

**Good Counsel – Main Campus
Mankato, MN**

HYDRAULIC DESIGN SUMMARY REPORT

For

Southwest Minnesota Housing Partnership

January 2026

Prepared by:
Widseth Consulting Engineers, Rochester, Minnesota

Project # 2025-10591

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.


Andre T. Ringle

01/27/2026
Lic. No. 60708

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DRAINAGE REPORT

Project Name:
Widseth Project #

Good Counsel Main Campus – Mankato, MN
2025-10591

SECTION 1.0 – Project Summary and Proposed Site Improvements

We have completed our analysis and design recommendation for the stormwater management system associated with the above referenced project. This design was guided by the MPCA NPDES permit and MnDOT.

Hydrologic & Hydraulic Modeling

The HydroCAD™ Ver. 10.0 modeling software was utilized to develop the hydrologic contributions serving the proposed project site. This software is adept at modeling urban drainage settings and can provide storage routing calculations under dynamic outlet conditions.

In accordance with MnDOT Technical Memorandum No. 13_08_B_04, NOAA Atlas 14 precipitation frequency data was utilized. Basin characteristics developed using the survey, along with NOAA Atlas 14 rainfall data, peak flows were generated utilizing SCS procedures. Where storage routing calculations were completed, SCS Unit Hydrograph procedures were utilized. See Appendix 1 for NOAA Atlas 14 precipitation frequency table.

PRE-Improvement Condition

The existing site consists of a developed campus that includes several buildings, an existing parking lot, and on-site utilities. There are steep, forested slopes surrounding the existing campus.

The existing soils on the project site are classified as HSG C/D according to web soil survey. See Appendix 2 for Soils Map.

POST-Improvement Condition

Proposed site improvements include the reconstruction and expansion of the existing parking lot and the associated stormwater and utility improvements to accommodate the expanded parking lot.

The stormwater runoff from the site will flow to proposed stormwater treatment basins located throughout the site. There will be one wet sedimentation basin and three filtration basins. Infiltration was not considered due to the presence of type D soils. Stormwater from the basins will be routed to existing storm sewer that flows down the adjacent bluff. The proposed stormwater improvements will reduce the runoff rate from the site and peak rate of water flowing directly down the bluff.

SECTION 2.0 – Water Quality Volume

Impervious Area:

Proposed impervious surface:	6.54	acres
Existing impervious surface:	4.75	acres
New & Reconstructed Impervious surface:	3.76	acres

Subcatchment / Node	Basin Type	Subcatchment Area (acres)	Impervious Area (acres)	Elevation of Max Water Quality Volume	Proposed Water Quality Volume (ft ³)
1S (1P)	Wet Sedimentation Basin	4.032	2.359	989.0	12462
3S (2P)	Filtration Basin	1.421	1.089	994.8	3906
6S (3P)	Filtration Basin	0.506	0.353	989.0	3262
8S (4P)	Filtration Basin	0.290	0.211	993.7	265
Total		6.249	4.012		19895

Impervious area shown is the entire impervious area planned to be routed to the given basin and does not represent the new and reconstructed impervious in a given catchment area.

Water Quality Volume:

Required Water Quality Volume:	0.31	acres-feet
Proposed Water Quality Volume:	0.46	acres-feet
Excess Water Quality Volume:	0.15	acres-feet

The required water quality volume was calculated using 1” of depth across the entire new and reconstructed impervious area.

SECTION 3.0 – PRE & POST-Improvement Discharge Rates:

Discharge Rates:

See Tables 1 & 2 for the PRE-Improvement & POST-Improvement Conditions for discharge rates for the 2, 10, and 100-year storm events.

Table 1 – PRE-Improvement Discharge Rates

Subcatchment	HydroCAD Node	Area (acres)	CN	2-Year Storm (cfs)	10-Year Storm (cfs)	100-Year Storm (cfs)
NW Storm Sewer	1R	4.887	88	6	23.8	44.1
West Storm Sewer	2R	1.739	85	1.7	7.8	15.1
West Bluff	3R	0.613	92	1	3.3	5.8
South Storm Sewer	4R	1.19	91	1.8	6.2	11.1
SE Bluff - To Road	5R	1.578	85	1.7	7.3	13.9
East Storm Sewer	6R	0.411	88	0.9	2.4	4
North Bluff	7R	0.492	97	0.2	1.5	3.2
Total		10.91	88	13.3	52.3	97.2

Table 2 – POST-Improvement Discharge Rates

Subcatchment	HydroCAD Node	Area (acres)	CN	2-Year Storm (cfs)	10-Year Storm (cfs)	100-Year Storm (cfs)
NW Storm Sewer	1R	5.343	91	2.7	13.8	20.1
West Storm Sewer	2R	2.034	91	1	7.3	11.4
West Bluff	3R	0.502	82	0.4	2.1	4.1
South Storm Sewer	4R	2.144	91	2.1	7.3	13.6
SE Bluff - To Road	5R	0.099	80	0.1	1.5	3.1
East Storm Sewer	6R	0.788	91	1.4	4.3	7.5
North Bluff	7R	0.000	-	0.0	0.0	0.0
Total		10.91	90	7.7	36.3	59.8

SECTION 4.0 – Risk Assessment

All proposed stormwater treatment basins and low points have HWL's at least one foot below the lowest adjacent FFE and emergency overflow of sufficient width to convey flows beyond the design storm.

Minor Adjustments

Minor adjustments in placement of structures and conveyance piping orientation will not invalidate this design/analysis. A variety of design and performance data can be found in the attached summary results information. Additional calculations and results will be stored in the project design file. Any exceptions to system contribution, sizing, invert elevations or locations should be revisited before final plans, specifications, and engineering.

Appendix

- 1 NOAA Atlas 14 Precipitation Frequency Table
- 2 Hydrologic Soils Group Map
- 3 Pre-Development Drainage Map & Hydrology Calculations for the 2, 10, & 100-year storm events (HydroCAD)
- 4 Post-Development Drainage Map & Hydrology Calculations for the 2, 10, & 100-year storm events (HydroCAD)

APPENDIX 1

NOAA Atlas 14 **Precipitation Frequency Table**



NOAA Atlas 14, Volume 8, Version 2
Location name: Mankato, Minnesota, USA*
Latitude: 44.1661°, Longitude: -94.0054°
Elevation: 778 ft**
 * source: ESRI Maps
 ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffrey Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerals](#)

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.376 (0.297-0.489)	0.448 (0.353-0.582)	0.569 (0.447-0.741)	0.673 (0.525-0.879)	0.821 (0.619-1.10)	0.938 (0.690-1.27)	1.06 (0.751-1.45)	1.18 (0.805-1.66)	1.36 (0.884-1.93)	1.49 (0.944-2.14)
10-min	0.551 (0.434-0.715)	0.656 (0.517-0.853)	0.833 (0.655-1.08)	0.985 (0.769-1.29)	1.20 (0.907-1.61)	1.37 (1.01-1.86)	1.55 (1.10-2.13)	1.74 (1.18-2.43)	1.99 (1.30-2.83)	2.18 (1.38-3.14)
15-min	0.671 (0.530-0.873)	0.800 (0.631-1.04)	1.02 (0.798-1.32)	1.20 (0.938-1.57)	1.46 (1.11-1.96)	1.68 (1.23-2.26)	1.89 (1.34-2.60)	2.12 (1.44-2.96)	2.42 (1.58-3.45)	2.66 (1.69-3.82)
30-min	0.909 (0.718-1.18)	1.09 (0.857-1.41)	1.39 (1.09-1.81)	1.64 (1.28-2.15)	2.01 (1.52-2.69)	2.30 (1.69-3.11)	2.60 (1.84-3.57)	2.91 (1.98-4.07)	3.34 (2.18-4.76)	3.67 (2.32-5.27)
60-min	1.18 (0.928-1.53)	1.40 (1.10-1.81)	1.78 (1.39-2.31)	2.11 (1.65-2.76)	2.60 (1.97-3.51)	3.01 (2.22-4.08)	3.44 (2.44-4.74)	3.89 (2.64-5.45)	4.52 (2.95-6.46)	5.02 (3.18-7.21)
2-hr	1.44 (1.15-1.84)	1.70 (1.36-2.18)	2.16 (1.72-2.78)	2.58 (2.04-3.32)	3.20 (2.46-4.27)	3.72 (2.78-4.99)	4.27 (3.08-5.83)	4.86 (3.35-6.76)	5.70 (3.76-8.07)	6.38 (4.08-9.06)
3-hr	1.62 (1.30-2.05)	1.90 (1.53-2.41)	2.41 (1.93-3.06)	2.88 (2.29-3.67)	3.59 (2.79-4.77)	4.20 (3.17-5.61)	4.85 (3.52-6.59)	5.56 (3.86-7.69)	6.58 (4.38-9.26)	7.40 (4.76-10.4)
6-hr	1.90 (1.55-2.38)	2.23 (1.82-2.79)	2.83 (2.30-3.55)	3.39 (2.74-4.26)	4.26 (3.35-5.59)	5.00 (3.82-6.59)	5.80 (4.27-7.79)	6.68 (4.70-9.14)	7.94 (5.35-11.1)	8.98 (5.84-12.5)
12-hr	2.17 (1.79-2.66)	2.55 (2.10-3.14)	3.24 (2.67-4.00)	3.88 (3.18-4.81)	4.87 (3.88-6.29)	5.70 (4.41-7.41)	6.60 (4.92-8.74)	7.59 (5.39-10.2)	9.00 (6.12-12.4)	10.1 (6.68-14.0)
24-hr	2.47 (2.07-2.99)	2.87 (2.40-3.48)	3.60 (3.00-4.37)	4.28 (3.55-5.22)	5.33 (4.31-6.79)	6.22 (4.88-7.98)	7.19 (5.42-9.40)	8.25 (5.94-11.0)	9.77 (6.72-13.3)	11.0 (7.32-15.1)
2-day	2.87 (2.44-3.42)	3.24 (2.75-3.86)	3.94 (3.33-4.70)	4.61 (3.87-5.53)	5.67 (4.65-7.14)	6.59 (5.24-8.35)	7.61 (5.82-9.83)	8.73 (6.37-11.5)	10.4 (7.23-14.0)	11.7 (7.88-15.8)
3-day	3.14 (2.69-3.70)	3.52 (3.01-4.15)	4.23 (3.61-5.01)	4.91 (4.16-5.84)	5.99 (4.95-7.46)	6.92 (5.54-8.68)	7.94 (6.11-10.2)	9.07 (6.66-11.9)	10.7 (7.52-14.4)	12.1 (8.17-16.2)
4-day	3.35 (2.89-3.93)	3.75 (3.23-4.40)	4.50 (3.86-5.29)	5.20 (4.43-6.14)	6.29 (5.22-7.76)	7.22 (5.81-8.99)	8.24 (6.37-10.5)	9.36 (6.90-12.2)	11.0 (7.74-14.6)	12.3 (8.38-16.5)
7-day	3.88 (3.38-4.49)	4.35 (3.78-5.03)	5.18 (4.49-6.01)	5.93 (5.11-6.91)	7.06 (5.90-8.56)	8.00 (6.49-9.80)	9.01 (7.02-11.3)	10.1 (7.50-13.0)	11.6 (8.26-15.3)	12.9 (8.84-17.1)
10-day	4.39 (3.86-5.04)	4.92 (4.31-5.64)	5.82 (5.08-6.69)	6.61 (5.74-7.64)	7.77 (6.52-9.30)	8.72 (7.11-10.6)	9.72 (7.62-12.0)	10.8 (8.05-13.7)	12.3 (8.74-16.0)	13.4 (9.27-17.7)
20-day	6.03 (5.37-6.80)	6.70 (5.96-7.56)	7.80 (6.90-8.82)	8.72 (7.67-9.90)	9.99 (8.46-11.7)	11.0 (9.06-13.0)	12.0 (9.49-14.6)	13.0 (9.81-16.2)	14.4 (10.4-18.4)	15.4 (10.8-20.1)
30-day	7.45 (6.69-8.31)	8.26 (7.40-9.22)	9.56 (8.54-10.7)	10.6 (9.42-11.9)	12.0 (10.3-13.9)	13.1 (10.9-15.4)	14.2 (11.3-17.0)	15.2 (11.5-18.8)	16.6 (12.0-21.0)	17.5 (12.4-22.7)
45-day	9.24 (8.37-10.2)	10.3 (9.29-11.4)	11.9 (10.7-13.2)	13.2 (11.8-14.7)	14.9 (12.7-16.9)	16.1 (13.4-18.6)	17.2 (13.8-20.5)	18.3 (14.0-22.4)	19.7 (14.4-24.8)	20.7 (14.6-26.6)
60-day	10.8 (9.80-11.8)	12.0 (10.9-13.2)	13.9 (12.6-15.3)	15.4 (13.9-17.1)	17.4 (14.9-19.6)	18.8 (15.7-21.5)	20.0 (16.1-23.6)	21.2 (16.3-25.7)	22.7 (16.6-28.3)	23.6 (16.8-30.2)

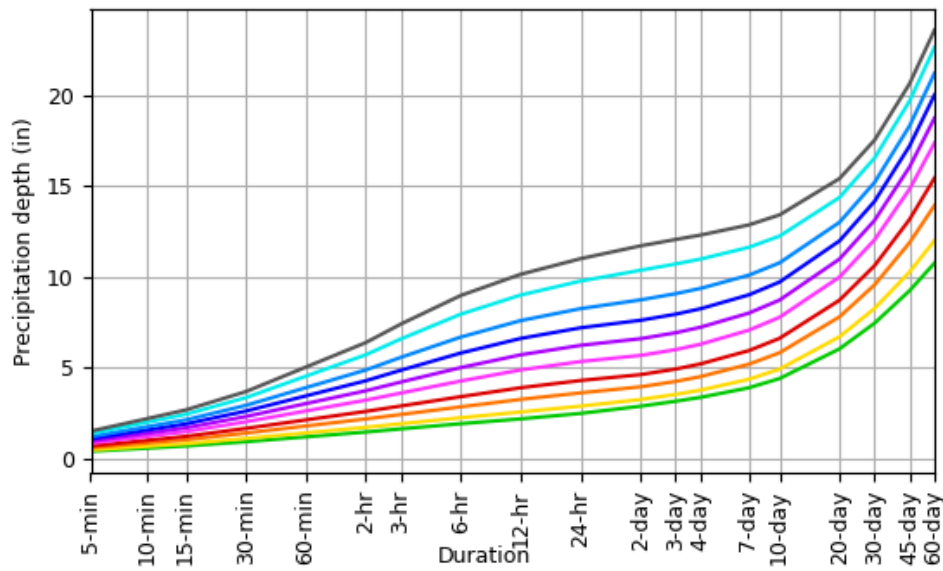
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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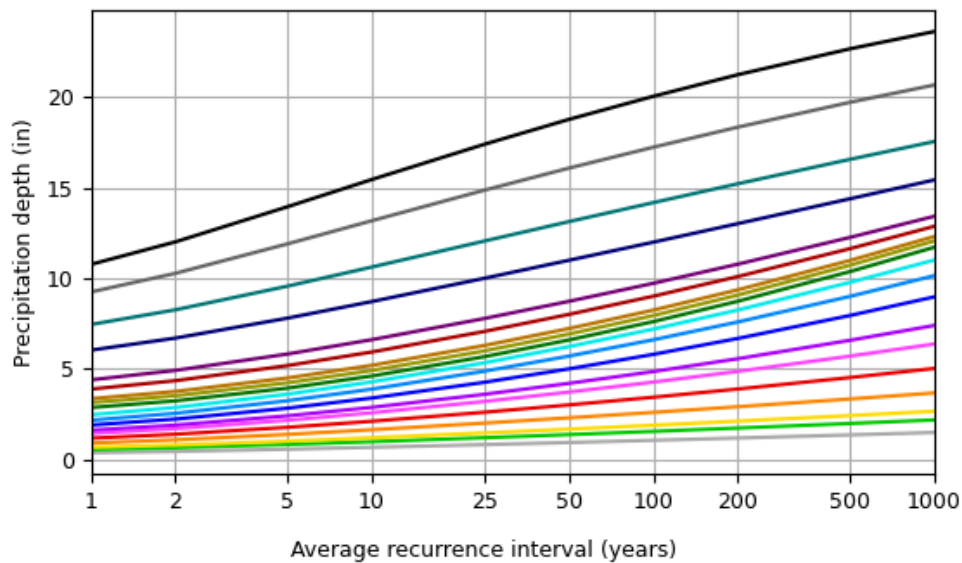
PF graphical

PDS-based depth-duration-frequency (DDF) curves

Latitude: 44.1661°, Longitude: -94.0054°



Average recurrence interval (years)
1
2
5
10
25
50
100
200
500
1000

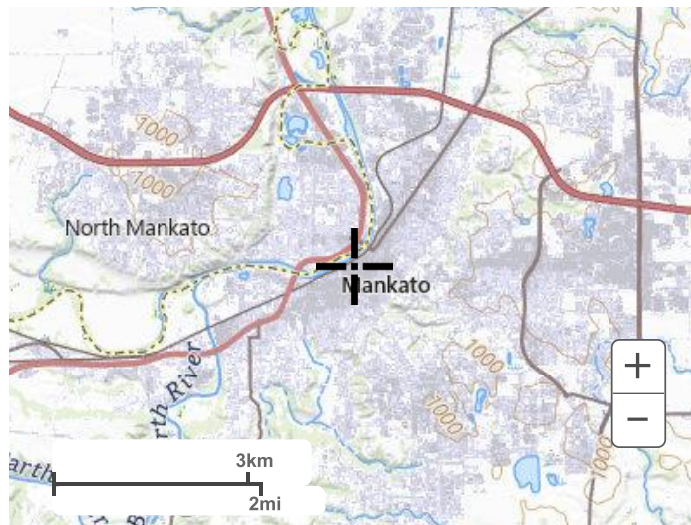


Duration	
5-min	2-day
10-min	3-day
15-min	4-day
30-min	7-day
60-min	10-day
2-hr	20-day
3-hr	30-day
6-hr	45-day
12-hr	60-day
24-hr	

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Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

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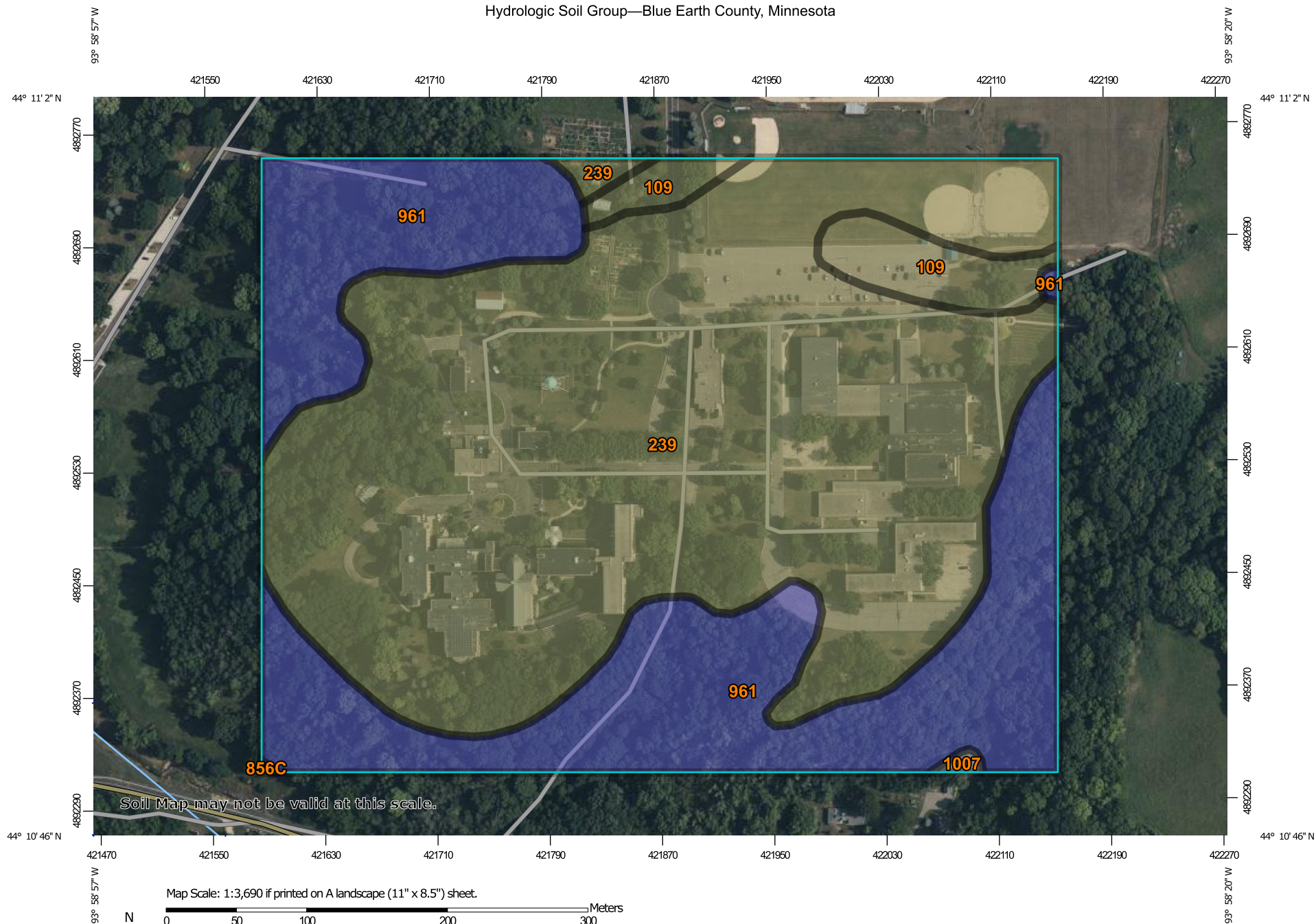
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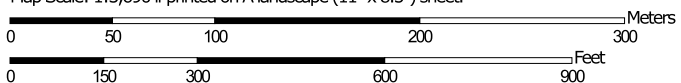
APPENDIX 2

Hydrologic Soils Group Map

Hydrologic Soil Group—Blue Earth County, Minnesota



Map Scale: 1:3,690 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge ticks: UTM Zone 15N WGS84



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

12/3/2025
Page 1 of 4

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Blue Earth County, Minnesota
 Survey Area Data: Version 23, Sep 9, 2025

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

Date(s) aerial images were photographed: Jul 2, 2023—Aug 8, 2023

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
109	Cordova clay loam, 0 to 2 percent slopes	C/D	2.4	4.0%
239	Le Sueur loam, 1 to 3 percent slopes	C/D	39.8	64.8%
856C	Terril-Urban land complex, 6 to 15 percent slopes	B	0.0	0.0%
961	Storden complex, very steep	B	19.0	31.0%
1007	Alluvial-Urban land complex		0.1	0.2%
Totals for Area of Interest			61.4	100.0%

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

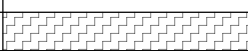
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX 3

Pre-Development Drainage Area Map And HydroCAD Report

PRE-DEVELOPMENT DRAINAGE MAP

EXISTING SUBCATCHMENT BOUNDARY	
EXISTING IMPERVIOUS AREA	



DRAWN BY:
ATR
CHECKED BY:
CNB

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL PROFESSION UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNER NAME

LIC. NO.: NUMBER DATE: JANUARY 2025

DATE	REV#	REVISIONS DESCRIPTION

WIDSETH
ARCHITECTS • ENGINEERS • SCIENTISTS • SURVEYORS

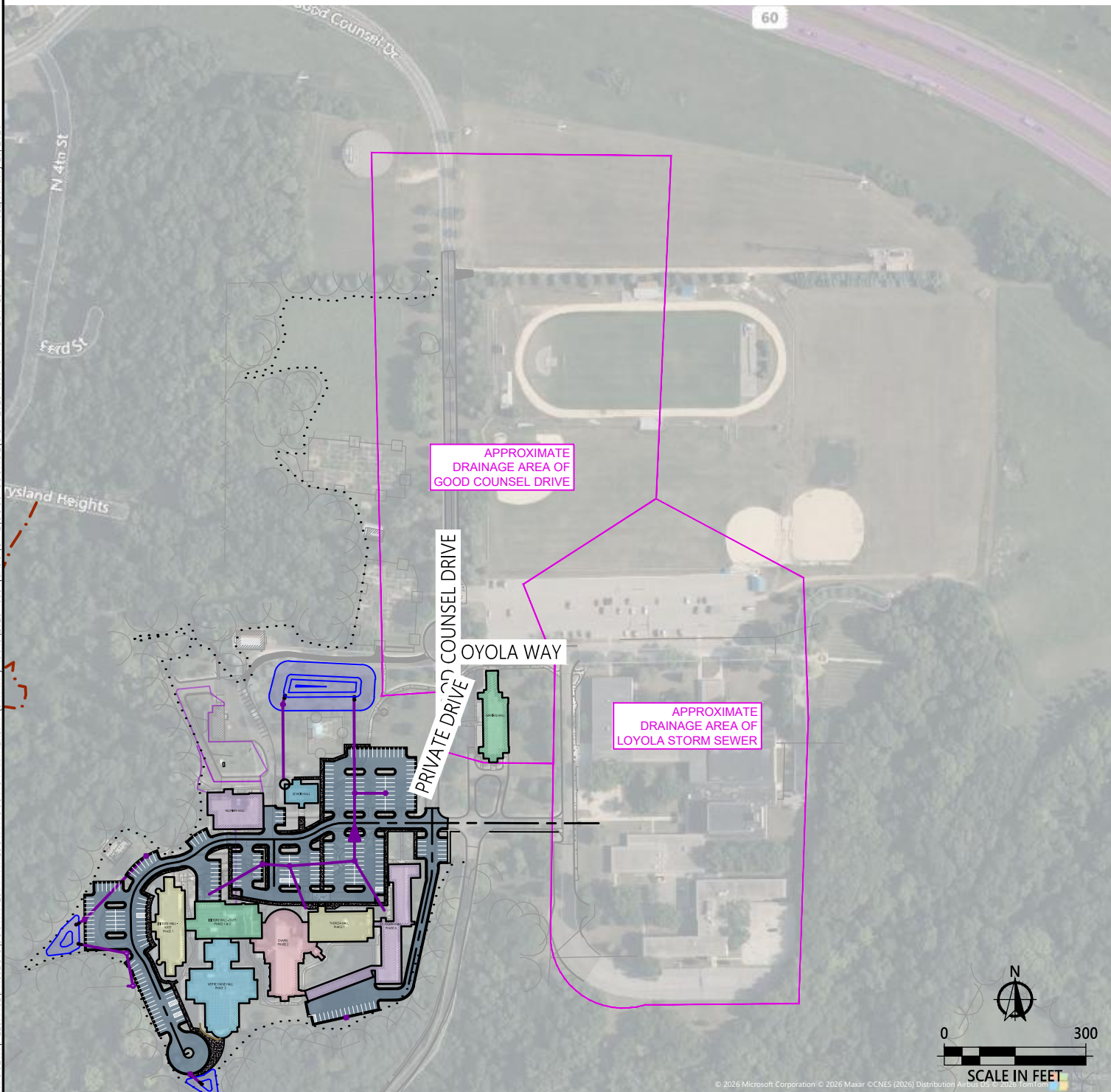
PRE-DEVELOPMENT DRAINAGE MAP

GOOD COUNSEL MAIN CAMPUS

PROJECT #: 2025-10591

LOYOLA STORM SEWER DRAINAGE MAP

SUBCATCHMENT BOUNDARY



DRAWN BY:
ATR
CHECKED BY:
CNB

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL PROFESSION UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNER NAME

LIC. NO.: NUMBER DATE: JANUARY 2025

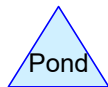
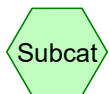
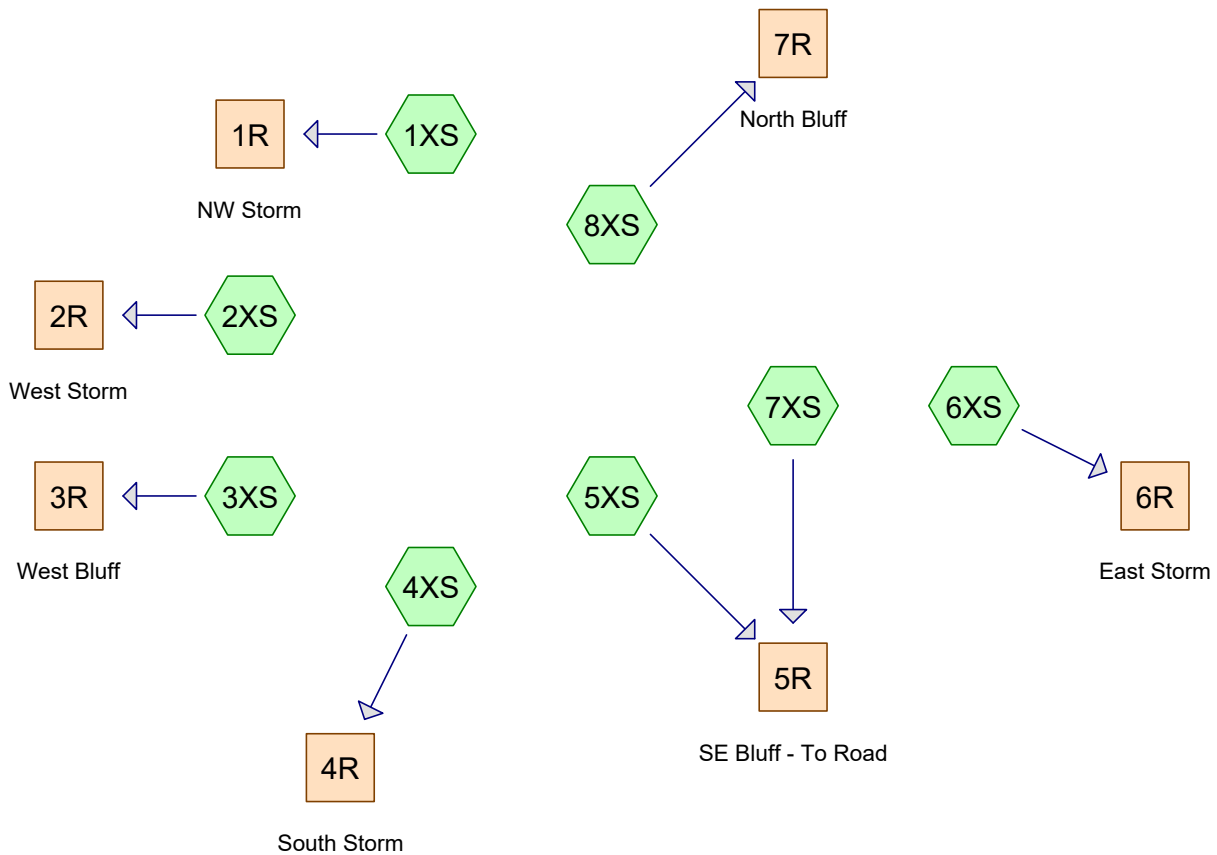
DATE	REV#	REVISIONS DESCRIPTION

WIDSETH
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LOYOLA STORM SEWER DRAINAGE MAP

GOOD COUNSEL MAIN CAMPUS

PROJECT #: 2025-10591



Pre-Development

Prepared by Widseth Smith Nolting

Printed 1/22/2026

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	Type II 24-hr		Default	24.00	1	1.70	2
2	10-YR	Type II 24-hr		Default	24.00	1	4.28	2
3	100-YR	Type II 24-hr		Default	24.00	1	7.19	2

Pre-Development

Prepared by Widseth Smith Nolting

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.067	80	>75% Grass cover, Good, HSG D (1XS, 2XS, 3XS, 4XS, 5XS, 6XS, 7XS, 8XS)
4.753	98	Paved parking, HSG D (1XS, 2XS, 3XS, 4XS, 5XS, 6XS, 7XS)
10.821	88	TOTAL AREA

Pre-Development

Prepared by Widseth Smith Nolting

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
10.821	HSG D	1XS, 2XS, 3XS, 4XS, 5XS, 6XS, 7XS, 8XS
0.000	Other	
10.821		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	6.067	0.000	6.067	>75% Grass cover, Good	1XS, 2XS, 3XS, 4XS, 5XS, 6XS, 7XS, 8XS
0.000	0.000	0.000	4.753	0.000	4.753	Paved parking	1XS, 2XS, 3XS, 4XS, 5XS, 6XS, 7XS
0.000	0.000	0.000	10.821	0.000	10.821	TOTAL AREA	

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Type II 24-hr 2-YR Rainfall=1.70"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1XS:	Runoff Area=212,871 sf 45.04% Impervious Runoff Depth>0.67" Tc=7.0 min CN=88 Runoff=6.0 cfs 0.272 af
Subcatchment2XS:	Runoff Area=75,763 sf 26.31% Impervious Runoff Depth>0.53" Tc=7.0 min CN=85 Runoff=1.7 cfs 0.076 af
Subcatchment3XS:	Runoff Area=26,713 sf 64.20% Impervious Runoff Depth>0.90" Tc=7.0 min CN=92 Runoff=1.0 cfs 0.046 af
Subcatchment4XS:	Runoff Area=51,828 sf 60.81% Impervious Runoff Depth>0.84" Tc=7.0 min CN=91 Runoff=1.8 cfs 0.083 af
Subcatchment5XS:	Runoff Area=41,786 sf 30.44% Impervious Runoff Depth>0.53" Tc=7.0 min CN=85 Runoff=0.9 cfs 0.042 af
Subcatchment6XS:	Runoff Area=17,899 sf 96.42% Impervious Runoff Depth>1.29" Tc=7.0 min CN=97 Runoff=0.9 cfs 0.044 af
Subcatchment7XS:	Runoff Area=26,971 sf 46.75% Impervious Runoff Depth>0.67" Tc=7.0 min CN=88 Runoff=0.8 cfs 0.034 af
Subcatchment8XS:	Runoff Area=17,512 sf 0.00% Impervious Runoff Depth>0.34" Tc=7.0 min CN=80 Runoff=0.2 cfs 0.012 af
Reach 1R: NW Storm	Inflow=6.0 cfs 0.272 af Outflow=6.0 cfs 0.272 af
Reach 2R: West Storm	Inflow=1.7 cfs 0.076 af Outflow=1.7 cfs 0.076 af
Reach 3R: West Bluff	Inflow=1.0 cfs 0.046 af Outflow=1.0 cfs 0.046 af
Reach 4R: South Storm	Inflow=1.8 cfs 0.083 af Outflow=1.8 cfs 0.083 af
Reach 5R: SE Bluff - To Road	Inflow=1.7 cfs 0.077 af Outflow=1.7 cfs 0.077 af
Reach 6R: East Storm	Inflow=0.9 cfs 0.044 af Outflow=0.9 cfs 0.044 af
Reach 7R: North Bluff	Inflow=0.2 cfs 0.012 af Outflow=0.2 cfs 0.012 af

Total Runoff Area = 10.821 ac Runoff Volume = 0.609 af Average Runoff Depth = 0.68"
56.07% Pervious = 6.067 ac 43.93% Impervious = 4.753 ac

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Type II 24-hr 2-YR Rainfall=1.70"

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Summary for Subcatchment 1XS:

Runoff = 6.0 cfs @ 11.99 hrs, Volume= 0.272 af, Depth> 0.67"
Routed to Reach 1R : NW Storm

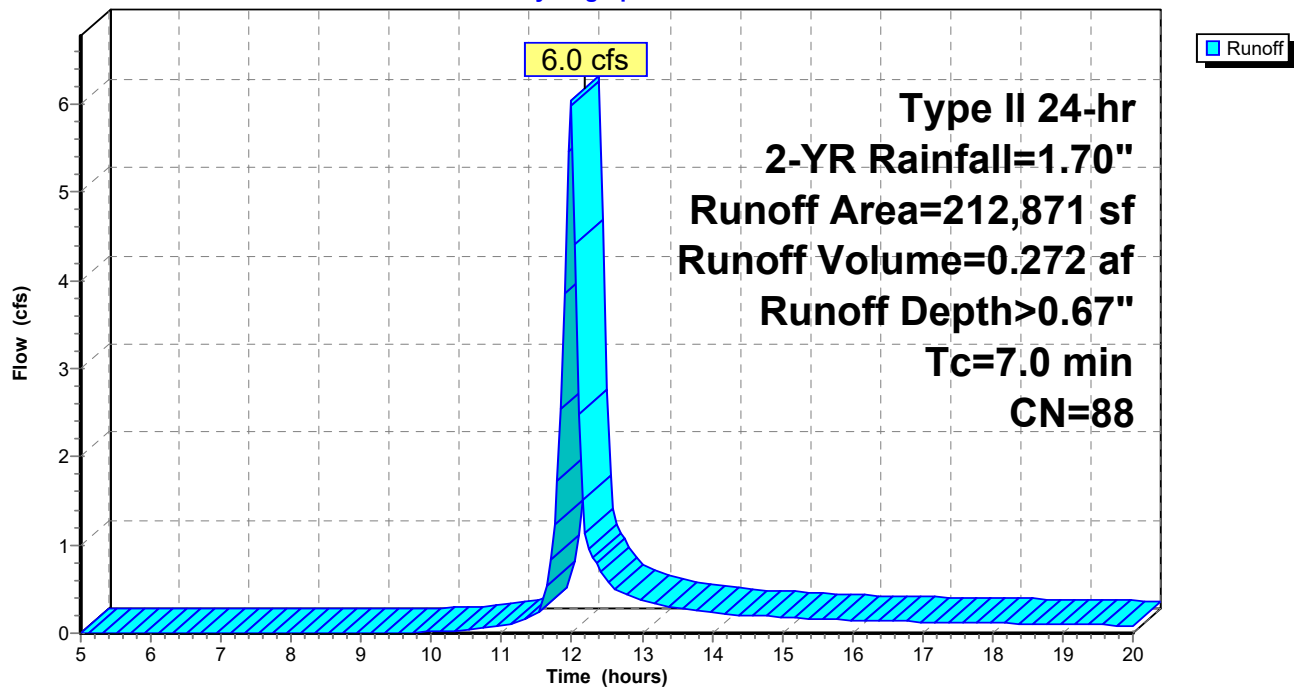
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
95,871	98	Paved parking, HSG D
117,000	80	>75% Grass cover, Good, HSG D
212,871	88	Weighted Average
117,000		54.96% Pervious Area
95,871		45.04% Impervious Area

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

Subcatchment 1XS:

Hydrograph



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Type II 24-hr 2-YR Rainfall=1.70"

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Summary for Subcatchment 2XS:

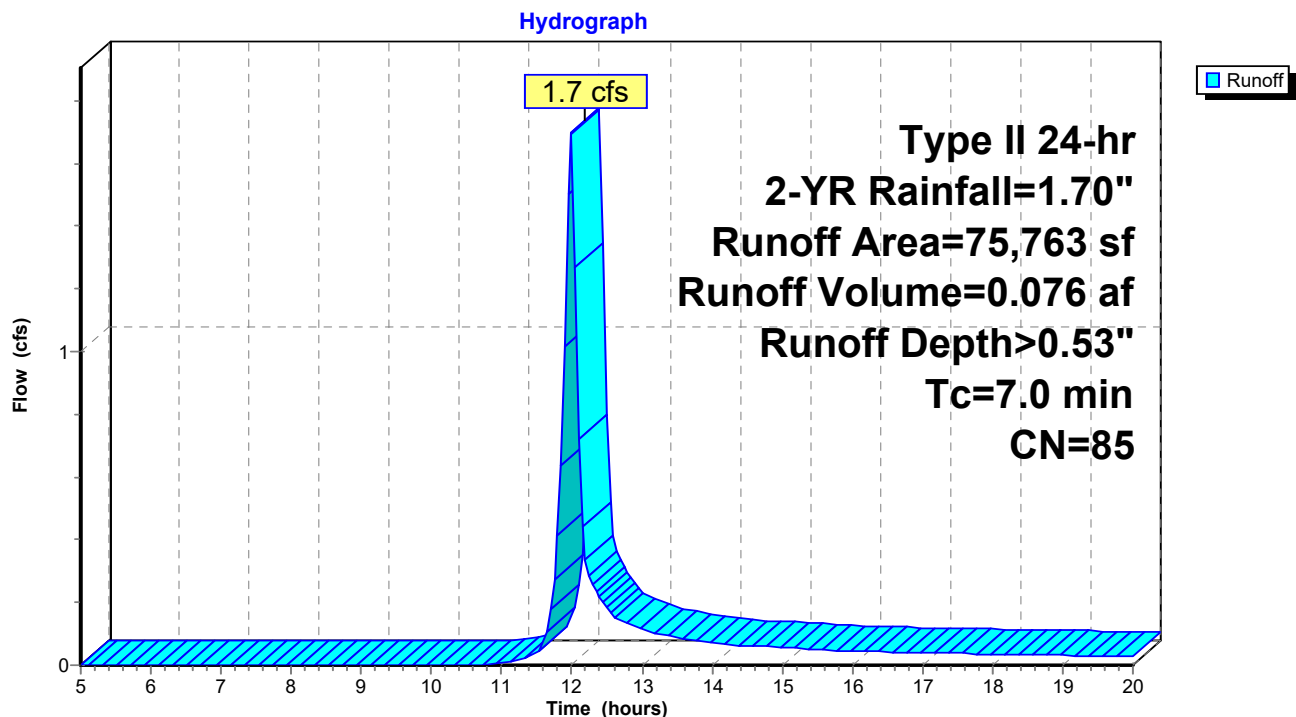
Runoff = 1.7 cfs @ 11.99 hrs, Volume= 0.076 af, Depth> 0.53"
Routed to Reach 2R : West Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
19,931	98	Paved parking, HSG D
55,832	80	>75% Grass cover, Good, HSG D
75,763	85	Weighted Average
55,832		73.69% Pervious Area
19,931		26.31% Impervious Area

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

Subcatchment 2XS:



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Type II 24-hr 2-YR Rainfall=1.70"

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Summary for Subcatchment 3XS:

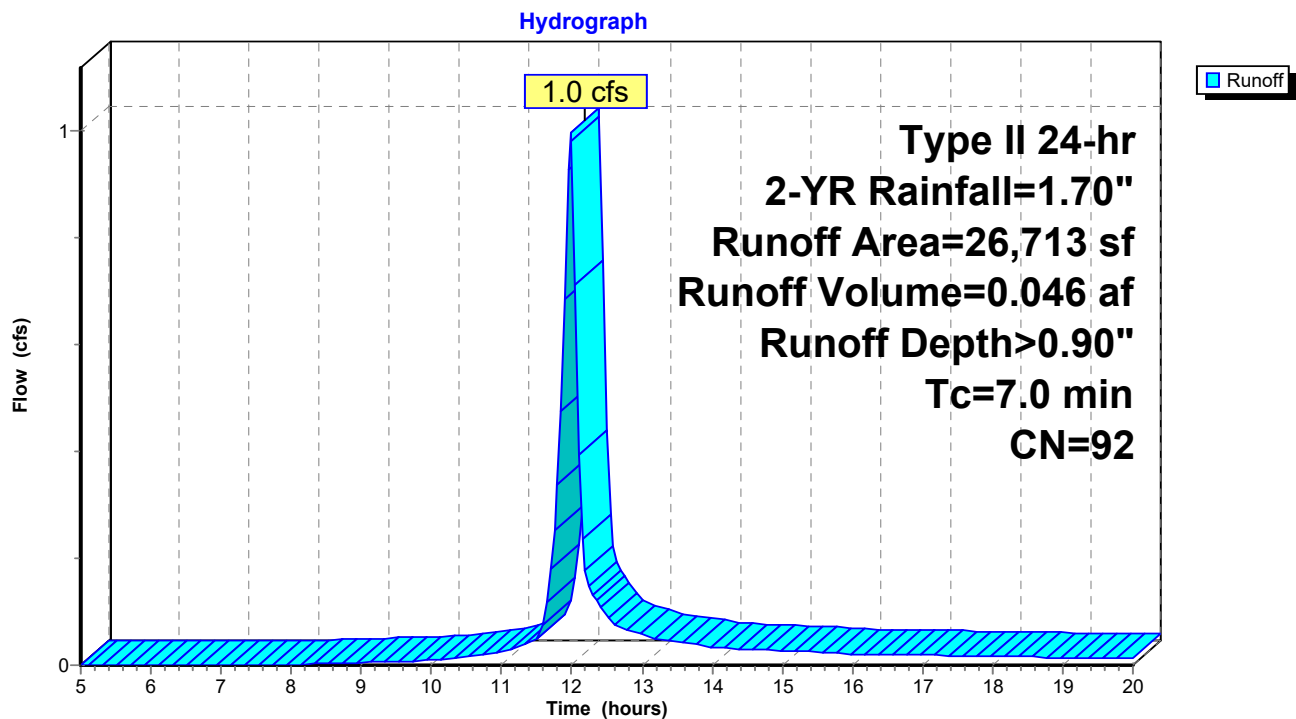
Runoff = 1.0 cfs @ 11.98 hrs, Volume= 0.046 af, Depth> 0.90"
Routed to Reach 3R : West Bluff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
17,151	98	Paved parking, HSG D
9,562	80	>75% Grass cover, Good, HSG D
26,713	92	Weighted Average
9,562		35.80% Pervious Area
17,151		64.20% Impervious Area

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

Subcatchment 3XS:



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Summary for Subcatchment 4XS:

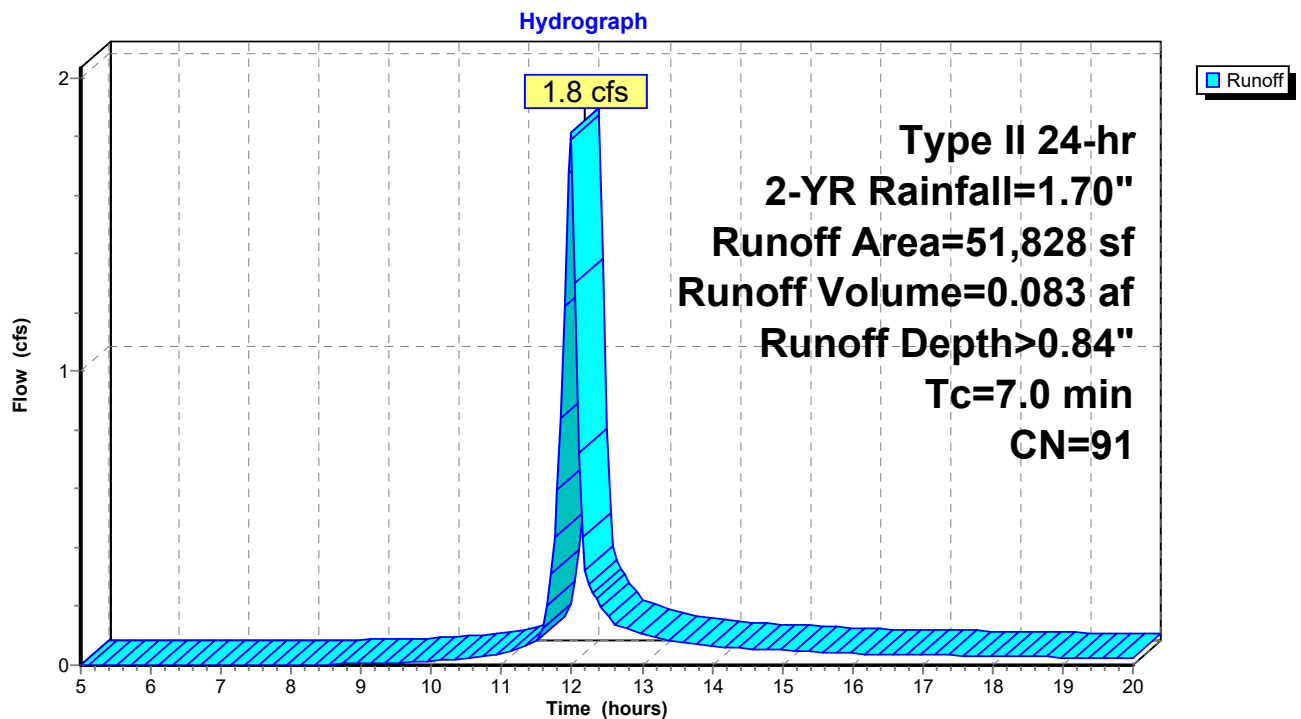
Runoff = 1.8 cfs @ 11.98 hrs, Volume= 0.083 af, Depth> 0.84"
Routed to Reach 4R : South Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
31,516	98	Paved parking, HSG D
20,312	80	>75% Grass cover, Good, HSG D
51,828	91	Weighted Average
20,312		39.19% Pervious Area
31,516		60.81% Impervious Area

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

Subcatchment 4XS:



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Type II 24-hr 2-YR Rainfall=1.70"

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Summary for Subcatchment 5XS:

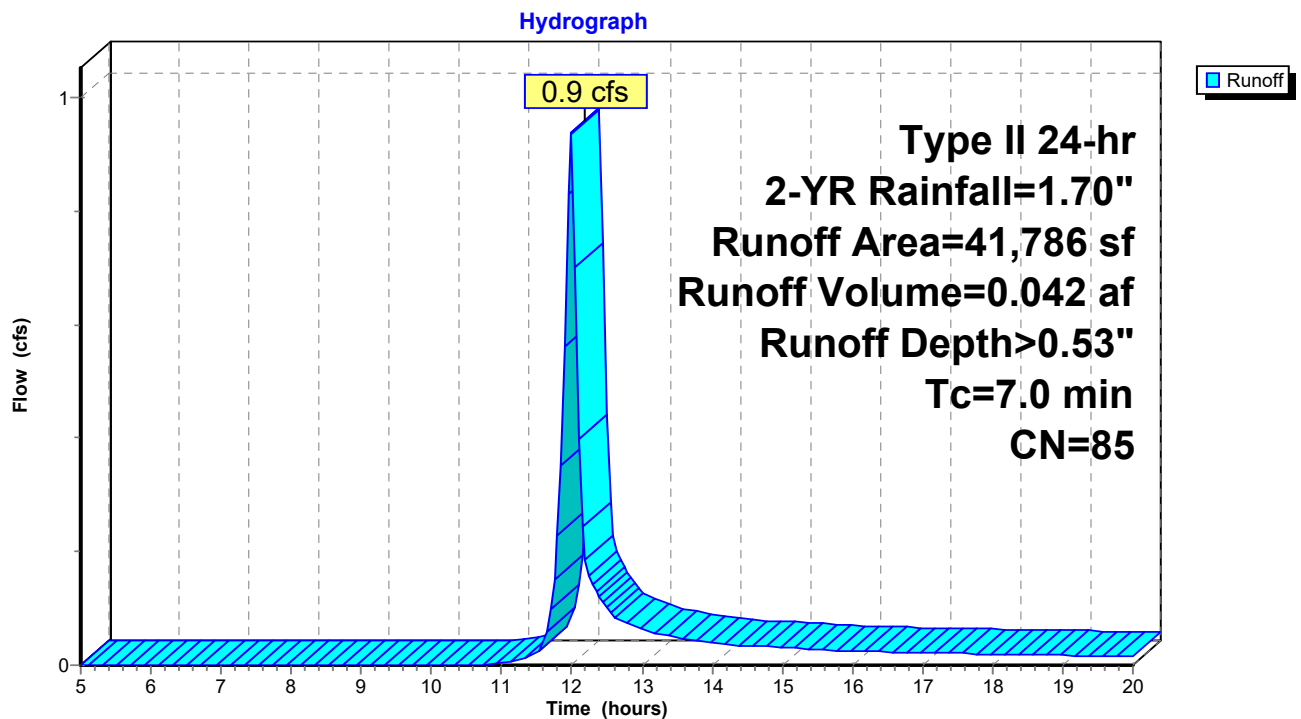
Runoff = 0.9 cfs @ 11.99 hrs, Volume= 0.042 af, Depth> 0.53"
Routed to Reach 5R : SE Bluff - To Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
12,719	98	Paved parking, HSG D
29,067	80	>75% Grass cover, Good, HSG D
41,786	85	Weighted Average
29,067		69.56% Pervious Area
12,719		30.44% Impervious Area

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

Subcatchment 5XS:



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Type II 24-hr 2-YR Rainfall=1.70"

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Summary for Subcatchment 6XS:

Runoff = 0.9 cfs @ 11.98 hrs, Volume= 0.044 af, Depth> 1.29"
Routed to Reach 6R : East Storm

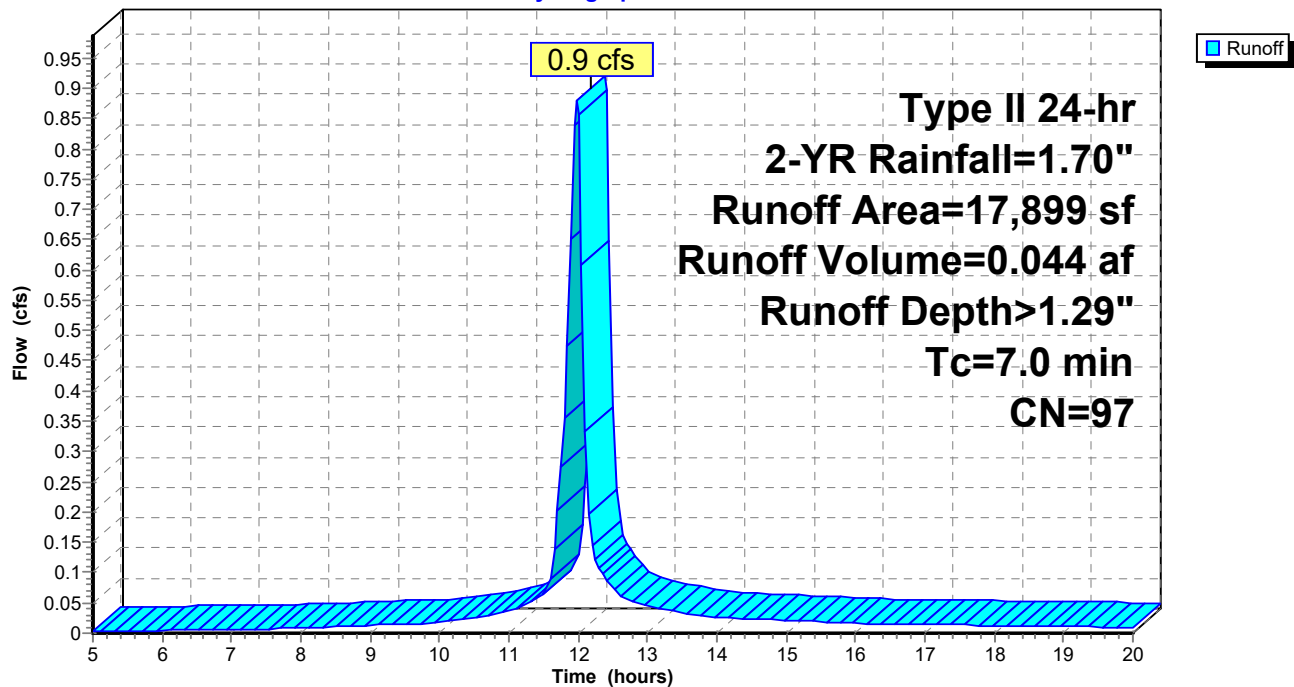
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
17,259	98	Paved parking, HSG D
640	80	>75% Grass cover, Good, HSG D
17,899	97	Weighted Average
640		3.58% Pervious Area
17,259		96.42% Impervious Area

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

Subcatchment 6XS:

Hydrograph



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Type II 24-hr 2-YR Rainfall=1.70"

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Summary for Subcatchment 7XS:

Runoff = 0.8 cfs @ 11.99 hrs, Volume= 0.034 af, Depth> 0.67"
Routed to Reach 5R : SE Bluff - To Road

