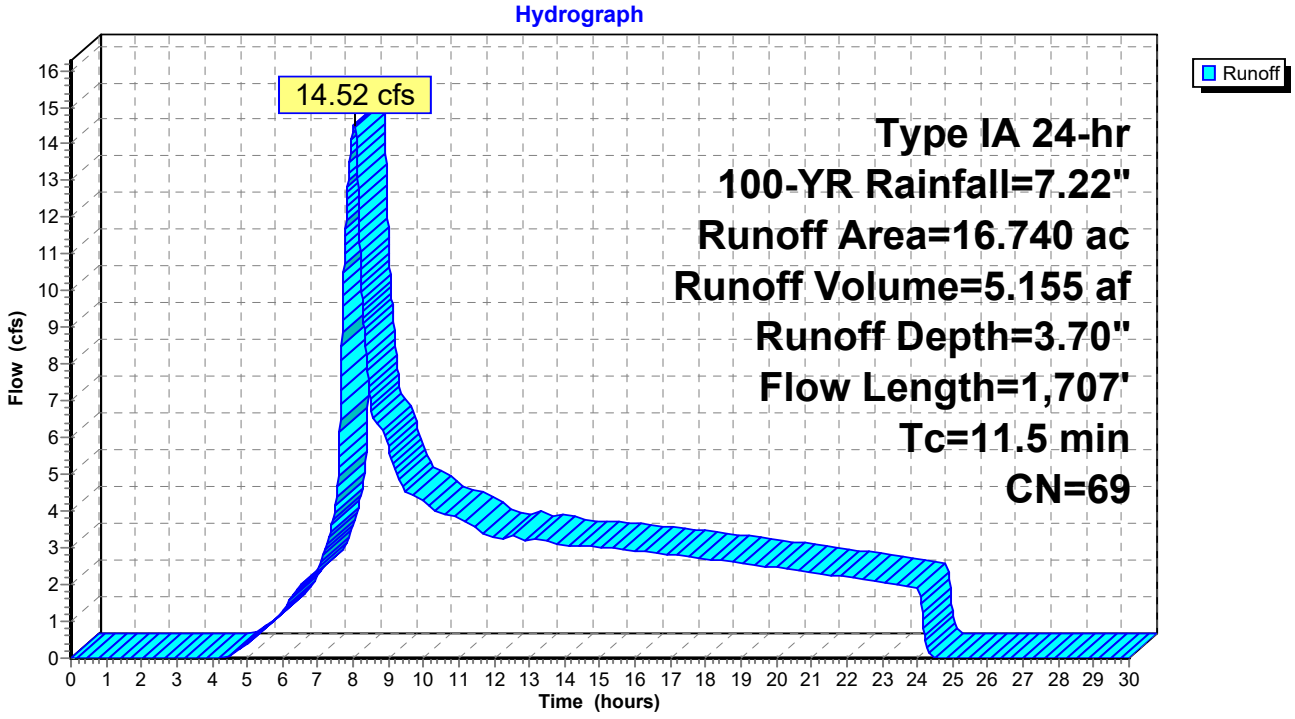
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-YR Rainfall=7.22"

	Area (ac)	CN	Description
*	0.000	0	, HSG B
	0.959	69	Annual Grass, Fair, HSG B
	0.796	79	Annual Grass, Fair, HSG C
	0.115	65	Brush, Good, HSG C
	0.006	82	Dirt roads, HSG B
	0.199	74	Farmsteads, HSG B
	0.905	82	Farmsteads, HSG C
	0.036	85	Gravel Roads, HSG B
	0.180	89	Gravel Roads, HSG C
	0.247	89	Paved roads w/open ditches, 50% imp, HSG B
	0.138	92	Paved roads w/open ditches, 50% imp, HSG C
	0.090	69	Vineyard, Fair, HSG B
	0.695	79	Vineyard, Fair, HSG C
	3.478	61	Vineyard, Good, HSG B
	2.125	75	Vineyard, Good, HSG C
	3.716	60	Woods, Fair, HSG B
	3.053	73	Woods, Fair, HSG C
	16.740	69	Weighted Average
	16.547		98.85% Pervious Area
	0.193		1.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.9	100	0.1800	0.28		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.23"
1.3	296	0.2800	3.70		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
1.6	266	0.3200	2.83		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.9	543	0.1100	10.22	40.87	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.8	90	0.0800	1.98		**Shallow Concentrated Flow, Shallow - Short Grass** Short Grass Pasture Kv= 7.0 fps
0.6	236	0.0500	6.36	19.08	**Trap/Vee/Rect Channel Flow, Pasture Ditch** Bot.W=1.00' D=1.00' Z= 2.0 '/' Top.W=5.00' n= 0.035
0.1	57	0.0400	18.72	58.82	**Pipe Channel, 24" PVC Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.010 PVC, smooth interior
0.1	57	0.0400	8.69	42.66	**Pipe Channel, 30" CMP Culvert** 30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63' n= 0.025

0.2	62	0.0200	4.36	17.43	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
11.5	1,707	Total			

Subcatchment WS-2C: Subcat WS-2C



Summary for Subcatchment WS-2D: Subcat WS-2D

[47] Hint: Peak is 164% of capacity of segment #3

Runoff = 27.03 cfs @ 8.09 hrs, Volume= 9.654 af, Depth= 4.23"
Routed to Reach R2D-4 : Reach 2D-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type IA 24-hr 100-YR Rainfall=7.22"

