

EXHIBIT G

Hardten Vineyard Hydrology Analysis

Prepared by Napa Valley Vineyard Engineering, Inc
January 13, 2020

INTRODUCTION

This project is the development of approximately 2.01 gross acres of new vineyard within APN 033-010-056 located at 3393 Atlas Peak Rd., Napa.

This hydrology study is to determine the anticipated affect the proposed vineyard development project will have on local hydrology and runoff patterns. Hydrologic modeling of existing and proposed conditions was performed using HydroCad software with the CA-1 rainfall distribution curve. Following is a summary of the data used to complete the hydrologic analysis and the results of this analysis.

RAINFALL DATA

Rainfall depths for the project site were obtained from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 6, Version 2, Precipitation Frequency Data for California, which uses the latitude and longitude of a site to determine rainfall depths. The latitude and longitude of this project are estimated to be 38.4026° N, -122.2422° W, based on information obtained from All Topo V7 USGS mapping software.

The following rainfall data from the NOAA website was used in the analysis:

2 year, 24 hour	4.78 inches
5 year, 24 hour	6.19 inches
10 year, 24 hour	7.34 inches
25 year, 24 hour	9.06 inches
50 year, 24 hour	10.40 inches
100 year, 24 hour	11.70 inches

WATERSHED AREAS

The project site is located within two small watersheds as shown on the Drainage Area Map in the Appendix. The Points of Interest (POI) are on drainages tributary Milliken Creek. The locations of the POIs were selected to be as close to the property boundary as practical, while still encompassing the proposed vineyard development. POI 1 is at the inlet to a culvert that crosses Atlas Peak Rd. There are no other known culverts within the watersheds. The watershed above each POI was determined based on Napa County contour mapping (2002).

PRE-PROJECT WATERSHED CONDITIONS

Soil Types

The United States Department of Agriculture Soil Conservation Service Soils Map for Napa County, August 1978, maps the following soil types within the watersheds:

SCS #100/102, Aiken loam, (Hydrologic Soil Group (HSG) C)
SCS #152 Hambright Rock outcrop (HSG D)

Land Use

Land use within each watershed was analyzed based on the 2016 aerial photograph obtained from the Napa County GIS website, and a 2018 Google Earth photograph. Both watersheds are within a rural area with existing residences, existing vineyard developments, tree canopy, brush and open grassland. The existing vineyard within the watersheds is largely within the project parcel and has a no-till cover crop which is strip sprayed (70 to 75% cover), which is considered a “good” hydrologic condition. All existing vineyard was modeled with a “good” condition. The tree canopy, brush and grassland within the watersheds is generally sparse, with very rocky soils and limited ground cover. Those areas were modeled with a “fair” condition. A detailed breakdown of land uses by area and hydrologic soil group is included in the HydroCad reports in the Appendix, and is shown on the Drainage Area Maps.

Time of Concentration

The time of concentration represents the time it takes for rainfall in the most hydraulically remote portion of the watershed to reach the POI. The time of concentration is estimated assuming sheet flow up to 100 feet in the uppermost reaches of each watershed. A shallow concentrated flow regime is used to model the runoff to the POI. There are no known roadside ditches or culverts that impact the flow paths or modeling of the time of concentration. A detailed breakdown of the time of concentration parameters is included in the HydroCad reports, and is shown on the Drainage Area Maps.

POST-PROJECT WATERSHED CONDITIONS

Soil Types

Land preparation for the proposed vineyard development does not alter the permeability of the mapped soil types. The post-project HSG remains the same as pre-project HSG.

Land Use

The proposed project area converts approximately 1.7 acres of open grassland and 0.2 acres of tree canopy to vineyard. All other areas within the subject watersheds remain

unchanged. The proposed vineyard will be maintained with a no-till cover crop with strip spraying along the vine rows. A minimum of 70% cover will be maintained, which is considered a "good" hydrologic condition. Vineyard avenues/turnspaces will be maintained in no-till cover and are modeled as part of the vineyard. Access drives are existing. A detailed breakdown of land uses by area and hydrologic soil group is included in the Appendix.

Time of Concentration

Vineyard development will not alter the flow paths used in this analysis.

CALCULATED RUNOFF RATE

Using the rainfall data, watershed area, land use and time of concentration parameters described above and included in the Appendix, the following runoff rates were calculated:

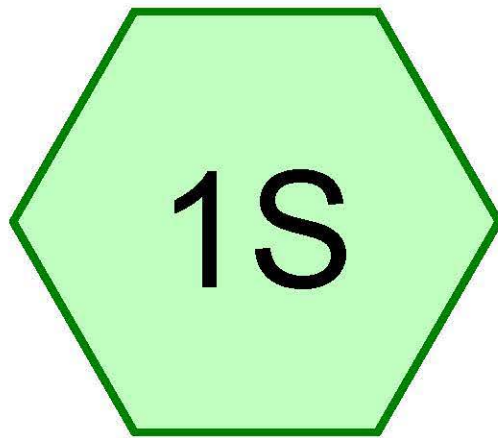
HydroCad Calculated Peak Runoff Rate (cfs)

24 hr. storm event Project Condition	2 yr.		5 yr.		10 yr.		25 yr.		50 yr.		100 yr.	
	pre	post	pre	post	pre	post	pre	post	pre	post	pre	post
Watershed 1	17.36	17.36	26.45	26.45	34.11	34.11	45.73	45.73	54.83	54.83	63.68	63.68
Watershed 2	3.38	3.28	4.80	4.70	5.96	5.86	7.70	7.59	9.04	8.94	10.33	10.24

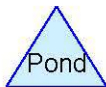
CONCLUSION

The hydrologic analysis presented above, and supporting information in the Appendix, demonstrate that the proposed vineyard will not increase the peak runoff rate in the affected watersheds.

**HydroCad REPORTS & MAP
APPENDIX**



WS1 pre



WS1-pre

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CA-1 2 yr Rainfall=4.78"

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Summary for Subcatchment 1S: WS1 pre

Runoff = 17.36 cfs @ 12.27 hrs, Volume= 7.458 af, Depth> 1.76"

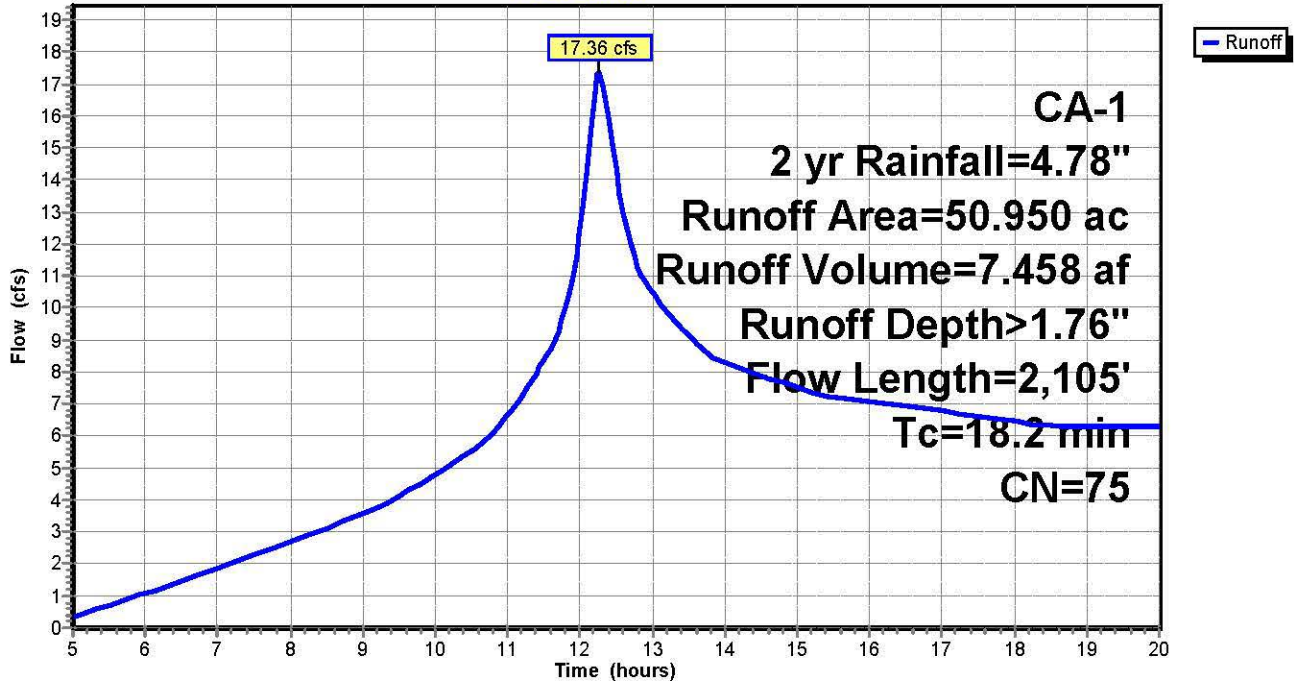
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 CA-1 2 yr Rainfall=4.78"

Area (ac)	CN	Description
* 1.120	98	Impervious
* 5.840	75	Vineyard, Good, HSG C
* 0.600	81	Vineyard, Good, HSG D
4.170	79	Pasture/grassland/range, Fair, HSG C
2.750	84	Pasture/grassland/range, Fair, HSG D
* 22.990	70	Woods, Fair, HSG C
13.480	79	Woods, Fair, HSG D
50.950	75	Weighted Average
49.830		97.80% Pervious Area
1.120		2.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.1400	0.21		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 4.78"
0.4	139	0.1600	6.44		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
9.7	1,866	0.0400	3.22		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
18.2	2,105	Total			

Subcatchment 1S: WS1 pre

Hydrograph



Summary for Subcatchment 1S: WS1 pre

Runoff = 26.45 cfs @ 12.27 hrs, Volume= 11.477 af, Depth> 2.70"

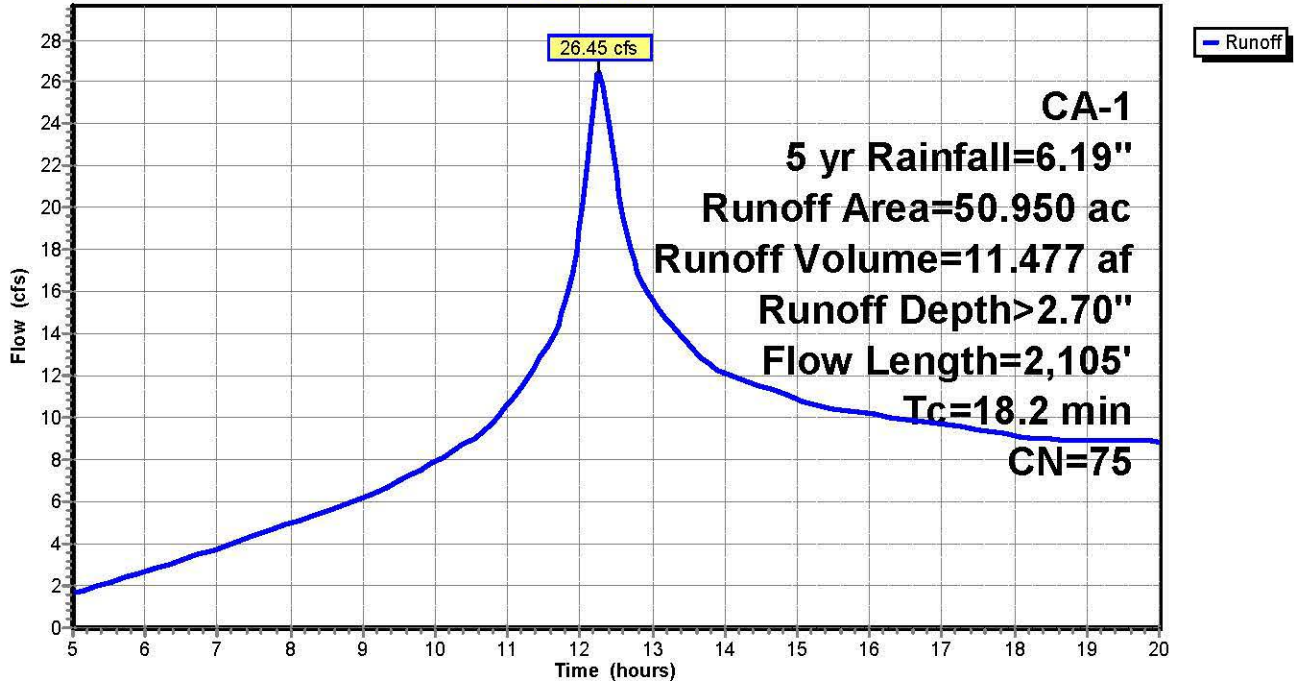
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WS1-pre