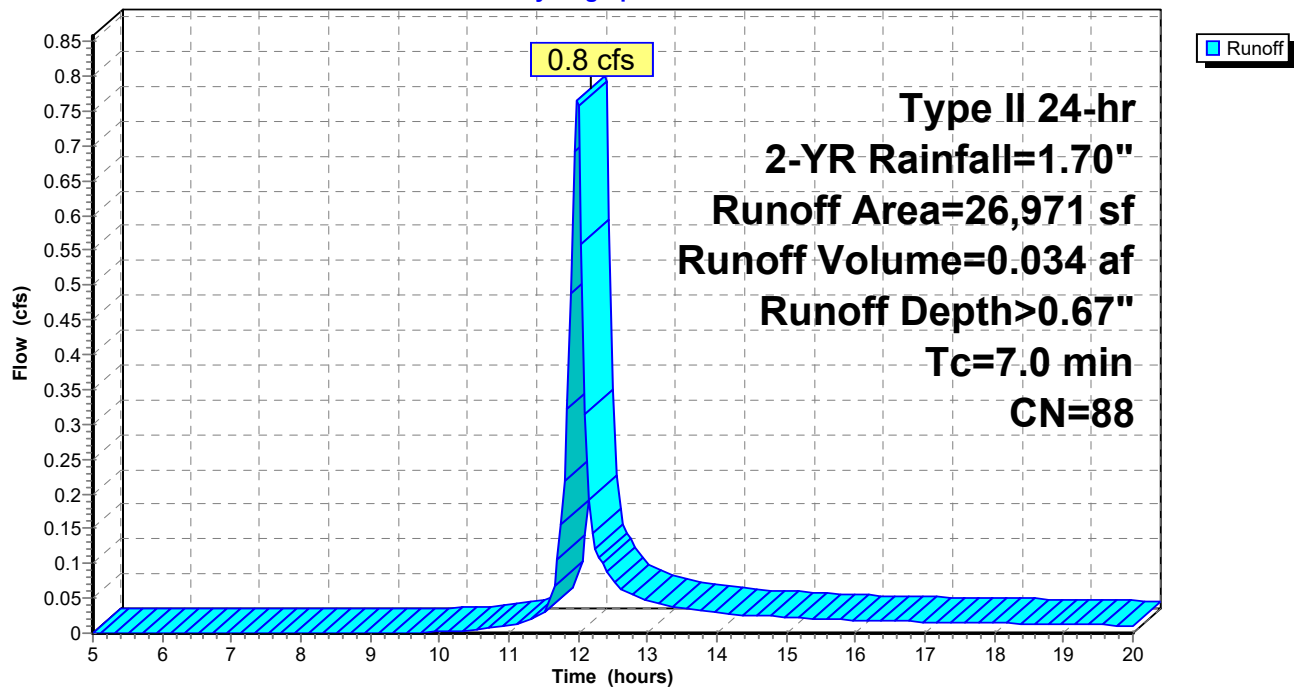
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
12,609	98	Paved parking, HSG D
14,362	80	>75% Grass cover, Good, HSG D
26,971	88	Weighted Average
14,362		53.25% Pervious Area
12,609		46.75% Impervious Area

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

Subcatchment 7XS:

Hydrograph



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Type II 24-hr 2-YR Rainfall=1.70"

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Summary for Subcatchment 8XS:

Runoff = 0.2 cfs @ 12.00 hrs, Volume= 0.012 af, Depth> 0.34"
Routed to Reach 7R : North Bluff

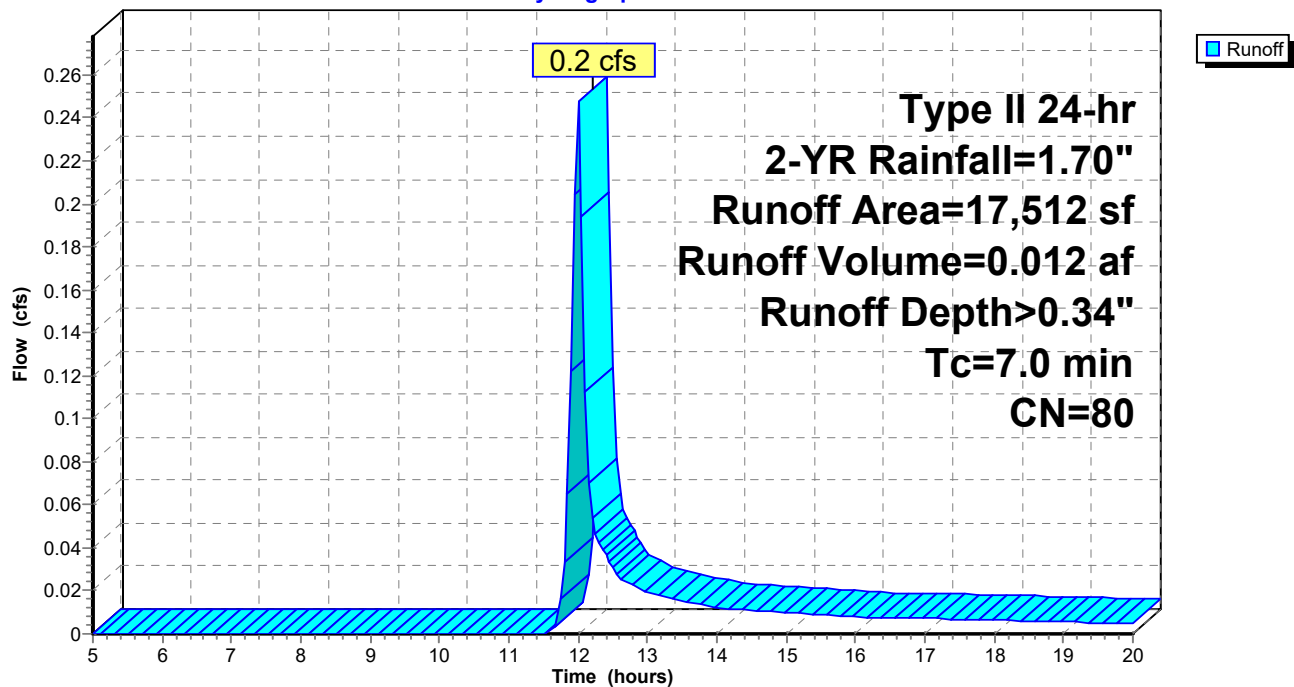
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
17,512	80	>75% Grass cover, Good, HSG D
17,512		100.00% Pervious Area

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

Subcatchment 8XS:

Hydrograph



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Type II 24-hr 2-YR Rainfall=1.70"

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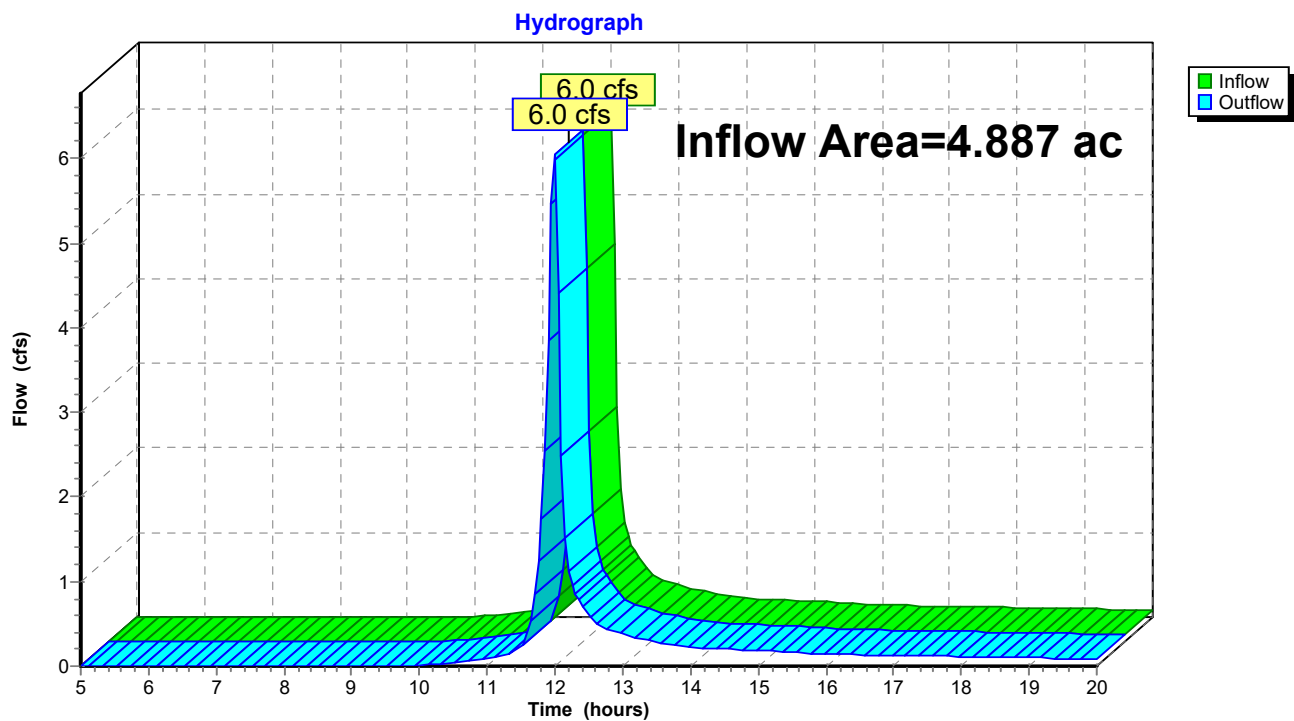
Summary for Reach 1R: NW Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.887 ac, 45.04% Impervious, Inflow Depth > 0.67" for 2-YR event
Inflow = 6.0 cfs @ 11.99 hrs, Volume= 0.272 af
Outflow = 6.0 cfs @ 11.99 hrs, Volume= 0.272 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: NW Storm



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Type II 24-hr 2-YR Rainfall=1.70"

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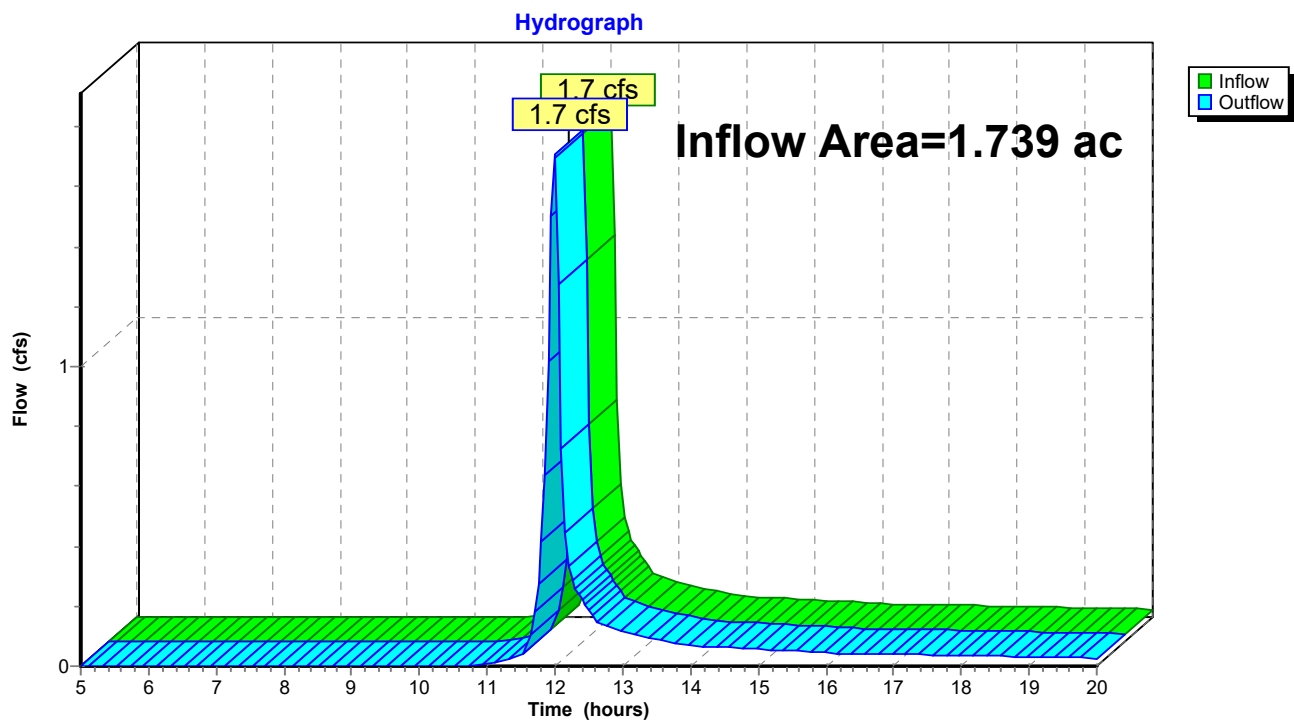
Summary for Reach 2R: West Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.739 ac, 26.31% Impervious, Inflow Depth > 0.53" for 2-YR event
Inflow = 1.7 cfs @ 11.99 hrs, Volume= 0.076 af
Outflow = 1.7 cfs @ 11.99 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 2R: West Storm



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Type II 24-hr 2-YR Rainfall=1.70"

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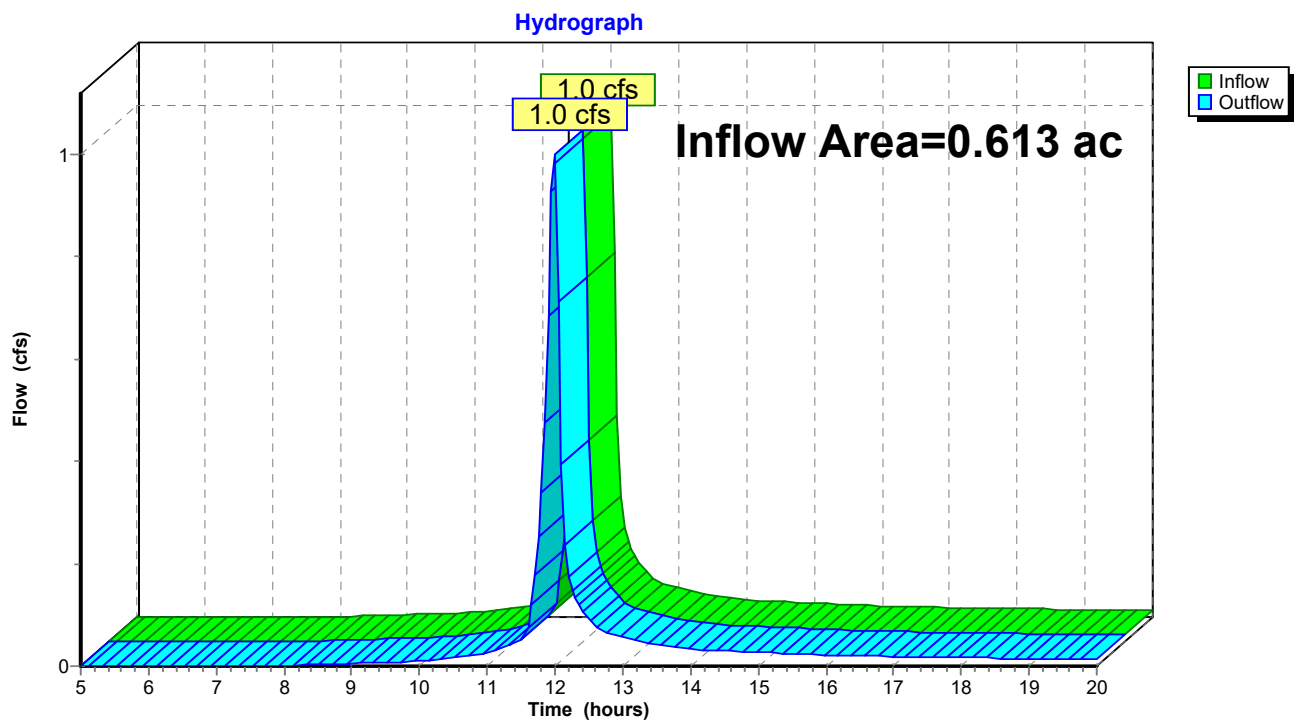
Summary for Reach 3R: West Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.613 ac, 64.20% Impervious, Inflow Depth > 0.90" for 2-YR event
Inflow = 1.0 cfs @ 11.98 hrs, Volume= 0.046 af
Outflow = 1.0 cfs @ 11.98 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 3R: West Bluff



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Type II 24-hr 2-YR Rainfall=1.70"

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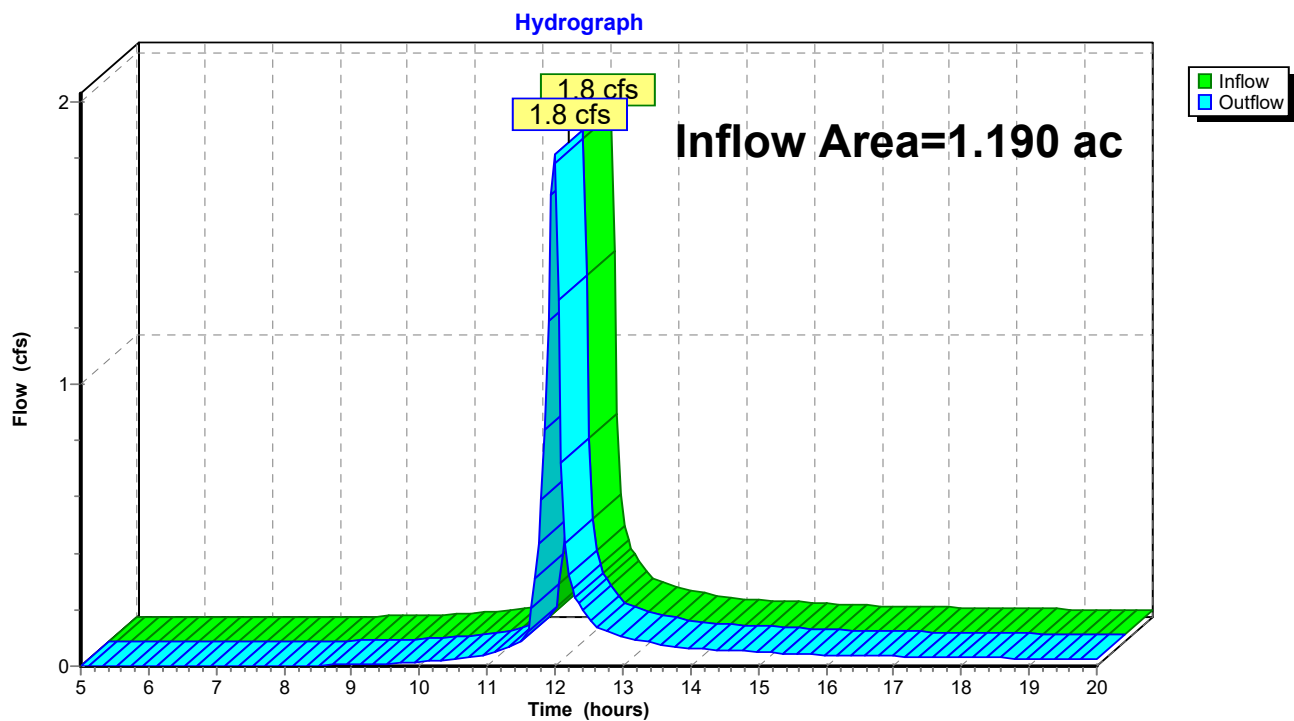
Summary for Reach 4R: South Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.190 ac, 60.81% Impervious, Inflow Depth > 0.84" for 2-YR event
Inflow = 1.8 cfs @ 11.98 hrs, Volume= 0.083 af
Outflow = 1.8 cfs @ 11.98 hrs, Volume= 0.083 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 4R: South Storm



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Type II 24-hr 2-YR Rainfall=1.70"

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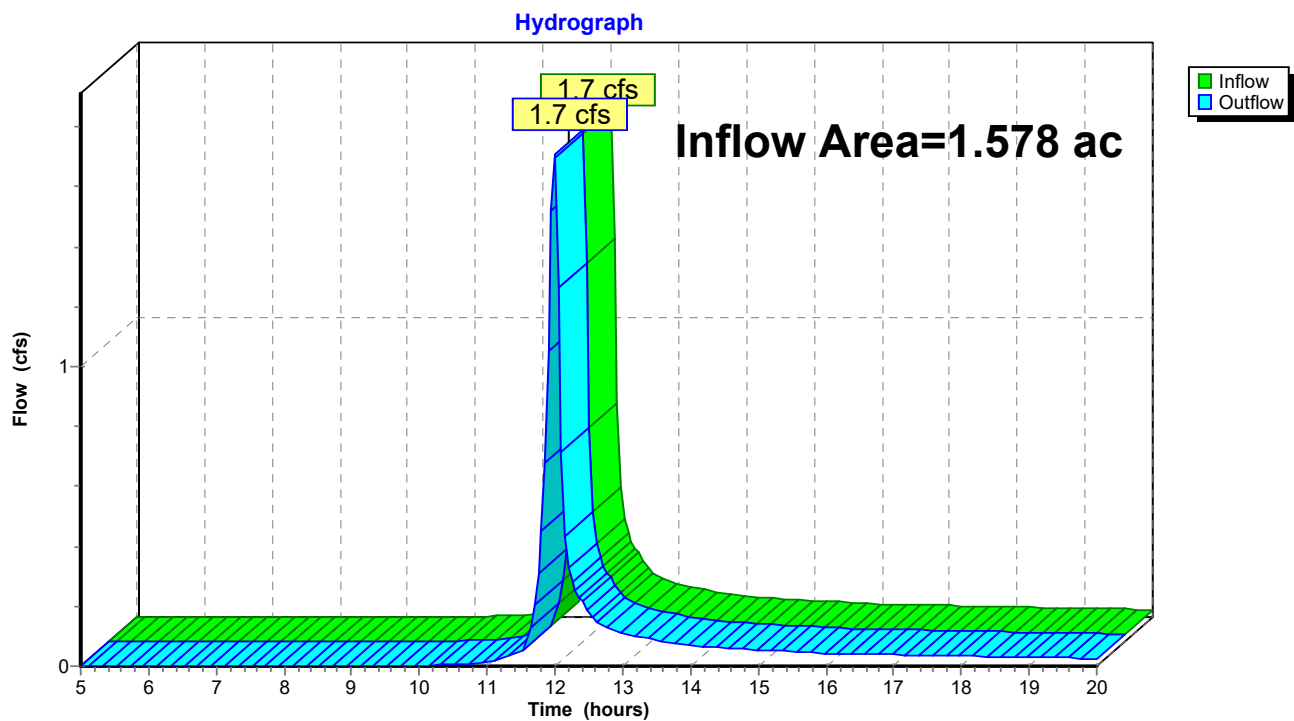
Summary for Reach 5R: SE Bluff - To Road

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.578 ac, 36.84% Impervious, Inflow Depth > 0.58" for 2-YR event
Inflow = 1.7 cfs @ 11.99 hrs, Volume= 0.077 af
Outflow = 1.7 cfs @ 11.99 hrs, Volume= 0.077 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: SE Bluff - To Road



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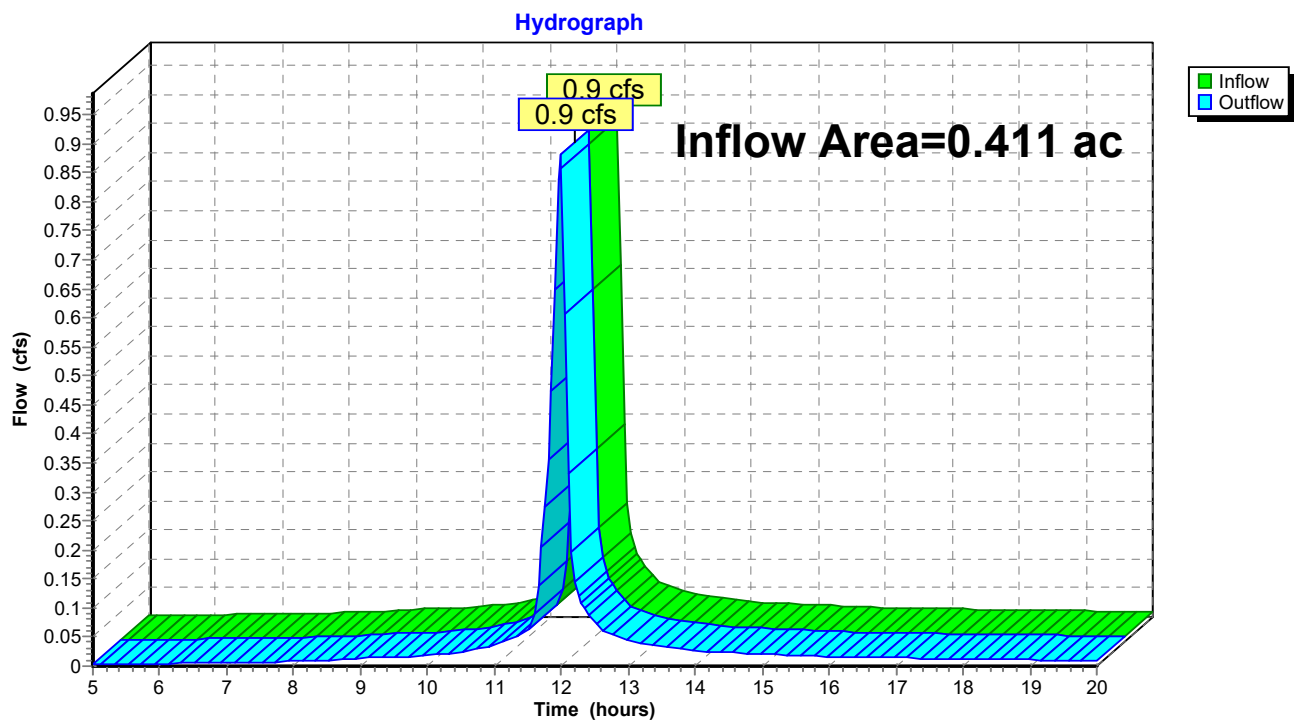
Summary for Reach 6R: East Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.411 ac, 96.42% Impervious, Inflow Depth > 1.29" for 2-YR event
Inflow = 0.9 cfs @ 11.98 hrs, Volume= 0.044 af
Outflow = 0.9 cfs @ 11.98 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 6R: East Storm



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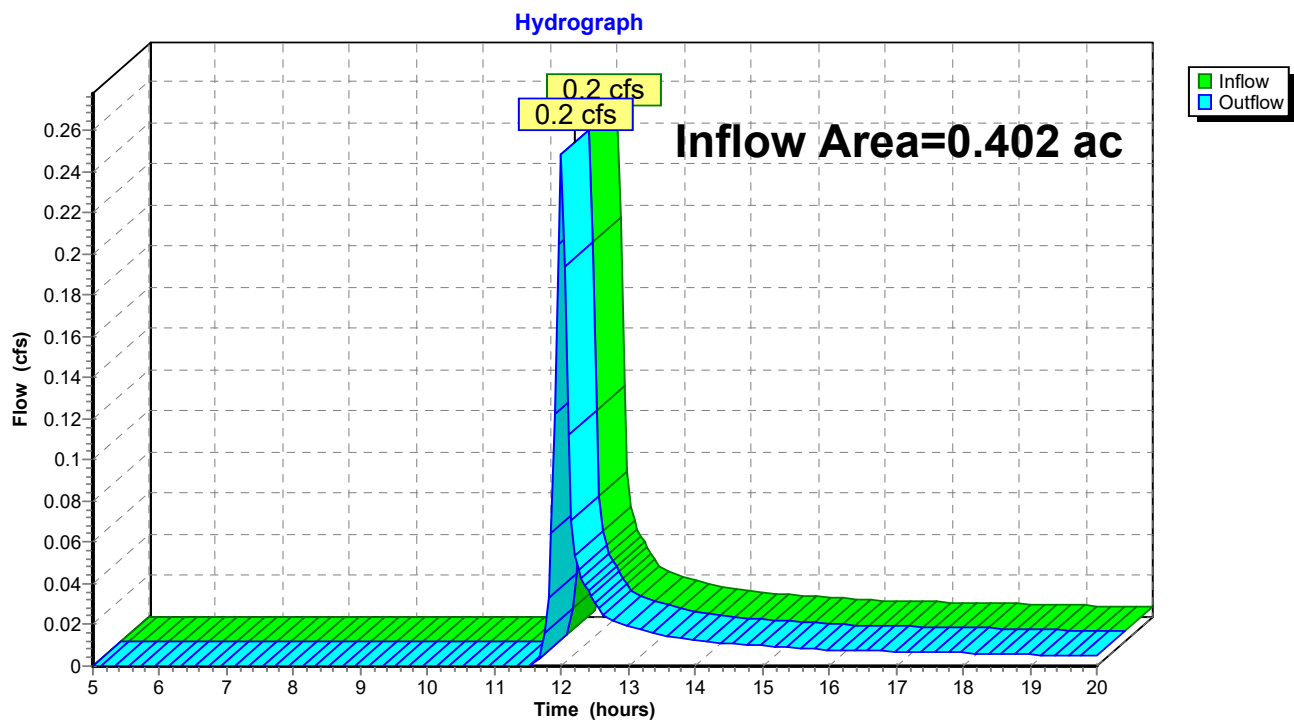
Summary for Reach 7R: North Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.402 ac, 0.00% Impervious, Inflow Depth > 0.34" for 2-YR event
Inflow = 0.2 cfs @ 12.00 hrs, Volume= 0.012 af
Outflow = 0.2 cfs @ 12.00 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 7R: North Bluff



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Type II 24-hr 10-YR Rainfall=4.28"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1XS:	Runoff Area=212,871 sf 45.04% Impervious Runoff Depth>2.79" Tc=7.0 min CN=88 Runoff=23.8 cfs 1.138 af
Subcatchment2XS:	Runoff Area=75,763 sf 26.31% Impervious Runoff Depth>2.52" Tc=7.0 min CN=85 Runoff=7.8 cfs 0.365 af
Subcatchment3XS:	Runoff Area=26,713 sf 64.20% Impervious Runoff Depth>3.18" Tc=7.0 min CN=92 Runoff=3.3 cfs 0.162 af
Subcatchment4XS:	Runoff Area=51,828 sf 60.81% Impervious Runoff Depth>3.08" Tc=7.0 min CN=91 Runoff=6.2 cfs 0.305 af
Subcatchment5XS:	Runoff Area=41,786 sf 30.44% Impervious Runoff Depth>2.52" Tc=7.0 min CN=85 Runoff=4.3 cfs 0.201 af
Subcatchment6XS:	Runoff Area=17,899 sf 96.42% Impervious Runoff Depth>3.64" Tc=7.0 min CN=97 Runoff=2.4 cfs 0.125 af
Subcatchment7XS:	Runoff Area=26,971 sf 46.75% Impervious Runoff Depth>2.79" Tc=7.0 min CN=88 Runoff=3.0 cfs 0.144 af
Subcatchment8XS:	Runoff Area=17,512 sf 0.00% Impervious Runoff Depth>2.10" Tc=7.0 min CN=80 Runoff=1.5 cfs 0.070 af
Reach 1R: NW Storm	Inflow=23.8 cfs 1.138 af Outflow=23.8 cfs 1.138 af
Reach 2R: West Storm	Inflow=7.8 cfs 0.365 af Outflow=7.8 cfs 0.365 af
Reach 3R: West Bluff	Inflow=3.3 cfs 0.162 af Outflow=3.3 cfs 0.162 af
Reach 4R: South Storm	Inflow=6.2 cfs 0.305 af Outflow=6.2 cfs 0.305 af
Reach 5R: SE Bluff - To Road	Inflow=7.3 cfs 0.346 af Outflow=7.3 cfs 0.346 af
Reach 6R: East Storm	Inflow=2.4 cfs 0.125 af Outflow=2.4 cfs 0.125 af
Reach 7R: North Bluff	Inflow=1.5 cfs 0.070 af Outflow=1.5 cfs 0.070 af

Total Runoff Area = 10.821 ac Runoff Volume = 2.512 af Average Runoff Depth = 2.79"
56.07% Pervious = 6.067 ac 43.93% Impervious = 4.753 ac

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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Subcatchment 1XS:

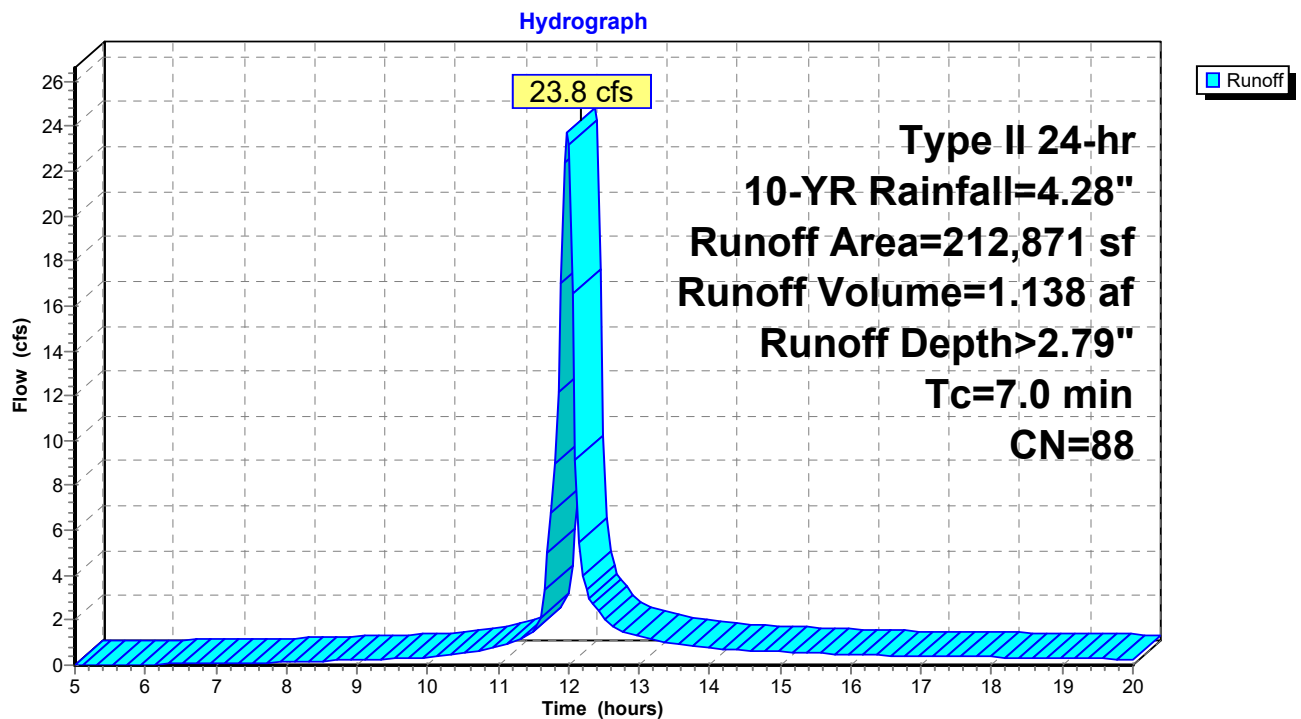
Runoff = 23.8 cfs @ 11.98 hrs, Volume= 1.138 af, Depth> 2.79"
Routed to Reach 1R : NW Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
95,871	98	Paved parking, HSG D
117,000	80	>75% Grass cover, Good, HSG D
212,871	88	Weighted Average
117,000		54.96% Pervious Area
95,871		45.04% Impervious Area

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

Subcatchment 1XS:



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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Subcatchment 2XS:

Runoff = 7.8 cfs @ 11.98 hrs, Volume= 0.365 af, Depth> 2.52"
Routed to Reach 2R : West Storm

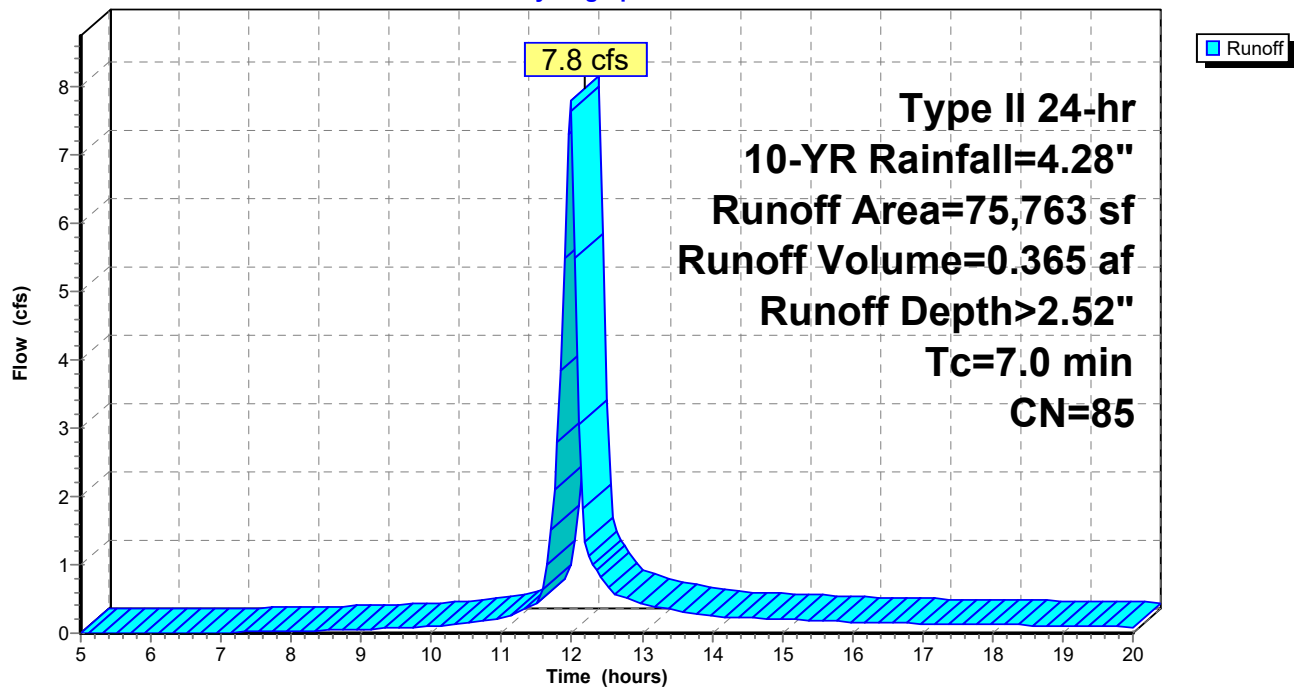
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
19,931	98	Paved parking, HSG D
55,832	80	>75% Grass cover, Good, HSG D
75,763	85	Weighted Average
55,832		73.69% Pervious Area
19,931		26.31% Impervious Area

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

Subcatchment 2XS:

Hydrograph



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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Subcatchment 3XS:

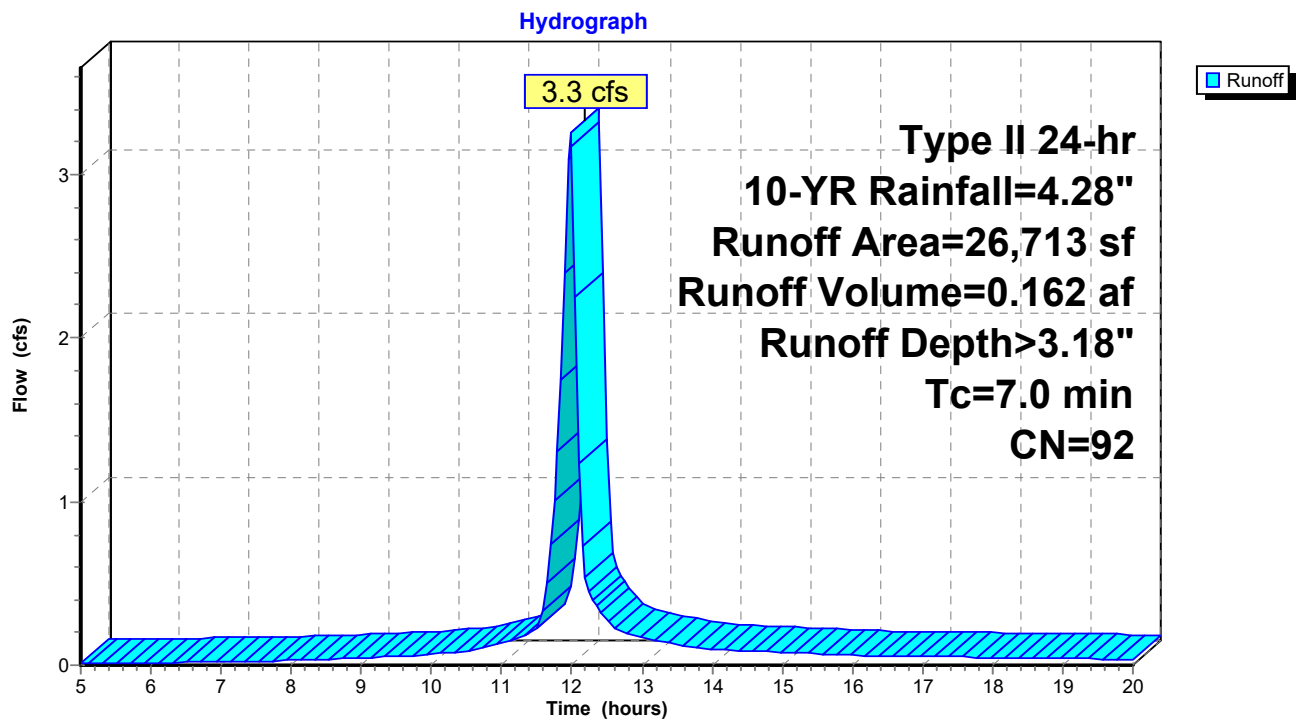
Runoff = 3.3 cfs @ 11.98 hrs, Volume= 0.162 af, Depth> 3.18"
Routed to Reach 3R : West Bluff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
17,151	98	Paved parking, HSG D
9,562	80	>75% Grass cover, Good, HSG D
26,713	92	Weighted Average
9,562		35.80% Pervious Area
17,151		64.20% Impervious Area

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

Subcatchment 3XS:



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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Subcatchment 4XS:

Runoff = 6.2 cfs @ 11.98 hrs, Volume= 0.305 af, Depth> 3.08"
Routed to Reach 4R : South Storm

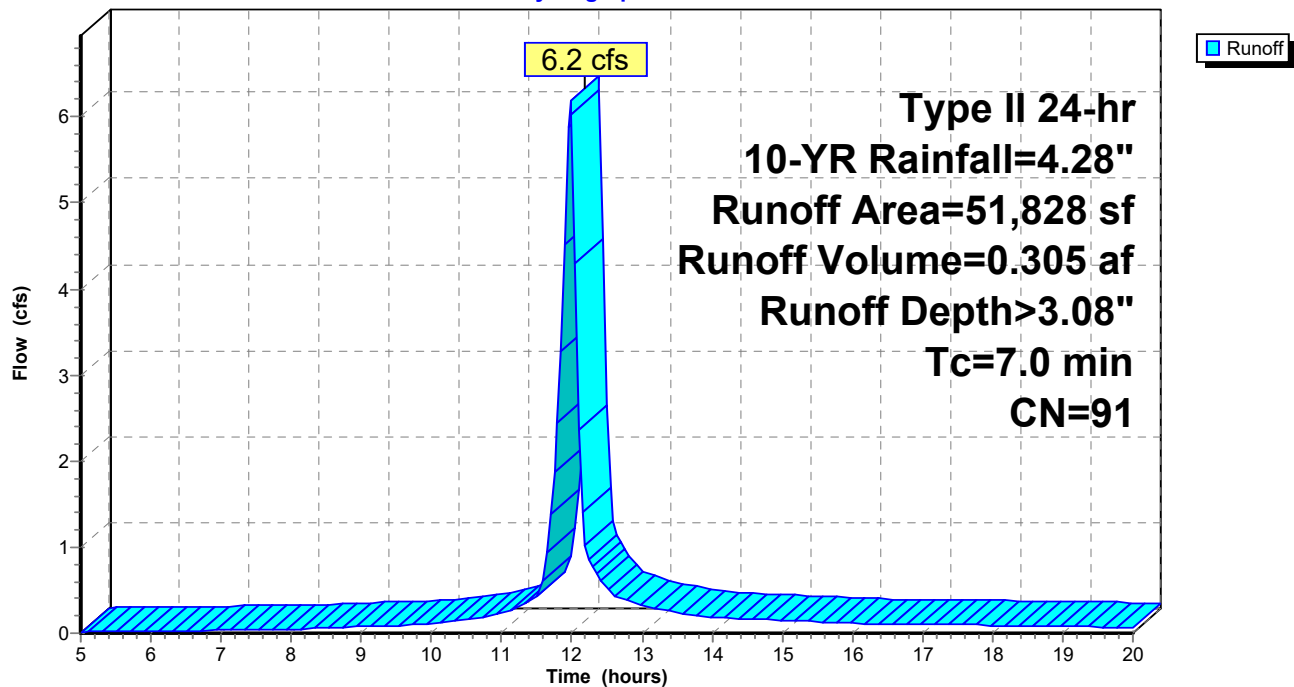
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
31,516	98	Paved parking, HSG D
20,312	80	>75% Grass cover, Good, HSG D
51,828	91	Weighted Average
20,312		39.19% Pervious Area
31,516		60.81% Impervious Area

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

Subcatchment 4XS:

Hydrograph



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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Subcatchment 5XS:

Runoff = 4.3 cfs @ 11.98 hrs, Volume= 0.201 af, Depth> 2.52"
Routed to Reach 5R : SE Bluff - To Road

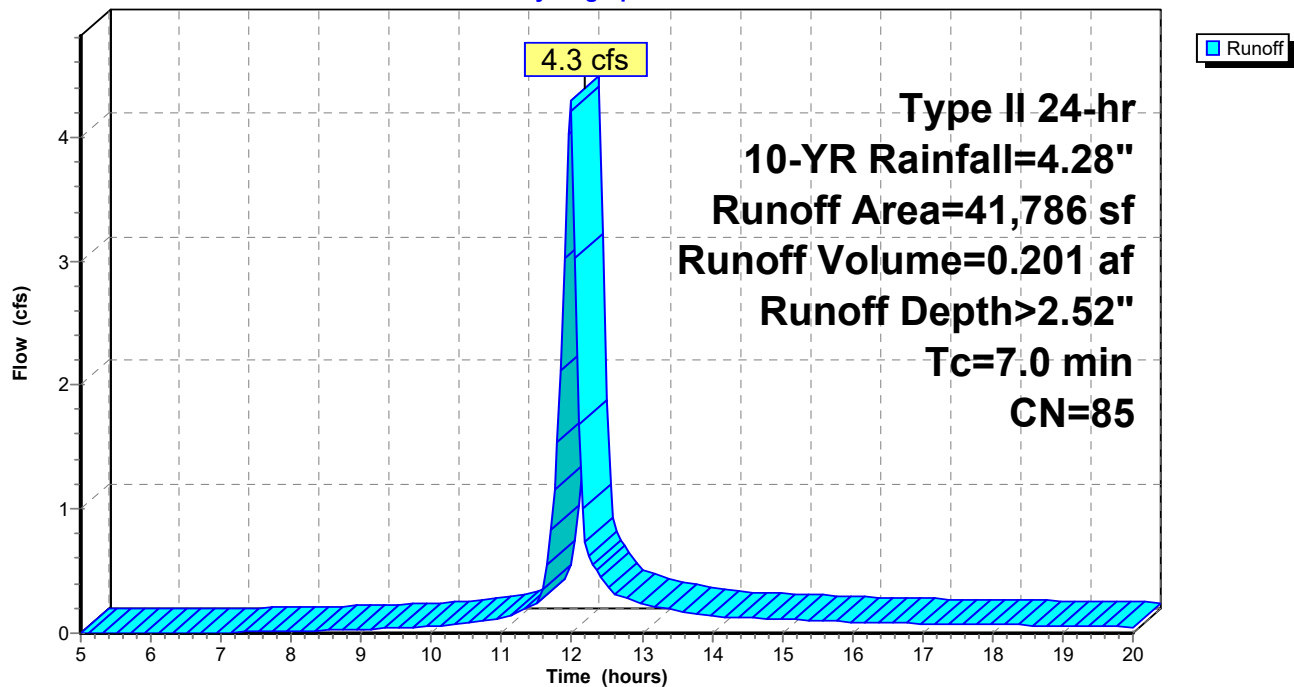
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
12,719	98	Paved parking, HSG D
29,067	80	>75% Grass cover, Good, HSG D
41,786	85	Weighted Average
29,067		69.56% Pervious Area
12,719		30.44% Impervious Area

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

Subcatchment 5XS:

Hydrograph



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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Subcatchment 6XS:

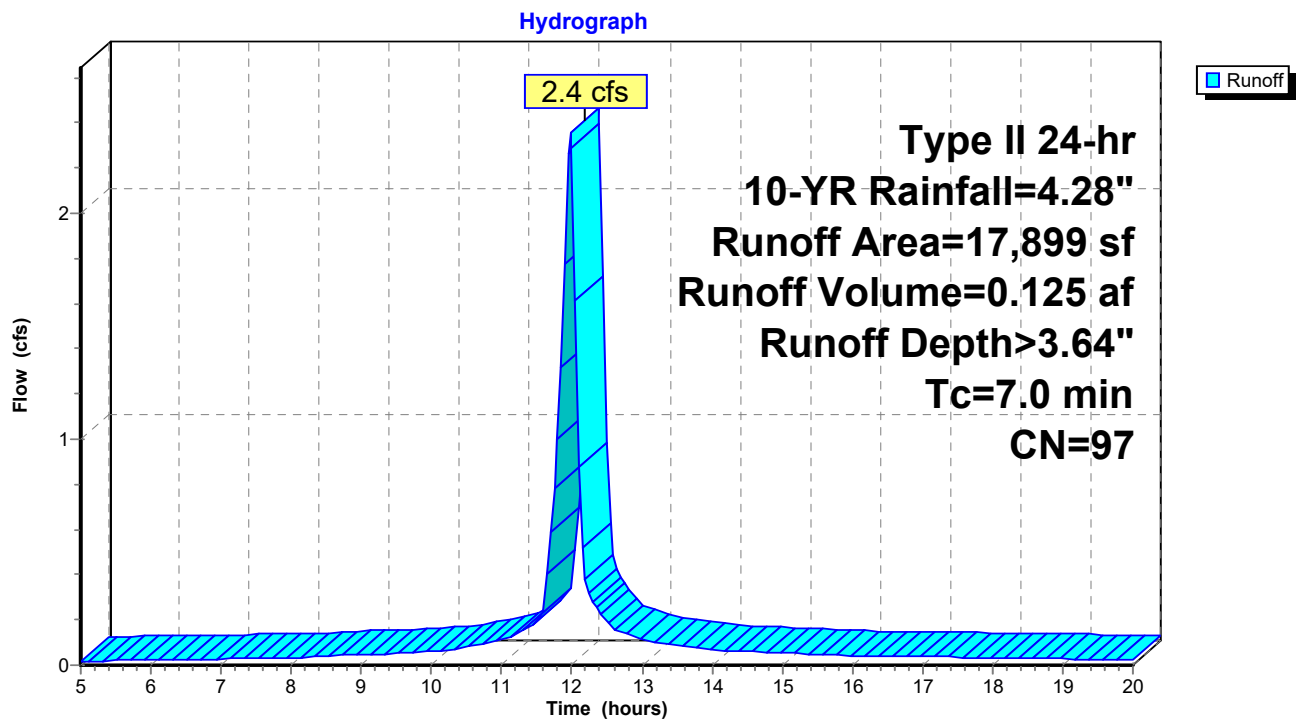
Runoff = 2.4 cfs @ 11.98 hrs, Volume= 0.125 af, Depth> 3.64"
Routed to Reach 6R : East Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
17,259	98	Paved parking, HSG D
640	80	>75% Grass cover, Good, HSG D
17,899	97	Weighted Average
640		3.58% Pervious Area
17,259		96.42% Impervious Area

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

Subcatchment 6XS:



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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Subcatchment 7XS:

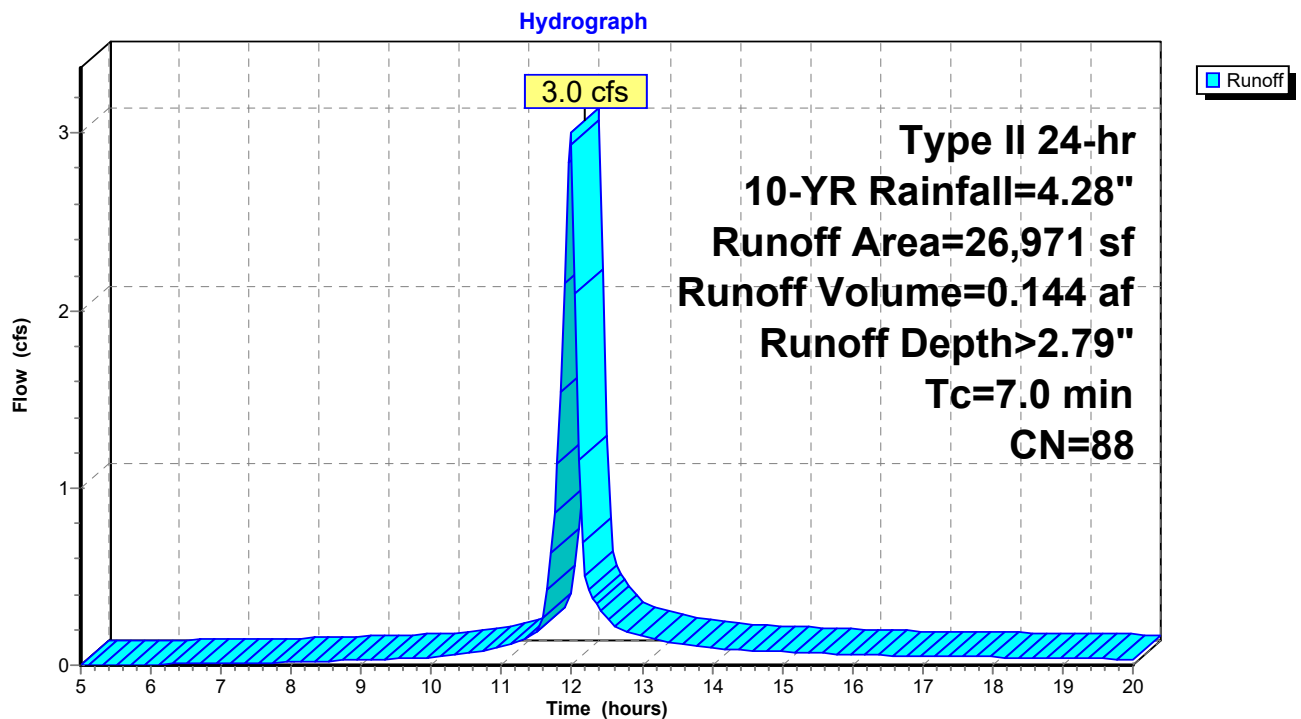
Runoff = 3.0 cfs @ 11.98 hrs, Volume= 0.144 af, Depth> 2.79"
Routed to Reach 5R : SE Bluff - To Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
12,609	98	Paved parking, HSG D
14,362	80	>75% Grass cover, Good, HSG D
26,971	88	Weighted Average
14,362		53.25% Pervious Area
12,609		46.75% Impervious Area

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

Subcatchment 7XS:



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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Subcatchment 8XS:

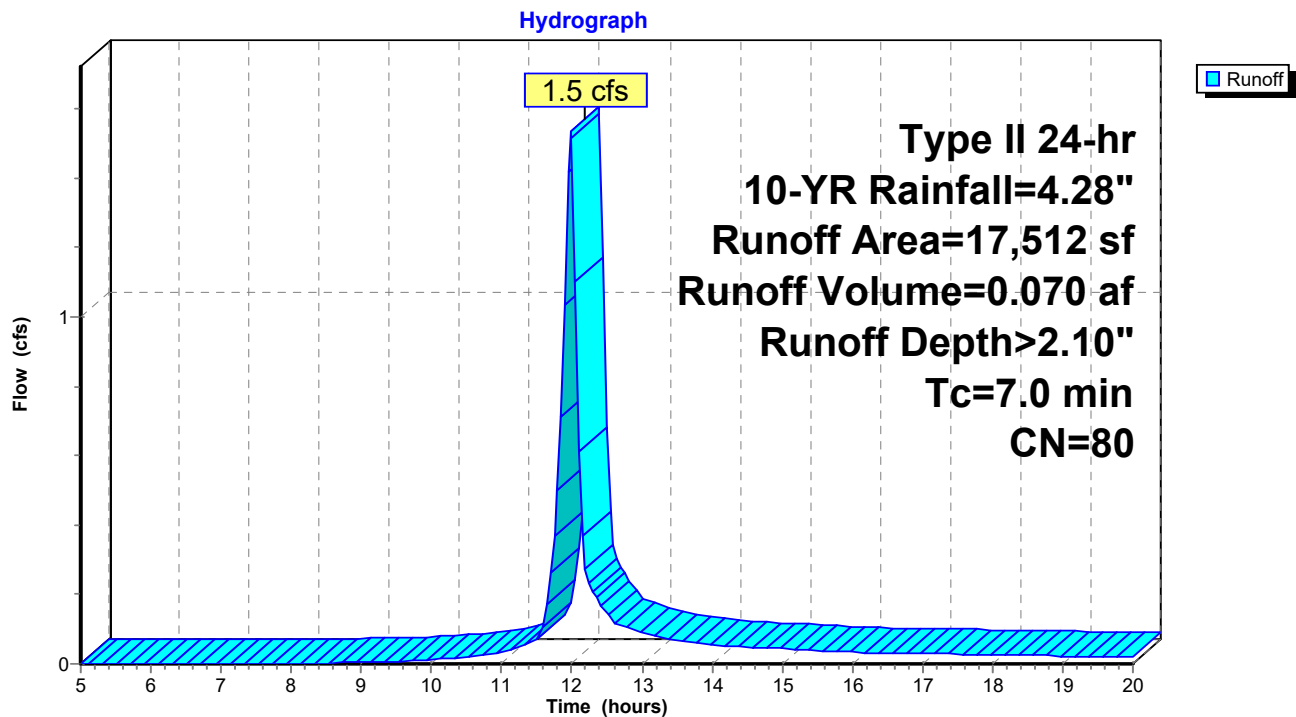
Runoff = 1.5 cfs @ 11.98 hrs, Volume= 0.070 af, Depth> 2.10"
Routed to Reach 7R : North Bluff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
17,512	80	>75% Grass cover, Good, HSG D
17,512		100.00% Pervious Area

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

Subcatchment 8XS:



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Type II 24-hr 10-YR Rainfall=4.28"

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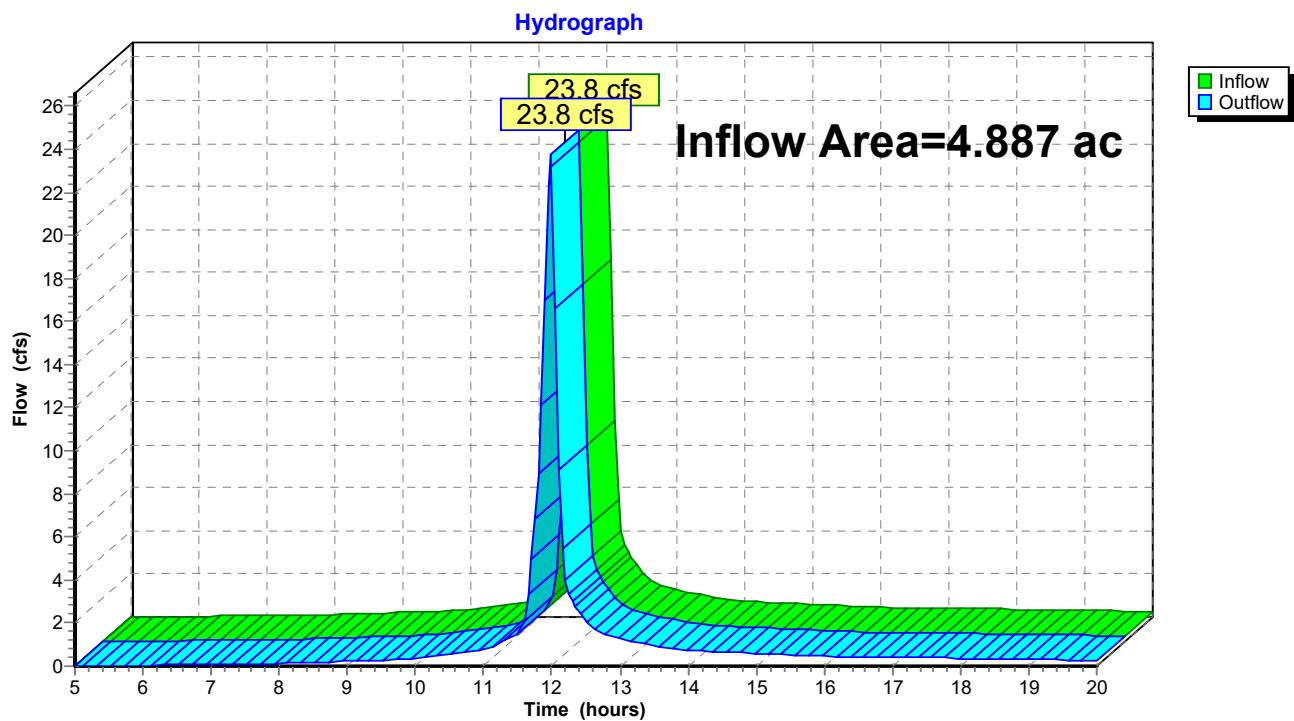
Summary for Reach 1R: NW Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.887 ac, 45.04% Impervious, Inflow Depth > 2.79" for 10-YR event
Inflow = 23.8 cfs @ 11.98 hrs, Volume= 1.138 af
Outflow = 23.8 cfs @ 11.98 hrs, Volume= 1.138 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: NW Storm



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Type II 24-hr 10-YR Rainfall=4.28"

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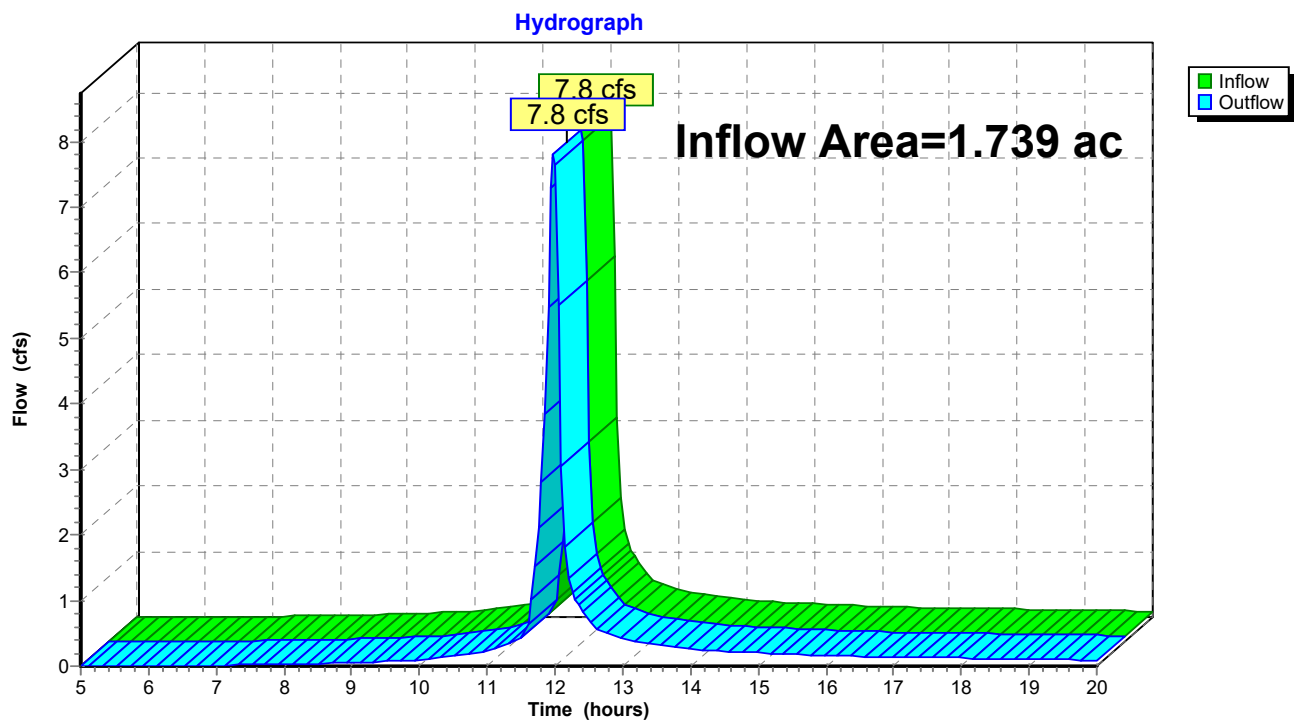
Summary for Reach 2R: West Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.739 ac, 26.31% Impervious, Inflow Depth > 2.52" for 10-YR event
Inflow = 7.8 cfs @ 11.98 hrs, Volume= 0.365 af
Outflow = 7.8 cfs @ 11.98 hrs, Volume= 0.365 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 2R: West Storm



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Type II 24-hr 10-YR Rainfall=4.28"

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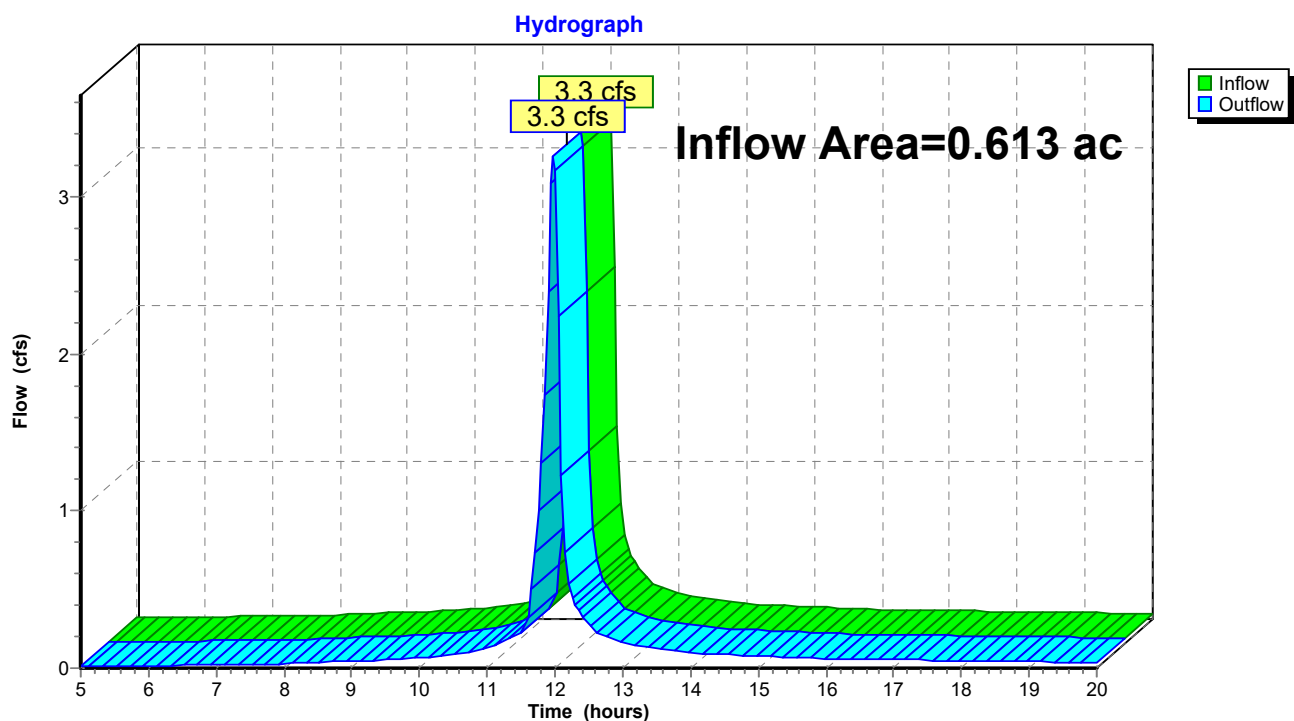
Summary for Reach 3R: West Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.613 ac, 64.20% Impervious, Inflow Depth > 3.18" for 10-YR event
Inflow = 3.3 cfs @ 11.98 hrs, Volume= 0.162 af
Outflow = 3.3 cfs @ 11.98 hrs, Volume= 0.162 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 3R: West Bluff



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Type II 24-hr 10-YR Rainfall=4.28"

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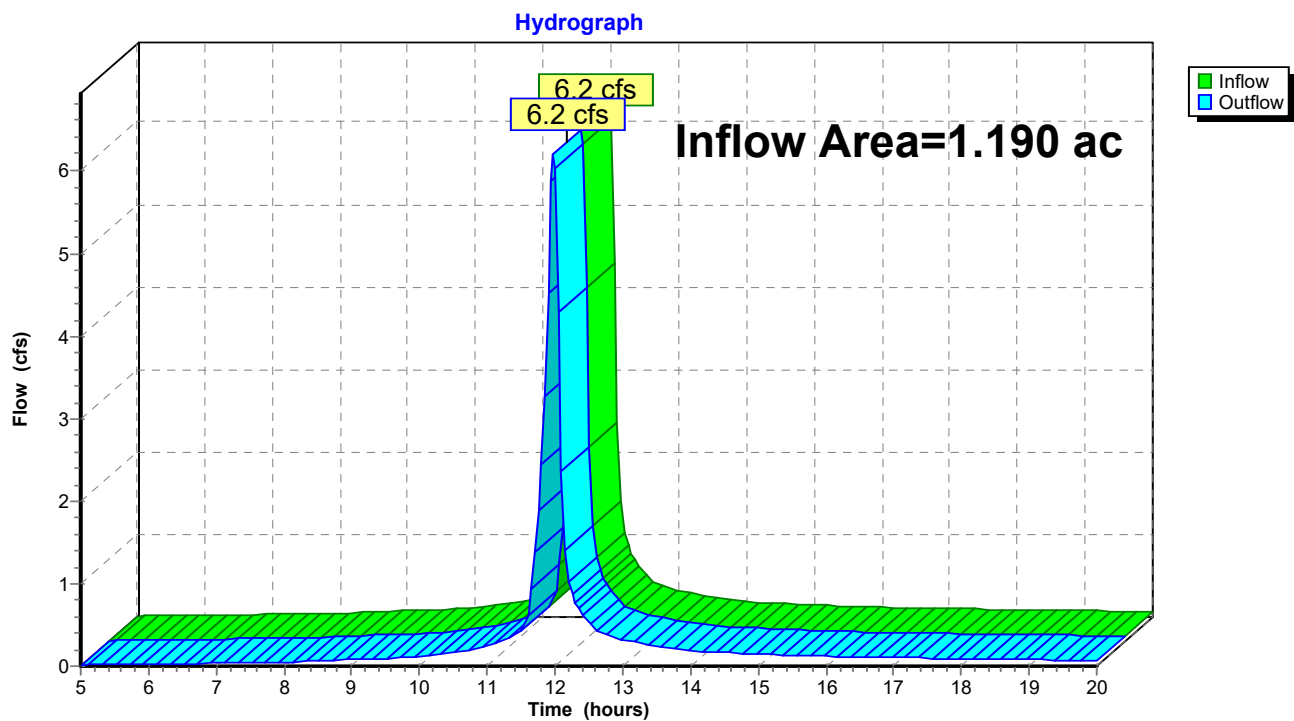
Summary for Reach 4R: South Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.190 ac, 60.81% Impervious, Inflow Depth > 3.08" for 10-YR event
Inflow = 6.2 cfs @ 11.98 hrs, Volume= 0.305 af
Outflow = 6.2 cfs @ 11.98 hrs, Volume= 0.305 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 4R: South Storm



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Type II 24-hr 10-YR Rainfall=4.28"

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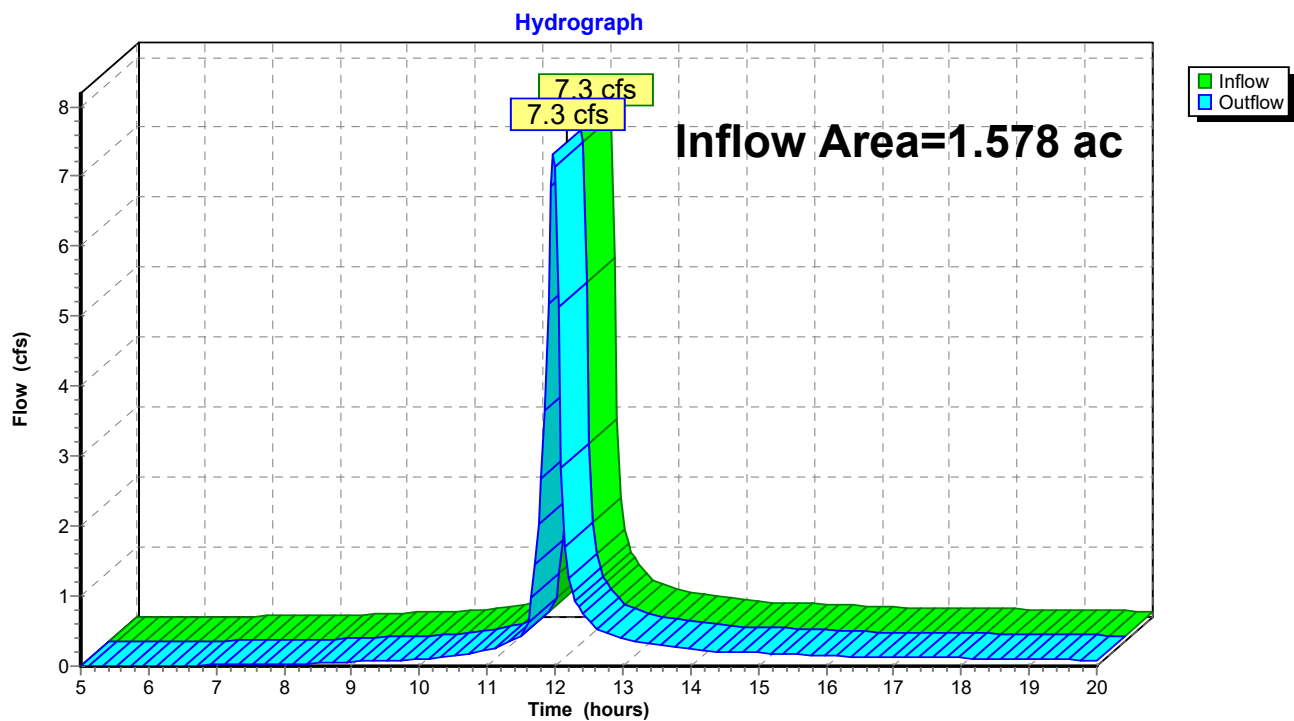
Summary for Reach 5R: SE Bluff - To Road

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.578 ac, 36.84% Impervious, Inflow Depth > 2.63" for 10-YR event
Inflow = 7.3 cfs @ 11.98 hrs, Volume= 0.346 af
Outflow = 7.3 cfs @ 11.98 hrs, Volume= 0.346 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: SE Bluff - To Road



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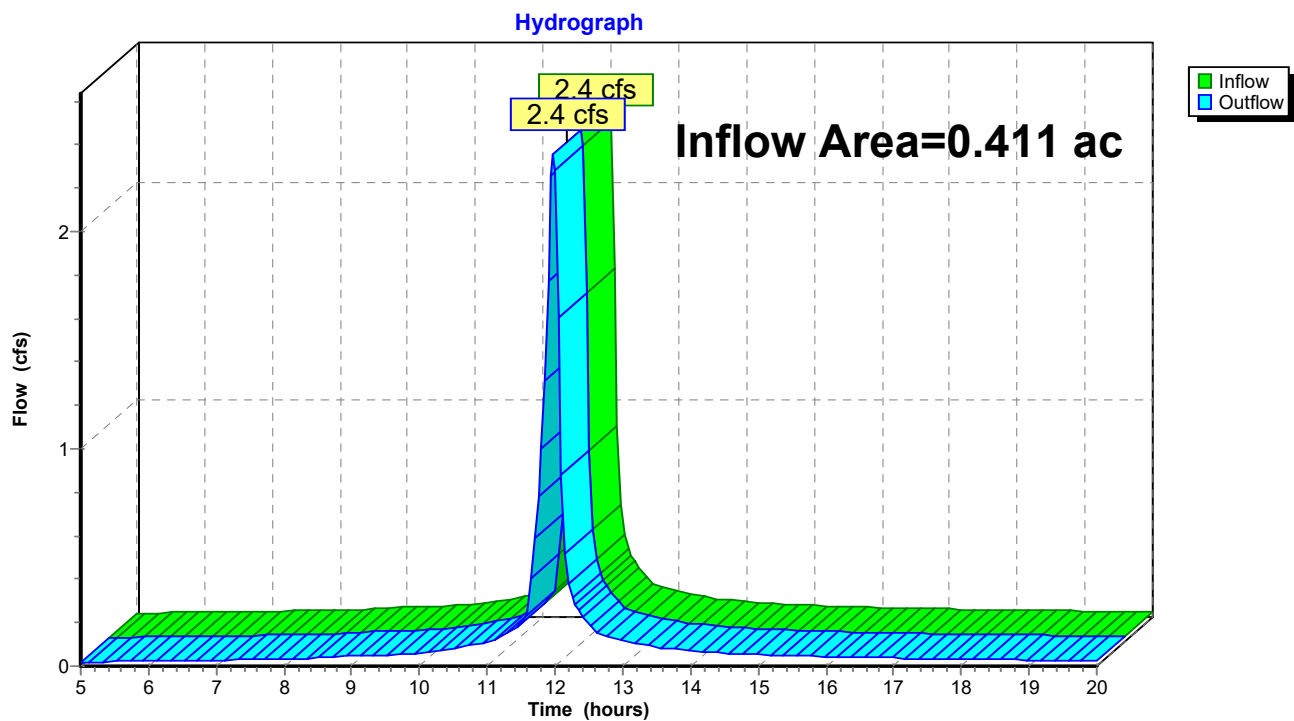
Summary for Reach 6R: East Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.411 ac, 96.42% Impervious, Inflow Depth > 3.64" for 10-YR event
Inflow = 2.4 cfs @ 11.98 hrs, Volume= 0.125 af
Outflow = 2.4 cfs @ 11.98 hrs, Volume= 0.125 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 6R: East Storm



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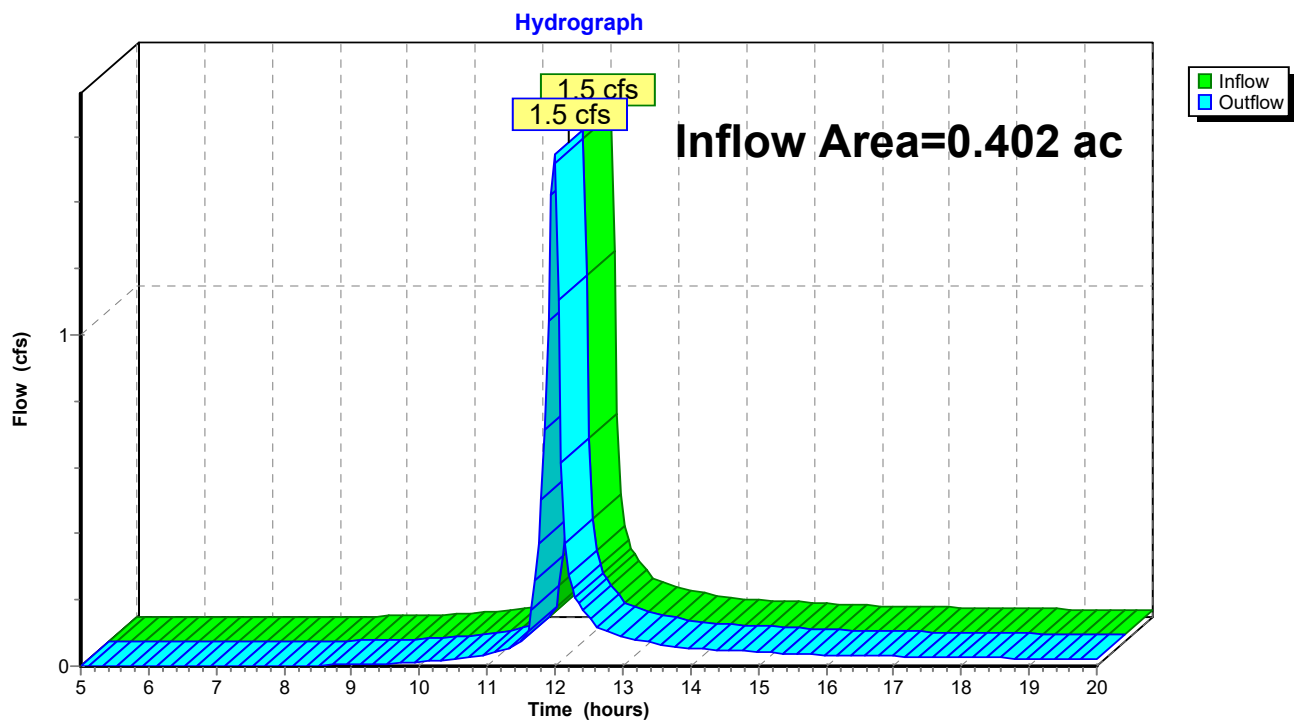
Summary for Reach 7R: North Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.402 ac, 0.00% Impervious, Inflow Depth > 2.10" for 10-YR event
Inflow = 1.5 cfs @ 11.98 hrs, Volume= 0.070 af
Outflow = 1.5 cfs @ 11.98 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 7R: North Bluff



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Type II 24-hr 100-YR Rainfall=7.19"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1XS:	Runoff Area=212,871 sf 45.04% Impervious Runoff Depth>5.42" Tc=7.0 min CN=88 Runoff=44.1 cfs 2.206 af
Subcatchment2XS:	Runoff Area=75,763 sf 26.31% Impervious Runoff Depth>5.09" Tc=7.0 min CN=85 Runoff=15.1 cfs 0.738 af
Subcatchment3XS:	Runoff Area=26,713 sf 64.20% Impervious Runoff Depth>5.83" Tc=7.0 min CN=92 Runoff=5.8 cfs 0.298 af
Subcatchment4XS:	Runoff Area=51,828 sf 60.81% Impervious Runoff Depth>5.73" Tc=7.0 min CN=91 Runoff=11.1 cfs 0.568 af
Subcatchment5XS:	Runoff Area=41,786 sf 30.44% Impervious Runoff Depth>5.09" Tc=7.0 min CN=85 Runoff=8.3 cfs 0.407 af
Subcatchment6XS:	Runoff Area=17,899 sf 96.42% Impervious Runoff Depth>6.27" Tc=7.0 min CN=97 Runoff=4.0 cfs 0.215 af
Subcatchment7XS:	Runoff Area=26,971 sf 46.75% Impervious Runoff Depth>5.42" Tc=7.0 min CN=88 Runoff=5.6 cfs 0.280 af
Subcatchment8XS:	Runoff Area=17,512 sf 0.00% Impervious Runoff Depth>4.54" Tc=7.0 min CN=80 Runoff=3.2 cfs 0.152 af
Reach 1R: NW Storm	Inflow=44.1 cfs 2.206 af Outflow=44.1 cfs 2.206 af
Reach 2R: West Storm	Inflow=15.1 cfs 0.738 af Outflow=15.1 cfs 0.738 af
Reach 3R: West Bluff	Inflow=5.8 cfs 0.298 af Outflow=5.8 cfs 0.298 af
Reach 4R: South Storm	Inflow=11.1 cfs 0.568 af Outflow=11.1 cfs 0.568 af
Reach 5R: SE Bluff - To Road	Inflow=13.9 cfs 0.687 af Outflow=13.9 cfs 0.687 af
Reach 6R: East Storm	Inflow=4.0 cfs 0.215 af Outflow=4.0 cfs 0.215 af
Reach 7R: North Bluff	Inflow=3.2 cfs 0.152 af Outflow=3.2 cfs 0.152 af

Total Runoff Area = 10.821 ac Runoff Volume = 4.864 af Average Runoff Depth = 5.39"
56.07% Pervious = 6.067 ac 43.93% Impervious = 4.753 ac

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Type II 24-hr 100-YR Rainfall=7.19"

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Summary for Subcatchment 1XS:

Runoff = 44.1 cfs @ 11.98 hrs, Volume= 2.206 af, Depth> 5.42"
Routed to Reach 1R : NW Storm

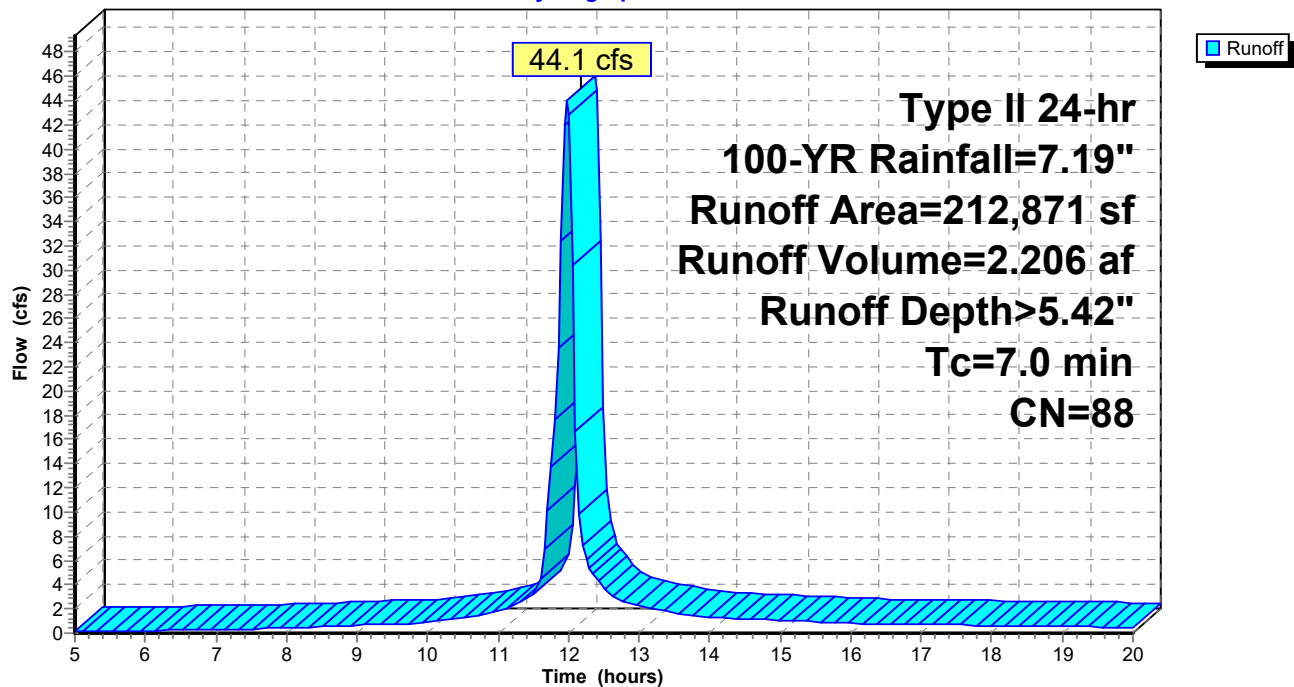
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
95,871	98	Paved parking, HSG D
117,000	80	>75% Grass cover, Good, HSG D
212,871	88	Weighted Average
117,000		54.96% Pervious Area
95,871		45.04% Impervious Area

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

Subcatchment 1XS:

Hydrograph



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Type II 24-hr 100-YR Rainfall=7.19"

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Summary for Subcatchment 2XS:

Runoff = 15.1 cfs @ 11.98 hrs, Volume= 0.738 af, Depth> 5.09"
Routed to Reach 2R : West Storm

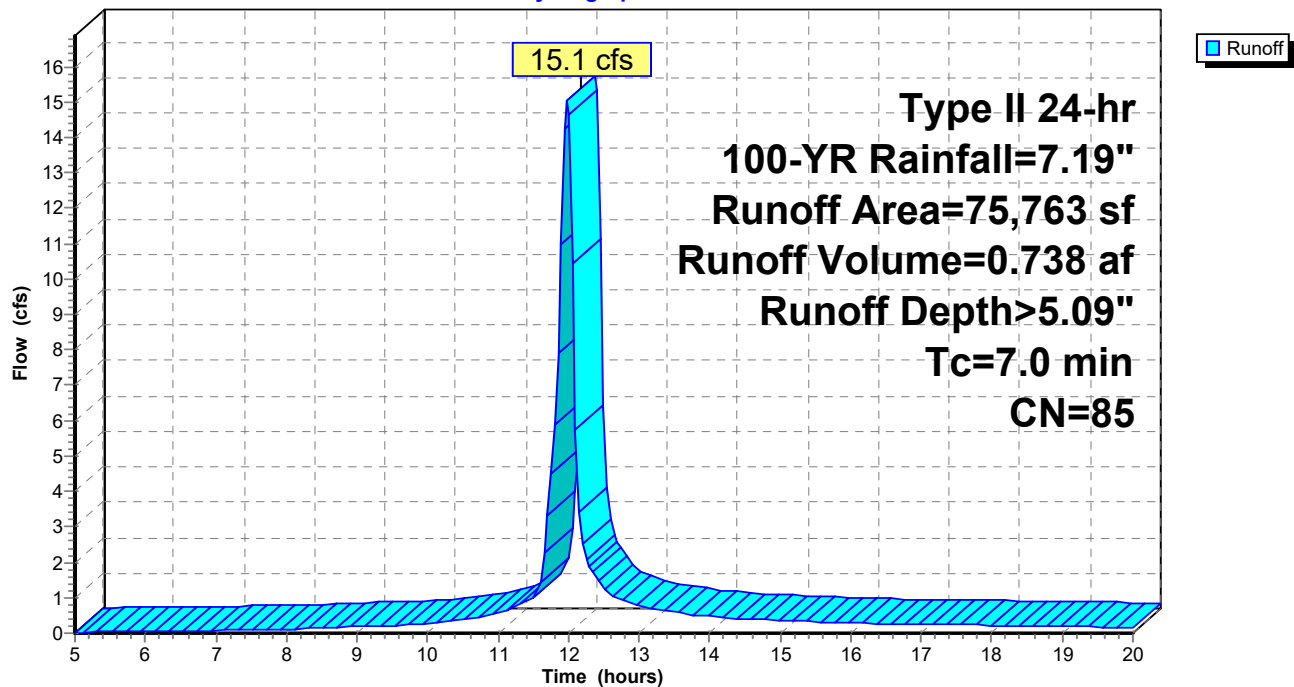
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
19,931	98	Paved parking, HSG D
55,832	80	>75% Grass cover, Good, HSG D
75,763	85	Weighted Average
55,832		73.69% Pervious Area
19,931		26.31% Impervious Area

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

Subcatchment 2XS:

Hydrograph



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Type II 24-hr 100-YR Rainfall=7.19"

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Summary for Subcatchment 3XS:

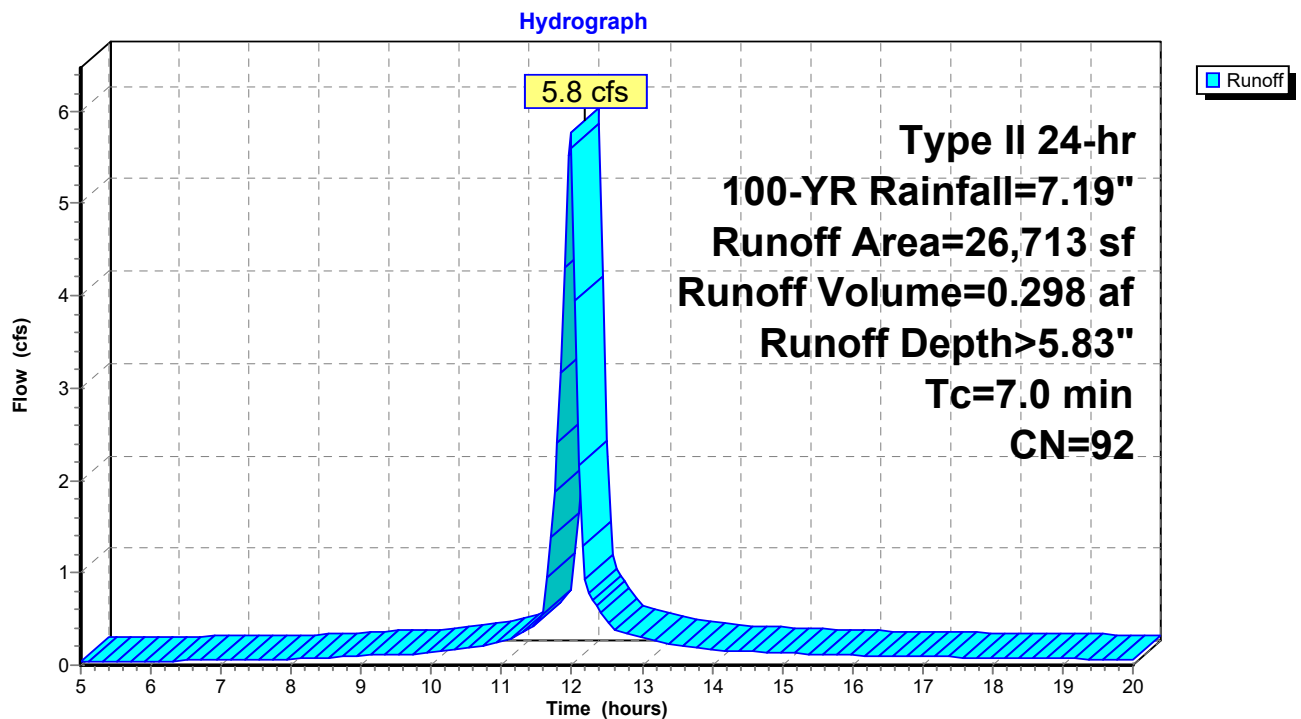
Runoff = 5.8 cfs @ 11.98 hrs, Volume= 0.298 af, Depth> 5.83"
Routed to Reach 3R : West Bluff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
17,151	98	Paved parking, HSG D
9,562	80	>75% Grass cover, Good, HSG D
26,713	92	Weighted Average
9,562		35.80% Pervious Area
17,151		64.20% Impervious Area

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

Subcatchment 3XS:



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Type II 24-hr 100-YR Rainfall=7.19"

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Summary for Subcatchment 4XS:

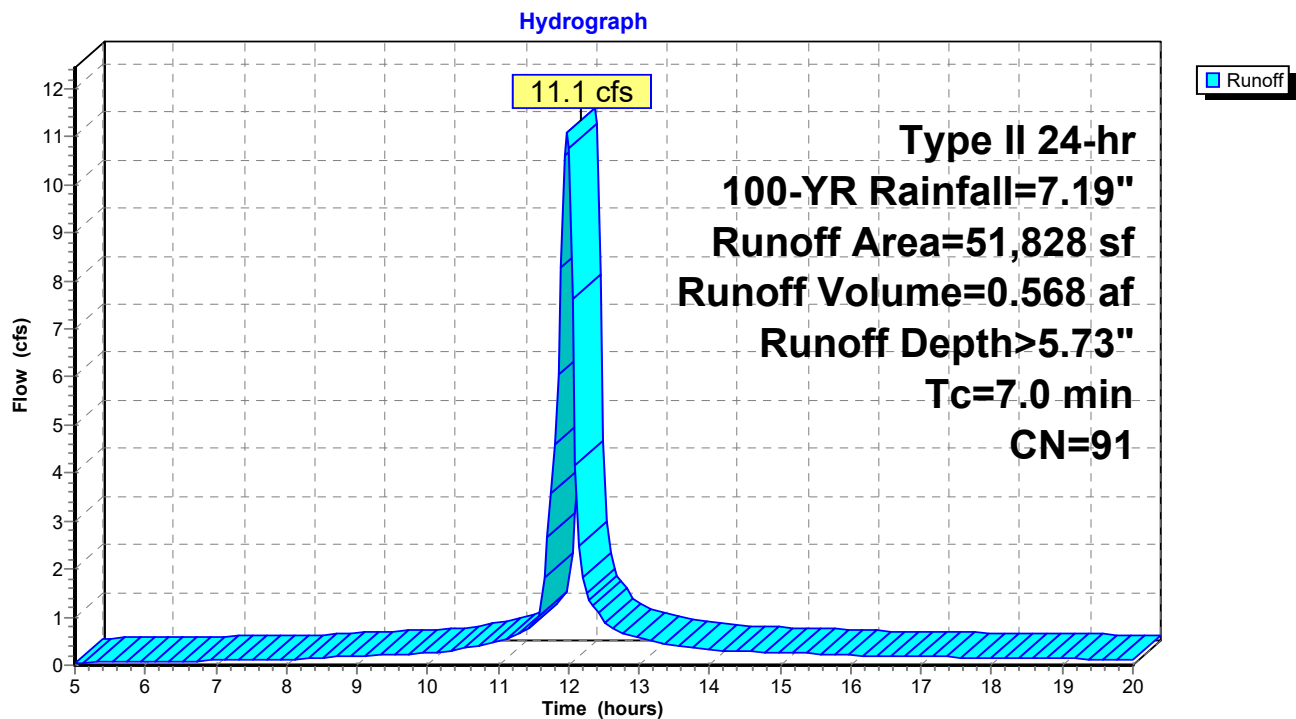
Runoff = 11.1 cfs @ 11.98 hrs, Volume= 0.568 af, Depth> 5.73"
Routed to Reach 4R : South Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
31,516	98	Paved parking, HSG D
20,312	80	>75% Grass cover, Good, HSG D
51,828	91	Weighted Average
20,312		39.19% Pervious Area
31,516		60.81% Impervious Area

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

Subcatchment 4XS:



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Type II 24-hr 100-YR Rainfall=7.19"

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Summary for Subcatchment 5XS:

Runoff = 8.3 cfs @ 11.98 hrs, Volume= 0.407 af, Depth> 5.09"
Routed to Reach 5R : SE Bluff - To Road

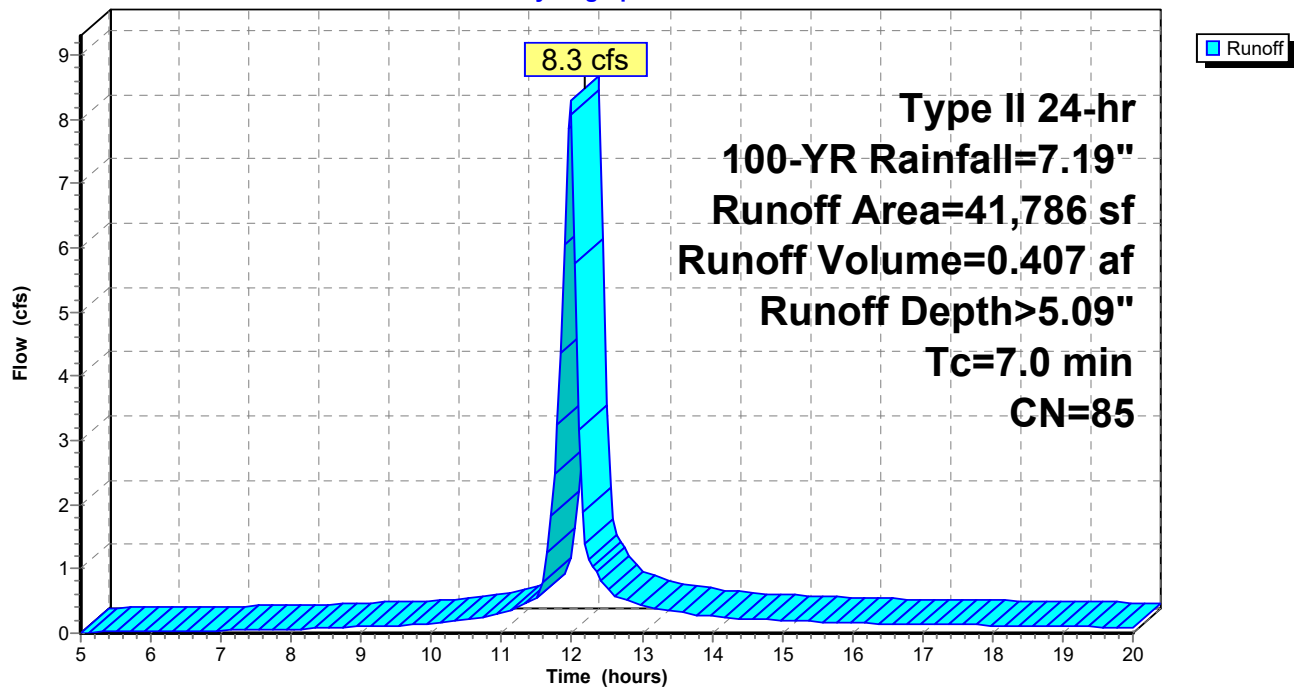
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
12,719	98	Paved parking, HSG D
29,067	80	>75% Grass cover, Good, HSG D
41,786	85	Weighted Average
29,067		69.56% Pervious Area
12,719		30.44% Impervious Area

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

Subcatchment 5XS:

Hydrograph



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Type II 24-hr 100-YR Rainfall=7.19"

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Summary for Subcatchment 6XS:

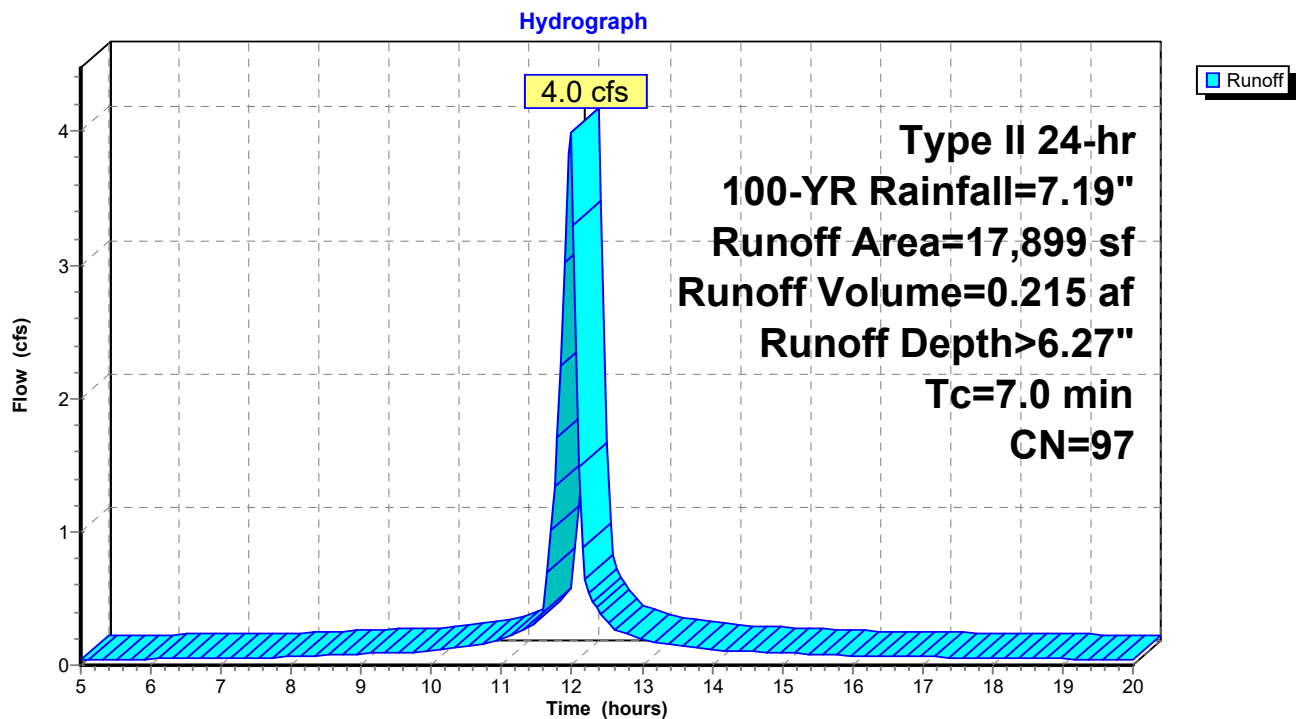
Runoff = 4.0 cfs @ 11.98 hrs, Volume= 0.215 af, Depth> 6.27"
Routed to Reach 6R : East Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
17,259	98	Paved parking, HSG D
640	80	>75% Grass cover, Good, HSG D
17,899	97	Weighted Average
640		3.58% Pervious Area
17,259		96.42% Impervious Area

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

Subcatchment 6XS:



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Type II 24-hr 100-YR Rainfall=7.19"

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Summary for Subcatchment 7XS:

Runoff = 5.6 cfs @ 11.98 hrs, Volume= 0.280 af, Depth> 5.42"
Routed to Reach 5R : SE Bluff - To Road

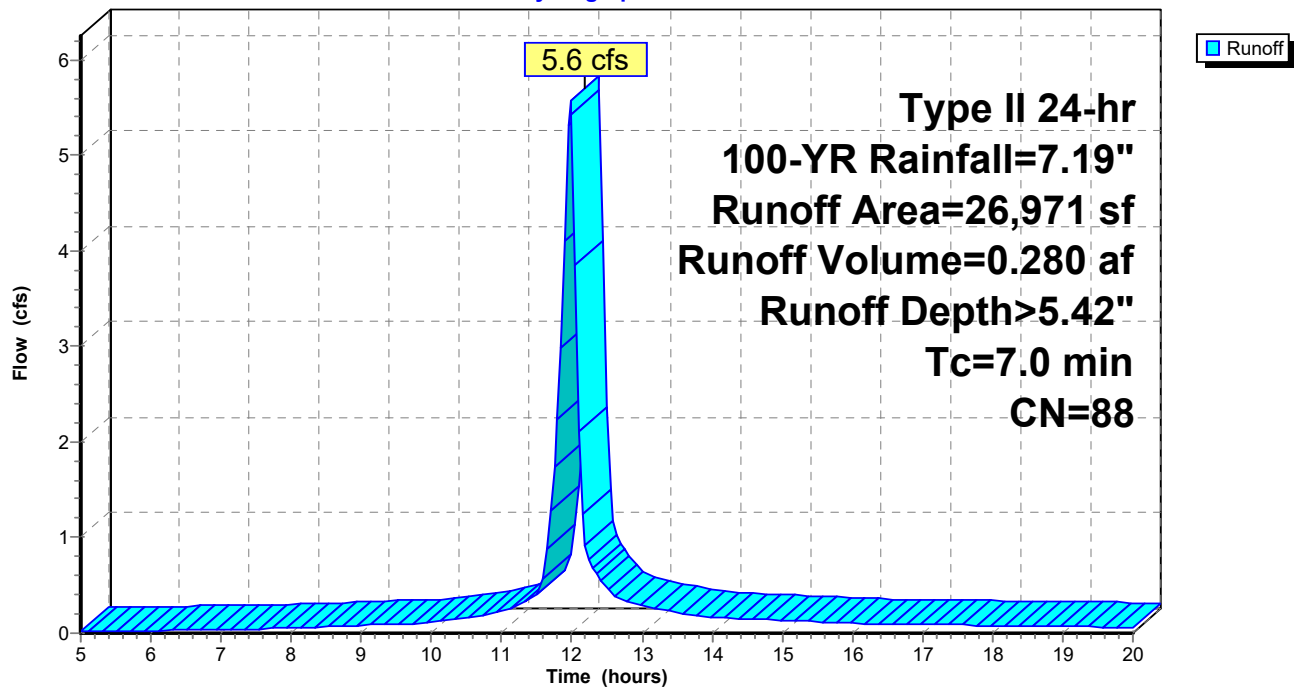
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
12,609	98	Paved parking, HSG D
14,362	80	>75% Grass cover, Good, HSG D
26,971	88	Weighted Average
14,362		53.25% Pervious Area
12,609		46.75% Impervious Area

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

Subcatchment 7XS:

Hydrograph



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Type II 24-hr 100-YR Rainfall=7.19"

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Summary for Subcatchment 8XS:

Runoff = 3.2 cfs @ 11.98 hrs, Volume= 0.152 af, Depth> 4.54"
Routed to Reach 7R : North Bluff

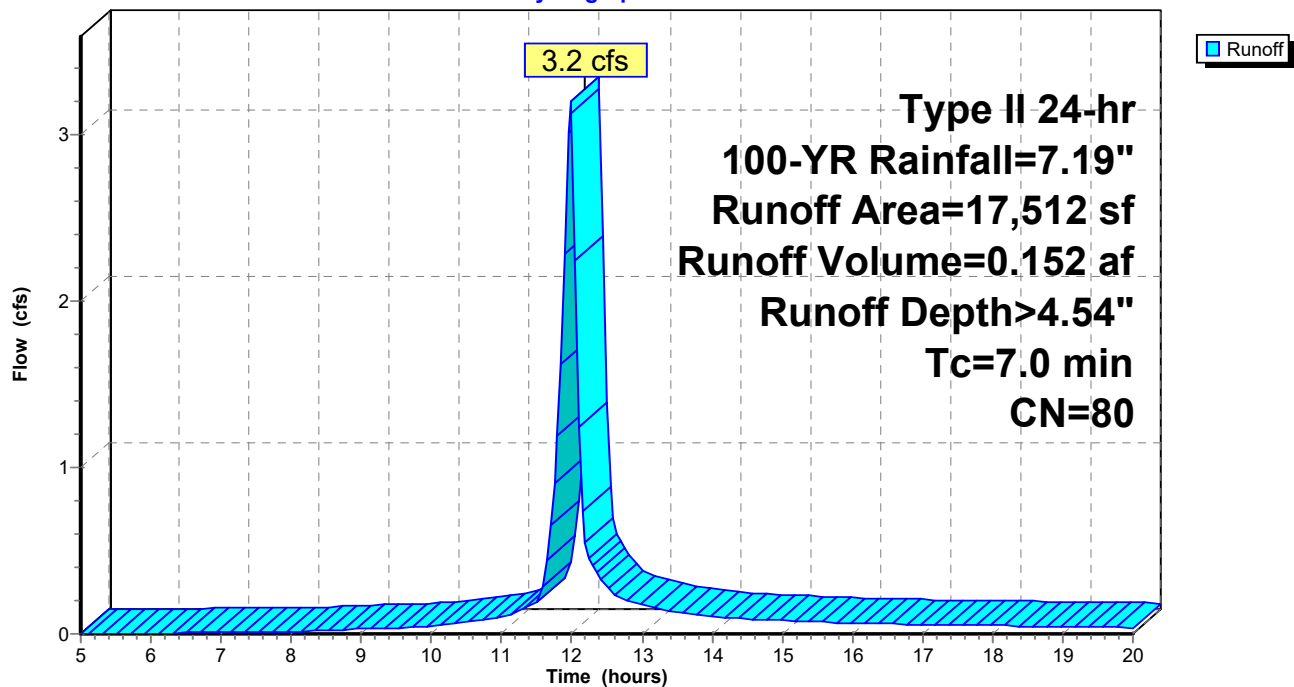
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
17,512	80	>75% Grass cover, Good, HSG D
17,512		100.00% Pervious Area

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

Subcatchment 8XS:

Hydrograph



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Type II 24-hr 100-YR Rainfall=7.19"

