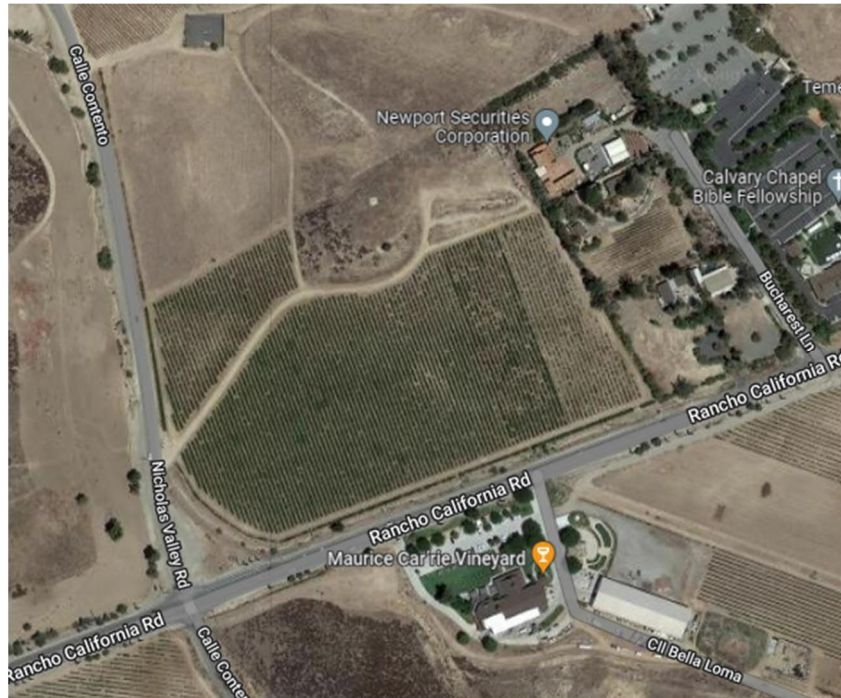


MEXIN WINERY
Winery Development
33990 Rancho California Road
Temecula, CA 92591
APNs : 943-250-019
Hydrology Study



July 2022

Revised:

Revised:

This report has been prepared under the direction of the following Registered Civil Engineer. The undersigned attests to the technical information contained herein and the qualifications of any technical specialist providing engineering data upon which recommendations, conclusions, and decisions are based:

Registered Civil Engineer

Submitted by
Valued Engineering Inc.
600 N. Mountain Avenue, Suite C102
Upland, CA 91786

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1.0 INTRODUCTION

Mexin Teme Agriculture Development, Inc proposes to develop 2.80 acres (121,900 square feet) of existing vacant land located in the City of Temecula, CA. This development is located near the intersection of Rancho California and Calle Contenido in the unincorporated portion of the County Riverside. The site location is bounded by Calle Contenido Street on the west, Rancho California Road on the southwest and vacant land on the east and south. The project proposes to develop a building and underground storage vault for harvest and use for water quality treatment. Other improvements will include associated parking lot and landscaping.

2.0 PURPOSE

The purpose of the study is to quantify the peak flow for the 2-year, 10-year and 100-year storm event for the pre-developed and post-developed conditions. The unit hydrograph was calculated for the 24-hour duration in the 2-year, 10-year storm events and 1-hour duration in the 100-year storm event. This study will demonstrate that the proposed on-site drainage plan is adequately sized to mitigate the proposed development impacts by controlling the outlet from the basin to match or be lower than pre-developed flows for the 10-year, 24-hour storm event. The rational method and unit hydrograph calculations are presented in Appendix C of this report.

3.0 METHODOLOGY

The analysis was performed in accordance with the Riverside County Hydrology Manual. This includes the determination of soil cover and subarea breakdowns. CivilDesign software by Bonadiman was used to perform rational method calculations, synthetic unit hydrograph calculations and basin routing calculations. The 10-year, 24-hr storm event and AMC II was used to simulate the developed hydrology condition, as recommended by the Riverside County Hydrology Manual. These methods were combined to understand how pre-developed and post-developed stormwater will flow.

4.0 SITE DESCRIPTION

Existing site conditions include exposed native earth with fair vegetated cover. Pictures of the existing condition can be seen in Appendix A of this report. Site hydrologic soils group classification was determined to be Hydrologic Soil Group "A" and "C" through the WebSoilSurvey. The project site is estimated as having an infiltration rate of 0.57 in/hr for soil Group "C" and 0.06 in/hr for soil Group "A". This soils investigation can be seen in Appendix B of this report.

Existing Drainage Condition

Existing runoff at the site is delineated into two drainage areas. The subareas A1 to A6 is located on the south portion of the site (See the "Existing Hydrology Map" in Appendix G of this report). The site generally drains from northeast to southwest with average grades of 8% to 10%. The

subareas B1-64 is located on the northwest of the site. The site generally drains from northeast to northwest with average grades of 1% to 6%. Stormwater sheet flows across the undeveloped land and is released at northerly points where eventually infiltrated through the existing native pervious surface. The existing site consists of ground cover that can be described as undeveloped good cover. Stormwater sheet flow across the lots then northwest to the existing channel. The flow sheet flows northwesterly off the property.

Proposed Drainage Condition

The proposed on-site watershed is broken down into seventeen drainage subareas (See the “Post-developed Hydrology Map” in Appendix G of this report for the proposed drainage areas).

Subareas A1-A3 includes the building and other improvements will include parking lot, landscape and curbs. The underground storage vault is proposed for harvest and use for water quality treatment. The runoff from this subarea will be collected by various inlets that is connected to the underground pipe cistern which is sized for 2-year, 24-hour storm to comply with HCOC Management to filter the stormwater runoff. The underground pipe cistern provides sufficient volume to treat for water quality purposes and mitigate for increased runoff for 2-year 24-hour, 10-year 24-hour and 100-year 1-hour storm durations. The storm water runoff will be stored in the underground pipe cisterns and will be pumped to irrigate the vineyard.

Subareas B1-B2 consists of the northeasterly portion of the site. Runoff from this slope area will drain into the proposed open channel and the riprap to release stormwater into the existing earth channel.

Subarea C1-C6 consist of the northwesterly portion of the proposed development. Stormwater from this subarea will begin at a high point and drains northerly to the existing channel. The proposed flow pattern from these subareas can be seen on the proposed hydrology map in Section G.

5.0 RESULTS

The following table summarizes the data and results for the 2-year, 10-year and 100-year storm events for the pre-developed and post-developed condition. Rational method calculations used to determine flows can be found in Appendix C of this report, respectively.

Pre-developed Hydrology – Rational Method							
		Frequency					
Existing Subareas	ACRE	Q ₂ (cfs)	Conflued Q ₂ (cfs)	Q ₁₀ (cfs)	Conflued Q ₁₀ (cfs)	Q ₁₀₀ (cfs)	Conflued Q ₁₀₀ (cfs)
A1	0.65	0.21	2.99	0.74	13.54	1.55	33.91
A2	3.20	0.68		3.02		7.21	
A3	0.69	0.26		0.85		1.70	
A4	3.05	0.45		2.35		6.31	
A5	1.35	0.51		1.66		3.33	
A6	6.91	0.88		4.92		13.81	
B1	0.36	0.25	2.98	0.71	8.57	1.35	16.29
B2	0.97	0.67		1.92		3.65	
B3	0.72	0.50		1.42		2.71	
B4	2.29	1.57		4.51		16.29	
Total	20.19						

Post-developed Hydrology – Rational Method							
		Frequency					
Proposed Subareas	ACRE	Q ₂ (cfs)	Confluent Q ₂ (cfs)	Q ₁₀ (cfs)	Confluent Q ₁₀ (cfs)	Q ₁₀₀ (cfs)	Confluent Q ₁₀₀ (cfs)
A1	0.78	0.92	2.50	1.82	4.95	3.09	8.44
A2	0.30	0.45		0.88		1.50	
A3	1.02	1.52		2.99		5.08	
B1	0.15	0.13	13.82	0.36	34.17	0.67	65.16
B2	0.07	0.10		0.19		0.32	
B3	0.43	0.31		0.96		1.89	
B4	3.22	1.81		6.51		13.68	
B5	2.96	1.15		5.08		11.85	
B6	6.84	9.11		18.02		31.19	
B7	0.29	0.40		0.79		1.34	
B8	0.94	0.82		2.26		4.21	
C1	0.10	0.07	2.42	0.20	6.54	0.38	12.24
C2	0.05	0.06		0.12		0.20	
C3	0.24	0.28		0.56		0.96	
C4	0.07	0.08		0.16		0.28	
C5	0.42	0.30		0.85		1.61	
C6	2.30	1.63		4.65		8.82	
Total	20.18						

In order to determine the impacts associated with the 100-year, 1-hour storm duration, a unit hydrograph was performed for the 100-year, 1-hour pre-project and post project conditions. The results indicate that the flows for the 100-year storm event will require mitigation for 0.03 ft³/s. The table below summarizes the unit hydrograph hydrology results:

Pre-Developed Unit Hydrograph Summary									
	2-Year, 24-Hour Stormevent			10-Year, 24-Hour Stormevent			100-Year, 1-Hour Stormevent		
	Q (cfs)	V (ac.ft)	V (cu.ft)	Q (cfs)	V (ac.ft)	V (cu.ft)	Q (cfs)	V (ac.ft)	V (cu.ft)
Subarea - A	0.064	0.039	1,685	0.939	0.360	15,684	9.497	0.261	11,361

Post-Developed Unit Hydrograph Summary									
	2-Year, 24-Hour Stormevent			10-Year, 24-Hour Stormevent			100-Year, 1-Hour Stormevent		
	Q (cfs)	V (ac.ft)	V (cu.ft)	Q (cfs)	V (ac.ft)	V (cu.ft)	Q (cfs)	V (ac.ft)	V (cu.ft)
Subarea - A	0.600	0.347	15,121	1.131	0.661	28,816	9.852	0.288	12,535

Based upon the 100-Yr unit hydrograph hydrology results, 0.316 ft³/s will be mitigated in the post-project condition so that the post-project flow rates do not exceed 9.497 ft³/s. The project site will incorporate Underground Pipe Cisterns which will store the increase runoff from development and reused for irrigation of the vineyards. The required mitigation volume was determined by taking the difference between pre-developed and post-developed unit hydrograph volumes for both storm durations (2-year, 24-hour and 10-year, 24-hour). The larger delta difference was then utilized as the required mitigation storage volume. Since this is a preliminary study, without detailed basin routing calculations, the required mitigation volume was multiplied by a factor of 1.25 to ensure that the basins design volume will be sufficient for mitigation. See the “Pre and Post-developed Unit Hydrograph Maps” in Appendix G of this report.

	Δ = Post Developed Volume – Pre Developed Volume	Δ = Post Developed Volume – Pre Developed w/ Safety Factor Volume
2-YR, 24-HR	0.308 ac-ft	0.385 ac-ft
10-YR, 24-HR	0.301 ac-ft	0.376 ac-ft

The volume required to be stored to mitigate for increased runoff is 0.376 ac-ft (16,379 ft³). This volume will be stored within the Underground Pipe Cisterns.

The 100-Year, 1-Hour storm durations resulted in a higher flow rate and higher volume for the post-project condition when compared to the pre-project condition, as shown in the table below:

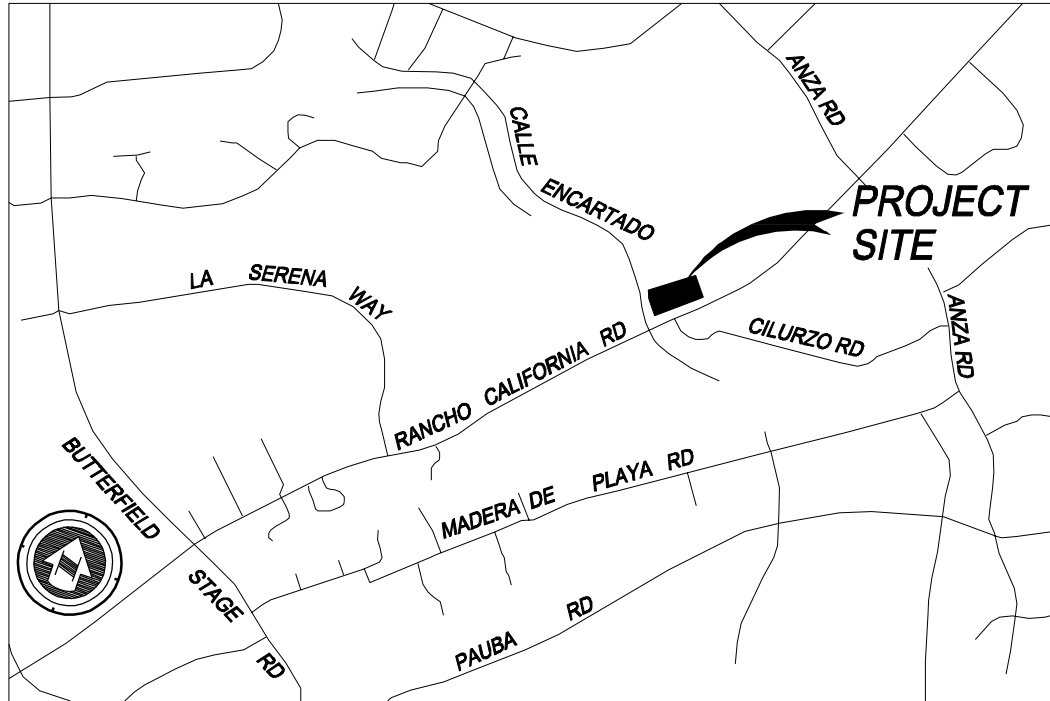
	100-Year, 1-Hour Flow Rate	100-Year, 1-Hour Volume
Pre-Developed	9.497 cfs	0.261 ac-ft
Post-Developed	9.852 cfs	0.288 ac-ft

Since the post-developed volume is more than the pre-developed volume, the methodology used to determine the required mitigation volume for the 10-year, 24-hour storm duration can be utilized. A total of 1.131 ft³/s must be mitigated in the post-developed condition for the 10-year, 24-hour storm duration. DMA "A" (on-site area) will be mitigated and will have a maximum allowable outflow of 8.721ft³/s which is 1.131 ft³/s less than the 9.852 ft³/s indicated from the post-developed unit hydrograph.

APPENDIX "A"

REFERENCE MATERIALS:

VICINITY MAP
POINT PRECIPITATION FREQUENCY ESTIMATES
SUBAREA BREAKDOWN
SOIL CLASSIFICATION MAP
SOIL COVER TYPE
PRE-DEVELOPED SITE CONDITIONS



VICINITY MAP

NOT TO SCALE



NOAA Atlas 14, Volume 6, Version 2
Location name: Temecula, California, USA*
Latitude: 33.5294°, Longitude: -117.0666°
Elevation: 1317.66 ft**

* source: ESRI Maps

** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps_&_aerials](#)

PF tabular

AMS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹

Duration	Annual exceedance probability (1/years)								
	1/2	1/5	1/10	1/25	1/50	1/100	1/200	1/500	1/1000
5-min	0.128 (0.107-0.154)	0.195 (0.163-0.235)	0.241 (0.200-0.294)	0.305 (0.244-0.384)	0.355 (0.278-0.459)	0.409 (0.311-0.542)	0.465 (0.344-0.636)	0.546 (0.387-0.779)	0.611 (0.417-0.904)
10-min	0.183 (0.153-0.220)	0.280 (0.234-0.337)	0.346 (0.287-0.421)	0.437 (0.349-0.551)	0.509 (0.398-0.657)	0.586 (0.446-0.776)	0.667 (0.494-0.911)	0.783 (0.554-1.12)	0.876 (0.598-1.30)
15-min	0.221 (0.186-0.266)	0.338 (0.283-0.408)	0.418 (0.347-0.509)	0.528 (0.422-0.666)	0.616 (0.482-0.795)	0.708 (0.540-0.939)	0.807 (0.597-1.10)	0.946 (0.670-1.35)	1.06 (0.723-1.57)
30-min	0.339 (0.284-0.408)	0.517 (0.433-0.625)	0.640 (0.531-0.779)	0.808 (0.647-1.02)	0.943 (0.737-1.22)	1.09 (0.827-1.44)	1.24 (0.914-1.69)	1.45 (1.03-2.07)	1.62 (1.11-2.40)
60-min	0.514 (0.431-0.619)	0.785 (0.657-0.948)	0.972 (0.806-1.18)	1.23 (0.982-1.55)	1.43 (1.12-1.85)	1.65 (1.25-2.18)	1.88 (1.39-2.56)	2.20 (1.56-3.14)	2.46 (1.68-3.64)
2-hr	0.737 (0.619-0.888)	1.10 (0.924-1.33)	1.35 (1.12-1.64)	1.68 (1.35-2.12)	1.95 (1.52-2.51)	2.22 (1.69-2.94)	2.50 (1.85-3.42)	2.90 (2.06-4.14)	3.22 (2.20-4.76)
3-hr	0.901 (0.756-1.09)	1.34 (1.12-1.62)	1.63 (1.35-1.99)	2.02 (1.62-2.55)	2.33 (1.82-3.01)	2.65 (2.02-3.51)	2.98 (2.20-4.07)	3.44 (2.44-4.91)	3.81 (2.60-5.63)
6-hr	1.28 (1.07-1.54)	1.89 (1.58-2.28)	2.29 (1.90-2.79)	2.83 (2.26-3.57)	3.24 (2.54-4.19)	3.67 (2.80-4.87)	4.12 (3.05-5.63)	4.74 (3.36-6.76)	5.23 (3.57-7.74)
12-hr	1.71 (1.43-2.05)	2.52 (2.11-3.04)	3.06 (2.54-3.73)	3.77 (3.02-4.76)	4.33 (3.39-5.59)	4.90 (3.73-6.49)	5.49 (4.06-7.50)	6.31 (4.47-9.00)	6.96 (4.75-10.3)
24-hr	2.21 (1.96-2.56)	3.32 (2.92-3.84)	4.05 (3.54-4.72)	5.02 (4.25-6.05)	5.78 (4.79-7.10)	6.56 (5.32-8.26)	7.37 (5.82-9.54)	8.50 (6.45-11.4)	9.40 (6.89-13.1)
2-day	2.65 (2.34-3.06)	4.09 (3.61-4.74)	5.07 (4.44-5.92)	6.41 (5.43-7.72)	7.47 (6.20-9.19)	8.59 (6.96-10.8)	9.78 (7.71-12.6)	11.5 (8.69-15.4)	12.8 (9.40-17.8)
3-day	2.82 (2.49-3.26)	4.45 (3.92-5.15)	5.59 (4.89-6.52)	7.16 (6.06-8.63)	8.43 (6.99-10.4)	9.79 (7.94-12.3)	11.3 (8.88-14.6)	13.4 (10.1-18.0)	15.1 (11.1-21.1)
4-day	3.06 (2.71-3.54)	4.90 (4.32-5.67)	6.19 (5.42-7.22)	7.99 (6.77-9.63)	9.46 (7.85-11.6)	11.1 (8.96-13.9)	12.8 (10.1-16.5)	15.3 (11.6-20.6)	17.4 (12.7-24.2)
7-day	3.55 (3.13-4.10)	5.75 (5.07-6.66)	7.31 (6.40-8.53)	9.50 (8.05-11.5)	11.3 (9.38-13.9)	13.3 (10.7-16.7)	15.4 (12.1-19.9)	18.5 (14.0-24.9)	21.1 (15.5-29.3)
10-day	3.84 (3.39-4.43)	6.27 (5.52-7.26)	8.00 (7.00-9.33)	10.4 (8.84-12.6)	12.4 (10.3-15.3)	14.6 (11.9-18.4)	17.0 (13.4-22.0)	20.5 (15.5-27.6)	23.4 (17.2-32.6)
20-day	4.72 (4.17-5.46)	7.88 (6.94-9.12)	10.1 (8.87-11.8)	13.4 (11.3-16.1)	16.0 (13.3-19.7)	18.9 (15.3-23.8)	22.1 (17.4-28.5)	26.7 (20.3-36.0)	30.6 (22.5-42.6)
30-day	5.61 (4.96-6.49)	9.44 (8.32-10.9)	12.2 (10.7-14.2)	16.1 (13.6-19.4)	19.4 (16.1-23.8)	22.9 (18.6-28.9)	26.8 (21.1-34.7)	32.5 (24.7-43.8)	37.3 (27.4-51.9)
45-day	6.60 (5.83-7.62)	11.1 (9.79-12.9)	14.4 (12.6-16.8)	19.0 (16.1-22.9)	22.9 (19.0-28.1)	27.1 (22.0-34.1)	31.7 (25.0-41.0)	38.5 (29.2-51.8)	44.2 (32.4-61.5)
60-day	7.65 (6.75-8.84)	12.8 (11.3-14.8)	16.5 (14.5-19.3)	21.8 (18.5-26.3)	26.3 (21.8-32.3)	31.1 (25.2-39.2)	36.4 (28.7-47.1)	44.2 (33.5-59.5)	50.8 (37.2-70.6)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of annual maxima series (AMS).

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 annual exceedance probability) 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.

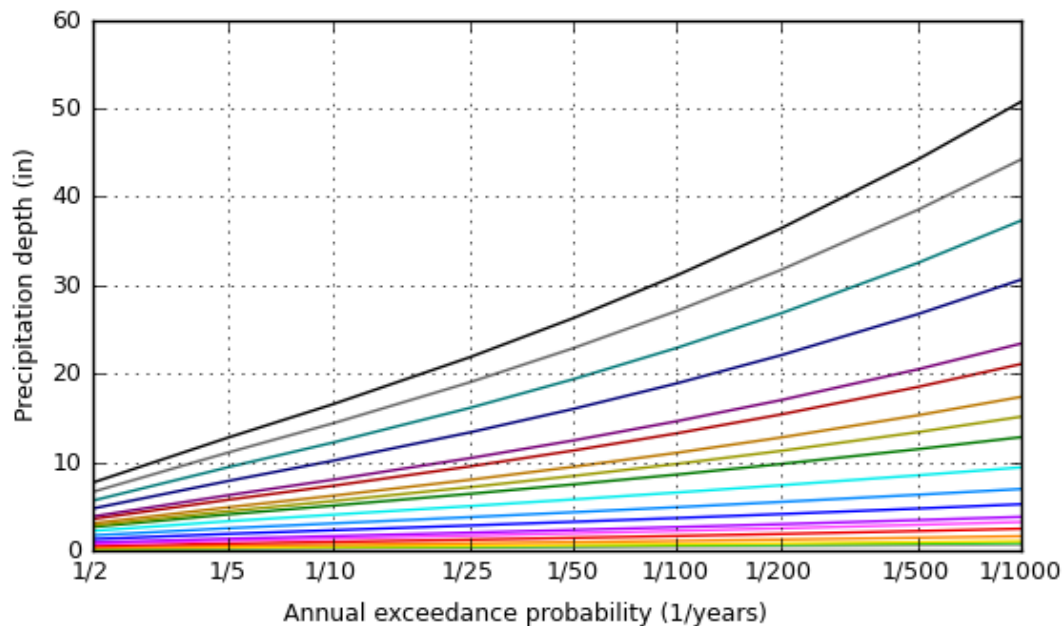
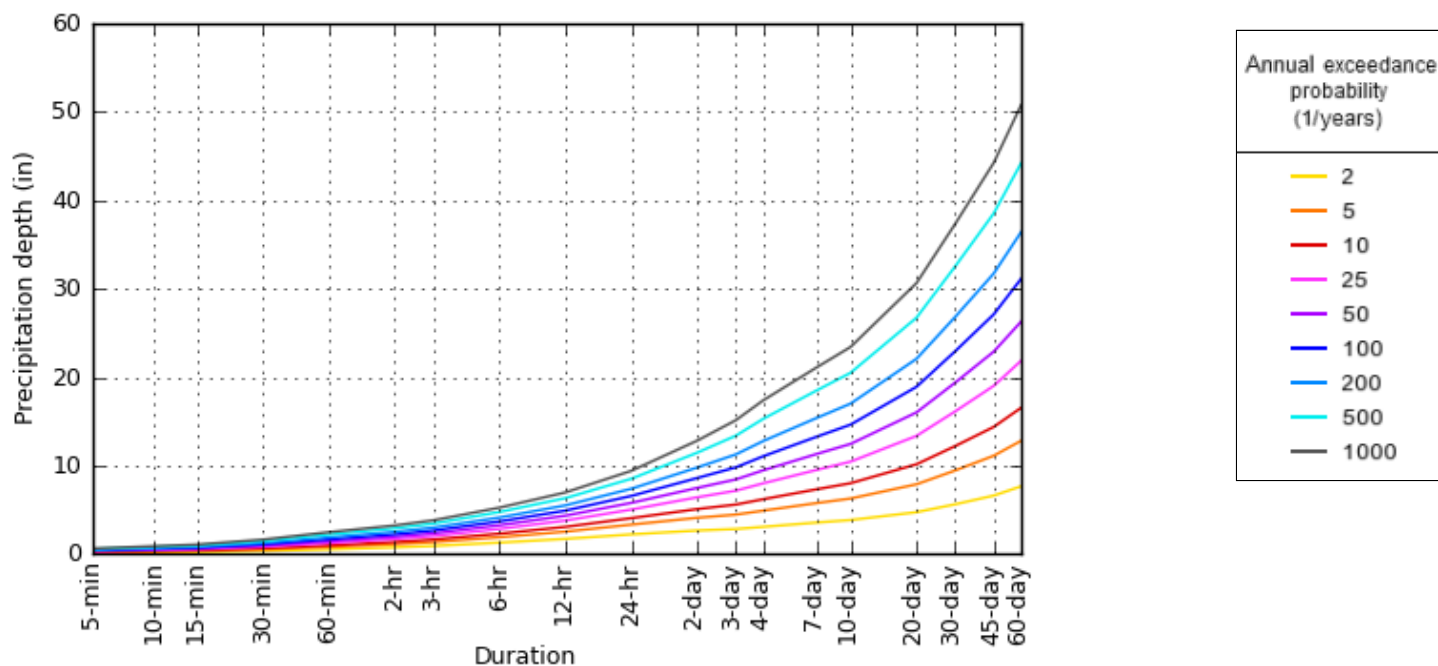
Please refer to NOAA Atlas 14 document for more information.