CA-1 10 yr Rainfall=7.34"

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Runoff = 34.11 cfs @ 12.27 hrs, Volume= 14.896 af, Depth> 3.51"

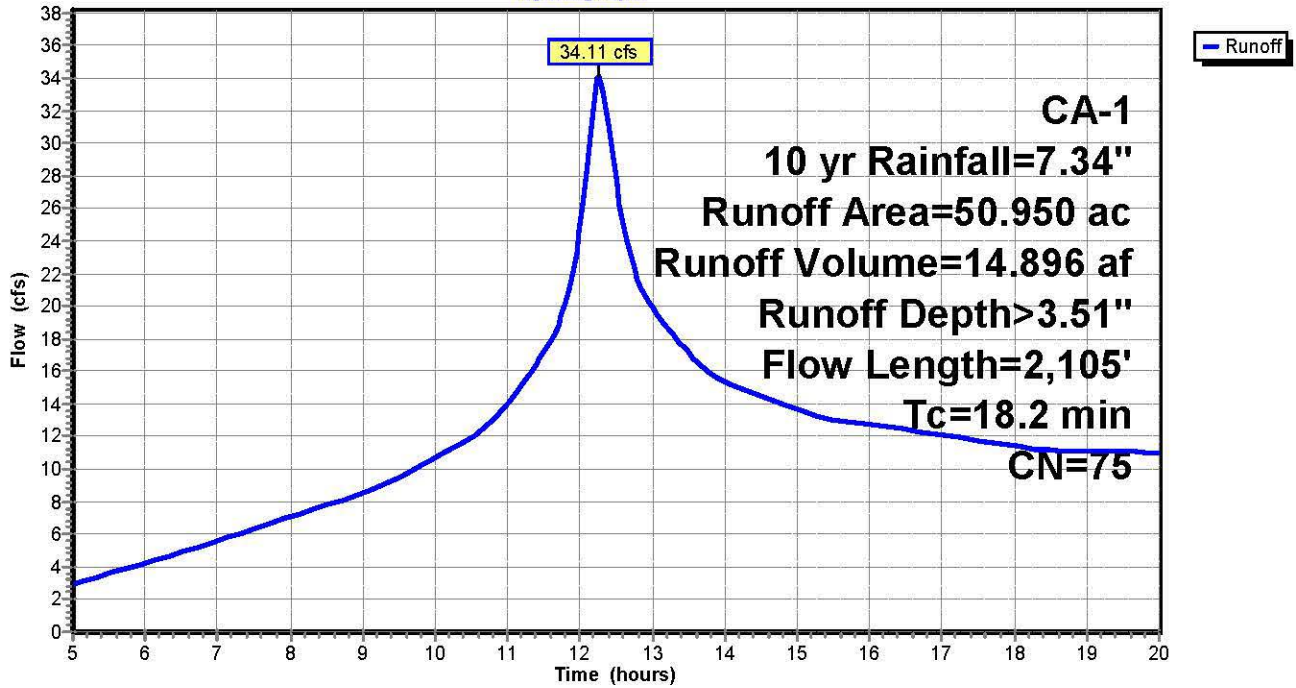
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CA-1 25 yr Rainfall=9.06"

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Summary for Subcatchment 1S: WS1 pre

Runoff = 45.73 cfs @ 12.26 hrs, Volume= 20.142 af, Depth> 4.74"

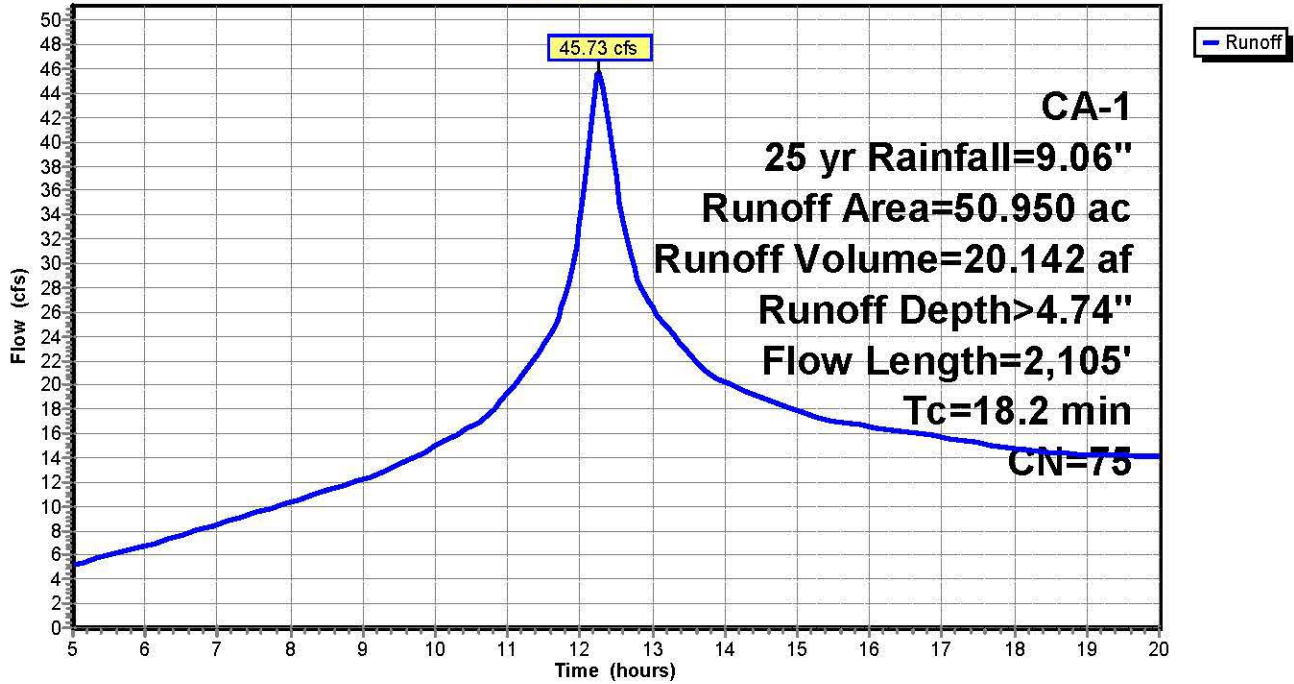
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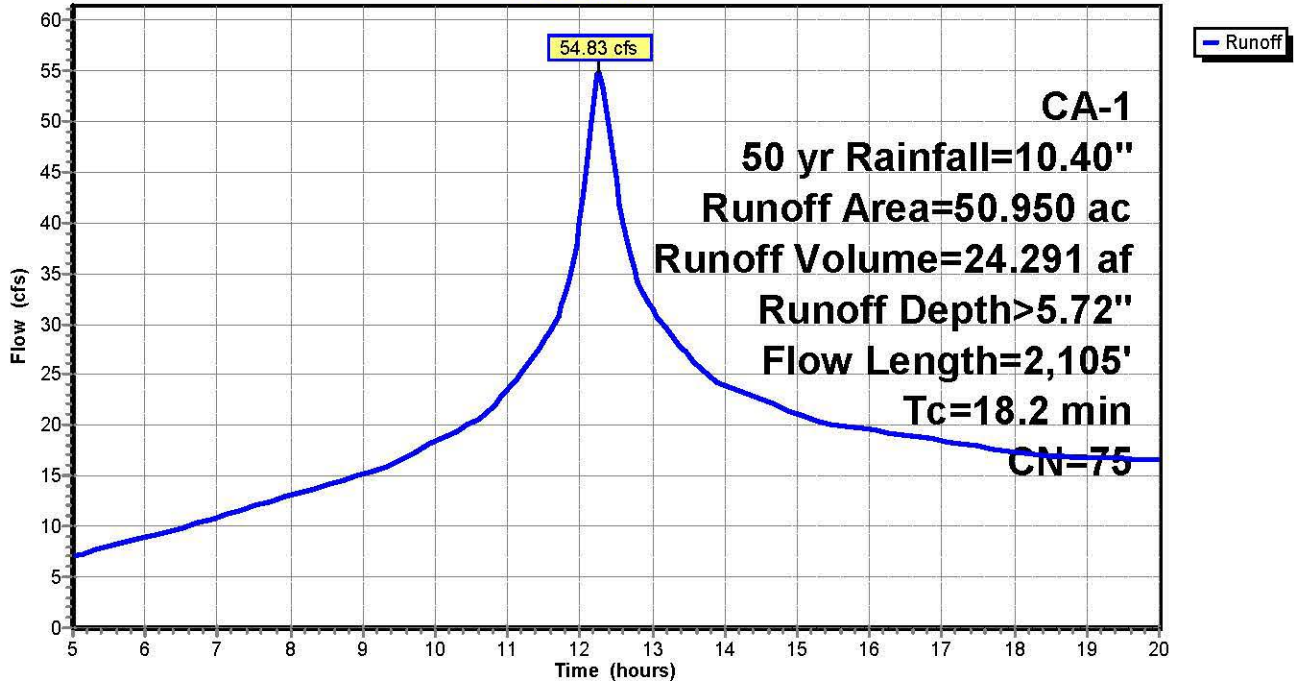
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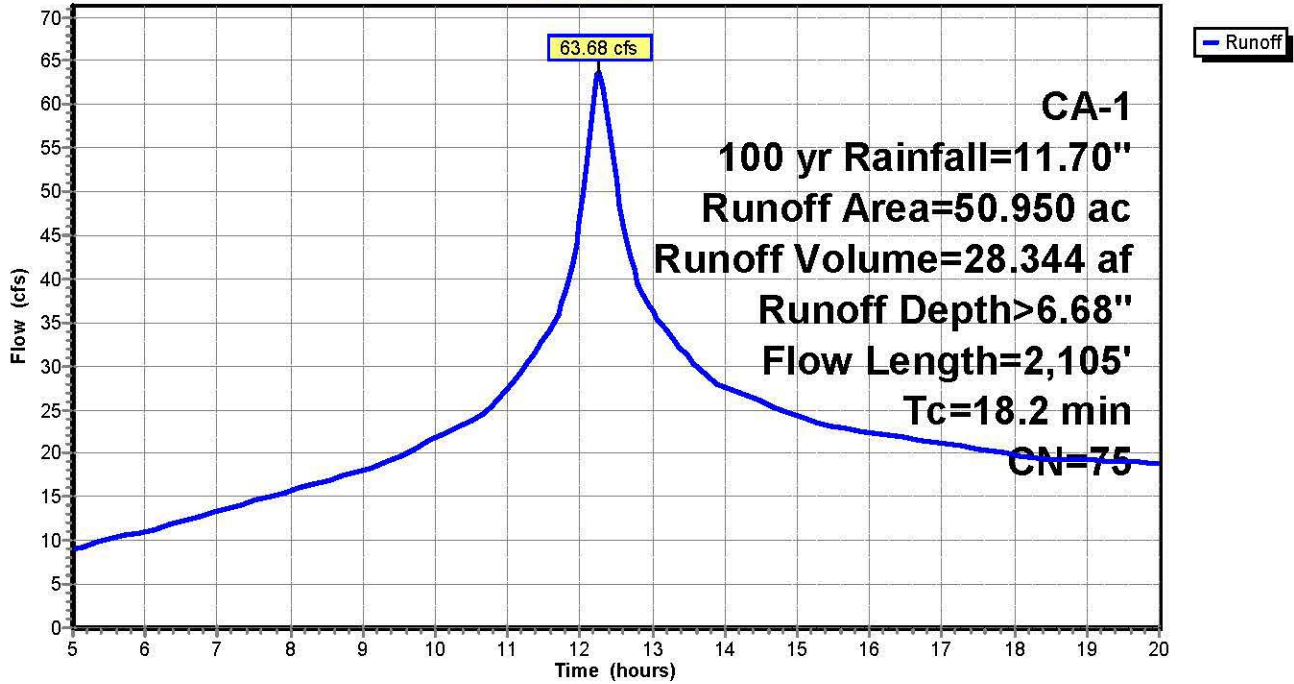
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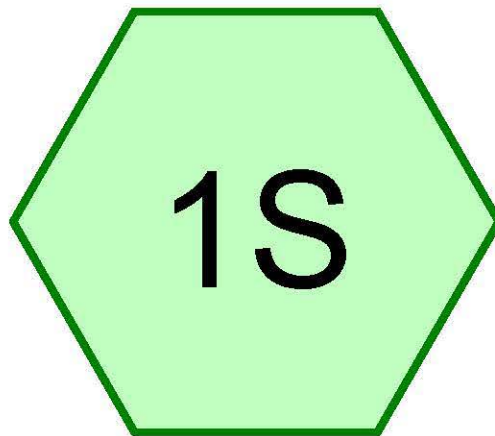
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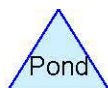
Subcatchment 1S: WS1 pre