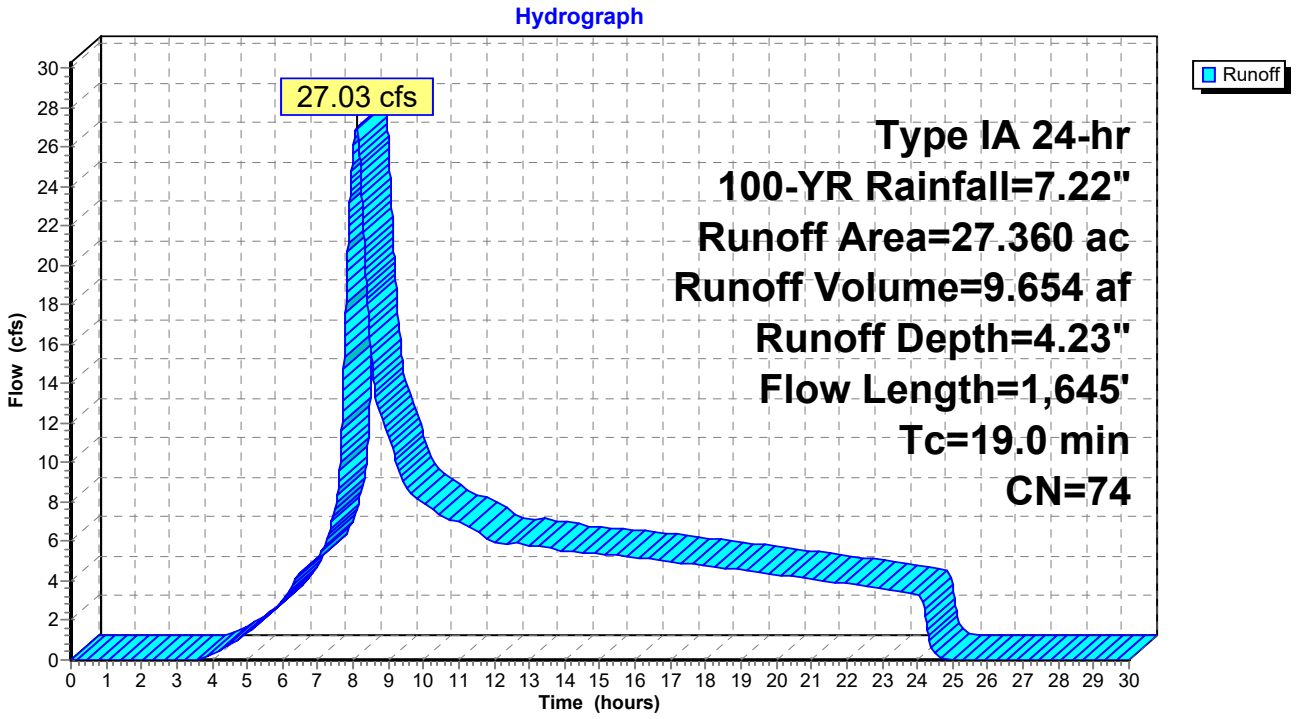
	Area (ac)	CN	Description
*	0.000	0	, HSG C
	0.031	69	Annual Grass, Fair, HSG B
	1.714	79	Annual Grass, Fair, HSG C
	0.420	75	Annual Grass, Good, HSG C
	0.320	82	Farmsteads, HSG C
	0.141	89	Gravel Roads, HSG C
	0.020	89	Paved roads w/open ditches, 50% imp, HSG B
	1.171	92	Paved roads w/open ditches, 50% imp, HSG C
	0.046	61	Vineyard, Good, HSG B
	6.048	75	Vineyard, Good, HSG C
	0.455	60	Woods, Fair, HSG B
	14.511	73	Woods, Fair, HSG C
	2.483	70	Woods, Good, HSG C
	27.360	74	Weighted Average
	26.764		97.82% Pervious Area
	0.596		2.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.1200	0.16		**Sheet Flow, Sheet** Woods: Light underbrush n= 0.400 P2= 3.23"
0.3	41	0.2500	2.50		**Shallow Concentrated Flow, Shallow - Woodland** Woodland Kv= 5.0 fps
0.5	267	0.1100	8.23	16.47	**Trap/Vee/Rect Channel Flow, Ditch** Bot.W=0.00' D=1.00' Z= 2.0 '/' Top.W=4.00' n= 0.035
0.1	104	0.3400	34.39	27.01	**Pipe Channel, 12" DW Pipe** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PPI Dual Walled CPP
6.6	100	0.3800	0.25		**Sheet Flow, Sheet - Post Pipe Level Spreader** Woods: Light underbrush n= 0.400 P2= 3.23"
0.1	58	0.2500	15.40	61.61	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.1	135	0.3800	23.08	72.52	**Pipe Channel, 24" CMP Culvert** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025
0.6	525	0.2000	13.78	55.11	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
0.0	42	0.2100	19.91	97.74	**Pipe Channel, 30" CMP Culvert**

30.0" Round Area= 4.9 sf Perim= 7.9' r= 0.63'

					n= 0.025
0.3	273	0.1800	13.07	52.28	**Trap/Vee/Rect Channel Flow, Stream** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.035
19.0	1,645	Total			

Subcatchment WS-2D: Subcat WS-2D



Summary for Reach R2B-1: Reach 2B-1

[65] Warning: Inlet elevation not specified

Inflow Area = 13.656 ac, 13.09% Impervious, Inflow Depth > 3.74" for 100-YR event
Inflow = 2.83 cfs @ 15.27 hrs, Volume= 4.251 af
Outflow = 2.83 cfs @ 15.47 hrs, Volume= 4.228 af, Atten= 0%, Lag= 11.9 min
Routed to Link Outlet 2 : Outlet 2

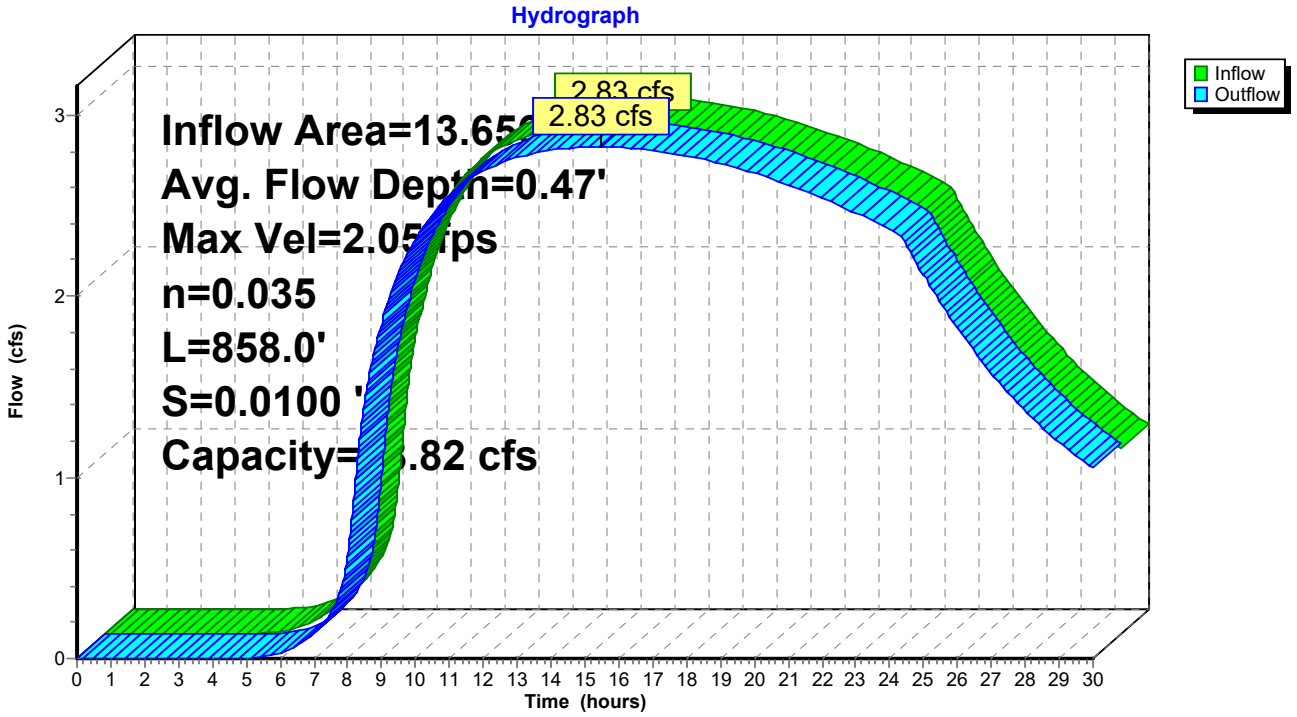
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.05 fps, Min. Travel Time= 7.0 min
Avg. Velocity = 1.68 fps, Avg. Travel Time= 8.5 min