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PF graphical

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

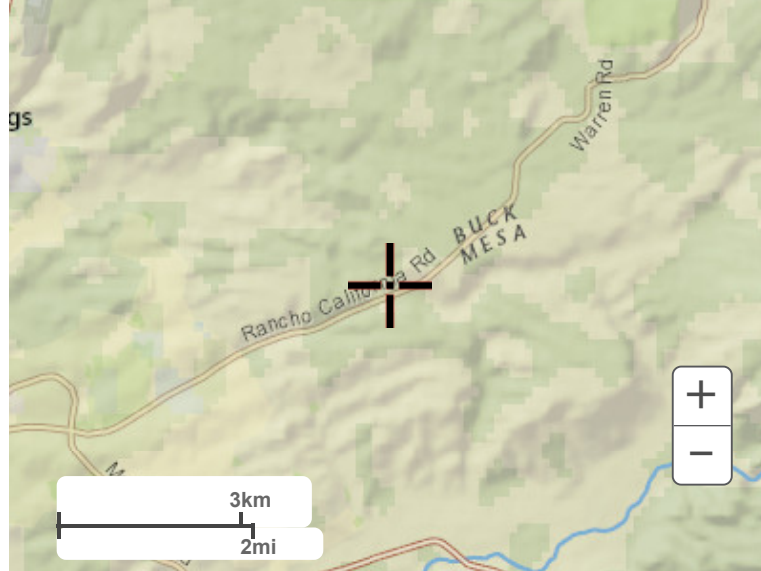
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Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



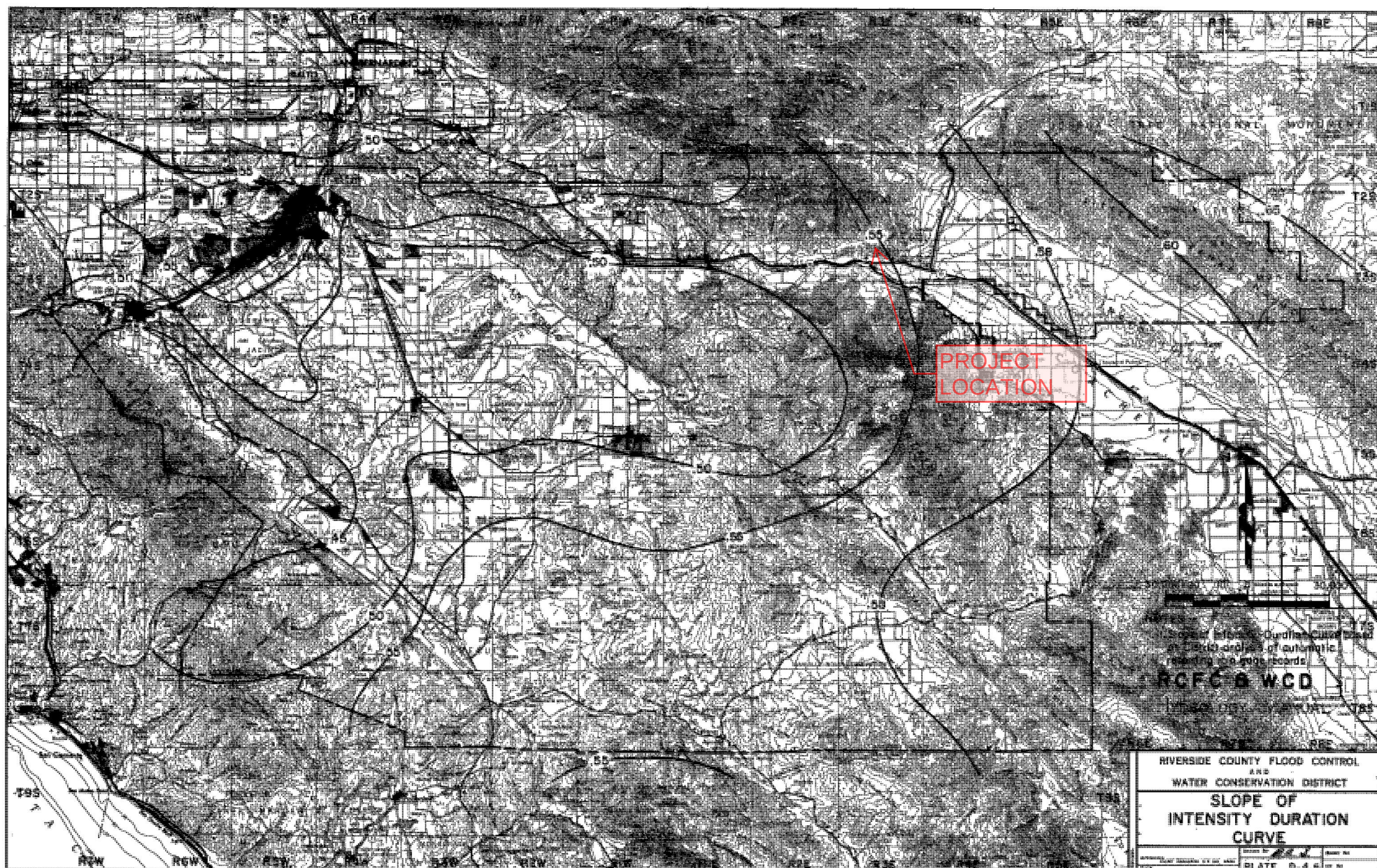
Large scale aerial

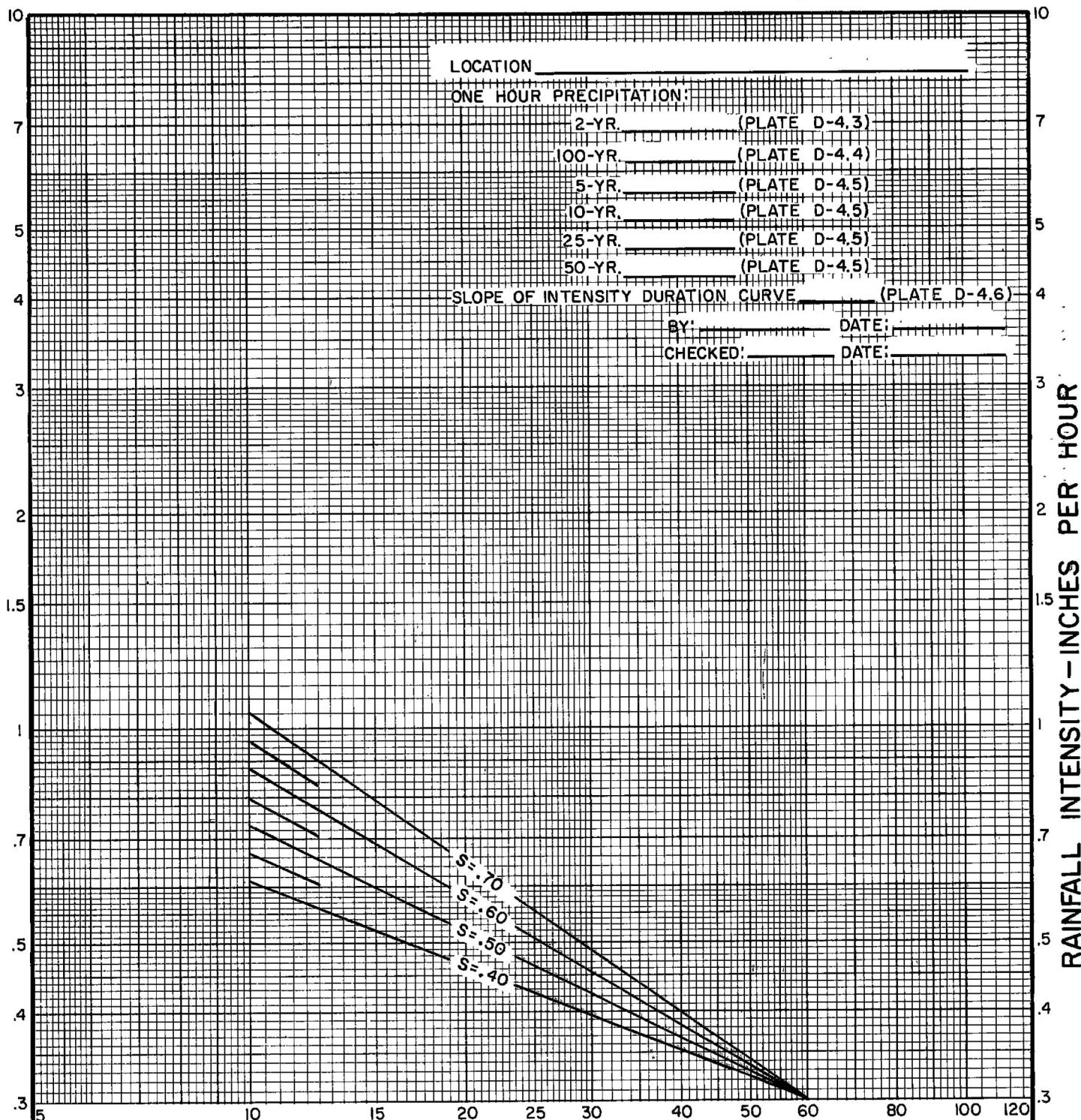


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RCFC & WCD
HYDROLOGY MANUAL

INTENSITY-DURATION
CURVES
CALCULATION SHEET

1162004 HYDROLOGY - MEXIN WINERY					
		FT ²	AC	%	DESCRIPTION
Pre Developed CONDITION	A _T =	879389.10	20.19	---	UNDEVELOPED - LANDSCAPING
	A _{LS} =	879389.10	20.19	100.00%	
	A _{IMP} =	0.00	0.00	0.00%	
A1-A6	A _T =	690597.80	15.85	---	
	A _{LS} =	690597.80	15.85	100.00%	
	A _{IMP} =	0.00	0.00	0.00%	
B1-B4	A _T =	188791.30	4.33	---	
	A _{LS} =	188791.30	4.33	100.00%	
	A _{IMP} =	0.00	0.00	0.00%	
PROPOSED CONDITION	A _T =	879389.98	20.19	---	BUILDING, LANDSCAPING, PCC DEVELOPED
	A _{LS} =	787717.93	18.08	89.58%	
	A _{IMP} =	91672.05	2.10	10.42%	
A1	A _T =	34189.41	0.78	---	
	A _{LS} =	1475.36	0.03	4.32%	
	A _{IMP} =	32714.05	0.75	95.68%	
A2	A _T =	13034.00	0.30	---	
	A _{LS} =	0.00	0.00	0.00%	
	A _{IMP} =	13034.00	0.30	100.00%	
A3	A _T =	44419.00	1.02	---	
	A _{LS} =	918.00	0.02	2.07%	
	A _{IMP} =	43501.00	1.00	97.93%	
B1	A _T =	6574.00	0.15	---	
	A _{LS} =	4767.00	0.11	72.51%	
	A _{IMP} =	1807.00	0.04	27.49%	
B2	A _T =	2984.00	0.07	---	
	A _{LS} =	2984.00	0.07	100.00%	
	A _{IMP} =	0.00	0.00	0.00%	
B3	A _T =	18877.00	0.43	---	
	A _{LS} =	18261.00	0.42	96.74%	

	A _{IMP} =	616.00	0.01	3.26%	
B4	A _T =	140234.00	3.22	---	
	A _{LS} =	140234.00	3.22	100.00%	
	A _{IMP} =	0.00	0.00	0.00%	
B5	A _T =	128926.00	2.96	---	
	A _{LS} =	128926.00	2.96	100.00%	
	A _{IMP} =	0.00	0.00	0.00%	
B6	A _T =	298168.00	6.84	---	
	A _{LS} =	298168.00	6.84	100.00%	
	A _{IMP} =	0.00	0.00	0.00%	
B7	A _T =	12658.00	0.29	---	
	A _{LS} =	12658.00	0.29	100.00%	
	A _{IMP} =	0.00	0.00	0.00%	
B8	A _T =	40812.00	0.94	---	
	A _{LS} =	40812.00	0.94	100.00%	
	A _{IMP} =	0.00	0.00	0.00%	
C1	A _T =	4547.00	0.10	---	
	A _{LS} =	4547.00	0.10	100.00%	
	A _{IMP} =	0.00	0.00	0.00%	
C2	A _T =	2200.00	0.05	---	
	A _{LS} =	2200.00	0.05	100.00%	
	A _{IMP} =	0.00	0.00	0.00%	
C3	A _T =	10421.00	0.24	---	
	A _{LS} =	10421.00	0.24	100.00%	
	A _{IMP} =	0.00	0.00	0.00%	
C4	A _T =	3266.57	0.07	---	
	A _{LS} =	3266.57	0.07	100.00%	
	A _{IMP} =	0.00	0.00	0.00%	
C5	A _T =	18092.00	0.42	---	
	A _{LS} =	18092.00	0.42	100.00%	
	A _{IMP} =	0.00	0.00	0.00%	

C6	A _T =	99988.00	2.30	---	
	A _{LS} =	99988.00	2.30	100.00%	
	A _{IMP} =	0.00	0.00	0.00%	

COVER TYPE DESCRIPTIONS

NATURAL COVERS -

Barren - Areas with 15 percent or less of the ground surface covered by plants or litter. It includes rockland, eroded land, and shaped or graded land. Barren land does not include fallow land.

Chaparral, Broadleaf - Areas on which the principal vegetation consists of evergreen shrubs with broad, hard, stiff leaves such as manzonita, ceanothus and scrub oak. The brush cover is usually dense or moderately dense.

Chaparral, Narrowleaf - Land on which the principal vegetation consists of diffusely branched evergreen shrubs with fine needle-like leaves such as chamise and redshank. The shrubs are usually widely spaced and low in growth. If the narrowleaf chaparral shrubs are dense and high; the land should be included with broadleaf chaparral cover.

Grass, Annual - Land on which the principal vegetation consists of annual grasses and weeds such as annual bromes, wild barley, soft chess, ryegrass and filaree.

Grass, Perennial - Areas on which the principal vegetation consists of perennial grass, either native or introduced, and which grows under normal dryland conditions. Examples are Stipa or needle grass, Harding grass and wheat grass. It does not include irrigated and meadow grasses.

Meadow - Land areas with seasonally high water table, often called cienegas. Principal vegetation consists of sod-forming grasses interspersed with other plants.

Open Brush - Principal vegetation consists of soft wood shrubs, usually grayish in color. Examples include California buckwheat, California sagebrush, black sage, white sage and purple sage. It also includes vegetation on desert facing slopes where broadleaf chaparral predominate in an open shrub cover.

Woodland - Areas on which coniferous or broadleaf trees predominate. The crown or canopy density, the amount of ground surface shaded at high noon, is at least 50 percent. Open areas may have a cover of annual or perennial grasses or of brush. Plant cover under the trees is usually sparse because of leaf or needle litter accumulation.

Woodland, Grass - Areas with an open cover of broadleaf or coniferous trees usually live oak and pines, with the intervening ground space occupied by annual grasses or weeds. The trees may occur singly or in small clumps. Canopy density, the amount of ground surface shaded at high noon, is from 20 to 50 percent.

URBAN COVERS -

Residential or Commercial Landscaping - The pervious portions of commercial establishments, single and multiple family dwellings, trailer parks and schools where the predominant land cover is lawn, shrubbery and trees.

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COVER TYPE
DESCRIPTIONS

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group			
		A	B	C	D
<u>NATURAL COVERS -</u>					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
<u>URBAN COVERS -</u>					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
<u>AGRICULTURAL COVERS -</u>					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

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**RUNOFF INDEX NUMBERS
FOR
PERVIOUS AREA**

APPENDIX "B"

SOILS REPORTS: INFILTRATION REPORT



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Western Riverside Area, California



July 6, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

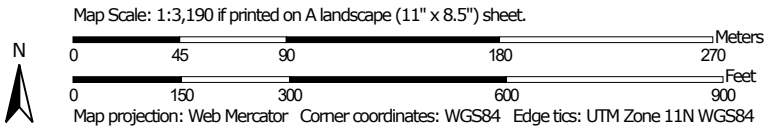
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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

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 1:15,800.

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: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

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

Date(s) aerial images were photographed: Jan 7, 2021—Jan 14, 2021

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GyC2	Greenfield sandy loam, 2 to 8 percent slopes, eroded	11.4	54.1%
RmE3	Ramona and Buren sandy loams, 15 to 25 percent slopes, severely eroded	9.7	45.9%
Totals for Area of Interest		21.0	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the

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development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Western Riverside Area, California

GyC2—Greenfield sandy loam, 2 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcvw
Elevation: 100 to 3,500 feet
Mean annual precipitation: 9 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Greenfield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Greenfield

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 26 inches: sandy loam
H2 - 26 to 43 inches: fine sandy loam
H3 - 43 to 60 inches: loam
H4 - 60 to 72 inches: stratified loamy sand to sandy loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Hanford

Percent of map unit: 3 percent

Hydric soil rating: No

Pachappa

Percent of map unit: 3 percent

Hydric soil rating: No

Arlington

Percent of map unit: 3 percent

Hydric soil rating: No

Unnamed

Percent of map unit: 3 percent

Hydric soil rating: No

Ramona

Percent of map unit: 3 percent

Hydric soil rating: No

**RmE3—Ramona and Buren sandy loams, 15 to 25 percent slopes,
severely eroded**

Map Unit Setting

National map unit symbol: hcyj

Elevation: 250 to 3,500 feet

Mean annual precipitation: 10 to 20 inches

Mean annual air temperature: 63 degrees F

Frost-free period: 230 to 320 days

Farmland classification: Not prime farmland

Map Unit Composition

Ramona and similar soils: 45 percent

Buren and similar soils: 40 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ramona

Setting

Landform: Terraces, alluvial fans

Landform position (three-dimensional): Tread

Down-slope shape: Concave

Across-slope shape: Convex

Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 8 inches: sandy loam

H2 - 8 to 17 inches: fine sandy loam

H3 - 17 to 68 inches: sandy clay loam

H4 - 68 to 74 inches: gravelly sandy loam

Properties and qualities

Slope: 15 to 25 percent

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Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Available water supply, 0 to 60 inches: Moderate (about 8.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Description of Buren

Setting

Landform: Terraces, alluvial fans
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear, convex
Parent material: Alluvium

Typical profile

H1 - 0 to 12 inches: sandy loam
H2 - 12 to 28 inches: loam
H3 - 28 to 37 inches: loam
H4 - 37 to 52 inches: cemented

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 37 to 40 inches to duripan
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R019XD029CA - LOAMY
Hydric soil rating: No

Minor Components

Buren

Percent of map unit: 5 percent

Hydric soil rating: No

Ramona

Percent of map unit: 5 percent

Hydric soil rating: No

Hanford

Percent of map unit: 5 percent

Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Physical Properties

Soil Physical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Saturated Hydraulic Conductivity (Ksat), Standard Classes

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits. The classes are:

Very low: 0.00 to 0.01

Low: 0.01 to 0.1

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Moderately low: 0.1 to 1.0

Moderately high: 1 to 10

High: 10 to 100

Very high: 100 to 705

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Map—Saturated Hydraulic Conductivity (Ksat), Standard Classes



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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

-  Very Low (0.0 - 0.01)
-  Low (0.01 - 0.1)
-  Moderately Low (0.1 - 1)
-  Moderately High (1 - 10)
-  High (10 - 100)
-  Very High (100 - 705)
-  Not rated or not available

Soil Rating Lines

-  Very Low (0.0 - 0.01)
-  Low (0.01 - 0.1)
-  Moderately Low (0.1 - 1)
-  Moderately High (1 - 10)
-  High (10 - 100)
-  Very High (100 - 705)
-  Not rated or not available

Soil Rating Points

-  Very Low (0.0 - 0.01)
-  Low (0.01 - 0.1)
-  Moderately Low (0.1 - 1)
-  Moderately High (1 - 10)
-  High (10 - 100)
-  Very High (100 - 705)

 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 1:15,800.

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: Western Riverside Area, California
Survey Area Data: Version 14, Sep 13, 2021

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

Date(s) aerial images were photographed: Jan 7, 2021—Jan 14, 2021

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.

Table—Saturated Hydraulic Conductivity (Ksat), Standard Classes

Map unit symbol	Map unit name	Rating (micrometers per second)	Acres in AOI	Percent of AOI
GyC2	Greenfield sandy loam, 2 to 8 percent slopes, eroded	23.5355	11.4	54.1%
RmE3	Ramona and Buren sandy loams, 15 to 25 percent slopes, severely eroded	4.1410	9.7	45.9%
Totals for Area of Interest			21.0	100.0%

Rating Options—Saturated Hydraulic Conductivity (Ksat), Standard Classes

Units of Measure: micrometers per second

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Fastest

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): All Layers (Weighted Average)

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Custom Soil Resource Report

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (<http://soils.usda.gov>)

Custom Soil Resource Report

Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties—Western Riverside Area, California														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/in	Pct	Pct					
GyC2— Greenfield sandy loam, 2 to 8 percent slopes, eroded														
Greenfield	0-26	-66-	-23-	7-11- 15	1.45-1.50-1.55	14.00-28.00-42.00	0.10-0.13-0.15	0.0- 1.5- 2.9	0.5- 0.8-1.0	.28	.28	5	3	86
	26-43	-70-	-16-	10-14- 18	1.50-1.55-1.60	14.00-28.00-42.00	0.11-0.14-0.16	0.0- 1.5- 2.9	0.0- 0.0-0.0	.28	.28			
	43-60	-41-	-37-	18-22- 25	1.45-1.50-1.55	4.00-9.00-14.00	0.14-0.15-0.16	0.0- 1.5- 2.9	0.0- 0.0-0.0	.37	.37			
	60-72	-66-	-23-	7-11- 15	-1.50-	14.00-28.00-42.00	0.07-0.10-0.12	0.0- 1.5- 2.9	0.0- 0.0-0.0	.17	.28			

Custom Soil Resource Report

Physical Soil Properties—Western Riverside Area, California														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
RmE3— Ramona and Buren sandy loams, 15 to 25 percent slopes, severely eroded														
Ramona	0-8	-69-	-24-	5- 8- 10	1.60-1.63-1.65	4.00-9.00-14.00	0.09-0.10-0.11	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.32	.32	5	3	86
	8-17	-68-	-21-	8-12- 15	1.50-1.58-1.65	4.00-9.00-14.00	0.10-0.13-0.15	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.37	.37			
	17-68	-60-	-18-	18-23- 27	1.70-1.80-1.90	1.40-2.70-4.00	0.12-0.15-0.17	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.28	.28			
	68-74	-68-	-20-	10-13- 15	1.50-1.55-1.60	1.40-2.70-4.00	0.05-0.08-0.10	0.0- 1.5- 2.9	0.0- 0.3- 0.5	.28	.28			
Buren	0-12	-66-	-19-	10-15- 20	1.50-1.55-1.60	14.00-28.00-42.00	0.12-0.13-0.14	0.0- 1.5- 2.9	0.5- 0.8- 1.0	.24	.24	4	3	86
	12-28	-39-	-37-	20-25- 30	1.35-1.43-1.50	1.40-2.70-4.00	0.15-0.17-0.18	3.0- 4.5- 5.9	0.0- 0.0- 0.0	.37	.37			
	28-37	-42-	-37-	15-21- 27	1.45-1.50-1.55	4.00-9.00-14.00	0.13-0.14-0.15	0.0- 1.5- 2.9	0.0- 0.0- 0.0	.43	.43			
	37-52	—	—	—	—	0.01-0.21-0.42	—	—	—					

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- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelpdb1043084>

Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

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APPENDIX "C"

RATIONAL METHOD:

PRE-DEVELOPED CONDITION Q_2 , Q_{10} & Q_{100}

POST-DEVELOPED CONDITION Q_2 , Q_{10} & Q_{100}

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 07/07/22

File:1162007EX.out

VALUED ENGINEERING, INC
PRE-DEVELOPED
WINERY DEVELOPMENT
2-YEAR STORMEVENT

***** Hydrology Study Control Information *****

English (in-lb) Units used in input data file

Program License Serial Number 6335

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation = 0.514(In.)
100 year, 1 hour precipitation = 1.650(In.)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.514(In/Hr)
Slope of intensity duration curve = 0.5500

++++
Process from Point/Station 1.000 to Point/Station 1.100
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 705.000(Ft.)
Top (of initial area) elevation = 1376.800(Ft.)
Bottom (of initial area) elevation = 1317.000(Ft.)
Difference in elevation = 59.800(Ft.)
Slope = 0.08482 s(percent)= 8.48
 $TC = k(0.940)^*[(length^3)/(elevation\ change)]^{0.2}$

Initial area time of concentration = 21.218 min.
Rainfall intensity = 0.910(In/Hr) for a 2.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.352
Decimal fraction soil group A = 0.170
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.830
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 48.46
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 0.205(CFS)
Total initial stream area = 0.640(Ac.)
Pervious area fraction = 1.000

+++++
Process from Point/Station 1.200 to Point/Station 1.300
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.235
Decimal fraction soil group A = 0.560
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.440
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 34.07
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 21.22 min.
Rainfall intensity = 0.910(In/Hr) for a 2.0 year storm
Subarea runoff = 0.684(CFS) for 3.200(Ac.)
Total runoff = 0.889(CFS) Total area = 3.840(Ac.)

+++++
Process from Point/Station 2.200 to Point/Station 1.400
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.417
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 55.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 21.22 min.
Rainfall intensity = 0.910(In/Hr) for a 2.0 year storm
Subarea runoff = 0.262(CFS) for 0.690(Ac.)
Total runoff = 1.151(CFS) Total area = 4.530(Ac.)

+++++
Process from Point/Station 1.400 to Point/Station 1.500
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.161
Decimal fraction soil group A = 0.870
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.130
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 24.14
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 21.22 min.
Rainfall intensity = 0.910(In/Hr) for a 2.0 year storm
Subarea runoff = 0.446(CFS) for 3.050(Ac.)
Total runoff = 1.597(CFS) Total area = 7.580(Ac.)

+++++
Process from Point/Station 2.400 to Point/Station 10.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.417
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 55.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 21.22 min.
Rainfall intensity = 0.910(In/Hr) for a 2.0 year storm
Subarea runoff = 0.512(CFS) for 1.350(Ac.)
Total runoff = 2.109(CFS) Total area = 8.930(Ac.)

+++++
Process from Point/Station 1.500 to Point/Station 10.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.140
Decimal fraction soil group A = 0.970
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.030
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 21.26
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 21.22 min.
Rainfall intensity = 0.910(In/Hr) for a 2.0 year storm
Subarea runoff = 0.882(CFS) for 6.910(Ac.)
Total runoff = 2.991(CFS) Total area = 15.840(Ac.)

+++++
Process from Point/Station 2.000 to Point/Station 2.100
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 150.000(Ft.)
Top (of initial area) elevation = 1373.000(Ft.)
Bottom (of initial area) elevation = 1351.000(Ft.)
Difference in elevation = 22.000(Ft.)
Slope = 0.14667 s(percent)= 14.67
TC = $k(0.940)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 10.240 min.
Rainfall intensity = 1.359(In/Hr) for a 2.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.506
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 55.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 0.248(CFS)
Total initial stream area = 0.360(Ac.)
Pervious area fraction = 1.000

+++++
Process from Point/Station 2.200 to Point/Station 2.300
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.506
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 55.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 10.24 min.
Rainfall intensity = 1.359(In/Hr) for a 2.0 year storm
Subarea runoff = 0.668(CFS) for 0.970(Ac.)
Total runoff = 0.916(CFS) Total area = 1.330(Ac.)