Hydrograph





WS1 post



WS1-post

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CA-1 2 yr Rainfall=4.78"

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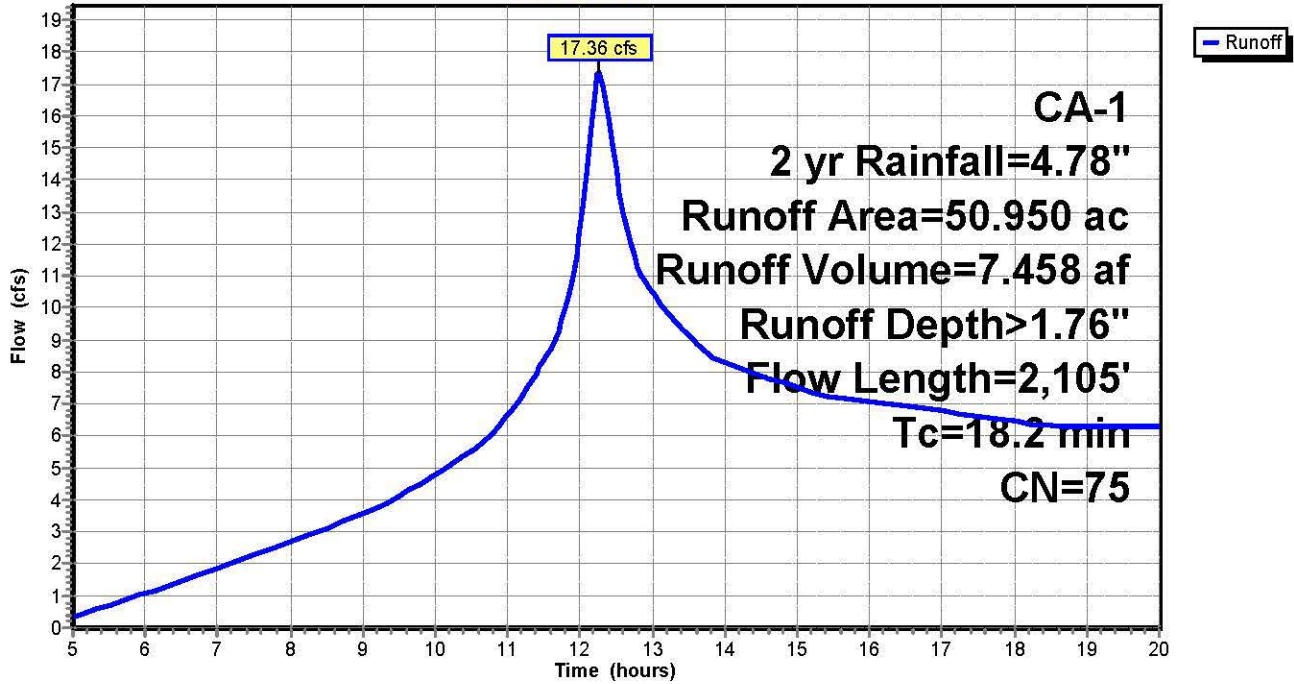
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Subcatchment 1S: WS1 post

Hydrograph



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CA-1 5 yr Rainfall=6.19"

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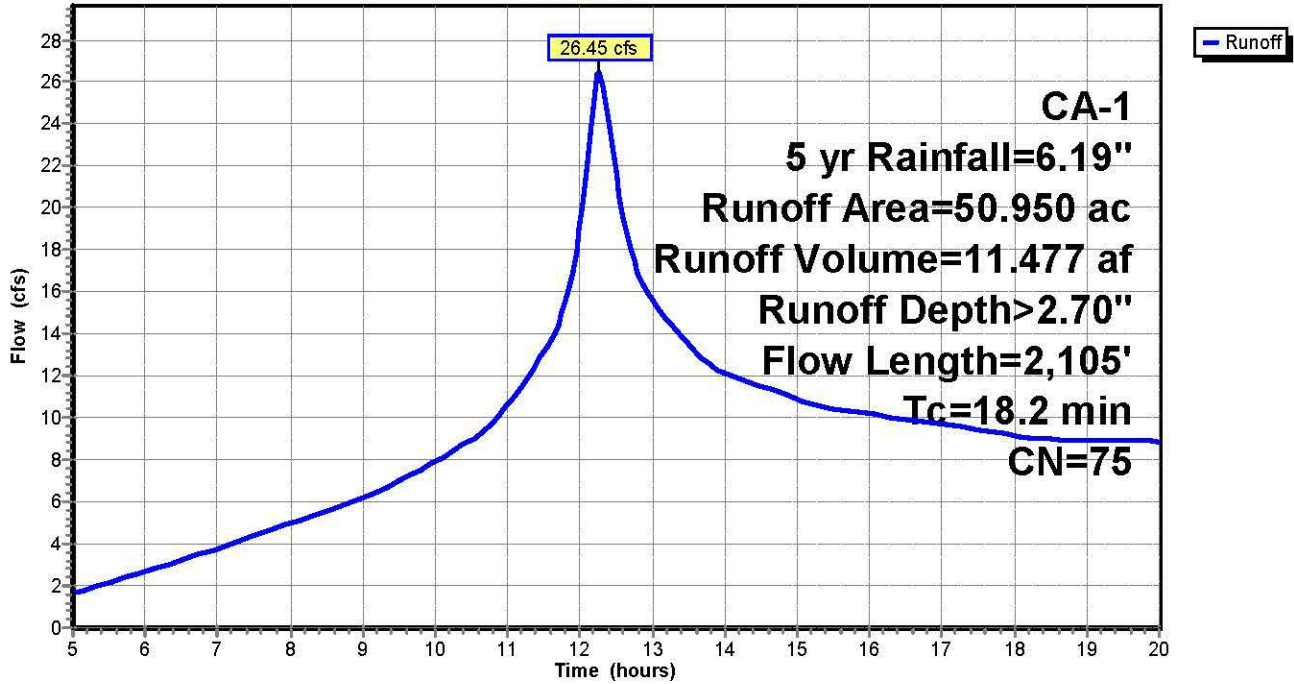
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WS1-post

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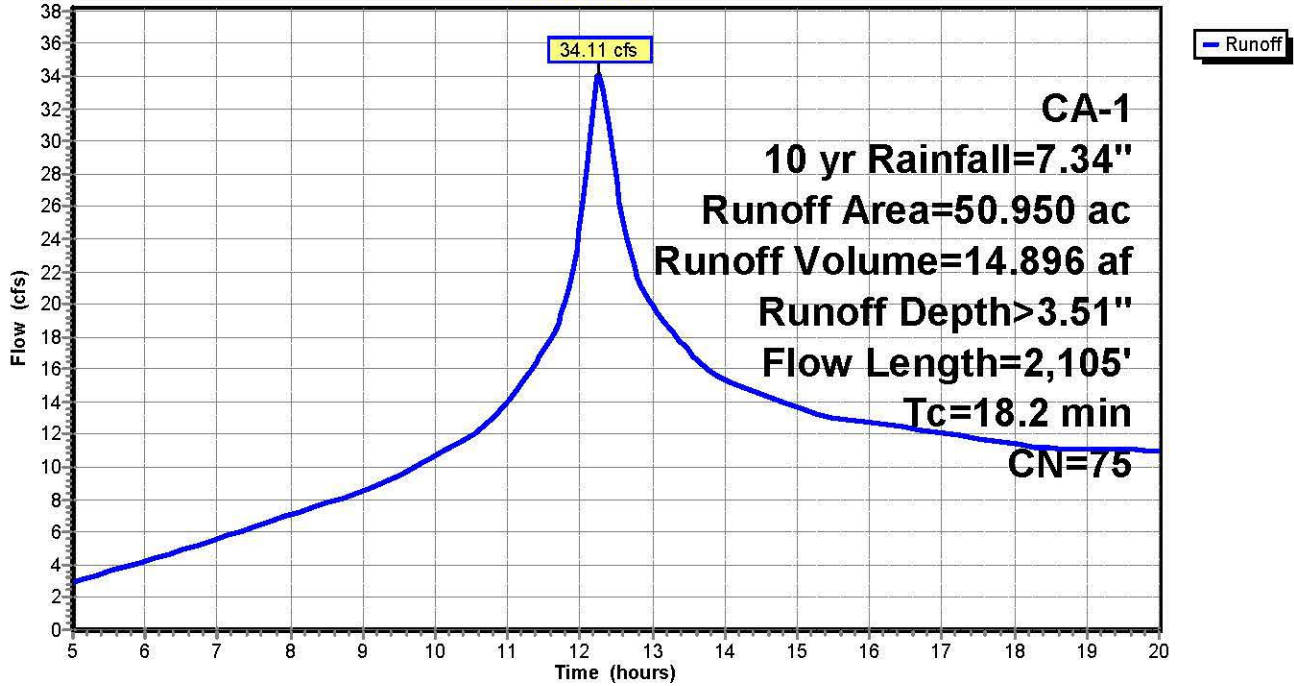
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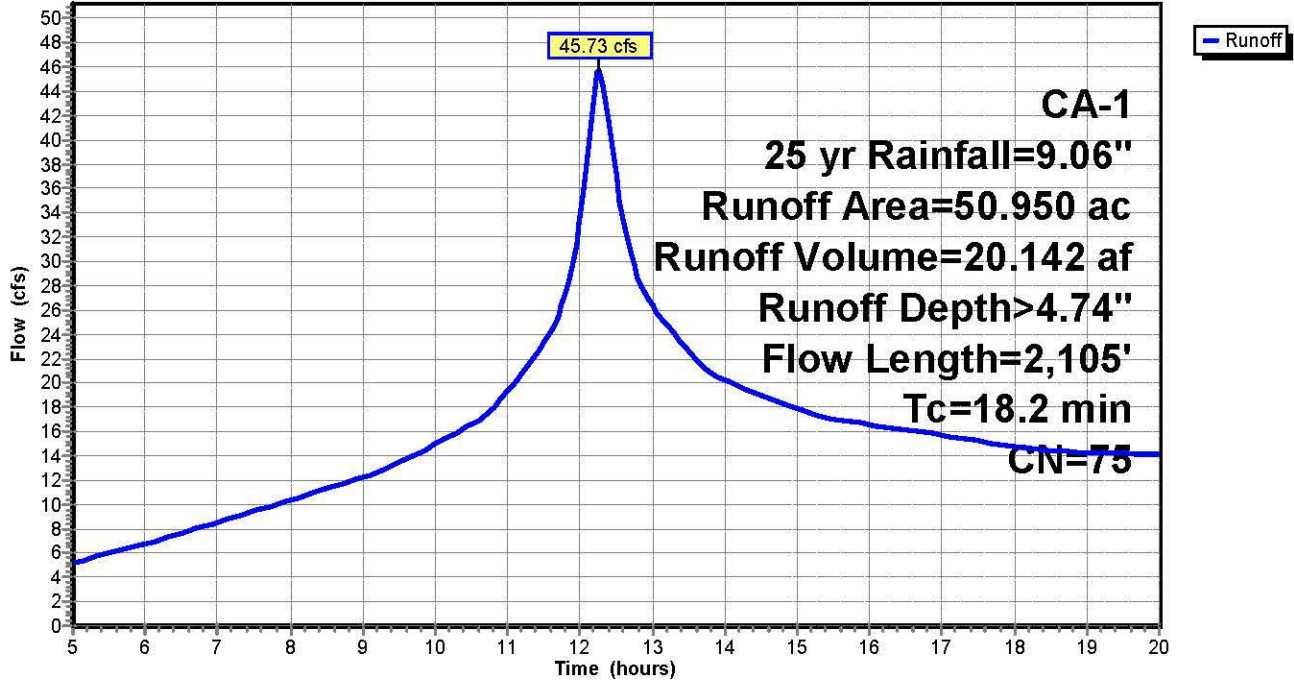
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WS1-post