Peak Storage= 1,182 cf @ 15.36 hrs
Average Depth at Peak Storage= 0.47' , Surface Width= 3.88'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 28.82 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 858.0' Slope= 0.0100 '/'
Inlet Invert= 0.00', Outlet Invert= -8.58'



Reach R2B-1: Reach 2B-1



Summary for Reach R2C-1: Reach 2C-1

[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 4.03" for 100-YR event
Inflow = 40.40 cfs @ 8.13 hrs, Volume= 14.809 af
Outflow = 40.40 cfs @ 8.13 hrs, Volume= 14.809 af, Atten= 0%, Lag= 0.2 min
Routed to Link Outlet 2 : Outlet 2

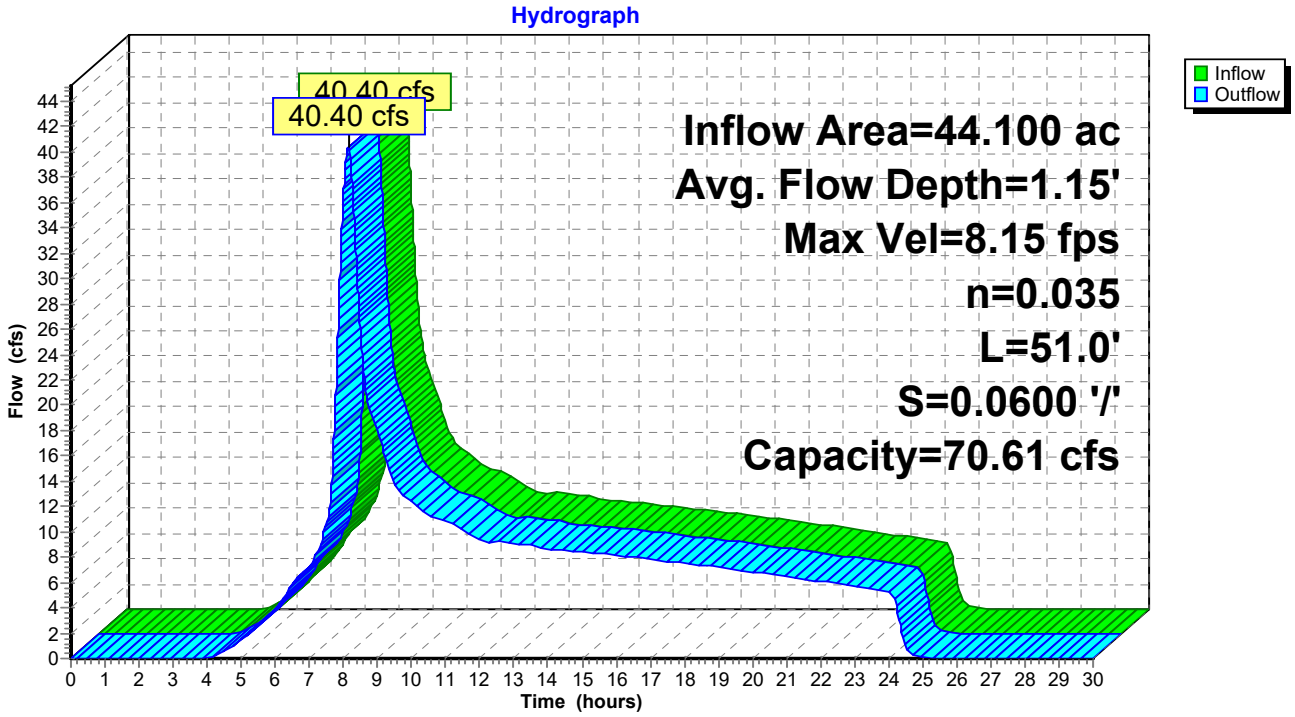
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.15 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 4.53 fps, Avg. Travel Time= 0.2 min

Peak Storage= 253 cf @ 8.13 hrs
Average Depth at Peak Storage= 1.15' , Surface Width= 6.61'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 70.61 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 51.0' Slope= 0.0600 '/'
Inlet Invert= 0.00', Outlet Invert= -3.06'



Reach R2C-1: Reach 2C-1



Summary for Reach R2C-2: Reach 2C-2

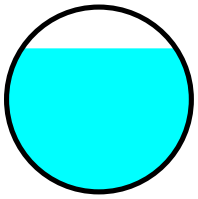
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 4.03" for 100-YR event
Inflow = 40.41 cfs @ 8.13 hrs, Volume= 14.809 af
Outflow = 40.40 cfs @ 8.13 hrs, Volume= 14.809 af, Atten= 0%, Lag= 0.2 min
Routed to Reach R2C-1 : Reach 2C-1