+++++
Process from Point/Station 2.400 to Point/Station 2.500
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.506
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 55.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 10.24 min.
Rainfall intensity = 1.359(In/Hr) for a 2.0 year storm

Subarea runoff = 0.496(CFS) for 0.720(Ac.)
Total runoff = 1.411(CFS) Total area = 2.050(Ac.)

+++++
Process from Point/Station 2.600 to Point/Station 20.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.506
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 55.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 10.24 min.
Rainfall intensity = 1.359(In/Hr) for a 2.0 year storm
Subarea runoff = 1.570(CFS) for 2.280(Ac.)
Total runoff = 2.981(CFS) Total area = 4.330(Ac.)
End of computations, total study area = 20.17 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(A_p) = 1.000
Area averaged RI index number = 53.9

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 07/07/22

File:1162007EX.out

VALUED ENGINEERING, INC
PRE-DEVELOPED
WINERY DEVELOPMENT
10-YEAR STORMEVENT

***** Hydrology Study Control Information *****

English (in-lb) Units used in input data file

Program License Serial Number 6335

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.514(In.)
100 year, 1 hour precipitation = 1.650(In.)

Storm event year = 10.0
Calculated rainfall intensity data:
1 hour intensity = 0.981(In/Hr)
Slope of intensity duration curve = 0.5500

++++
Process from Point/Station 1.000 to Point/Station 1.100
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 705.000(Ft.)
Top (of initial area) elevation = 1376.800(Ft.)
Bottom (of initial area) elevation = 1317.000(Ft.)
Difference in elevation = 59.800(Ft.)
Slope = 0.08482 s(percent)= 8.48
 $TC = k(0.940)^*[(length^3)/(elevation\ change)]^{0.2}$

Initial area time of concentration = 21.218 min.
Rainfall intensity = 1.738(In/Hr) for a 10.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.660
Decimal fraction soil group A = 0.170
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.830
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 67.88
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 0.735(CFS)
Total initial stream area = 0.640(Ac.)
Pervious area fraction = 1.000

+++++
Process from Point/Station 1.200 to Point/Station 1.300
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.543
Decimal fraction soil group A = 0.560
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.440
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 53.84
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 21.22 min.
Rainfall intensity = 1.738(In/Hr) for a 10.0 year storm
Subarea runoff = 3.020(CFS) for 3.200(Ac.)
Total runoff = 3.755(CFS) Total area = 3.840(Ac.)

+++++
Process from Point/Station 2.200 to Point/Station 1.400
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.709
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 74.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 21.22 min.
Rainfall intensity = 1.738(In/Hr) for a 10.0 year storm
Subarea runoff = 0.850(CFS) for 0.690(Ac.)
Total runoff = 4.605(CFS) Total area = 4.530(Ac.)

+++++
Process from Point/Station 1.400 to Point/Station 1.500
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.443
Decimal fraction soil group A = 0.870
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.130
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 42.68
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 21.22 min.
Rainfall intensity = 1.738(In/Hr) for a 10.0 year storm
Subarea runoff = 2.350(CFS) for 3.050(Ac.)
Total runoff = 6.956(CFS) Total area = 7.580(Ac.)

+++++
Process from Point/Station 2.400 to Point/Station 10.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.709
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 74.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 21.22 min.
Rainfall intensity = 1.738(In/Hr) for a 10.0 year storm
Subarea runoff = 1.664(CFS) for 1.350(Ac.)
Total runoff = 8.619(CFS) Total area = 8.930(Ac.)

+++++
Process from Point/Station 1.500 to Point/Station 10.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.410
Decimal fraction soil group A = 0.970
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.030
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 39.08
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 21.22 min.
Rainfall intensity = 1.738(In/Hr) for a 10.0 year storm
Subarea runoff = 4.924(CFS) for 6.910(Ac.)
Total runoff = 13.543(CFS) Total area = 15.840(Ac.)

+++++
Process from Point/Station 2.000 to Point/Station 2.100
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 150.000(Ft.)
Top (of initial area) elevation = 1373.000(Ft.)
Bottom (of initial area) elevation = 1351.000(Ft.)
Difference in elevation = 22.000(Ft.)
Slope = 0.14667 s(percent)= 14.67
TC = $k(0.940)*[(length^3)/(elevation\ change)]^{0.2}$
Initial area time of concentration = 10.240 min.
Rainfall intensity = 2.595(In/Hr) for a 10.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.762
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 74.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 0.712(CFS)
Total initial stream area = 0.360(Ac.)
Pervious area fraction = 1.000

+++++
Process from Point/Station 2.200 to Point/Station 2.300
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.762
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 74.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 10.24 min.
Rainfall intensity = 2.595(In/Hr) for a 10.0 year storm
Subarea runoff = 1.919(CFS) for 0.970(Ac.)
Total runoff = 2.631(CFS) Total area = 1.330(Ac.)

+++++
Process from Point/Station 2.400 to Point/Station 2.500
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.762
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 74.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 10.24 min.
Rainfall intensity = 2.595(In/Hr) for a 10.0 year storm

Subarea runoff = 1.424(CFS) for 0.720(Ac.)
Total runoff = 4.056(CFS) Total area = 2.050(Ac.)

+++++
Process from Point/Station 2.600 to Point/Station 20.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.762
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 74.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 10.24 min.
Rainfall intensity = 2.595(In/Hr) for a 10.0 year storm
Subarea runoff = 4.511(CFS) for 2.280(Ac.)
Total runoff = 8.566(CFS) Total area = 4.330(Ac.)
End of computations, total study area = 20.17 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(A_p) = 1.000
Area averaged RI index number = 53.9

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 07/07/22

File:1162007EX.out

VALUED ENGINEERING, INC
PRE-DEVELOPED
WINERY DEVELOPMENT
100-YEAR STORMEVENT

***** Hydrology Study Control Information *****

English (in-lb) Units used in input data file

Program License Serial Number 6335

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.514(In.)
100 year, 1 hour precipitation = 1.650(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.650(In/Hr)
Slope of intensity duration curve = 0.5500

++++
Process from Point/Station 1.000 to Point/Station 1.100
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 705.000(Ft.)
Top (of initial area) elevation = 1376.800(Ft.)
Bottom (of initial area) elevation = 1317.000(Ft.)
Difference in elevation = 59.800(Ft.)
Slope = 0.08482 s(percent)= 8.48
 $TC = k(0.940)^*[(length^3)/(elevation\ change)]^{0.2}$

Initial area time of concentration = 21.218 min.
Rainfall intensity = 2.923(In/Hr) for a 100.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.827
Decimal fraction soil group A = 0.170
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.830
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 83.73
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 1.546(CFS)
Total initial stream area = 0.640(Ac.)
Pervious area fraction = 1.000

+++++
Process from Point/Station 1.200 to Point/Station 1.300
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.770
Decimal fraction soil group A = 0.560
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.440
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 73.07
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 21.22 min.
Rainfall intensity = 2.923(In/Hr) for a 100.0 year storm
Subarea runoff = 7.206(CFS) for 3.200(Ac.)
Total runoff = 8.752(CFS) Total area = 3.840(Ac.)

+++++
Process from Point/Station 2.200 to Point/Station 1.400
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.844
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 21.22 min.
Rainfall intensity = 2.923(In/Hr) for a 100.0 year storm
Subarea runoff = 1.703(CFS) for 0.690(Ac.)
Total runoff = 10.455(CFS) Total area = 4.530(Ac.)

+++++
Process from Point/Station 1.400 to Point/Station 1.500
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.708
Decimal fraction soil group A = 0.870
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.130
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 62.68
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 21.22 min.
Rainfall intensity = 2.923(In/Hr) for a 100.0 year storm
Subarea runoff = 6.309(CFS) for 3.050(Ac.)
Total runoff = 16.764(CFS) Total area = 7.580(Ac.)

+++++
Process from Point/Station 2.400 to Point/Station 10.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.844
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 21.22 min.
Rainfall intensity = 2.923(In/Hr) for a 100.0 year storm
Subarea runoff = 3.332(CFS) for 1.350(Ac.)
Total runoff = 20.096(CFS) Total area = 8.930(Ac.)

+++++
Process from Point/Station 1.500 to Point/Station 10.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.684
Decimal fraction soil group A = 0.970
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.030
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 59.08
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 21.22 min.
Rainfall intensity = 2.923(In/Hr) for a 100.0 year storm
Subarea runoff = 13.812(CFS) for 6.910(Ac.)
Total runoff = 33.908(CFS) Total area = 15.840(Ac.)

+++++
Process from Point/Station 2.000 to Point/Station 2.100
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 150.000(Ft.)
Top (of initial area) elevation = 1373.000(Ft.)
Bottom (of initial area) elevation = 1351.000(Ft.)
Difference in elevation = 22.000(Ft.)
Slope = 0.14667 s(percent)= 14.67
TC = $k(0.940)*[(\text{length}^3)/(\text{elevation change})]^{0.2}$
Initial area time of concentration = 10.240 min.
Rainfall intensity = 4.363(In/Hr) for a 100.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.862
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 1.354(CFS)
Total initial stream area = 0.360(Ac.)
Pervious area fraction = 1.000

+++++
Process from Point/Station 2.200 to Point/Station 2.300
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.862
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 10.24 min.
Rainfall intensity = 4.363(In/Hr) for a 100.0 year storm
Subarea runoff = 3.648(CFS) for 0.970(Ac.)
Total runoff = 5.002(CFS) Total area = 1.330(Ac.)

+++++
Process from Point/Station 2.400 to Point/Station 2.500
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.862
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 10.24 min.
Rainfall intensity = 4.363(In/Hr) for a 100.0 year storm

Subarea runoff = 2.708(CFS) for 0.720(Ac.)
Total runoff = 7.710(CFS) Total area = 2.050(Ac.)

+++++
Process from Point/Station 2.600 to Point/Station 20.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.862
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 10.24 min.
Rainfall intensity = 4.363(In/Hr) for a 100.0 year storm
Subarea runoff = 8.575(CFS) for 2.280(Ac.)
Total runoff = 16.286(CFS) Total area = 4.330(Ac.)
End of computations, total study area = 20.17 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(A_p) = 1.000
Area averaged RI index number = 53.9

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 07/11/22

File:1162007PR0.out

VALUED ENGINEERING, INC
POST-DEVELOPED
WINERY DEVELOPMENT
2-YEAR STORMEVENT

***** Hydrology Study Control Information *****

English (in-lb) Units used in input data file

Program License Serial Number 6335

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation = 0.514(In.)
100 year, 1 hour precipitation = 1.650(In.)

Storm event year = 2.0
Calculated rainfall intensity data:
1 hour intensity = 0.514(In/Hr)
Slope of intensity duration curve = 0.5500

++++
Process from Point/Station 1.000 to Point/Station 1.100
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 400.000(Ft.)
Top (of initial area) elevation = 1363.480(Ft.)
Bottom (of initial area) elevation = 1361.900(Ft.)
Difference in elevation = 1.580(Ft.)
Slope = 0.00395 s(percent)= 0.39
 $TC = k(0.300)^*[(length^3)/(elevation\ change)]^{0.2}$

Initial area time of concentration = 9.968 min.
Rainfall intensity = 1.379(In/Hr) for a 2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.856
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 49.80
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 0.921(CFS)
Total initial stream area = 0.780(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 1.100 to Point/Station 10.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1361.900(Ft.)
Downstream point/station elevation = 1346.000(Ft.)
Pipe length = 320.00(Ft.) Manning's N= 0.013
No. of pipes = 1 Required pipe flow = 0.921(CFS)
Nearest computed pipe diameter = 6.00(In.)
Calculated individual pipe flow = 0.921(CFS)
Normal flow depth in pipe = 3.83(In.)
Flow top width inside pipe = 5.77(In.)
Critical Depth = 5.56(In.)
Pipe flow velocity = 6.96(Ft/s)
Travel time through pipe = 0.77 min.
Time of concentration (TC) = 10.73 min.

+++++
Process from Point/Station 1.100 to Point/Station 10.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 0.780(Ac.)
Runoff from this stream = 0.921(CFS)
Time of concentration = 10.73 min.
Rainfall intensity = 1.324(In/Hr)

+++++
Process from Point/Station 1.000 to Point/Station 1.200
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 231.000(Ft.)
Top (of initial area) elevation = 1363.480(Ft.)
Bottom (of initial area) elevation = 1361.000(Ft.)
Difference in elevation = 2.480(Ft.)
Slope = 0.01074 s(percent)= 1.07
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$

Initial area time of concentration = 6.552 min.
Rainfall intensity = 1.738(In/Hr) for a 2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.861
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 49.80
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 0.449(CFS)
Total initial stream area = 0.300(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 1.200 to Point/Station 10.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1361.000(Ft.)
Downstream point/station elevation = 1346.000(Ft.)
Pipe length = 220.00(Ft.) Manning's N= 0.013
No. of pipes = 1 Required pipe flow = 0.449(CFS)
Nearest computed pipe diameter = 6.00(In.)
Calculated individual pipe flow = 0.449(CFS)
Normal flow depth in pipe = 2.28(In.)
Flow top width inside pipe = 5.82(In.)
Critical Depth = 4.09(In.)
Pipe flow velocity = 6.56(Ft/s)
Travel time through pipe = 0.56 min.
Time of concentration (TC) = 7.11 min.

+++++
Process from Point/Station 1.200 to Point/Station 10.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 0.300(Ac.)
Runoff from this stream = 0.449(CFS)
Time of concentration = 7.11 min.
Rainfall intensity = 1.661(In/Hr)

+++++
Process from Point/Station 1.100 to Point/Station 1.300
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 420.000(Ft.)
Top (of initial area) elevation = 1361.900(Ft.)
Bottom (of initial area) elevation = 1347.400(Ft.)
Difference in elevation = 14.500(Ft.)
Slope = 0.03452 s(percent)= 3.45
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$

Initial area time of concentration = 6.589 min.
 Rainfall intensity = 1.732(In/Hr) for a 2.0 year storm
 COMMERCIAL subarea type
 Runoff Coefficient = 0.861
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 1.000
 Decimal fraction soil group D = 0.000
 RI index for soil(AMC 1) = 49.80
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Initial subarea runoff = 1.521(CFS)
 Total initial stream area = 1.020(Ac.)
 Pervious area fraction = 0.100

++++++
 Process from Point/Station 1.300 to Point/Station 10.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1347.400(Ft.)
 Downstream point/station elevation = 1346.000(Ft.)
 Pipe length = 12.00(Ft.) Manning's N= 0.013
 No. of pipes = 1 Required pipe flow = 1.521(CFS)
 Nearest computed pipe diameter = 6.00(In.)
 Calculated individual pipe flow = 1.521(CFS)
 Normal flow depth in pipe = 4.04(In.)
 Flow top width inside pipe = 5.63(In.)
 Critical depth could not be calculated.
 Pipe flow velocity = 10.83(Ft/s)
 Travel time through pipe = 0.02 min.
 Time of concentration (TC) = 6.61 min.

++++++
 Process from Point/Station 1.300 to Point/Station 10.000
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 3
 Stream flow area = 1.020(Ac.)
 Runoff from this stream = 1.521(CFS)
 Time of concentration = 6.61 min.
 Rainfall intensity = 1.730(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	0.921	10.73	1.324
2	0.449	7.11	1.661
3	1.521	6.61	1.730

Largest stream flow has longer or shorter time of concentration
 $Q_p = \frac{1.521 + \text{sum of}}{Q_a \quad T_b/T_a}$

$0.921 * 0.616 = 0.567$
 $Qa \quad Tb/Ta$
 $0.449 * 0.929 = 0.417$
 $Qp = 2.504$

Total of 3 streams to confluence:

Flow rates before confluence point:

0.921 0.449 1.521

Area of streams before confluence:

0.780 0.300 1.020

Results of confluence:

Total flow rate = 2.504(CFS)

Time of concentration = 6.607 min.

Effective stream area after confluence = 2.100(Ac.)

++++++
 Process from Point/Station 2.000 to Point/Station 2.100
 ***** INITIAL AREA EVALUATION *****

Initial area flow distance = 77.000(Ft.)
 Top (of initial area) elevation = 1376.000(Ft.)
 Bottom (of initial area) elevation = 1362.230(Ft.)
 Difference in elevation = 13.770(Ft.)
 Slope = 0.17883 s(percent)= 17.88
 $TC = k(0.940)*[(length^3)/(elevation\ change)]^{0.2}$
 Initial area time of concentration = 7.538 min.
 Rainfall intensity = 1.609(In/Hr) for a 2.0 year storm
 UNDEVELOPED (good cover) subarea
 Runoff Coefficient = 0.543
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 1.000
 Decimal fraction soil group D = 0.000
 RI index for soil(AMC 1) = 55.80
 Pervious area fraction = 1.000; Impervious fraction = 0.000
 Initial subarea runoff = 0.131(CFS)
 Total initial stream area = 0.150(Ac.)
 Pervious area fraction = 1.000

++++++
 Process from Point/Station 2.100 to Point/Station 2.100
 ***** SUBAREA FLOW ADDITION *****

COMMERCIAL subarea type
 Runoff Coefficient = 0.859
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 1.000
 Decimal fraction soil group D = 0.000
 RI index for soil(AMC 1) = 49.80
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Time of concentration = 7.54 min.

Rainfall intensity = 1.609(In/Hr) for a 2.0 year storm
Subarea runoff = 0.097(CFS) for 0.070(Ac.)
Total runoff = 0.228(CFS) Total area = 0.220(Ac.)

+++++
Process from Point/Station 2.100 to Point/Station 2.100
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.444
Decimal fraction soil group A = 0.260
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.740
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 44.64
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 7.54 min.
Rainfall intensity = 1.609(In/Hr) for a 2.0 year storm
Subarea runoff = 0.307(CFS) for 0.430(Ac.)
Total runoff = 0.535(CFS) Total area = 0.650(Ac.)

+++++
Process from Point/Station 2.100 to Point/Station 2.200
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.348
Decimal fraction soil group A = 0.550
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.450
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 34.36
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 7.54 min.
Rainfall intensity = 1.609(In/Hr) for a 2.0 year storm
Subarea runoff = 1.805(CFS) for 3.220(Ac.)
Total runoff = 2.339(CFS) Total area = 3.870(Ac.)

+++++
Process from Point/Station 1.300 to Point/Station 2.300
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.241
Decimal fraction soil group A = 0.900
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 23.28
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 7.54 min.

Rainfall intensity = 1.609(In/Hr) for a 2.0 year storm
Subarea runoff = 1.148(CFS) for 2.960(Ac.)
Total runoff = 3.488(CFS) Total area = 6.830(Ac.)

+++++
Process from Point/Station 2.400 to Point/Station 20.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.827
Decimal fraction soil group A = 0.980
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.020
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 16.64
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 7.54 min.
Rainfall intensity = 1.609(In/Hr) for a 2.0 year storm
Subarea runoff = 9.105(CFS) for 6.840(Ac.)
Total runoff = 12.593(CFS) Total area = 13.670(Ac.)

+++++
Process from Point/Station 20.000 to Point/Station 20.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.859
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 49.80
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 7.54 min.
Rainfall intensity = 1.609(In/Hr) for a 2.0 year storm
Subarea runoff = 0.401(CFS) for 0.290(Ac.)
Total runoff = 12.994(CFS) Total area = 13.960(Ac.)

+++++
Process from Point/Station 20.000 to Point/Station 20.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.543
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 55.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 7.54 min.

Rainfall intensity = 1.609(In/Hr) for a 2.0 year storm
Subarea runoff = 0.822(CFS) for 0.940(Ac.)
Total runoff = 13.815(CFS) Total area = 14.900(Ac.)

+++++
Process from Point/Station 3.000 to Point/Station 3.100
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 142.000(Ft.)
Top (of initial area) elevation = 1373.000(Ft.)
Bottom (of initial area) elevation = 1351.000(Ft.)
Difference in elevation = 22.000(Ft.)
Slope = 0.15493 s(percent)= 15.49
TC = $k(0.940)*[(\text{length}^3)/(\text{elevation change})]^{0.2}$
Initial area time of concentration = 9.909 min.
Rainfall intensity = 1.384(In/Hr) for a 2.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.510
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 55.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 0.071(CFS)
Total initial stream area = 0.100(Ac.)
Pervious area fraction = 1.000

+++++
Process from Point/Station 1.000 to Point/Station 3.100
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.856
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 49.80
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 9.91 min.
Rainfall intensity = 1.384(In/Hr) for a 2.0 year storm
Subarea runoff = 0.059(CFS) for 0.050(Ac.)
Total runoff = 0.130(CFS) Total area = 0.150(Ac.)

+++++
Process from Point/Station 3.200 to Point/Station 3.300
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.856

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 49.80
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 9.91 min.
Rainfall intensity = 1.384(In/Hr) for a 2.0 year storm
Subarea runoff = 0.284(CFS) for 0.240(Ac.)
Total runoff = 0.414(CFS) Total area = 0.390(Ac.)

+++++
Process from Point/Station 3.300 to Point/Station 3.400
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.856
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 49.80
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 9.91 min.
Rainfall intensity = 1.384(In/Hr) for a 2.0 year storm
Subarea runoff = 0.083(CFS) for 0.070(Ac.)
Total runoff = 0.497(CFS) Total area = 0.460(Ac.)

+++++
Process from Point/Station 3.400 to Point/Station 3.500
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.510
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 55.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 9.91 min.
Rainfall intensity = 1.384(In/Hr) for a 2.0 year storm
Subarea runoff = 0.297(CFS) for 0.420(Ac.)
Total runoff = 0.794(CFS) Total area = 0.880(Ac.)

+++++
Process from Point/Station 3.500 to Point/Station 30.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.510

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 55.80
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 9.91 min.
Rainfall intensity = 1.384(In/Hr) for a 2.0 year storm
Subarea runoff = 1.625(CFS) for 2.300(Ac.)
Total runoff = 2.419(CFS) Total area = 3.180(Ac.)
End of computations, total study area = 20.18 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(A_p) = 0.569
Area averaged RI index number = 51.2

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 07/11/22

File:1162007PR0.out

VALUED ENGINEERING, INC
POST-DEVELOPED
WINERY DEVELOPMENT
10-YEAR STORM EVENT

***** Hydrology Study Control Information *****

English (in-lb) Units used in input data file

Program License Serial Number 6335

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 10.00 Antecedent Moisture Condition = 2

2 year, 1 hour precipitation = 0.514(In.)

100 year, 1 hour precipitation = 1.650(In.)

Storm event year = 10.0

Calculated rainfall intensity data:

1 hour intensity = 0.981(In/Hr)

Slope of intensity duration curve = 0.5500

++++
Process from Point/Station 1.000 to Point/Station 1.100
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 400.000(Ft.)

Top (of initial area) elevation = 1363.480(Ft.)

Bottom (of initial area) elevation = 1361.900(Ft.)

Difference in elevation = 1.580(Ft.)

Slope = 0.00395 s(percent) = 0.39

TC = $k(0.300)^*[(\text{length}^3)/(\text{elevation change})]^{0.2}$

Initial area time of concentration = 9.968 min.
Rainfall intensity = 2.634(In/Hr) for a 10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 69.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 1.815(CFS)
Total initial stream area = 0.780(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 1.100 to Point/Station 10.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1361.900(Ft.)
Downstream point/station elevation = 1346.000(Ft.)
Pipe length = 320.00(Ft.) Manning's N= 0.013
No. of pipes = 1 Required pipe flow = 1.815(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 1.815(CFS)
Normal flow depth in pipe = 4.46(In.)
Flow top width inside pipe = 9.00(In.)
Critical Depth = 7.40(In.)
Pipe flow velocity = 8.31(Ft/s)
Travel time through pipe = 0.64 min.
Time of concentration (TC) = 10.61 min.

+++++
Process from Point/Station 1.100 to Point/Station 10.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 0.780(Ac.)
Runoff from this stream = 1.815(CFS)
Time of concentration = 10.61 min.
Rainfall intensity = 2.545(In/Hr)

+++++
Process from Point/Station 1.000 to Point/Station 1.200
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 231.000(Ft.)
Top (of initial area) elevation = 1363.480(Ft.)
Bottom (of initial area) elevation = 1361.000(Ft.)
Difference in elevation = 2.480(Ft.)
Slope = 0.01074 s(percent)= 1.07
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$

Initial area time of concentration = 6.552 min.
Rainfall intensity = 3.317(In/Hr) for a 10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.886
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 69.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 0.882(CFS)
Total initial stream area = 0.300(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 1.200 to Point/Station 10.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1361.000(Ft.)
Downstream point/station elevation = 1346.000(Ft.)
Pipe length = 220.00(Ft.) Manning's N= 0.013
No. of pipes = 1 Required pipe flow = 0.882(CFS)
Nearest computed pipe diameter = 6.00(In.)
Calculated individual pipe flow = 0.882(CFS)
Normal flow depth in pipe = 3.36(In.)
Flow top width inside pipe = 5.96(In.)
Critical Depth = 5.50(In.)
Pipe flow velocity = 7.81(Ft/s)
Travel time through pipe = 0.47 min.
Time of concentration (TC) = 7.02 min.

+++++
Process from Point/Station 1.200 to Point/Station 10.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 0.300(Ac.)
Runoff from this stream = 0.882(CFS)
Time of concentration = 7.02 min.
Rainfall intensity = 3.193(In/Hr)

+++++
Process from Point/Station 1.100 to Point/Station 1.300
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 420.000(Ft.)
Top (of initial area) elevation = 1361.900(Ft.)
Bottom (of initial area) elevation = 1347.400(Ft.)
Difference in elevation = 14.500(Ft.)
Slope = 0.03452 s(percent)= 3.45
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$

Initial area time of concentration = 6.589 min.
 Rainfall intensity = 3.307(In/Hr) for a 10.0 year storm
 COMMERCIAL subarea type
 Runoff Coefficient = 0.886
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 1.000
 Decimal fraction soil group D = 0.000
 RI index for soil(AMC 2) = 69.00
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Initial subarea runoff = 2.990(CFS)
 Total initial stream area = 1.020(Ac.)
 Pervious area fraction = 0.100

++++++
 Process from Point/Station 1.300 to Point/Station 10.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1347.400(Ft.)
 Downstream point/station elevation = 1346.000(Ft.)
 Pipe length = 12.00(Ft.) Manning's N= 0.013
 No. of pipes = 1 Required pipe flow = 2.990(CFS)
 Nearest computed pipe diameter = 9.00(In.)
 Calculated individual pipe flow = 2.990(CFS)
 Normal flow depth in pipe = 4.65(In.)
 Flow top width inside pipe = 8.99(In.)
 Critical depth could not be calculated.
 Pipe flow velocity = 12.97(Ft/s)
 Travel time through pipe = 0.02 min.
 Time of concentration (TC) = 6.60 min.