CA-1 50 yr Rainfall=10.40"

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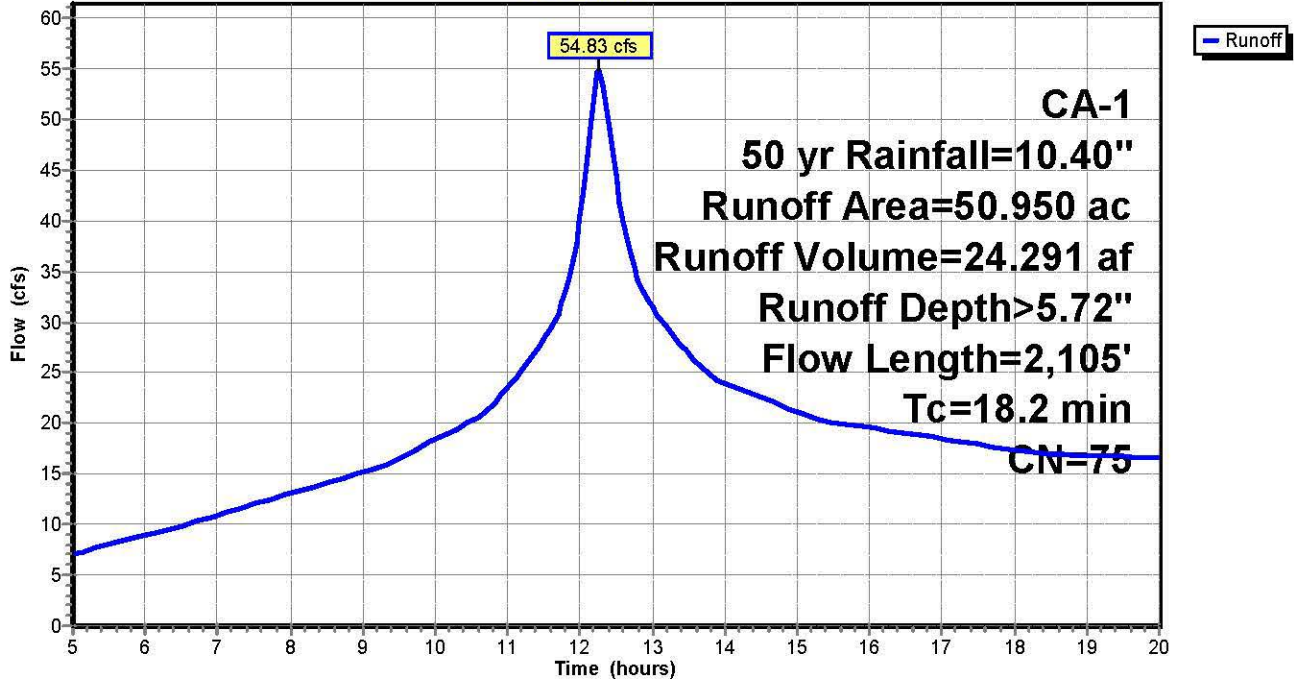
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1.120		2.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.1400	0.21		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 4.78"
0.4	139	0.1600	6.44		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
9.7	1,866	0.0400	3.22		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
18.2	2,105	Total			

Subcatchment 1S: WS1 post

Hydrograph



WS1-post

CA-1 100 yr Rainfall=11.70"

Prepared by Napa Valley Vineyard Engineering

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Summary for Subcatchment 1S: WS1 post

Runoff = 63.68 cfs @ 12.26 hrs, Volume= 28.344 af, Depth> 6.68"

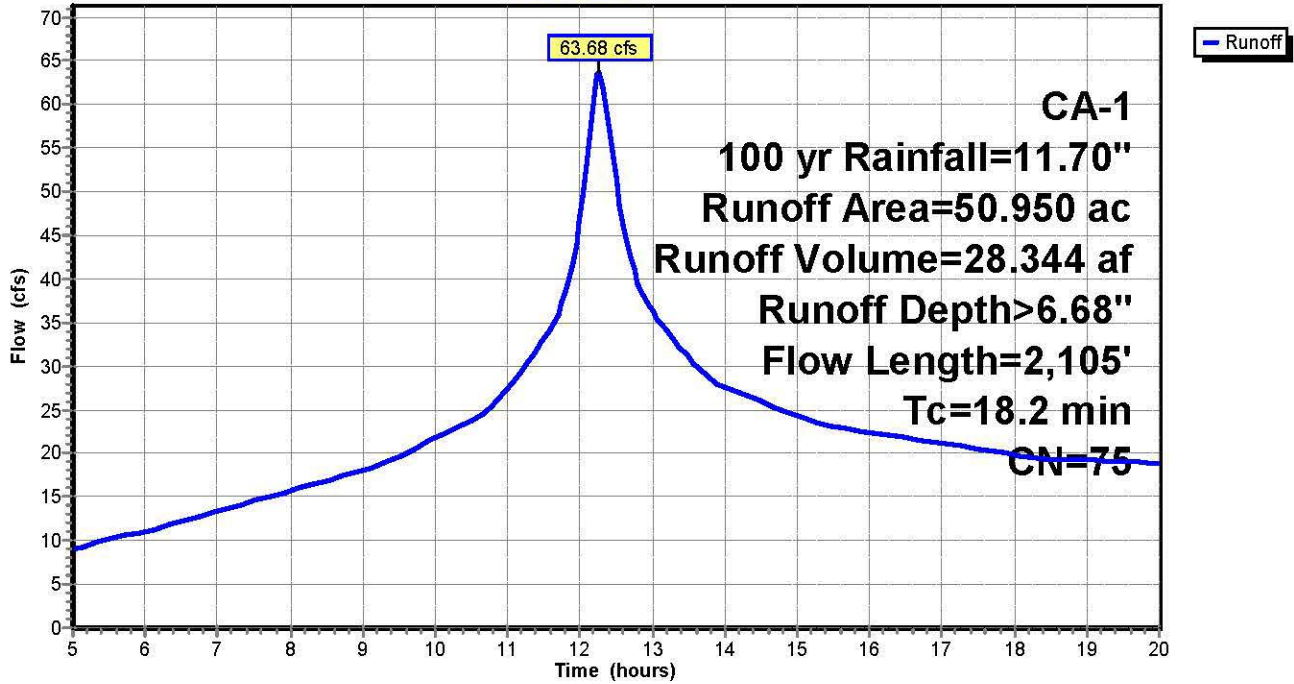
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
CA-1 100 yr Rainfall=11.70"

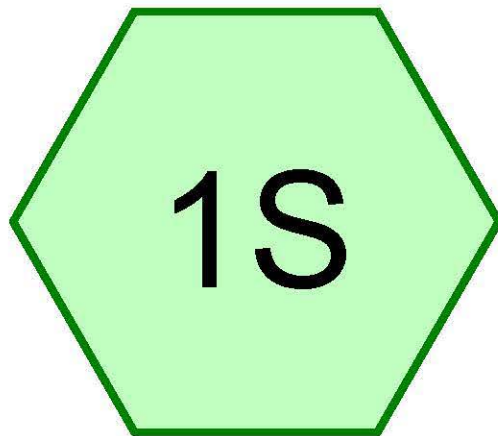
Area (ac)	CN	Description
* 1.120	98	Impervious
* 6.540	75	Vineyard, Good, HSG C
* 0.940	81	Vineyard, Good, HSG D
3.740	79	Pasture/grassland/range, Fair, HSG C
2.460	84	Pasture/grassland/range, Fair, HSG D
* 22.720	70	Woods, Fair, HSG C
13.430	79	Woods, Fair, HSG D
50.950	75	Weighted Average
49.830		97.80% Pervious Area
1.120		2.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.1	100	0.1400	0.21		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 4.78"
0.4	139	0.1600	6.44		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
9.7	1,866	0.0400	3.22		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
18.2	2,105	Total			

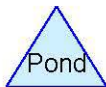
Subcatchment 1S: WS1 post

Hydrograph





WS2 pre



Summary for Subcatchment 1S: WS2 pre

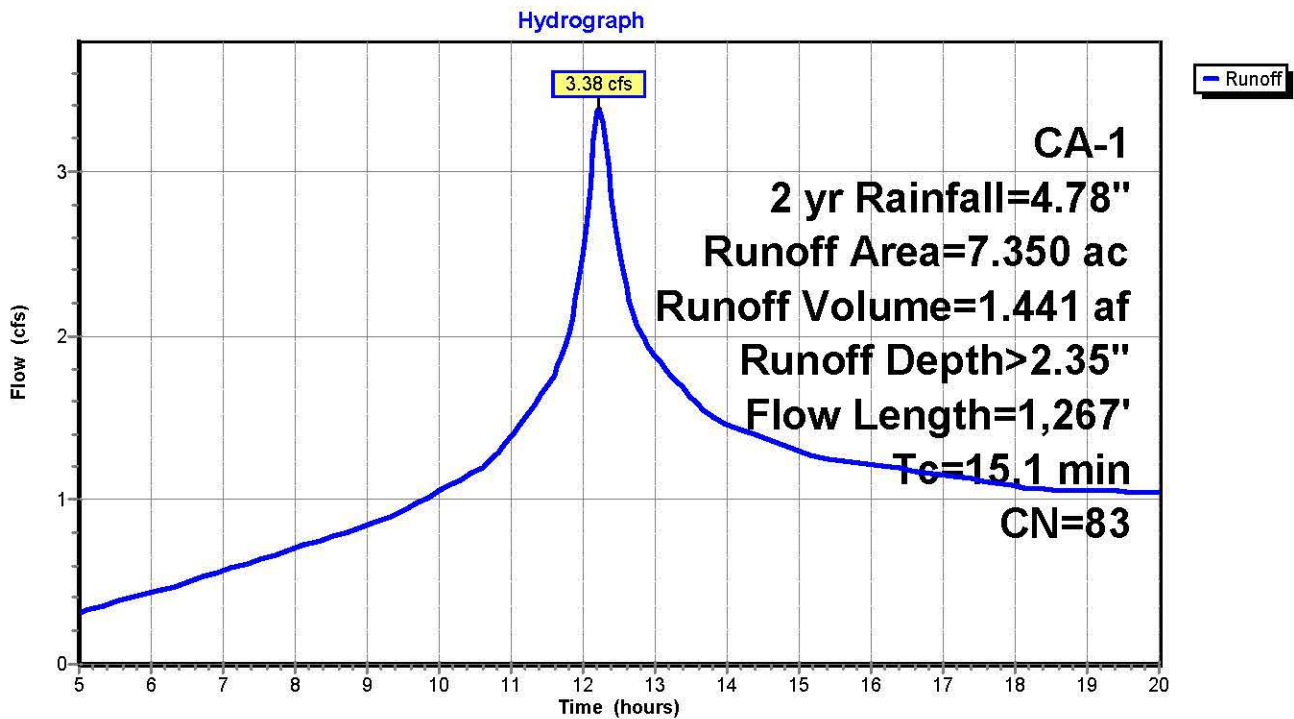
Runoff = 3.38 cfs @ 12.23 hrs, Volume= 1.441 af, Depth> 2.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 CA-1 2 yr Rainfall=4.78"

Area (ac)	CN	Description
* 0.430	98	Impervious
* 0.430	81	Vineyard, Good, HSG D
2.880	84	Pasture/grassland/range, Fair, HSG D
* 0.710	83	Open Brush, Fair, HSG D
2.900	79	Woods, Fair, HSG D
7.350	83	Weighted Average
6.920		94.15% Pervious Area
0.430		5.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0600	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 4.78"
3.8	1,167	0.1000	5.09		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.1	1,267	Total			