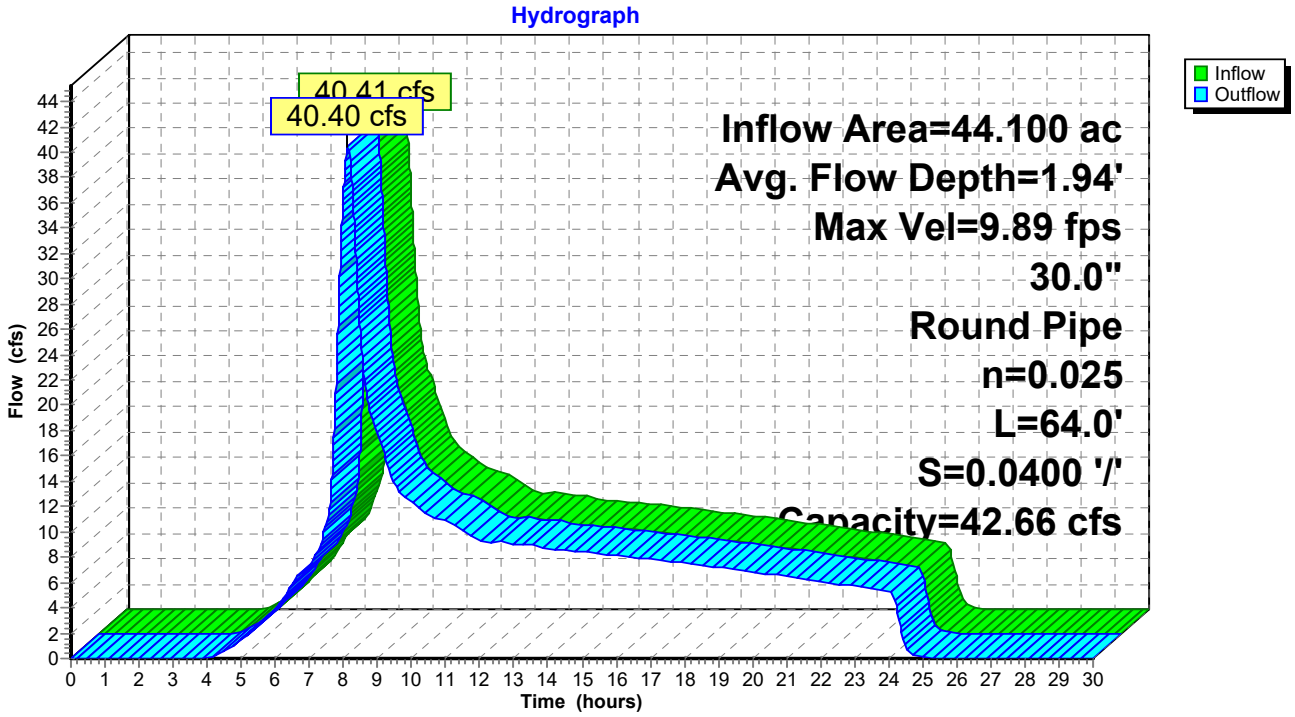
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.89 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.79 fps, Avg. Travel Time= 0.2 min

Peak Storage= 262 cf @ 8.13 hrs
Average Depth at Peak Storage= 1.94' , Surface Width= 2.08'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 42.66 cfs

30.0" Round Pipe
n= 0.025 Corrugated metal
Length= 64.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.56'



Reach R2C-2: Reach 2C-2



Summary for Reach R2C-3: Reach 2C-3

[65] Warning: Inlet elevation not specified

Inflow Area = 44.100 ac, 1.79% Impervious, Inflow Depth = 4.03" for 100-YR event
Inflow = 40.51 cfs @ 8.09 hrs, Volume= 14.809 af
Outflow = 40.41 cfs @ 8.13 hrs, Volume= 14.809 af, Atten= 0%, Lag= 2.4 min
Routed to Reach R2C-2 : Reach 2C-2

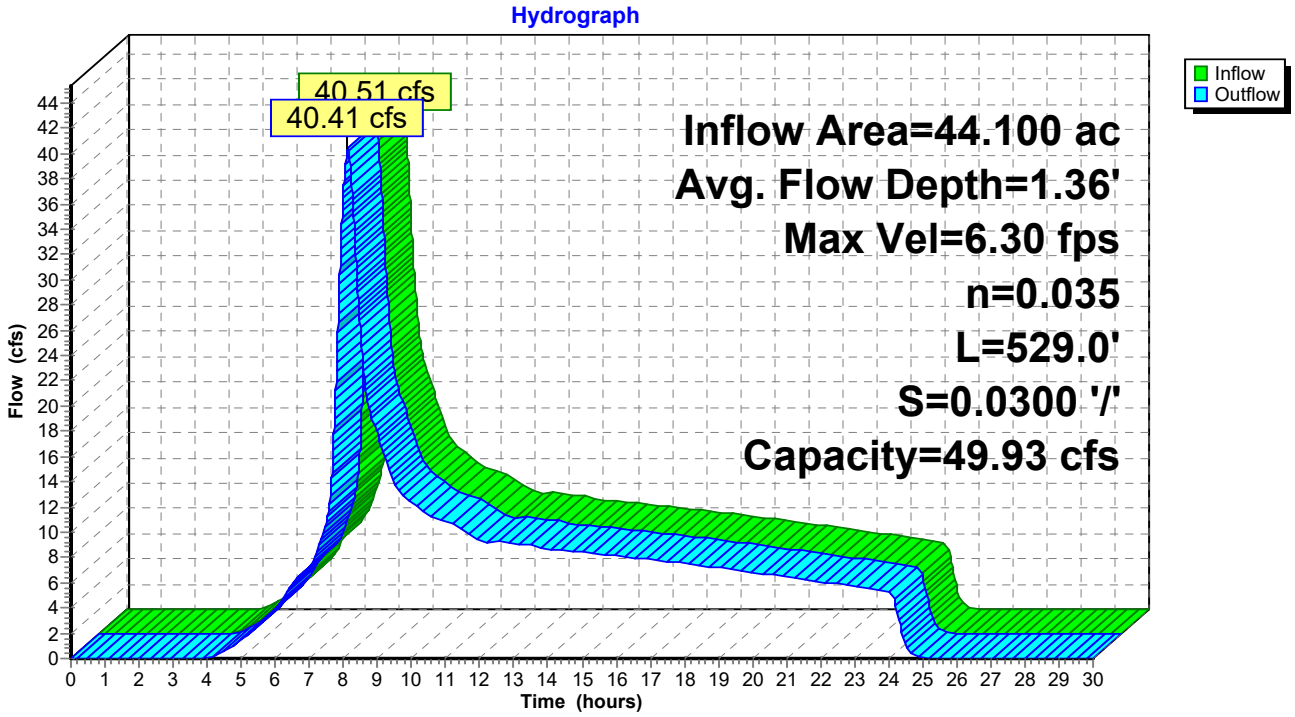
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 6.30 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 3.52 fps, Avg. Travel Time= 2.5 min