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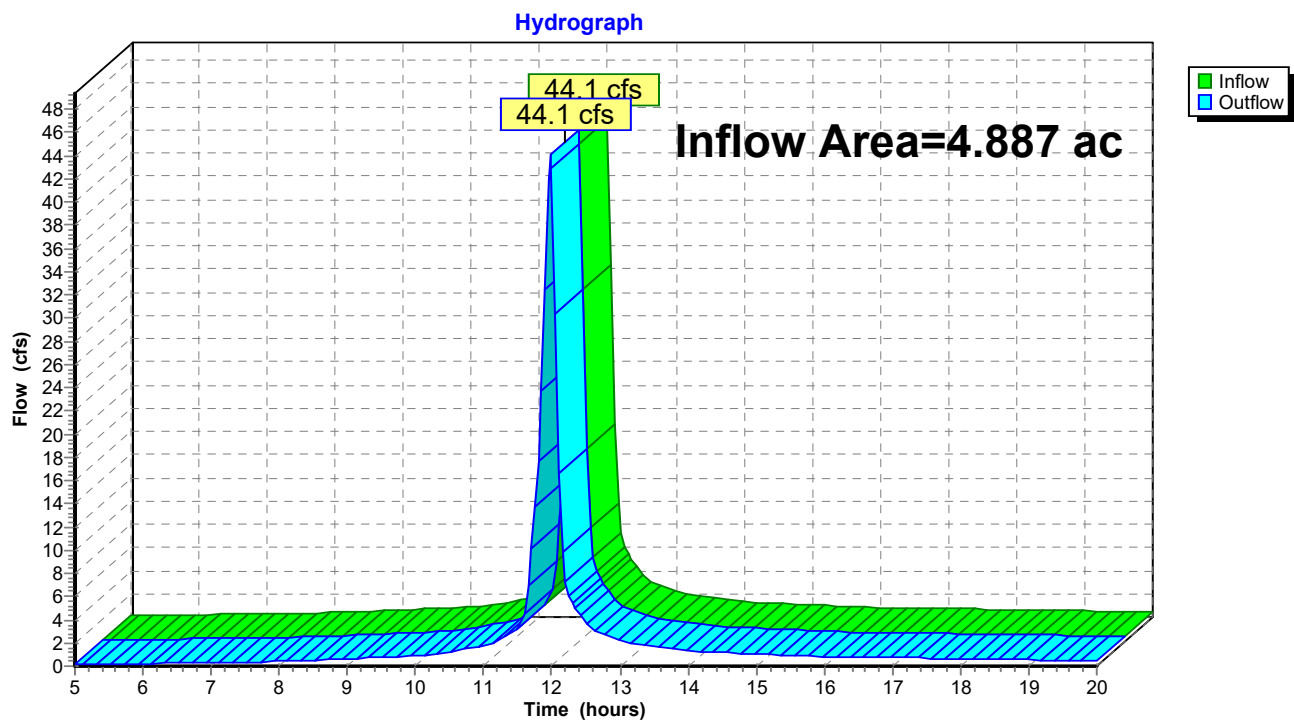
Summary for Reach 1R: NW Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.887 ac, 45.04% Impervious, Inflow Depth > 5.42" for 100-YR event
Inflow = 44.1 cfs @ 11.98 hrs, Volume= 2.206 af
Outflow = 44.1 cfs @ 11.98 hrs, Volume= 2.206 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: NW Storm



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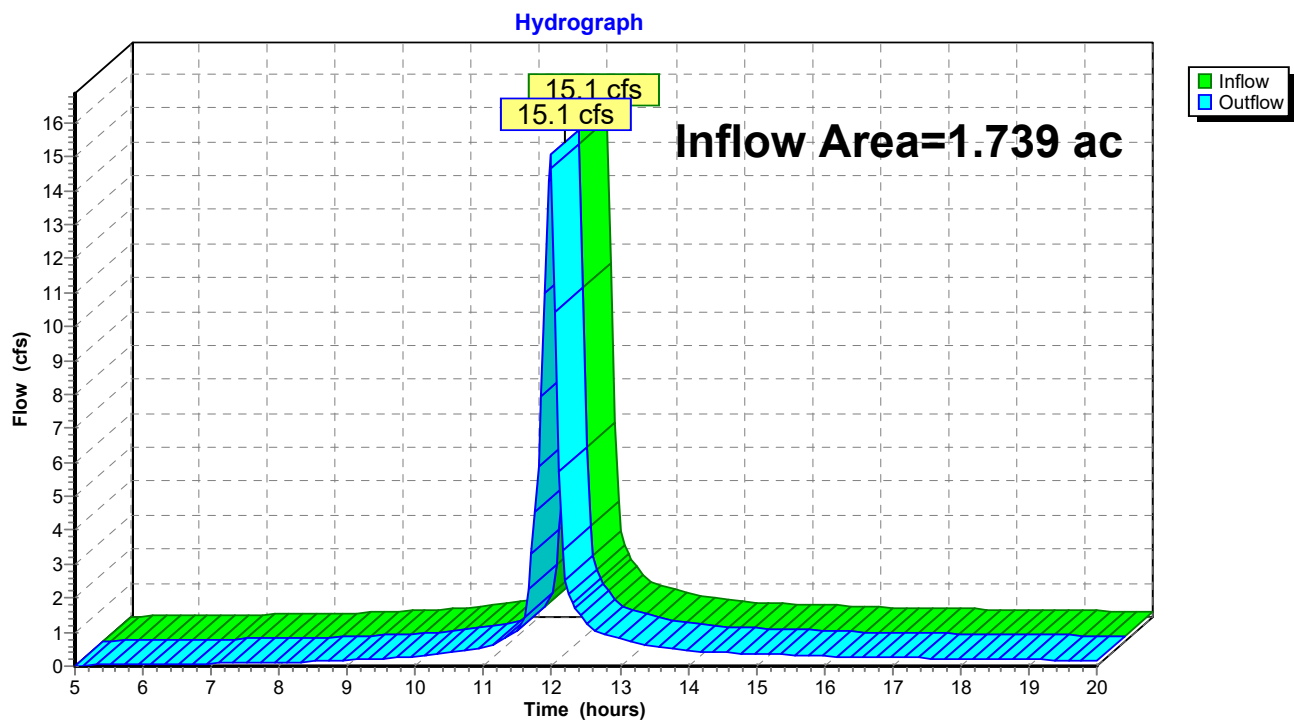
Summary for Reach 2R: West Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.739 ac, 26.31% Impervious, Inflow Depth > 5.09" for 100-YR event
Inflow = 15.1 cfs @ 11.98 hrs, Volume= 0.738 af
Outflow = 15.1 cfs @ 11.98 hrs, Volume= 0.738 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 2R: West Storm



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Type II 24-hr 100-YR Rainfall=7.19"

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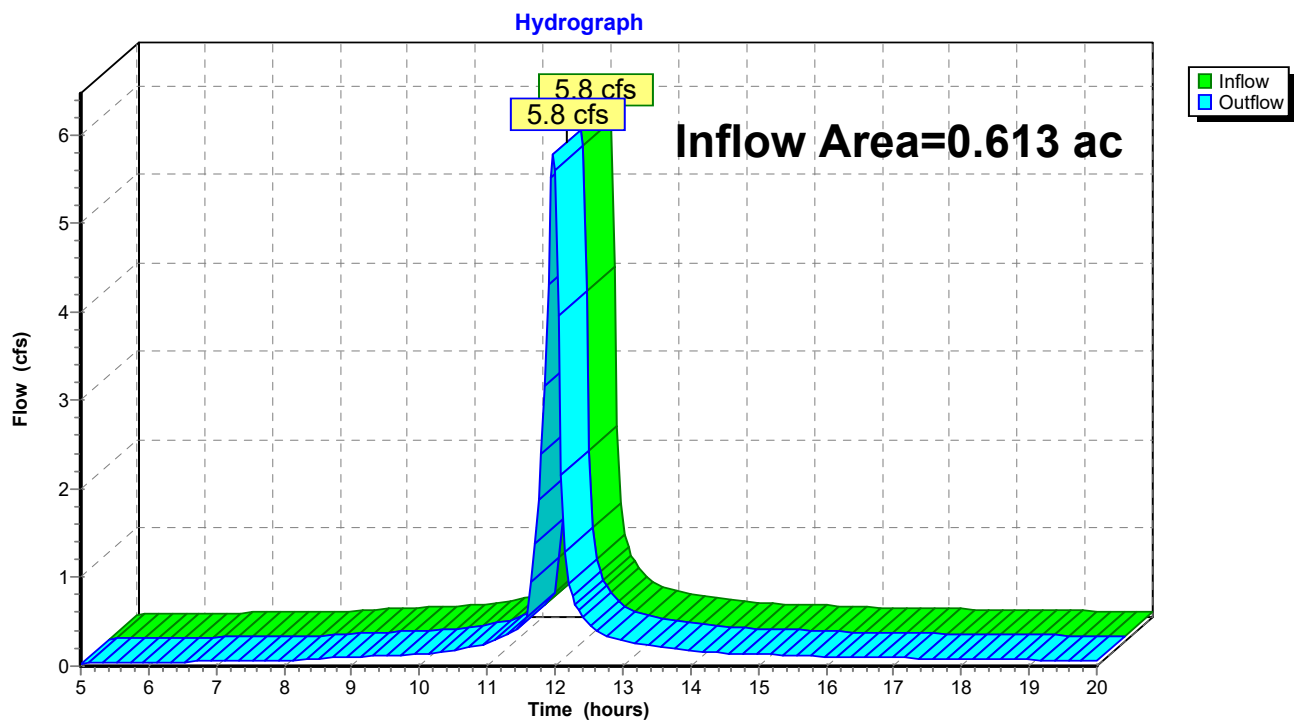
Summary for Reach 3R: West Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.613 ac, 64.20% Impervious, Inflow Depth > 5.83" for 100-YR event
Inflow = 5.8 cfs @ 11.98 hrs, Volume= 0.298 af
Outflow = 5.8 cfs @ 11.98 hrs, Volume= 0.298 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 3R: West Bluff



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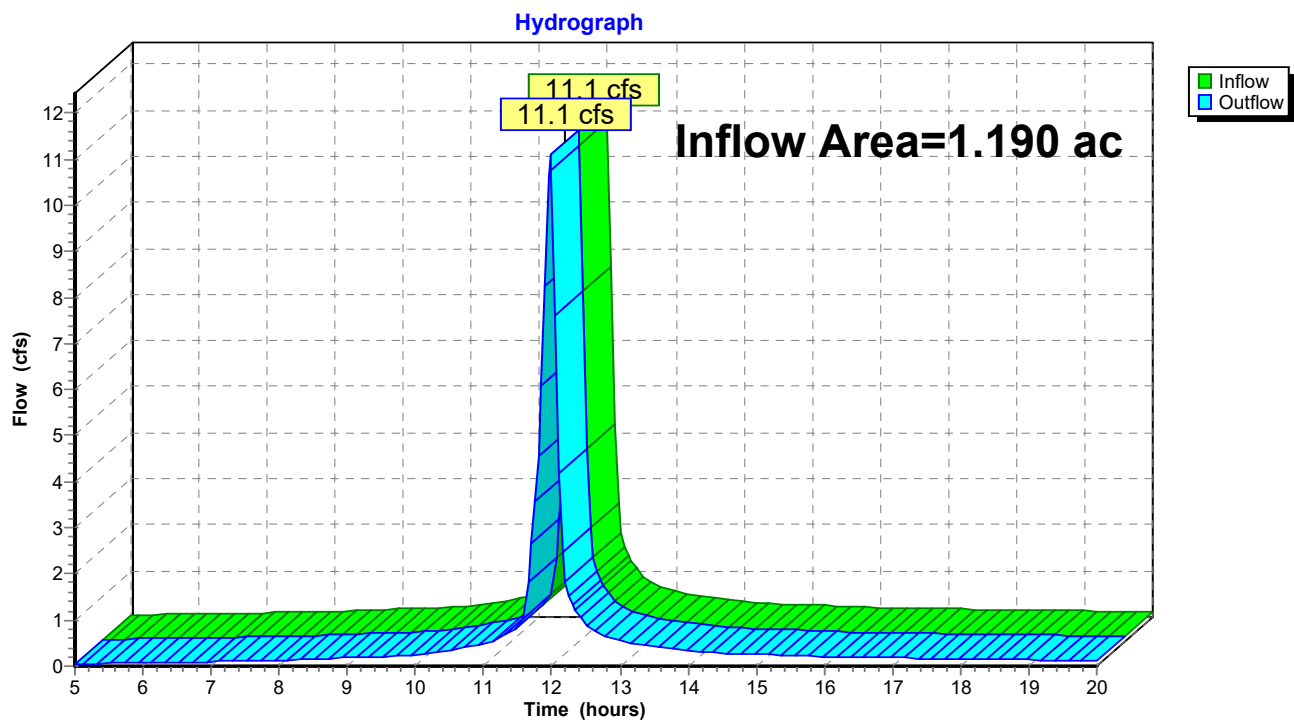
Summary for Reach 4R: South Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.190 ac, 60.81% Impervious, Inflow Depth > 5.73" for 100-YR event
Inflow = 11.1 cfs @ 11.98 hrs, Volume= 0.568 af
Outflow = 11.1 cfs @ 11.98 hrs, Volume= 0.568 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 4R: South Storm



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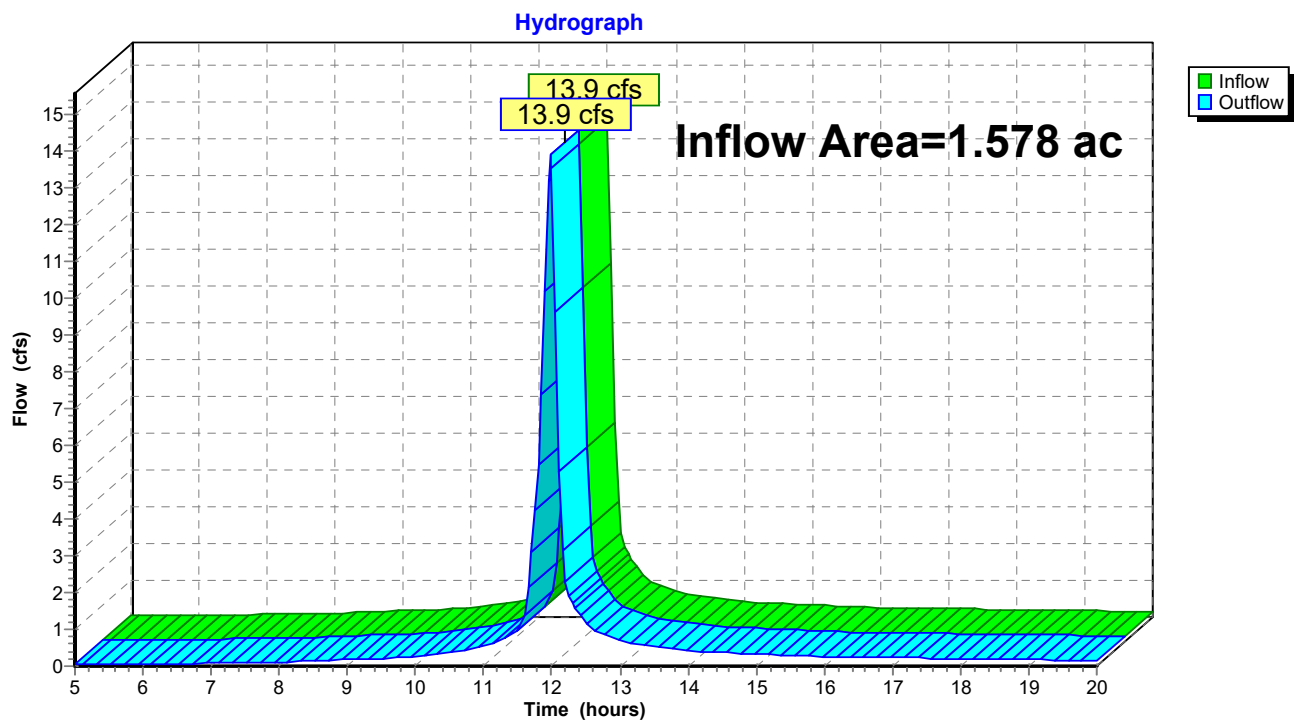
Summary for Reach 5R: SE Bluff - To Road

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.578 ac, 36.84% Impervious, Inflow Depth > 5.22" for 100-YR event
Inflow = 13.9 cfs @ 11.98 hrs, Volume= 0.687 af
Outflow = 13.9 cfs @ 11.98 hrs, Volume= 0.687 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: SE Bluff - To Road



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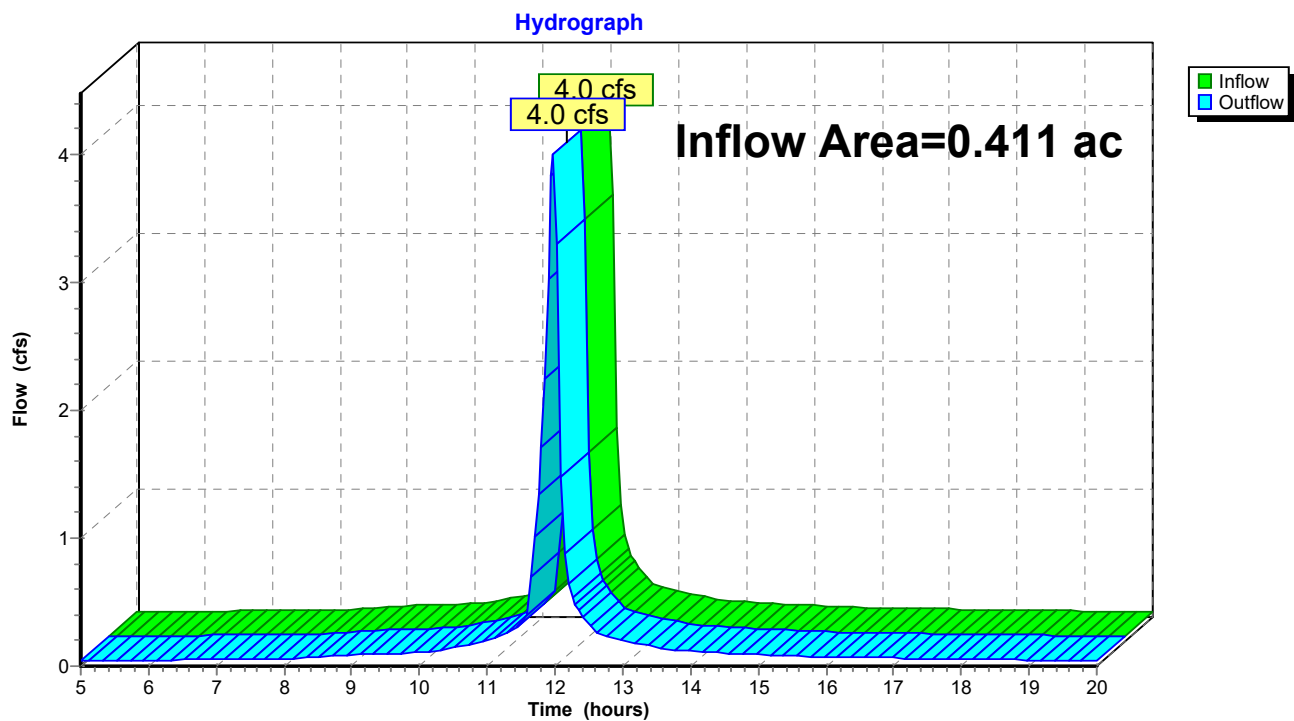
Summary for Reach 6R: East Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.411 ac, 96.42% Impervious, Inflow Depth > 6.27" for 100-YR event
Inflow = 4.0 cfs @ 11.98 hrs, Volume= 0.215 af
Outflow = 4.0 cfs @ 11.98 hrs, Volume= 0.215 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 6R: East Storm



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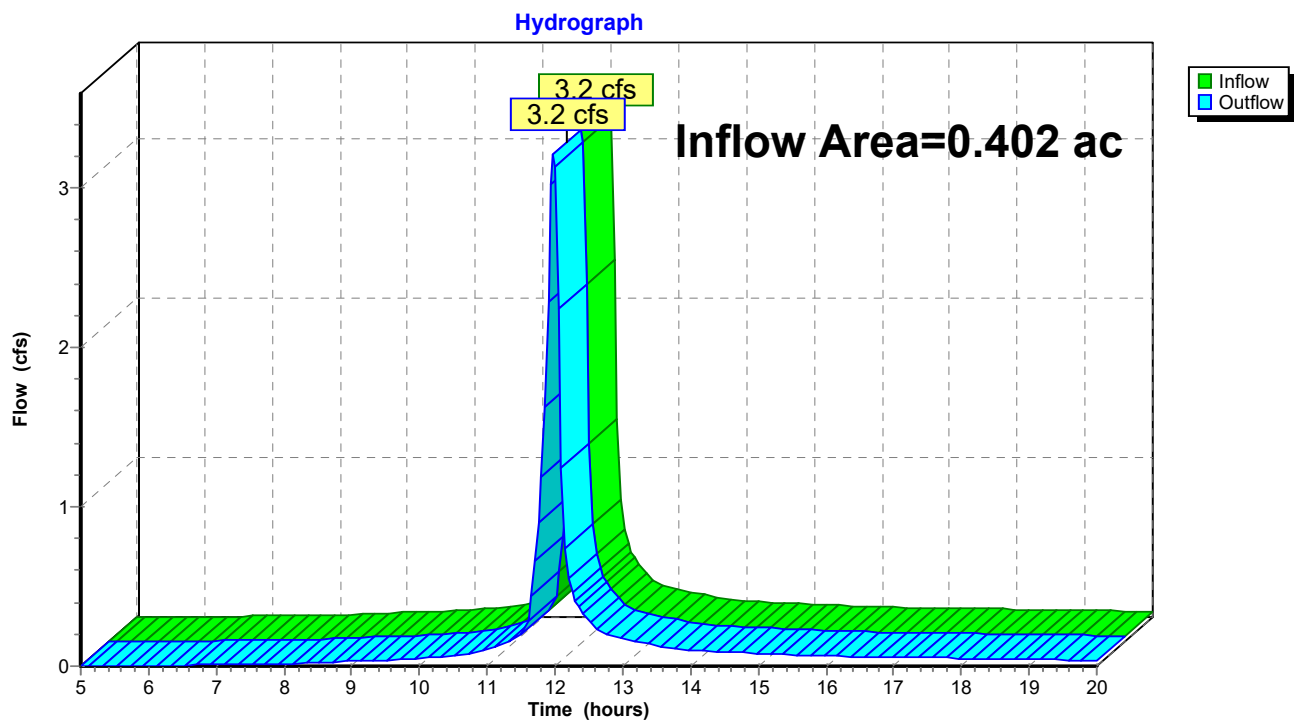
Summary for Reach 7R: North Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.402 ac, 0.00% Impervious, Inflow Depth > 4.54" for 100-YR event
Inflow = 3.2 cfs @ 11.98 hrs, Volume= 0.152 af
Outflow = 3.2 cfs @ 11.98 hrs, Volume= 0.152 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 7R: North Bluff

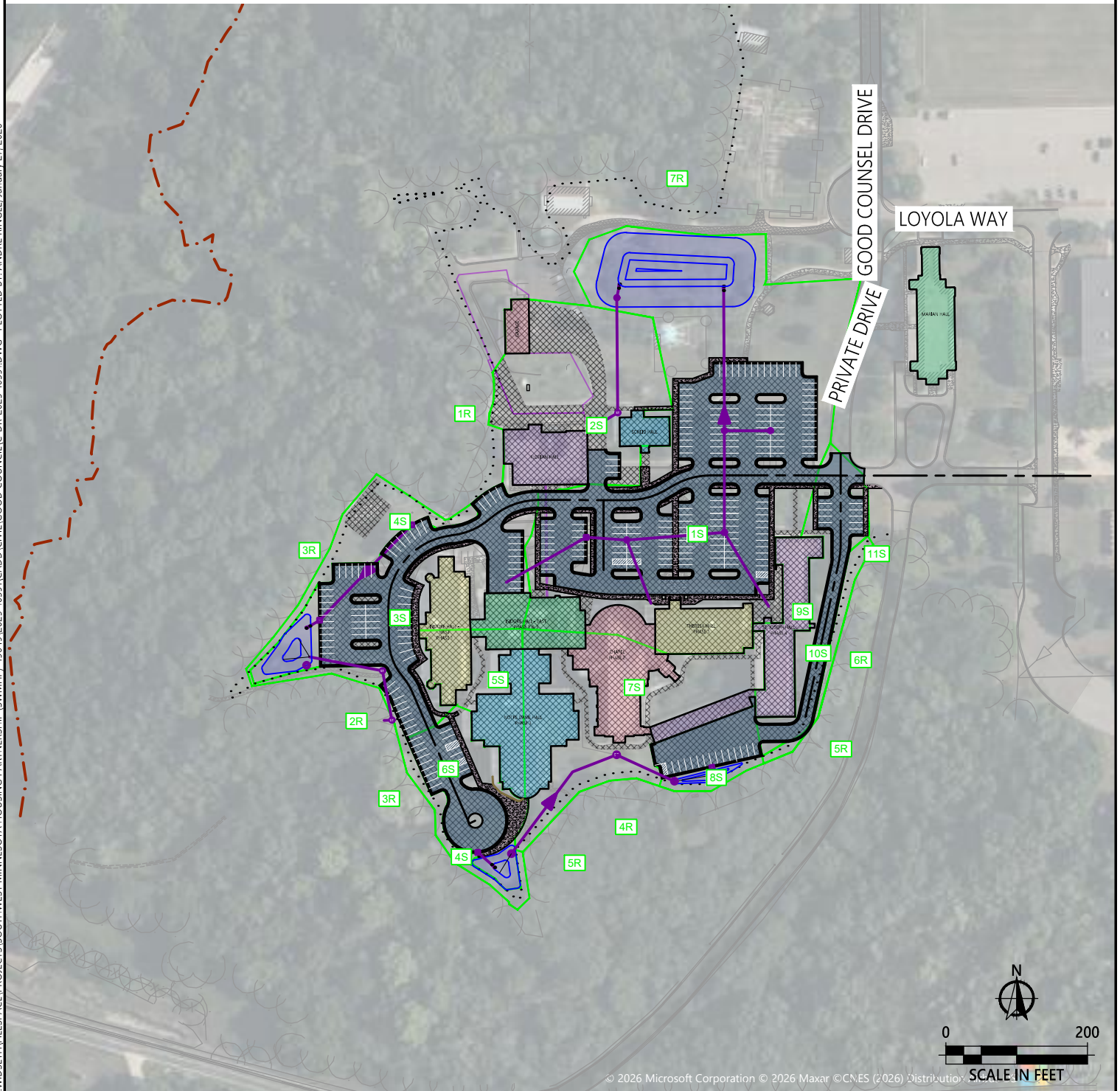


APPENDIX 4

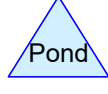
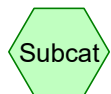
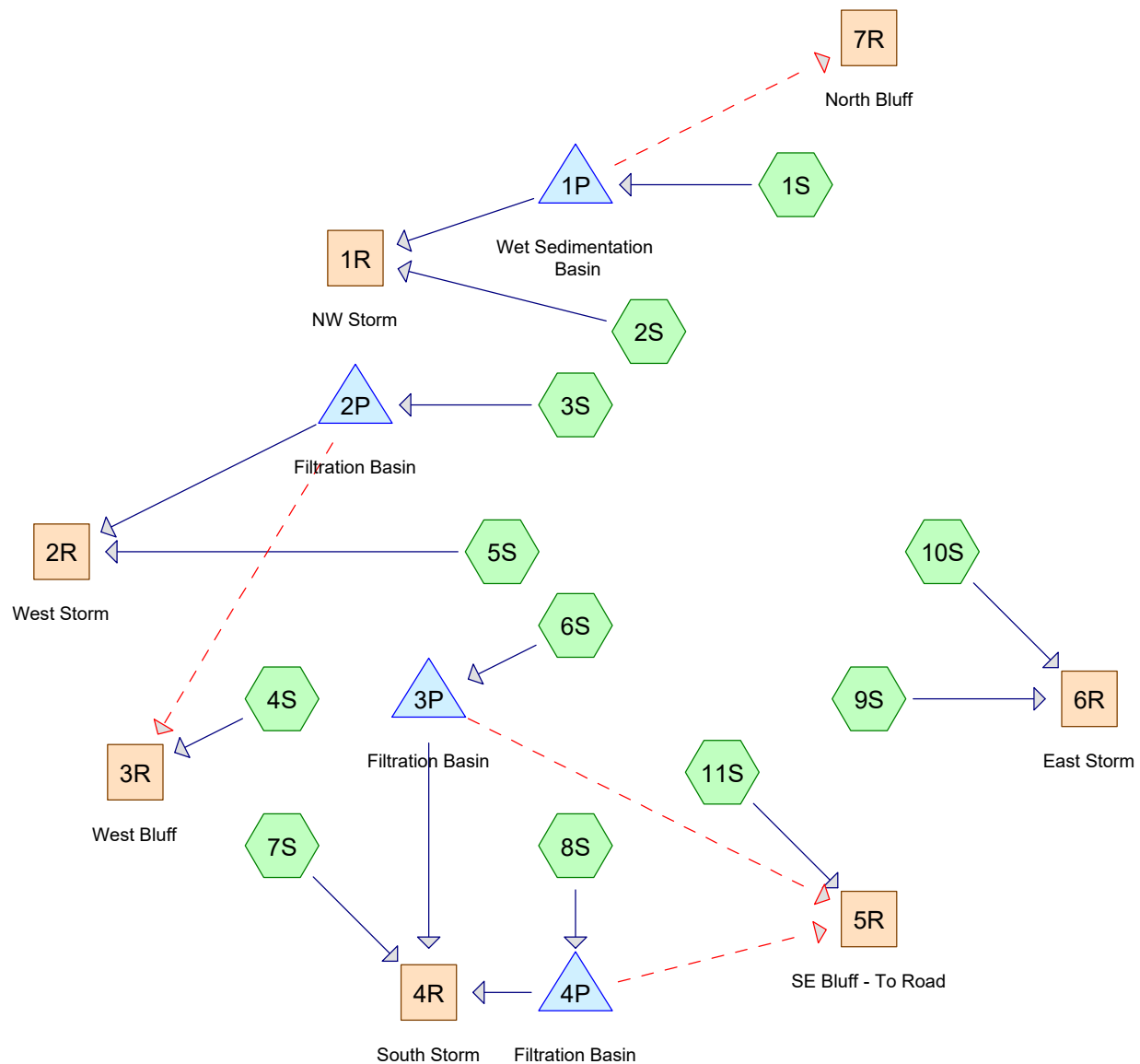
Post-Development Drainage Area Map And HydroCAD Report

POST-DEVELOPMENT DRAINAGE MAP

PROPOSED SUBCATCHMENT BOUNDARY	
PROPOSED IMPERVIOUS AREA	



 ARCHITECTS ■ ENGINEERS ■ SCIENTISTS ■ SURVEYORS	DRAWN BY: ATR CHECKED BY: CNB	I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL PROFESSION UNDER THE LAWS OF THE STATE OF MINNESOTA. SIGNER NAME _____ LIC. NO.: _____ NUMBER _____ DATE: JANUARY 2026	DATE	REV#	REVISIONS	DESCRIPTION
 ARCHITECTS ■ ENGINEERS ■ SCIENTISTS ■ SURVEYORS		POST-DEVELOPMENT DRAINAGE MAP GOOD COUNSEL MAIN CAMPUS				- PROJECT #: 2025-10591



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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	Type II 24-hr		Default	24.00	1	1.70	2
2	10-YR	Type II 24-hr		Default	24.00	1	4.28	2
3	100-YR	Type II 24-hr		Default	24.00	1	7.19	2

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.369	80	>75% Grass cover, Good, HSG D (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 10S, 11S)
6.541	98	Paved parking, HSG D (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S)
10.910	91	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
10.910	HSG D	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S
0.000	Other	
10.910		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	4.369	0.000	4.369	>75% Grass cover, Good	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 10S, 11S
0.000	0.000	0.000	6.541	0.000	6.541	Paved parking	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S
0.000	0.000	0.000	10.910	0.000	10.910	TOTAL AREA	

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	1P	981.69	980.00	169.0	0.0100	0.013	0.0	12.0	0.0	
2	2P	980.00	978.00	200.0	0.0100	0.013	0.0	12.0	0.0	
3	3P	984.50	982.35	215.0	0.0100	0.013	0.0	12.0	0.0	
4	4P	981.22	981.07	151.0	0.0010	0.011	0.0	6.0	0.0	

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Type II 24-hr 2-YR Rainfall=1.70"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S:	Runoff Area=175,645 sf 58.50% Impervious Runoff Depth>0.84" Tc=7.0 min CN=91 Runoff=6.2 cfs 0.281 af
Subcatchment2S:	Runoff Area=57,101 sf 58.18% Impervious Runoff Depth>0.78" Tc=7.0 min CN=90 Runoff=1.9 cfs 0.085 af
Subcatchment3S:	Runoff Area=61,891 sf 76.15% Impervious Runoff Depth>1.04" Tc=7.0 min CN=94 Runoff=2.6 cfs 0.123 af
Subcatchment4S:	Runoff Area=21,859 sf 11.55% Impervious Runoff Depth>0.41" Tc=7.0 min CN=82 Runoff=0.4 cfs 0.017 af
Subcatchment5S:	Runoff Area=26,713 sf 64.20% Impervious Runoff Depth>0.90" Tc=7.0 min CN=92 Runoff=1.0 cfs 0.046 af
Subcatchment6S:	Runoff Area=22,043 sf 69.75% Impervious Runoff Depth>0.97" Tc=7.0 min CN=93 Runoff=0.9 cfs 0.041 af
Subcatchment7S:	Runoff Area=58,710 sf 53.68% Impervious Runoff Depth>0.78" Tc=7.0 min CN=90 Runoff=1.9 cfs 0.087 af
Subcatchment8S:	Runoff Area=12,647 sf 72.78% Impervious Runoff Depth>0.97" Tc=7.0 min CN=93 Runoff=0.5 cfs 0.023 af
Subcatchment9S:	Runoff Area=12,130 sf 100.00% Impervious Runoff Depth>1.38" Tc=7.0 min CN=98 Runoff=0.6 cfs 0.032 af
Subcatchment10S:	Runoff Area=22,212 sf 62.70% Impervious Runoff Depth>0.84" Tc=7.0 min CN=91 Runoff=0.8 cfs 0.036 af
Subcatchment11S:	Runoff Area=4,300 sf 0.00% Impervious Runoff Depth>0.34" Tc=7.0 min CN=80 Runoff=0.1 cfs 0.003 af
Reach 1R: NW Storm	Inflow=2.7 cfs 0.354 af Outflow=2.7 cfs 0.354 af
Reach 2R: West Storm	Inflow=1.0 cfs 0.088 af Outflow=1.0 cfs 0.088 af
Reach 3R: West Bluff	Inflow=0.4 cfs 0.017 af Outflow=0.4 cfs 0.017 af
Reach 4R: South Storm	Inflow=2.1 cfs 0.138 af Outflow=2.1 cfs 0.138 af
Reach 5R: SE Bluff - To Road	Inflow=0.1 cfs 0.003 af Outflow=0.1 cfs 0.003 af

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Type II 24-hr 2-YR Rainfall=1.70"

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Reach 6R: East Storm

Inflow=1.4 cfs 0.068 af

Outflow=1.4 cfs 0.068 af

Reach 7R: North Bluff

Inflow=0.0 cfs 0.000 af

Outflow=0.0 cfs 0.000 af

Pond 1P: Wet Sedimentation Basin

Peak Elev=987.51' Storage=11,085 cf Inflow=6.2 cfs 0.281 af

Primary=1.1 cfs 0.269 af Secondary=0.0 cfs 0.000 af Outflow=1.1 cfs 0.269 af

Pond 2P: Filtration Basin

Peak Elev=984.77' Storage=3,843 cf Inflow=2.6 cfs 0.123 af

Primary=0.1 cfs 0.042 af Secondary=0.0 cfs 0.000 af Outflow=0.1 cfs 0.042 af

Pond 3P: Filtration Basin

Peak Elev=988.01' Storage=1,034 cf Inflow=0.9 cfs 0.041 af

Primary=0.0 cfs 0.029 af Secondary=0.0 cfs 0.000 af Outflow=0.0 cfs 0.029 af

Pond 4P: Filtration Basin

Peak Elev=993.84' Storage=374 cf Inflow=0.5 cfs 0.023 af

Primary=0.3 cfs 0.022 af Secondary=0.0 cfs 0.000 af Outflow=0.3 cfs 0.022 af

Total Runoff Area = 10.910 ac Runoff Volume = 0.774 af Average Runoff Depth = 0.85"
40.05% Pervious = 4.369 ac 59.95% Impervious = 6.541 ac

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Type II 24-hr 2-YR Rainfall=1.70"

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Summary for Subcatchment 1S:

Runoff = 6.2 cfs @ 11.98 hrs, Volume= 0.281 af, Depth> 0.84"
Routed to Pond 1P : Wet Sedimentation Basin

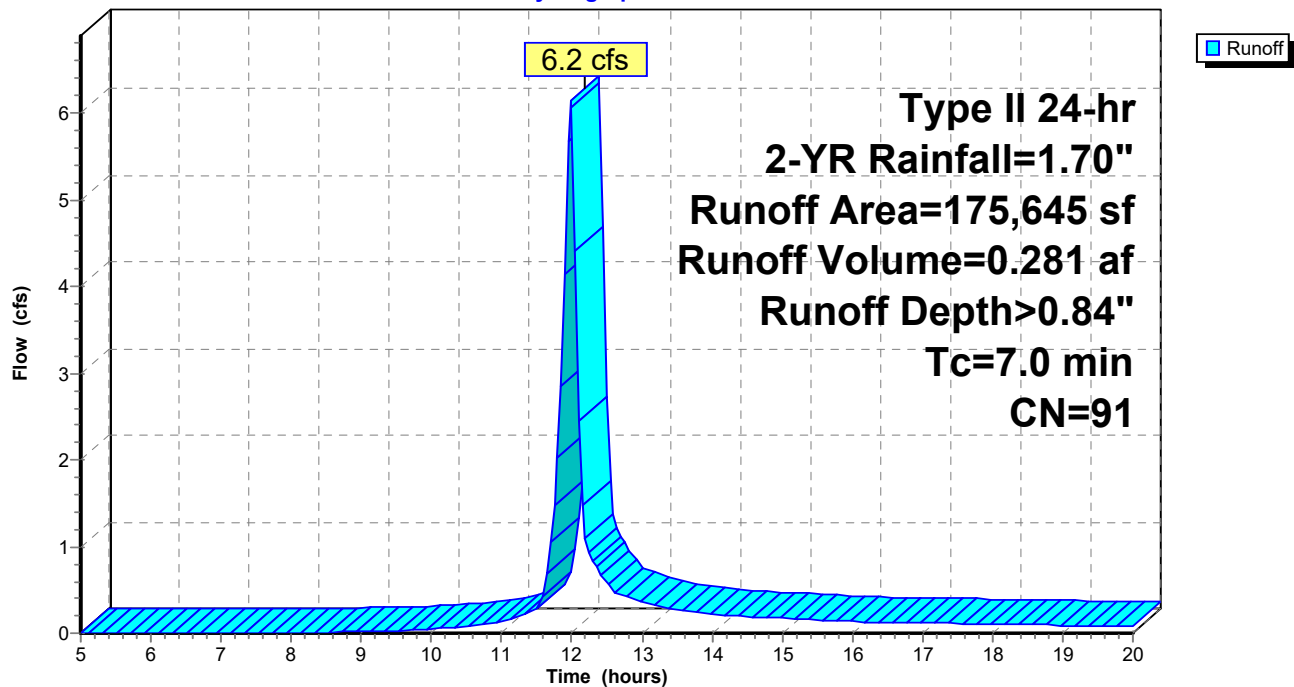
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
102,749	98	Paved parking, HSG D
72,896	80	>75% Grass cover, Good, HSG D
175,645	91	Weighted Average
72,896		41.50% Pervious Area
102,749		58.50% Impervious Area

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

Subcatchment 1S:

Hydrograph



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Type II 24-hr 2-YR Rainfall=1.70"

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Summary for Subcatchment 2S:

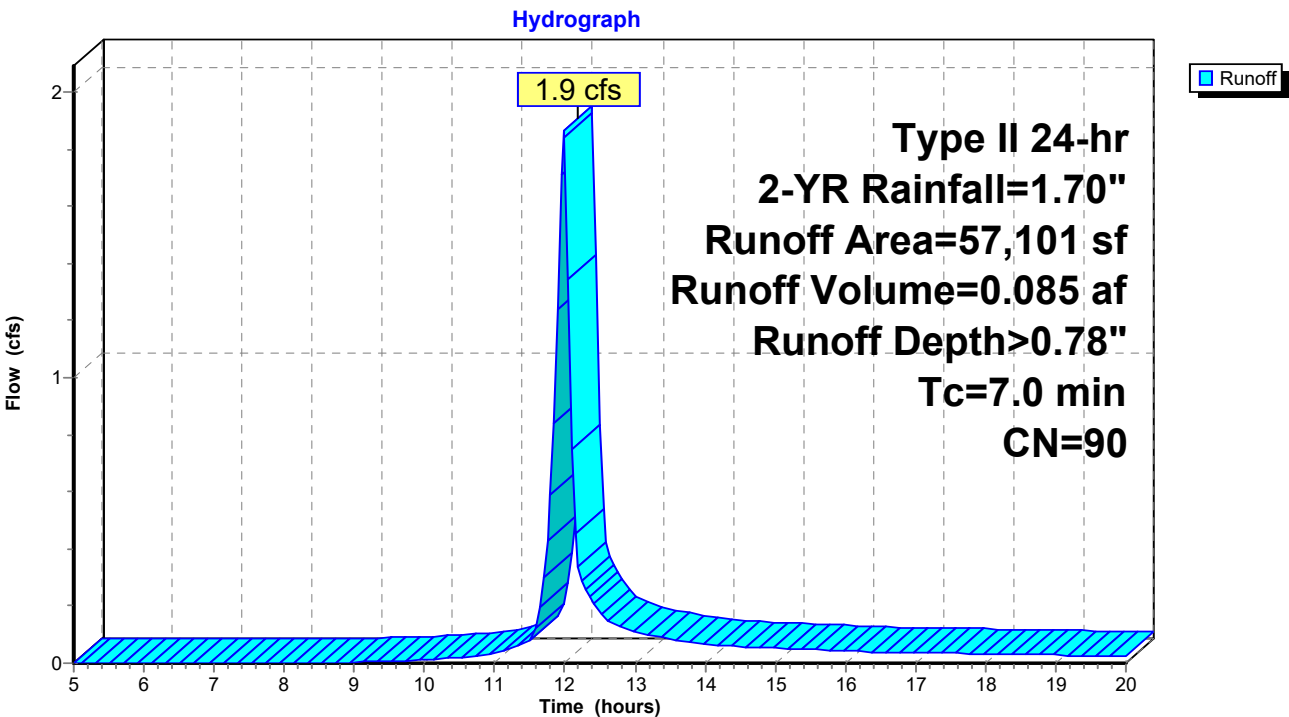
Runoff = 1.9 cfs @ 11.99 hrs, Volume= 0.085 af, Depth> 0.78"
Routed to Reach 1R : NW Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
33,220	98	Paved parking, HSG D
23,881	80	>75% Grass cover, Good, HSG D
57,101	90	Weighted Average
23,881		41.82% Pervious Area
33,220		58.18% Impervious Area

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

Subcatchment 2S:



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Type II 24-hr 2-YR Rainfall=1.70"

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Summary for Subcatchment 3S:

Runoff = 2.6 cfs @ 11.98 hrs, Volume= 0.123 af, Depth> 1.04"
Routed to Pond 2P : Filtration Basin

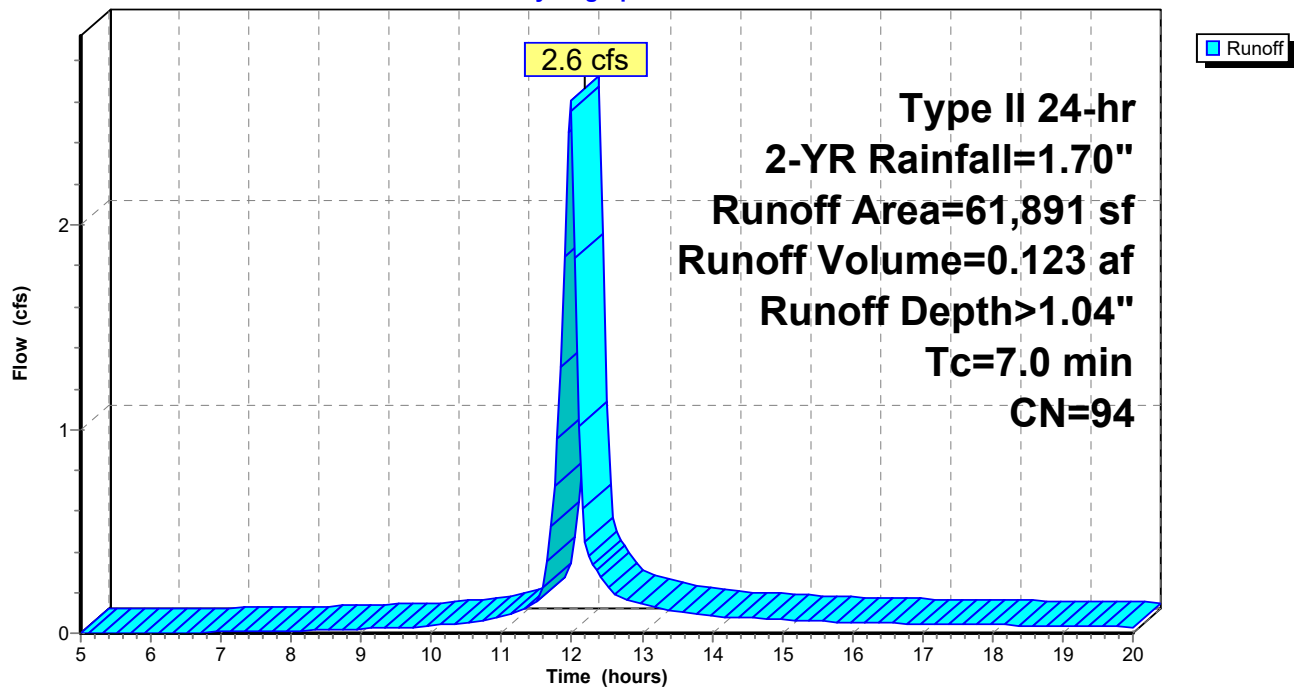
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
47,128	98	Paved parking, HSG D
14,763	80	>75% Grass cover, Good, HSG D
61,891	94	Weighted Average
14,763		23.85% Pervious Area
47,128		76.15% Impervious Area

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

Subcatchment 3S:

Hydrograph



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Type II 24-hr 2-YR Rainfall=1.70"

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Summary for Subcatchment 4S:

Runoff = 0.4 cfs @ 11.99 hrs, Volume= 0.017 af, Depth> 0.41"
Routed to Reach 3R : West Bluff

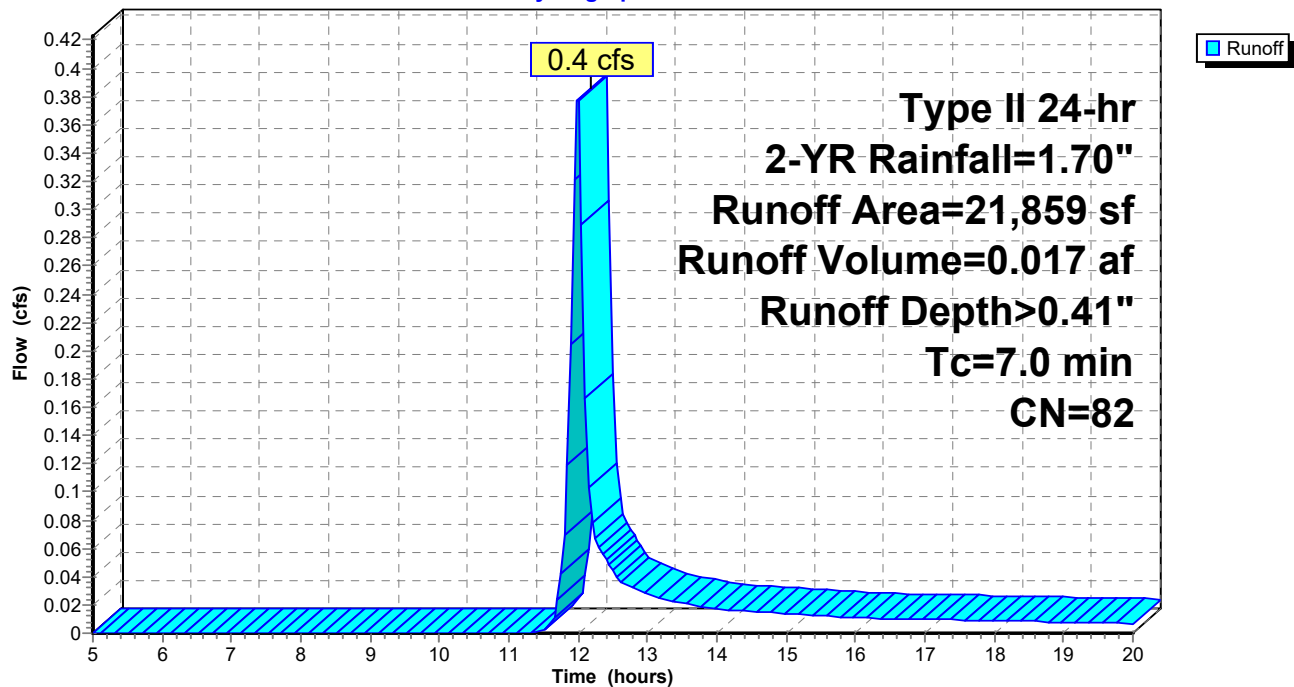
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
2,525	98	Paved parking, HSG D
19,334	80	>75% Grass cover, Good, HSG D
21,859	82	Weighted Average
19,334		88.45% Pervious Area
2,525		11.55% Impervious Area

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

Subcatchment 4S:

Hydrograph



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Type II 24-hr 2-YR Rainfall=1.70"

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Summary for Subcatchment 5S:

Runoff = 1.0 cfs @ 11.98 hrs, Volume= 0.046 af, Depth> 0.90"
Routed to Reach 2R : West Storm

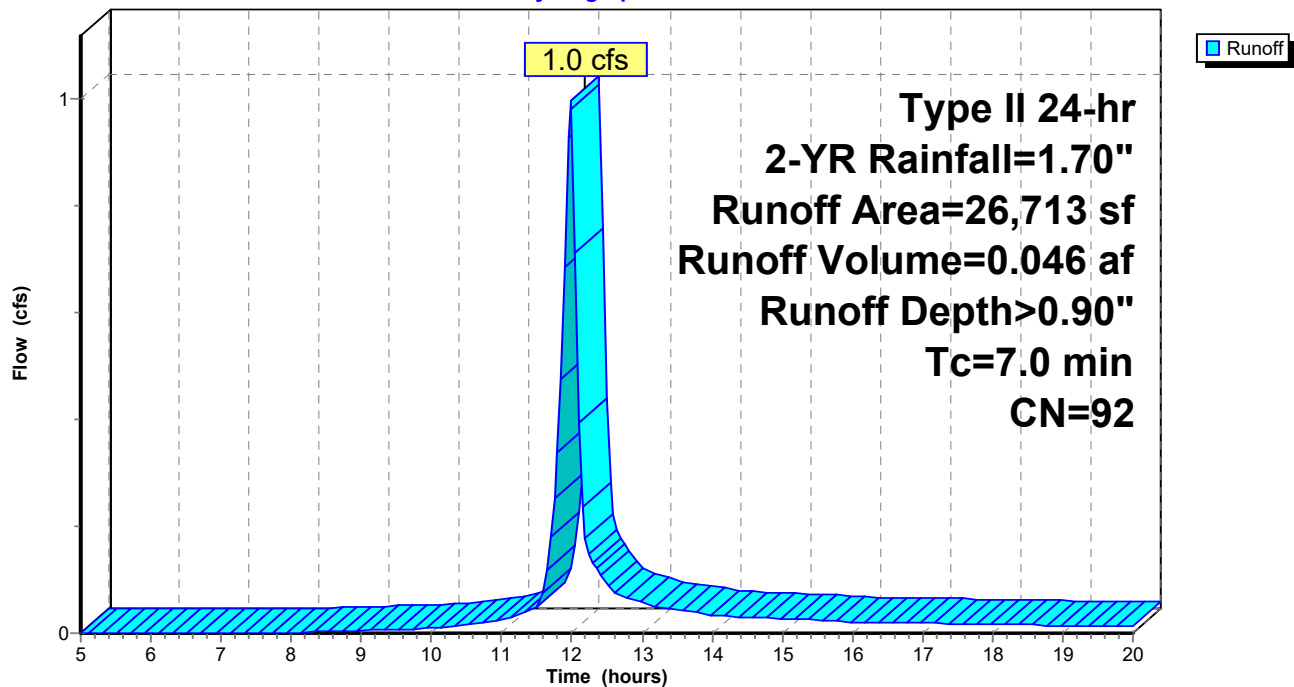
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
17,151	98	Paved parking, HSG D
9,562	80	>75% Grass cover, Good, HSG D
26,713	92	Weighted Average
9,562		35.80% Pervious Area
17,151		64.20% Impervious Area

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

Subcatchment 5S:

Hydrograph



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Type II 24-hr 2-YR Rainfall=1.70"

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Summary for Subcatchment 6S:

Runoff = 0.9 cfs @ 11.98 hrs, Volume= 0.041 af, Depth> 0.97"
Routed to Pond 3P : Filtration Basin

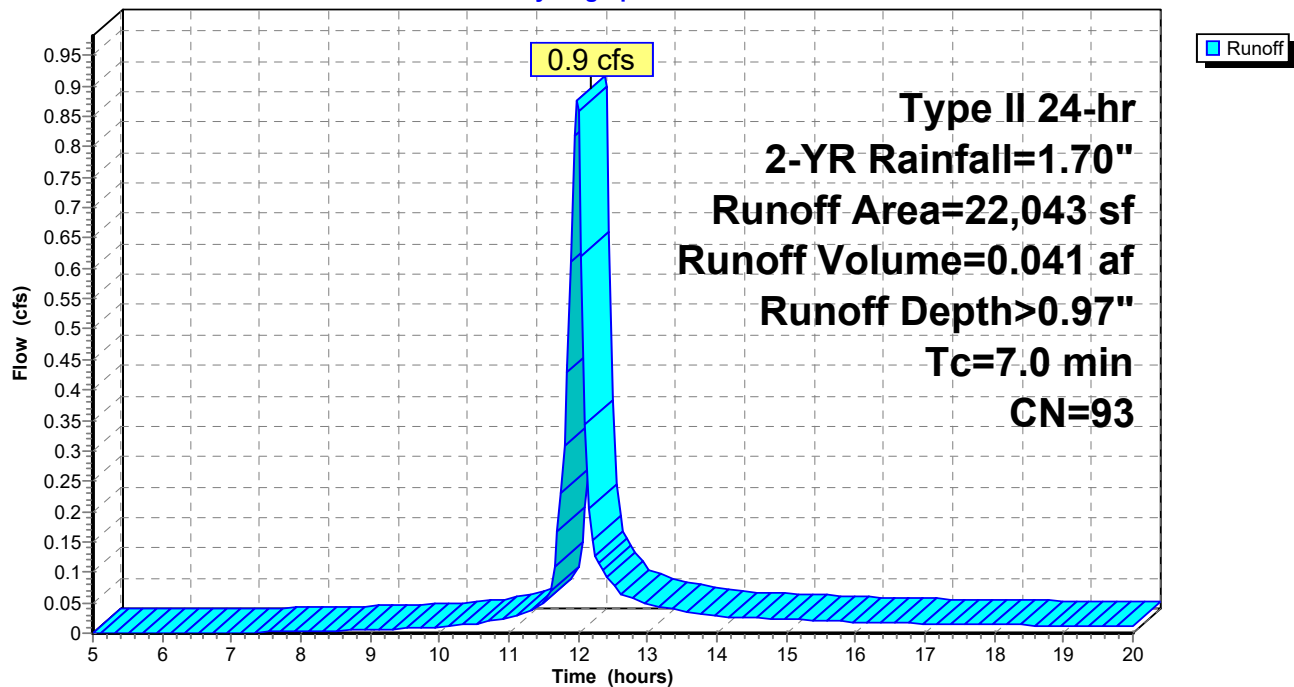
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
15,375	98	Paved parking, HSG D
6,668	80	>75% Grass cover, Good, HSG D
22,043	93	Weighted Average
6,668		30.25% Pervious Area
15,375		69.75% Impervious Area

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

Subcatchment 6S:

Hydrograph



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Type II 24-hr 2-YR Rainfall=1.70"

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Summary for Subcatchment 7S:

Runoff = 1.9 cfs @ 11.99 hrs, Volume= 0.087 af, Depth> 0.78"
Routed to Reach 4R : South Storm

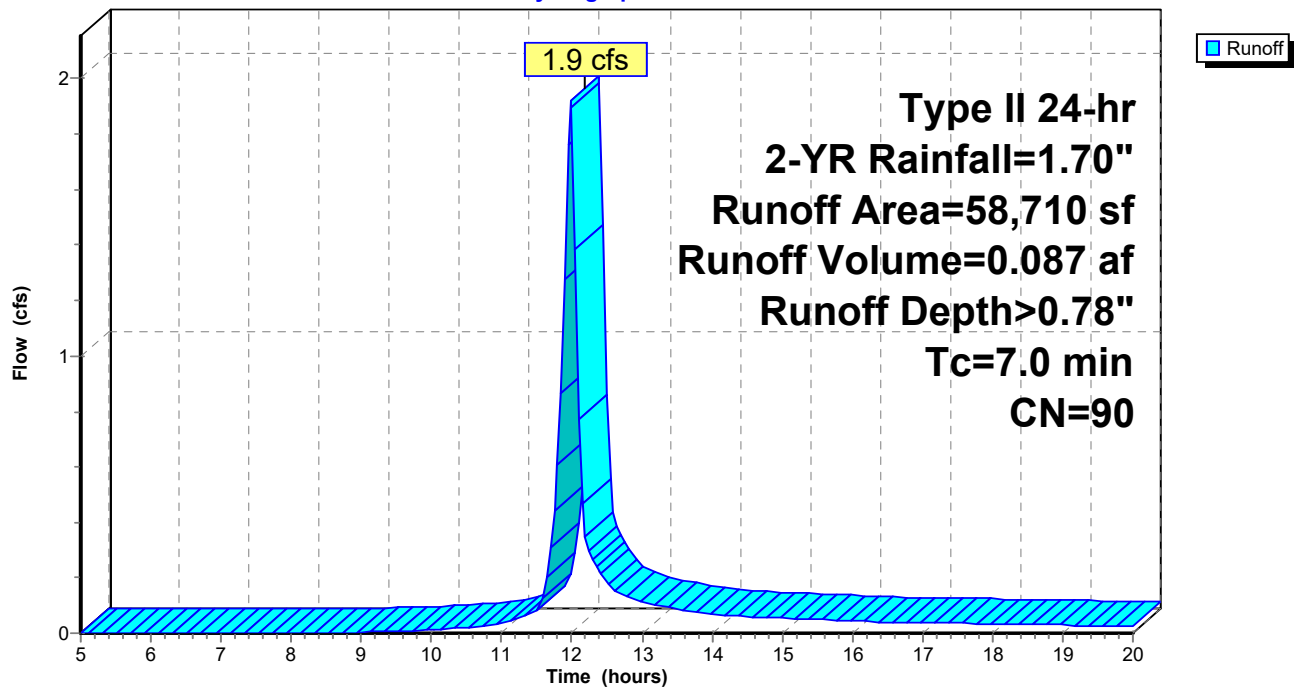
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
31,516	98	Paved parking, HSG D
27,194	80	>75% Grass cover, Good, HSG D
58,710	90	Weighted Average
27,194		46.32% Pervious Area
31,516		53.68% Impervious Area

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

Subcatchment 7S:

Hydrograph



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Type II 24-hr 2-YR Rainfall=1.70"

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Summary for Subcatchment 8S:

Runoff = 0.5 cfs @ 11.98 hrs, Volume= 0.023 af, Depth> 0.97"
Routed to Pond 4P : Filtration Basin

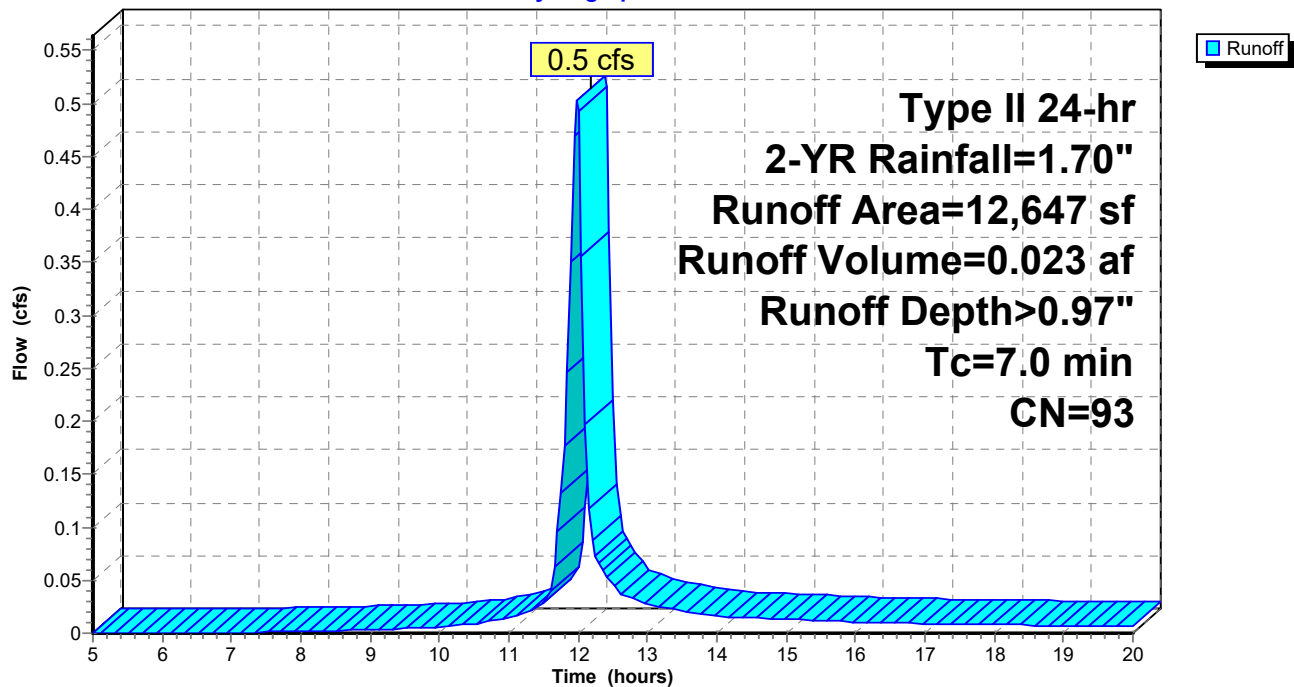
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
9,205	98	Paved parking, HSG D
3,442	80	>75% Grass cover, Good, HSG D
12,647	93	Weighted Average
3,442		27.22% Pervious Area
9,205		72.78% Impervious Area

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

Subcatchment 8S:

Hydrograph



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Type II 24-hr 2-YR Rainfall=1.70"

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Summary for Subcatchment 9S:

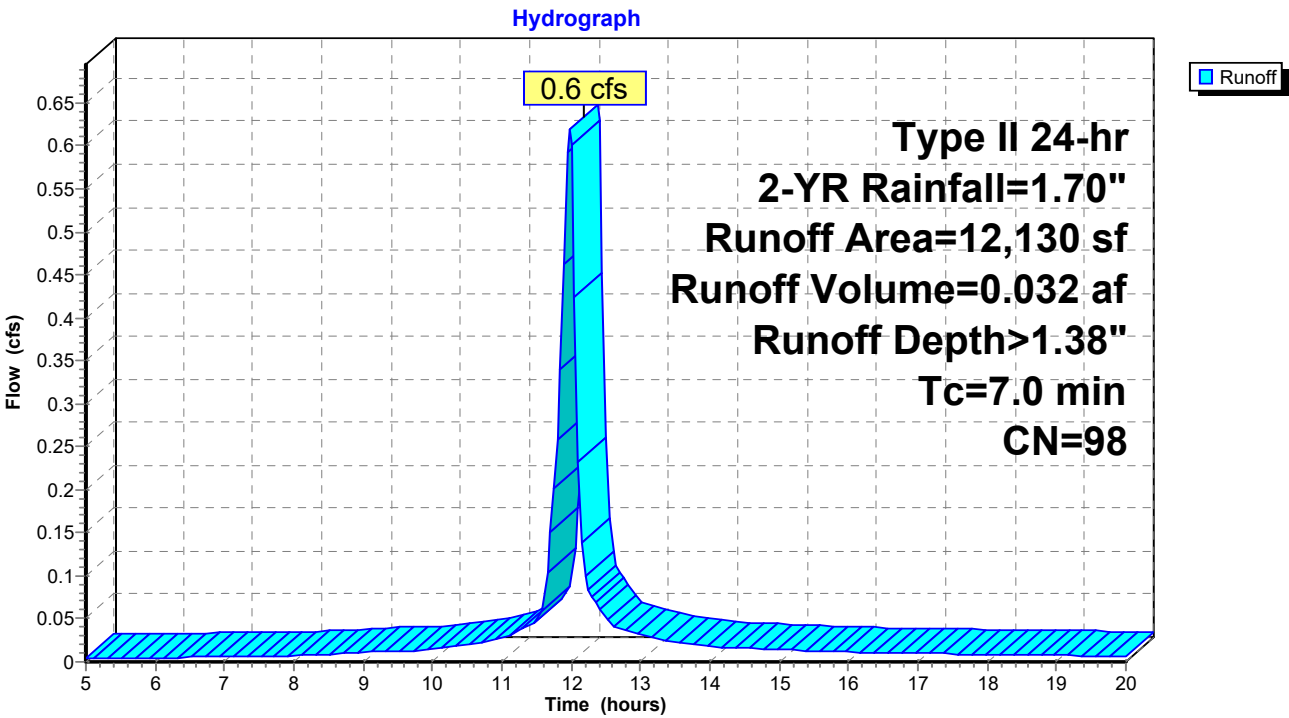
Runoff = 0.6 cfs @ 11.98 hrs, Volume= 0.032 af, Depth> 1.38"
Routed to Reach 6R : East Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
12,130	98	Paved parking, HSG D
12,130		100.00% Impervious Area

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

Subcatchment 9S:



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Summary for Subcatchment 10S:

Runoff = 0.8 cfs @ 11.98 hrs, Volume= 0.036 af, Depth> 0.84"
Routed to Reach 6R : East Storm

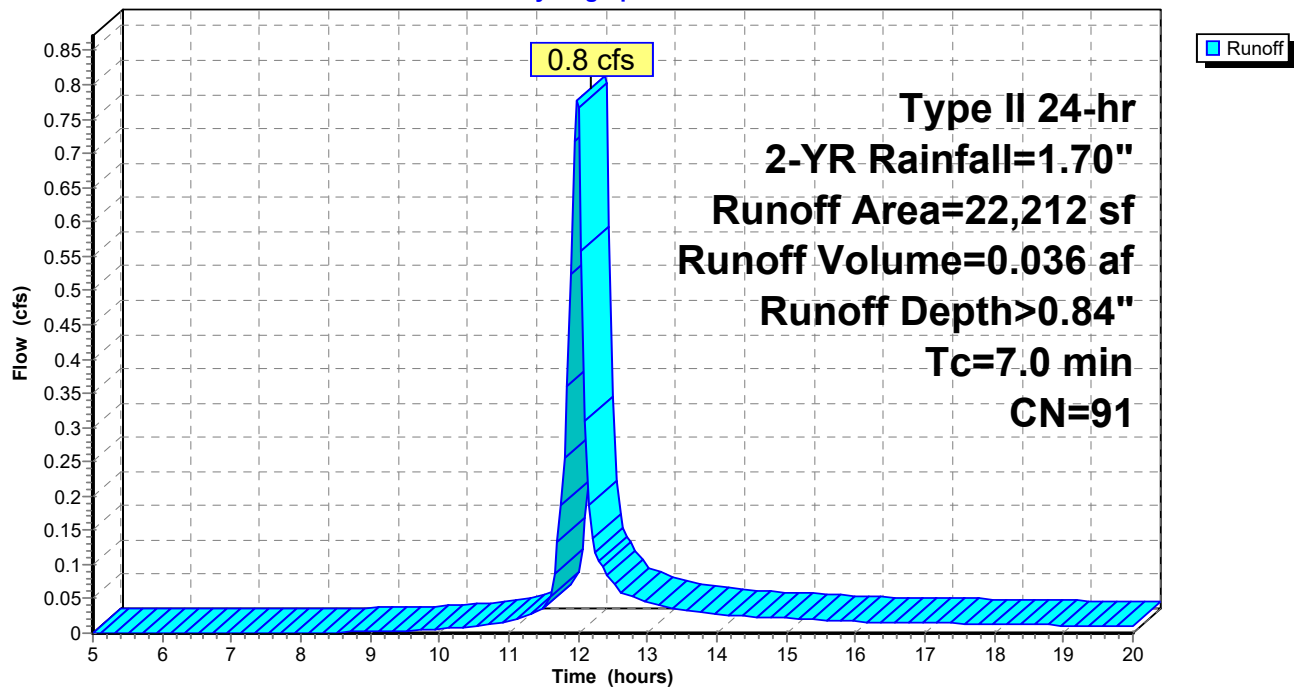
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
13,928	98	Paved parking, HSG D
8,284	80	>75% Grass cover, Good, HSG D
22,212	91	Weighted Average
8,284		37.30% Pervious Area
13,928		62.70% Impervious Area

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

Subcatchment 10S:

Hydrograph



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Summary for Subcatchment 11S:

Runoff = 0.1 cfs @ 12.00 hrs, Volume= 0.003 af, Depth> 0.34"
Routed to Reach 5R : SE Bluff - To Road

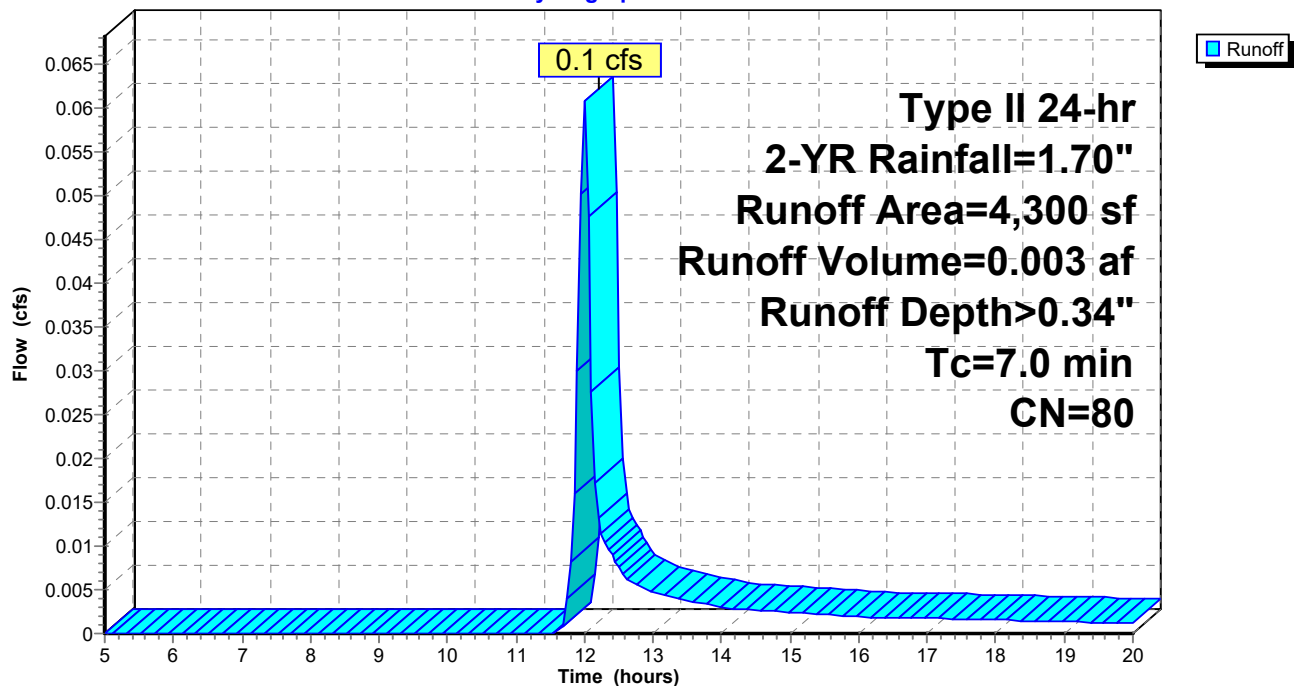
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
0	98	Paved parking, HSG D
4,300	80	>75% Grass cover, Good, HSG D
4,300	80	Weighted Average
4,300		100.00% Pervious Area

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

Subcatchment 11S:

Hydrograph



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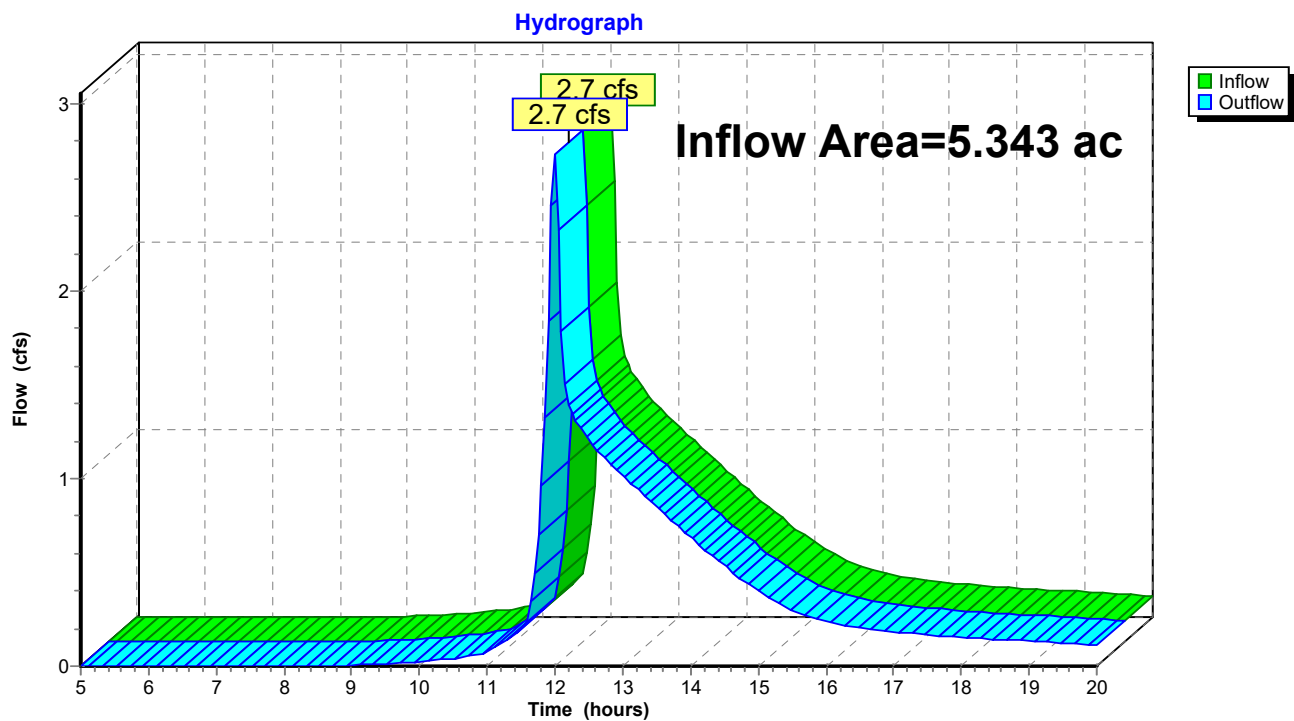
Summary for Reach 1R: NW Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.343 ac, 58.42% Impervious, Inflow Depth > 0.80" for 2-YR event
Inflow = 2.7 cfs @ 12.00 hrs, Volume= 0.354 af
Outflow = 2.7 cfs @ 12.00 hrs, Volume= 0.354 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: NW Storm



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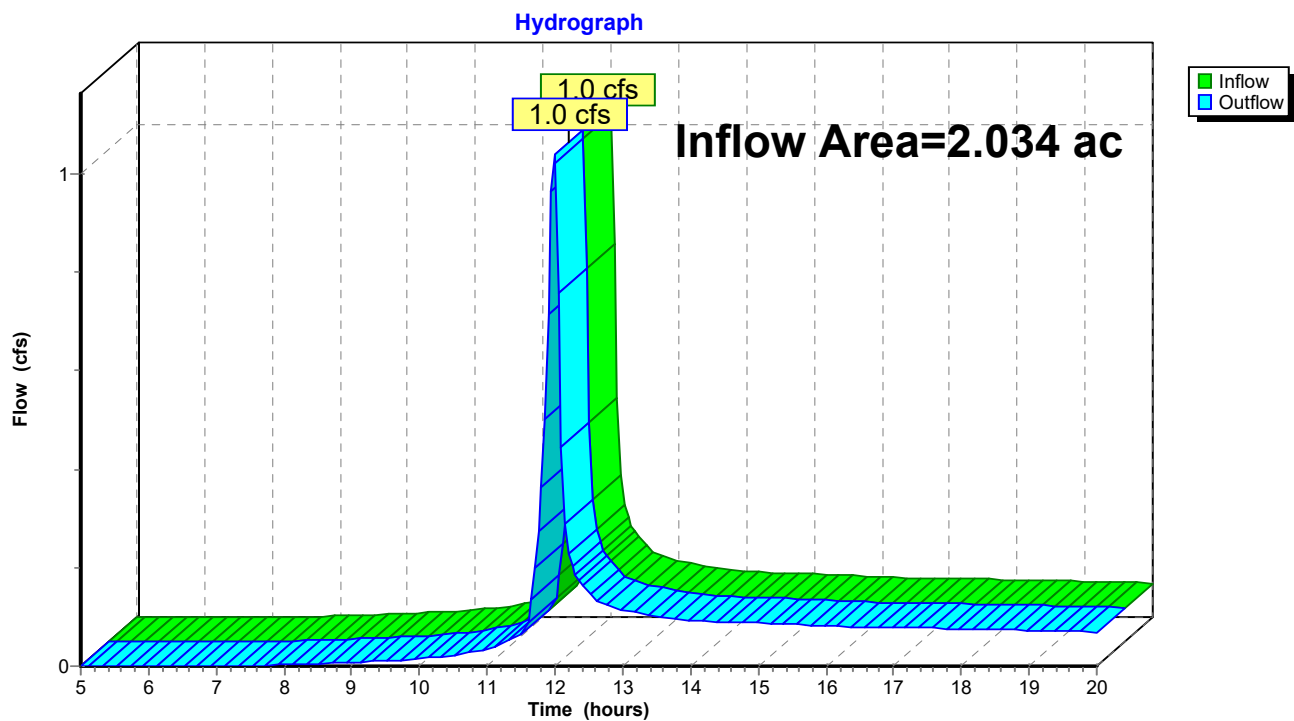
Summary for Reach 2R: West Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.034 ac, 72.55% Impervious, Inflow Depth > 0.52" for 2-YR event
Inflow = 1.0 cfs @ 11.98 hrs, Volume= 0.088 af
Outflow = 1.0 cfs @ 11.98 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 2R: West Storm



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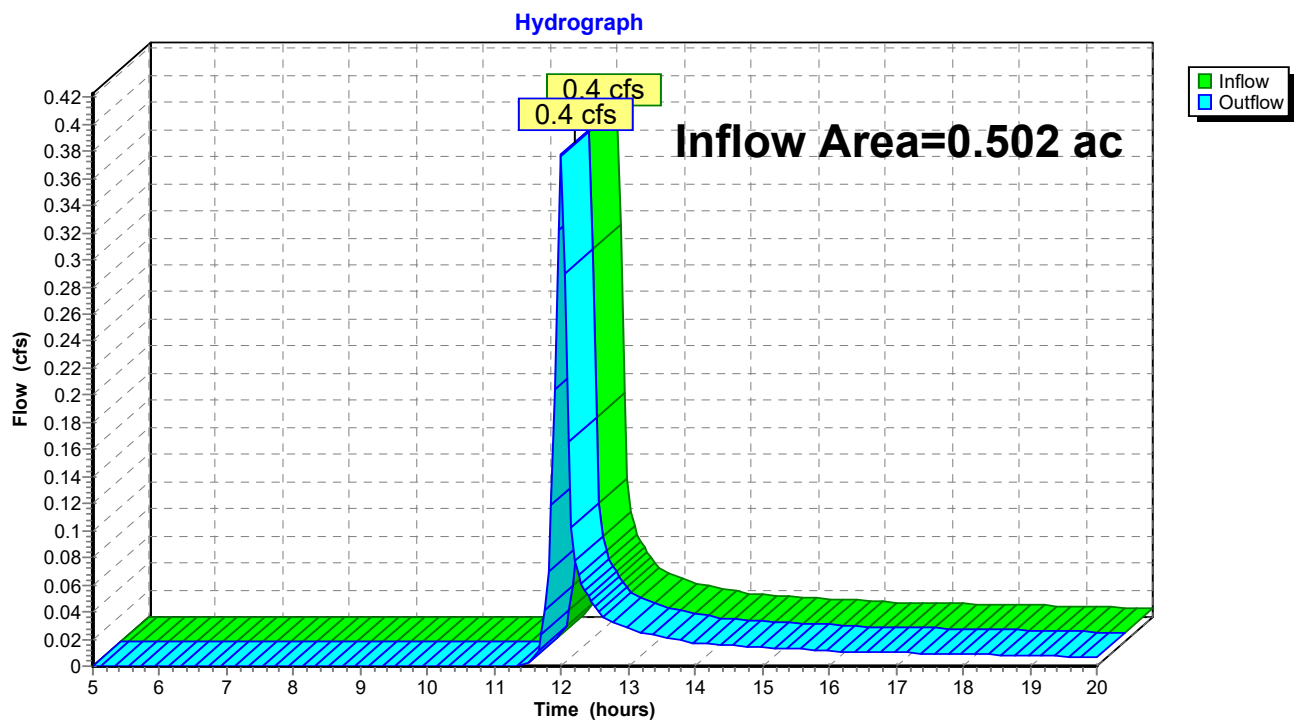
Summary for Reach 3R: West Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.502 ac, 11.55% Impervious, Inflow Depth > 0.41" for 2-YR event
Inflow = 0.4 cfs @ 11.99 hrs, Volume= 0.017 af
Outflow = 0.4 cfs @ 11.99 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 3R: West Bluff



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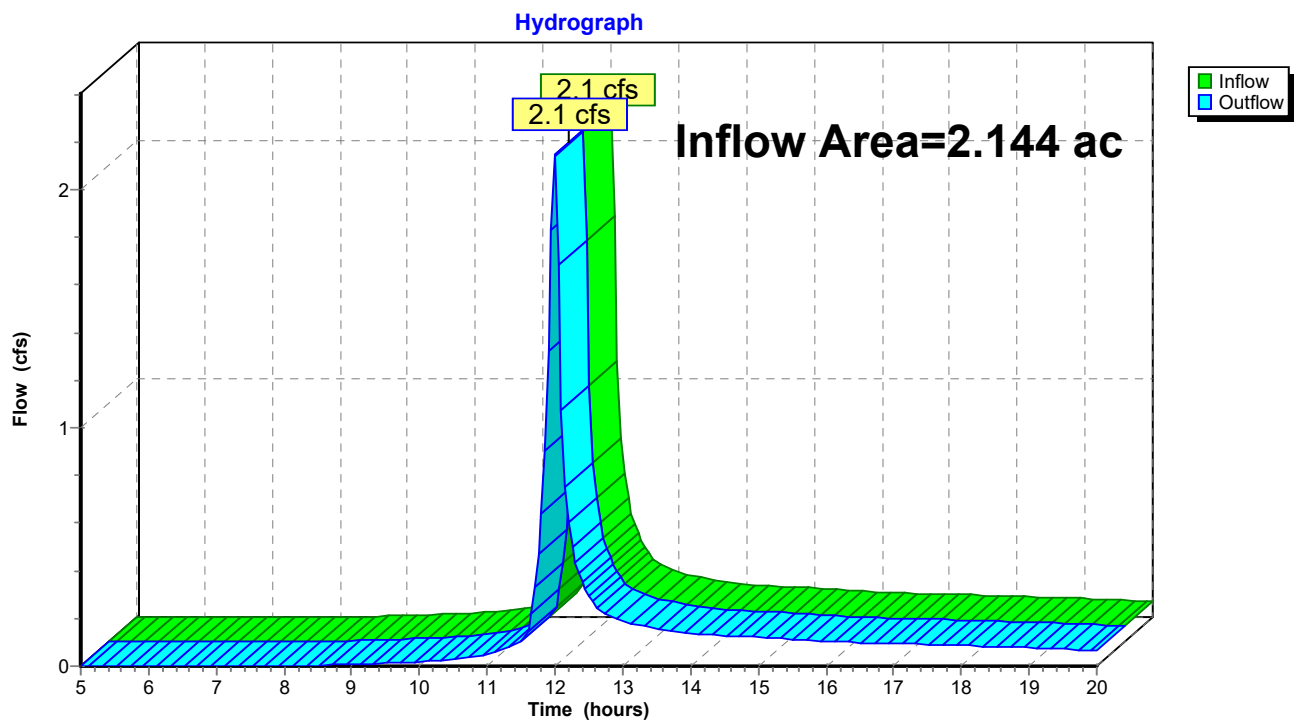
Summary for Reach 4R: South Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.144 ac, 60.06% Impervious, Inflow Depth > 0.77" for 2-YR event
Inflow = 2.1 cfs @ 12.00 hrs, Volume= 0.138 af
Outflow = 2.1 cfs @ 12.00 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 4R: South Storm



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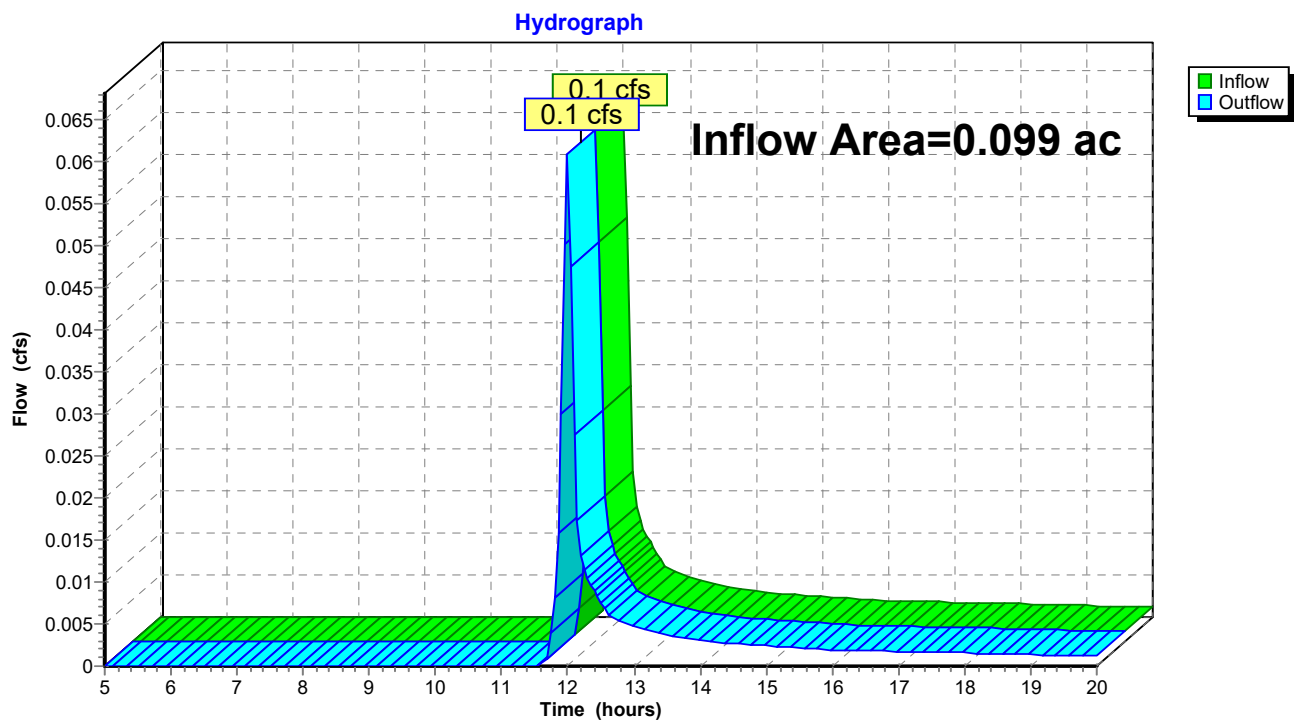
Summary for Reach 5R: SE Bluff - To Road

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.099 ac, 0.00% Impervious, Inflow Depth > 0.34" for 2-YR event
Inflow = 0.1 cfs @ 12.00 hrs, Volume= 0.003 af
Outflow = 0.1 cfs @ 12.00 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: SE Bluff - To Road



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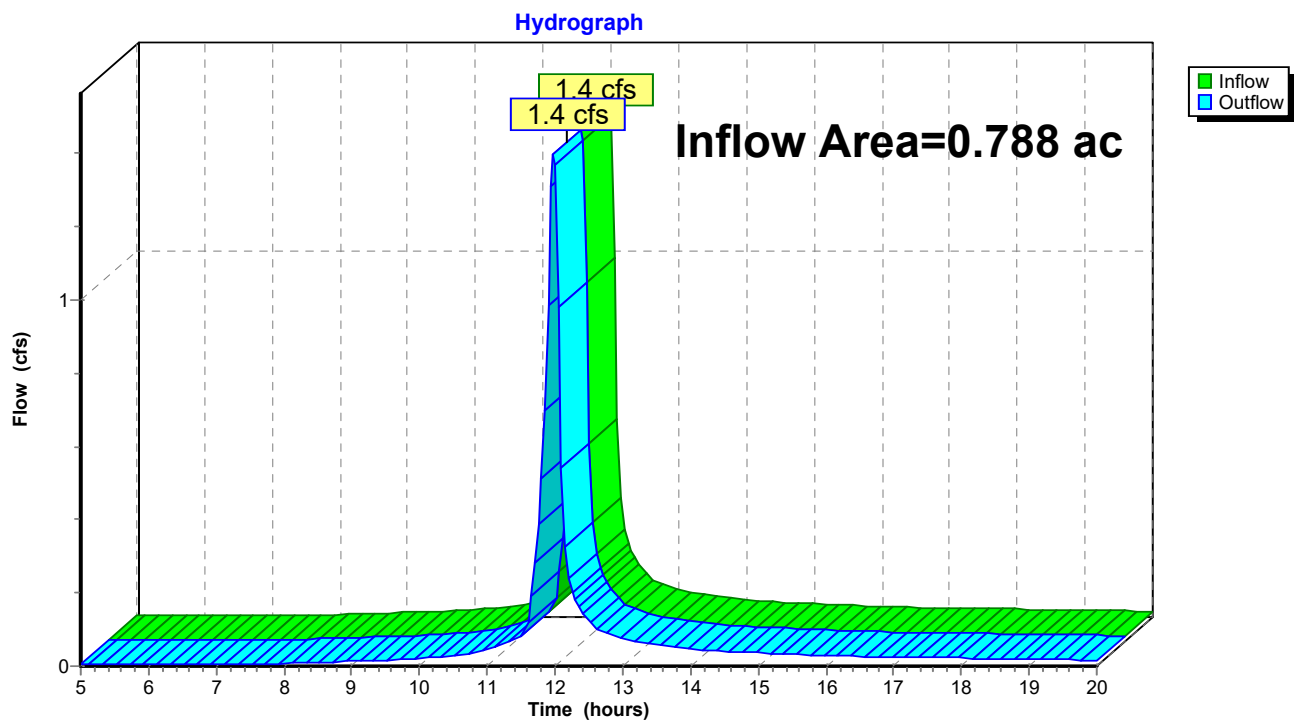
Summary for Reach 6R: East Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.788 ac, 75.88% Impervious, Inflow Depth > 1.03" for 2-YR event
Inflow = 1.4 cfs @ 11.98 hrs, Volume= 0.068 af
Outflow = 1.4 cfs @ 11.98 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 6R: East Storm



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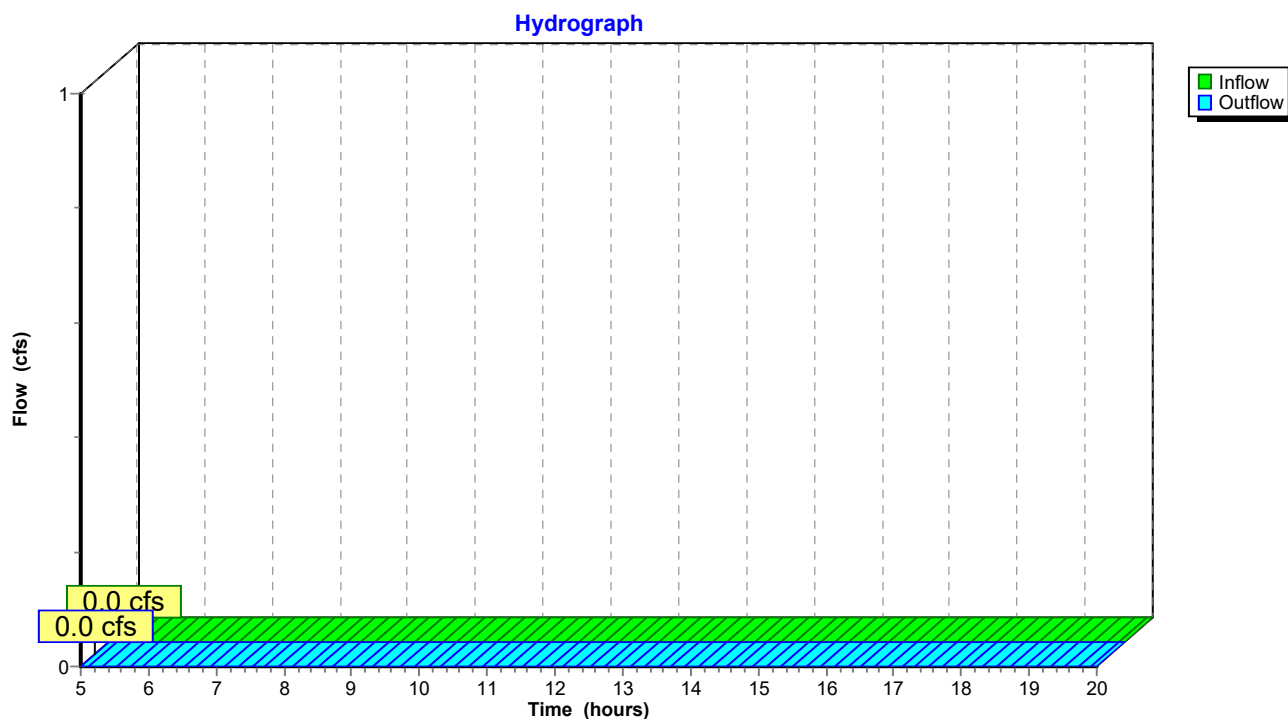
Summary for Reach 7R: North Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow	=	0.0 cfs @	5.00 hrs,	Volume=	0.000 af
Outflow	=	0.0 cfs @	5.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 7R: North Bluff



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Summary for Pond 1P: Wet Sedimentation Basin

Inflow Area = 4.032 ac, 58.50% Impervious, Inflow Depth > 0.84" for 2-YR event
Inflow = 6.2 cfs @ 11.98 hrs, Volume= 0.281 af
Outflow = 1.1 cfs @ 12.22 hrs, Volume= 0.269 af, Atten= 83%, Lag= 13.9 min
Primary = 1.1 cfs @ 12.22 hrs, Volume= 0.269 af
Routed to Reach 1R : NW Storm
Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 7R : North Bluff

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Starting Elev= 986.00' Surf.Area= 2,905 sf Storage= 5,818 cf

Peak Elev= 987.51' @ 12.22 hrs Surf.Area= 3,762 sf Storage= 11,085 cf (5,267 cf above start)

Plug-Flow detention time= 222.7 min calculated for 0.135 af (48% of inflow)

Center-of-Mass det. time= 55.1 min (840.1 - 785.0)

Volume	Invert	Avail.Storage	Storage Description
#1	981.00'	52,963 cf	Custom Stage Data (Prismatic) Listed below (Recalc) x 0.5

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
981.00	108	0	0
985.00	3,406	7,028	7,028
986.50	7,012	7,814	14,842
995.00	11,323	77,924	92,765
996.00	15,000	13,162	105,927

Device	Routing	Invert	Outlet Devices
#1	Primary	981.69'	12.0" Round Culvert L= 169.0' Ke= 0.500 Inlet / Outlet Invert= 981.69' / 980.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	986.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	989.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#4	Device 1	990.00'	HAALA 48" ID Pond Skimmer Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 1.320 3.740 6.870 10.580 14.790 19.250 20.790 22.220 23.570 24.850 30.430 35.140 39.280 43.030 46.480 49.690 52.700 55.560
#5	Secondary	995.50'	20.0' long x 20.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

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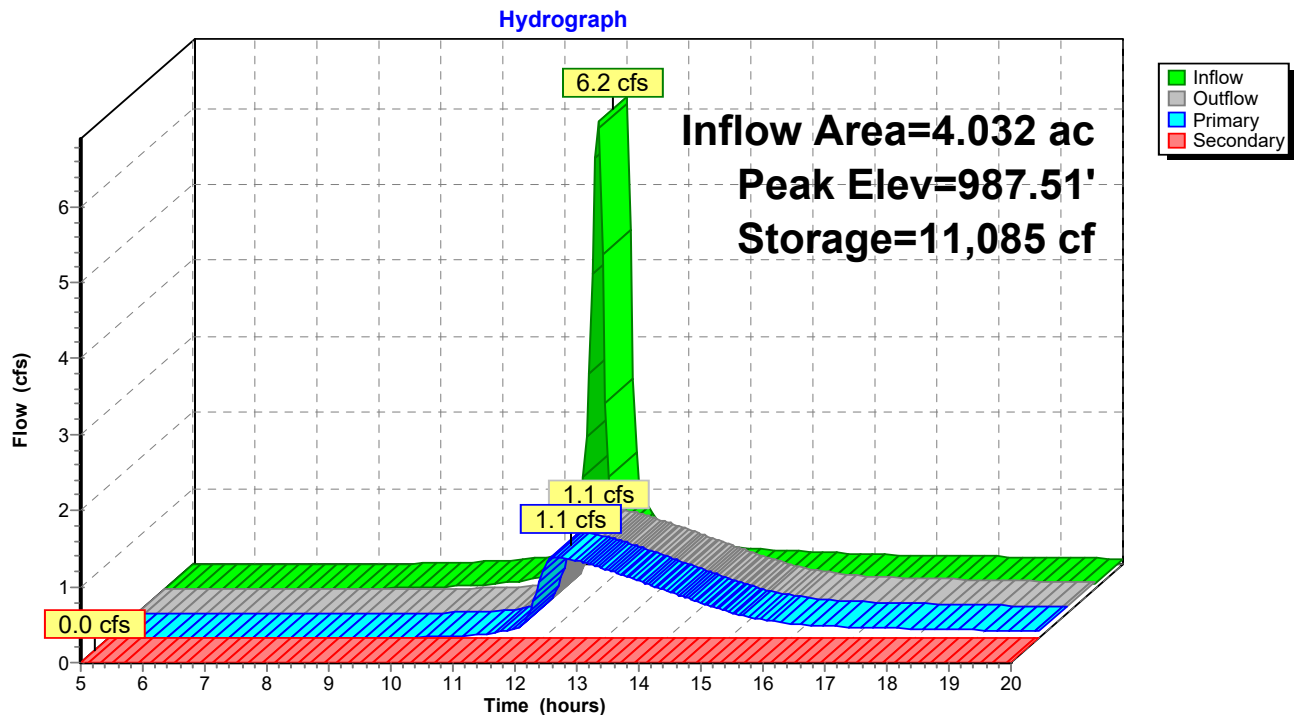
Primary OutFlow Max=1.1 cfs @ 12.22 hrs HW=987.51' (Free Discharge)

- 1=Culvert (Passes 1.1 cfs of 6.2 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 1.1 cfs @ 5.40 fps)
- 3=Sharp-Crested Rectangular Weir(Controls 0.0 cfs)
- 4=HAALA 48" ID Pond Skimmer(Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=986.00' (Free Discharge)

- 5=Broad-Crested Rectangular Weir(Controls 0.0 cfs)

Pond 1P: Wet Sedimentation Basin



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Type II 24-hr 2-YR Rainfall=1.70"

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Summary for Pond 2P: Filtration Basin

Inflow Area = 1.421 ac, 76.15% Impervious, Inflow Depth > 1.04" for 2-YR event
Inflow = 2.6 cfs @ 11.98 hrs, Volume= 0.123 af
Outflow = 0.1 cfs @ 15.45 hrs, Volume= 0.042 af, Atten= 98%, Lag= 208.0 min
Primary = 0.1 cfs @ 15.45 hrs, Volume= 0.042 af
Routed to Reach 2R : West Storm
Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 3R : West Bluff

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 984.77' @ 15.45 hrs Surf.Area= 2,185 sf Storage= 3,843 cf

Plug-Flow detention time= 263.9 min calculated for 0.042 af (34% of inflow)
Center-of-Mass det. time= 171.9 min (942.2 - 770.3)

Volume	Invert	Avail.Storage	Storage Description
#1	982.00'	13,880 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
982.00	588	0	0
987.00	3,470	10,145	10,145
988.00	4,000	3,735	13,880

Device	Routing	Invert	Outlet Devices
#1	Primary	980.00'	12.0" Round Culvert L= 200.0' Ke= 0.500 Inlet / Outlet Invert= 980.00' / 978.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	982.00'	1.630 in/hr Exfiltration over Surface area above 982.00' Excluded Surface area = 588 sf Phase-In= 0.01'
#3	Device 1	984.80'	15" Nyloplast Dome Grate Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 0.410 1.170 2.150 2.590 2.890 3.170 3.420 3.660 3.880 4.090 5.010 5.790 6.470 7.090 7.660 8.190 8.680 9.150
#4	Secondary	987.00'	133.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=0.1 cfs @ 15.45 hrs HW=984.77' (Free Discharge)

↑ **1=Culvert** (Passes 0.1 cfs of 5.4 cfs potential flow)
↑ **2=Exfiltration** (Exfiltration Controls 0.1 cfs)
↑ **3=15" Nyloplast Dome Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=982.00' (Free Discharge)

↑ **4=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

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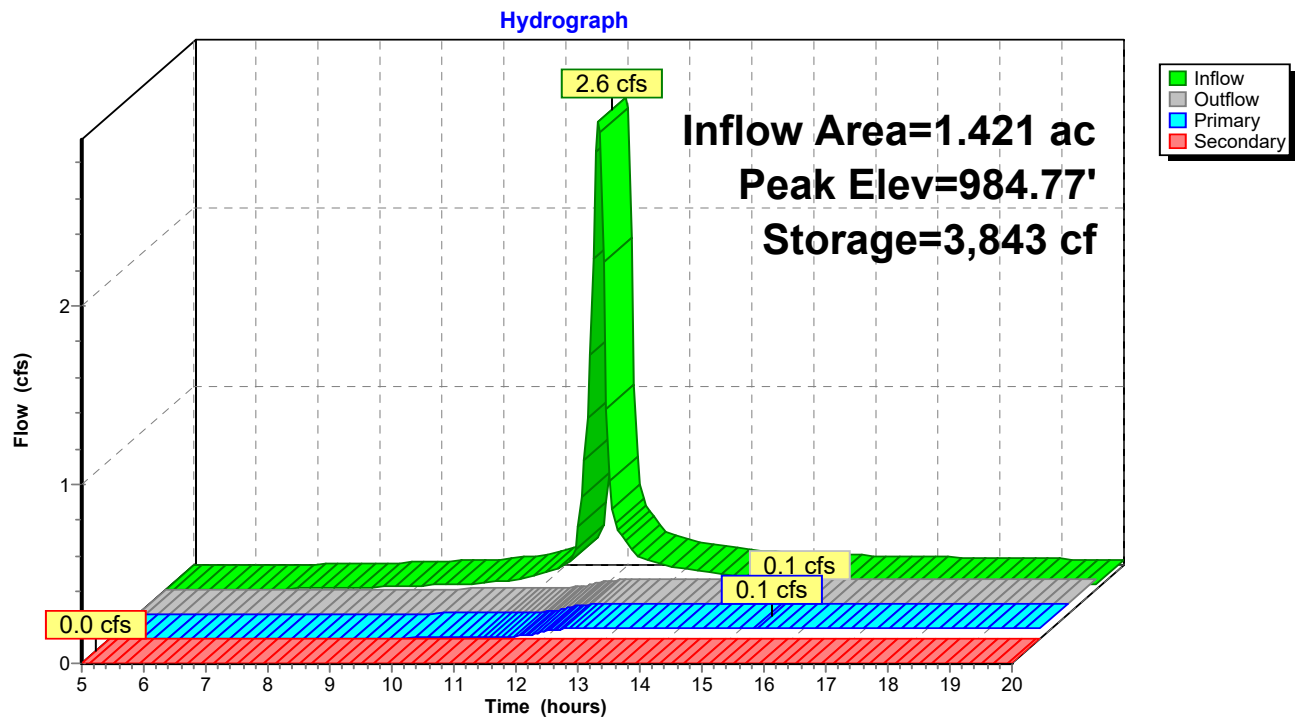
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Pond 2P: Filtration Basin



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Summary for Pond 3P: Filtration Basin

Inflow Area = 0.506 ac, 69.75% Impervious, Inflow Depth > 0.97" for 2-YR event
Inflow = 0.9 cfs @ 11.98 hrs, Volume= 0.041 af
Outflow = 0.0 cfs @ 13.05 hrs, Volume= 0.029 af, Atten= 95%, Lag= 63.9 min
Primary = 0.0 cfs @ 13.05 hrs, Volume= 0.029 af
Routed to Reach 4R : South Storm
Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 5R : SE Bluff - To Road

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 988.01' @ 13.05 hrs Surf.Area= 1,645 sf Storage= 1,034 cf

Plug-Flow detention time= 216.9 min calculated for 0.029 af (70% of inflow)
Center-of-Mass det. time= 150.3 min (926.0 - 775.7)

Volume	Invert	Avail.Storage	Storage Description
#1	987.00'	14,421 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
987.00	398	0	0
991.00	5,330	11,456	11,456
992.00	600	2,965	14,421

Device	Routing	Invert	Outlet Devices
#1	Primary	984.50'	12.0" Round Culvert L= 215.0' Ke= 0.500 Inlet / Outlet Invert= 984.50' / 982.35' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	987.00'	1.630 in/hr Exfiltration over Surface area above 987.00' Excluded Surface area = 398 sf Phase-In= 0.01'
#3	Device 1	989.00'	12" Nyloplast Dome Grate Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 0.210 0.450 0.550 0.640 0.710 0.780 0.850 0.900 0.960 1.010 1.240 1.430 1.600 1.750 1.890 2.020 2.140 2.260
#4	Secondary	990.00'	10.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.0 cfs @ 13.05 hrs HW=988.01' (Free Discharge)

↑ **1=Culvert** (Passes 0.0 cfs of 4.7 cfs potential flow)
↑ **2=Exfiltration** (Exfiltration Controls 0.0 cfs)
↑ **3=12" Nyloplast Dome Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=987.00' (Free Discharge)

↑ **4=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Post-Development

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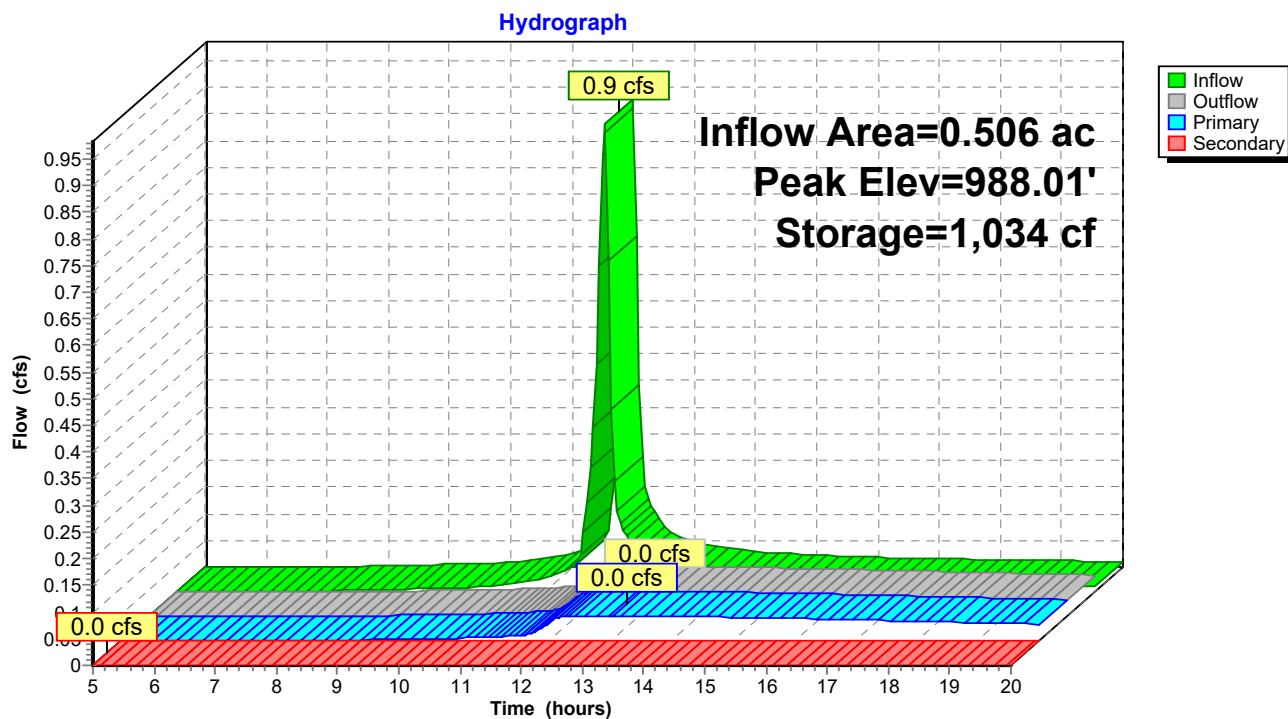
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Type II 24-hr 2-YR Rainfall=1.70"

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Pond 3P: Filtration Basin



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Type II 24-hr 2-YR Rainfall=1.70"

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Summary for Pond 4P: Filtration Basin

Inflow Area = 0.290 ac, 72.78% Impervious, Inflow Depth > 0.97" for 2-YR event
Inflow = 0.5 cfs @ 11.98 hrs, Volume= 0.023 af
Outflow = 0.3 cfs @ 12.08 hrs, Volume= 0.022 af, Atten= 48%, Lag= 6.0 min
Primary = 0.3 cfs @ 12.08 hrs, Volume= 0.022 af
Routed to Reach 4R : South Storm
Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 5R : SE Bluff - To Road

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 993.84' @ 12.08 hrs Surf.Area= 840 sf Storage= 374 cf

Plug-Flow detention time= 95.9 min calculated for 0.022 af (93% of inflow)
Center-of-Mass det. time= 70.2 min (845.9 - 775.7)

Volume	Invert	Avail.Storage	Storage Description
#1	993.00'	1,615 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
993.00	50	0	0
994.00	990	520	520
995.00	1,200	1,095	1,615

Device	Routing	Invert	Outlet Devices
#1	Primary	981.22'	6.0" Round Culvert L= 151.0' Ke= 0.500 Inlet / Outlet Invert= 981.22' / 981.07' S= 0.0010 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	993.00'	1.600 in/hr Exfiltration over Surface area above 993.00' Excluded Surface area = 50 sf Phase-In= 0.01'
#3	Device 1	993.70'	Nyloplast 8" Drop In Grate Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 0.200 0.280 0.340 0.400 0.440 0.480 0.520 0.560 0.590 0.630 0.770 0.890 0.990 1.080 1.170 1.250 1.330 1.400
#4	Secondary	994.00'	50.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=0.3 cfs @ 12.08 hrs HW=993.84' (Free Discharge)

↑ **1=Culvert** (Passes 0.3 cfs of 1.7 cfs potential flow)
↑ **2=Exfiltration** (Exfiltration Controls 0.0 cfs)
↑ **3=Nyloplast 8" Drop In Grate** (Custom Controls 0.2 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=993.00' (Free Discharge)