Subcatchment 1S: WS2 pre



Summary for Subcatchment 1S: WS2 pre

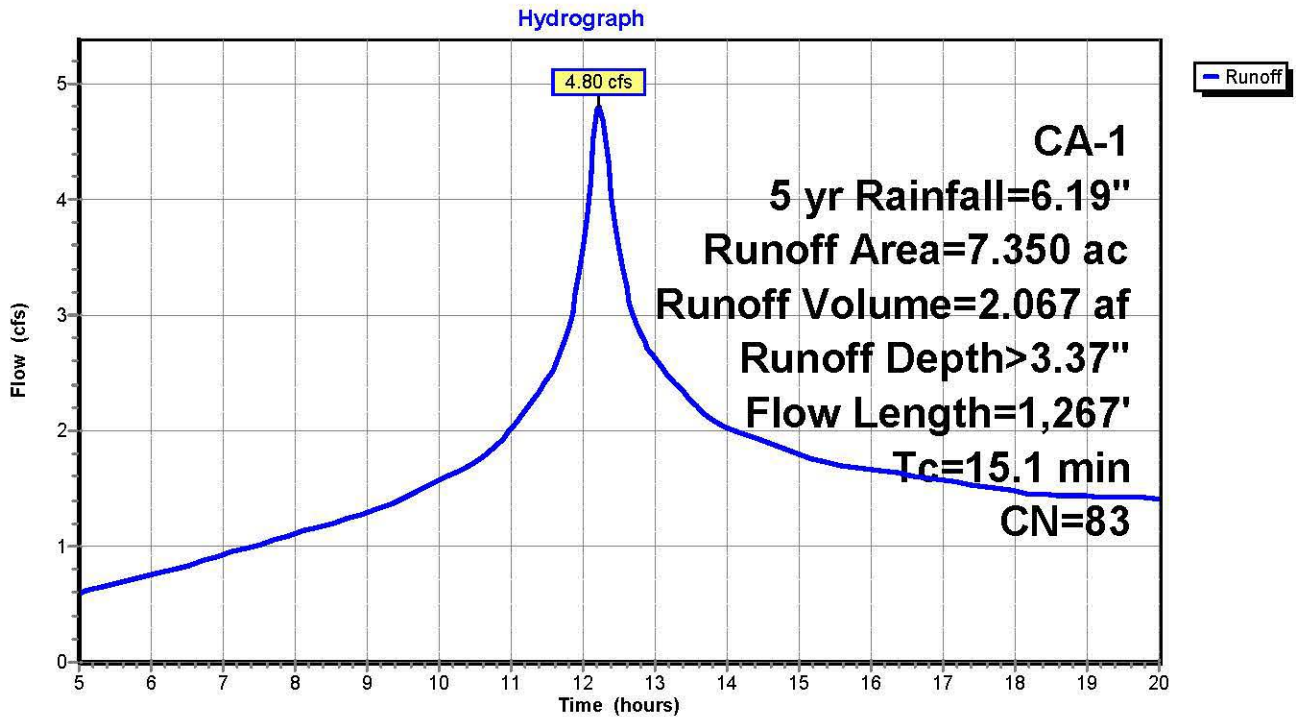
Runoff = 4.80 cfs @ 12.23 hrs, Volume= 2.067 af, Depth> 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
CA-1 5 yr Rainfall=6.19"

Area (ac)	CN	Description
* 0.430	98	Impervious
* 0.430	81	Vineyard, Good, HSG D
2.880	84	Pasture/grassland/range, Fair, HSG D
* 0.710	83	Open Brush, Fair, HSG D
2.900	79	Woods, Fair, HSG D
7.350	83	Weighted Average
6.920		94.15% Pervious Area
0.430		5.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0600	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 4.78"
3.8	1,167	0.1000	5.09		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.1	1,267	Total			

Subcatchment 1S: WS2 pre



Summary for Subcatchment 1S: WS2 pre

Runoff = 5.96 cfs @ 12.23 hrs, Volume= 2.584 af, Depth> 4.22"

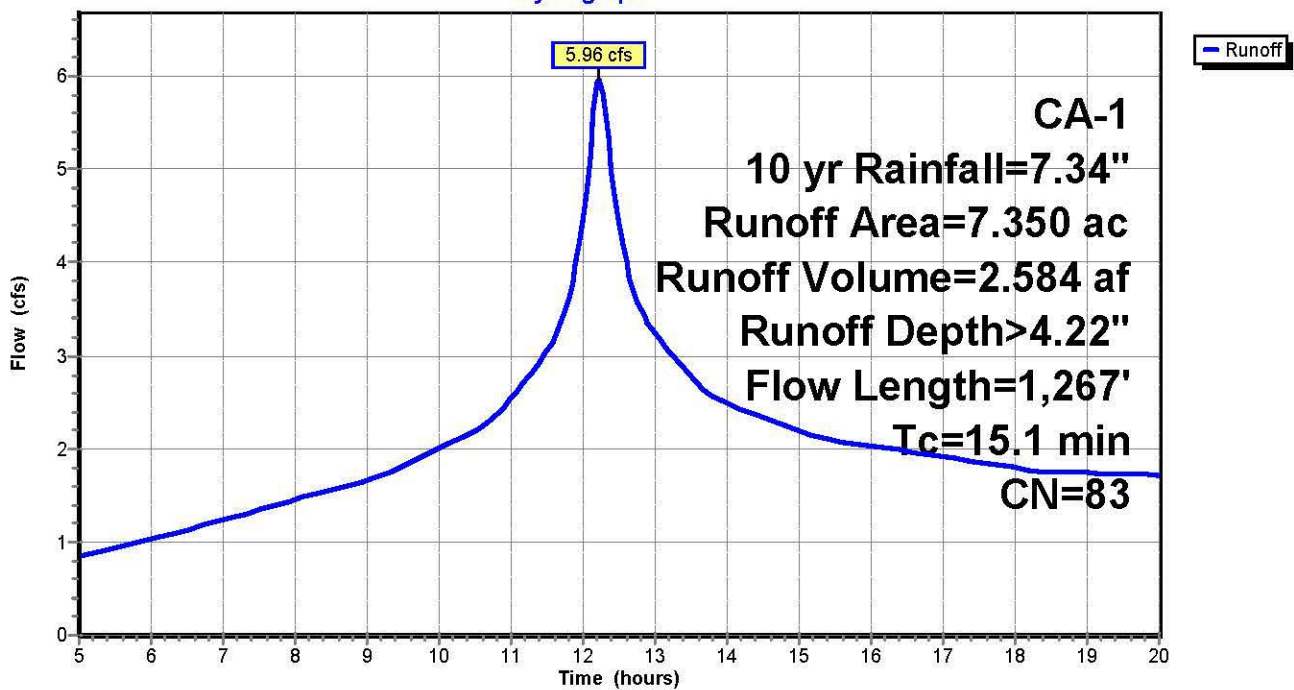
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
CA-1 10 yr Rainfall=7.34"

Area (ac)	CN	Description
* 0.430	98	Impervious
* 0.430	81	Vineyard, Good, HSG D
2.880	84	Pasture/grassland/range, Fair, HSG D
* 0.710	83	Open Brush, Fair, HSG D
2.900	79	Woods, Fair, HSG D
7.350	83	Weighted Average
6.920		94.15% Pervious Area
0.430		5.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0600	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 4.78"
3.8	1,167	0.1000	5.09		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.1	1,267	Total			

Subcatchment 1S: WS2 pre

Hydrograph



Summary for Subcatchment 1S: WS2 pre

Runoff = 7.70 cfs @ 12.23 hrs, Volume= 3.362 af, Depth> 5.49"

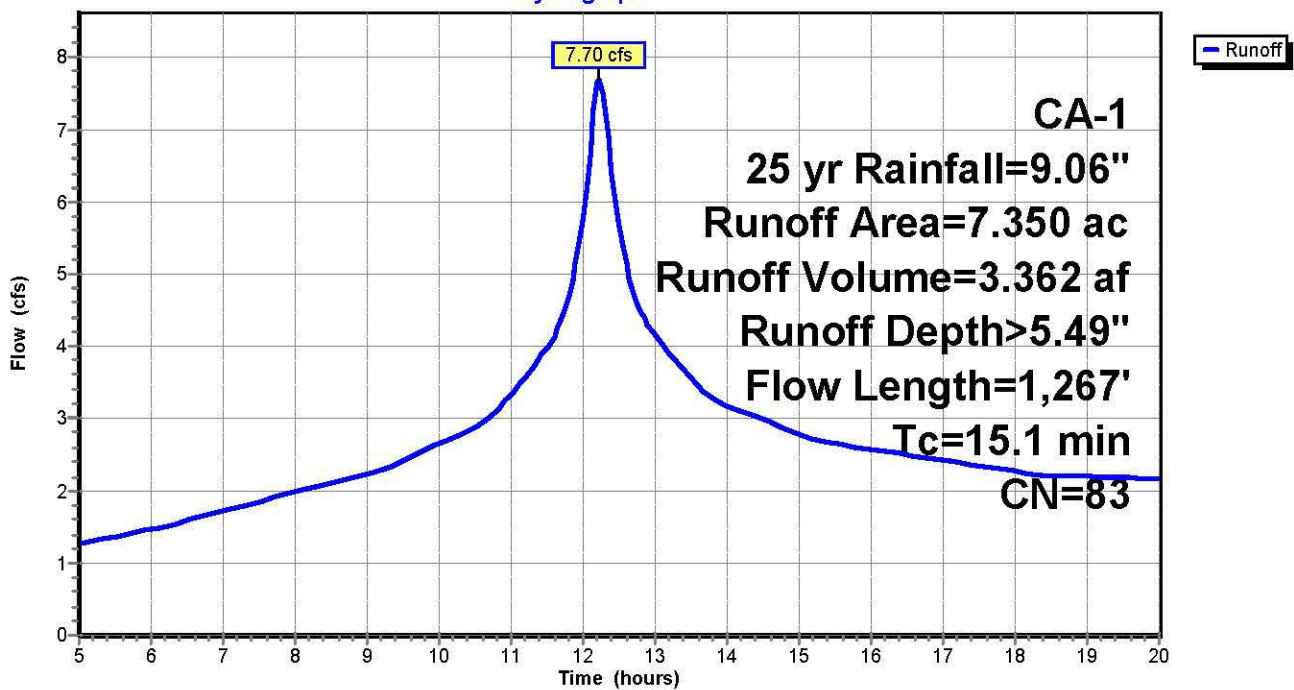
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
CA-1 25 yr Rainfall=9.06"

Area (ac)	CN	Description
* 0.430	98	Impervious
* 0.430	81	Vineyard, Good, HSG D
2.880	84	Pasture/grassland/range, Fair, HSG D
* 0.710	83	Open Brush, Fair, HSG D
2.900	79	Woods, Fair, HSG D
7.350	83	Weighted Average
6.920		94.15% Pervious Area
0.430		5.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0600	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 4.78"
3.8	1,167	0.1000	5.09		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.1	1,267	Total			