++++++
 Process from Point/Station 1.300 to Point/Station 10.000
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 3
 Stream flow area = 1.020(Ac.)
 Runoff from this stream = 2.990(CFS)
 Time of concentration = 6.60 min.
 Rainfall intensity = 3.303(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	1.815	10.61	2.545
2	0.882	7.02	3.193
3	2.990	6.60	3.303

Largest stream flow has longer or shorter time of concentration
 $Q_p = \frac{2.990 + \text{sum of}}{Q_a \quad T_b/T_a}$

	1.815 *	0.622 =	1.129
	Qa	Tb/Ta	
	0.882 *	0.940 =	0.829
Qp =	4.949		

Total of 3 streams to confluence:

Flow rates before confluence point:

1.815	0.882	2.990
-------	-------	-------

Area of streams before confluence:

0.780	0.300	1.020
-------	-------	-------

Results of confluence:

Total flow rate = 4.949(CFS)

Time of concentration = 6.604 min.

Effective stream area after confluence = 2.100(Ac.)

+++++
 Process from Point/Station 2.000 to Point/Station 2.100
 ***** INITIAL AREA EVALUATION *****

Initial area flow distance = 77.000(Ft.)
 Top (of initial area) elevation = 1376.000(Ft.)
 Bottom (of initial area) elevation = 1362.230(Ft.)
 Difference in elevation = 13.770(Ft.)
 Slope = 0.17883 s(percent)= 17.88
 $TC = k(0.940)*[(length^3)/(elevation\ change)]^{0.2}$
 Initial area time of concentration = 7.538 min.
 Rainfall intensity = 3.071(In/Hr) for a 10.0 year storm
 UNDEVELOPED (good cover) subarea
 Runoff Coefficient = 0.781
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 1.000
 Decimal fraction soil group D = 0.000
 RI index for soil(AMC 2) = 74.00
 Pervious area fraction = 1.000; Impervious fraction = 0.000
 Initial subarea runoff = 0.360(CFS)
 Total initial stream area = 0.150(Ac.)
 Pervious area fraction = 1.000

+++++
 Process from Point/Station 2.100 to Point/Station 2.100
 ***** SUBAREA FLOW ADDITION *****

COMMERCIAL subarea type
 Runoff Coefficient = 0.885
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 1.000
 Decimal fraction soil group D = 0.000
 RI index for soil(AMC 2) = 69.00
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Time of concentration = 7.54 min.

Rainfall intensity = 3.071(In/Hr) for a 10.0 year storm
Subarea runoff = 0.190(CFS) for 0.070(Ac.)
Total runoff = 0.550(CFS) Total area = 0.220(Ac.)

+++++
Process from Point/Station 2.100 to Point/Station 2.100
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.727
Decimal fraction soil group A = 0.260
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.740
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 64.64
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 7.54 min.
Rainfall intensity = 3.071(In/Hr) for a 10.0 year storm
Subarea runoff = 0.961(CFS) for 0.430(Ac.)
Total runoff = 1.511(CFS) Total area = 0.650(Ac.)

+++++
Process from Point/Station 2.100 to Point/Station 2.200
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.658
Decimal fraction soil group A = 0.550
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.450
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 54.20
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 7.54 min.
Rainfall intensity = 3.071(In/Hr) for a 10.0 year storm
Subarea runoff = 6.512(CFS) for 3.220(Ac.)
Total runoff = 8.023(CFS) Total area = 3.870(Ac.)

+++++
Process from Point/Station 1.300 to Point/Station 2.300
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.559
Decimal fraction soil group A = 0.900
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 41.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 7.54 min.

Rainfall intensity = 3.071(In/Hr) for a 10.0 year storm
Subarea runoff = 5.084(CFS) for 2.960(Ac.)
Total runoff = 13.106(CFS) Total area = 6.830(Ac.)

+++++
Process from Point/Station 2.400 to Point/Station 20.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.858
Decimal fraction soil group A = 0.980
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.020
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 32.74
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 7.54 min.
Rainfall intensity = 3.071(In/Hr) for a 10.0 year storm
Subarea runoff = 18.016(CFS) for 6.840(Ac.)
Total runoff = 31.122(CFS) Total area = 13.670(Ac.)

+++++
Process from Point/Station 20.000 to Point/Station 20.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.885
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 69.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 7.54 min.
Rainfall intensity = 3.071(In/Hr) for a 10.0 year storm
Subarea runoff = 0.789(CFS) for 0.290(Ac.)
Total runoff = 31.911(CFS) Total area = 13.960(Ac.)

+++++
Process from Point/Station 20.000 to Point/Station 20.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.781
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 74.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 7.54 min.

Rainfall intensity = 3.071(In/Hr) for a 10.0 year storm
Subarea runoff = 2.255(CFS) for 0.940(Ac.)
Total runoff = 34.166(CFS) Total area = 14.900(Ac.)

+++++
Process from Point/Station 3.000 to Point/Station 3.100
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 142.000(Ft.)
Top (of initial area) elevation = 1373.000(Ft.)
Bottom (of initial area) elevation = 1351.000(Ft.)
Difference in elevation = 22.000(Ft.)
Slope = 0.15493 s(percent)= 15.49
TC = $k(0.940)*[(\text{length}^3)/(\text{elevation change})]^{0.2}$
Initial area time of concentration = 9.909 min.
Rainfall intensity = 2.642(In/Hr) for a 10.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.764
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 74.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 0.202(CFS)
Total initial stream area = 0.100(Ac.)
Pervious area fraction = 1.000

+++++
Process from Point/Station 1.000 to Point/Station 3.100
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 69.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 9.91 min.
Rainfall intensity = 2.642(In/Hr) for a 10.0 year storm
Subarea runoff = 0.117(CFS) for 0.050(Ac.)
Total runoff = 0.319(CFS) Total area = 0.150(Ac.)

+++++
Process from Point/Station 3.200 to Point/Station 3.300
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.883

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 69.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 9.91 min.
Rainfall intensity = 2.642(In/Hr) for a 10.0 year storm
Subarea runoff = 0.560(CFS) for 0.240(Ac.)
Total runoff = 0.879(CFS) Total area = 0.390(Ac.)

+++++
Process from Point/Station 3.300 to Point/Station 3.400
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 69.00
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 9.91 min.
Rainfall intensity = 2.642(In/Hr) for a 10.0 year storm
Subarea runoff = 0.163(CFS) for 0.070(Ac.)
Total runoff = 1.042(CFS) Total area = 0.460(Ac.)

+++++
Process from Point/Station 3.400 to Point/Station 3.500
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.764
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 74.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 9.91 min.
Rainfall intensity = 2.642(In/Hr) for a 10.0 year storm
Subarea runoff = 0.848(CFS) for 0.420(Ac.)
Total runoff = 1.891(CFS) Total area = 0.880(Ac.)

+++++
Process from Point/Station 3.500 to Point/Station 30.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.764

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 2) = 74.00
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 9.91 min.
Rainfall intensity = 2.642(In/Hr) for a 10.0 year storm
Subarea runoff = 4.646(CFS) for 2.300(Ac.)
Total runoff = 6.537(CFS) Total area = 3.180(Ac.)
End of computations, total study area = 20.18 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(A_p) = 0.569
Area averaged RI index number = 51.2

Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2014 Version 9.0
Rational Hydrology Study Date: 07/11/22

File:1162007PR0.out

VALUED ENGINEERING, INC
POST-DEVELOPED
WINERY DEVELOPMENT
100-YEAR STORMEVENT

***** Hydrology Study Control Information *****

English (in-lb) Units used in input data file

Program License Serial Number 6335

Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) = 100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation = 0.514(In.)
100 year, 1 hour precipitation = 1.650(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity = 1.650(In/Hr)
Slope of intensity duration curve = 0.5500

++++
Process from Point/Station 1.000 to Point/Station 1.100
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 400.000(Ft.)
Top (of initial area) elevation = 1363.480(Ft.)
Bottom (of initial area) elevation = 1361.900(Ft.)
Difference in elevation = 1.580(Ft.)
Slope = 0.00395 s(percent)= 0.39
 $TC = k(0.300)^*[(length^3)/(elevation\ change)]^{0.2}$

Initial area time of concentration = 9.968 min.
Rainfall intensity = 4.428(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.895
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.40
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 3.092(CFS)
Total initial stream area = 0.780(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 1.100 to Point/Station 10.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1361.900(Ft.)
Downstream point/station elevation = 1346.000(Ft.)
Pipe length = 320.00(Ft.) Manning's N= 0.013
No. of pipes = 1 Required pipe flow = 3.092(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 3.092(CFS)
Normal flow depth in pipe = 6.30(In.)
Flow top width inside pipe = 8.24(In.)
Critical depth could not be calculated.
Pipe flow velocity = 9.35(Ft/s)
Travel time through pipe = 0.57 min.
Time of concentration (TC) = 10.54 min.

+++++
Process from Point/Station 1.100 to Point/Station 10.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 0.780(Ac.)
Runoff from this stream = 3.092(CFS)
Time of concentration = 10.54 min.
Rainfall intensity = 4.295(In/Hr)

+++++
Process from Point/Station 1.000 to Point/Station 1.200
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 231.000(Ft.)
Top (of initial area) elevation = 1363.480(Ft.)
Bottom (of initial area) elevation = 1361.000(Ft.)
Difference in elevation = 2.480(Ft.)
Slope = 0.01074 s(percent)= 1.07
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$

Initial area time of concentration = 6.552 min.
Rainfall intensity = 5.578(In/Hr) for a 100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.896
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.40
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 1.500(CFS)
Total initial stream area = 0.300(Ac.)
Pervious area fraction = 0.100

+++++
Process from Point/Station 1.200 to Point/Station 10.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1361.000(Ft.)
Downstream point/station elevation = 1346.000(Ft.)
Pipe length = 220.00(Ft.) Manning's N= 0.013
No. of pipes = 1 Required pipe flow = 1.500(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 1.500(CFS)
Normal flow depth in pipe = 3.66(In.)
Flow top width inside pipe = 8.84(In.)
Critical Depth = 6.77(In.)
Pipe flow velocity = 8.89(Ft/s)
Travel time through pipe = 0.41 min.
Time of concentration (TC) = 6.96 min.

+++++
Process from Point/Station 1.200 to Point/Station 10.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 0.300(Ac.)
Runoff from this stream = 1.500(CFS)
Time of concentration = 6.96 min.
Rainfall intensity = 5.393(In/Hr)

+++++
Process from Point/Station 1.100 to Point/Station 1.300
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 420.000(Ft.)
Top (of initial area) elevation = 1361.900(Ft.)
Bottom (of initial area) elevation = 1347.400(Ft.)
Difference in elevation = 14.500(Ft.)
Slope = 0.03452 s(percent)= 3.45
 $TC = k(0.300)*[(length^3)/(elevation\ change)]^{0.2}$

Initial area time of concentration = 6.589 min.
 Rainfall intensity = 5.561(In/Hr) for a 100.0 year storm
 COMMERCIAL subarea type
 Runoff Coefficient = 0.896
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 1.000
 Decimal fraction soil group D = 0.000
 RI index for soil(AMC 3) = 84.40
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Initial subarea runoff = 5.083(CFS)
 Total initial stream area = 1.020(Ac.)
 Pervious area fraction = 0.100

++++++
 Process from Point/Station 1.300 to Point/Station 10.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1347.400(Ft.)
 Downstream point/station elevation = 1346.000(Ft.)
 Pipe length = 12.00(Ft.) Manning's N= 0.013
 No. of pipes = 1 Required pipe flow = 5.083(CFS)
 Nearest computed pipe diameter = 9.00(In.)
 Calculated individual pipe flow = 5.083(CFS)
 Normal flow depth in pipe = 6.67(In.)
 Flow top width inside pipe = 7.89(In.)
 Critical depth could not be calculated.
 Pipe flow velocity = 14.47(Ft/s)
 Travel time through pipe = 0.01 min.
 Time of concentration (TC) = 6.60 min.

++++++
 Process from Point/Station 1.300 to Point/Station 10.000
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 3
 Stream flow area = 1.020(Ac.)
 Runoff from this stream = 5.083(CFS)
 Time of concentration = 6.60 min.
 Rainfall intensity = 5.554(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	3.092	10.54	4.295
2	1.500	6.96	5.393
3	5.083	6.60	5.554

Largest stream flow has longer or shorter time of concentration
 $Q_p = \frac{5.083 + \text{sum of}}{Q_a \quad T_b/T_a}$

	3.092 *	0.626 =	1.937
	Qa	Tb/Ta	
	1.500 *	0.948 =	1.422
Qp =	8.442		

Total of 3 streams to confluence:

Flow rates before confluence point:

3.092	1.500	5.083
-------	-------	-------

Area of streams before confluence:

0.780	0.300	1.020
-------	-------	-------

Results of confluence:

Total flow rate = 8.442(CFS)

Time of concentration = 6.602 min.

Effective stream area after confluence = 2.100(Ac.)

+++++

Process from Point/Station	2.000 to Point/Station	2.100
**** INITIAL AREA EVALUATION ****		

Initial area flow distance = 77.000(Ft.)
 Top (of initial area) elevation = 1376.000(Ft.)
 Bottom (of initial area) elevation = 1362.230(Ft.)
 Difference in elevation = 13.770(Ft.)
 Slope = 0.17883 s(percent)= 17.88
 $TC = k(0.940)*[(length^3)/(elevation\ change)]^{0.2}$
 Initial area time of concentration = 7.538 min.
 Rainfall intensity = 5.164(In/Hr) for a 100.0 year storm
 UNDEVELOPED (good cover) subarea
 Runoff Coefficient = 0.868
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 1.000
 Decimal fraction soil group D = 0.000
 RI index for soil(AMC 3) = 87.40
 Pervious area fraction = 1.000; Impervious fraction = 0.000
 Initial subarea runoff = 0.672(CFS)
 Total initial stream area = 0.150(Ac.)
 Pervious area fraction = 1.000

+++++

Process from Point/Station	2.100 to Point/Station	2.100
**** SUBAREA FLOW ADDITION ****		

COMMERCIAL subarea type
 Runoff Coefficient = 0.896
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 1.000
 Decimal fraction soil group D = 0.000
 RI index for soil(AMC 3) = 84.40
 Pervious area fraction = 0.100; Impervious fraction = 0.900
 Time of concentration = 7.54 min.

Rainfall intensity = 5.164(In/Hr) for a 100.0 year storm
Subarea runoff = 0.324(CFS) for 0.070(Ac.)
Total runoff = 0.996(CFS) Total area = 0.220(Ac.)

+++++
Process from Point/Station 2.100 to Point/Station 2.100
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.851
Decimal fraction soil group A = 0.260
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.740
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 81.71
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 7.54 min.
Rainfall intensity = 5.164(In/Hr) for a 100.0 year storm
Subarea runoff = 1.889(CFS) for 0.430(Ac.)
Total runoff = 2.885(CFS) Total area = 0.650(Ac.)

+++++
Process from Point/Station 2.100 to Point/Station 2.200
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.823
Decimal fraction soil group A = 0.550
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.450
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 73.36
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 7.54 min.
Rainfall intensity = 5.164(In/Hr) for a 100.0 year storm
Subarea runoff = 13.682(CFS) for 3.220(Ac.)
Total runoff = 16.568(CFS) Total area = 3.870(Ac.)

+++++
Process from Point/Station 1.300 to Point/Station 2.300
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.775
Decimal fraction soil group A = 0.900
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.100
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 61.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 7.54 min.

Rainfall intensity = 5.164(In/Hr) for a 100.0 year storm
Subarea runoff = 11.850(CFS) for 2.960(Ac.)
Total runoff = 28.417(CFS) Total area = 6.830(Ac.)

+++++
Process from Point/Station 2.400 to Point/Station 20.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.883
Decimal fraction soil group A = 0.980
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.020
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 52.74
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 7.54 min.
Rainfall intensity = 5.164(In/Hr) for a 100.0 year storm
Subarea runoff = 31.192(CFS) for 6.840(Ac.)
Total runoff = 59.610(CFS) Total area = 13.670(Ac.)

+++++
Process from Point/Station 20.000 to Point/Station 20.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.896
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.40
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 7.54 min.
Rainfall intensity = 5.164(In/Hr) for a 100.0 year storm
Subarea runoff = 1.342(CFS) for 0.290(Ac.)
Total runoff = 60.951(CFS) Total area = 13.960(Ac.)

+++++
Process from Point/Station 20.000 to Point/Station 20.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.868
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 7.54 min.

Rainfall intensity = 5.164(In/Hr) for a 100.0 year storm
Subarea runoff = 4.212(CFS) for 0.940(Ac.)
Total runoff = 65.163(CFS) Total area = 14.900(Ac.)

+++++
Process from Point/Station 3.000 to Point/Station 3.100
**** INITIAL AREA EVALUATION ****

Initial area flow distance = 142.000(Ft.)
Top (of initial area) elevation = 1373.000(Ft.)
Bottom (of initial area) elevation = 1351.000(Ft.)
Difference in elevation = 22.000(Ft.)
Slope = 0.15493 s(percent)= 15.49
TC = $k(0.940)*[(\text{length}^3)/(\text{elevation change})]^{0.2}$
Initial area time of concentration = 9.909 min.
Rainfall intensity = 4.443(In/Hr) for a 100.0 year storm
UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.863
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 0.383(CFS)
Total initial stream area = 0.100(Ac.)
Pervious area fraction = 1.000

+++++
Process from Point/Station 1.000 to Point/Station 3.100
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.895
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.40
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 9.91 min.
Rainfall intensity = 4.443(In/Hr) for a 100.0 year storm
Subarea runoff = 0.199(CFS) for 0.050(Ac.)
Total runoff = 0.582(CFS) Total area = 0.150(Ac.)

+++++
Process from Point/Station 3.200 to Point/Station 3.300
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.895

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.40
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 9.91 min.
Rainfall intensity = 4.443(In/Hr) for a 100.0 year storm
Subarea runoff = 0.955(CFS) for 0.240(Ac.)
Total runoff = 1.537(CFS) Total area = 0.390(Ac.)

+++++
Process from Point/Station 3.300 to Point/Station 3.400
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Runoff Coefficient = 0.895
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 84.40
Pervious area fraction = 0.100; Impervious fraction = 0.900
Time of concentration = 9.91 min.
Rainfall intensity = 4.443(In/Hr) for a 100.0 year storm
Subarea runoff = 0.278(CFS) for 0.070(Ac.)
Total runoff = 1.815(CFS) Total area = 0.460(Ac.)

+++++
Process from Point/Station 3.400 to Point/Station 3.500
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.863
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 9.91 min.
Rainfall intensity = 4.443(In/Hr) for a 100.0 year storm
Subarea runoff = 1.610(CFS) for 0.420(Ac.)
Total runoff = 3.425(CFS) Total area = 0.880(Ac.)

+++++
Process from Point/Station 3.500 to Point/Station 30.000
**** SUBAREA FLOW ADDITION ****

UNDEVELOPED (good cover) subarea
Runoff Coefficient = 0.863

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 3) = 87.40
Pervious area fraction = 1.000; Impervious fraction = 0.000
Time of concentration = 9.91 min.
Rainfall intensity = 4.443(In/Hr) for a 100.0 year storm
Subarea runoff = 8.815(CFS) for 2.300(Ac.)
Total runoff = 12.240(CFS) Total area = 3.180(Ac.)
End of computations, total study area = 20.18 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(A_p) = 0.569
Area averaged RI index number = 51.2

APPENDIX “D”

SYNTHETIC UNIT HYDROGRAPH METHOD

PRE-DEVELOPED 1-HR/24-HR, (2-YEAR, 10-YEAR & 100-YEAR)
POST-DEVELOPED 1-HR/24-HR, (2-YEAR, 10-YEAR & 100-YEAR)

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
Study date 07/11/22 File: 1162007EXUH242.out

+++++

Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6335

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

VALUED ENGINEERING, INC
1162007 - WINERY DEVELOPMENT
PRE-DEVELOPED, UNIT-HYDROGRAPH
2-YEAR, 24-HOUR STORMEVENT

Drainage Area = 2.10(Ac.) = 0.003 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 2.10(Ac.) =
0.003 Sq. Mi.
Length along longest watercourse = 330.00(Ft.)
Length along longest watercourse measured to centroid =
158.00(Ft.)
Length along longest watercourse = 0.063 Mi.
Length along longest watercourse measured to centroid = 0.030 Mi.
Difference in elevation = 18.00(Ft.)
Slope along watercourse = 288.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.023 Hr.
Lag time = 1.35 Min.
25% of lag time = 0.34 Min.
40% of lag time = 0.54 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.10	2.21	4.64

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.10	6.56	13.78

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.210(In)
Area Averaged 100-Year Rainfall = 6.560(In)

Point rain (area averaged) = 2.210(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.210(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
2.100	74.00	0.000

Total Area Entered = 2.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
74.0	55.8	0.513	0.000	0.513	1.000	0.513
Sum (F) =						0.513

Area averaged mean soil loss (F) (In/Hr) = 0.513
Minimum soil loss rate ((In/Hr)) = 0.256
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	369.358	62.850	1.330
2 0.167	738.716	33.581	0.711
3 0.250	1108.074	3.569	0.076
Sum = 100.000		Sum=	2.116

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time	Pattern	Storm Rain	Loss rate(In./Hr)	Effective
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	(Hr.)	Percent	(In/Hr)	Max		Low	(In/Hr)
1	0.08	0.07	0.018	(0.909)		0.016	0.002
2	0.17	0.07	0.018	(0.906)		0.016	0.002
3	0.25	0.07	0.018	(0.902)		0.016	0.002
4	0.33	0.10	0.027	(0.899)		0.024	0.003
5	0.42	0.10	0.027	(0.895)		0.024	0.003
6	0.50	0.10	0.027	(0.892)		0.024	0.003
7	0.58	0.10	0.027	(0.888)		0.024	0.003
8	0.67	0.10	0.027	(0.885)		0.024	0.003
9	0.75	0.10	0.027	(0.881)		0.024	0.003
10	0.83	0.13	0.035	(0.878)		0.032	0.004
11	0.92	0.13	0.035	(0.874)		0.032	0.004
12	1.00	0.13	0.035	(0.871)		0.032	0.004
13	1.08	0.10	0.027	(0.867)		0.024	0.003
14	1.17	0.10	0.027	(0.864)		0.024	0.003
15	1.25	0.10	0.027	(0.861)		0.024	0.003
16	1.33	0.10	0.027	(0.857)		0.024	0.003
17	1.42	0.10	0.027	(0.854)		0.024	0.003
18	1.50	0.10	0.027	(0.850)		0.024	0.003
19	1.58	0.10	0.027	(0.847)		0.024	0.003
20	1.67	0.10	0.027	(0.843)		0.024	0.003
21	1.75	0.10	0.027	(0.840)		0.024	0.003
22	1.83	0.13	0.035	(0.837)		0.032	0.004
23	1.92	0.13	0.035	(0.833)		0.032	0.004
24	2.00	0.13	0.035	(0.830)		0.032	0.004
25	2.08	0.13	0.035	(0.827)		0.032	0.004
26	2.17	0.13	0.035	(0.823)		0.032	0.004
27	2.25	0.13	0.035	(0.820)		0.032	0.004
28	2.33	0.13	0.035	(0.817)		0.032	0.004
29	2.42	0.13	0.035	(0.813)		0.032	0.004
30	2.50	0.13	0.035	(0.810)		0.032	0.004
31	2.58	0.17	0.044	(0.807)		0.040	0.004
32	2.67	0.17	0.044	(0.803)		0.040	0.004
33	2.75	0.17	0.044	(0.800)		0.040	0.004
34	2.83	0.17	0.044	(0.797)		0.040	0.004
35	2.92	0.17	0.044	(0.793)		0.040	0.004
36	3.00	0.17	0.044	(0.790)		0.040	0.004
37	3.08	0.17	0.044	(0.787)		0.040	0.004
38	3.17	0.17	0.044	(0.784)		0.040	0.004
39	3.25	0.17	0.044	(0.780)		0.040	0.004
40	3.33	0.17	0.044	(0.777)		0.040	0.004
41	3.42	0.17	0.044	(0.774)		0.040	0.004
42	3.50	0.17	0.044	(0.771)		0.040	0.004
43	3.58	0.17	0.044	(0.767)		0.040	0.004
44	3.67	0.17	0.044	(0.764)		0.040	0.004
45	3.75	0.17	0.044	(0.761)		0.040	0.004
46	3.83	0.20	0.053	(0.758)		0.048	0.005
47	3.92	0.20	0.053	(0.755)		0.048	0.005
48	4.00	0.20	0.053	(0.751)		0.048	0.005
49	4.08	0.20	0.053	(0.748)		0.048	0.005
50	4.17	0.20	0.053	(0.745)		0.048	0.005
51	4.25	0.20	0.053	(0.742)		0.048	0.005
52	4.33	0.23	0.062	(0.739)		0.056	0.006
53	4.42	0.23	0.062	(0.736)		0.056	0.006