Peak Storage= 3,391 cf @ 8.10 hrs
Average Depth at Peak Storage= 1.36' , Surface Width= 7.44'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 49.93 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 529.0' Slope= 0.0300 '/'
Inlet Invert= 0.00', Outlet Invert= -15.87'



Reach R2C-3: Reach 2C-3



Summary for Reach R2D-1: Reach 2D-1

[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 4.23" for 100-YR event
Inflow = 26.97 cfs @ 8.15 hrs, Volume= 9.654 af
Outflow = 26.96 cfs @ 8.15 hrs, Volume= 9.654 af, Atten= 0%, Lag= 0.4 min
Routed to Reach R2C-3 : Reach 2C-3

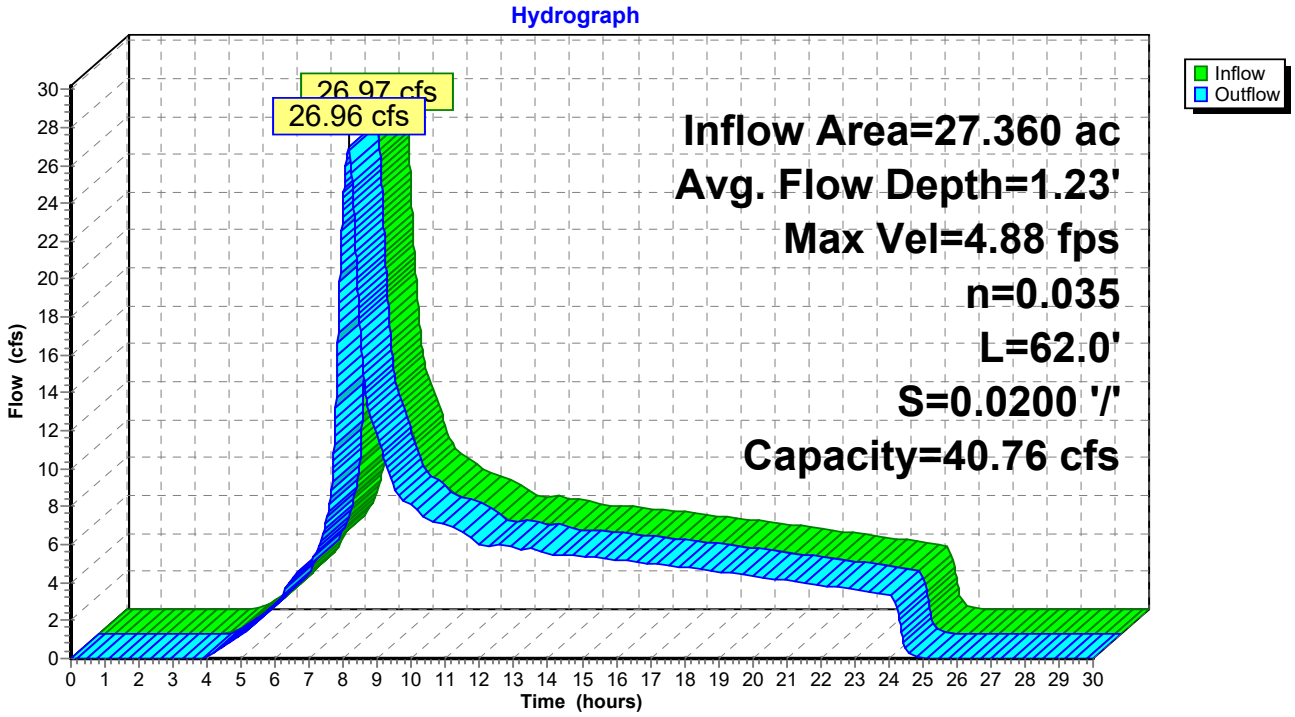
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.88 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.78 fps, Avg. Travel Time= 0.4 min

Peak Storage= 342 cf @ 8.15 hrs
Average Depth at Peak Storage= 1.23' , Surface Width= 6.94'
Bank-Full Depth= 1.50' Flow Area= 7.5 sf, Capacity= 40.76 cfs

2.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 8.00'
Length= 62.0' Slope= 0.0200 '/'
Inlet Invert= 0.00', Outlet Invert= -1.24'



Reach R2D-1: Reach 2D-1



Summary for Reach R2D-2: Reach 2D-2

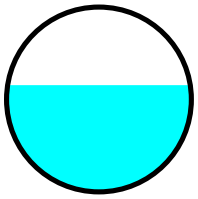
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 4.23" for 100-YR event
Inflow = 26.97 cfs @ 8.14 hrs, Volume= 9.654 af
Outflow = 26.97 cfs @ 8.15 hrs, Volume= 9.654 af, Atten= 0%, Lag= 0.2 min
Routed to Reach R2D-1 : Reach 2D-1

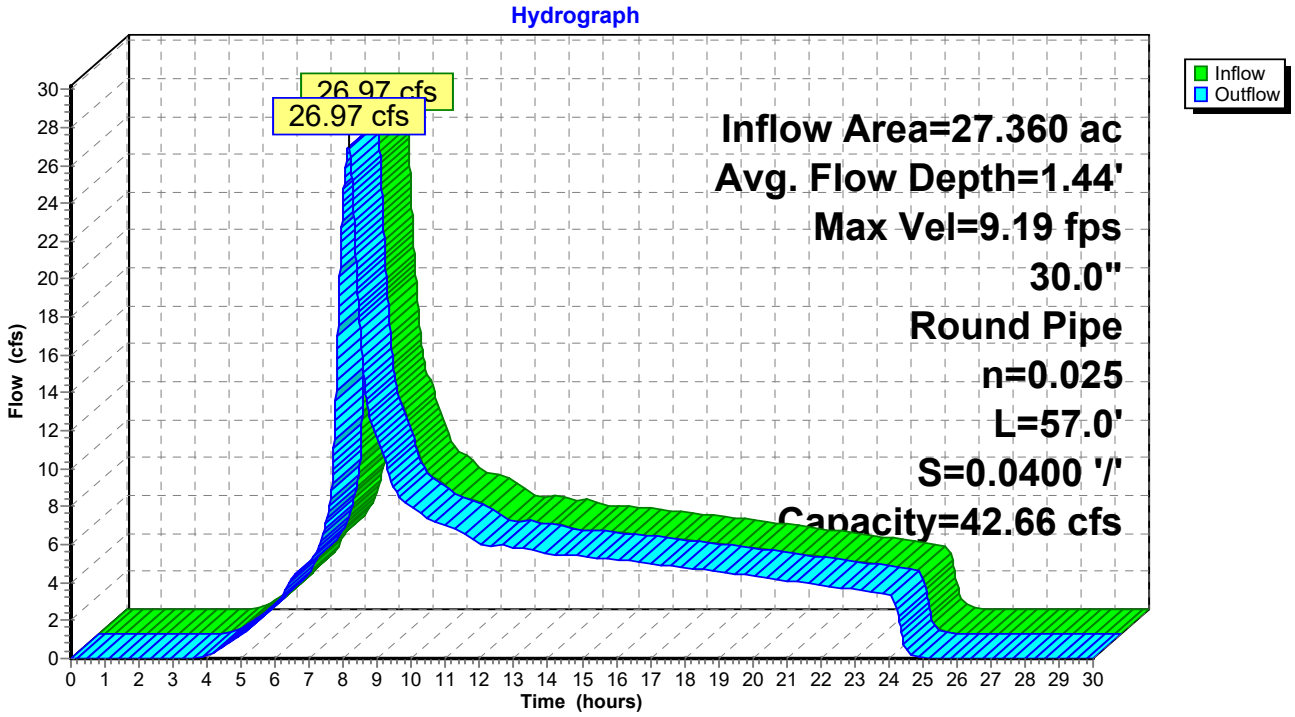
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 9.19 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 5.30 fps, Avg. Travel Time= 0.2 min