Subcatchment 1S: WS2 pre

Hydrograph



Summary for Subcatchment 1S: WS2 pre

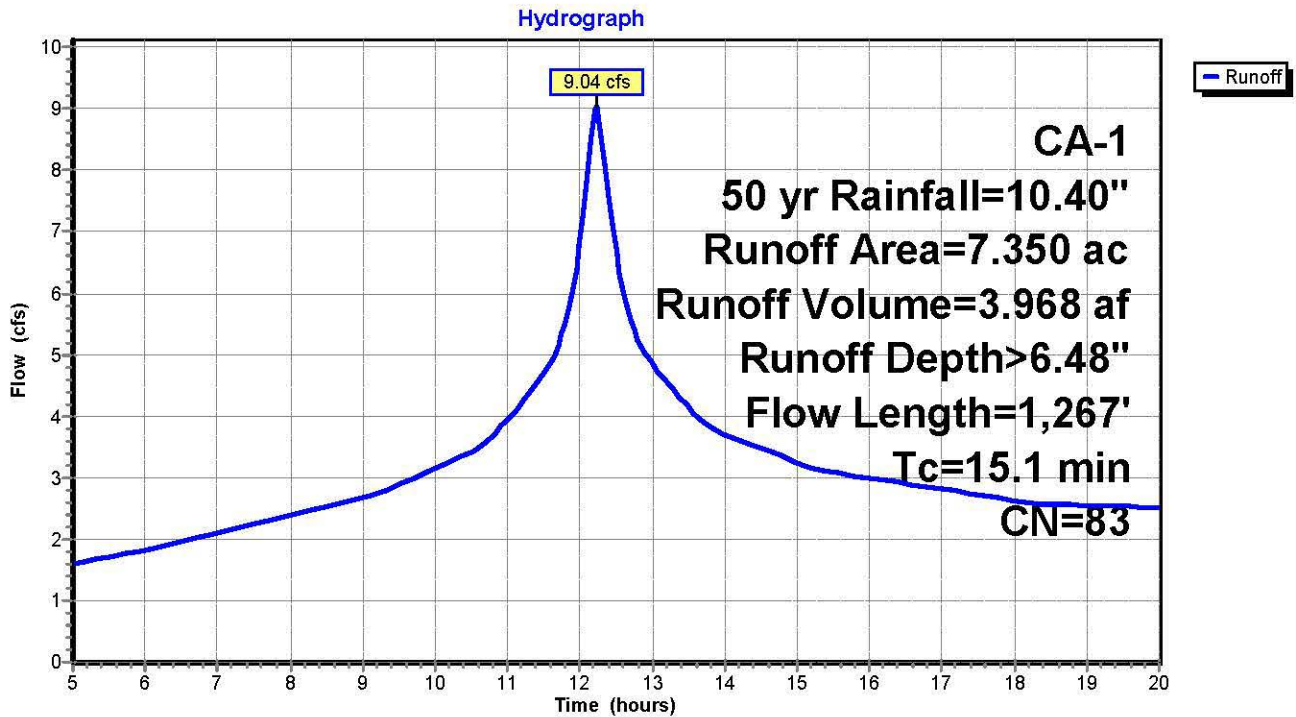
Runoff = 9.04 cfs @ 12.23 hrs, Volume= 3.968 af, Depth> 6.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
CA-1 50 yr Rainfall=10.40"

Area (ac)	CN	Description
* 0.430	98	Impervious
* 0.430	81	Vineyard, Good, HSG D
2.880	84	Pasture/grassland/range, Fair, HSG D
* 0.710	83	Open Brush, Fair, HSG D
2.900	79	Woods, Fair, HSG D
7.350	83	Weighted Average
6.920		94.15% Pervious Area
0.430		5.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0600	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 4.78"
3.8	1,167	0.1000	5.09		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.1	1,267	Total			

Subcatchment 1S: WS2 pre



Summary for Subcatchment 1S: WS2 pre

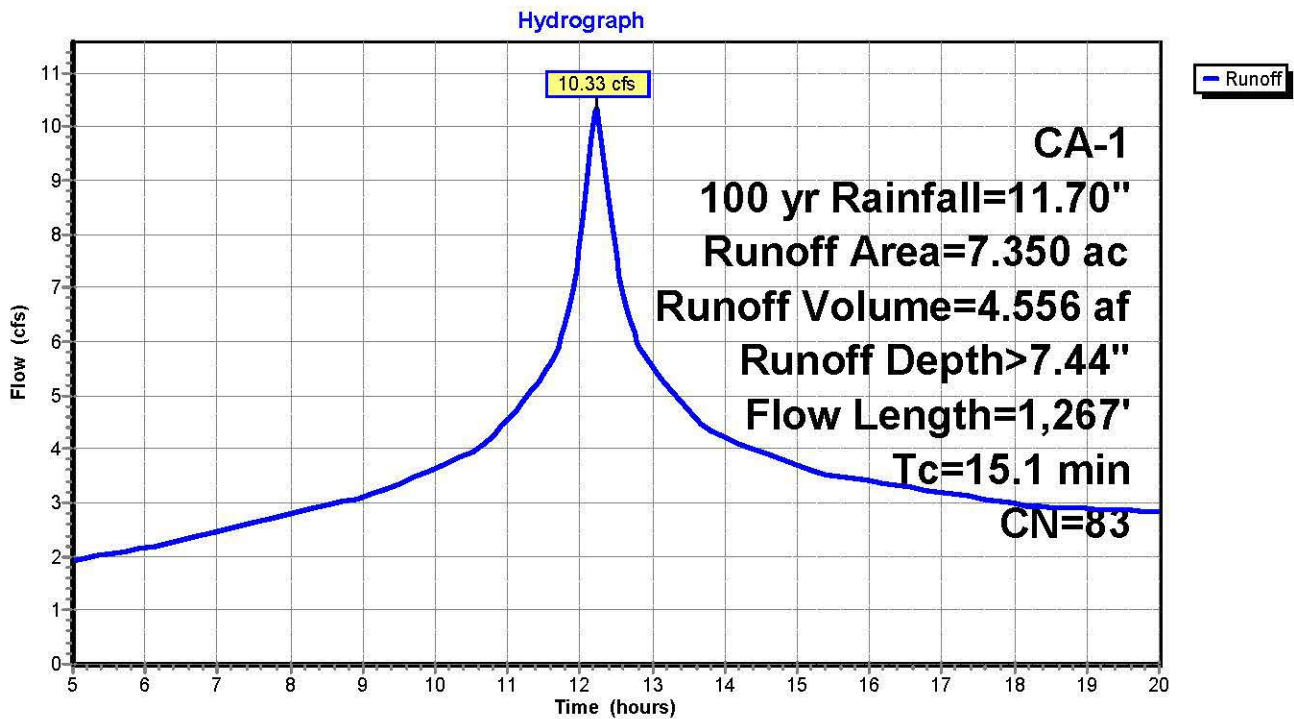
Runoff = 10.33 cfs @ 12.23 hrs, Volume= 4.556 af, Depth> 7.44"

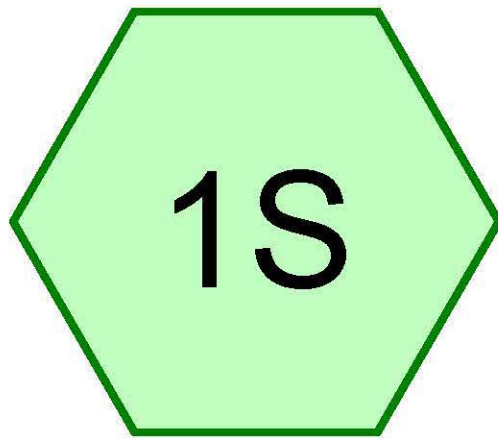
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
CA-1 100 yr Rainfall=11.70"

Area (ac)	CN	Description
* 0.430	98	Impervious
* 0.430	81	Vineyard, Good, HSG D
2.880	84	Pasture/grassland/range, Fair, HSG D
* 0.710	83	Open Brush, Fair, HSG D
2.900	79	Woods, Fair, HSG D
7.350	83	Weighted Average
6.920		94.15% Pervious Area
0.430		5.85% Impervious Area

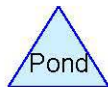
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0600	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 4.78"
3.8	1,167	0.1000	5.09		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.1	1,267	Total			

Subcatchment 1S: WS2 pre





WS2 post



WS2-post

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CA-1 2 yr Rainfall=4.78"

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Summary for Subcatchment 1S: WS2 post

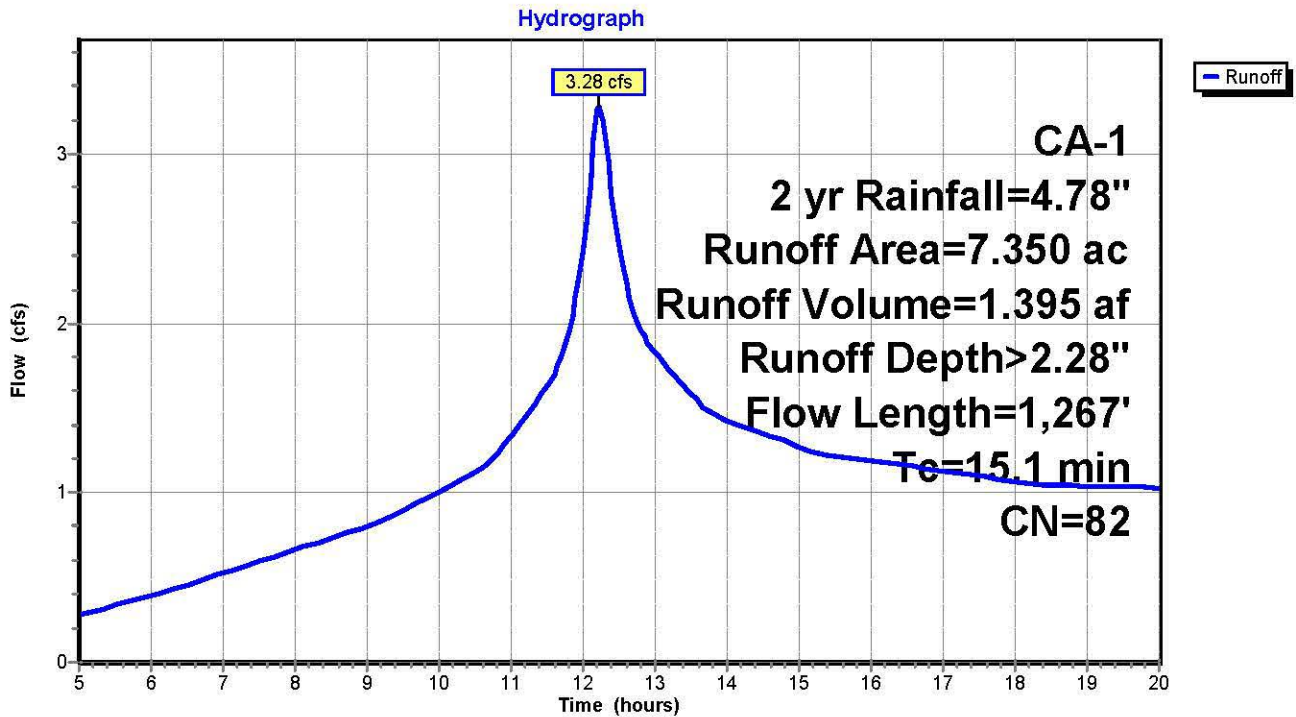
Runoff = 3.28 cfs @ 12.23 hrs, Volume= 1.395 af, Depth> 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 CA-1 2 yr Rainfall=4.78"

Area (ac)	CN	Description
* 0.430	98	Impervious
* 1.400	81	Vineyard, Good, HSG D
2.200	84	Pasture/grassland/range, Fair, HSG D
* 0.420	83	Open Brush, Fair, HSG D
2.900	79	Woods, Fair, HSG D
7.350	82	Weighted Average
6.920		94.15% Pervious Area
0.430		5.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0600	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 4.78"
3.8	1,167	0.1000	5.09		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.1	1,267	Total			