54	4.50	0.23	0.062	(0.732)	0.056	0.006
55	4.58	0.23	0.062	(0.729)	0.056	0.006
56	4.67	0.23	0.062	(0.726)	0.056	0.006
57	4.75	0.23	0.062	(0.723)	0.056	0.006
58	4.83	0.27	0.071	(0.720)	0.064	0.007
59	4.92	0.27	0.071	(0.717)	0.064	0.007
60	5.00	0.27	0.071	(0.714)	0.064	0.007
61	5.08	0.20	0.053	(0.711)	0.048	0.005
62	5.17	0.20	0.053	(0.707)	0.048	0.005
63	5.25	0.20	0.053	(0.704)	0.048	0.005
64	5.33	0.23	0.062	(0.701)	0.056	0.006
65	5.42	0.23	0.062	(0.698)	0.056	0.006
66	5.50	0.23	0.062	(0.695)	0.056	0.006
67	5.58	0.27	0.071	(0.692)	0.064	0.007
68	5.67	0.27	0.071	(0.689)	0.064	0.007
69	5.75	0.27	0.071	(0.686)	0.064	0.007
70	5.83	0.27	0.071	(0.683)	0.064	0.007
71	5.92	0.27	0.071	(0.680)	0.064	0.007
72	6.00	0.27	0.071	(0.677)	0.064	0.007
73	6.08	0.30	0.080	(0.674)	0.072	0.008
74	6.17	0.30	0.080	(0.671)	0.072	0.008
75	6.25	0.30	0.080	(0.668)	0.072	0.008
76	6.33	0.30	0.080	(0.665)	0.072	0.008
77	6.42	0.30	0.080	(0.662)	0.072	0.008
78	6.50	0.30	0.080	(0.659)	0.072	0.008
79	6.58	0.33	0.088	(0.656)	0.080	0.009
80	6.67	0.33	0.088	(0.653)	0.080	0.009
81	6.75	0.33	0.088	(0.650)	0.080	0.009
82	6.83	0.33	0.088	(0.647)	0.080	0.009
83	6.92	0.33	0.088	(0.644)	0.080	0.009
84	7.00	0.33	0.088	(0.641)	0.080	0.009
85	7.08	0.33	0.088	(0.638)	0.080	0.009
86	7.17	0.33	0.088	(0.636)	0.080	0.009
87	7.25	0.33	0.088	(0.633)	0.080	0.009
88	7.33	0.37	0.097	(0.630)	0.088	0.010
89	7.42	0.37	0.097	(0.627)	0.088	0.010
90	7.50	0.37	0.097	(0.624)	0.088	0.010
91	7.58	0.40	0.106	(0.621)	0.095	0.011
92	7.67	0.40	0.106	(0.618)	0.095	0.011
93	7.75	0.40	0.106	(0.615)	0.095	0.011
94	7.83	0.43	0.115	(0.613)	0.103	0.011
95	7.92	0.43	0.115	(0.610)	0.103	0.011
96	8.00	0.43	0.115	(0.607)	0.103	0.011
97	8.08	0.50	0.133	(0.604)	0.119	0.013
98	8.17	0.50	0.133	(0.601)	0.119	0.013
99	8.25	0.50	0.133	(0.598)	0.119	0.013
100	8.33	0.50	0.133	(0.596)	0.119	0.013
101	8.42	0.50	0.133	(0.593)	0.119	0.013
102	8.50	0.50	0.133	(0.590)	0.119	0.013
103	8.58	0.53	0.141	(0.587)	0.127	0.014
104	8.67	0.53	0.141	(0.585)	0.127	0.014
105	8.75	0.53	0.141	(0.582)	0.127	0.014
106	8.83	0.57	0.150	(0.579)	0.135	0.015
107	8.92	0.57	0.150	(0.576)	0.135	0.015

108	9.00	0.57	0.150	(0.574)	0.135	0.015
109	9.08	0.63	0.168	(0.571)	0.151	0.017
110	9.17	0.63	0.168	(0.568)	0.151	0.017
111	9.25	0.63	0.168	(0.566)	0.151	0.017
112	9.33	0.67	0.177	(0.563)	0.159	0.018
113	9.42	0.67	0.177	(0.560)	0.159	0.018
114	9.50	0.67	0.177	(0.557)	0.159	0.018
115	9.58	0.70	0.186	(0.555)	0.167	0.019
116	9.67	0.70	0.186	(0.552)	0.167	0.019
117	9.75	0.70	0.186	(0.549)	0.167	0.019
118	9.83	0.73	0.194	(0.547)	0.175	0.019
119	9.92	0.73	0.194	(0.544)	0.175	0.019
120	10.00	0.73	0.194	(0.542)	0.175	0.019
121	10.08	0.50	0.133	(0.539)	0.119	0.013
122	10.17	0.50	0.133	(0.536)	0.119	0.013
123	10.25	0.50	0.133	(0.534)	0.119	0.013
124	10.33	0.50	0.133	(0.531)	0.119	0.013
125	10.42	0.50	0.133	(0.529)	0.119	0.013
126	10.50	0.50	0.133	(0.526)	0.119	0.013
127	10.58	0.67	0.177	(0.523)	0.159	0.018
128	10.67	0.67	0.177	(0.521)	0.159	0.018
129	10.75	0.67	0.177	(0.518)	0.159	0.018
130	10.83	0.67	0.177	(0.516)	0.159	0.018
131	10.92	0.67	0.177	(0.513)	0.159	0.018
132	11.00	0.67	0.177	(0.511)	0.159	0.018
133	11.08	0.63	0.168	(0.508)	0.151	0.017
134	11.17	0.63	0.168	(0.506)	0.151	0.017
135	11.25	0.63	0.168	(0.503)	0.151	0.017
136	11.33	0.63	0.168	(0.501)	0.151	0.017
137	11.42	0.63	0.168	(0.498)	0.151	0.017
138	11.50	0.63	0.168	(0.496)	0.151	0.017
139	11.58	0.57	0.150	(0.493)	0.135	0.015
140	11.67	0.57	0.150	(0.491)	0.135	0.015
141	11.75	0.57	0.150	(0.488)	0.135	0.015
142	11.83	0.60	0.159	(0.486)	0.143	0.016
143	11.92	0.60	0.159	(0.484)	0.143	0.016
144	12.00	0.60	0.159	(0.481)	0.143	0.016
145	12.08	0.83	0.221	(0.479)	0.199	0.022
146	12.17	0.83	0.221	(0.476)	0.199	0.022
147	12.25	0.83	0.221	(0.474)	0.199	0.022
148	12.33	0.87	0.230	(0.472)	0.207	0.023
149	12.42	0.87	0.230	(0.469)	0.207	0.023
150	12.50	0.87	0.230	(0.467)	0.207	0.023
151	12.58	0.93	0.248	(0.464)	0.223	0.025
152	12.67	0.93	0.248	(0.462)	0.223	0.025
153	12.75	0.93	0.248	(0.460)	0.223	0.025
154	12.83	0.97	0.256	(0.457)	0.231	0.026
155	12.92	0.97	0.256	(0.455)	0.231	0.026
156	13.00	0.97	0.256	(0.453)	0.231	0.026
157	13.08	1.13	0.301	(0.451)	0.271	0.030
158	13.17	1.13	0.301	(0.448)	0.271	0.030
159	13.25	1.13	0.301	(0.446)	0.271	0.030
160	13.33	1.13	0.301	(0.444)	0.271	0.030
161	13.42	1.13	0.301	(0.442)	0.271	0.030

162	13.50	1.13	0.301	(0.439)	0.271	0.030
163	13.58	0.77	0.203	(0.437)	0.183	0.020
164	13.67	0.77	0.203	(0.435)	0.183	0.020
165	13.75	0.77	0.203	(0.433)	0.183	0.020
166	13.83	0.77	0.203	(0.430)	0.183	0.020
167	13.92	0.77	0.203	(0.428)	0.183	0.020
168	14.00	0.77	0.203	(0.426)	0.183	0.020
169	14.08	0.90	0.239	(0.424)	0.215	0.024
170	14.17	0.90	0.239	(0.422)	0.215	0.024
171	14.25	0.90	0.239	(0.419)	0.215	0.024
172	14.33	0.87	0.230	(0.417)	0.207	0.023
173	14.42	0.87	0.230	(0.415)	0.207	0.023
174	14.50	0.87	0.230	(0.413)	0.207	0.023
175	14.58	0.87	0.230	(0.411)	0.207	0.023
176	14.67	0.87	0.230	(0.409)	0.207	0.023
177	14.75	0.87	0.230	(0.407)	0.207	0.023
178	14.83	0.83	0.221	(0.405)	0.199	0.022
179	14.92	0.83	0.221	(0.403)	0.199	0.022
180	15.00	0.83	0.221	(0.401)	0.199	0.022
181	15.08	0.80	0.212	(0.398)	0.191	0.021
182	15.17	0.80	0.212	(0.396)	0.191	0.021
183	15.25	0.80	0.212	(0.394)	0.191	0.021
184	15.33	0.77	0.203	(0.392)	0.183	0.020
185	15.42	0.77	0.203	(0.390)	0.183	0.020
186	15.50	0.77	0.203	(0.388)	0.183	0.020
187	15.58	0.63	0.168	(0.386)	0.151	0.017
188	15.67	0.63	0.168	(0.384)	0.151	0.017
189	15.75	0.63	0.168	(0.382)	0.151	0.017
190	15.83	0.63	0.168	(0.380)	0.151	0.017
191	15.92	0.63	0.168	(0.379)	0.151	0.017
192	16.00	0.63	0.168	(0.377)	0.151	0.017
193	16.08	0.13	0.035	(0.375)	0.032	0.004
194	16.17	0.13	0.035	(0.373)	0.032	0.004
195	16.25	0.13	0.035	(0.371)	0.032	0.004
196	16.33	0.13	0.035	(0.369)	0.032	0.004
197	16.42	0.13	0.035	(0.367)	0.032	0.004
198	16.50	0.13	0.035	(0.365)	0.032	0.004
199	16.58	0.10	0.027	(0.363)	0.024	0.003
200	16.67	0.10	0.027	(0.362)	0.024	0.003
201	16.75	0.10	0.027	(0.360)	0.024	0.003
202	16.83	0.10	0.027	(0.358)	0.024	0.003
203	16.92	0.10	0.027	(0.356)	0.024	0.003
204	17.00	0.10	0.027	(0.354)	0.024	0.003
205	17.08	0.17	0.044	(0.352)	0.040	0.004
206	17.17	0.17	0.044	(0.351)	0.040	0.004
207	17.25	0.17	0.044	(0.349)	0.040	0.004
208	17.33	0.17	0.044	(0.347)	0.040	0.004
209	17.42	0.17	0.044	(0.345)	0.040	0.004
210	17.50	0.17	0.044	(0.344)	0.040	0.004
211	17.58	0.17	0.044	(0.342)	0.040	0.004
212	17.67	0.17	0.044	(0.340)	0.040	0.004
213	17.75	0.17	0.044	(0.339)	0.040	0.004
214	17.83	0.13	0.035	(0.337)	0.032	0.004
215	17.92	0.13	0.035	(0.335)	0.032	0.004

216	18.00	0.13	0.035	(0.334)	0.032	0.004
217	18.08	0.13	0.035	(0.332)	0.032	0.004
218	18.17	0.13	0.035	(0.330)	0.032	0.004
219	18.25	0.13	0.035	(0.329)	0.032	0.004
220	18.33	0.13	0.035	(0.327)	0.032	0.004
221	18.42	0.13	0.035	(0.325)	0.032	0.004
222	18.50	0.13	0.035	(0.324)	0.032	0.004
223	18.58	0.10	0.027	(0.322)	0.024	0.003
224	18.67	0.10	0.027	(0.321)	0.024	0.003
225	18.75	0.10	0.027	(0.319)	0.024	0.003
226	18.83	0.07	0.018	(0.318)	0.016	0.002
227	18.92	0.07	0.018	(0.316)	0.016	0.002
228	19.00	0.07	0.018	(0.315)	0.016	0.002
229	19.08	0.10	0.027	(0.313)	0.024	0.003
230	19.17	0.10	0.027	(0.312)	0.024	0.003
231	19.25	0.10	0.027	(0.310)	0.024	0.003
232	19.33	0.13	0.035	(0.309)	0.032	0.004
233	19.42	0.13	0.035	(0.307)	0.032	0.004
234	19.50	0.13	0.035	(0.306)	0.032	0.004
235	19.58	0.10	0.027	(0.305)	0.024	0.003
236	19.67	0.10	0.027	(0.303)	0.024	0.003
237	19.75	0.10	0.027	(0.302)	0.024	0.003
238	19.83	0.07	0.018	(0.300)	0.016	0.002
239	19.92	0.07	0.018	(0.299)	0.016	0.002
240	20.00	0.07	0.018	(0.298)	0.016	0.002
241	20.08	0.10	0.027	(0.296)	0.024	0.003
242	20.17	0.10	0.027	(0.295)	0.024	0.003
243	20.25	0.10	0.027	(0.294)	0.024	0.003
244	20.33	0.10	0.027	(0.293)	0.024	0.003
245	20.42	0.10	0.027	(0.291)	0.024	0.003
246	20.50	0.10	0.027	(0.290)	0.024	0.003
247	20.58	0.10	0.027	(0.289)	0.024	0.003
248	20.67	0.10	0.027	(0.288)	0.024	0.003
249	20.75	0.10	0.027	(0.287)	0.024	0.003
250	20.83	0.07	0.018	(0.285)	0.016	0.002
251	20.92	0.07	0.018	(0.284)	0.016	0.002
252	21.00	0.07	0.018	(0.283)	0.016	0.002
253	21.08	0.10	0.027	(0.282)	0.024	0.003
254	21.17	0.10	0.027	(0.281)	0.024	0.003
255	21.25	0.10	0.027	(0.280)	0.024	0.003
256	21.33	0.07	0.018	(0.279)	0.016	0.002
257	21.42	0.07	0.018	(0.278)	0.016	0.002
258	21.50	0.07	0.018	(0.277)	0.016	0.002
259	21.58	0.10	0.027	(0.276)	0.024	0.003
260	21.67	0.10	0.027	(0.275)	0.024	0.003
261	21.75	0.10	0.027	(0.274)	0.024	0.003
262	21.83	0.07	0.018	(0.273)	0.016	0.002
263	21.92	0.07	0.018	(0.272)	0.016	0.002
264	22.00	0.07	0.018	(0.271)	0.016	0.002
265	22.08	0.10	0.027	(0.270)	0.024	0.003
266	22.17	0.10	0.027	(0.269)	0.024	0.003
267	22.25	0.10	0.027	(0.268)	0.024	0.003
268	22.33	0.07	0.018	(0.267)	0.016	0.002
269	22.42	0.07	0.018	(0.266)	0.016	0.002

270	22.50	0.07	0.018	(0.266)	0.016	0.002
271	22.58	0.07	0.018	(0.265)	0.016	0.002
272	22.67	0.07	0.018	(0.264)	0.016	0.002
273	22.75	0.07	0.018	(0.263)	0.016	0.002
274	22.83	0.07	0.018	(0.263)	0.016	0.002
275	22.92	0.07	0.018	(0.262)	0.016	0.002
276	23.00	0.07	0.018	(0.261)	0.016	0.002
277	23.08	0.07	0.018	(0.261)	0.016	0.002
278	23.17	0.07	0.018	(0.260)	0.016	0.002
279	23.25	0.07	0.018	(0.260)	0.016	0.002
280	23.33	0.07	0.018	(0.259)	0.016	0.002
281	23.42	0.07	0.018	(0.259)	0.016	0.002
282	23.50	0.07	0.018	(0.258)	0.016	0.002
283	23.58	0.07	0.018	(0.258)	0.016	0.002
284	23.67	0.07	0.018	(0.257)	0.016	0.002
285	23.75	0.07	0.018	(0.257)	0.016	0.002
286	23.83	0.07	0.018	(0.257)	0.016	0.002
287	23.92	0.07	0.018	(0.257)	0.016	0.002
288	24.00	0.07	0.018	(0.256)	0.016	0.002

(Loss Rate Not Used)

Sum = 100.0 Sum = 2.7

Flood volume = Effective rainfall 0.22(In)
times area 2.1(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)

Total soil loss = 1.99(In)

Total soil loss = 0.348(Ac.Ft)

Total rainfall = 2.21(In)

Flood volume = 1684.7 Cubic Feet

Total soil loss = 15162.1 Cubic Feet

Peak flow rate of this hydrograph = 0.064(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q					
0+10	0.0000	0.00	Q					
0+15	0.0001	0.00	Q					
0+20	0.0001	0.00	Q					
0+25	0.0001	0.01	Q					
0+30	0.0002	0.01	Q					
0+35	0.0002	0.01	Q					
0+40	0.0003	0.01	Q					
0+45	0.0003	0.01	Q					
0+50	0.0003	0.01	Q					
0+55	0.0004	0.01	Q					
1+ 0	0.0004	0.01	Q					
1+ 5	0.0005	0.01	Q					
1+10	0.0005	0.01	Q					

1+15	0.0006	0.01	Q				
1+20	0.0006	0.01	Q				
1+25	0.0006	0.01	Q				
1+30	0.0007	0.01	Q				
1+35	0.0007	0.01	Q				
1+40	0.0008	0.01	Q				
1+45	0.0008	0.01	Q				
1+50	0.0008	0.01	Q				
1+55	0.0009	0.01	Q				
2+ 0	0.0009	0.01	Q				
2+ 5	0.0010	0.01	QV				
2+10	0.0010	0.01	QV				
2+15	0.0011	0.01	QV				
2+20	0.0012	0.01	QV				
2+25	0.0012	0.01	QV				
2+30	0.0013	0.01	QV				
2+35	0.0013	0.01	QV				
2+40	0.0014	0.01	QV				
2+45	0.0014	0.01	QV				
2+50	0.0015	0.01	QV				
2+55	0.0016	0.01	QV				
3+ 0	0.0016	0.01	QV				
3+ 5	0.0017	0.01	QV				
3+10	0.0018	0.01	QV				
3+15	0.0018	0.01	QV				
3+20	0.0019	0.01	QV				
3+25	0.0020	0.01	Q V				
3+30	0.0020	0.01	Q V				
3+35	0.0021	0.01	Q V				
3+40	0.0022	0.01	Q V				
3+45	0.0022	0.01	Q V				
3+50	0.0023	0.01	Q V				
3+55	0.0024	0.01	Q V				
4+ 0	0.0024	0.01	Q V				
4+ 5	0.0025	0.01	Q V				
4+10	0.0026	0.01	Q V				
4+15	0.0027	0.01	Q V				
4+20	0.0028	0.01	Q V				
4+25	0.0029	0.01	Q V				
4+30	0.0029	0.01	Q V				
4+35	0.0030	0.01	Q V				
4+40	0.0031	0.01	Q V				
4+45	0.0032	0.01	Q V				
4+50	0.0033	0.01	Q V				
4+55	0.0034	0.01	Q V				
5+ 0	0.0035	0.01	Q V				
5+ 5	0.0036	0.01	Q V				
5+10	0.0037	0.01	Q V				
5+15	0.0038	0.01	Q V				
5+20	0.0038	0.01	Q V				
5+25	0.0039	0.01	Q V				
5+30	0.0040	0.01	Q V				
5+35	0.0041	0.01	Q V				
5+40	0.0042	0.01	Q V				

5+45	0.0043	0.01	Q	V				
5+50	0.0044	0.01	Q	V				
5+55	0.0045	0.01	Q	V				
6+ 0	0.0046	0.01	Q	V				
6+ 5	0.0047	0.02	Q	V				
6+10	0.0049	0.02	Q	V				
6+15	0.0050	0.02	Q	V				
6+20	0.0051	0.02	Q	V				
6+25	0.0052	0.02	Q	V				
6+30	0.0053	0.02	Q	V				
6+35	0.0055	0.02	Q	V				
6+40	0.0056	0.02	Q	V				
6+45	0.0057	0.02	Q	V				
6+50	0.0058	0.02	Q	V				
6+55	0.0060	0.02	Q	V				
7+ 0	0.0061	0.02	Q	V				
7+ 5	0.0062	0.02	Q	V				
7+10	0.0064	0.02	Q	V				
7+15	0.0065	0.02	Q	V				
7+20	0.0066	0.02	Q	V				
7+25	0.0068	0.02	Q	V				
7+30	0.0069	0.02	Q	V				
7+35	0.0071	0.02	Q	V				
7+40	0.0072	0.02	Q	V				
7+45	0.0074	0.02	Q	V				
7+50	0.0075	0.02	Q	V				
7+55	0.0077	0.02	Q	V				
8+ 0	0.0079	0.02	Q	V				
8+ 5	0.0080	0.03	Q	V				
8+10	0.0082	0.03	Q	V				
8+15	0.0084	0.03	Q	V				
8+20	0.0086	0.03	Q	V				
8+25	0.0088	0.03	Q	V				
8+30	0.0090	0.03	Q	V				
8+35	0.0092	0.03	Q	V				
8+40	0.0094	0.03	Q	V				
8+45	0.0096	0.03	Q	V				
8+50	0.0098	0.03	Q	V				
8+55	0.0101	0.03	Q	V				
9+ 0	0.0103	0.03	Q	V				
9+ 5	0.0105	0.03	Q	V				
9+10	0.0108	0.04	Q	V				
9+15	0.0110	0.04	Q	V				
9+20	0.0113	0.04	Q	V				
9+25	0.0115	0.04	Q	V				
9+30	0.0118	0.04	Q	V				
9+35	0.0120	0.04	Q	V				
9+40	0.0123	0.04	Q	V				
9+45	0.0126	0.04	Q	V				
9+50	0.0129	0.04	Q	V				
9+55	0.0131	0.04	Q	V				
10+ 0	0.0134	0.04	Q	V				
10+ 5	0.0136	0.03	Q	V				
10+10	0.0138	0.03	Q	V				

10+15	0.0140	0.03	Q	V			
10+20	0.0142	0.03	Q	V			
10+25	0.0144	0.03	Q	V			
10+30	0.0146	0.03	Q	V			
10+35	0.0149	0.03	Q	V			
10+40	0.0151	0.04	Q	V			
10+45	0.0154	0.04	Q	V			
10+50	0.0156	0.04	Q	V			
10+55	0.0159	0.04	Q	V			
11+ 0	0.0161	0.04	Q	V			
11+ 5	0.0164	0.04	Q	V			
11+10	0.0166	0.04	Q	V			
11+15	0.0169	0.04	Q	V			
11+20	0.0171	0.04	Q	V			
11+25	0.0174	0.04	Q	V			
11+30	0.0176	0.04	Q	V			
11+35	0.0178	0.03	Q	V			
11+40	0.0181	0.03	Q	V			
11+45	0.0183	0.03	Q	V			
11+50	0.0185	0.03	Q	V			
11+55	0.0187	0.03	Q	V			
12+ 0	0.0190	0.03	Q	V			
12+ 5	0.0193	0.04	Q	V			
12+10	0.0196	0.05	Q	V			
12+15	0.0199	0.05	Q	V			
12+20	0.0202	0.05	Q	V			
12+25	0.0206	0.05	Q	V			
12+30	0.0209	0.05	Q	V			
12+35	0.0213	0.05	Q	V			
12+40	0.0216	0.05	Q	V			
12+45	0.0220	0.05	Q	V			
12+50	0.0223	0.05	Q	V			
12+55	0.0227	0.05	Q	V			
13+ 0	0.0231	0.05	Q	V			
13+ 5	0.0235	0.06	Q	V			
13+10	0.0239	0.06	Q	V			
13+15	0.0244	0.06	Q	V			
13+20	0.0248	0.06	Q	V			
13+25	0.0253	0.06	Q	V			
13+30	0.0257	0.06	Q	V			
13+35	0.0260	0.05	Q	V			
13+40	0.0263	0.04	Q	V			
13+45	0.0266	0.04	Q	V			
13+50	0.0269	0.04	Q	V			
13+55	0.0272	0.04	Q	V			
14+ 0	0.0275	0.04	Q	V			
14+ 5	0.0279	0.05	Q	V			
14+10	0.0282	0.05	Q	V			
14+15	0.0286	0.05	Q	V			
14+20	0.0289	0.05	Q	V			
14+25	0.0292	0.05	Q	V			
14+30	0.0296	0.05	Q	V			
14+35	0.0299	0.05	Q	V			
14+40	0.0302	0.05	Q	V			

14+45	0.0306	0.05	Q			V	
14+50	0.0309	0.05	Q			V	
14+55	0.0312	0.05	Q			V	
15+ 0	0.0315	0.05	Q			V	
15+ 5	0.0319	0.05	Q			V	
15+10	0.0322	0.04	Q			V	
15+15	0.0325	0.04	Q			V	
15+20	0.0328	0.04	Q			V	
15+25	0.0331	0.04	Q			V	
15+30	0.0334	0.04	Q			V	
15+35	0.0336	0.04	Q			V	
15+40	0.0339	0.04	Q			V	
15+45	0.0341	0.04	Q			V	
15+50	0.0344	0.04	Q			V	
15+55	0.0346	0.04	Q			V	
16+ 0	0.0349	0.04	Q			V	
16+ 5	0.0350	0.02	Q			V	
16+10	0.0350	0.01	Q			V	
16+15	0.0351	0.01	Q			V	
16+20	0.0351	0.01	Q			V	
16+25	0.0352	0.01	Q			V	
16+30	0.0353	0.01	Q			V	
16+35	0.0353	0.01	Q			V	
16+40	0.0353	0.01	Q			V	
16+45	0.0354	0.01	Q			V	
16+50	0.0354	0.01	Q			V	
16+55	0.0354	0.01	Q			V	
17+ 0	0.0355	0.01	Q			V	
17+ 5	0.0355	0.01	Q			V	
17+10	0.0356	0.01	Q			V	
17+15	0.0357	0.01	Q			V	
17+20	0.0357	0.01	Q			V	
17+25	0.0358	0.01	Q			V	
17+30	0.0359	0.01	Q			V	
17+35	0.0359	0.01	Q			V	
17+40	0.0360	0.01	Q			V	
17+45	0.0361	0.01	Q			V	
17+50	0.0361	0.01	Q			V	
17+55	0.0362	0.01	Q			V	
18+ 0	0.0362	0.01	Q			V	
18+ 5	0.0363	0.01	Q			V	
18+10	0.0363	0.01	Q			V	
18+15	0.0364	0.01	Q			V	
18+20	0.0364	0.01	Q			V	
18+25	0.0365	0.01	Q			V	
18+30	0.0365	0.01	Q			V	
18+35	0.0366	0.01	Q			V	
18+40	0.0366	0.01	Q			V	
18+45	0.0366	0.01	Q			V	
18+50	0.0367	0.00	Q			V	
18+55	0.0367	0.00	Q			V	
19+ 0	0.0367	0.00	Q			V	
19+ 5	0.0368	0.00	Q			V	
19+10	0.0368	0.01	Q			V	

19+15	0.0368	0.01	Q				V
19+20	0.0369	0.01	Q				V
19+25	0.0369	0.01	Q				V
19+30	0.0370	0.01	Q				V
19+35	0.0370	0.01	Q				V
19+40	0.0371	0.01	Q				V
19+45	0.0371	0.01	Q				V
19+50	0.0371	0.00	Q				V
19+55	0.0372	0.00	Q				V
20+ 0	0.0372	0.00	Q				V
20+ 5	0.0372	0.00	Q				V
20+10	0.0373	0.01	Q				V
20+15	0.0373	0.01	Q				V
20+20	0.0373	0.01	Q				V
20+25	0.0374	0.01	Q				V
20+30	0.0374	0.01	Q				V
20+35	0.0375	0.01	Q				V
20+40	0.0375	0.01	Q				V
20+45	0.0375	0.01	Q				V
20+50	0.0376	0.00	Q				V
20+55	0.0376	0.00	Q				V
21+ 0	0.0376	0.00	Q				V
21+ 5	0.0377	0.00	Q				V
21+10	0.0377	0.01	Q				V
21+15	0.0377	0.01	Q				V
21+20	0.0378	0.00	Q				V
21+25	0.0378	0.00	Q				V
21+30	0.0378	0.00	Q				V
21+35	0.0378	0.00	Q				V
21+40	0.0379	0.01	Q				V
21+45	0.0379	0.01	Q				V
21+50	0.0380	0.00	Q				V
21+55	0.0380	0.00	Q				V
22+ 0	0.0380	0.00	Q				V
22+ 5	0.0380	0.00	Q				V
22+10	0.0381	0.01	Q				V
22+15	0.0381	0.01	Q				V
22+20	0.0381	0.00	Q				V
22+25	0.0382	0.00	Q				V
22+30	0.0382	0.00	Q				V
22+35	0.0382	0.00	Q				V
22+40	0.0383	0.00	Q				V
22+45	0.0383	0.00	Q				V
22+50	0.0383	0.00	Q				V
22+55	0.0383	0.00	Q				V
23+ 0	0.0384	0.00	Q				V
23+ 5	0.0384	0.00	Q				V
23+10	0.0384	0.00	Q				V
23+15	0.0384	0.00	Q				V
23+20	0.0385	0.00	Q				V
23+25	0.0385	0.00	Q				V
23+30	0.0385	0.00	Q				V
23+35	0.0385	0.00	Q				V
23+40	0.0386	0.00	Q				V