Peak Storage= 167 cf @ 8.15 hrs
Average Depth at Peak Storage= 1.44' , Surface Width= 2.47'
Bank-Full Depth= 2.50' Flow Area= 4.9 sf, Capacity= 42.66 cfs

30.0" Round Pipe
n= 0.025 Corrugated metal
Length= 57.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.28'



Reach R2D-2: Reach 2D-2



Summary for Reach R2D-3: Reach 2D-3

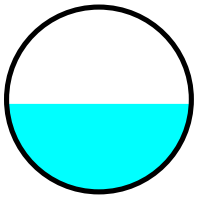
[52] Hint: Inlet/Outlet conditions not evaluated
[65] Warning: Inlet elevation not specified

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 4.23" for 100-YR event
Inflow = 26.97 cfs @ 8.14 hrs, Volume= 9.654 af
Outflow = 26.97 cfs @ 8.14 hrs, Volume= 9.654 af, Atten= 0%, Lag= 0.1 min
Routed to Reach R2D-2 : Reach 2D-2

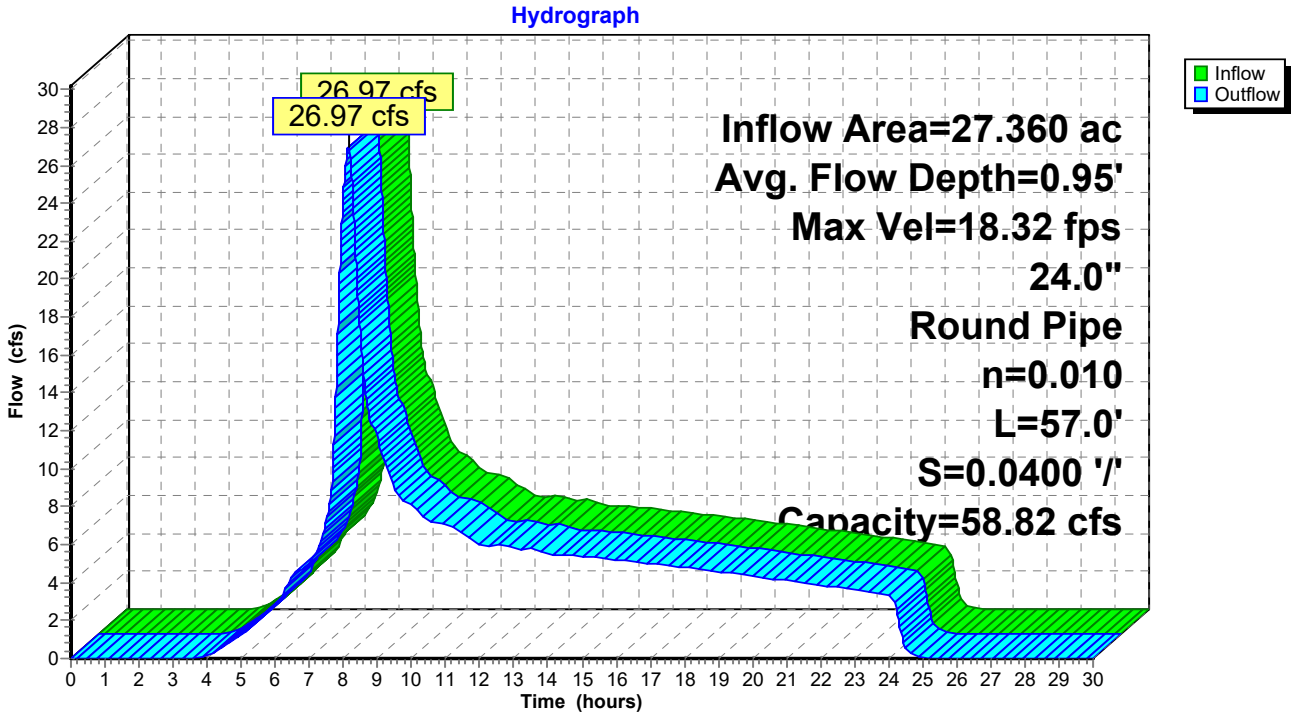
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 18.32 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 10.51 fps, Avg. Travel Time= 0.1 min

Peak Storage= 84 cf @ 8.14 hrs
Average Depth at Peak Storage= 0.95' , Surface Width= 2.00'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 58.82 cfs

24.0" Round Pipe
n= 0.010 PVC, smooth interior
Length= 57.0' Slope= 0.0400 '/'
Inlet Invert= 0.00', Outlet Invert= -2.28'



Reach R2D-3: Reach 2D-3



Summary for Reach R2D-4: Reach 2D-4

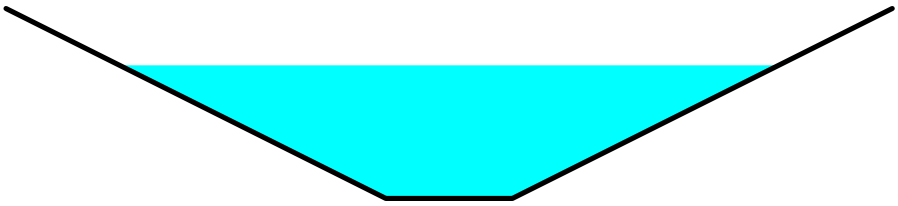
[65] Warning: Inlet elevation not specified
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=1)