Subcatchment 1S: WS2 post



WS2-post

Summary for Subcatchment 1S: WS2 post

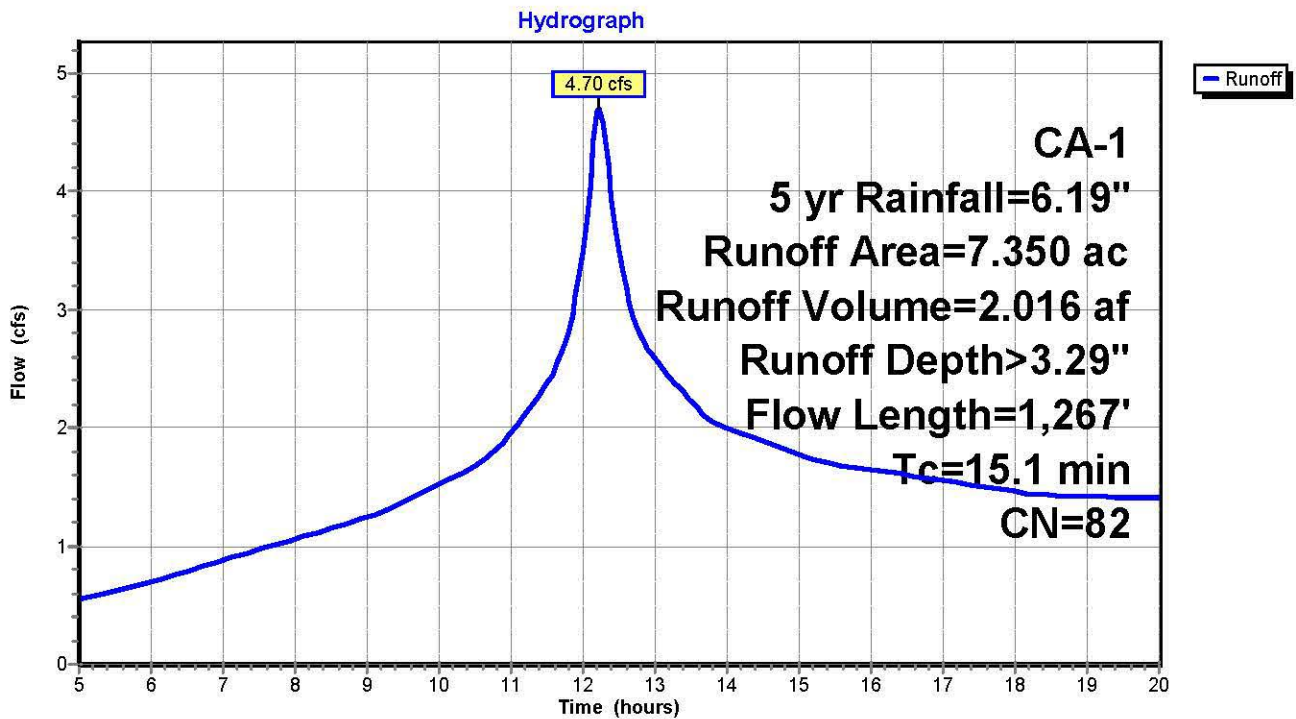
Runoff = 4.70 cfs @ 12.23 hrs, Volume= 2.016 af, Depth> 3.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 CA-1 5 yr Rainfall=6.19"

Area (ac)	CN	Description
* 0.430	98	Impervious
* 1.400	81	Vineyard, Good, HSG D
2.200	84	Pasture/grassland/range, Fair, HSG D
* 0.420	83	Open Brush, Fair, HSG D
2.900	79	Woods, Fair, HSG D
7.350	82	Weighted Average
6.920		94.15% Pervious Area
0.430		5.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0600	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 4.78"
3.8	1,167	0.1000	5.09		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.1	1,267	Total			

Subcatchment 1S: WS2 post



WS2-post

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CA-1 10 yr Rainfall=7.34"

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Summary for Subcatchment 1S: WS2 post

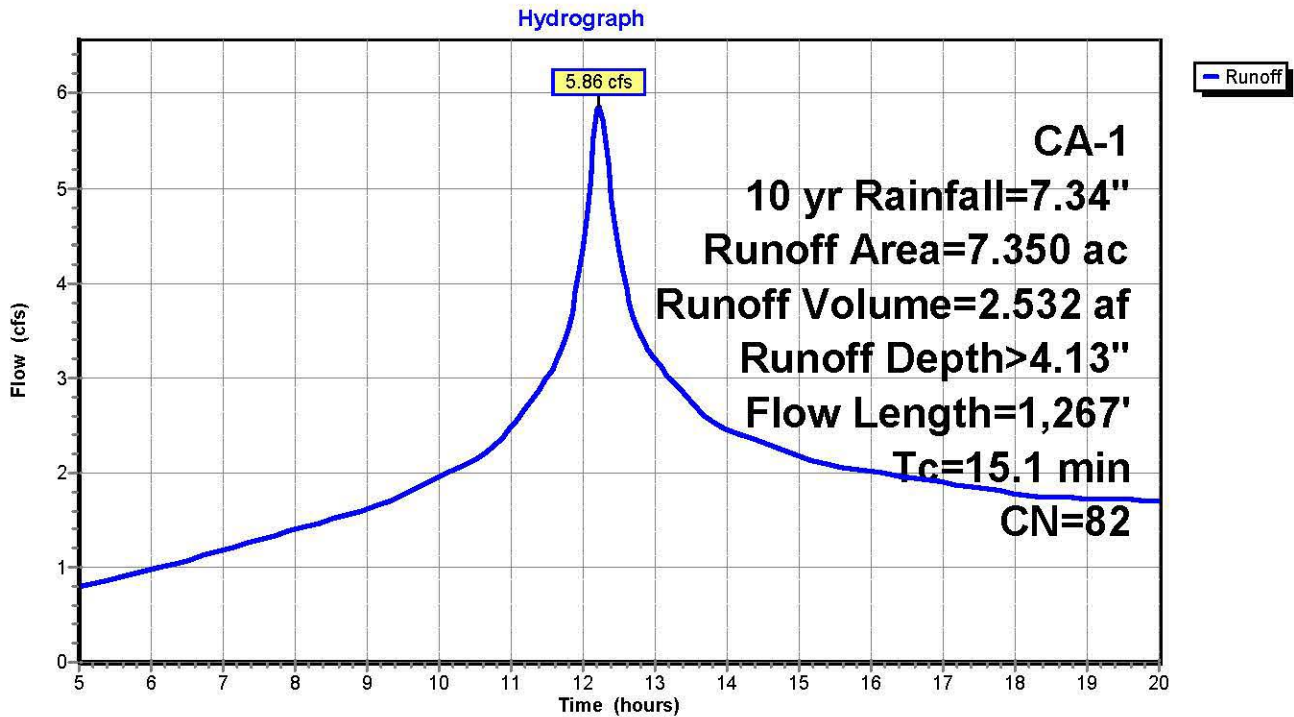
Runoff = 5.86 cfs @ 12.23 hrs, Volume= 2.532 af, Depth> 4.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 CA-1 10 yr Rainfall=7.34"

Area (ac)	CN	Description
* 0.430	98	Impervious
* 1.400	81	Vineyard, Good, HSG D
2.200	84	Pasture/grassland/range, Fair, HSG D
* 0.420	83	Open Brush, Fair, HSG D
2.900	79	Woods, Fair, HSG D
7.350	82	Weighted Average
6.920		94.15% Pervious Area
0.430		5.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0600	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 4.78"
3.8	1,167	0.1000	5.09		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.1	1,267	Total			

Subcatchment 1S: WS2 post



WS2-post

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CA-1 25 yr Rainfall=9.06"

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Summary for Subcatchment 1S: WS2 post

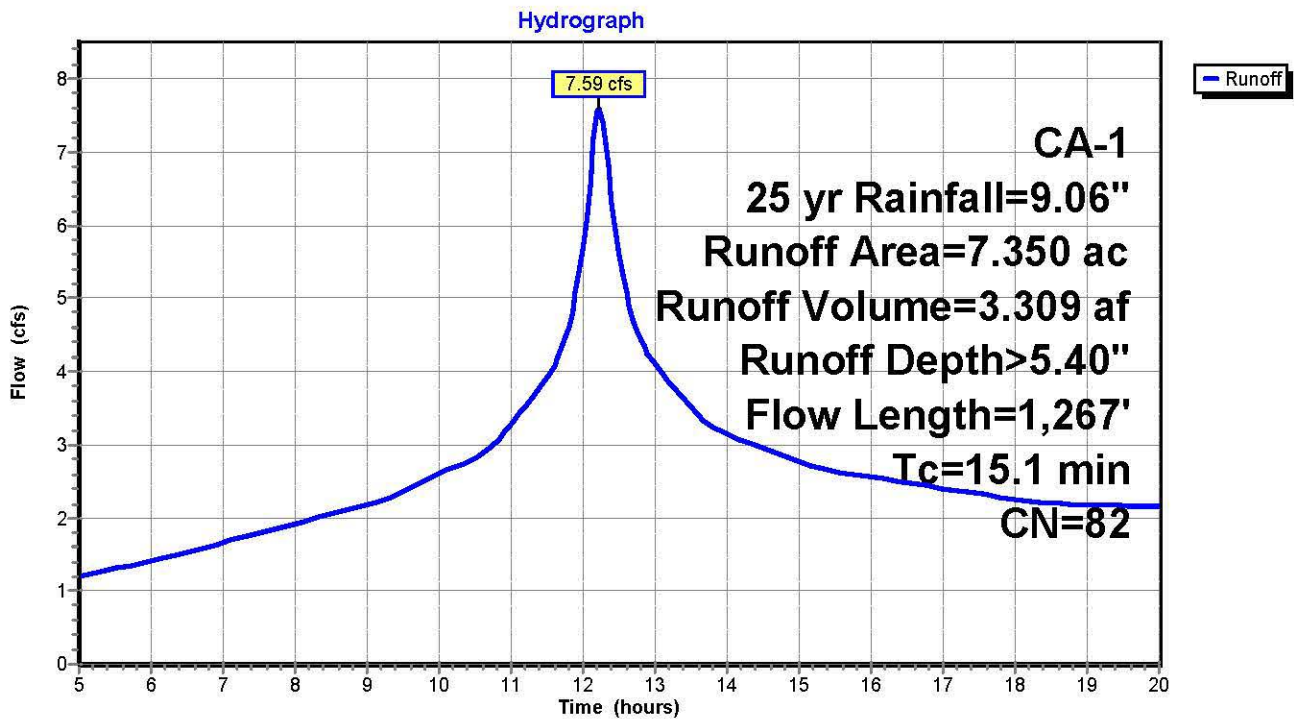
Runoff = 7.59 cfs @ 12.23 hrs, Volume= 3.309 af, Depth> 5.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 CA-1 25 yr Rainfall=9.06"

Area (ac)	CN	Description
* 0.430	98	Impervious
* 1.400	81	Vineyard, Good, HSG D
2.200	84	Pasture/grassland/range, Fair, HSG D
* 0.420	83	Open Brush, Fair, HSG D
2.900	79	Woods, Fair, HSG D
7.350	82	Weighted Average
6.920		94.15% Pervious Area
0.430		5.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0600	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 4.78"
3.8	1,167	0.1000	5.09		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.1	1,267	Total			

Subcatchment 1S: WS2 post



WS2-post

Summary for Subcatchment 1S: WS2 post

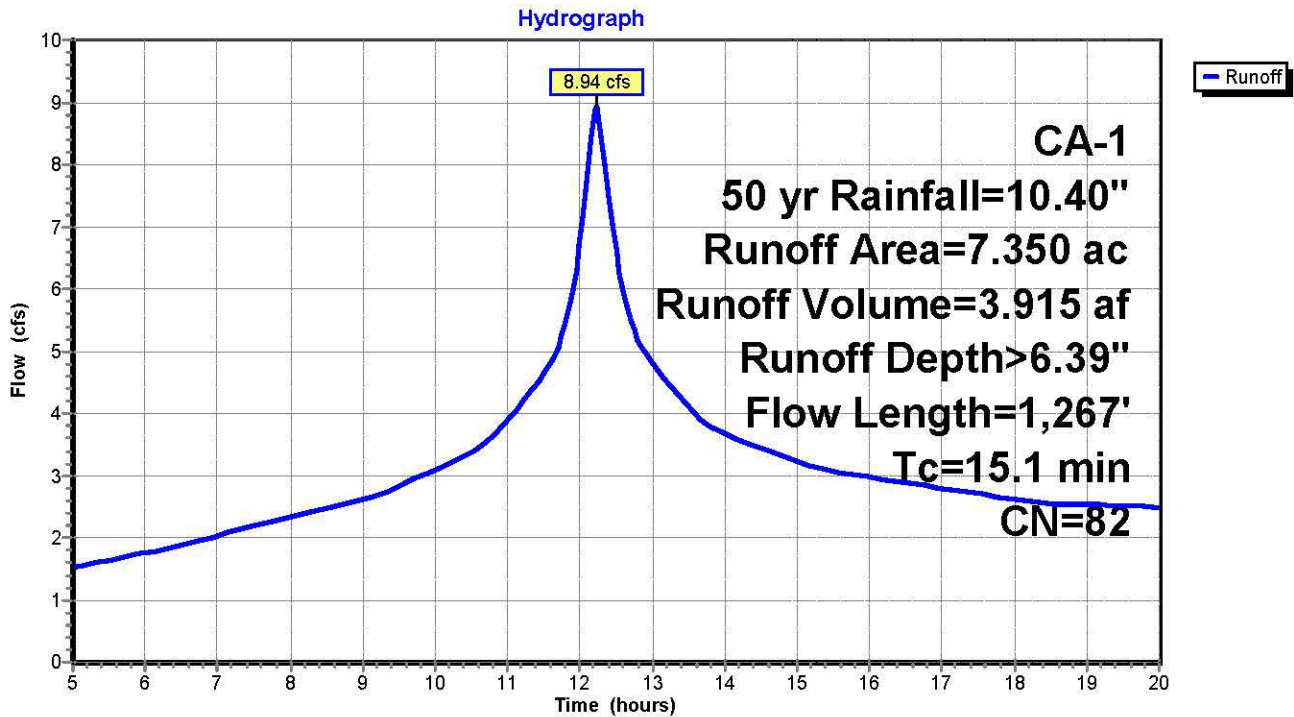
Runoff = 8.94 cfs @ 12.23 hrs, Volume= 3.915 af, Depth> 6.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 CA-1 50 yr Rainfall=10.40"