23+45	0.0386	0.00	Q				V
23+50	0.0386	0.00	Q				V
23+55	0.0386	0.00	Q				V
24+ 0	0.0387	0.00	Q				V
24+ 5	0.0387	0.00	Q				V
24+10	0.0387	0.00	Q				V

Unit Hydrograph Analysis

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Study date 07/11/22 File: 1162007EXUH2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6335

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

VALUED ENGINEERING, INC
1162007 - WINERY DEVELOPMENT
PRE-DEVELOPED, UNIT-HYDROGRAPH
10-YEAR, 24-HOUR STORMEVENT

Drainage Area = 2.10(Ac.) = 0.003 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 2.10(Ac.) =
0.003 Sq. Mi.
Length along longest watercourse = 330.00(Ft.)
Length along longest watercourse measured to centroid =
158.00(Ft.)
Length along longest watercourse = 0.063 Mi.
Length along longest watercourse measured to centroid = 0.030 Mi.
Difference in elevation = 18.00(Ft.)
Slope along watercourse = 288.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.023 Hr.
Lag time = 1.35 Min.
25% of lag time = 0.34 Min.
40% of lag time = 0.54 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.10	2.21	4.64

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.10	6.56	13.78

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.210(In)
Area Averaged 100-Year Rainfall = 6.560(In)

Point rain (area averaged) = 4.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
2.100	91.00	0.000

Total Area Entered = 2.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
91.0	91.0	0.117	0.000	0.117	1.000	0.117
Sum (F) =						0.117

Area averaged mean soil loss (F) (In/Hr) = 0.117
Minimum soil loss rate ((In/Hr)) = 0.059
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	369.358	62.850	1.330
2 0.167	738.716	33.581	0.711
3 0.250	1108.074	3.569	0.076
Sum = 100.000		Sum=	2.116

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time	Pattern	Storm Rain	Loss rate(In./Hr)	Effective
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	(Hr.)	Percent	(In/Hr)	Max		Low	(In/Hr)
1	0.08	0.07	0.032	(0.207)		0.029	0.003
2	0.17	0.07	0.032	(0.207)		0.029	0.003
3	0.25	0.07	0.032	(0.206)		0.029	0.003
4	0.33	0.10	0.048	(0.205)		0.043	0.005
5	0.42	0.10	0.048	(0.204)		0.043	0.005
6	0.50	0.10	0.048	(0.203)		0.043	0.005
7	0.58	0.10	0.048	(0.203)		0.043	0.005
8	0.67	0.10	0.048	(0.202)		0.043	0.005
9	0.75	0.10	0.048	(0.201)		0.043	0.005
10	0.83	0.13	0.064	(0.200)		0.058	0.006
11	0.92	0.13	0.064	(0.199)		0.058	0.006
12	1.00	0.13	0.064	(0.199)		0.058	0.006
13	1.08	0.10	0.048	(0.198)		0.043	0.005
14	1.17	0.10	0.048	(0.197)		0.043	0.005
15	1.25	0.10	0.048	(0.196)		0.043	0.005
16	1.33	0.10	0.048	(0.196)		0.043	0.005
17	1.42	0.10	0.048	(0.195)		0.043	0.005
18	1.50	0.10	0.048	(0.194)		0.043	0.005
19	1.58	0.10	0.048	(0.193)		0.043	0.005
20	1.67	0.10	0.048	(0.192)		0.043	0.005
21	1.75	0.10	0.048	(0.192)		0.043	0.005
22	1.83	0.13	0.064	(0.191)		0.058	0.006
23	1.92	0.13	0.064	(0.190)		0.058	0.006
24	2.00	0.13	0.064	(0.189)		0.058	0.006
25	2.08	0.13	0.064	(0.189)		0.058	0.006
26	2.17	0.13	0.064	(0.188)		0.058	0.006
27	2.25	0.13	0.064	(0.187)		0.058	0.006
28	2.33	0.13	0.064	(0.186)		0.058	0.006
29	2.42	0.13	0.064	(0.186)		0.058	0.006
30	2.50	0.13	0.064	(0.185)		0.058	0.006
31	2.58	0.17	0.080	(0.184)		0.072	0.008
32	2.67	0.17	0.080	(0.183)		0.072	0.008
33	2.75	0.17	0.080	(0.183)		0.072	0.008
34	2.83	0.17	0.080	(0.182)		0.072	0.008
35	2.92	0.17	0.080	(0.181)		0.072	0.008
36	3.00	0.17	0.080	(0.180)		0.072	0.008
37	3.08	0.17	0.080	(0.180)		0.072	0.008
38	3.17	0.17	0.080	(0.179)		0.072	0.008
39	3.25	0.17	0.080	(0.178)		0.072	0.008
40	3.33	0.17	0.080	(0.177)		0.072	0.008
41	3.42	0.17	0.080	(0.177)		0.072	0.008
42	3.50	0.17	0.080	(0.176)		0.072	0.008
43	3.58	0.17	0.080	(0.175)		0.072	0.008
44	3.67	0.17	0.080	(0.174)		0.072	0.008
45	3.75	0.17	0.080	(0.174)		0.072	0.008
46	3.83	0.20	0.096	(0.173)		0.086	0.010
47	3.92	0.20	0.096	(0.172)		0.086	0.010
48	4.00	0.20	0.096	(0.171)		0.086	0.010
49	4.08	0.20	0.096	(0.171)		0.086	0.010
50	4.17	0.20	0.096	(0.170)		0.086	0.010
51	4.25	0.20	0.096	(0.169)		0.086	0.010
52	4.33	0.23	0.112	(0.169)		0.101	0.011
53	4.42	0.23	0.112	(0.168)		0.101	0.011

54	4.50	0.23	0.112	(0.167)	0.101	0.011
55	4.58	0.23	0.112	(0.166)	0.101	0.011
56	4.67	0.23	0.112	(0.166)	0.101	0.011
57	4.75	0.23	0.112	(0.165)	0.101	0.011
58	4.83	0.27	0.128	(0.164)	0.115	0.013
59	4.92	0.27	0.128	(0.164)	0.115	0.013
60	5.00	0.27	0.128	(0.163)	0.115	0.013
61	5.08	0.20	0.096	(0.162)	0.086	0.010
62	5.17	0.20	0.096	(0.161)	0.086	0.010
63	5.25	0.20	0.096	(0.161)	0.086	0.010
64	5.33	0.23	0.112	(0.160)	0.101	0.011
65	5.42	0.23	0.112	(0.159)	0.101	0.011
66	5.50	0.23	0.112	(0.159)	0.101	0.011
67	5.58	0.27	0.128	(0.158)	0.115	0.013
68	5.67	0.27	0.128	(0.157)	0.115	0.013
69	5.75	0.27	0.128	(0.157)	0.115	0.013
70	5.83	0.27	0.128	(0.156)	0.115	0.013
71	5.92	0.27	0.128	(0.155)	0.115	0.013
72	6.00	0.27	0.128	(0.154)	0.115	0.013
73	6.08	0.30	0.144	(0.154)	0.130	0.014
74	6.17	0.30	0.144	(0.153)	0.130	0.014
75	6.25	0.30	0.144	(0.152)	0.130	0.014
76	6.33	0.30	0.144	(0.152)	0.130	0.014
77	6.42	0.30	0.144	(0.151)	0.130	0.014
78	6.50	0.30	0.144	(0.150)	0.130	0.014
79	6.58	0.33	0.160	(0.150)	0.144	0.016
80	6.67	0.33	0.160	(0.149)	0.144	0.016
81	6.75	0.33	0.160	(0.148)	0.144	0.016
82	6.83	0.33	0.160	(0.148)	0.144	0.016
83	6.92	0.33	0.160	(0.147)	0.144	0.016
84	7.00	0.33	0.160	(0.146)	0.144	0.016
85	7.08	0.33	0.160	(0.146)	0.144	0.016
86	7.17	0.33	0.160	(0.145)	0.144	0.016
87	7.25	0.33	0.160	(0.144)	0.144	0.016
88	7.33	0.37	0.176	0.144 (0.158)		0.032
89	7.42	0.37	0.176	0.143 (0.158)		0.033
90	7.50	0.37	0.176	0.142 (0.158)		0.034
91	7.58	0.40	0.192	0.142 (0.173)		0.050
92	7.67	0.40	0.192	0.141 (0.173)		0.051
93	7.75	0.40	0.192	0.140 (0.173)		0.052
94	7.83	0.43	0.208	0.140 (0.187)		0.068
95	7.92	0.43	0.208	0.139 (0.187)		0.069
96	8.00	0.43	0.208	0.138 (0.187)		0.070
97	8.08	0.50	0.240	0.138 (0.216)		0.102
98	8.17	0.50	0.240	0.137 (0.216)		0.103
99	8.25	0.50	0.240	0.137 (0.216)		0.103
100	8.33	0.50	0.240	0.136 (0.216)		0.104
101	8.42	0.50	0.240	0.135 (0.216)		0.105
102	8.50	0.50	0.240	0.135 (0.216)		0.105
103	8.58	0.53	0.256	0.134 (0.230)		0.122
104	8.67	0.53	0.256	0.133 (0.230)		0.123
105	8.75	0.53	0.256	0.133 (0.230)		0.123
106	8.83	0.57	0.272	0.132 (0.245)		0.140
107	8.92	0.57	0.272	0.131 (0.245)		0.140

108	9.00	0.57	0.272	0.131	(0.245)	0.141
109	9.08	0.63	0.304	0.130	(0.274)	0.174
110	9.17	0.63	0.304	0.130	(0.274)	0.174
111	9.25	0.63	0.304	0.129	(0.274)	0.175
112	9.33	0.67	0.320	0.128	(0.288)	0.192
113	9.42	0.67	0.320	0.128	(0.288)	0.192
114	9.50	0.67	0.320	0.127	(0.288)	0.193
115	9.58	0.70	0.336	0.127	(0.302)	0.209
116	9.67	0.70	0.336	0.126	(0.302)	0.210
117	9.75	0.70	0.336	0.125	(0.302)	0.211
118	9.83	0.73	0.352	0.125	(0.317)	0.227
119	9.92	0.73	0.352	0.124	(0.317)	0.228
120	10.00	0.73	0.352	0.124	(0.317)	0.228
121	10.08	0.50	0.240	0.123	(0.216)	0.117
122	10.17	0.50	0.240	0.122	(0.216)	0.118
123	10.25	0.50	0.240	0.122	(0.216)	0.118
124	10.33	0.50	0.240	0.121	(0.216)	0.119
125	10.42	0.50	0.240	0.121	(0.216)	0.119
126	10.50	0.50	0.240	0.120	(0.216)	0.120
127	10.58	0.67	0.320	0.119	(0.288)	0.201
128	10.67	0.67	0.320	0.119	(0.288)	0.201
129	10.75	0.67	0.320	0.118	(0.288)	0.202
130	10.83	0.67	0.320	0.118	(0.288)	0.202
131	10.92	0.67	0.320	0.117	(0.288)	0.203
132	11.00	0.67	0.320	0.117	(0.288)	0.203
133	11.08	0.63	0.304	0.116	(0.274)	0.188
134	11.17	0.63	0.304	0.115	(0.274)	0.189
135	11.25	0.63	0.304	0.115	(0.274)	0.189
136	11.33	0.63	0.304	0.114	(0.274)	0.190
137	11.42	0.63	0.304	0.114	(0.274)	0.190
138	11.50	0.63	0.304	0.113	(0.274)	0.191
139	11.58	0.57	0.272	0.113	(0.245)	0.159
140	11.67	0.57	0.272	0.112	(0.245)	0.160
141	11.75	0.57	0.272	0.111	(0.245)	0.161
142	11.83	0.60	0.288	0.111	(0.259)	0.177
143	11.92	0.60	0.288	0.110	(0.259)	0.178
144	12.00	0.60	0.288	0.110	(0.259)	0.178
145	12.08	0.83	0.400	0.109	(0.360)	0.291
146	12.17	0.83	0.400	0.109	(0.360)	0.291
147	12.25	0.83	0.400	0.108	(0.360)	0.292
148	12.33	0.87	0.416	0.108	(0.374)	0.308
149	12.42	0.87	0.416	0.107	(0.374)	0.309
150	12.50	0.87	0.416	0.107	(0.374)	0.309
151	12.58	0.93	0.448	0.106	(0.403)	0.342
152	12.67	0.93	0.448	0.105	(0.403)	0.343
153	12.75	0.93	0.448	0.105	(0.403)	0.343
154	12.83	0.97	0.464	0.104	(0.418)	0.360
155	12.92	0.97	0.464	0.104	(0.418)	0.360
156	13.00	0.97	0.464	0.103	(0.418)	0.361
157	13.08	1.13	0.544	0.103	(0.490)	0.441
158	13.17	1.13	0.544	0.102	(0.490)	0.442
159	13.25	1.13	0.544	0.102	(0.490)	0.442
160	13.33	1.13	0.544	0.101	(0.490)	0.443
161	13.42	1.13	0.544	0.101	(0.490)	0.443

162	13.50	1.13	0.544	0.100	(0.490)	0.444
163	13.58	0.77	0.368	0.100	(0.331)	0.268
164	13.67	0.77	0.368	0.099	(0.331)	0.269
165	13.75	0.77	0.368	0.099	(0.331)	0.269
166	13.83	0.77	0.368	0.098	(0.331)	0.270
167	13.92	0.77	0.368	0.098	(0.331)	0.270
168	14.00	0.77	0.368	0.097	(0.331)	0.271
169	14.08	0.90	0.432	0.097	(0.389)	0.335
170	14.17	0.90	0.432	0.096	(0.389)	0.336
171	14.25	0.90	0.432	0.096	(0.389)	0.336
172	14.33	0.87	0.416	0.095	(0.374)	0.321
173	14.42	0.87	0.416	0.095	(0.374)	0.321
174	14.50	0.87	0.416	0.094	(0.374)	0.322
175	14.58	0.87	0.416	0.094	(0.374)	0.322
176	14.67	0.87	0.416	0.093	(0.374)	0.323
177	14.75	0.87	0.416	0.093	(0.374)	0.323
178	14.83	0.83	0.400	0.092	(0.360)	0.308
179	14.92	0.83	0.400	0.092	(0.360)	0.308
180	15.00	0.83	0.400	0.091	(0.360)	0.309
181	15.08	0.80	0.384	0.091	(0.346)	0.293
182	15.17	0.80	0.384	0.090	(0.346)	0.294
183	15.25	0.80	0.384	0.090	(0.346)	0.294
184	15.33	0.77	0.368	0.090	(0.331)	0.278
185	15.42	0.77	0.368	0.089	(0.331)	0.279
186	15.50	0.77	0.368	0.089	(0.331)	0.279
187	15.58	0.63	0.304	0.088	(0.274)	0.216
188	15.67	0.63	0.304	0.088	(0.274)	0.216
189	15.75	0.63	0.304	0.087	(0.274)	0.217
190	15.83	0.63	0.304	0.087	(0.274)	0.217
191	15.92	0.63	0.304	0.086	(0.274)	0.218
192	16.00	0.63	0.304	0.086	(0.274)	0.218
193	16.08	0.13	0.064	(0.085)	0.058	0.006
194	16.17	0.13	0.064	(0.085)	0.058	0.006
195	16.25	0.13	0.064	(0.085)	0.058	0.006
196	16.33	0.13	0.064	(0.084)	0.058	0.006
197	16.42	0.13	0.064	(0.084)	0.058	0.006
198	16.50	0.13	0.064	(0.083)	0.058	0.006
199	16.58	0.10	0.048	(0.083)	0.043	0.005
200	16.67	0.10	0.048	(0.082)	0.043	0.005
201	16.75	0.10	0.048	(0.082)	0.043	0.005
202	16.83	0.10	0.048	(0.082)	0.043	0.005
203	16.92	0.10	0.048	(0.081)	0.043	0.005
204	17.00	0.10	0.048	(0.081)	0.043	0.005
205	17.08	0.17	0.080	(0.080)	0.072	0.008
206	17.17	0.17	0.080	(0.080)	0.072	0.008
207	17.25	0.17	0.080	(0.080)	0.072	0.008
208	17.33	0.17	0.080	(0.079)	0.072	0.008
209	17.42	0.17	0.080	(0.079)	0.072	0.008
210	17.50	0.17	0.080	(0.078)	0.072	0.008
211	17.58	0.17	0.080	(0.078)	0.072	0.008
212	17.67	0.17	0.080	(0.078)	0.072	0.008
213	17.75	0.17	0.080	(0.077)	0.072	0.008
214	17.83	0.13	0.064	(0.077)	0.058	0.006
215	17.92	0.13	0.064	(0.076)	0.058	0.006

216	18.00	0.13	0.064	(0.076)	0.058	0.006
217	18.08	0.13	0.064	(0.076)	0.058	0.006
218	18.17	0.13	0.064	(0.075)	0.058	0.006
219	18.25	0.13	0.064	(0.075)	0.058	0.006
220	18.33	0.13	0.064	(0.075)	0.058	0.006
221	18.42	0.13	0.064	(0.074)	0.058	0.006
222	18.50	0.13	0.064	(0.074)	0.058	0.006
223	18.58	0.10	0.048	(0.074)	0.043	0.005
224	18.67	0.10	0.048	(0.073)	0.043	0.005
225	18.75	0.10	0.048	(0.073)	0.043	0.005
226	18.83	0.07	0.032	(0.072)	0.029	0.003
227	18.92	0.07	0.032	(0.072)	0.029	0.003
228	19.00	0.07	0.032	(0.072)	0.029	0.003
229	19.08	0.10	0.048	(0.071)	0.043	0.005
230	19.17	0.10	0.048	(0.071)	0.043	0.005
231	19.25	0.10	0.048	(0.071)	0.043	0.005
232	19.33	0.13	0.064	(0.070)	0.058	0.006
233	19.42	0.13	0.064	(0.070)	0.058	0.006
234	19.50	0.13	0.064	(0.070)	0.058	0.006
235	19.58	0.10	0.048	(0.069)	0.043	0.005
236	19.67	0.10	0.048	(0.069)	0.043	0.005
237	19.75	0.10	0.048	(0.069)	0.043	0.005
238	19.83	0.07	0.032	(0.069)	0.029	0.003
239	19.92	0.07	0.032	(0.068)	0.029	0.003
240	20.00	0.07	0.032	(0.068)	0.029	0.003
241	20.08	0.10	0.048	(0.068)	0.043	0.005
242	20.17	0.10	0.048	(0.067)	0.043	0.005
243	20.25	0.10	0.048	(0.067)	0.043	0.005
244	20.33	0.10	0.048	(0.067)	0.043	0.005
245	20.42	0.10	0.048	(0.066)	0.043	0.005
246	20.50	0.10	0.048	(0.066)	0.043	0.005
247	20.58	0.10	0.048	(0.066)	0.043	0.005
248	20.67	0.10	0.048	(0.066)	0.043	0.005
249	20.75	0.10	0.048	(0.065)	0.043	0.005
250	20.83	0.07	0.032	(0.065)	0.029	0.003
251	20.92	0.07	0.032	(0.065)	0.029	0.003
252	21.00	0.07	0.032	(0.065)	0.029	0.003
253	21.08	0.10	0.048	(0.064)	0.043	0.005
254	21.17	0.10	0.048	(0.064)	0.043	0.005
255	21.25	0.10	0.048	(0.064)	0.043	0.005
256	21.33	0.07	0.032	(0.064)	0.029	0.003
257	21.42	0.07	0.032	(0.063)	0.029	0.003
258	21.50	0.07	0.032	(0.063)	0.029	0.003
259	21.58	0.10	0.048	(0.063)	0.043	0.005
260	21.67	0.10	0.048	(0.063)	0.043	0.005
261	21.75	0.10	0.048	(0.062)	0.043	0.005
262	21.83	0.07	0.032	(0.062)	0.029	0.003
263	21.92	0.07	0.032	(0.062)	0.029	0.003
264	22.00	0.07	0.032	(0.062)	0.029	0.003
265	22.08	0.10	0.048	(0.062)	0.043	0.005
266	22.17	0.10	0.048	(0.061)	0.043	0.005
267	22.25	0.10	0.048	(0.061)	0.043	0.005
268	22.33	0.07	0.032	(0.061)	0.029	0.003
269	22.42	0.07	0.032	(0.061)	0.029	0.003

270	22.50	0.07	0.032	(0.061)	0.029	0.003
271	22.58	0.07	0.032	(0.060)	0.029	0.003
272	22.67	0.07	0.032	(0.060)	0.029	0.003
273	22.75	0.07	0.032	(0.060)	0.029	0.003
274	22.83	0.07	0.032	(0.060)	0.029	0.003
275	22.92	0.07	0.032	(0.060)	0.029	0.003
276	23.00	0.07	0.032	(0.060)	0.029	0.003
277	23.08	0.07	0.032	(0.060)	0.029	0.003
278	23.17	0.07	0.032	(0.059)	0.029	0.003
279	23.25	0.07	0.032	(0.059)	0.029	0.003
280	23.33	0.07	0.032	(0.059)	0.029	0.003
281	23.42	0.07	0.032	(0.059)	0.029	0.003
282	23.50	0.07	0.032	(0.059)	0.029	0.003
283	23.58	0.07	0.032	(0.059)	0.029	0.003
284	23.67	0.07	0.032	(0.059)	0.029	0.003
285	23.75	0.07	0.032	(0.059)	0.029	0.003
286	23.83	0.07	0.032	(0.059)	0.029	0.003
287	23.92	0.07	0.032	(0.059)	0.029	0.003
288	24.00	0.07	0.032	(0.059)	0.029	0.003

(Loss Rate Not Used)

Sum = 100.0 Sum = 24.7

Flood volume = Effective rainfall 2.06(In)
times area 2.1(Ac.)/[(In)/(Ft.)] = 0.4(Ac.Ft)

Total soil loss = 1.94(In)

Total soil loss = 0.340(Ac.Ft)

Total rainfall = 4.00(In)

Flood volume = 15684.4 Cubic Feet

Total soil loss = 14804.6 Cubic Feet

Peak flow rate of this hydrograph = 0.939(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00	Q				
0+10	0.0001	0.01	Q				
0+15	0.0001	0.01	Q				
0+20	0.0002	0.01	Q				
0+25	0.0003	0.01	Q				
0+30	0.0003	0.01	Q				
0+35	0.0004	0.01	Q				
0+40	0.0005	0.01	Q				
0+45	0.0005	0.01	Q				
0+50	0.0006	0.01	Q				
0+55	0.0007	0.01	Q				
1+ 0	0.0008	0.01	Q				
1+ 5	0.0009	0.01	Q				
1+10	0.0010	0.01	Q				

1+15	0.0010	0.01	Q				
1+20	0.0011	0.01	Q				
1+25	0.0012	0.01	Q				
1+30	0.0012	0.01	Q				
1+35	0.0013	0.01	Q				
1+40	0.0014	0.01	Q				
1+45	0.0014	0.01	Q				
1+50	0.0015	0.01	Q				
1+55	0.0016	0.01	Q				
2+ 0	0.0017	0.01	Q				
2+ 5	0.0018	0.01	Q				
2+10	0.0019	0.01	Q				
2+15	0.0020	0.01	Q				
2+20	0.0021	0.01	Q				
2+25	0.0022	0.01	Q				
2+30	0.0023	0.01	Q				
2+35	0.0024	0.02	Q				
2+40	0.0025	0.02	Q				
2+45	0.0026	0.02	Q				
2+50	0.0027	0.02	Q				
2+55	0.0028	0.02	Q				
3+ 0	0.0030	0.02	Q				
3+ 5	0.0031	0.02	Q				
3+10	0.0032	0.02	Q				
3+15	0.0033	0.02	Q				
3+20	0.0034	0.02	Q				
3+25	0.0035	0.02	Q				
3+30	0.0037	0.02	Q				
3+35	0.0038	0.02	Q				
3+40	0.0039	0.02	Q				
3+45	0.0040	0.02	Q				
3+50	0.0041	0.02	Q				
3+55	0.0043	0.02	Q				
4+ 0	0.0044	0.02	Q				
4+ 5	0.0046	0.02	Q				
4+10	0.0047	0.02	Q				
4+15	0.0048	0.02	Q				
4+20	0.0050	0.02	Q				
4+25	0.0052	0.02	Q				
4+30	0.0053	0.02	Q				
4+35	0.0055	0.02	Q				
4+40	0.0056	0.02	Q				
4+45	0.0058	0.02	Q				
4+50	0.0060	0.03	Q				
4+55	0.0062	0.03	Q				
5+ 0	0.0064	0.03	Q				
5+ 5	0.0065	0.02	Q				
5+10	0.0067	0.02	Q				
5+15	0.0068	0.02	Q				
5+20	0.0070	0.02	Q				
5+25	0.0071	0.02	Q				
5+30	0.0073	0.02	Q				
5+35	0.0075	0.03	Q				
5+40	0.0076	0.03	Q				