↑ **4=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Post-Development

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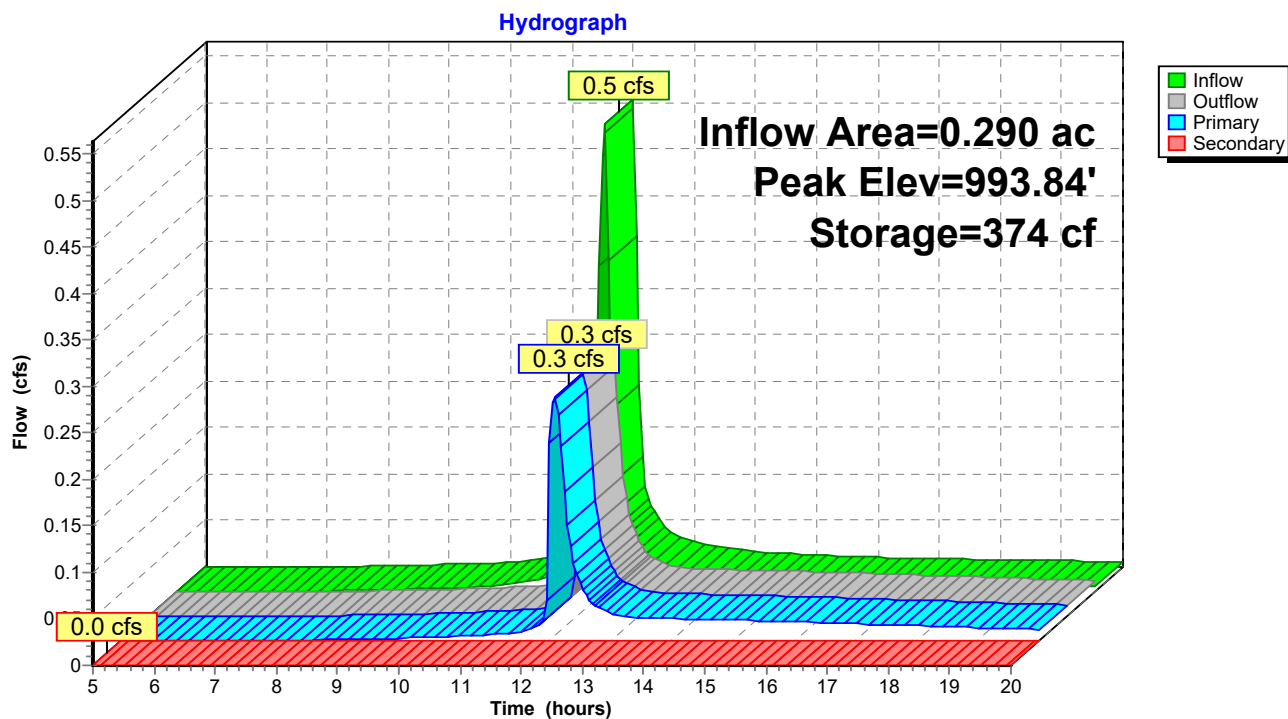
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Type II 24-hr 2-YR Rainfall=1.70"

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Pond 4P: Filtration Basin



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Type II 24-hr 10-YR Rainfall=4.28"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S:	Runoff Area=175,645 sf 58.50% Impervious Runoff Depth>3.08" Tc=7.0 min CN=91 Runoff=21.0 cfs 1.035 af
Subcatchment2S:	Runoff Area=57,101 sf 58.18% Impervious Runoff Depth>2.98" Tc=7.0 min CN=90 Runoff=6.7 cfs 0.326 af
Subcatchment3S:	Runoff Area=61,891 sf 76.15% Impervious Runoff Depth>3.37" Tc=7.0 min CN=94 Runoff=7.8 cfs 0.399 af
Subcatchment4S:	Runoff Area=21,859 sf 11.55% Impervious Runoff Depth>2.26" Tc=7.0 min CN=82 Runoff=2.1 cfs 0.095 af
Subcatchment5S:	Runoff Area=26,713 sf 64.20% Impervious Runoff Depth>3.18" Tc=7.0 min CN=92 Runoff=3.3 cfs 0.162 af
Subcatchment6S:	Runoff Area=22,043 sf 69.75% Impervious Runoff Depth>3.27" Tc=7.0 min CN=93 Runoff=2.7 cfs 0.138 af
Subcatchment7S:	Runoff Area=58,710 sf 53.68% Impervious Runoff Depth>2.98" Tc=7.0 min CN=90 Runoff=6.9 cfs 0.335 af
Subcatchment8S:	Runoff Area=12,647 sf 72.78% Impervious Runoff Depth>3.27" Tc=7.0 min CN=93 Runoff=1.6 cfs 0.079 af
Subcatchment9S:	Runoff Area=12,130 sf 100.00% Impervious Runoff Depth>3.72" Tc=7.0 min CN=98 Runoff=1.6 cfs 0.086 af
Subcatchment10S:	Runoff Area=22,212 sf 62.70% Impervious Runoff Depth>3.08" Tc=7.0 min CN=91 Runoff=2.7 cfs 0.131 af
Subcatchment11S:	Runoff Area=4,300 sf 0.00% Impervious Runoff Depth>2.10" Tc=7.0 min CN=80 Runoff=0.4 cfs 0.017 af
Reach 1R: NW Storm	Inflow=13.8 cfs 1.338 af Outflow=13.8 cfs 1.338 af
Reach 2R: West Storm	Inflow=7.3 cfs 0.471 af Outflow=7.3 cfs 0.471 af
Reach 3R: West Bluff	Inflow=2.1 cfs 0.095 af Outflow=2.1 cfs 0.095 af
Reach 4R: South Storm	Inflow=7.3 cfs 0.475 af Outflow=7.3 cfs 0.475 af
Reach 5R: SE Bluff - To Road	Inflow=1.5 cfs 0.034 af Outflow=1.5 cfs 0.034 af

Post-Development

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Type II 24-hr 10-YR Rainfall=4.28"

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Reach 6R: East Storm

Inflow=4.3 cfs 0.217 af

Outflow=4.3 cfs 0.217 af

Reach 7R: North Bluff

Inflow=0.0 cfs 0.000 af

Outflow=0.0 cfs 0.000 af

Pond 1P: Wet Sedimentation Basin

Peak Elev=990.46' Storage=23,276 cf Inflow=21.0 cfs 1.035 af
Primary=7.4 cfs 1.012 af Secondary=0.0 cfs 0.000 af Outflow=7.4 cfs 1.012 af

Pond 2P: Filtration Basin

Peak Elev=985.93' Storage=6,773 cf Inflow=7.8 cfs 0.399 af
Primary=4.4 cfs 0.309 af Secondary=0.0 cfs 0.000 af Outflow=4.4 cfs 0.309 af

Pond 3P: Filtration Basin

Peak Elev=989.08' Storage=3,506 cf Inflow=2.7 cfs 0.138 af
Primary=0.3 cfs 0.083 af Secondary=0.0 cfs 0.000 af Outflow=0.3 cfs 0.083 af

Pond 4P: Filtration Basin

Peak Elev=994.04' Storage=561 cf Inflow=1.6 cfs 0.079 af
Primary=0.4 cfs 0.057 af Secondary=1.2 cfs 0.017 af Outflow=1.6 cfs 0.074 af

Total Runoff Area = 10.910 ac Runoff Volume = 2.804 af Average Runoff Depth = 3.08"
40.05% Pervious = 4.369 ac 59.95% Impervious = 6.541 ac

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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Subcatchment 1S:

Runoff = 21.0 cfs @ 11.98 hrs, Volume= 1.035 af, Depth> 3.08"
Routed to Pond 1P : Wet Sedimentation Basin

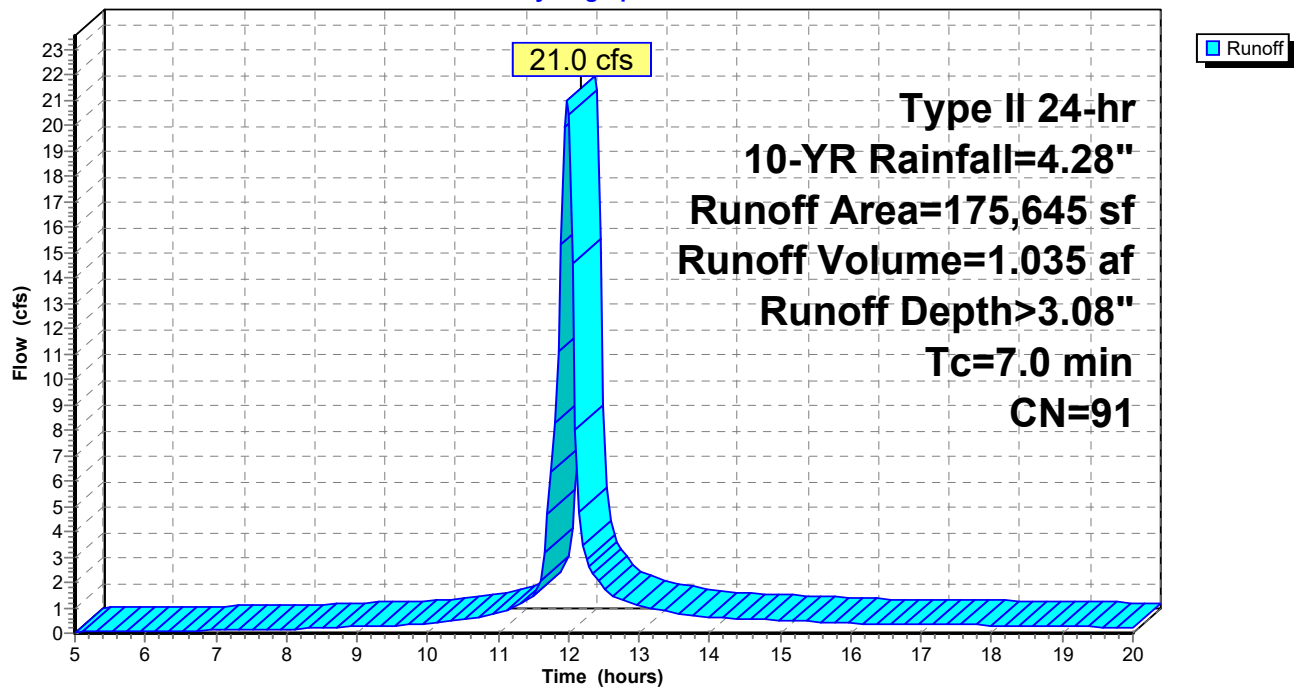
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
102,749	98	Paved parking, HSG D
72,896	80	>75% Grass cover, Good, HSG D
175,645	91	Weighted Average
72,896		41.50% Pervious Area
102,749		58.50% Impervious Area

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

Subcatchment 1S:

Hydrograph



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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Subcatchment 2S:

Runoff = 6.7 cfs @ 11.98 hrs, Volume= 0.326 af, Depth> 2.98"
Routed to Reach 1R : NW Storm

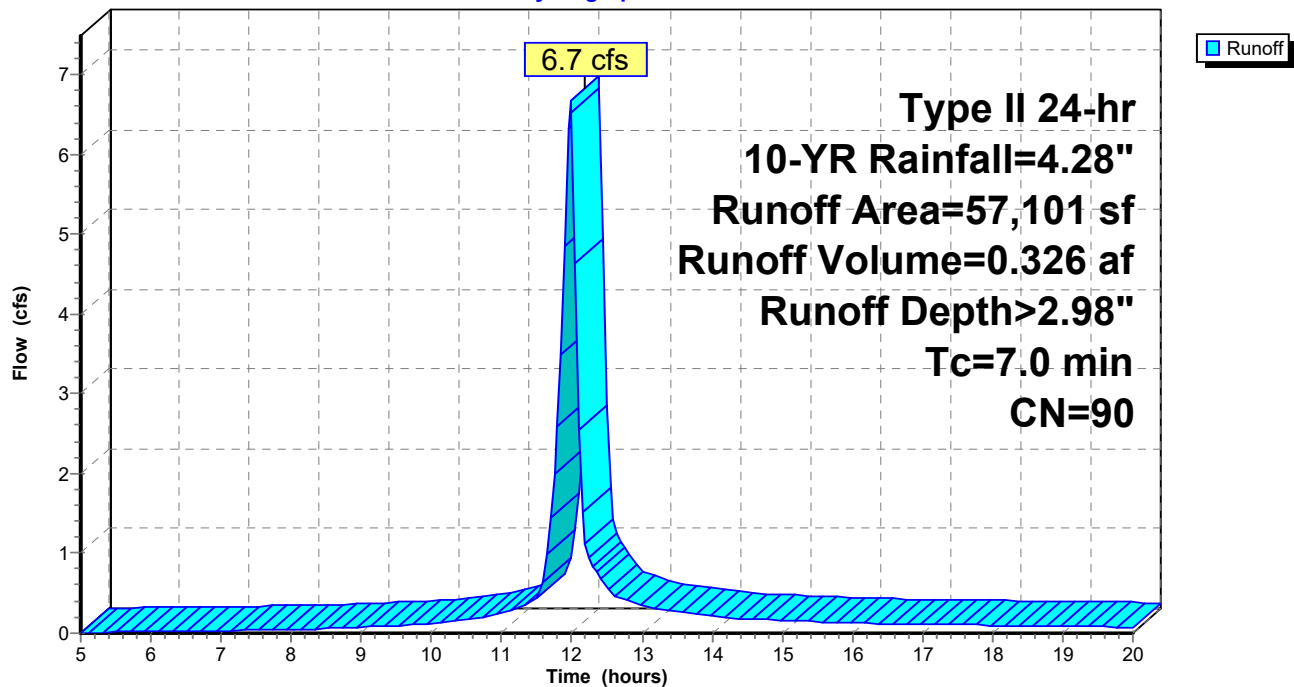
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
33,220	98	Paved parking, HSG D
23,881	80	>75% Grass cover, Good, HSG D
57,101	90	Weighted Average
23,881		41.82% Pervious Area
33,220		58.18% Impervious Area

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

Subcatchment 2S:

Hydrograph



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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Subcatchment 3S:

Runoff = 7.8 cfs @ 11.98 hrs, Volume= 0.399 af, Depth> 3.37"
Routed to Pond 2P : Filtration Basin

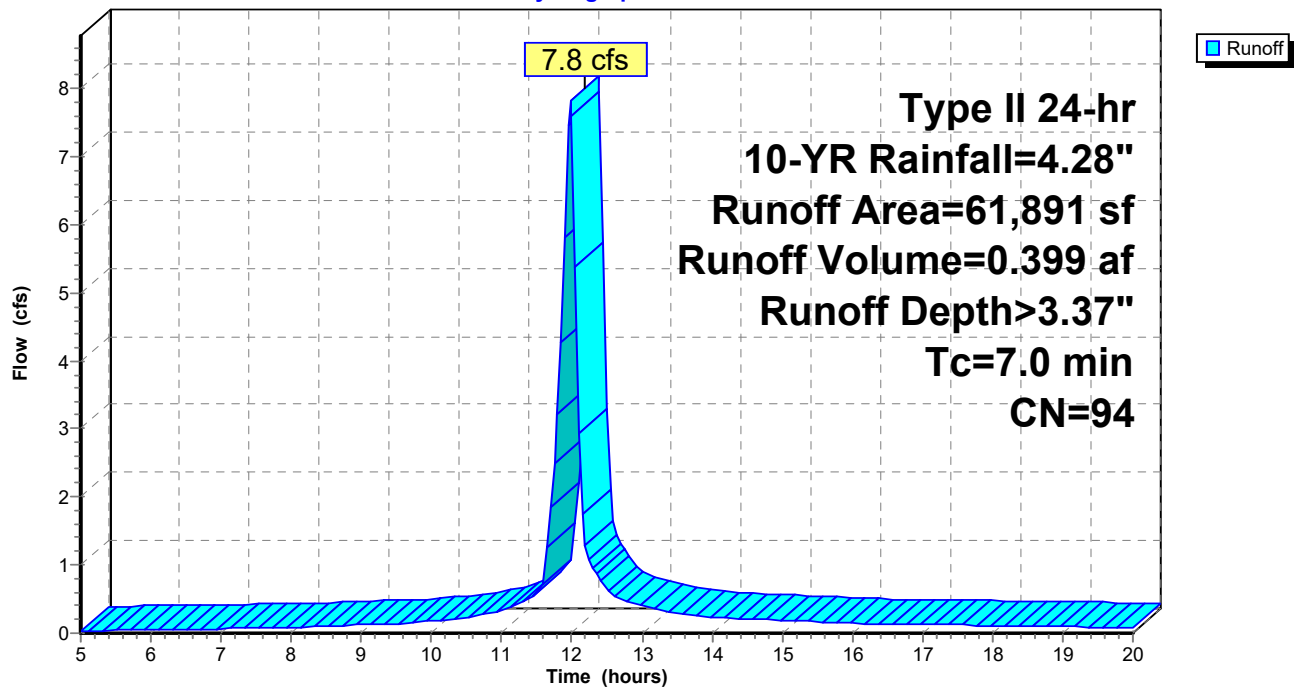
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
47,128	98	Paved parking, HSG D
14,763	80	>75% Grass cover, Good, HSG D
61,891	94	Weighted Average
14,763		23.85% Pervious Area
47,128		76.15% Impervious Area

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

Subcatchment 3S:

Hydrograph



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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Subcatchment 4S:

Runoff = 2.1 cfs @ 11.98 hrs, Volume= 0.095 af, Depth> 2.26"
Routed to Reach 3R : West Bluff

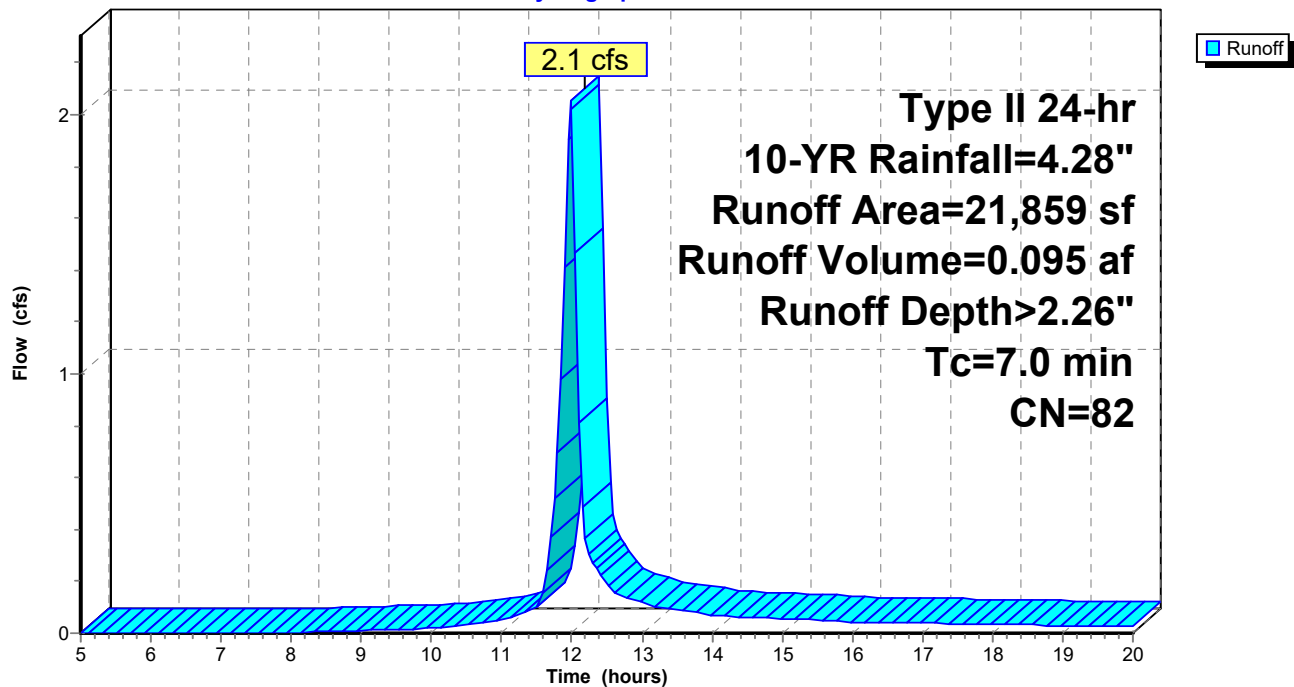
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
2,525	98	Paved parking, HSG D
19,334	80	>75% Grass cover, Good, HSG D
21,859	82	Weighted Average
19,334		88.45% Pervious Area
2,525		11.55% Impervious Area

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

Subcatchment 4S:

Hydrograph



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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Subcatchment 5S:

Runoff = 3.3 cfs @ 11.98 hrs, Volume= 0.162 af, Depth> 3.18"
Routed to Reach 2R : West Storm

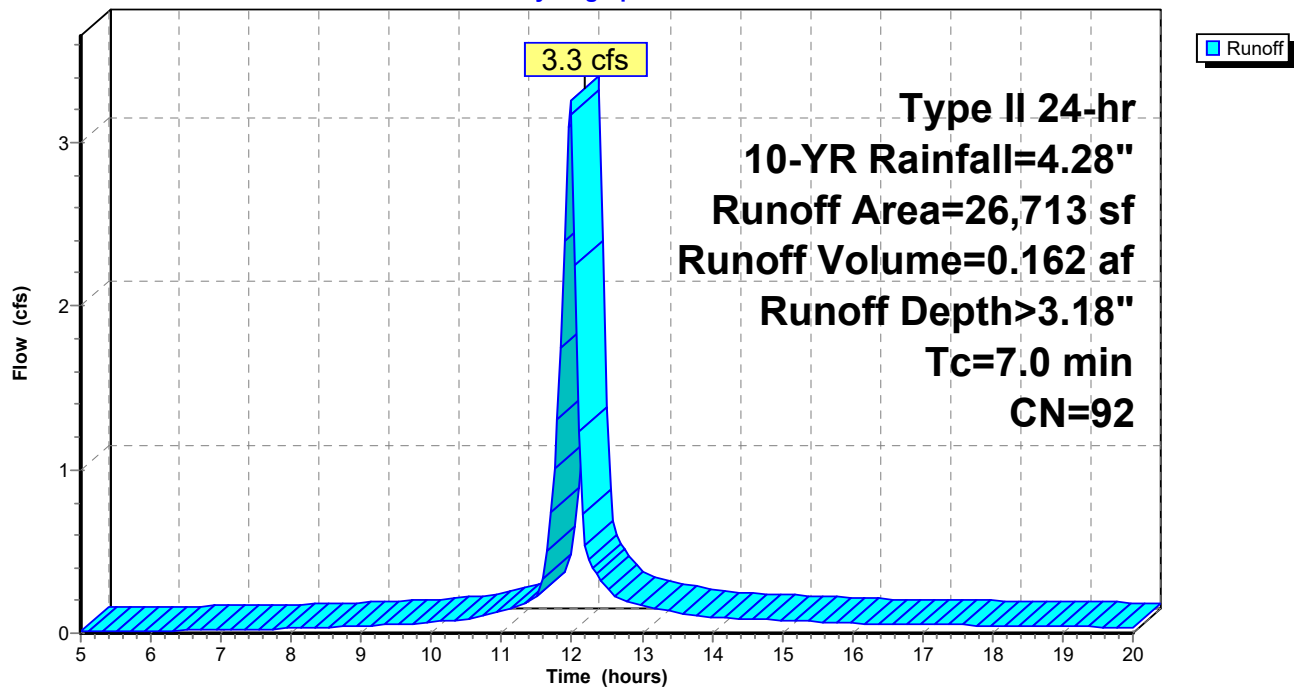
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
17,151	98	Paved parking, HSG D
9,562	80	>75% Grass cover, Good, HSG D
26,713	92	Weighted Average
9,562		35.80% Pervious Area
17,151		64.20% Impervious Area

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

Subcatchment 5S:

Hydrograph



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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Subcatchment 6S:

Runoff = 2.7 cfs @ 11.98 hrs, Volume= 0.138 af, Depth> 3.27"
Routed to Pond 3P : Filtration Basin

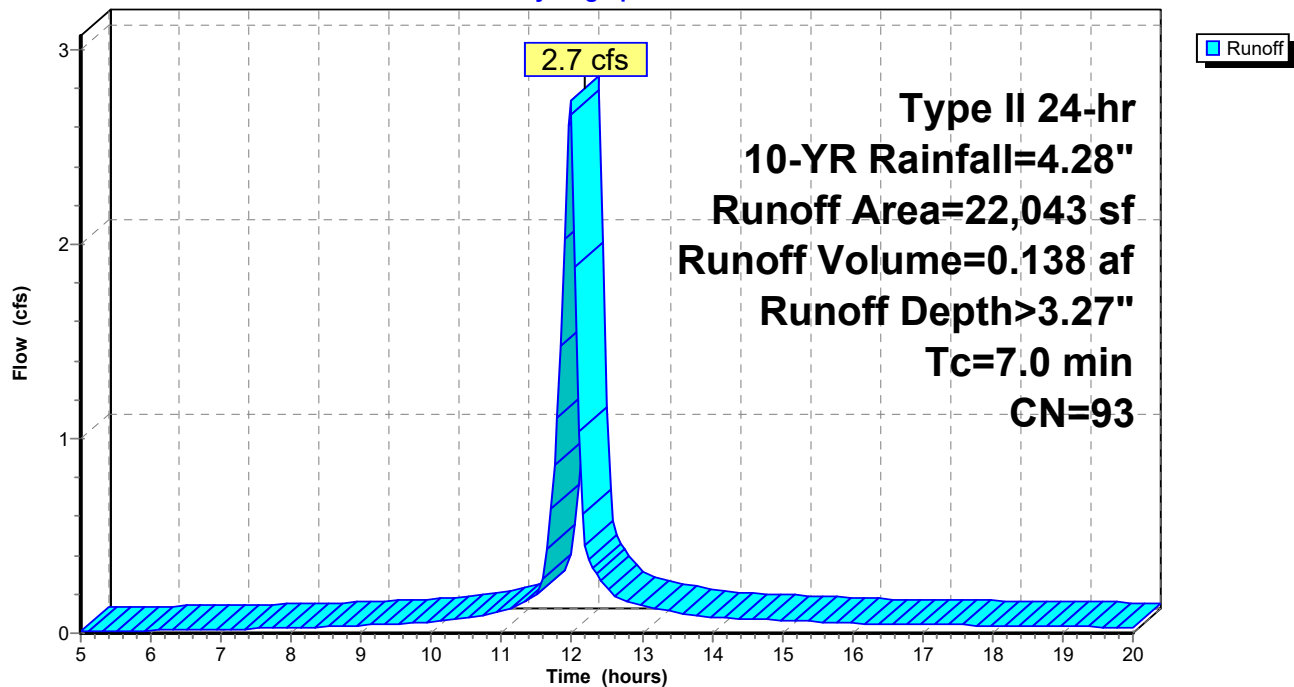
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
15,375	98	Paved parking, HSG D
6,668	80	>75% Grass cover, Good, HSG D
22,043	93	Weighted Average
6,668		30.25% Pervious Area
15,375		69.75% Impervious Area

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

Subcatchment 6S:

Hydrograph



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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Subcatchment 7S:

Runoff = 6.9 cfs @ 11.98 hrs, Volume= 0.335 af, Depth> 2.98"
Routed to Reach 4R : South Storm

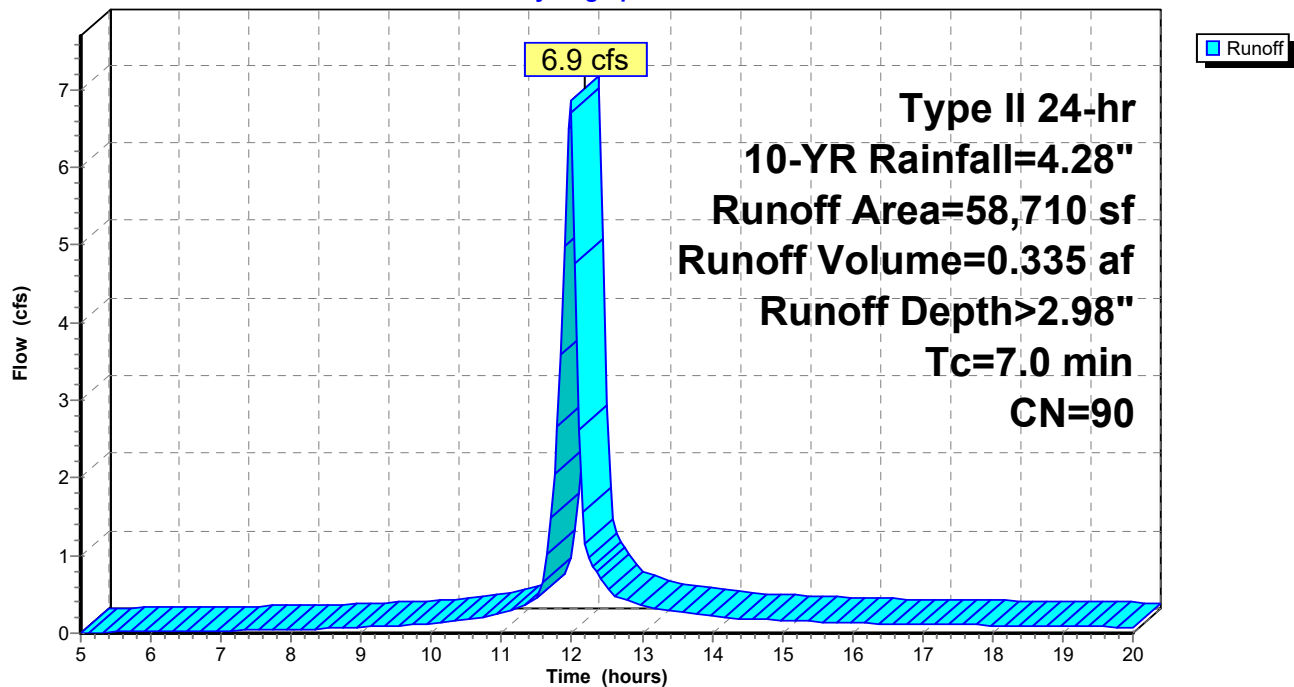
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
31,516	98	Paved parking, HSG D
27,194	80	>75% Grass cover, Good, HSG D
58,710	90	Weighted Average
27,194		46.32% Pervious Area
31,516		53.68% Impervious Area

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

Subcatchment 7S:

Hydrograph



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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Subcatchment 8S:

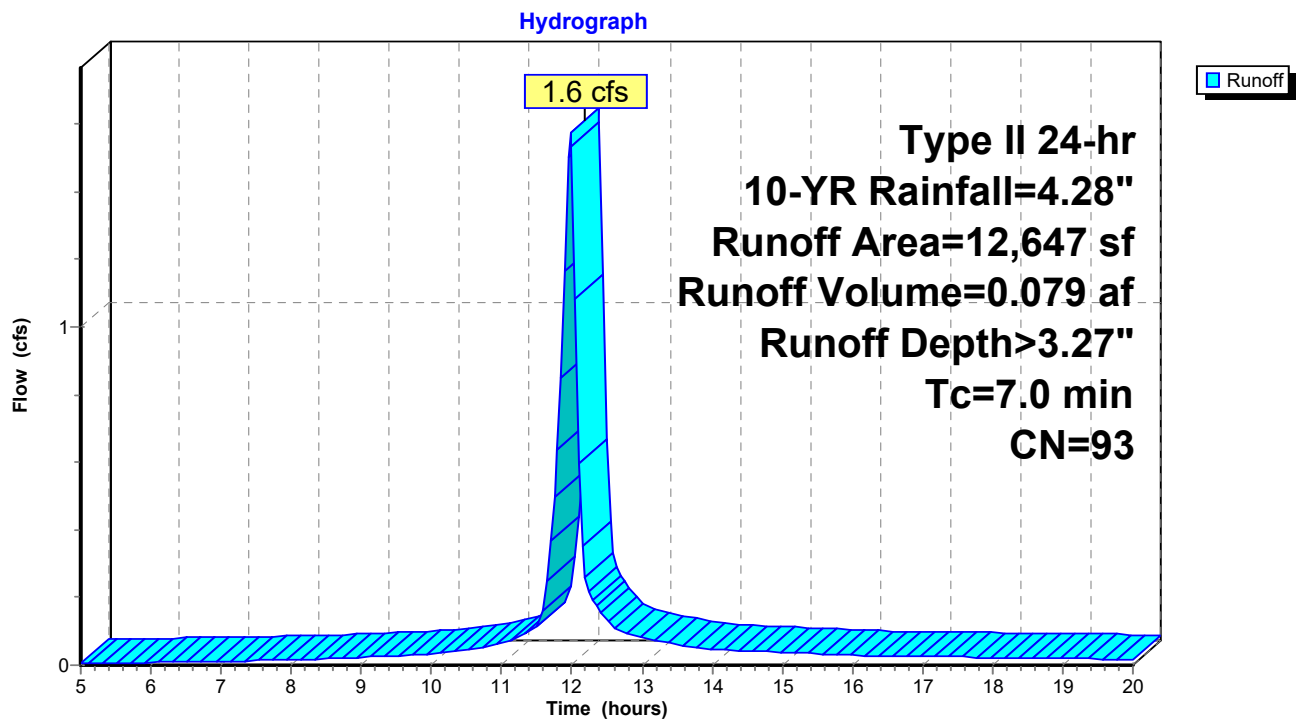
Runoff = 1.6 cfs @ 11.98 hrs, Volume= 0.079 af, Depth> 3.27"
Routed to Pond 4P : Filtration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
9,205	98	Paved parking, HSG D
3,442	80	>75% Grass cover, Good, HSG D
12,647	93	Weighted Average
3,442		27.22% Pervious Area
9,205		72.78% Impervious Area

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

Subcatchment 8S:



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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Subcatchment 9S:

Runoff = 1.6 cfs @ 11.98 hrs, Volume= 0.086 af, Depth> 3.72"
Routed to Reach 6R : East Storm

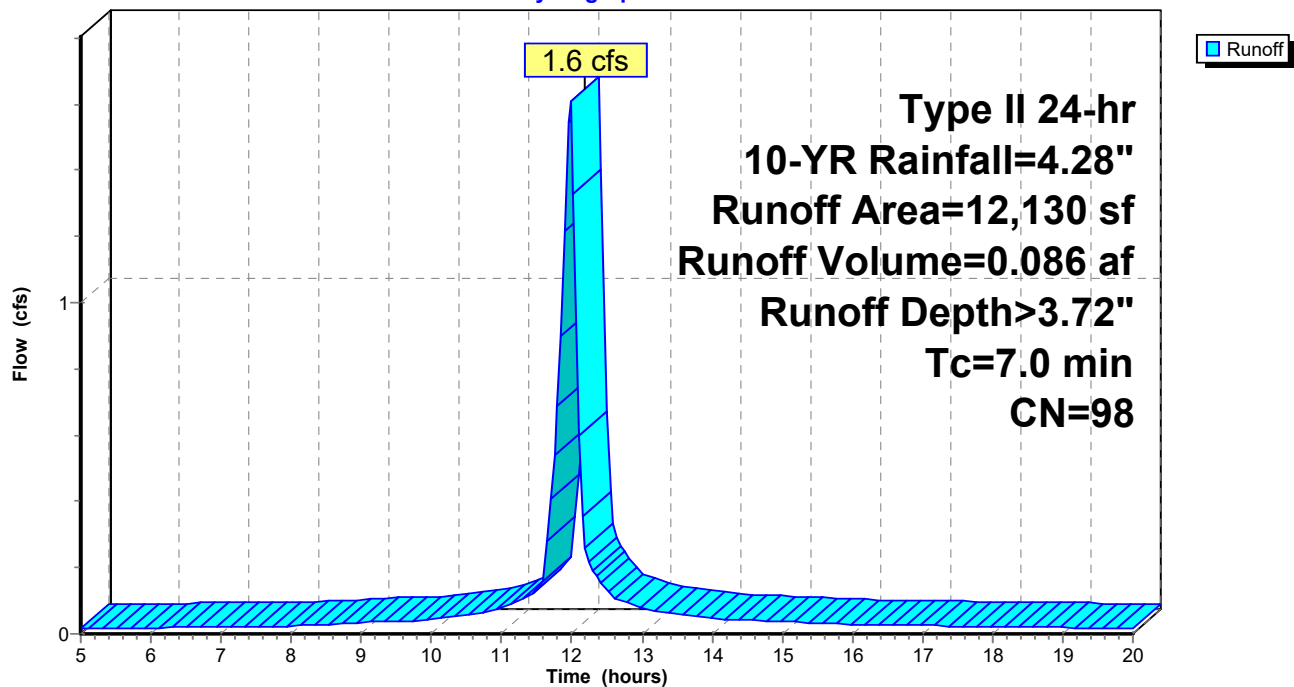
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
12,130	98	Paved parking, HSG D
12,130		100.00% Impervious Area

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

Subcatchment 9S:

Hydrograph



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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Subcatchment 10S:

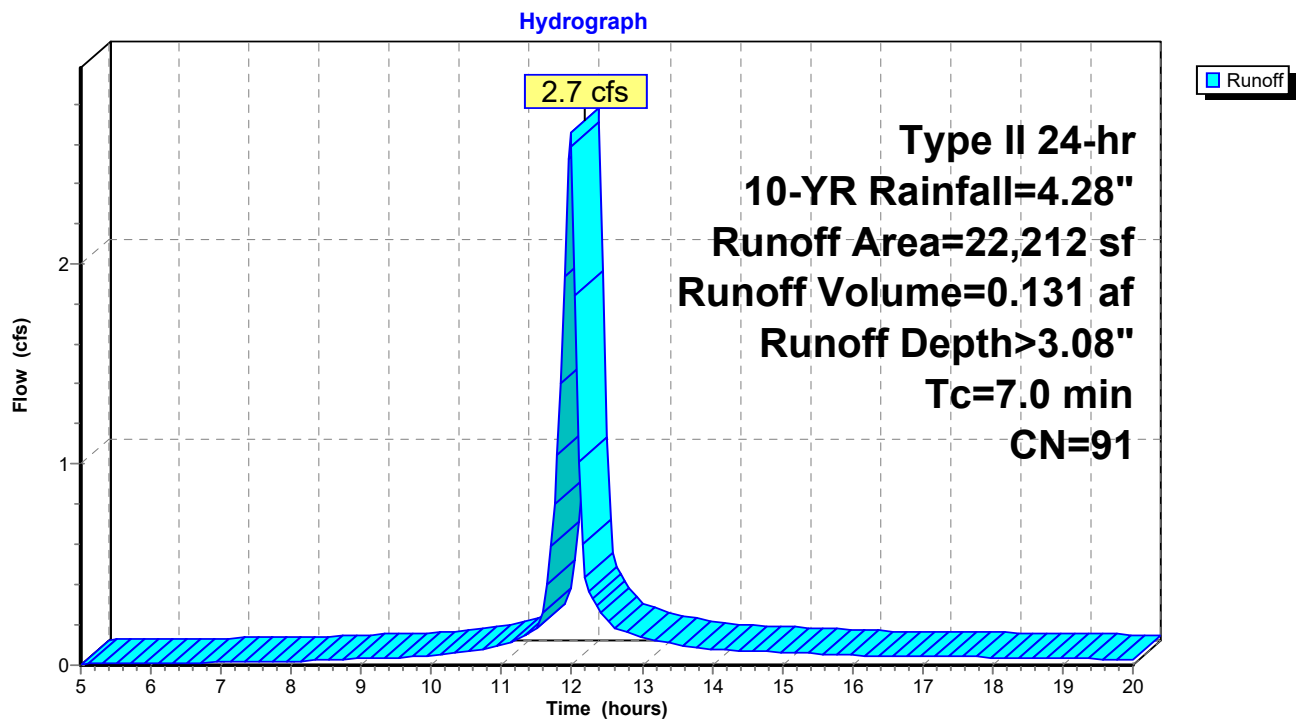
Runoff = 2.7 cfs @ 11.98 hrs, Volume= 0.131 af, Depth> 3.08"
Routed to Reach 6R : East Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
13,928	98	Paved parking, HSG D
8,284	80	>75% Grass cover, Good, HSG D
22,212	91	Weighted Average
8,284		37.30% Pervious Area
13,928		62.70% Impervious Area

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

Subcatchment 10S:



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Summary for Subcatchment 11S:

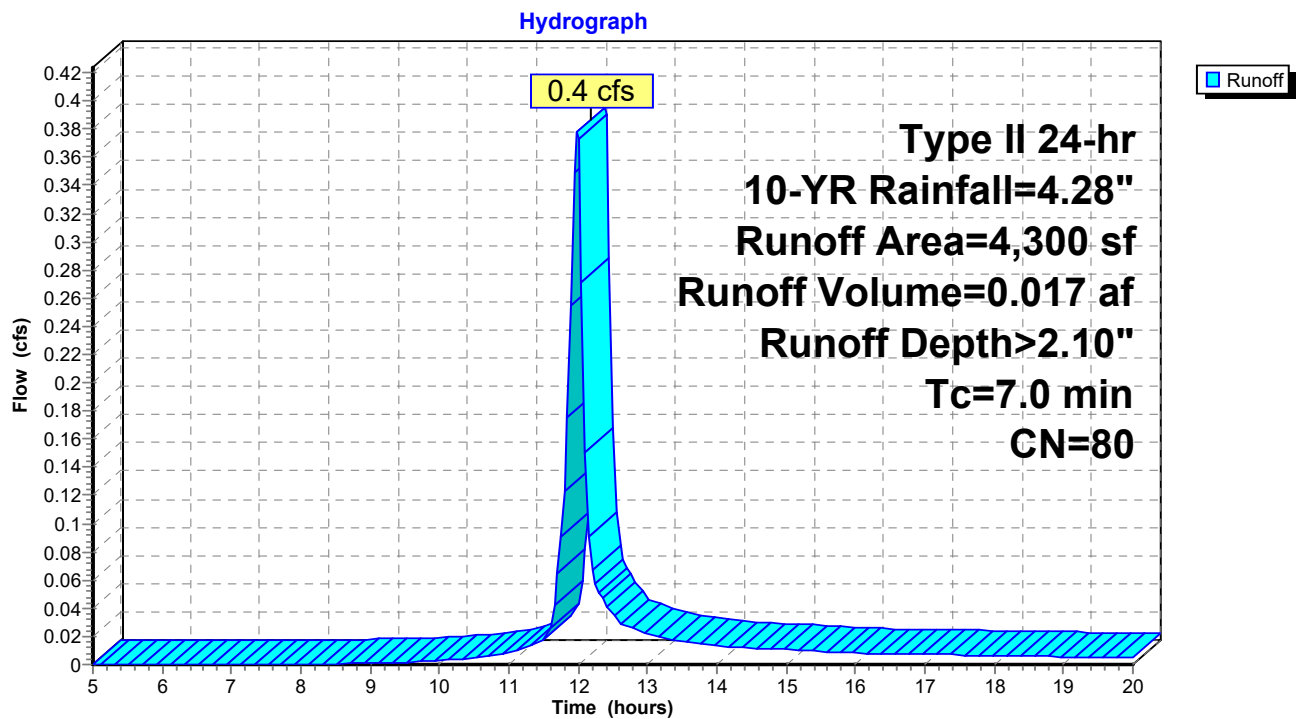
Runoff = 0.4 cfs @ 11.98 hrs, Volume= 0.017 af, Depth> 2.10"
Routed to Reach 5R : SE Bluff - To Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
0	98	Paved parking, HSG D
4,300	80	>75% Grass cover, Good, HSG D
4,300	80	Weighted Average
4,300		100.00% Pervious Area

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

Subcatchment 11S:



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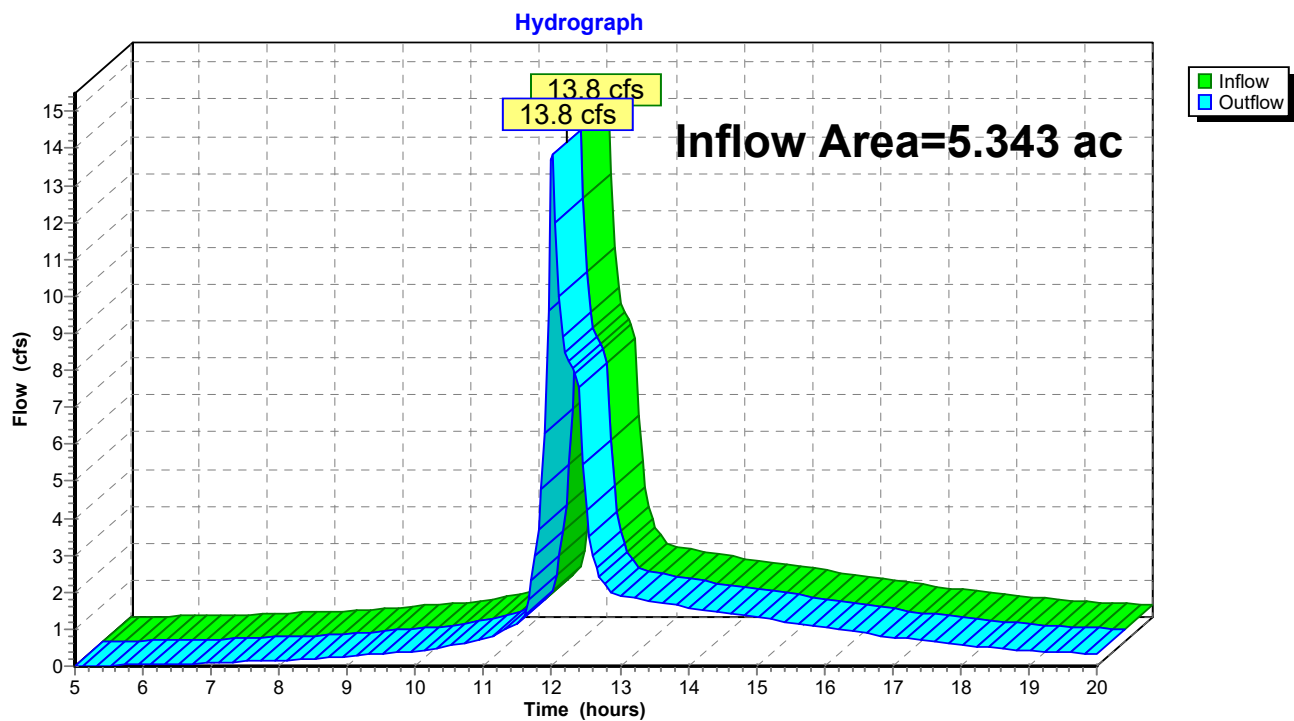
Summary for Reach 1R: NW Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.343 ac, 58.42% Impervious, Inflow Depth > 3.01" for 10-YR event
Inflow = 13.8 cfs @ 12.01 hrs, Volume= 1.338 af
Outflow = 13.8 cfs @ 12.01 hrs, Volume= 1.338 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: NW Storm



Post-Development

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Type II 24-hr 10-YR Rainfall=4.28"

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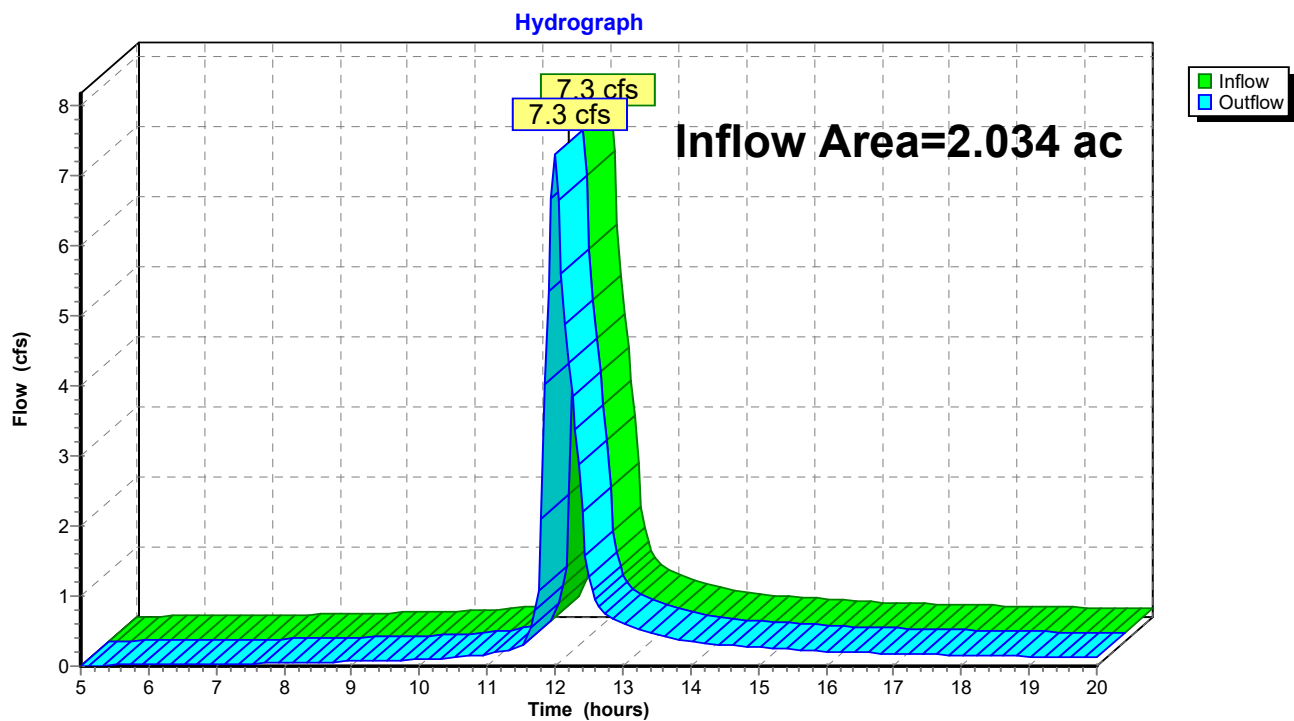
Summary for Reach 2R: West Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.034 ac, 72.55% Impervious, Inflow Depth > 2.78" for 10-YR event
Inflow = 7.3 cfs @ 12.00 hrs, Volume= 0.471 af
Outflow = 7.3 cfs @ 12.00 hrs, Volume= 0.471 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 2R: West Storm



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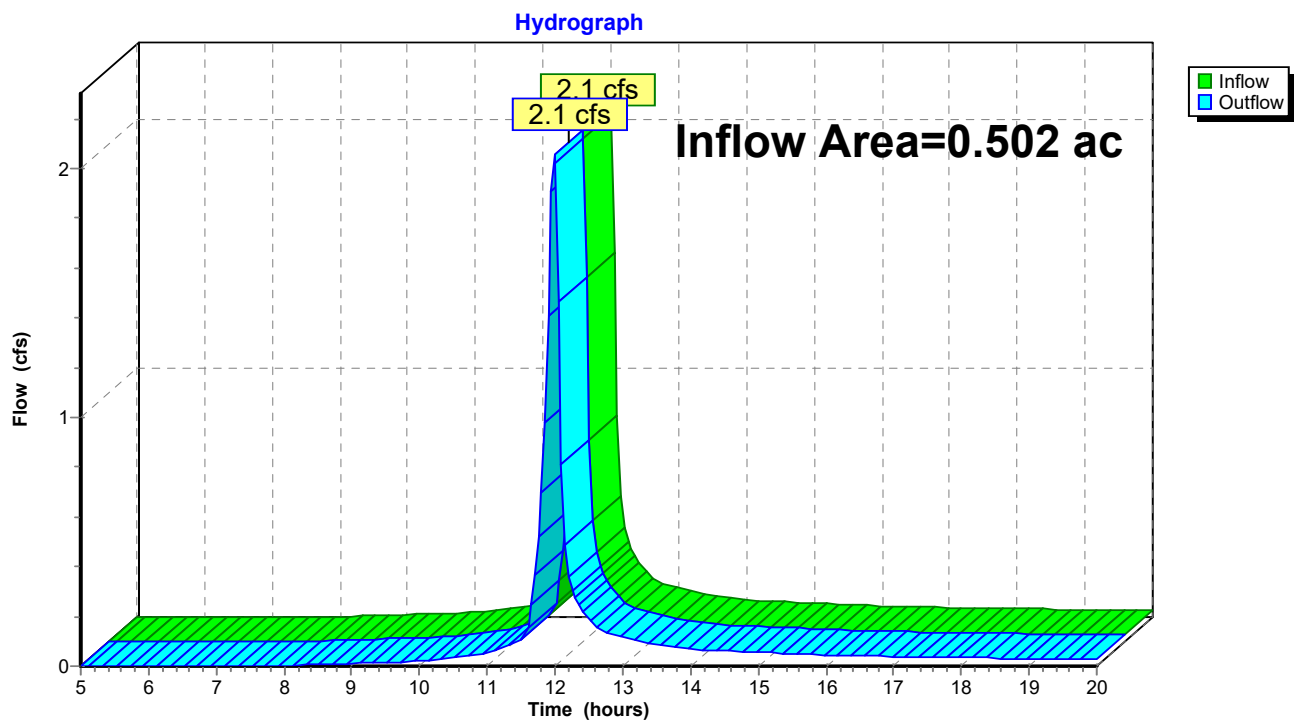
Summary for Reach 3R: West Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.502 ac, 11.55% Impervious, Inflow Depth > 2.26" for 10-YR event
Inflow = 2.1 cfs @ 11.98 hrs, Volume= 0.095 af
Outflow = 2.1 cfs @ 11.98 hrs, Volume= 0.095 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 3R: West Bluff



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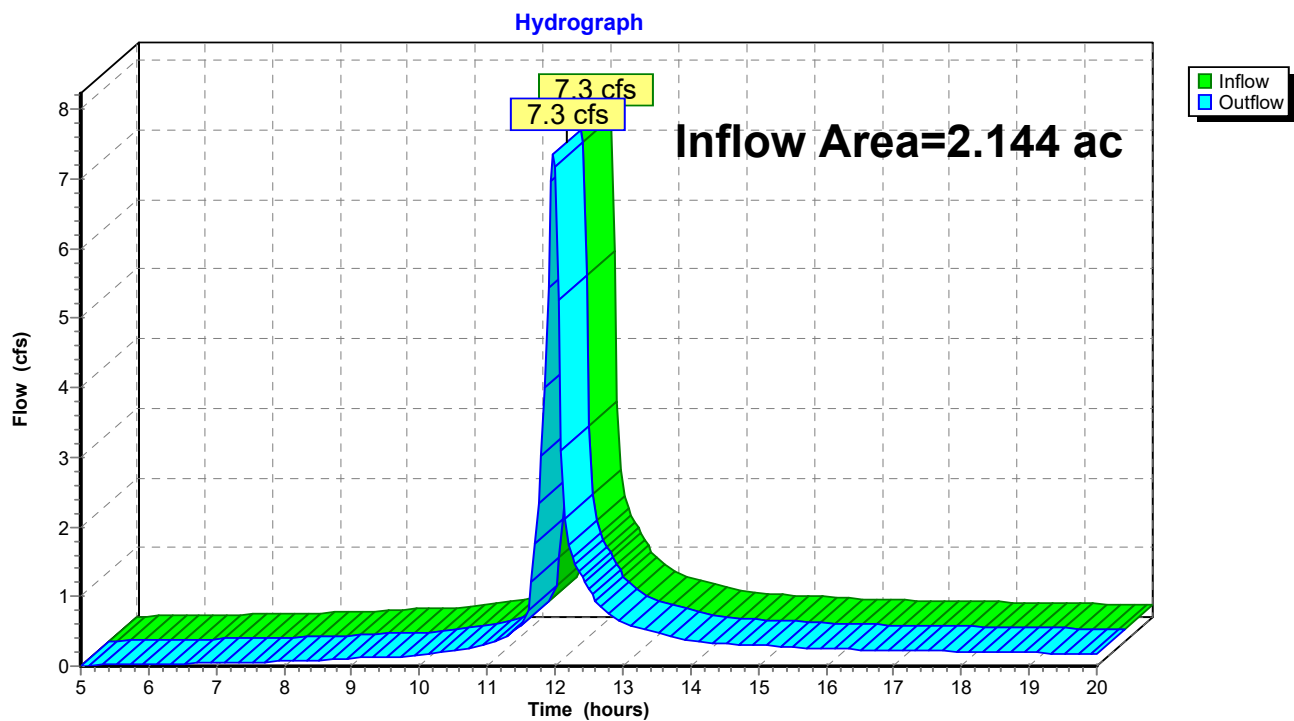
Summary for Reach 4R: South Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.144 ac, 60.06% Impervious, Inflow Depth > 2.66" for 10-YR event
Inflow = 7.3 cfs @ 11.98 hrs, Volume= 0.475 af
Outflow = 7.3 cfs @ 11.98 hrs, Volume= 0.475 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 4R: South Storm