Inflow Area = 27.360 ac, 2.18% Impervious, Inflow Depth = 4.23" for 100-YR event
Inflow = 27.03 cfs @ 8.09 hrs, Volume= 9.654 af
Outflow = 26.97 cfs @ 8.14 hrs, Volume= 9.654 af, Atten= 0%, Lag= 2.9 min
Routed to Reach R2D-3 : Reach 2D-3

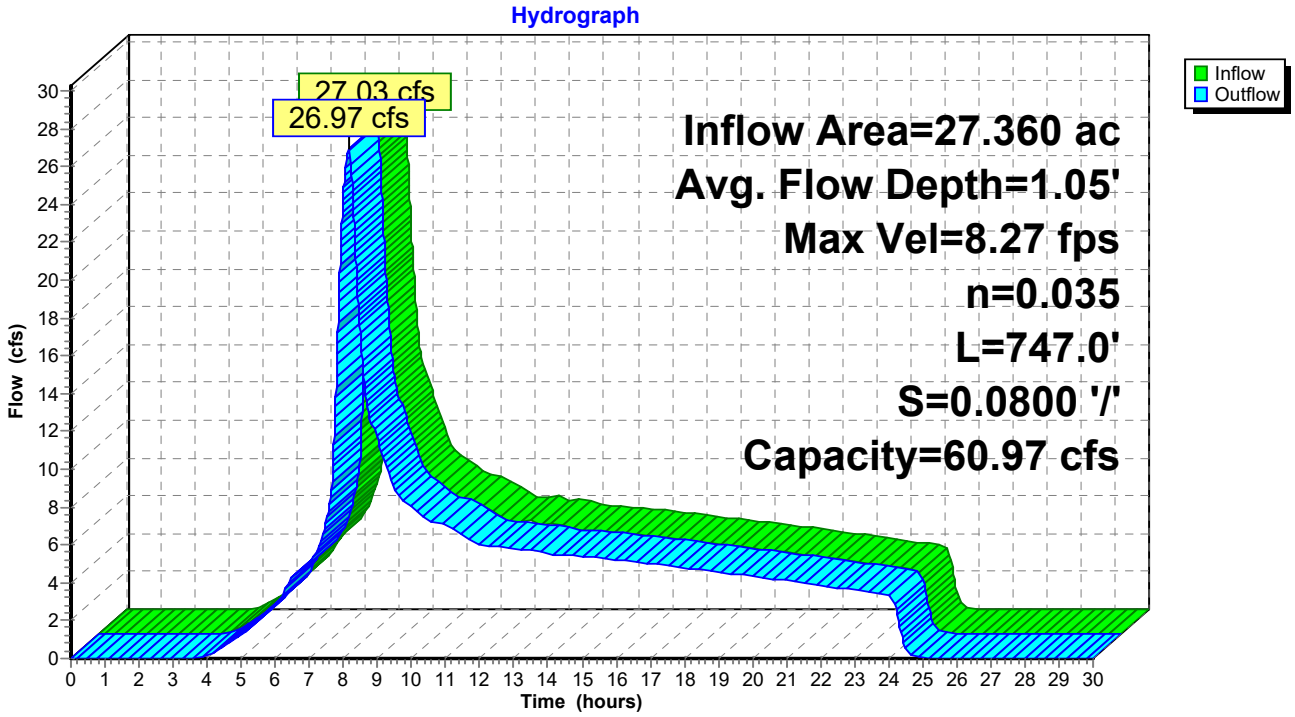
Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Max. Velocity= 8.27 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 4.86 fps, Avg. Travel Time= 2.6 min

Peak Storage= 2,435 cf @ 8.12 hrs
Average Depth at Peak Storage= 1.05' , Surface Width= 5.20'
Bank-Full Depth= 1.50' Flow Area= 6.0 sf, Capacity= 60.97 cfs

1.00' x 1.50' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 7.00'
Length= 747.0' Slope= 0.0800 '/'
Inlet Invert= 0.00', Outlet Invert= -59.76'



Reach R2D-4: Reach 2D-4



Summary for Pond 1P: Existing Reservoir

Inflow Area = 13.656 ac, 13.09% Impervious, Inflow Depth = 4.79" for 100-YR event
Inflow = 16.69 cfs @ 7.97 hrs, Volume= 5.447 af
Outflow = 2.83 cfs @ 15.27 hrs, Volume= 4.251 af, Atten= 83%, Lag= 438.1 min
Primary = 2.83 cfs @ 15.27 hrs, Volume= 4.251 af
Routed to Reach R2B-1 : Reach 2B-1

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Starting Elev= 99.00' Surf.Area= 2.150 ac Storage= 2.075 af
Peak Elev= 100.00' @ 15.27 hrs Surf.Area= 2.300 ac Storage= 4.299 af (2.224 af above start)

Plug-Flow detention time= 911.2 min calculated for 2.175 af (40% of inflow)
Center-of-Mass det. time= 326.6 min (1,080.9 - 754.3)