5+45	0.0078	0.03	Q				
5+50	0.0080	0.03	Q				
5+55	0.0082	0.03	Q				
6+ 0	0.0084	0.03	Q				
6+ 5	0.0086	0.03	Q				
6+10	0.0088	0.03	Q				
6+15	0.0090	0.03	QV				
6+20	0.0092	0.03	QV				
6+25	0.0094	0.03	QV				
6+30	0.0096	0.03	QV				
6+35	0.0099	0.03	QV				
6+40	0.0101	0.03	QV				
6+45	0.0103	0.03	QV				
6+50	0.0106	0.03	QV				
6+55	0.0108	0.03	QV				
7+ 0	0.0110	0.03	QV				
7+ 5	0.0113	0.03	QV				
7+10	0.0115	0.03	QV				
7+15	0.0117	0.03	QV				
7+20	0.0121	0.06	QV				
7+25	0.0126	0.07	QV				
7+30	0.0131	0.07	QV				
7+35	0.0137	0.09	QV				
7+40	0.0144	0.11	QV				
7+45	0.0152	0.11	QV				
7+50	0.0161	0.13	QV				
7+55	0.0171	0.14	QV				
8+ 0	0.0181	0.15	Q V				
8+ 5	0.0194	0.19	Q V				
8+10	0.0209	0.21	Q V				
8+15	0.0224	0.22	Q V				
8+20	0.0239	0.22	Q V				
8+25	0.0254	0.22	Q V				
8+30	0.0270	0.22	Q V				
8+35	0.0287	0.25	Q V				
8+40	0.0304	0.26	Q V				
8+45	0.0322	0.26	Q V				
8+50	0.0342	0.28	Q V				
8+55	0.0362	0.30	Q V				
9+ 0	0.0383	0.30	Q V				
9+ 5	0.0406	0.34	Q V				
9+10	0.0431	0.37	Q V				
9+15	0.0457	0.37	Q V				
9+20	0.0484	0.39	Q V				
9+25	0.0512	0.41	Q V				
9+30	0.0540	0.41	Q V				
9+35	0.0570	0.43	Q V				
9+40	0.0600	0.44	Q V				
9+45	0.0631	0.45	Q V				
9+50	0.0663	0.47	Q V				
9+55	0.0696	0.48	Q V				
10+ 0	0.0729	0.48	Q V				
10+ 5	0.0752	0.34	Q V				
10+10	0.0770	0.26	Q V				

10+15	0.0787	0.25	Q	V				
10+20	0.0805	0.25	Q	V				
10+25	0.0822	0.25	Q	V				
10+30	0.0839	0.25	Q	V				
10+35	0.0864	0.36	Q	V				
10+40	0.0893	0.42	Q	V				
10+45	0.0923	0.43	Q	V				
10+50	0.0952	0.43	Q	V				
10+55	0.0982	0.43	Q	V				
11+ 0	0.1011	0.43	Q	V				
11+ 5	0.1040	0.41	Q	V				
11+10	0.1067	0.40	Q	V				
11+15	0.1095	0.40	Q	V				
11+20	0.1122	0.40	Q	V				
11+25	0.1150	0.40	Q	V				
11+30	0.1178	0.40	Q	V				
11+35	0.1203	0.36	Q	V				
11+40	0.1226	0.34	Q	V				
11+45	0.1250	0.34	Q	V				
11+50	0.1275	0.36	Q	V				
11+55	0.1300	0.37	Q	V				
12+ 0	0.1326	0.38	Q	V				
12+ 5	0.1363	0.53	Q	V				
12+10	0.1404	0.61	Q	V				
12+15	0.1447	0.62	Q	V				
12+20	0.1491	0.64	Q	V				
12+25	0.1536	0.65	Q	V				
12+30	0.1581	0.65	Q	V				
12+35	0.1629	0.70	Q	V				
12+40	0.1679	0.72	Q	V				
12+45	0.1729	0.73	Q	V				
12+50	0.1780	0.75	Q	V				
12+55	0.1833	0.76	Q	V				
13+ 0	0.1885	0.76	Q	V				
13+ 5	0.1945	0.87	Q	V				
13+10	0.2009	0.93	Q	V				
13+15	0.2074	0.94	Q	V				
13+20	0.2138	0.94	Q	V				
13+25	0.2203	0.94	Q	V				
13+30	0.2268	0.94	Q	V				
13+35	0.2316	0.71	Q	V				
13+40	0.2356	0.58	Q	V				
13+45	0.2396	0.57	Q	V				
13+50	0.2435	0.57	Q	V				
13+55	0.2474	0.57	Q	V				
14+ 0	0.2514	0.57	Q	V				
14+ 5	0.2559	0.66	Q	V				
14+10	0.2608	0.71	Q	V				
14+15	0.2657	0.71	Q	V				
14+20	0.2704	0.69	Q	V				
14+25	0.2751	0.68	Q	V				
14+30	0.2798	0.68	Q	V				
14+35	0.2845	0.68	Q	V				
14+40	0.2892	0.68	Q	V				

14+45	0.2939	0.68	Q				V	
14+50	0.2985	0.66	Q				V	
14+55	0.3030	0.65	Q				V	
15+ 0	0.3075	0.65	Q				V	
15+ 5	0.3118	0.63	Q				V	
15+10	0.3161	0.62	Q				V	
15+15	0.3204	0.62	Q				V	
15+20	0.3246	0.60	Q				V	
15+25	0.3286	0.59	Q				V	
15+30	0.3327	0.59	Q				V	
15+35	0.3362	0.51	Q				V	
15+40	0.3394	0.46	Q				V	
15+45	0.3425	0.46	Q				V	
15+50	0.3457	0.46	Q				V	
15+55	0.3489	0.46	Q				V	
16+ 0	0.3521	0.46	Q				V	
16+ 5	0.3533	0.18	Q				V	
16+10	0.3535	0.03	Q				V	
16+15	0.3536	0.01	Q				V	
16+20	0.3537	0.01	Q				V	
16+25	0.3538	0.01	Q				V	
16+30	0.3539	0.01	Q				V	
16+35	0.3539	0.01	Q				V	
16+40	0.3540	0.01	Q				V	
16+45	0.3541	0.01	Q				V	
16+50	0.3542	0.01	Q				V	
16+55	0.3542	0.01	Q				V	
17+ 0	0.3543	0.01	Q				V	
17+ 5	0.3544	0.01	Q				V	
17+10	0.3545	0.02	Q				V	
17+15	0.3546	0.02	Q				V	
17+20	0.3547	0.02	Q				V	
17+25	0.3549	0.02	Q				V	
17+30	0.3550	0.02	Q				V	
17+35	0.3551	0.02	Q				V	
17+40	0.3552	0.02	Q				V	
17+45	0.3553	0.02	Q				V	
17+50	0.3554	0.01	Q				V	
17+55	0.3555	0.01	Q				V	
18+ 0	0.3556	0.01	Q				V	
18+ 5	0.3557	0.01	Q				V	
18+10	0.3558	0.01	Q				V	
18+15	0.3559	0.01	Q				V	
18+20	0.3560	0.01	Q				V	
18+25	0.3561	0.01	Q				V	
18+30	0.3562	0.01	Q				V	
18+35	0.3563	0.01	Q				V	
18+40	0.3563	0.01	Q				V	
18+45	0.3564	0.01	Q				V	
18+50	0.3565	0.01	Q				V	
18+55	0.3565	0.01	Q				V	
19+ 0	0.3565	0.01	Q				V	
19+ 5	0.3566	0.01	Q				V	
19+10	0.3567	0.01	Q				V	

19+15	0.3567	0.01	Q				V
19+20	0.3568	0.01	Q				V
19+25	0.3569	0.01	Q				V
19+30	0.3570	0.01	Q				V
19+35	0.3571	0.01	Q				V
19+40	0.3572	0.01	Q				V
19+45	0.3572	0.01	Q				V
19+50	0.3573	0.01	Q				V
19+55	0.3573	0.01	Q				V
20+ 0	0.3574	0.01	Q				V
20+ 5	0.3574	0.01	Q				V
20+10	0.3575	0.01	Q				V
20+15	0.3576	0.01	Q				V
20+20	0.3577	0.01	Q				V
20+25	0.3577	0.01	Q				V
20+30	0.3578	0.01	Q				V
20+35	0.3579	0.01	Q				V
20+40	0.3579	0.01	Q				V
20+45	0.3580	0.01	Q				V
20+50	0.3581	0.01	Q				V
20+55	0.3581	0.01	Q				V
21+ 0	0.3582	0.01	Q				V
21+ 5	0.3582	0.01	Q				V
21+10	0.3583	0.01	Q				V
21+15	0.3584	0.01	Q				V
21+20	0.3584	0.01	Q				V
21+25	0.3585	0.01	Q				V
21+30	0.3585	0.01	Q				V
21+35	0.3586	0.01	Q				V
21+40	0.3586	0.01	Q				V
21+45	0.3587	0.01	Q				V
21+50	0.3588	0.01	Q				V
21+55	0.3588	0.01	Q				V
22+ 0	0.3589	0.01	Q				V
22+ 5	0.3589	0.01	Q				V
22+10	0.3590	0.01	Q				V
22+15	0.3591	0.01	Q				V
22+20	0.3591	0.01	Q				V
22+25	0.3592	0.01	Q				V
22+30	0.3592	0.01	Q				V
22+35	0.3593	0.01	Q				V
22+40	0.3593	0.01	Q				V
22+45	0.3593	0.01	Q				V
22+50	0.3594	0.01	Q				V
22+55	0.3594	0.01	Q				V
23+ 0	0.3595	0.01	Q				V
23+ 5	0.3595	0.01	Q				V
23+10	0.3596	0.01	Q				V
23+15	0.3596	0.01	Q				V
23+20	0.3597	0.01	Q				V
23+25	0.3597	0.01	Q				V
23+30	0.3598	0.01	Q				V
23+35	0.3598	0.01	Q				V
23+40	0.3599	0.01	Q				V

23+45	0.3599	0.01	Q				V
23+50	0.3600	0.01	Q				V
23+55	0.3600	0.01	Q				V
24+ 0	0.3600	0.01	Q				V
24+ 5	0.3601	0.00	Q				V
24+10	0.3601	0.00	Q				V

Unit Hydrograph Analysis

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Study date 07/11/22 File: 1162007EXUH1100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6335

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

VALUED ENGINEERING, INC
1162007 - WINERY DEVELOPMENT
PRE-DEVELOPED, UNIT-HYDROGRAPH
100-YEAR, 1-HR STORMEVENT

Drainage Area = 2.10(Ac.) = 0.003 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 2.10(Ac.) =
0.003 Sq. Mi.
Length along longest watercourse = 330.00(Ft.)
Length along longest watercourse measured to centroid =
158.00(Ft.)
Length along longest watercourse = 0.063 Mi.
Length along longest watercourse measured to centroid = 0.030 Mi.
Difference in elevation = 5.80(Ft.)
Slope along watercourse = 92.8000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.028 Hr.
Lag time = 1.68 Min.
25% of lag time = 0.42 Min.
40% of lag time = 0.67 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.10	0.51	1.08

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.10	1.65	3.46

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.514(In)
Area Averaged 100-Year Rainfall = 1.650(In)

Point rain (area averaged) = 1.650(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.650(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
2.100	74.00	0.000

Total Area Entered = 2.10(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
74.0	87.4	0.160	0.000	0.160	1.000	0.160
Sum (F) =						0.160

Area averaged mean soil loss (F) (In/Hr) = 0.160
Minimum soil loss rate ((In/Hr)) = 0.080
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5500

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	297.850	1.195
2	0.167	595.699	0.788
3	0.250	893.549	0.133
		Sum = 100.000	Sum= 2.116

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.08	3.30	0.653	0.160	(0.588)	0.494
2	0.17	4.20	0.832	0.160	(0.748)	0.672
3	0.25	4.40	0.871	0.160	(0.784)	0.712
4	0.33	4.80	0.950	0.160	(0.855)	0.791
5	0.42	5.20	1.030	0.160	(0.927)	0.870
6	0.50	6.20	1.228	0.160	(1.105)	1.068
7	0.58	6.80	1.346	0.160	(1.212)	1.187
8	0.67	8.80	1.742	0.160	(1.568)	1.583
9	0.75	13.90	2.752	0.160	(2.477)	2.593
10	0.83	31.40	6.217	0.160	(5.595)	6.057
11	0.92	7.20	1.426	0.160	(1.283)	1.266
12	1.00	3.80	0.752	0.160	(0.677)	0.593

(Loss Rate Not Used)

Sum = 100.0

Sum = 17.9

Flood volume = Effective rainfall 1.49(In)
times area 2.1(Ac.)/[(In)/(Ft.)] = 0.3(Ac.Ft)
Total soil loss = 0.16(In)
Total soil loss = 0.028(Ac.Ft)
Total rainfall = 1.65(In)
Flood volume = 11360.8 Cubic Feet
Total soil loss = 1216.9 Cubic Feet

Peak flow rate of this hydrograph = 9.497(CFS)

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1 - H O U R S T O R M
Run o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0041	0.59	V Q				
0+10	0.0123	1.19	V Q				
0+15	0.0222	1.45	V Q				
0+20	0.0332	1.60	VQ				
0+25	0.0453	1.76	VQ				
0+30	0.0596	2.07	QV				
0+35	0.0760	2.38	Q V				
0+40	0.0964	2.97	Q V				
0+45	0.1274	4.51	QV				
0+50	0.1929	9.50				V	Q
0+55	0.2386	6.64			Q		V
1+ 0	0.2559	2.51		Q			V
1+ 5	0.2603	0.64	Q				V
1+10	0.2608	0.08	Q				V

Unit Hydrograph Analysis

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Study date 07/11/22 File: 1162007PRUH242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6335

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

VALUED ENGINEERING, INC
1162007 - WINERY DEVELOPMENT
POST-DEVELOPED, UNIT-HYDROGRAPH
2-YEAR, 24-HOUR STORMEVENT

Drainage Area = 2.10(Ac.) = 0.003 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 2.10(Ac.) =
0.003 Sq. Mi.
Length along longest watercourse = 822.00(Ft.)
Length along longest watercourse measured to centroid =
420.00(Ft.)
Length along longest watercourse = 0.156 Mi.
Length along longest watercourse measured to centroid = 0.080 Mi.
Difference in elevation = 17.48(Ft.)
Slope along watercourse = 112.2803 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.028 Hr.
Lag time = 1.66 Min.
25% of lag time = 0.42 Min.
40% of lag time = 0.66 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.10	2.21	4.64

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.10	6.56	13.78

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 2.210(In)
Area Averaged 100-Year Rainfall = 6.560(In)

Point rain (area averaged) = 2.210(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.210(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
2.050	98.00	1.000
0.050	69.00	0.000
Total Area Entered = 2.10(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-1	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
98.0	94.8	0.068	1.000	0.007	0.976	0.007
69.0	49.8	0.574	0.000	0.574	0.024	0.014
Sum (F) =						0.020

Area averaged mean soil loss (F) (In/Hr) = 0.020
Minimum soil loss rate ((In/Hr)) = 0.010
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.124

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	301.155	56.798
2	0.167	602.309	37.065
3	0.250	903.464	6.137
Sum = 100.000		Sum=	2.116

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.08	0.07	0.018	(0.036)	0.002	0.015
2	0.17	0.07	0.018	(0.036)	0.002	0.015
3	0.25	0.07	0.018	(0.036)	0.002	0.015
4	0.33	0.10	0.027	(0.036)	0.003	0.023
5	0.42	0.10	0.027	(0.035)	0.003	0.023
6	0.50	0.10	0.027	(0.035)	0.003	0.023
7	0.58	0.10	0.027	(0.035)	0.003	0.023
8	0.67	0.10	0.027	(0.035)	0.003	0.023
9	0.75	0.10	0.027	(0.035)	0.003	0.023
10	0.83	0.13	0.035	(0.035)	0.004	0.031
11	0.92	0.13	0.035	(0.035)	0.004	0.031
12	1.00	0.13	0.035	(0.034)	0.004	0.031
13	1.08	0.10	0.027	(0.034)	0.003	0.023
14	1.17	0.10	0.027	(0.034)	0.003	0.023
15	1.25	0.10	0.027	(0.034)	0.003	0.023
16	1.33	0.10	0.027	(0.034)	0.003	0.023
17	1.42	0.10	0.027	(0.034)	0.003	0.023
18	1.50	0.10	0.027	(0.034)	0.003	0.023
19	1.58	0.10	0.027	(0.033)	0.003	0.023
20	1.67	0.10	0.027	(0.033)	0.003	0.023
21	1.75	0.10	0.027	(0.033)	0.003	0.023
22	1.83	0.13	0.035	(0.033)	0.004	0.031
23	1.92	0.13	0.035	(0.033)	0.004	0.031
24	2.00	0.13	0.035	(0.033)	0.004	0.031
25	2.08	0.13	0.035	(0.033)	0.004	0.031
26	2.17	0.13	0.035	(0.033)	0.004	0.031
27	2.25	0.13	0.035	(0.032)	0.004	0.031
28	2.33	0.13	0.035	(0.032)	0.004	0.031
29	2.42	0.13	0.035	(0.032)	0.004	0.031
30	2.50	0.13	0.035	(0.032)	0.004	0.031
31	2.58	0.17	0.044	(0.032)	0.005	0.039
32	2.67	0.17	0.044	(0.032)	0.005	0.039
33	2.75	0.17	0.044	(0.032)	0.005	0.039
34	2.83	0.17	0.044	(0.031)	0.005	0.039
35	2.92	0.17	0.044	(0.031)	0.005	0.039
36	3.00	0.17	0.044	(0.031)	0.005	0.039
37	3.08	0.17	0.044	(0.031)	0.005	0.039
38	3.17	0.17	0.044	(0.031)	0.005	0.039
39	3.25	0.17	0.044	(0.031)	0.005	0.039
40	3.33	0.17	0.044	(0.031)	0.005	0.039
41	3.42	0.17	0.044	(0.031)	0.005	0.039
42	3.50	0.17	0.044	(0.030)	0.005	0.039
43	3.58	0.17	0.044	(0.030)	0.005	0.039
44	3.67	0.17	0.044	(0.030)	0.005	0.039
45	3.75	0.17	0.044	(0.030)	0.005	0.039
46	3.83	0.20	0.053	(0.030)	0.007	0.046
47	3.92	0.20	0.053	(0.030)	0.007	0.046
48	4.00	0.20	0.053	(0.030)	0.007	0.046
49	4.08	0.20	0.053	(0.030)	0.007	0.046
50	4.17	0.20	0.053	(0.029)	0.007	0.046
51	4.25	0.20	0.053	(0.029)	0.007	0.046

52	4.33	0.23	0.062	(0.029)	0.008	0.054
53	4.42	0.23	0.062	(0.029)	0.008	0.054
54	4.50	0.23	0.062	(0.029)	0.008	0.054
55	4.58	0.23	0.062	(0.029)	0.008	0.054
56	4.67	0.23	0.062	(0.029)	0.008	0.054
57	4.75	0.23	0.062	(0.029)	0.008	0.054
58	4.83	0.27	0.071	(0.028)	0.009	0.062
59	4.92	0.27	0.071	(0.028)	0.009	0.062
60	5.00	0.27	0.071	(0.028)	0.009	0.062
61	5.08	0.20	0.053	(0.028)	0.007	0.046
62	5.17	0.20	0.053	(0.028)	0.007	0.046
63	5.25	0.20	0.053	(0.028)	0.007	0.046
64	5.33	0.23	0.062	(0.028)	0.008	0.054
65	5.42	0.23	0.062	(0.028)	0.008	0.054
66	5.50	0.23	0.062	(0.027)	0.008	0.054
67	5.58	0.27	0.071	(0.027)	0.009	0.062
68	5.67	0.27	0.071	(0.027)	0.009	0.062
69	5.75	0.27	0.071	(0.027)	0.009	0.062
70	5.83	0.27	0.071	(0.027)	0.009	0.062
71	5.92	0.27	0.071	(0.027)	0.009	0.062
72	6.00	0.27	0.071	(0.027)	0.009	0.062
73	6.08	0.30	0.080	(0.027)	0.010	0.070
74	6.17	0.30	0.080	(0.027)	0.010	0.070
75	6.25	0.30	0.080	(0.026)	0.010	0.070
76	6.33	0.30	0.080	(0.026)	0.010	0.070
77	6.42	0.30	0.080	(0.026)	0.010	0.070
78	6.50	0.30	0.080	(0.026)	0.010	0.070
79	6.58	0.33	0.088	(0.026)	0.011	0.077
80	6.67	0.33	0.088	(0.026)	0.011	0.077
81	6.75	0.33	0.088	(0.026)	0.011	0.077
82	6.83	0.33	0.088	(0.026)	0.011	0.077
83	6.92	0.33	0.088	(0.025)	0.011	0.077
84	7.00	0.33	0.088	(0.025)	0.011	0.077
85	7.08	0.33	0.088	(0.025)	0.011	0.077
86	7.17	0.33	0.088	(0.025)	0.011	0.077
87	7.25	0.33	0.088	(0.025)	0.011	0.077
88	7.33	0.37	0.097	(0.025)	0.012	0.085
89	7.42	0.37	0.097	(0.025)	0.012	0.085
90	7.50	0.37	0.097	(0.025)	0.012	0.085
91	7.58	0.40	0.106	(0.025)	0.013	0.093
92	7.67	0.40	0.106	(0.024)	0.013	0.093
93	7.75	0.40	0.106	(0.024)	0.013	0.093
94	7.83	0.43	0.115	(0.024)	0.014	0.101
95	7.92	0.43	0.115	(0.024)	0.014	0.101
96	8.00	0.43	0.115	(0.024)	0.014	0.101
97	8.08	0.50	0.133	(0.024)	0.016	0.116
98	8.17	0.50	0.133	(0.024)	0.016	0.116
99	8.25	0.50	0.133	(0.024)	0.016	0.116
100	8.33	0.50	0.133	(0.024)	0.016	0.116
101	8.42	0.50	0.133	(0.023)	0.016	0.116
102	8.50	0.50	0.133	(0.023)	0.016	0.116
103	8.58	0.53	0.141	(0.023)	0.018	0.124
104	8.67	0.53	0.141	(0.023)	0.018	0.124
105	8.75	0.53	0.141	(0.023)	0.018	0.124

106	8.83	0.57	0.150	(0.023)	0.019	0.132
107	8.92	0.57	0.150	(0.023)	0.019	0.132
108	9.00	0.57	0.150	(0.023)	0.019	0.132
109	9.08	0.63	0.168	(0.023)	0.021	0.147
110	9.17	0.63	0.168	(0.022)	0.021	0.147
111	9.25	0.63	0.168	(0.022)	0.021	0.147
112	9.33	0.67	0.177	(0.022)	0.022	0.155
113	9.42	0.67	0.177	(0.022)	0.022	0.155
114	9.50	0.67	0.177	(0.022)	0.022	0.155
115	9.58	0.70	0.186	0.022 (0.023)		0.164
116	9.67	0.70	0.186	0.022 (0.023)		0.164
117	9.75	0.70	0.186	0.022 (0.023)		0.164
118	9.83	0.73	0.194	0.022 (0.024)		0.173
119	9.92	0.73	0.194	0.022 (0.024)		0.173
120	10.00	0.73	0.194	0.021 (0.024)		0.173
121	10.08	0.50	0.133	(0.021)	0.016	0.116
122	10.17	0.50	0.133	(0.021)	0.016	0.116
123	10.25	0.50	0.133	(0.021)	0.016	0.116
124	10.33	0.50	0.133	(0.021)	0.016	0.116
125	10.42	0.50	0.133	(0.021)	0.016	0.116
126	10.50	0.50	0.133	(0.021)	0.016	0.116
127	10.58	0.67	0.177	0.021 (0.022)		0.156
128	10.67	0.67	0.177	0.021 (0.022)		0.156
129	10.75	0.67	0.177	0.020 (0.022)		0.156
130	10.83	0.67	0.177	0.020 (0.022)		0.156
131	10.92	0.67	0.177	0.020 (0.022)		0.157
132	11.00	0.67	0.177	0.020 (0.022)		0.157
133	11.08	0.63	0.168	0.020 (0.021)		0.148
134	11.17	0.63	0.168	0.020 (0.021)		0.148
135	11.25	0.63	0.168	0.020 (0.021)		0.148
136	11.33	0.63	0.168	0.020 (0.021)		0.148
137	11.42	0.63	0.168	0.020 (0.021)		0.148
138	11.50	0.63	0.168	0.020 (0.021)		0.148
139	11.58	0.57	0.150	(0.019)	0.019	0.132
140	11.67	0.57	0.150	(0.019)	0.019	0.132
141	11.75	0.57	0.150	(0.019)	0.019	0.132
142	11.83	0.60	0.159	0.019 (0.020)		0.140
143	11.92	0.60	0.159	0.019 (0.020)		0.140
144	12.00	0.60	0.159	0.019 (0.020)		0.140
145	12.08	0.83	0.221	0.019 (0.027)		0.202
146	12.17	0.83	0.221	0.019 (0.027)		0.202
147	12.25	0.83	0.221	0.019 (0.027)		0.202
148	12.33	0.87	0.230	0.019 (0.029)		0.211
149	12.42	0.87	0.230	0.019 (0.029)		0.211
150	12.50	0.87	0.230	0.018 (0.029)		0.211
151	12.58	0.93	0.248	0.018 (0.031)		0.229
152	12.67	0.93	0.248	0.018 (0.031)		0.229
153	12.75	0.93	0.248	0.018 (0.031)		0.229
154	12.83	0.97	0.256	0.018 (0.032)		0.238
155	12.92	0.97	0.256	0.018 (0.032)		0.238
156	13.00	0.97	0.256	0.018 (0.032)		0.238
157	13.08	1.13	0.301	0.018 (0.037)		0.283
158	13.17	1.13	0.301	0.018 (0.037)		0.283
159	13.25	1.13	0.301	0.018 (0.037)		0.283