Area (ac)	CN	Description
* 0.430	98	Impervious
* 1.400	81	Vineyard, Good, HSG D
2.200	84	Pasture/grassland/range, Fair, HSG D
* 0.420	83	Open Brush, Fair, HSG D
2.900	79	Woods, Fair, HSG D
7.350	82	Weighted Average
6.920		94.15% Pervious Area
0.430		5.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0600	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 4.78"
3.8	1,167	0.1000	5.09		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.1	1,267	Total			

Subcatchment 1S: WS2 post



WS2-post

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CA-1 100 yr Rainfall=11.70"

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Summary for Subcatchment 1S: WS2 post

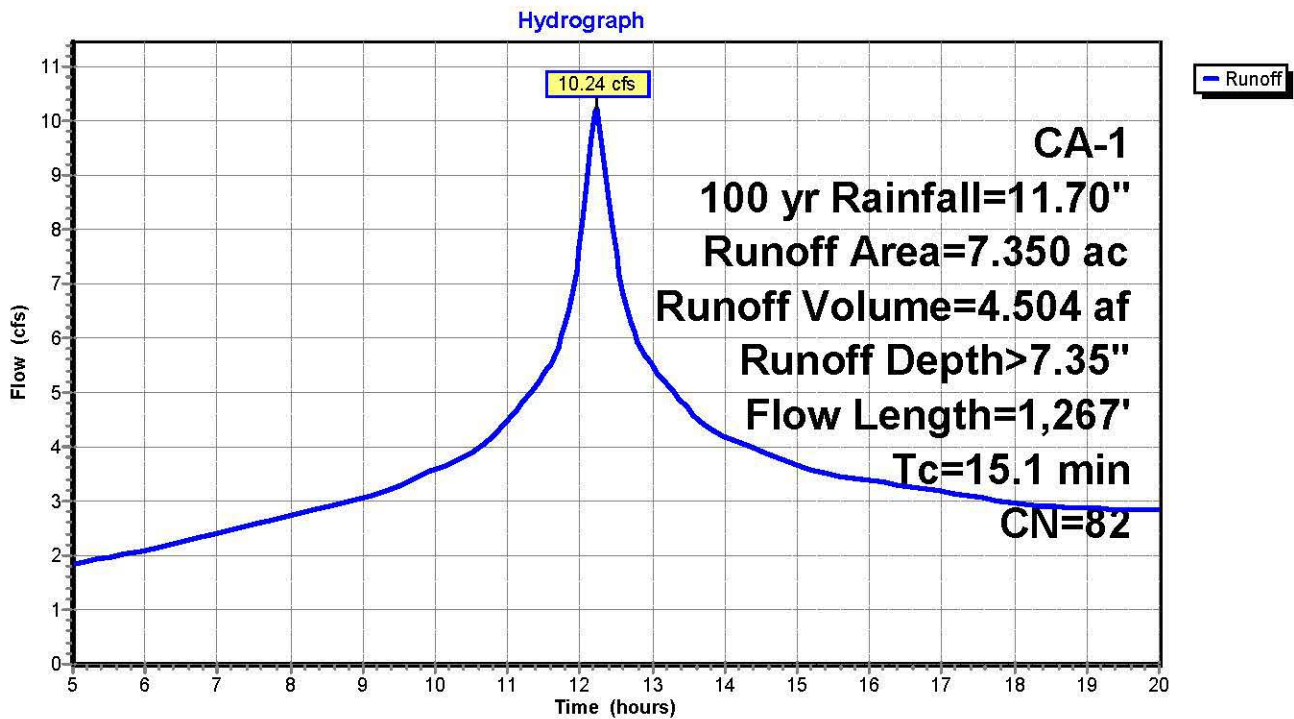
Runoff = 10.24 cfs @ 12.23 hrs, Volume= 4.504 af, Depth> 7.35"

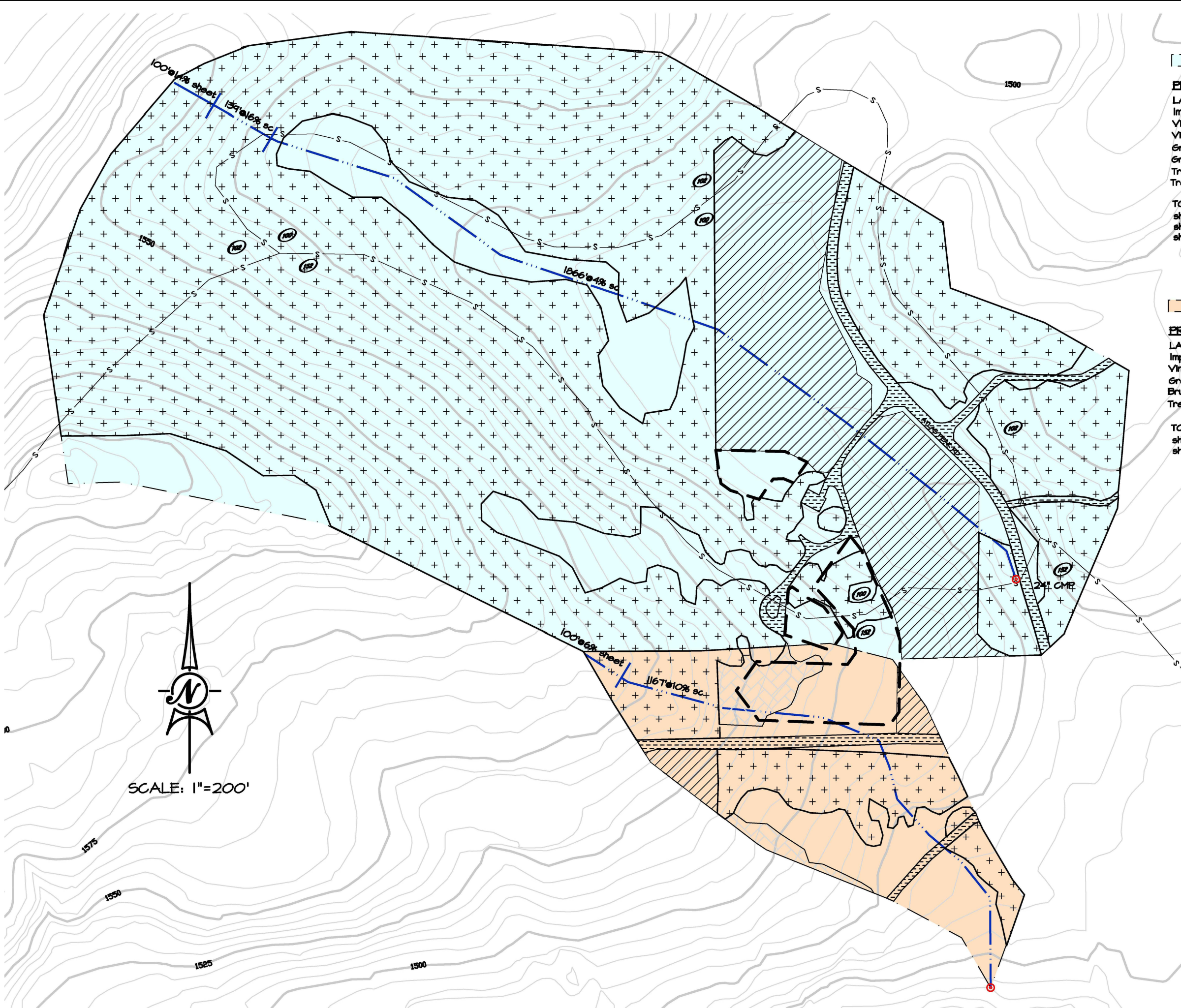
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 CA-1 100 yr Rainfall=11.70"

Area (ac)	CN	Description
* 0.430	98	Impervious
* 1.400	81	Vineyard, Good, HSG D
2.200	84	Pasture/grassland/range, Fair, HSG D
* 0.420	83	Open Brush, Fair, HSG D
2.900	79	Woods, Fair, HSG D
7.350	82	Weighted Average
6.920		94.15% Pervious Area
0.430		5.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.3	100	0.0600	0.15		Sheet Flow, Woods: Light underbrush n= 0.400 P2= 4.78"
3.8	1,167	0.1000	5.09		Shallow Concentrated Flow, Unpaved Kv= 16.1 fps
15.1	1,267	Total			

Subcatchment 1S: WS2 post





WS 1 = 50.95 ac

PRE-PROJECT
 LAND USE:
 Impervious - 1.12 ac
 Vineyard (HSG C, good) - 5.84 ac
 Vineyard (HSG D, good) - 0.60 ac
 Grassland (HSG C, fair) - 4.17 ac
 Grassland (HSG D, fair) - 2.75 ac
 Trees (HSG C, fair) - 22.99 ac
 Trees (HSG D, fair) - 13.48 ac

TC:
 sheet flow 100' @ 14%
 shallow concentrated - 139' @ 16%
 shallow concentrated - 1866' @ 4%

WS 1 = 50.95 ac

POST-PROJECT
 LAND USE:
 Impervious - 1.12 ac
 Vineyard (HSG C, good) - 6.54 ac
 Vineyard (HSG D, good) - 0.94 ac
 Grassland (HSG C, fair) - 3.74 ac
 Grassland (HSG D, fair) - 2.46 ac
 Trees (HSG C, fair) - 22.72 ac
 Trees (HSG D, fair) - 13.43 ac

TC:
 sheet flow 100' @ 14%
 shallow concentrated - 139' @ 16%
 shallow concentrated - 1866' @ 4%

WS 2 = 7.35 ac

PRE-PROJECT
 LAND USE:
 Impervious - 0.43 ac
 Vineyard (HSG D, good) - 0.43 ac
 Grassland (HSG D, fair) - 2.88 ac
 Brush (HSG D, fair) - 0.71 ac
 Trees (HSG D, fair) - 2.90 ac

TC:
 sheet flow 100' @ 6%
 shallow concentrated - 1167' @ 10%

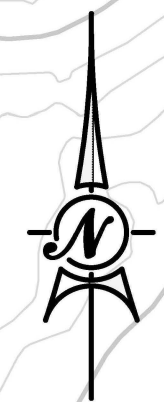
WS 2 = 7.35 ac

POST-PROJECT
 LAND USE:
 Impervious - 0.43 ac
 Vineyard (HSG D, good) - 1.40 ac
 Grassland (HSG D, fair) - 2.20 ac
 Brush (HSG D, fair) - 0.42 ac
 Trees (HSG D, fair) - 2.90 ac

TC:
 sheet flow 100' @ 6%
 shallow concentrated - 1167' @ 10%

LEGEND

- brush
- existing vineyard
- flow path
- grassland
- impervious
- point of interest
- project boundary
- trees
- watershed boundary



SCALE: 1"=200'

Hardten Vineyard
 Hydrological Analysis
 Drainage & Land Use Map
 Pre & Post Project
 NWVE, January 13, 2020