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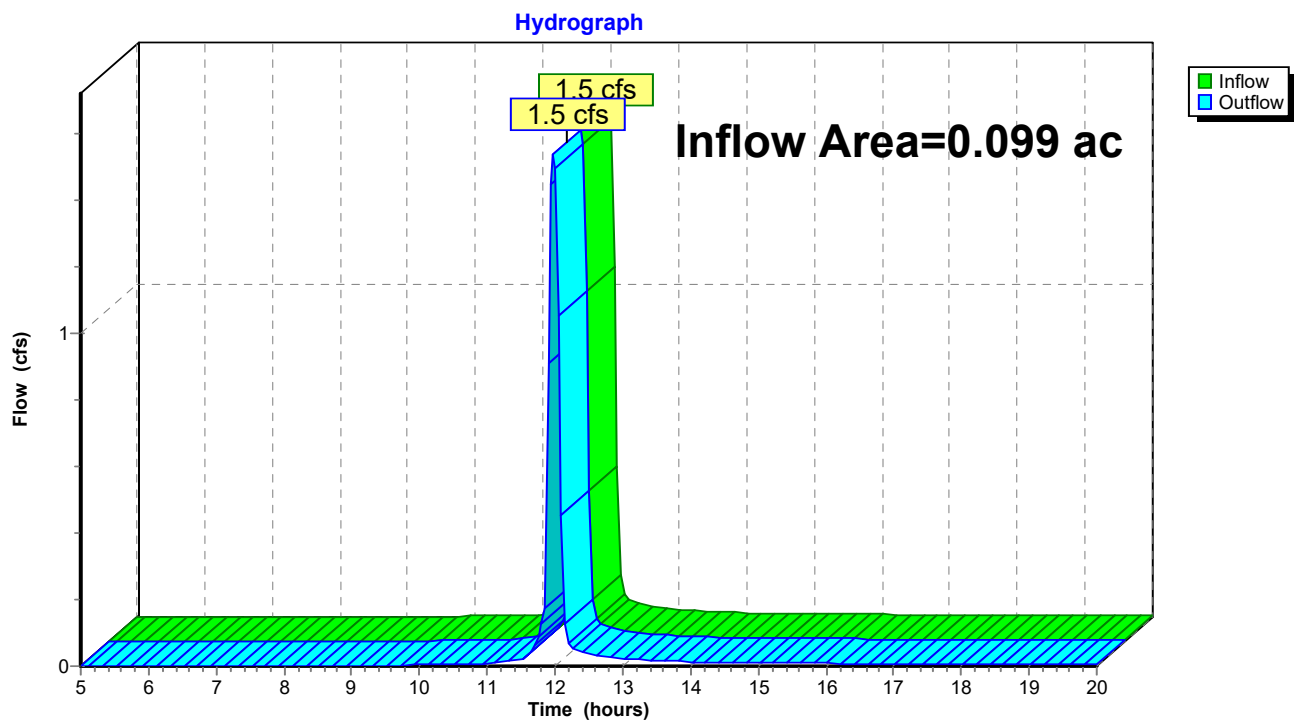
Summary for Reach 5R: SE Bluff - To Road

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.099 ac, 0.00% Impervious, Inflow Depth > 4.11" for 10-YR event
Inflow = 1.5 cfs @ 11.98 hrs, Volume= 0.034 af
Outflow = 1.5 cfs @ 11.98 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: SE Bluff - To Road



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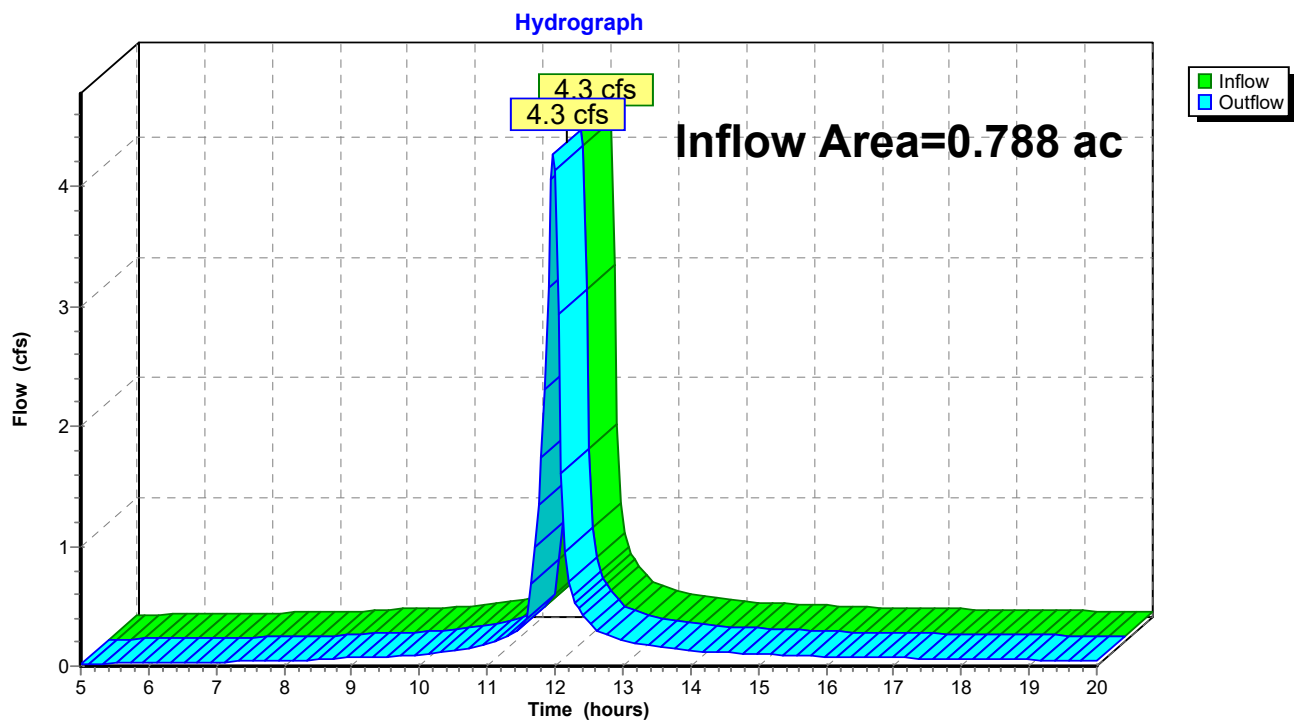
Summary for Reach 6R: East Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.788 ac, 75.88% Impervious, Inflow Depth > 3.31" for 10-YR event
Inflow = 4.3 cfs @ 11.98 hrs, Volume= 0.217 af
Outflow = 4.3 cfs @ 11.98 hrs, Volume= 0.217 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 6R: East Storm



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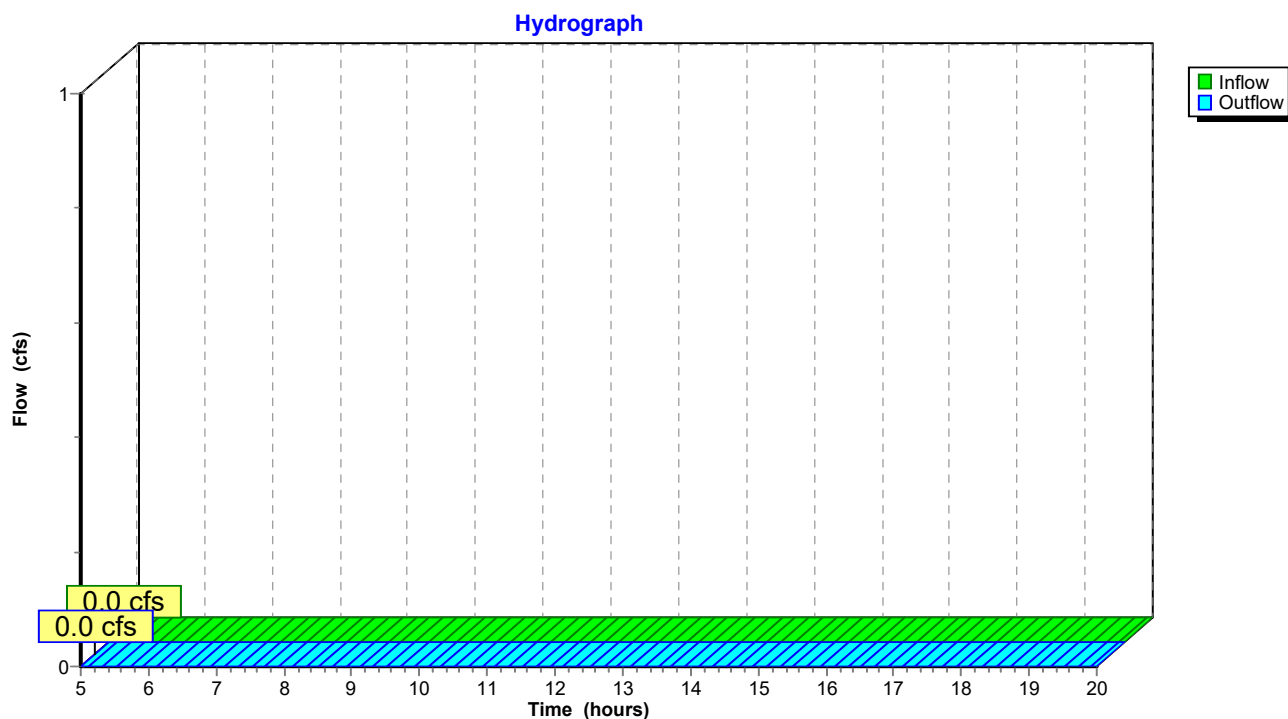
Summary for Reach 7R: North Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow	=	0.0 cfs @	5.00 hrs,	Volume=	0.000 af
Outflow	=	0.0 cfs @	5.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 7R: North Bluff



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Type II 24-hr 10-YR Rainfall=4.28"

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Summary for Pond 1P: Wet Sedimentation Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 4.032 ac, 58.50% Impervious, Inflow Depth > 3.08" for 10-YR event
Inflow = 21.0 cfs @ 11.98 hrs, Volume= 1.035 af
Outflow = 7.4 cfs @ 12.11 hrs, Volume= 1.012 af, Atten= 65%, Lag= 8.1 min
Primary = 7.4 cfs @ 12.11 hrs, Volume= 1.012 af
Routed to Reach 1R : NW Storm
Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 7R : North Bluff

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Starting Elev= 986.00' Surf.Area= 2,905 sf Storage= 5,818 cf

Peak Elev= 990.46' @ 12.11 hrs Surf.Area= 4,509 sf Storage= 23,276 cf (17,458 cf above start)

Plug-Flow detention time= 134.5 min calculated for 0.876 af (85% of inflow)

Center-of-Mass det. time= 59.9 min (815.6 - 755.6)

Volume	Invert	Avail.Storage	Storage Description
#1	981.00'	52,963 cf	Custom Stage Data (Prismatic) Listed below (Recalc) x 0.5

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
981.00	108	0	0
985.00	3,406	7,028	7,028
986.50	7,012	7,814	14,842
995.00	11,323	77,924	92,765
996.00	15,000	13,162	105,927

Device	Routing	Invert	Outlet Devices
#1	Primary	981.69'	12.0" Round Culvert L= 169.0' Ke= 0.500 Inlet / Outlet Invert= 981.69' / 980.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	986.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	989.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#4	Device 1	990.00'	HAALA 48" ID Pond Skimmer Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 1.320 3.740 6.870 10.580 14.790 19.250 20.790 22.220 23.570 24.850 30.430 35.140 39.280 43.030 46.480 49.690 52.700 55.560
#5	Secondary	995.50'	20.0' long x 20.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Post-Development

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Primary OutFlow Max=7.4 cfs @ 12.11 hrs HW=990.44' (Free Discharge)

1=Culvert (Barrel Controls 7.4 cfs @ 9.45 fps)

2=Orifice/Grate (Passes < 1.9 cfs potential flow)

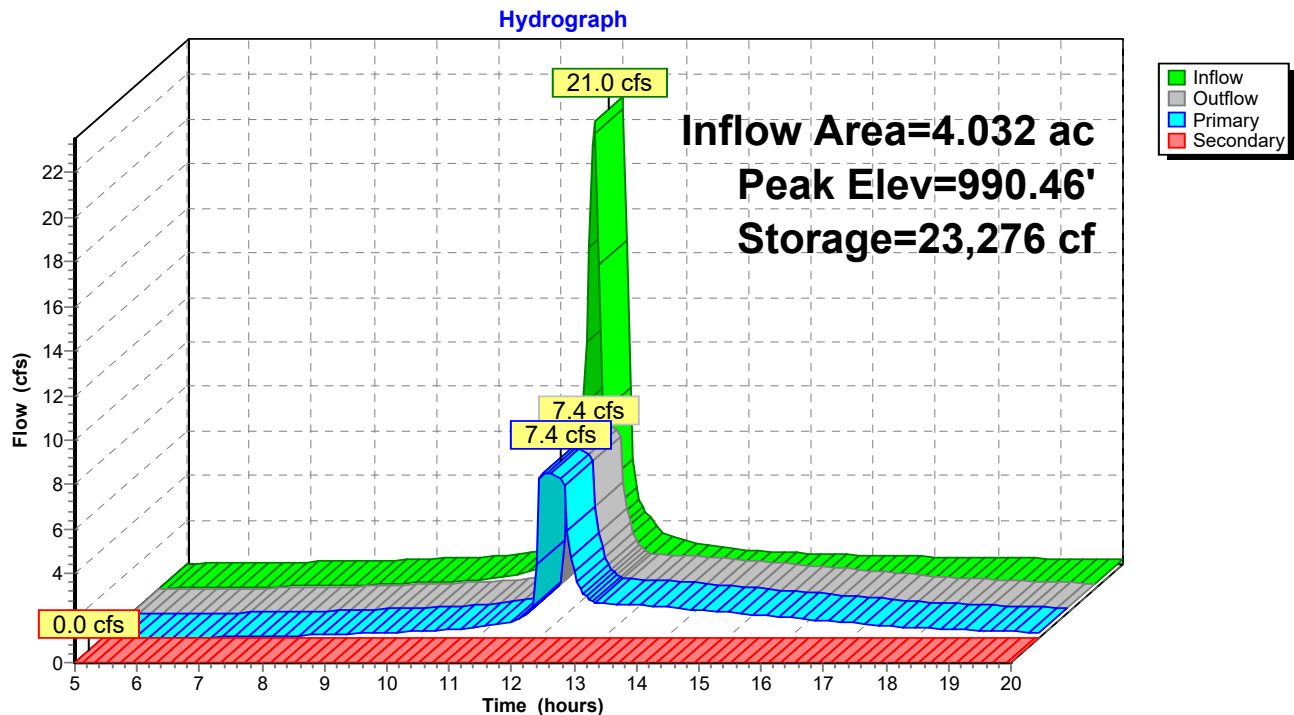
3=Sharp-Crested Rectangular Weir (Passes < 24.6 cfs potential flow)

4=HAALA 48" ID Pond Skimmer (Passes < 12.1 cfs potential flow)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=986.00' (Free Discharge)

5=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Pond 1P: Wet Sedimentation Basin



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Summary for Pond 2P: Filtration Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.421 ac, 76.15% Impervious, Inflow Depth > 3.37" for 10-YR event
Inflow = 7.8 cfs @ 11.98 hrs, Volume= 0.399 af
Outflow = 4.4 cfs @ 12.07 hrs, Volume= 0.309 af, Atten= 44%, Lag= 5.6 min
Primary = 4.4 cfs @ 12.07 hrs, Volume= 0.309 af
Routed to Reach 2R : West Storm
Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 3R : West Bluff

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 985.93' @ 12.07 hrs Surf.Area= 2,855 sf Storage= 6,773 cf

Plug-Flow detention time= 101.8 min calculated for 0.308 af (77% of inflow)
Center-of-Mass det. time= 45.0 min (790.7 - 745.7)

Volume	Invert	Avail.Storage	Storage Description
#1	982.00'	13,880 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
982.00	588	0	0
987.00	3,470	10,145	10,145
988.00	4,000	3,735	13,880

Device	Routing	Invert	Outlet Devices
#1	Primary	980.00'	12.0" Round Culvert L= 200.0' Ke= 0.500 Inlet / Outlet Invert= 980.00' / 978.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	982.00'	1.630 in/hr Exfiltration over Surface area above 982.00' Excluded Surface area = 588 sf Phase-In= 0.01'
#3	Device 1	984.80'	15" Nyloplast Dome Grate Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 0.410 1.170 2.150 2.590 2.890 3.170 3.420 3.660 3.880 4.090 5.010 5.790 6.470 7.090 7.660 8.190 8.680 9.150
#4	Secondary	987.00'	133.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Post-Development

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Primary OutFlow Max=4.4 cfs @ 12.07 hrs HW=985.91' (Free Discharge)

1=Culvert (Passes 4.4 cfs of 5.9 cfs potential flow)

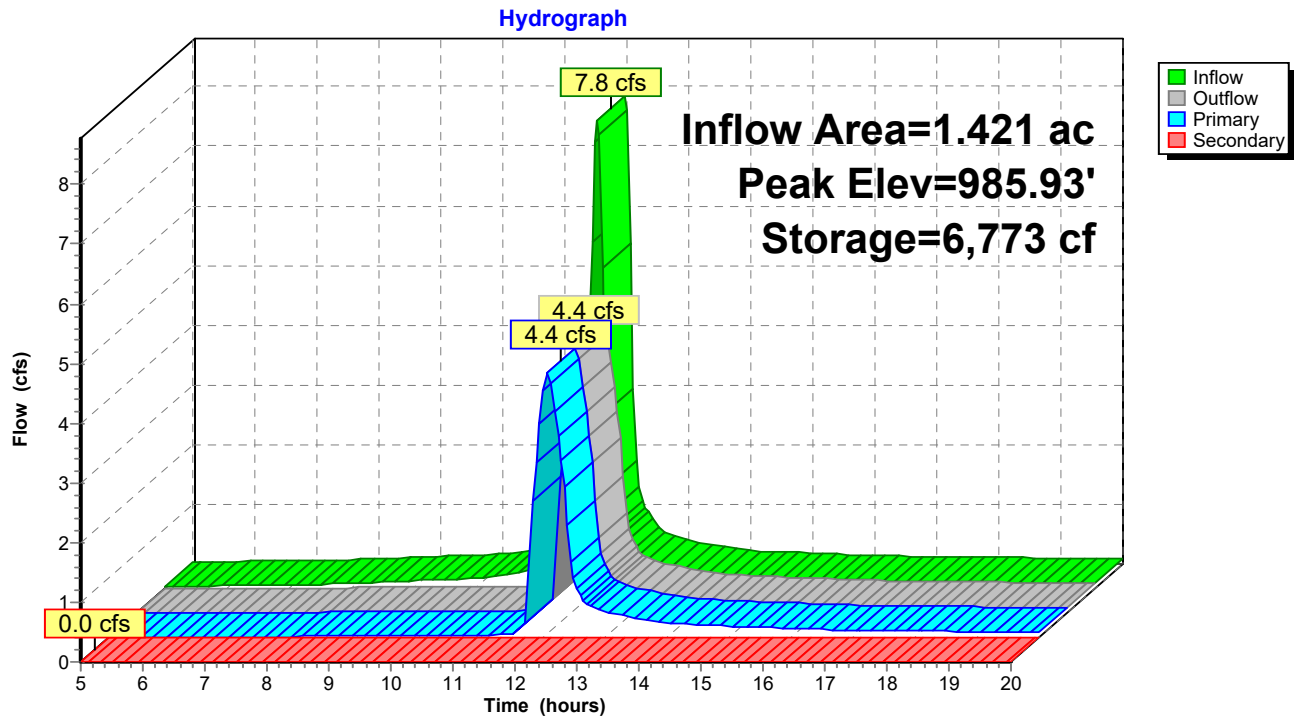
2=Exfiltration (Exfiltration Controls 0.1 cfs)

3=15" Nyloplast Dome Grate (Custom Controls 4.3 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=982.00' (Free Discharge)

4=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Pond 2P: Filtration Basin



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Summary for Pond 3P: Filtration Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.506 ac, 69.75% Impervious, Inflow Depth > 3.27" for 10-YR event
Inflow = 2.7 cfs @ 11.98 hrs, Volume= 0.138 af
Outflow = 0.3 cfs @ 12.42 hrs, Volume= 0.083 af, Atten= 90%, Lag= 26.5 min
Primary = 0.3 cfs @ 12.42 hrs, Volume= 0.083 af
Routed to Reach 4R : South Storm
Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 5R : SE Bluff - To Road

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 989.08' @ 12.42 hrs Surf.Area= 2,967 sf Storage= 3,506 cf

Plug-Flow detention time= 205.5 min calculated for 0.083 af (60% of inflow)
Center-of-Mass det. time= 131.7 min (880.8 - 749.1)

Volume	Invert	Avail.Storage	Storage Description
#1	987.00'	14,421 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
987.00	398	0	0
991.00	5,330	11,456	11,456
992.00	600	2,965	14,421

Device	Routing	Invert	Outlet Devices
#1	Primary	984.50'	12.0" Round Culvert L= 215.0' Ke= 0.500 Inlet / Outlet Invert= 984.50' / 982.35' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	987.00'	1.630 in/hr Exfiltration over Surface area above 987.00' Excluded Surface area = 398 sf Phase-In= 0.01'
#3	Device 1	989.00'	12" Nyloplast Dome Grate Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 0.210 0.450 0.550 0.640 0.710 0.780 0.850 0.900 0.960 1.010 1.240 1.430 1.600 1.750 1.890 2.020 2.140 2.260
#4	Secondary	990.00'	10.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

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Type II 24-hr 10-YR Rainfall=4.28"

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Primary OutFlow Max=0.3 cfs @ 12.42 hrs HW=989.08' (Free Discharge)

1=Culvert (Passes 0.3 cfs of 5.3 cfs potential flow)

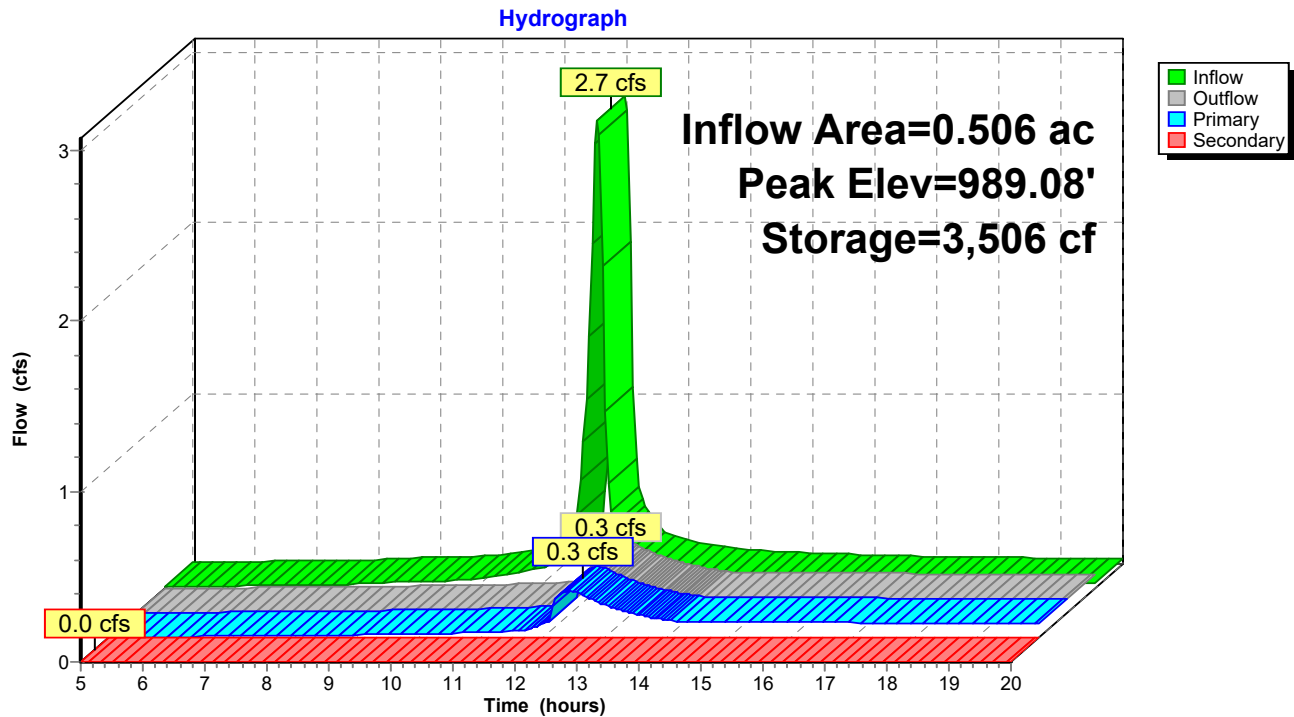
2=Exfiltration (Exfiltration Controls 0.1 cfs)

3=12" Nyloplast Dome Grate (Custom Controls 0.2 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=987.00' (Free Discharge)

4=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Pond 3P: Filtration Basin



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Summary for Pond 4P: Filtration Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.290 ac, 72.78% Impervious, Inflow Depth > 3.27" for 10-YR event
Inflow = 1.6 cfs @ 11.98 hrs, Volume= 0.079 af
Outflow = 1.6 cfs @ 11.98 hrs, Volume= 0.074 af, Atten= 1%, Lag= 0.0 min
Primary = 0.4 cfs @ 11.98 hrs, Volume= 0.057 af
Routed to Reach 4R : South Storm
Secondary = 1.2 cfs @ 11.98 hrs, Volume= 0.017 af
Routed to Reach 5R : SE Bluff - To Road

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 994.04' @ 11.98 hrs Surf.Area= 999 sf Storage= 561 cf

Plug-Flow detention time= 47.9 min calculated for 0.074 af (93% of inflow)
Center-of-Mass det. time= 22.9 min (772.0 - 749.1)

Volume	Invert	Avail.Storage	Storage Description
#1	993.00'	1,615 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
993.00	50	0	0
994.00	990	520	520
995.00	1,200	1,095	1,615

Device	Routing	Invert	Outlet Devices
#1	Primary	981.22'	6.0" Round Culvert L= 151.0' Ke= 0.500 Inlet / Outlet Invert= 981.22' / 981.07' S= 0.0010 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	993.00'	1.600 in/hr Exfiltration over Surface area above 993.00' Excluded Surface area = 50 sf Phase-In= 0.01'
#3	Device 1	993.70'	Nyloplast 8" Drop In Grate Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 0.200 0.280 0.340 0.400 0.440 0.480 0.520 0.560 0.590 0.630 0.770 0.890 0.990 1.080 1.170 1.250 1.330 1.400
#4	Secondary	994.00'	50.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

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Primary OutFlow Max=0.4 cfs @ 11.98 hrs HW=994.04' (Free Discharge)

1=Culvert (Passes 0.4 cfs of 1.8 cfs potential flow)

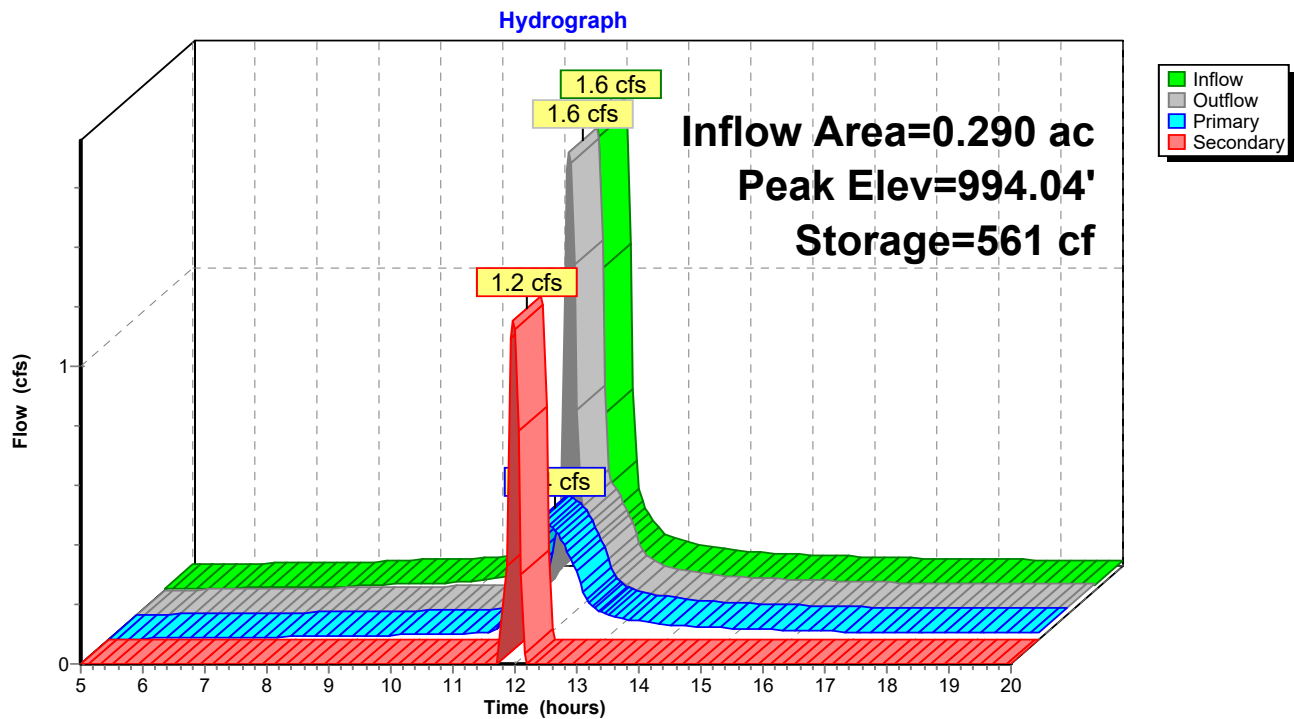
2=Exfiltration (Exfiltration Controls 0.0 cfs)

3=Nyloplast 8" Drop In Grate (Custom Controls 0.4 cfs)

Secondary OutFlow Max=1.0 cfs @ 11.98 hrs HW=994.04' (Free Discharge)

4=Broad-Crested Rectangular Weir (Weir Controls 1.0 cfs @ 0.49 fps)

Pond 4P: Filtration Basin



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Type II 24-hr 100-YR Rainfall=7.19"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S:	Runoff Area=175,645 sf 58.50% Impervious Runoff Depth>5.73" Tc=7.0 min CN=91 Runoff=37.6 cfs 1.926 af
Subcatchment2S:	Runoff Area=57,101 sf 58.18% Impervious Runoff Depth>5.63" Tc=7.0 min CN=90 Runoff=12.1 cfs 0.615 af
Subcatchment3S:	Runoff Area=61,891 sf 76.15% Impervious Runoff Depth>6.03" Tc=7.0 min CN=94 Runoff=13.6 cfs 0.713 af
Subcatchment4S:	Runoff Area=21,859 sf 11.55% Impervious Runoff Depth>4.76" Tc=7.0 min CN=82 Runoff=4.1 cfs 0.199 af
Subcatchment5S:	Runoff Area=26,713 sf 64.20% Impervious Runoff Depth>5.83" Tc=7.0 min CN=92 Runoff=5.8 cfs 0.298 af
Subcatchment6S:	Runoff Area=22,043 sf 69.75% Impervious Runoff Depth>5.93" Tc=7.0 min CN=93 Runoff=4.8 cfs 0.250 af
Subcatchment7S:	Runoff Area=58,710 sf 53.68% Impervious Runoff Depth>5.63" Tc=7.0 min CN=90 Runoff=12.4 cfs 0.632 af
Subcatchment8S:	Runoff Area=12,647 sf 72.78% Impervious Runoff Depth>5.93" Tc=7.0 min CN=93 Runoff=2.8 cfs 0.143 af
Subcatchment9S:	Runoff Area=12,130 sf 100.00% Impervious Runoff Depth>6.34" Tc=7.0 min CN=98 Runoff=2.7 cfs 0.147 af
Subcatchment10S:	Runoff Area=22,212 sf 62.70% Impervious Runoff Depth>5.73" Tc=7.0 min CN=91 Runoff=4.8 cfs 0.244 af
Subcatchment11S:	Runoff Area=4,300 sf 0.00% Impervious Runoff Depth>4.54" Tc=7.0 min CN=80 Runoff=0.8 cfs 0.037 af
Reach 1R: NW Storm	Inflow=20.1 cfs 2.497 af Outflow=20.1 cfs 2.497 af
Reach 2R: West Storm	Inflow=11.4 cfs 0.913 af Outflow=11.4 cfs 0.913 af
Reach 3R: West Bluff	Inflow=4.1 cfs 0.207 af Outflow=4.1 cfs 0.207 af
Reach 4R: South Storm	Inflow=13.6 cfs 0.909 af Outflow=13.6 cfs 0.909 af
Reach 5R: SE Bluff - To Road	Inflow=3.1 cfs 0.081 af Outflow=3.1 cfs 0.081 af

Post-Development

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Type II 24-hr 100-YR Rainfall=7.19"

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Reach 6R: East Storm

Inflow=7.5 cfs 0.391 af

Outflow=7.5 cfs 0.391 af

Reach 7R: North Bluff

Inflow=0.0 cfs 0.000 af

Outflow=0.0 cfs 0.000 af

Pond 1P: Wet Sedimentation Basin

Peak Elev=993.74' Storage=39,468 cf Inflow=37.6 cfs 1.926 af
Primary=8.6 cfs 1.882 af Secondary=0.0 cfs 0.000 af Outflow=8.6 cfs 1.882 af

Pond 2P: Filtration Basin

Peak Elev=987.03' Storage=10,243 cf Inflow=13.6 cfs 0.713 af
Primary=6.2 cfs 0.615 af Secondary=1.1 cfs 0.008 af Outflow=7.3 cfs 0.623 af

Pond 3P: Filtration Basin

Peak Elev=989.75' Storage=5,743 cf Inflow=4.8 cfs 0.250 af
Primary=1.0 cfs 0.183 af Secondary=0.0 cfs 0.000 af Outflow=1.0 cfs 0.183 af

Pond 4P: Filtration Basin

Peak Elev=994.07' Storage=589 cf Inflow=2.8 cfs 0.143 af
Primary=0.4 cfs 0.094 af Secondary=2.3 cfs 0.044 af Outflow=2.8 cfs 0.137 af

Total Runoff Area = 10.910 ac Runoff Volume = 5.205 af Average Runoff Depth = 5.73"
40.05% Pervious = 4.369 ac 59.95% Impervious = 6.541 ac

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Type II 24-hr 100-YR Rainfall=7.19"

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Summary for Subcatchment 1S:

Runoff = 37.6 cfs @ 11.98 hrs, Volume= 1.926 af, Depth> 5.73"
Routed to Pond 1P : Wet Sedimentation Basin

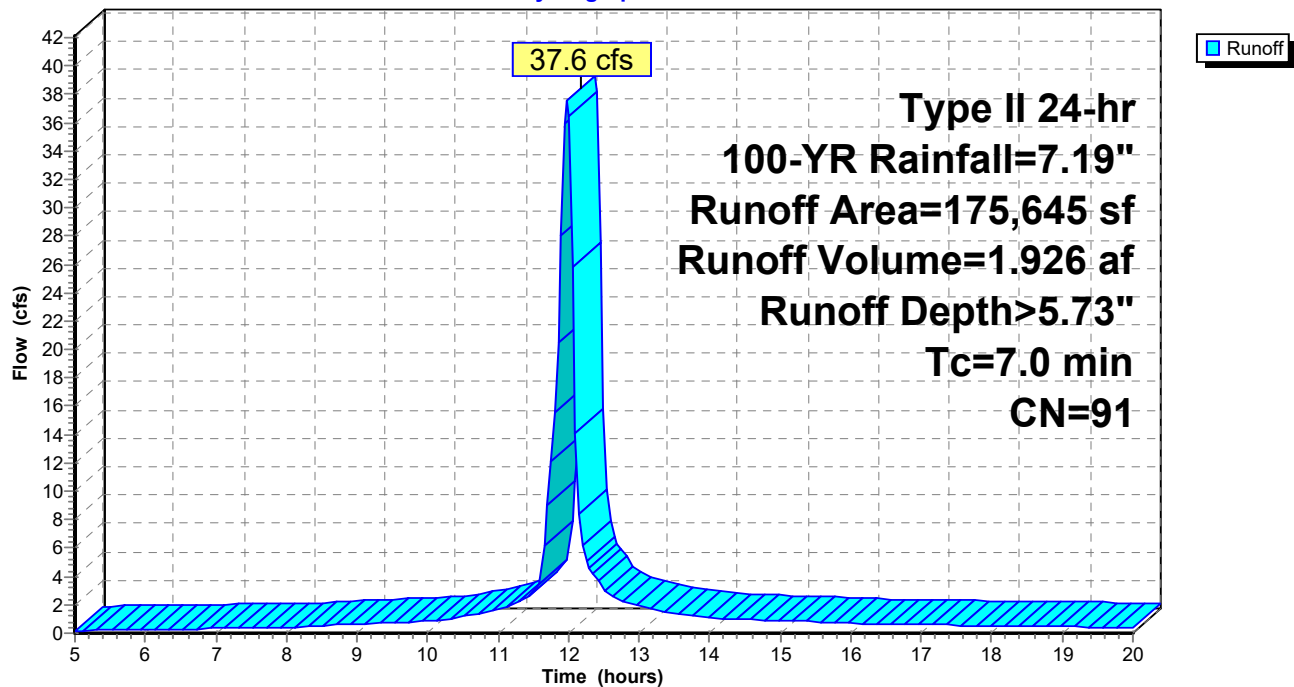
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
102,749	98	Paved parking, HSG D
72,896	80	>75% Grass cover, Good, HSG D
175,645	91	Weighted Average
72,896		41.50% Pervious Area
102,749		58.50% Impervious Area

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

Subcatchment 1S:

Hydrograph



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Type II 24-hr 100-YR Rainfall=7.19"

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Summary for Subcatchment 2S:

Runoff = 12.1 cfs @ 11.98 hrs, Volume= 0.615 af, Depth> 5.63"
Routed to Reach 1R : NW Storm

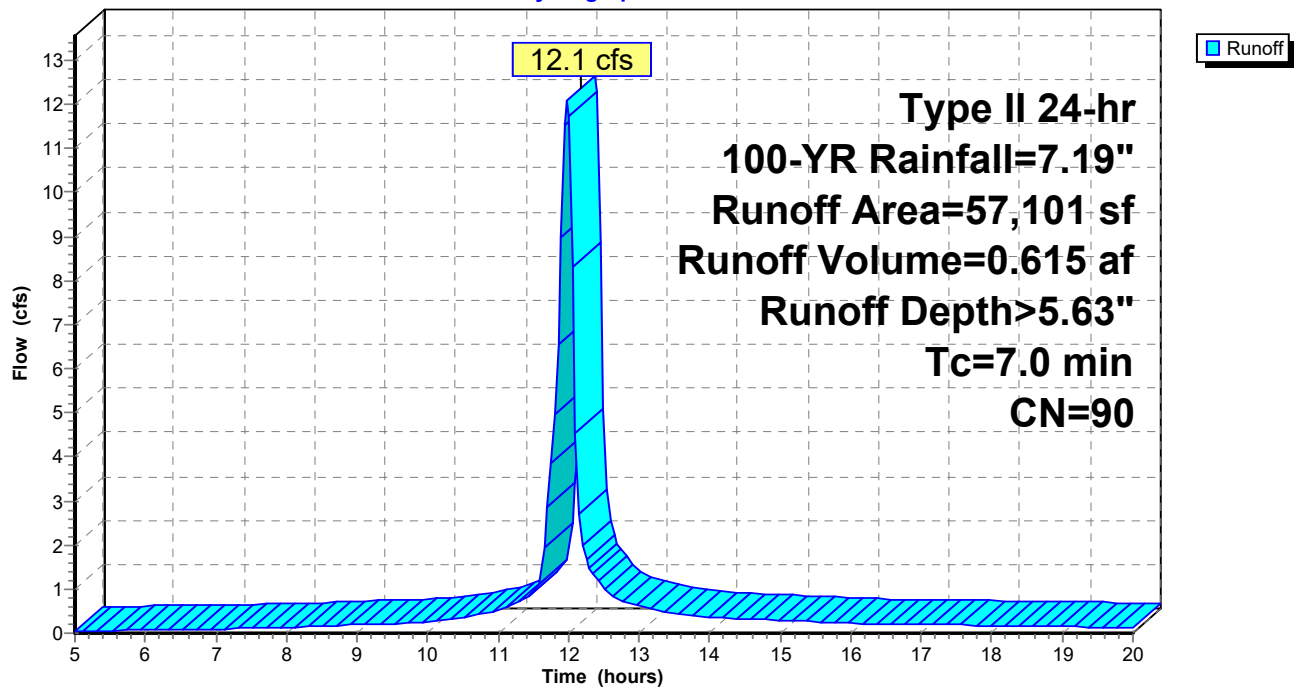
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
33,220	98	Paved parking, HSG D
23,881	80	>75% Grass cover, Good, HSG D
57,101	90	Weighted Average
23,881		41.82% Pervious Area
33,220		58.18% Impervious Area

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

Subcatchment 2S:

Hydrograph



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Summary for Subcatchment 3S:

Runoff = 13.6 cfs @ 11.98 hrs, Volume= 0.713 af, Depth> 6.03"
Routed to Pond 2P : Filtration Basin

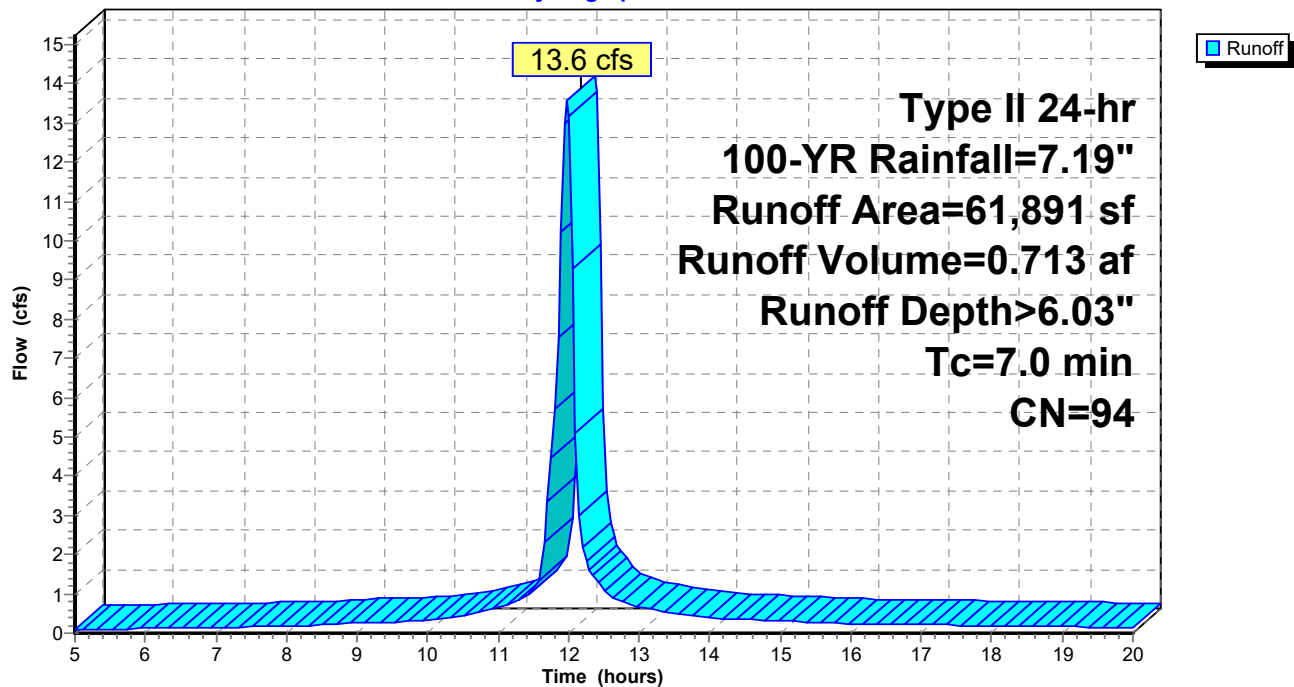
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
47,128	98	Paved parking, HSG D
14,763	80	>75% Grass cover, Good, HSG D
61,891	94	Weighted Average
14,763		23.85% Pervious Area
47,128		76.15% Impervious Area

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

Subcatchment 3S:

Hydrograph



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Summary for Subcatchment 4S:

Runoff = 4.1 cfs @ 11.98 hrs, Volume= 0.199 af, Depth> 4.76"
Routed to Reach 3R : West Bluff

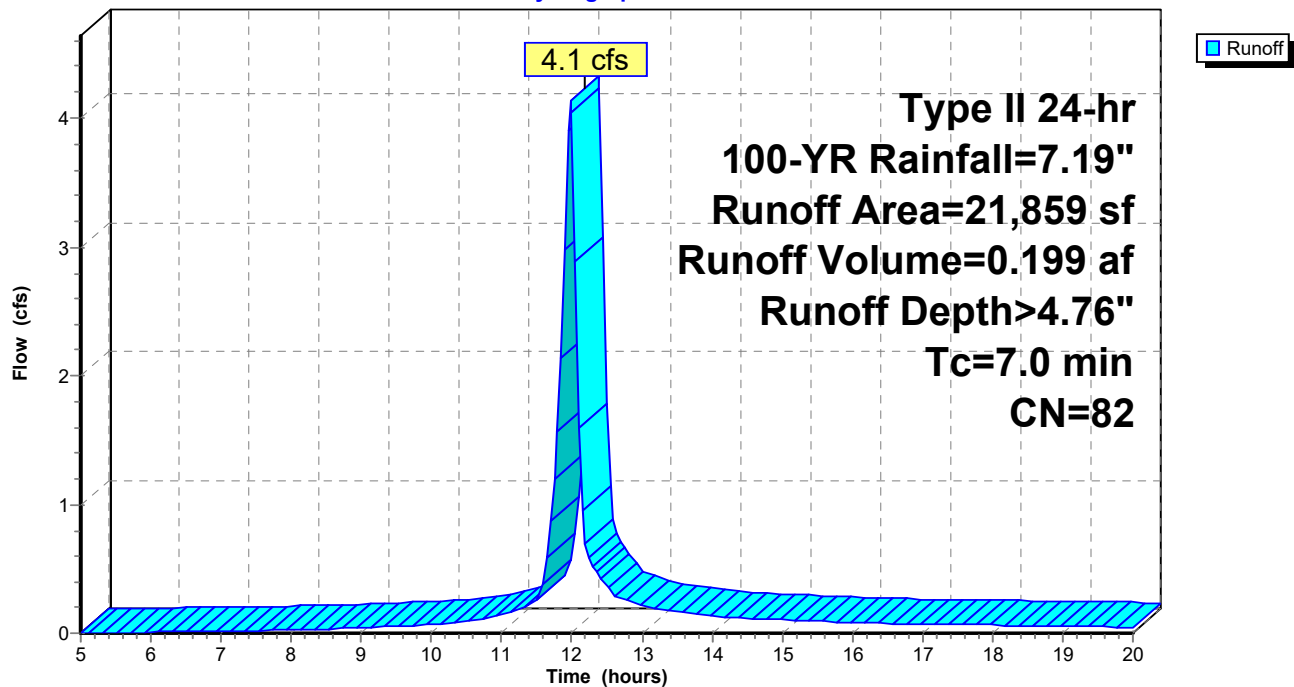
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
2,525	98	Paved parking, HSG D
19,334	80	>75% Grass cover, Good, HSG D
21,859	82	Weighted Average
19,334		88.45% Pervious Area
2,525		11.55% Impervious Area

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

Subcatchment 4S:

Hydrograph



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Summary for Subcatchment 5S:

Runoff = 5.8 cfs @ 11.98 hrs, Volume= 0.298 af, Depth> 5.83"
Routed to Reach 2R : West Storm

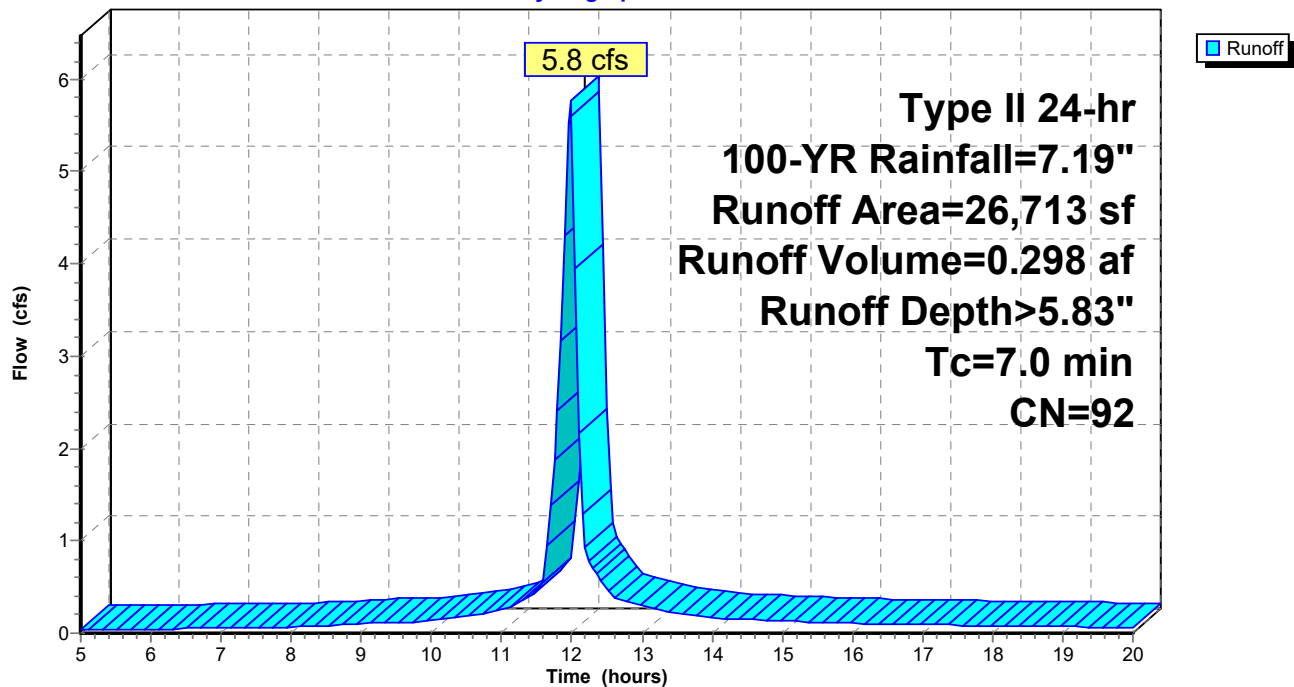
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
17,151	98	Paved parking, HSG D
9,562	80	>75% Grass cover, Good, HSG D
26,713	92	Weighted Average
9,562		35.80% Pervious Area
17,151		64.20% Impervious Area

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

Subcatchment 5S:

Hydrograph



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Summary for Subcatchment 6S:

Runoff = 4.8 cfs @ 11.98 hrs, Volume= 0.250 af, Depth> 5.93"
Routed to Pond 3P : Filtration Basin

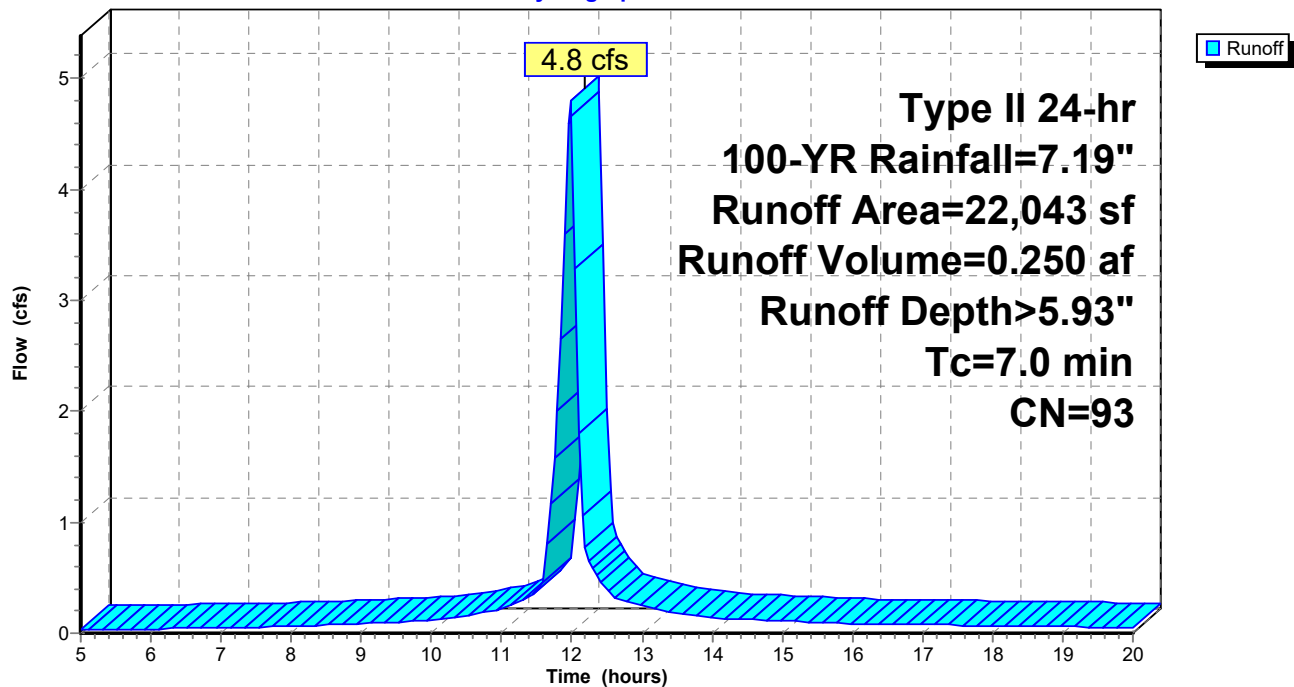
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
15,375	98	Paved parking, HSG D
6,668	80	>75% Grass cover, Good, HSG D
22,043	93	Weighted Average
6,668		30.25% Pervious Area
15,375		69.75% Impervious Area

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

Subcatchment 6S:

Hydrograph



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Summary for Subcatchment 7S:

Runoff = 12.4 cfs @ 11.98 hrs, Volume= 0.632 af, Depth> 5.63"
Routed to Reach 4R : South Storm