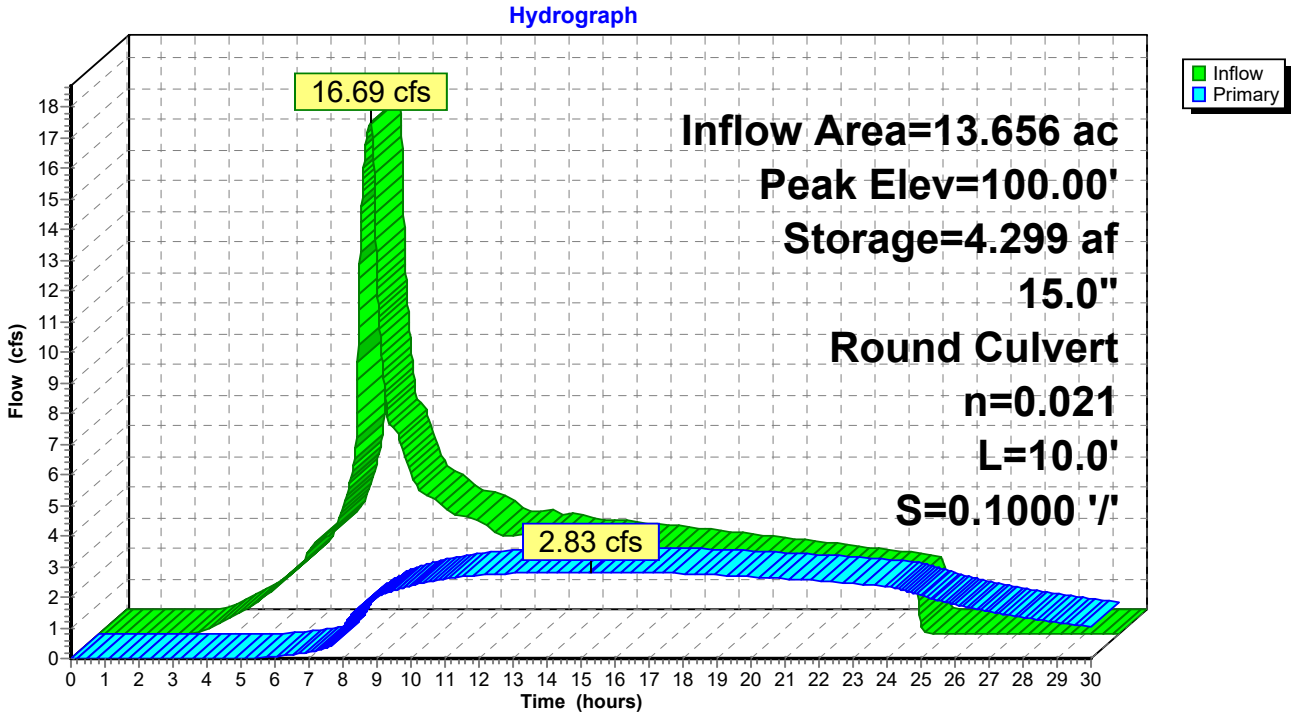
Volume	Invert	Avail.Storage	Storage Description
#1	98.00'	4.300 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
98.00	2.000	0.000	0.000
100.00	2.300	4.300	4.300

Device	Routing	Invert	Outlet Devices
#1	Primary	99.00'	**15.0" Round Culvert** L= 10.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 99.00' / 98.00' S= 0.1000 '/' Cc= 0.900 n= 0.021 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=2.83 cfs @ 15.27 hrs HW=100.00' (Free Discharge)
1=Culvert (Inlet Controls 2.83 cfs @ 2.69 fps)

Pond 1P: Existing Reservoir

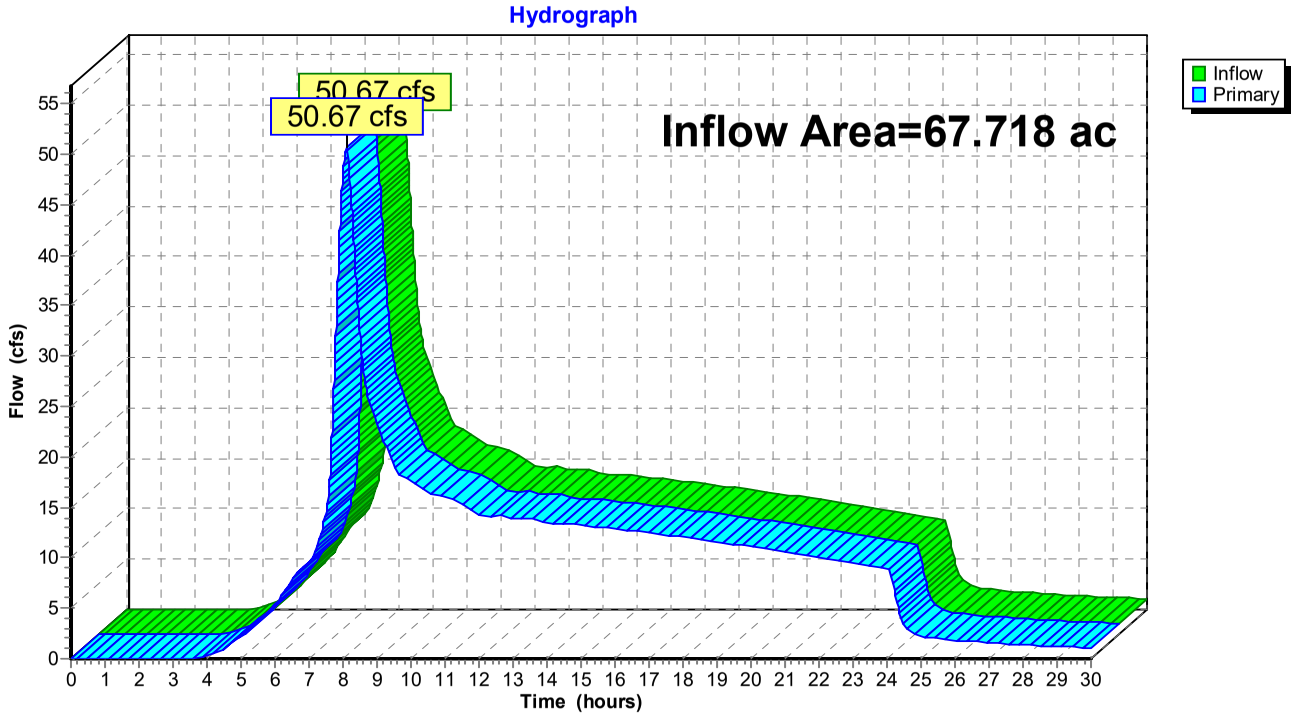


Summary for Link Outlet 2: Outlet 2

Inflow Area = 67.718 ac, 3.94% Impervious, Inflow Depth > 4.01" for 100-YR event
Inflow = 50.67 cfs @ 8.09 hrs, Volume= 22.643 af
Primary = 50.67 cfs @ 8.09 hrs, Volume= 22.643 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Link Outlet 2: Outlet 2





Subarea 3

Subcat Reach Pond Link

Routing Diagram for Wappo Hill Post-Project WS3-4
Prepared by PPI Engineering, Printed 11/9/2023
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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.393	79	Annual Grass, Fair, HSG C (WS-3)
0.561	79	Vineyard, Fair, HSG C (WS-3)
0.623	75	Vineyard, Good, HSG C (WS-3)
1.631	73	Woods, Fair, HSG C (WS-3)
5.208	**77**	**TOTAL AREA**



Subarea 4

Subcat Reach Pond Link

Routing Diagram for Wappo Hill Post-Project WS3-4
Prepared by PPI Engineering, Printed 11/9/2023
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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.570	79	Annual Grass, Fair, HSG C (WS-4)
0.181	75	Vineyard, Good, HSG C (WS-4)
1.391	73	Woods, Fair, HSG C (WS-4)
2.142	**75**	**TOTAL AREA**