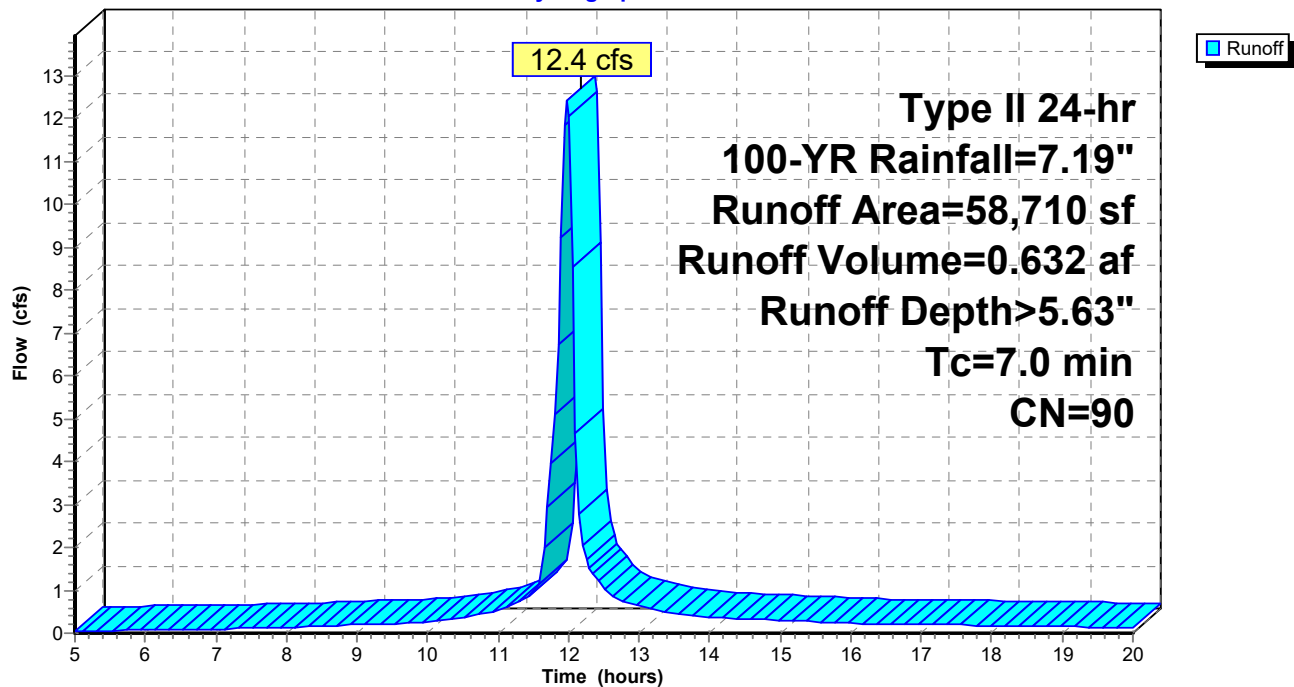
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
31,516	98	Paved parking, HSG D
27,194	80	>75% Grass cover, Good, HSG D
58,710	90	Weighted Average
27,194		46.32% Pervious Area
31,516		53.68% Impervious Area

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

Subcatchment 7S:

Hydrograph



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Type II 24-hr 100-YR Rainfall=7.19"

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Summary for Subcatchment 8S:

Runoff = 2.8 cfs @ 11.98 hrs, Volume= 0.143 af, Depth> 5.93"
Routed to Pond 4P : Filtration Basin

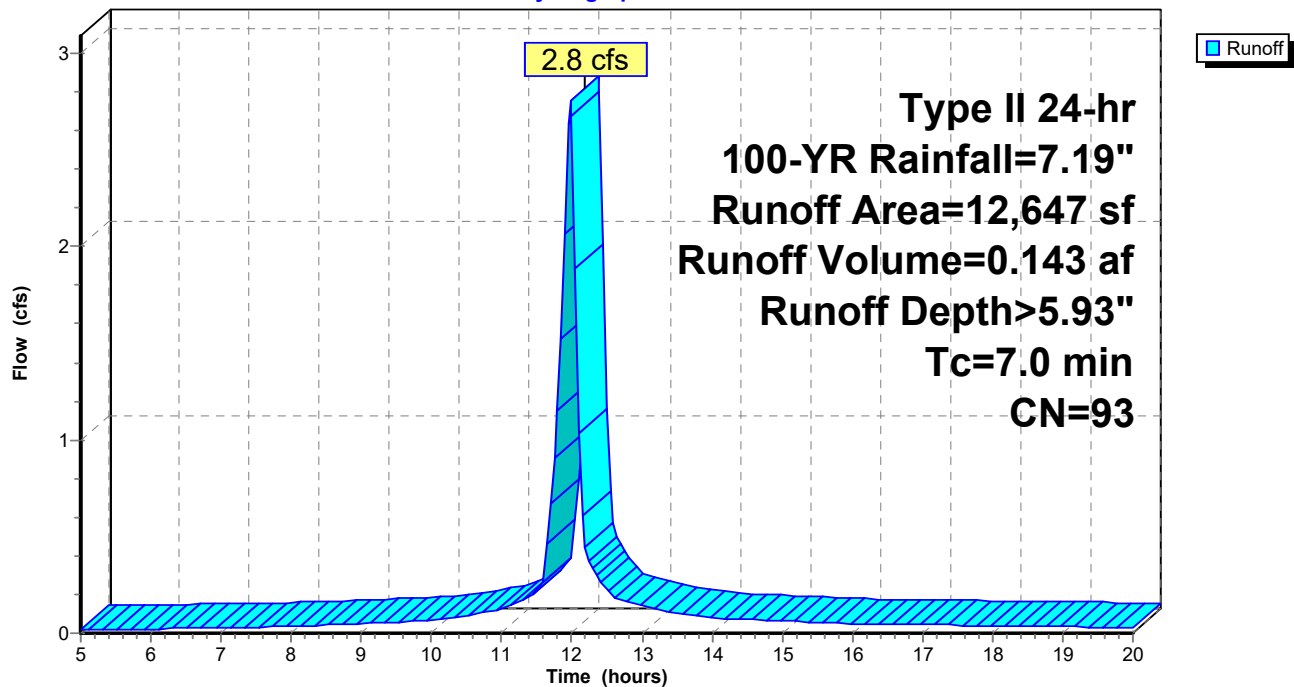
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
9,205	98	Paved parking, HSG D
3,442	80	>75% Grass cover, Good, HSG D
12,647	93	Weighted Average
3,442		27.22% Pervious Area
9,205		72.78% Impervious Area

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

Subcatchment 8S:

Hydrograph



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Summary for Subcatchment 9S:

Runoff = 2.7 cfs @ 11.98 hrs, Volume= 0.147 af, Depth> 6.34"
Routed to Reach 6R : East Storm

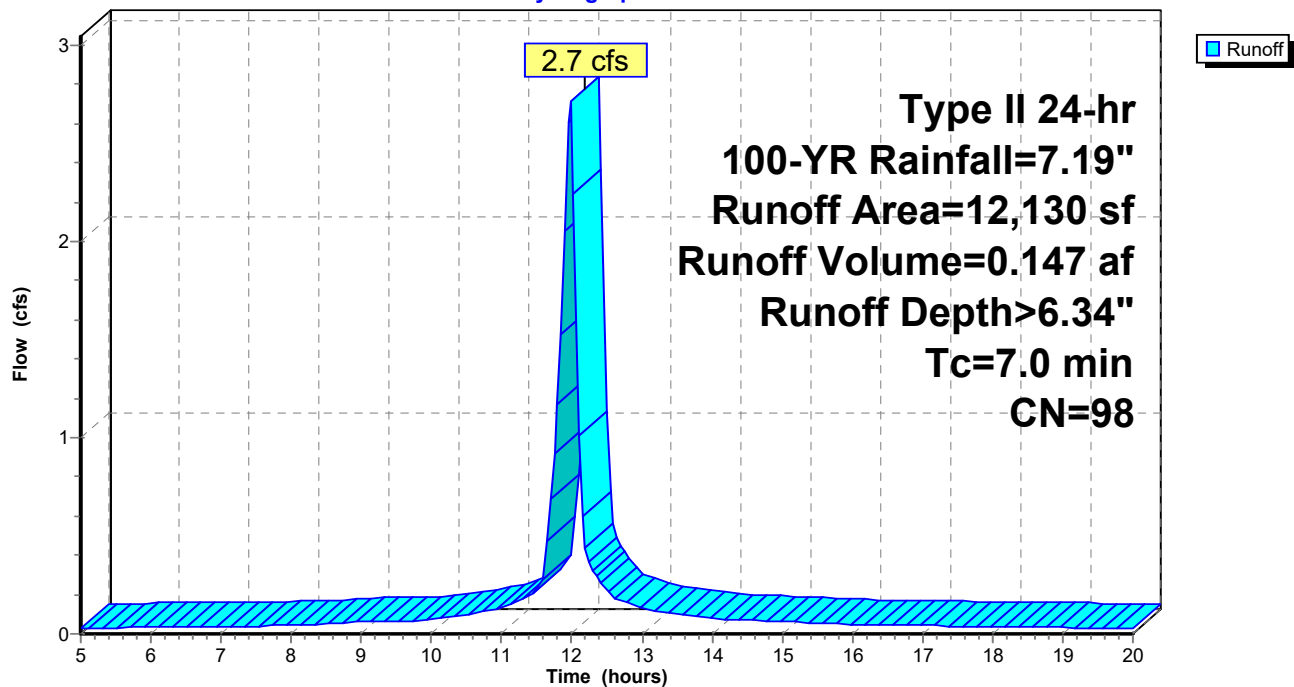
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
12,130	98	Paved parking, HSG D
12,130		100.00% Impervious Area

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

Subcatchment 9S:

Hydrograph



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Summary for Subcatchment 10S:

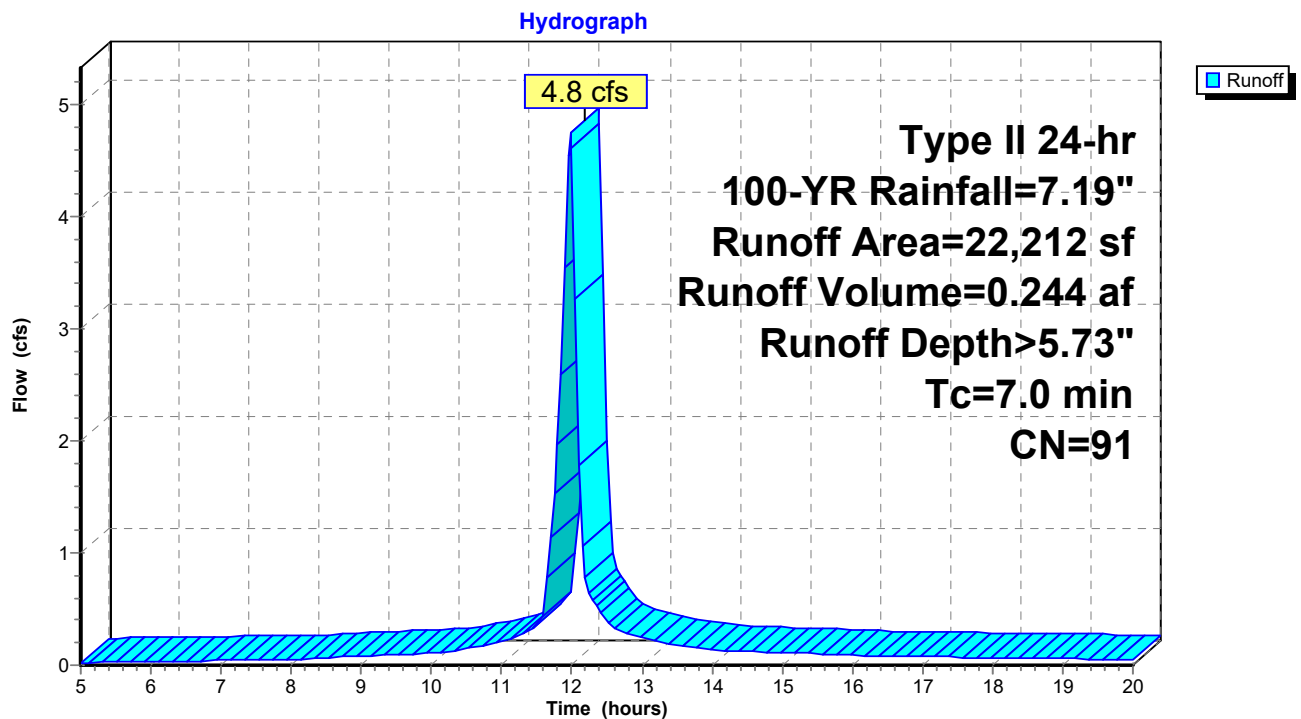
Runoff = 4.8 cfs @ 11.98 hrs, Volume= 0.244 af, Depth> 5.73"
Routed to Reach 6R : East Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
13,928	98	Paved parking, HSG D
8,284	80	>75% Grass cover, Good, HSG D
22,212	91	Weighted Average
8,284		37.30% Pervious Area
13,928		62.70% Impervious Area

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

Subcatchment 10S:



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Summary for Subcatchment 11S:

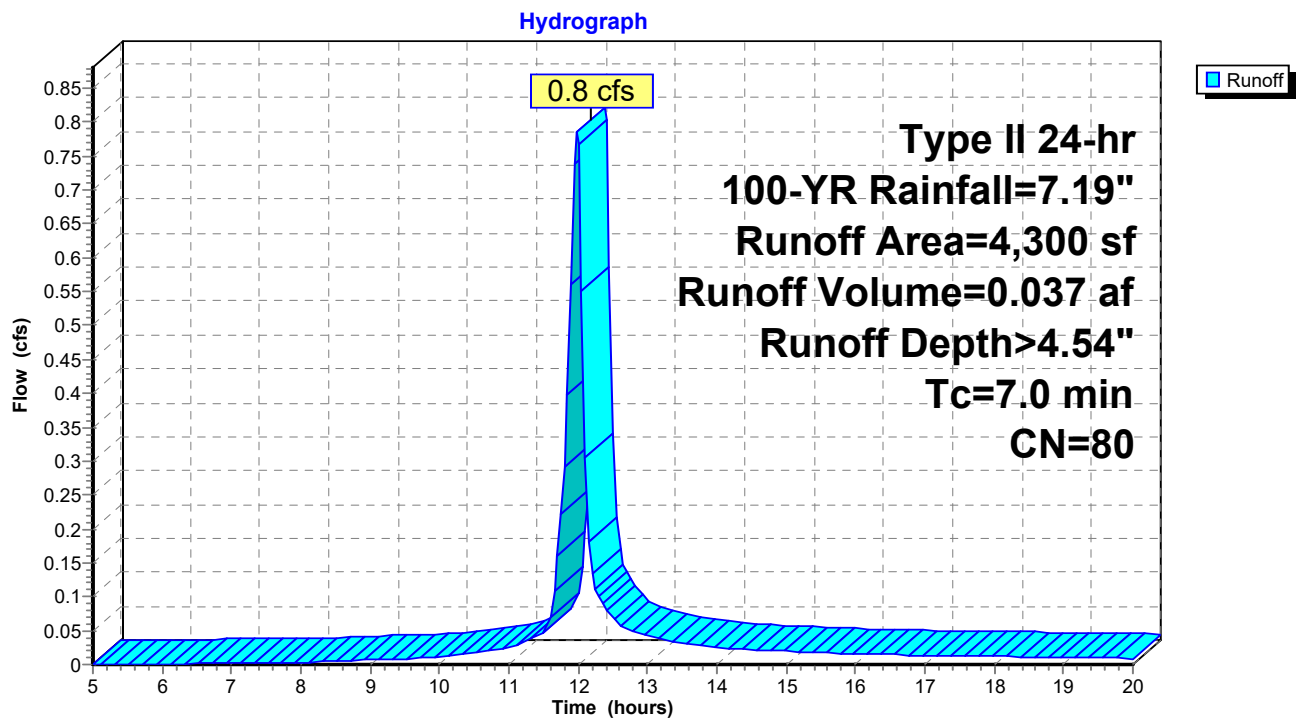
Runoff = 0.8 cfs @ 11.98 hrs, Volume= 0.037 af, Depth> 4.54"
Routed to Reach 5R : SE Bluff - To Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
0	98	Paved parking, HSG D
4,300	80	>75% Grass cover, Good, HSG D
4,300	80	Weighted Average
4,300		100.00% Pervious Area

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

Subcatchment 11S:



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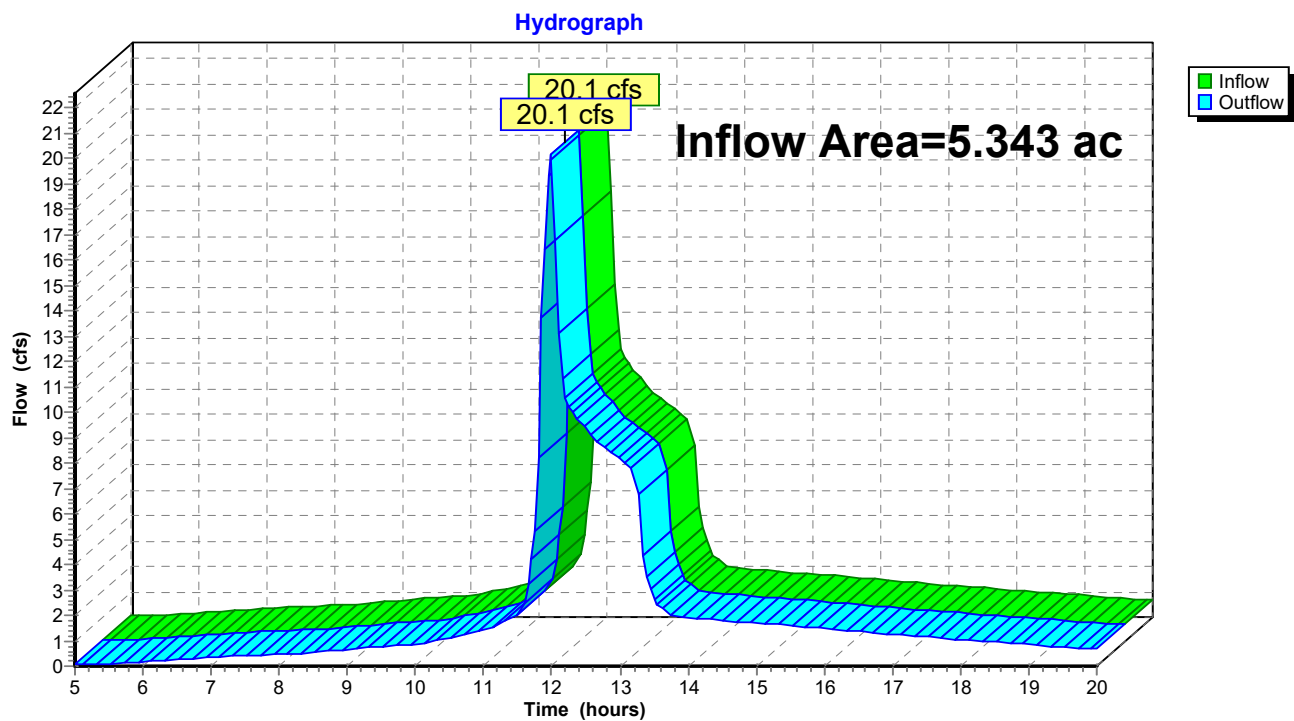
Summary for Reach 1R: NW Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.343 ac, 58.42% Impervious, Inflow Depth > 5.61" for 100-YR event
Inflow = 20.1 cfs @ 11.98 hrs, Volume= 2.497 af
Outflow = 20.1 cfs @ 11.98 hrs, Volume= 2.497 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: NW Storm



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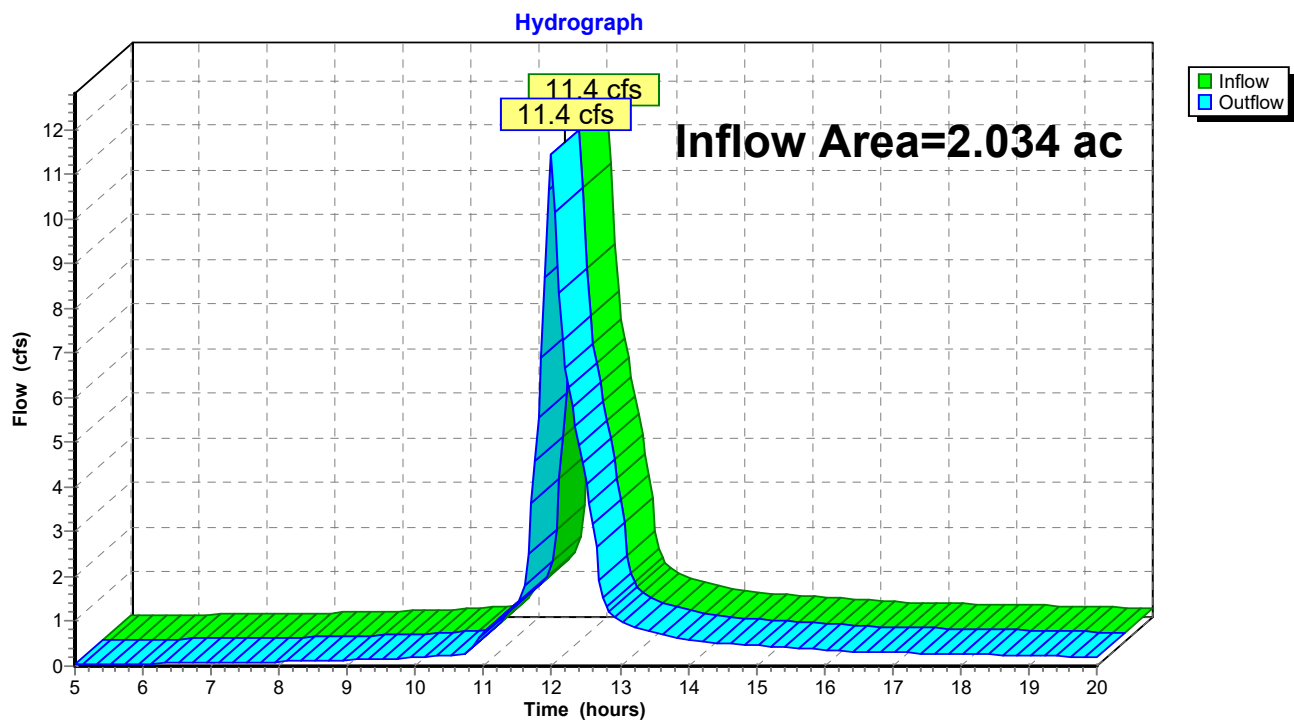
Summary for Reach 2R: West Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.034 ac, 72.55% Impervious, Inflow Depth > 5.39" for 100-YR event
Inflow = 11.4 cfs @ 11.99 hrs, Volume= 0.913 af
Outflow = 11.4 cfs @ 11.99 hrs, Volume= 0.913 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 2R: West Storm



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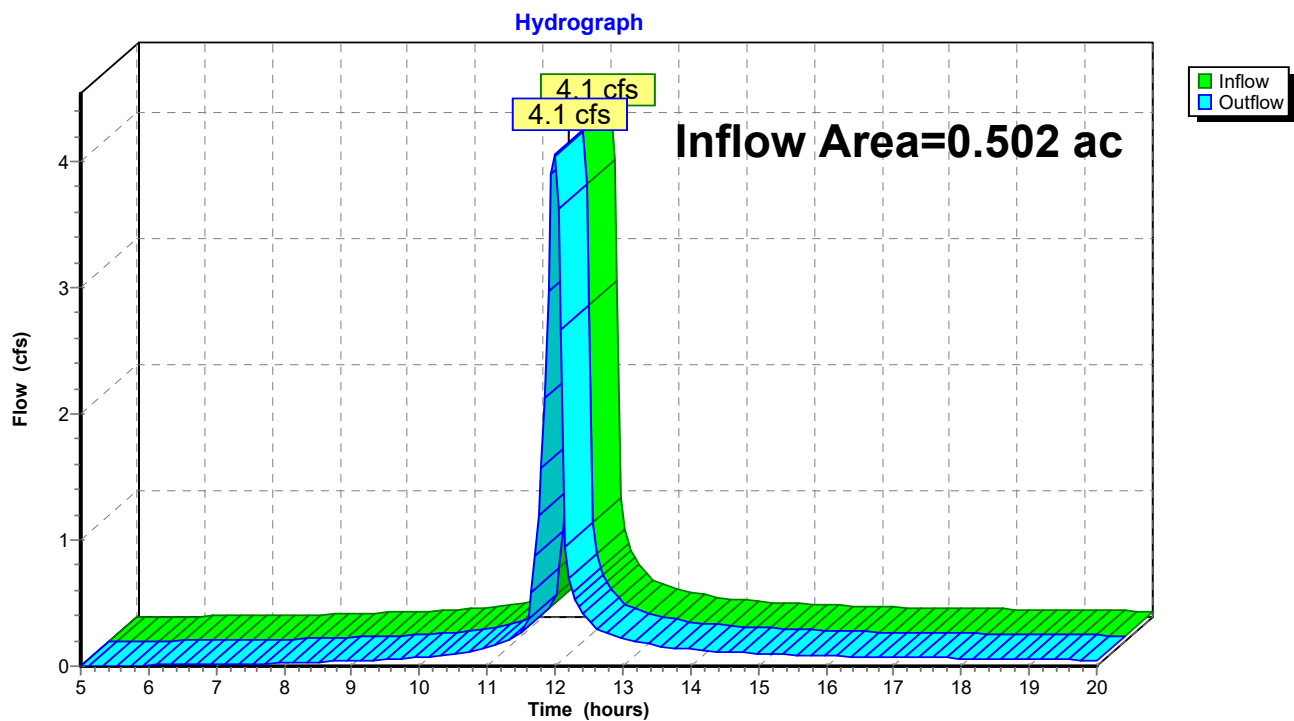
Summary for Reach 3R: West Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.502 ac, 11.55% Impervious, Inflow Depth > 4.94" for 100-YR event
Inflow = 4.1 cfs @ 11.99 hrs, Volume= 0.207 af
Outflow = 4.1 cfs @ 11.99 hrs, Volume= 0.207 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 3R: West Bluff



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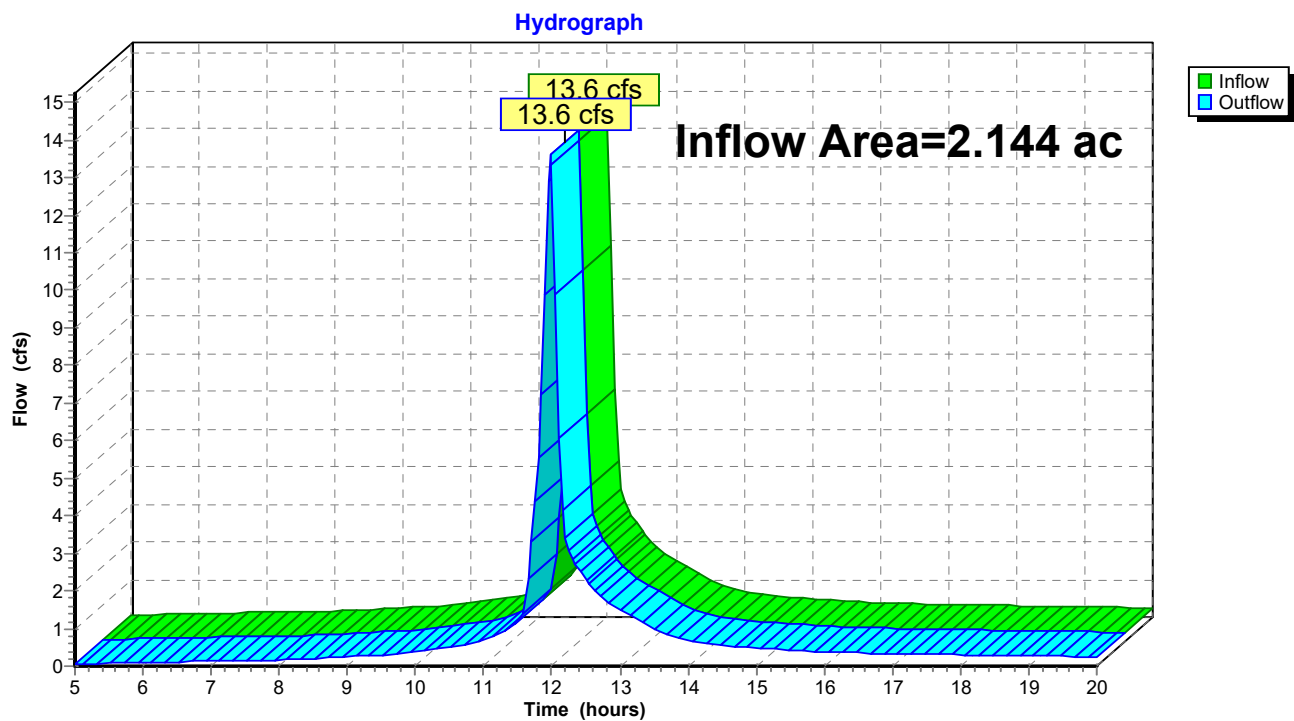
Summary for Reach 4R: South Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.144 ac, 60.06% Impervious, Inflow Depth > 5.09" for 100-YR event
Inflow = 13.6 cfs @ 11.98 hrs, Volume= 0.909 af
Outflow = 13.6 cfs @ 11.98 hrs, Volume= 0.909 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 4R: South Storm



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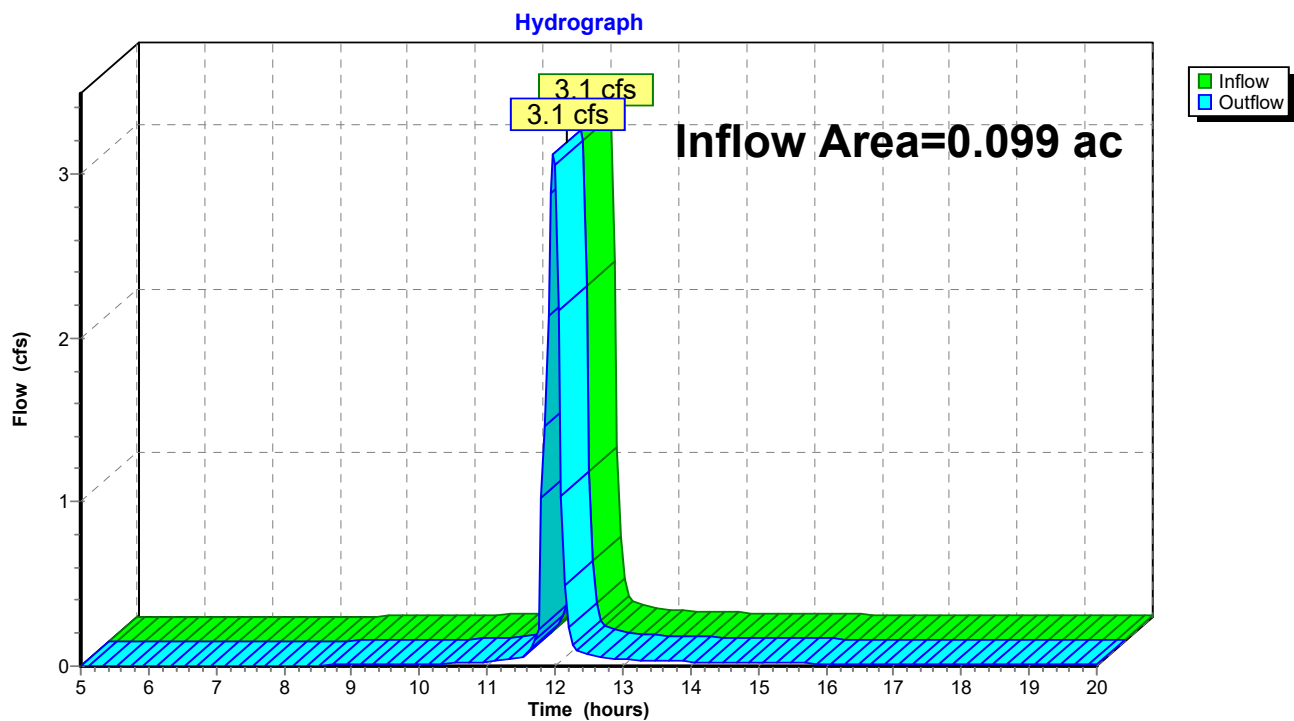
Summary for Reach 5R: SE Bluff - To Road

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.099 ac, 0.00% Impervious, Inflow Depth > 9.86" for 100-YR event
Inflow = 3.1 cfs @ 11.98 hrs, Volume= 0.081 af
Outflow = 3.1 cfs @ 11.98 hrs, Volume= 0.081 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: SE Bluff - To Road



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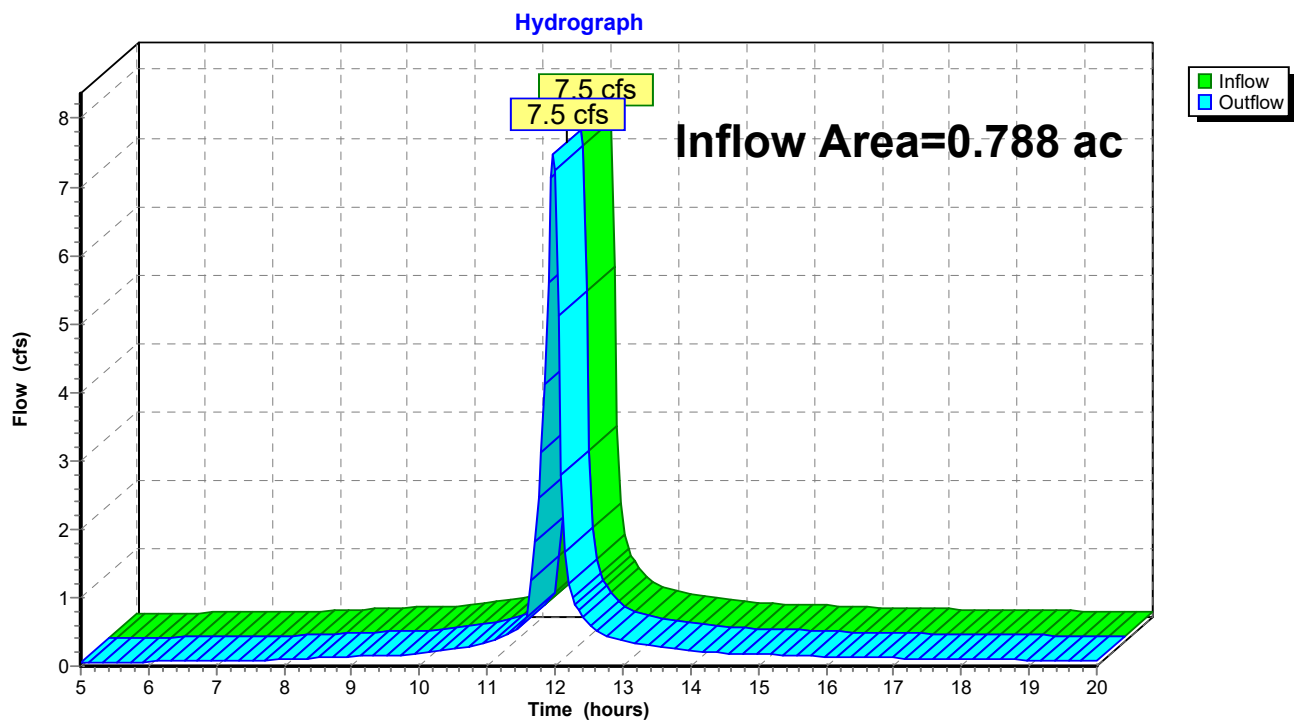
Summary for Reach 6R: East Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.788 ac, 75.88% Impervious, Inflow Depth > 5.95" for 100-YR event
Inflow = 7.5 cfs @ 11.98 hrs, Volume= 0.391 af
Outflow = 7.5 cfs @ 11.98 hrs, Volume= 0.391 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 6R: East Storm



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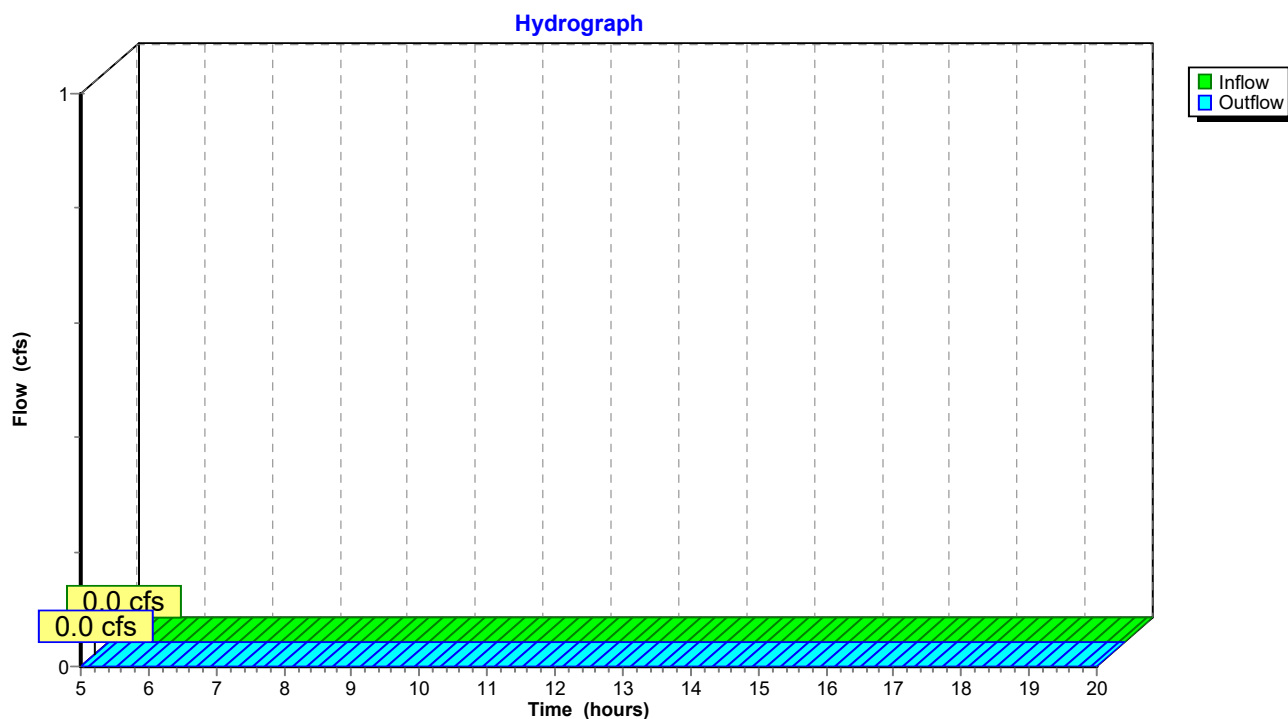
Summary for Reach 7R: North Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow	=	0.0 cfs @	5.00 hrs,	Volume=	0.000 af
Outflow	=	0.0 cfs @	5.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 7R: North Bluff



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Summary for Pond 1P: Wet Sedimentation Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 4.032 ac, 58.50% Impervious, Inflow Depth > 5.73" for 100-YR event
Inflow = 37.6 cfs @ 11.98 hrs, Volume= 1.926 af
Outflow = 8.6 cfs @ 12.16 hrs, Volume= 1.882 af, Atten= 77%, Lag= 10.8 min
Primary = 8.6 cfs @ 12.16 hrs, Volume= 1.882 af
Routed to Reach 1R : NW Storm
Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 7R : North Bluff

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Starting Elev= 986.00' Surf.Area= 2,905 sf Storage= 5,818 cf

Peak Elev= 993.74' @ 12.16 hrs Surf.Area= 5,343 sf Storage= 39,468 cf (33,650 cf above start)

Plug-Flow detention time= 110.8 min calculated for 1.742 af (90% of inflow)

Center-of-Mass det. time= 56.3 min (800.5 - 744.2)

Volume	Invert	Avail.Storage	Storage Description
#1	981.00'	52,963 cf	Custom Stage Data (Prismatic) Listed below (Recalc) x 0.5

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
981.00	108	0	0
985.00	3,406	7,028	7,028
986.50	7,012	7,814	14,842
995.00	11,323	77,924	92,765
996.00	15,000	13,162	105,927

Device	Routing	Invert	Outlet Devices
#1	Primary	981.69'	12.0" Round Culvert L= 169.0' Ke= 0.500 Inlet / Outlet Invert= 981.69' / 980.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	986.00'	6.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Device 1	989.00'	4.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#4	Device 1	990.00'	HAALA 48" ID Pond Skimmer Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 1.320 3.740 6.870 10.580 14.790 19.250 20.790 22.220 23.570 24.850 30.430 35.140 39.280 43.030 46.480 49.690 52.700 55.560
#5	Secondary	995.50'	20.0' long x 20.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

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Type II 24-hr 100-YR Rainfall=7.19"

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Primary OutFlow Max=8.6 cfs @ 12.16 hrs HW=993.73' (Free Discharge)

1=Culvert (Barrel Controls 8.6 cfs @ 10.98 fps)

2=Orifice/Grate (Passes < 2.6 cfs potential flow)

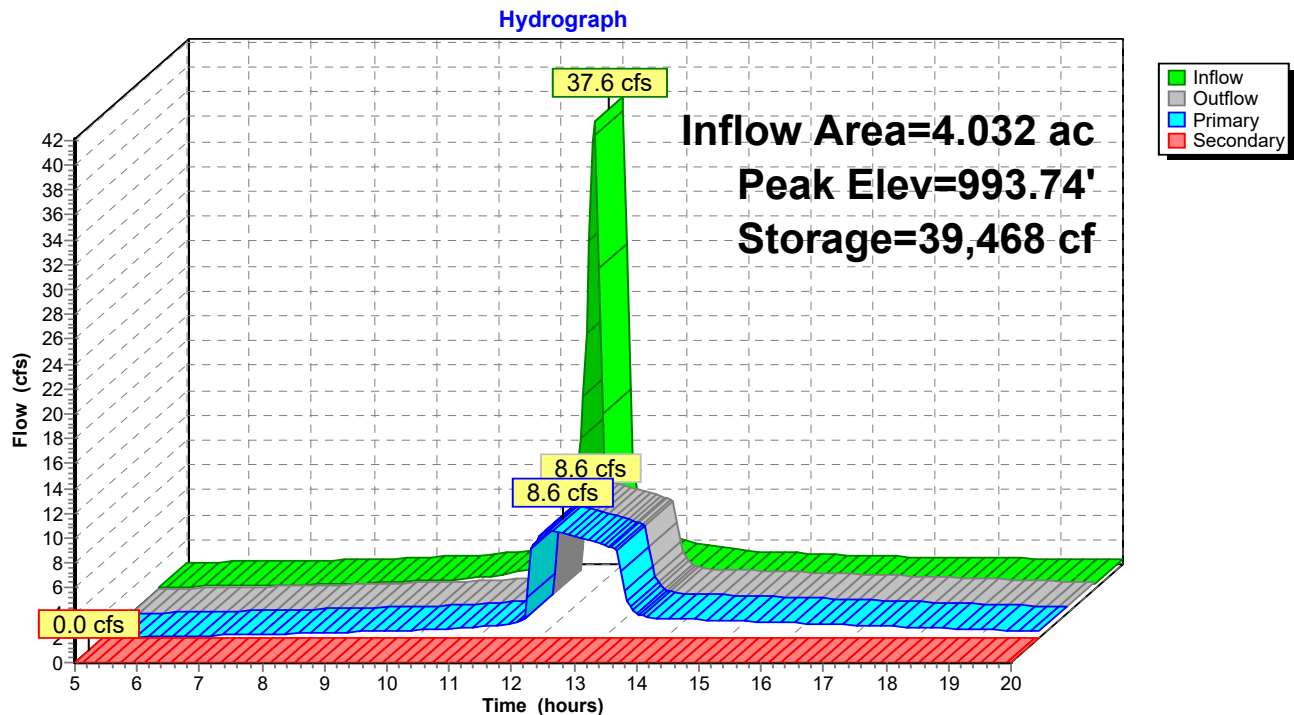
3=Sharp-Crested Rectangular Weir (Passes < 162.4 cfs potential flow)

4=HAALA 48" ID Pond Skimmer (Passes < 48.0 cfs potential flow)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=986.00' (Free Discharge)

5=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Pond 1P: Wet Sedimentation Basin



Post-Development

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Type II 24-hr 100-YR Rainfall=7.19"

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Summary for Pond 2P: Filtration Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.421 ac, 76.15% Impervious, Inflow Depth > 6.03" for 100-YR event
Inflow = 13.6 cfs @ 11.98 hrs, Volume= 0.713 af
Outflow = 7.3 cfs @ 12.09 hrs, Volume= 0.623 af, Atten= 46%, Lag= 6.5 min
Primary = 6.2 cfs @ 12.08 hrs, Volume= 0.615 af
Routed to Reach 2R : West Storm
Secondary = 1.1 cfs @ 12.09 hrs, Volume= 0.008 af
Routed to Reach 3R : West Bluff

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 987.03' @ 12.08 hrs Surf.Area= 3,485 sf Storage= 10,243 cf

Plug-Flow detention time= 81.1 min calculated for 0.620 af (87% of inflow)
Center-of-Mass det. time= 40.2 min (777.7 - 737.5)

Volume	Invert	Avail.Storage	Storage Description
#1	982.00'	13,880 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
982.00	588	0	0
987.00	3,470	10,145	10,145
988.00	4,000	3,735	13,880

Device	Routing	Invert	Outlet Devices
#1	Primary	980.00'	12.0" Round Culvert L= 200.0' Ke= 0.500 Inlet / Outlet Invert= 980.00' / 978.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	982.00'	1.630 in/hr Exfiltration over Surface area above 982.00' Excluded Surface area = 588 sf Phase-In= 0.01'
#3	Device 1	984.80'	15" Nyloplast Dome Grate Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 0.410 1.170 2.150 2.590 2.890 3.170 3.420 3.660 3.880 4.090 5.010 5.790 6.470 7.090 7.660 8.190 8.680 9.150
#4	Secondary	987.00'	133.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Post-Development

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Primary OutFlow Max=6.2 cfs @ 12.08 hrs HW=987.01' (Free Discharge)

1=Culvert (Passes 6.2 cfs of 6.4 cfs potential flow)

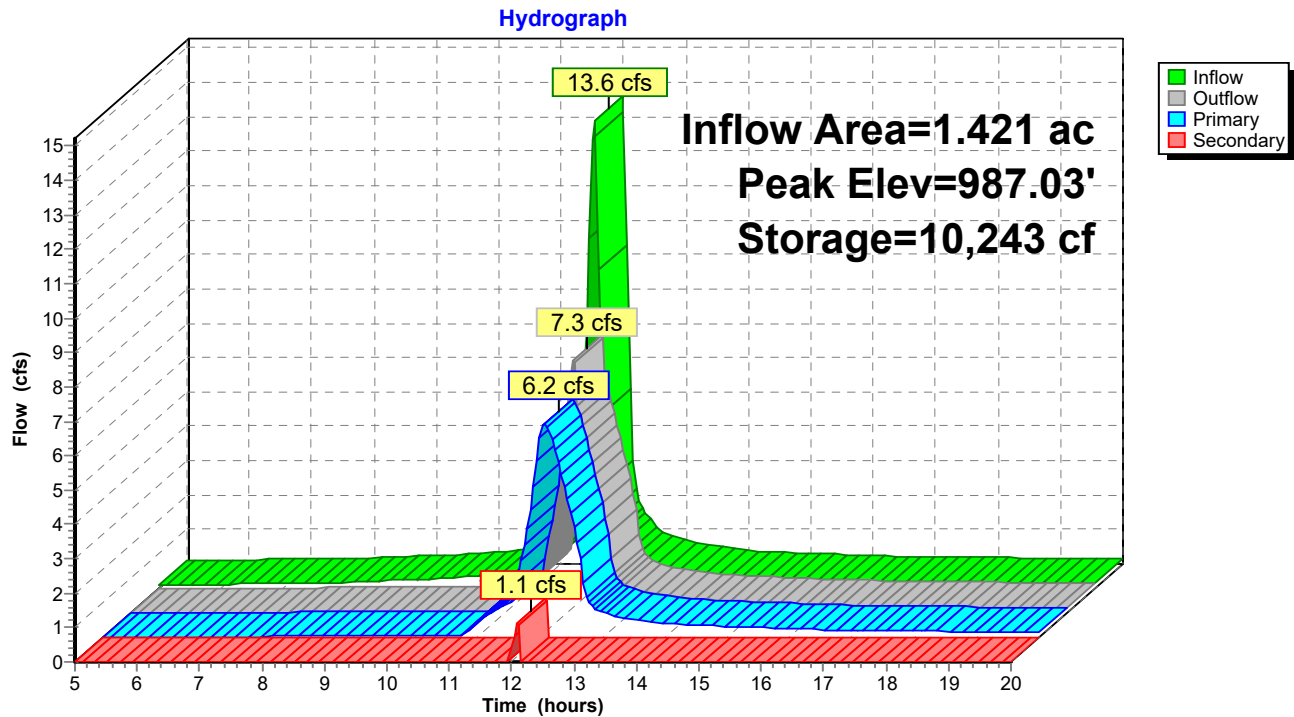
2=Exfiltration (Exfiltration Controls 0.1 cfs)

3=15" Nyloplast Dome Grate (Custom Controls 6.1 cfs)

Secondary OutFlow Max=0.4 cfs @ 12.09 hrs HW=987.01' (Free Discharge)

4=Broad-Crested Rectangular Weir (Weir Controls 0.4 cfs @ 0.26 fps)

Pond 2P: Filtration Basin



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Summary for Pond 3P: Filtration Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.506 ac, 69.75% Impervious, Inflow Depth > 5.93" for 100-YR event
Inflow = 4.8 cfs @ 11.98 hrs, Volume= 0.250 af
Outflow = 1.0 cfs @ 12.17 hrs, Volume= 0.183 af, Atten= 79%, Lag= 11.4 min
Primary = 1.0 cfs @ 12.17 hrs, Volume= 0.183 af
Routed to Reach 4R : South Storm
Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 5R : SE Bluff - To Road

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 989.75' @ 12.17 hrs Surf.Area= 3,784 sf Storage= 5,743 cf

Plug-Flow detention time= 138.6 min calculated for 0.183 af (73% of inflow)
Center-of-Mass det. time= 76.0 min (815.7 - 739.7)

Volume	Invert	Avail.Storage	Storage Description
#1	987.00'	14,421 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
987.00	398	0	0
991.00	5,330	11,456	11,456
992.00	600	2,965	14,421

Device	Routing	Invert	Outlet Devices
#1	Primary	984.50'	12.0" Round Culvert L= 215.0' Ke= 0.500 Inlet / Outlet Invert= 984.50' / 982.35' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	987.00'	1.630 in/hr Exfiltration over Surface area above 987.00' Excluded Surface area = 398 sf Phase-In= 0.01'
#3	Device 1	989.00'	12" Nyloplast Dome Grate Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 0.210 0.450 0.550 0.640 0.710 0.780 0.850 0.900 0.960 1.010 1.240 1.430 1.600 1.750 1.890 2.020 2.140 2.260
#4	Secondary	990.00'	10.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

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Primary OutFlow Max=1.0 cfs @ 12.17 hrs HW=989.74' (Free Discharge)

1=Culvert (Passes 1.0 cfs of 5.5 cfs potential flow)

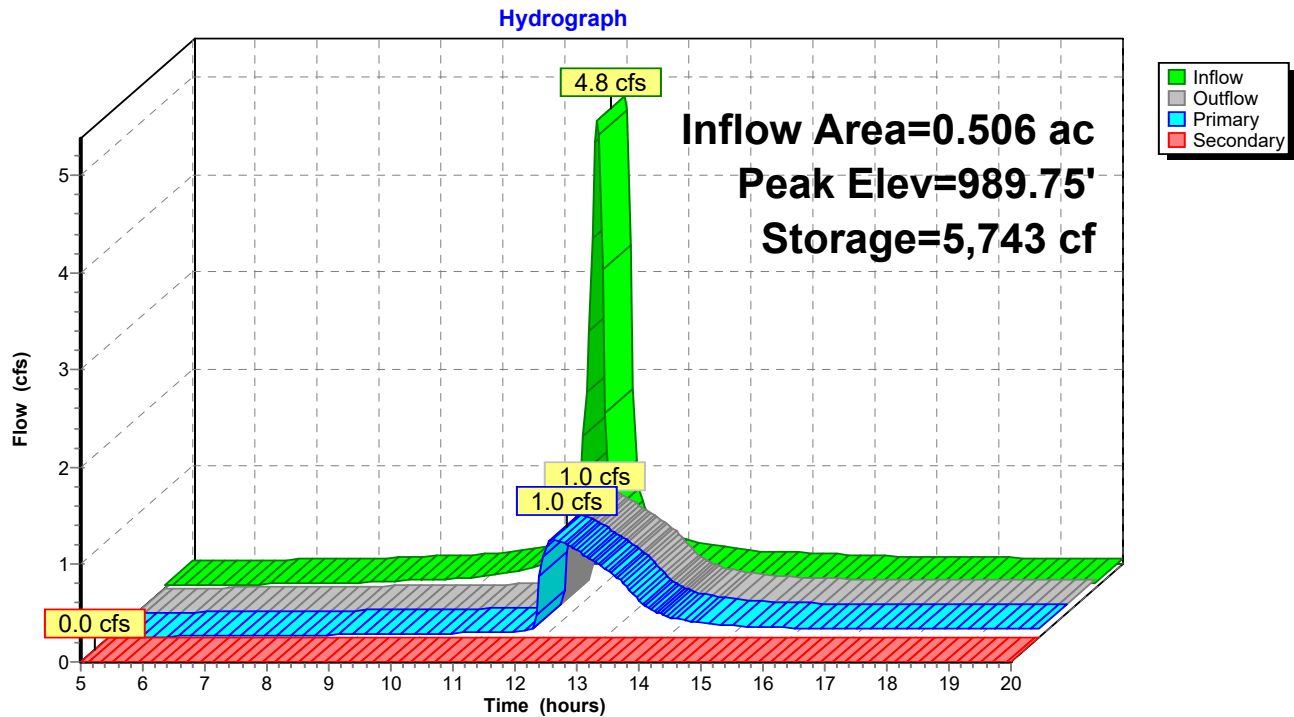
2=Exfiltration (Exfiltration Controls 0.1 cfs)

3=12" Nyloplast Dome Grate (Custom Controls 0.9 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=987.01' (Free Discharge)

4=Broad-Crested Rectangular Weir (Controls 0.0 cfs)

Pond 3P: Filtration Basin



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Summary for Pond 4P: Filtration Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.290 ac, 72.78% Impervious, Inflow Depth > 5.93" for 100-YR event
Inflow = 2.8 cfs @ 11.98 hrs, Volume= 0.143 af
Outflow = 2.8 cfs @ 11.98 hrs, Volume= 0.137 af, Atten= 0%, Lag= 0.4 min
Primary = 0.4 cfs @ 11.98 hrs, Volume= 0.094 af
Routed to Reach 4R : South Storm
Secondary = 2.3 cfs @ 11.98 hrs, Volume= 0.044 af
Routed to Reach 5R : SE Bluff - To Road

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 994.07' @ 11.98 hrs Surf.Area= 1,005 sf Storage= 589 cf

Plug-Flow detention time= 34.5 min calculated for 0.137 af (96% of inflow)
Center-of-Mass det. time= 16.9 min (756.6 - 739.7)

Volume	Invert	Avail.Storage	Storage Description
#1	993.00'	1,615 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
993.00	50	0	0
994.00	990	520	520
995.00	1,200	1,095	1,615

Device	Routing	Invert	Outlet Devices
#1	Primary	981.22'	6.0" Round Culvert L= 151.0' Ke= 0.500 Inlet / Outlet Invert= 981.22' / 981.07' S= 0.0010 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	993.00'	1.600 in/hr Exfiltration over Surface area above 993.00' Excluded Surface area = 50 sf Phase-In= 0.01'
#3	Device 1	993.70'	Nyloplast 8" Drop In Grate Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 0.200 0.280 0.340 0.400 0.440 0.480 0.520 0.560 0.590 0.630 0.770 0.890 0.990 1.080 1.170 1.250 1.330 1.400
#4	Secondary	994.00'	50.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

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Primary OutFlow Max=0.4 cfs @ 11.98 hrs HW=994.07' (Free Discharge)

1=Culvert (Passes 0.4 cfs of 1.8 cfs potential flow)

2=Exfiltration (Exfiltration Controls 0.0 cfs)

3=Nyloplast 8" Drop In Grate (Custom Controls 0.4 cfs)

Secondary OutFlow Max=2.1 cfs @ 11.98 hrs HW=994.07' (Free Discharge)

4=Broad-Crested Rectangular Weir (Weir Controls 2.1 cfs @ 0.63 fps)

Pond 4P: Filtration Basin