160	13.33	1.13	0.301	0.018	(0.037)	0.283
161	13.42	1.13	0.301	0.017	(0.037)	0.283
162	13.50	1.13	0.301	0.017	(0.037)	0.283
163	13.58	0.77	0.203	0.017	(0.025)	0.186
164	13.67	0.77	0.203	0.017	(0.025)	0.186
165	13.75	0.77	0.203	0.017	(0.025)	0.186
166	13.83	0.77	0.203	0.017	(0.025)	0.186
167	13.92	0.77	0.203	0.017	(0.025)	0.186
168	14.00	0.77	0.203	0.017	(0.025)	0.186
169	14.08	0.90	0.239	0.017	(0.030)	0.222
170	14.17	0.90	0.239	0.017	(0.030)	0.222
171	14.25	0.90	0.239	0.017	(0.030)	0.222
172	14.33	0.87	0.230	0.016	(0.029)	0.213
173	14.42	0.87	0.230	0.016	(0.029)	0.213
174	14.50	0.87	0.230	0.016	(0.029)	0.214
175	14.58	0.87	0.230	0.016	(0.029)	0.214
176	14.67	0.87	0.230	0.016	(0.029)	0.214
177	14.75	0.87	0.230	0.016	(0.029)	0.214
178	14.83	0.83	0.221	0.016	(0.027)	0.205
179	14.92	0.83	0.221	0.016	(0.027)	0.205
180	15.00	0.83	0.221	0.016	(0.027)	0.205
181	15.08	0.80	0.212	0.016	(0.026)	0.196
182	15.17	0.80	0.212	0.016	(0.026)	0.196
183	15.25	0.80	0.212	0.016	(0.026)	0.197
184	15.33	0.77	0.203	0.016	(0.025)	0.188
185	15.42	0.77	0.203	0.015	(0.025)	0.188
186	15.50	0.77	0.203	0.015	(0.025)	0.188
187	15.58	0.63	0.168	0.015	(0.021)	0.153
188	15.67	0.63	0.168	0.015	(0.021)	0.153
189	15.75	0.63	0.168	0.015	(0.021)	0.153
190	15.83	0.63	0.168	0.015	(0.021)	0.153
191	15.92	0.63	0.168	0.015	(0.021)	0.153
192	16.00	0.63	0.168	0.015	(0.021)	0.153
193	16.08	0.13	0.035	(0.015)	0.004	0.031
194	16.17	0.13	0.035	(0.015)	0.004	0.031
195	16.25	0.13	0.035	(0.015)	0.004	0.031
196	16.33	0.13	0.035	(0.015)	0.004	0.031
197	16.42	0.13	0.035	(0.015)	0.004	0.031
198	16.50	0.13	0.035	(0.014)	0.004	0.031
199	16.58	0.10	0.027	(0.014)	0.003	0.023
200	16.67	0.10	0.027	(0.014)	0.003	0.023
201	16.75	0.10	0.027	(0.014)	0.003	0.023
202	16.83	0.10	0.027	(0.014)	0.003	0.023
203	16.92	0.10	0.027	(0.014)	0.003	0.023
204	17.00	0.10	0.027	(0.014)	0.003	0.023
205	17.08	0.17	0.044	(0.014)	0.005	0.039
206	17.17	0.17	0.044	(0.014)	0.005	0.039
207	17.25	0.17	0.044	(0.014)	0.005	0.039
208	17.33	0.17	0.044	(0.014)	0.005	0.039
209	17.42	0.17	0.044	(0.014)	0.005	0.039
210	17.50	0.17	0.044	(0.014)	0.005	0.039
211	17.58	0.17	0.044	(0.014)	0.005	0.039
212	17.67	0.17	0.044	(0.013)	0.005	0.039
213	17.75	0.17	0.044	(0.013)	0.005	0.039

214	17.83	0.13	0.035	(0.013)	0.004	0.031
215	17.92	0.13	0.035	(0.013)	0.004	0.031
216	18.00	0.13	0.035	(0.013)	0.004	0.031
217	18.08	0.13	0.035	(0.013)	0.004	0.031
218	18.17	0.13	0.035	(0.013)	0.004	0.031
219	18.25	0.13	0.035	(0.013)	0.004	0.031
220	18.33	0.13	0.035	(0.013)	0.004	0.031
221	18.42	0.13	0.035	(0.013)	0.004	0.031
222	18.50	0.13	0.035	(0.013)	0.004	0.031
223	18.58	0.10	0.027	(0.013)	0.003	0.023
224	18.67	0.10	0.027	(0.013)	0.003	0.023
225	18.75	0.10	0.027	(0.013)	0.003	0.023
226	18.83	0.07	0.018	(0.013)	0.002	0.015
227	18.92	0.07	0.018	(0.012)	0.002	0.015
228	19.00	0.07	0.018	(0.012)	0.002	0.015
229	19.08	0.10	0.027	(0.012)	0.003	0.023
230	19.17	0.10	0.027	(0.012)	0.003	0.023
231	19.25	0.10	0.027	(0.012)	0.003	0.023
232	19.33	0.13	0.035	(0.012)	0.004	0.031
233	19.42	0.13	0.035	(0.012)	0.004	0.031
234	19.50	0.13	0.035	(0.012)	0.004	0.031
235	19.58	0.10	0.027	(0.012)	0.003	0.023
236	19.67	0.10	0.027	(0.012)	0.003	0.023
237	19.75	0.10	0.027	(0.012)	0.003	0.023
238	19.83	0.07	0.018	(0.012)	0.002	0.015
239	19.92	0.07	0.018	(0.012)	0.002	0.015
240	20.00	0.07	0.018	(0.012)	0.002	0.015
241	20.08	0.10	0.027	(0.012)	0.003	0.023
242	20.17	0.10	0.027	(0.012)	0.003	0.023
243	20.25	0.10	0.027	(0.012)	0.003	0.023
244	20.33	0.10	0.027	(0.012)	0.003	0.023
245	20.42	0.10	0.027	(0.012)	0.003	0.023
246	20.50	0.10	0.027	(0.011)	0.003	0.023
247	20.58	0.10	0.027	(0.011)	0.003	0.023
248	20.67	0.10	0.027	(0.011)	0.003	0.023
249	20.75	0.10	0.027	(0.011)	0.003	0.023
250	20.83	0.07	0.018	(0.011)	0.002	0.015
251	20.92	0.07	0.018	(0.011)	0.002	0.015
252	21.00	0.07	0.018	(0.011)	0.002	0.015
253	21.08	0.10	0.027	(0.011)	0.003	0.023
254	21.17	0.10	0.027	(0.011)	0.003	0.023
255	21.25	0.10	0.027	(0.011)	0.003	0.023
256	21.33	0.07	0.018	(0.011)	0.002	0.015
257	21.42	0.07	0.018	(0.011)	0.002	0.015
258	21.50	0.07	0.018	(0.011)	0.002	0.015
259	21.58	0.10	0.027	(0.011)	0.003	0.023
260	21.67	0.10	0.027	(0.011)	0.003	0.023
261	21.75	0.10	0.027	(0.011)	0.003	0.023
262	21.83	0.07	0.018	(0.011)	0.002	0.015
263	21.92	0.07	0.018	(0.011)	0.002	0.015
264	22.00	0.07	0.018	(0.011)	0.002	0.015
265	22.08	0.10	0.027	(0.011)	0.003	0.023
266	22.17	0.10	0.027	(0.011)	0.003	0.023
267	22.25	0.10	0.027	(0.011)	0.003	0.023

268	22.33	0.07	0.018	(0.011)	0.002	0.015
269	22.42	0.07	0.018	(0.011)	0.002	0.015
270	22.50	0.07	0.018	(0.010)	0.002	0.015
271	22.58	0.07	0.018	(0.010)	0.002	0.015
272	22.67	0.07	0.018	(0.010)	0.002	0.015
273	22.75	0.07	0.018	(0.010)	0.002	0.015
274	22.83	0.07	0.018	(0.010)	0.002	0.015
275	22.92	0.07	0.018	(0.010)	0.002	0.015
276	23.00	0.07	0.018	(0.010)	0.002	0.015
277	23.08	0.07	0.018	(0.010)	0.002	0.015
278	23.17	0.07	0.018	(0.010)	0.002	0.015
279	23.25	0.07	0.018	(0.010)	0.002	0.015
280	23.33	0.07	0.018	(0.010)	0.002	0.015
281	23.42	0.07	0.018	(0.010)	0.002	0.015
282	23.50	0.07	0.018	(0.010)	0.002	0.015
283	23.58	0.07	0.018	(0.010)	0.002	0.015
284	23.67	0.07	0.018	(0.010)	0.002	0.015
285	23.75	0.07	0.018	(0.010)	0.002	0.015
286	23.83	0.07	0.018	(0.010)	0.002	0.015
287	23.92	0.07	0.018	(0.010)	0.002	0.015
288	24.00	0.07	0.018	(0.010)	0.002	0.015

(Loss Rate Not Used)

Sum = 100.0

Sum = 23.8

Flood volume = Effective rainfall 1.98(In)

times area 2.1(Ac.)/[(In)/(Ft.)] = 0.3(Ac.Ft)

Total soil loss = 0.23(In)

Total soil loss = 0.040(Ac.Ft)

Total rainfall = 2.21(In)

Flood volume = 15121.2 Cubic Feet

Total soil loss = 1725.6 Cubic Feet

Peak flow rate of this hydrograph = 0.600(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.02	Q					
0+10	0.0003	0.03	Q					
0+15	0.0006	0.03	Q					
0+20	0.0009	0.04	Q					
0+25	0.0012	0.05	Q					
0+30	0.0015	0.05	Q					
0+35	0.0019	0.05	Q					
0+40	0.0022	0.05	Q					
0+45	0.0025	0.05	Q					
0+50	0.0029	0.06	Q					
0+55	0.0034	0.06	Q					
1+ 0	0.0038	0.07	Q					

1+ 5	0.0042	0.06	Q				
1+10	0.0046	0.05	Q				
1+15	0.0049	0.05	Q				
1+20	0.0053	0.05	Q				
1+25	0.0056	0.05	Q				
1+30	0.0059	0.05	Q				
1+35	0.0063	0.05	Q				
1+40	0.0066	0.05	Q				
1+45	0.0069	0.05	Q				
1+50	0.0074	0.06	Q				
1+55	0.0078	0.06	Q				
2+ 0	0.0082	0.07	Q				
2+ 5	0.0087	0.07	QV				
2+10	0.0092	0.07	QV				
2+15	0.0096	0.07	QV				
2+20	0.0101	0.07	QV				
2+25	0.0105	0.07	QV				
2+30	0.0110	0.07	QV				
2+35	0.0115	0.07	QV				
2+40	0.0120	0.08	QV				
2+45	0.0126	0.08	QV				
2+50	0.0132	0.08	QV				
2+55	0.0137	0.08	QV				
3+ 0	0.0143	0.08	QV				
3+ 5	0.0149	0.08	QV				
3+10	0.0154	0.08	QV				
3+15	0.0160	0.08	QV				
3+20	0.0165	0.08	QV				
3+25	0.0171	0.08	QV				
3+30	0.0177	0.08	Q V				
3+35	0.0182	0.08	Q V				
3+40	0.0188	0.08	Q V				
3+45	0.0194	0.08	Q V				
3+50	0.0200	0.09	Q V				
3+55	0.0207	0.10	Q V				
4+ 0	0.0213	0.10	Q V				
4+ 5	0.0220	0.10	Q V				
4+10	0.0227	0.10	Q V				
4+15	0.0234	0.10	Q V				
4+20	0.0241	0.11	Q V				
4+25	0.0249	0.11	Q V				
4+30	0.0257	0.11	Q V				
4+35	0.0265	0.11	Q V				
4+40	0.0273	0.11	Q V				
4+45	0.0281	0.11	Q V				
4+50	0.0289	0.12	Q V				
4+55	0.0298	0.13	Q V				
5+ 0	0.0307	0.13	Q V				
5+ 5	0.0315	0.11	Q V				
5+10	0.0322	0.10	Q V				
5+15	0.0329	0.10	Q V				
5+20	0.0336	0.11	Q V				
5+25	0.0344	0.11	Q V				
5+30	0.0352	0.11	Q V				

5+35	0.0360	0.12	Q	V				
5+40	0.0369	0.13	Q	V				
5+45	0.0378	0.13	Q	V				
5+50	0.0387	0.13	Q	V				
5+55	0.0396	0.13	Q	V				
6+ 0	0.0405	0.13	Q	V				
6+ 5	0.0415	0.14	Q	V				
6+10	0.0425	0.15	Q	V				
6+15	0.0435	0.15	Q	V				
6+20	0.0446	0.15	Q	V				
6+25	0.0456	0.15	Q	V				
6+30	0.0466	0.15	Q	V				
6+35	0.0477	0.16	Q	V				
6+40	0.0488	0.16	Q	V				
6+45	0.0499	0.16	Q	V				
6+50	0.0511	0.16	Q	V				
6+55	0.0522	0.16	Q	V				
7+ 0	0.0533	0.16	Q	V				
7+ 5	0.0544	0.16	Q	V				
7+10	0.0556	0.16	Q	V				
7+15	0.0567	0.16	Q	V				
7+20	0.0579	0.17	Q	V				
7+25	0.0591	0.18	Q	V				
7+30	0.0604	0.18	Q	V				
7+35	0.0617	0.19	Q	V				
7+40	0.0630	0.20	Q	V				
7+45	0.0644	0.20	Q	V				
7+50	0.0658	0.21	Q	V				
7+55	0.0673	0.21	Q	V				
8+ 0	0.0687	0.21	Q	V				
8+ 5	0.0703	0.23	Q	V				
8+10	0.0720	0.24	Q	V				
8+15	0.0737	0.25	Q	V				
8+20	0.0754	0.25	Q	V				
8+25	0.0771	0.25	Q	V				
8+30	0.0788	0.25	Q	V				
8+35	0.0805	0.26	Q	V				
8+40	0.0823	0.26	Q	V				
8+45	0.0841	0.26	Q	V				
8+50	0.0860	0.27	Q	V				
8+55	0.0879	0.28	Q	V				
9+ 0	0.0898	0.28	Q	V				
9+ 5	0.0919	0.30	Q	V				
9+10	0.0940	0.31	Q	V				
9+15	0.0962	0.31	Q	V				
9+20	0.0984	0.32	Q	V				
9+25	0.1006	0.33	Q	V				
9+30	0.1029	0.33	Q	V				
9+35	0.1052	0.34	Q	V				
9+40	0.1076	0.35	Q	V				
9+45	0.1100	0.35	Q	V				
9+50	0.1125	0.36	Q	V				
9+55	0.1150	0.37	Q	V				
10+ 0	0.1175	0.37	Q	V				

10+ 5	0.1196	0.30	Q	V			
10+10	0.1213	0.25	Q	V			
10+15	0.1230	0.25	Q	V			
10+20	0.1247	0.25	Q	V			
10+25	0.1264	0.25	Q	V			
10+30	0.1281	0.25	Q	V			
10+35	0.1301	0.29	Q	V			
10+40	0.1323	0.33	Q	V			
10+45	0.1346	0.33	Q	V			
10+50	0.1369	0.33	Q	V			
10+55	0.1392	0.33	Q	V			
11+ 0	0.1415	0.33	Q	V			
11+ 5	0.1437	0.32	Q	V			
11+10	0.1458	0.31	Q	V			
11+15	0.1480	0.31	Q	V			
11+20	0.1502	0.31	Q	V			
11+25	0.1523	0.31	Q	V			
11+30	0.1545	0.31	Q	V			
11+35	0.1565	0.29	Q	V			
11+40	0.1584	0.28	Q	V			
11+45	0.1604	0.28	Q	V			
11+50	0.1624	0.29	Q	V			
11+55	0.1644	0.30	Q	V			
12+ 0	0.1664	0.30	Q	V			
12+ 5	0.1690	0.37	Q	V			
12+10	0.1719	0.42	Q	V			
12+15	0.1748	0.43	Q	V			
12+20	0.1778	0.44	Q	V			
12+25	0.1809	0.45	Q	V			
12+30	0.1840	0.45	Q	V			
12+35	0.1872	0.47	Q	V			
12+40	0.1906	0.48	Q	V			
12+45	0.1939	0.49	Q	V			
12+50	0.1973	0.50	Q	V			
12+55	0.2008	0.50	Q	V			
13+ 0	0.2043	0.50	Q	V			
13+ 5	0.2081	0.56	Q	V			
13+10	0.2122	0.59	Q	V			
13+15	0.2163	0.60	Q	V			
13+20	0.2204	0.60	Q	V			
13+25	0.2246	0.60	Q	V			
13+30	0.2287	0.60	Q	V			
13+35	0.2320	0.48	Q	V			
13+40	0.2348	0.41	Q	V			
13+45	0.2375	0.39	Q	V			
13+50	0.2403	0.39	Q	V			
13+55	0.2430	0.39	Q	V			
14+ 0	0.2457	0.39	Q	V			
14+ 5	0.2487	0.44	Q	V			
14+10	0.2519	0.47	Q	V			
14+15	0.2552	0.47	Q	V			
14+20	0.2583	0.46	Q	V			
14+25	0.2614	0.45	Q	V			
14+30	0.2646	0.45	Q	V			

14+35	0.2677	0.45	Q			V	
14+40	0.2708	0.45	Q			V	
14+45	0.2739	0.45	Q			V	
14+50	0.2769	0.44	Q			V	
14+55	0.2799	0.44	Q			V	
15+ 0	0.2829	0.43	Q			V	
15+ 5	0.2859	0.42	Q			V	
15+10	0.2887	0.42	Q			V	
15+15	0.2916	0.42	Q			V	
15+20	0.2944	0.41	Q			V	
15+25	0.2971	0.40	Q			V	
15+30	0.2999	0.40	Q			V	
15+35	0.3023	0.36	Q			V	
15+40	0.3046	0.33	Q			V	
15+45	0.3068	0.32	Q			V	
15+50	0.3090	0.32	Q			V	
15+55	0.3113	0.32	Q			V	
16+ 0	0.3135	0.32	Q			V	
16+ 5	0.3147	0.18	Q			V	
16+10	0.3153	0.08	Q			V	
16+15	0.3157	0.07	Q			V	
16+20	0.3162	0.07	Q			V	
16+25	0.3166	0.07	Q			V	
16+30	0.3171	0.07	Q			V	
16+35	0.3175	0.06	Q			V	
16+40	0.3178	0.05	Q			V	
16+45	0.3182	0.05	Q			V	
16+50	0.3185	0.05	Q			V	
16+55	0.3188	0.05	Q			V	
17+ 0	0.3192	0.05	Q			V	
17+ 5	0.3197	0.07	Q			V	
17+10	0.3202	0.08	Q			V	
17+15	0.3208	0.08	Q			V	
17+20	0.3213	0.08	Q			V	
17+25	0.3219	0.08	Q			V	
17+30	0.3225	0.08	Q			V	
17+35	0.3230	0.08	Q			V	
17+40	0.3236	0.08	Q			V	
17+45	0.3242	0.08	Q			V	
17+50	0.3247	0.07	Q			V	
17+55	0.3251	0.07	Q			V	
18+ 0	0.3256	0.07	Q			V	
18+ 5	0.3260	0.07	Q			V	
18+10	0.3265	0.07	Q			V	
18+15	0.3269	0.07	Q			V	
18+20	0.3274	0.07	Q			V	
18+25	0.3278	0.07	Q			V	
18+30	0.3283	0.07	Q			V	
18+35	0.3287	0.06	Q			V	
18+40	0.3290	0.05	Q			V	
18+45	0.3293	0.05	Q			V	
18+50	0.3296	0.04	Q			V	
18+55	0.3299	0.03	Q			V	
19+ 0	0.3301	0.03	Q			V	

19+ 5	0.3304	0.04	Q				V
19+10	0.3307	0.05	Q				V
19+15	0.3310	0.05	Q				V
19+20	0.3314	0.06	Q				V
19+25	0.3319	0.06	Q				V
19+30	0.3323	0.07	Q				V
19+35	0.3327	0.06	Q				V
19+40	0.3331	0.05	Q				V
19+45	0.3334	0.05	Q				V
19+50	0.3337	0.04	Q				V
19+55	0.3339	0.03	Q				V
20+ 0	0.3341	0.03	Q				V
20+ 5	0.3344	0.04	Q				V
20+10	0.3348	0.05	Q				V
20+15	0.3351	0.05	Q				V
20+20	0.3354	0.05	Q				V
20+25	0.3358	0.05	Q				V
20+30	0.3361	0.05	Q				V
20+35	0.3365	0.05	Q				V
20+40	0.3368	0.05	Q				V
20+45	0.3371	0.05	Q				V
20+50	0.3374	0.04	Q				V
20+55	0.3376	0.03	Q				V
21+ 0	0.3379	0.03	Q				V
21+ 5	0.3382	0.04	Q				V
21+10	0.3385	0.05	Q				V
21+15	0.3388	0.05	Q				V
21+20	0.3391	0.04	Q				V
21+25	0.3393	0.03	Q				V
21+30	0.3396	0.03	Q				V
21+35	0.3399	0.04	Q				V
21+40	0.3402	0.05	Q				V
21+45	0.3405	0.05	Q				V
21+50	0.3408	0.04	Q				V
21+55	0.3410	0.03	Q				V
22+ 0	0.3413	0.03	Q				V
22+ 5	0.3416	0.04	Q				V
22+10	0.3419	0.05	Q				V
22+15	0.3422	0.05	Q				V
22+20	0.3425	0.04	Q				V
22+25	0.3427	0.03	Q				V
22+30	0.3430	0.03	Q				V
22+35	0.3432	0.03	Q				V
22+40	0.3434	0.03	Q				V
22+45	0.3436	0.03	Q				V
22+50	0.3439	0.03	Q				V
22+55	0.3441	0.03	Q				V
23+ 0	0.3443	0.03	Q				V
23+ 5	0.3445	0.03	Q				V
23+10	0.3448	0.03	Q				V
23+15	0.3450	0.03	Q				V
23+20	0.3452	0.03	Q				V
23+25	0.3454	0.03	Q				V
23+30	0.3457	0.03	Q				V

23+35	0.3459	0.03	Q				V
23+40	0.3461	0.03	Q				V
23+45	0.3463	0.03	Q				V
23+50	0.3466	0.03	Q				V
23+55	0.3468	0.03	Q				V
24+ 0	0.3470	0.03	Q				V
24+ 5	0.3471	0.01	Q				V
24+10	0.3471	0.00	Q				V

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Unit Hydrograph Analysis

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Study date 07/11/22 File: 1162007PRUH2410.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6335

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

VALUED ENGINEERING, INC
1162007 - WINERY DEVELOPMENT
POST-DEVELOPED, UNIT-HYDROGRAPH
10-YEAR, 24-HOUR STORMEVENT

Drainage Area = 2.10(Ac.) = 0.003 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 2.10(Ac.) =
0.003 Sq. Mi.
Length along longest watercourse = 822.00(Ft.)
Length along longest watercourse measured to centroid =
420.00(Ft.)
Length along longest watercourse = 0.156 Mi.
Length along longest watercourse measured to centroid = 0.080 Mi.
Difference in elevation = 17.48(Ft.)
Slope along watercourse = 112.2803 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.028 Hr.
Lag time = 1.66 Min.
25% of lag time = 0.42 Min.
40% of lag time = 0.66 Min.
Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.10	2.21	4.64

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.10	6.56	13.78

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.210(In)
Area Averaged 100-Year Rainfall = 6.560(In)

Point rain (area averaged) = 4.000(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.000(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
2.050	98.00	1.000
0.050	69.00	0.000
Total Area Entered = 2.10(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
98.0	98.0	0.026	1.000	0.003	0.976	0.003
69.0	69.0	0.373	0.000	0.373	0.024	0.009
Sum (F) =						0.011

Area averaged mean soil loss (F) (In/Hr) = 0.011
Minimum soil loss rate ((In/Hr)) = 0.006
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.124

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	301.155	56.798	1.202
2 0.167	602.309	37.065	0.784
3 0.250	903.464	6.137	0.130
Sum = 100.000		Sum=	2.116

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.08	0.07	0.032	(0.020)	0.004	0.028
2	0.17	0.07	0.032	(0.020)	0.004	0.028
3	0.25	0.07	0.032	(0.020)	0.004	0.028
4	0.33	0.10	0.048	(0.020)	0.006	0.042
5	0.42	0.10	0.048	(0.020)	0.006	0.042
6	0.50	0.10	0.048	(0.020)	0.006	0.042
7	0.58	0.10	0.048	(0.020)	0.006	0.042
8	0.67	0.10	0.048	(0.020)	0.006	0.042
9	0.75	0.10	0.048	(0.020)	0.006	0.042
10	0.83	0.13	0.064	(0.020)	0.008	0.056
11	0.92	0.13	0.064	(0.019)	0.008	0.056
12	1.00	0.13	0.064	(0.019)	0.008	0.056
13	1.08	0.10	0.048	(0.019)	0.006	0.042
14	1.17	0.10	0.048	(0.019)	0.006	0.042
15	1.25	0.10	0.048	(0.019)	0.006	0.042
16	1.33	0.10	0.048	(0.019)	0.006	0.042
17	1.42	0.10	0.048	(0.019)	0.006	0.042
18	1.50	0.10	0.048	(0.019)	0.006	0.042
19	1.58	0.10	0.048	(0.019)	0.006	0.042
20	1.67	0.10	0.048	(0.019)	0.006	0.042
21	1.75	0.10	0.048	(0.019)	0.006	0.042
22	1.83	0.13	0.064	(0.019)	0.008	0.056
23	1.92	0.13	0.064	(0.019)	0.008	0.056
24	2.00	0.13	0.064	(0.018)	0.008	0.056
25	2.08	0.13	0.064	(0.018)	0.008	0.056
26	2.17	0.13	0.064	(0.018)	0.008	0.056
27	2.25	0.13	0.064	(0.018)	0.008	0.056
28	2.33	0.13	0.064	(0.018)	0.008	0.056
29	2.42	0.13	0.064	(0.018)	0.008	0.056
30	2.50	0.13	0.064	(0.018)	0.008	0.056
31	2.58	0.17	0.080	(0.018)	0.010	0.070
32	2.67	0.17	0.080	(0.018)	0.010	0.070
33	2.75	0.17	0.080	(0.018)	0.010	0.070
34	2.83	0.17	0.080	(0.018)	0.010	0.070
35	2.92	0.17	0.080	(0.018)	0.010	0.070
36	3.00	0.17	0.080	(0.018)	0.010	0.070
37	3.08	0.17	0.080	(0.018)	0.010	0.070
38	3.17	0.17	0.080	(0.017)	0.010	0.070
39	3.25	0.17	0.080	(0.017)	0.010	0.070
40	3.33	0.17	0.080	(0.017)	0.010	0.070
41	3.42	0.17	0.080	(0.017)	0.010	0.070
42	3.50	0.17	0.080	(0.017)	0.010	0.070
43	3.58	0.17	0.080	(0.017)	0.010	0.070
44	3.67	0.17	0.080	(0.017)	0.010	0.070
45	3.75	0.17	0.080	(0.017)	0.010	0.070
46	3.83	0.20	0.096	(0.017)	0.012	0.084
47	3.92	0.20	0.096	(0.017)	0.012	0.084
48	4.00	0.20	0.096	(0.017)	0.012	0.084
49	4.08	0.20	0.096	(0.017)	0.012	0.084
50	4.17	0.20	0.096	(0.017)	0.012	0.084
51	4.25	0.20	0.096	(0.017)	0.012	0.084

52	4.33	0.23	0.112	(0.016)	0.014	0.098
53	4.42	0.23	0.112	(0.016)	0.014	0.098
54	4.50	0.23	0.112	(0.016)	0.014	0.098
55	4.58	0.23	0.112	(0.016)	0.014	0.098
56	4.67	0.23	0.112	(0.016)	0.014	0.098
57	4.75	0.23	0.112	(0.016)	0.014	0.098
58	4.83	0.27	0.128	(0.016)	0.016	0.112
59	4.92	0.27	0.128	(0.016)	0.016	0.112
60	5.00	0.27	0.128	(0.016)	0.016	0.112
61	5.08	0.20	0.096	(0.016)	0.012	0.084
62	5.17	0.20	0.096	(0.016)	0.012	0.084
63	5.25	0.20	0.096	(0.016)	0.012	0.084
64	5.33	0.23	0.112	(0.016)	0.014	0.098
65	5.42	0.23	0.112	(0.016)	0.014	0.098
66	5.50	0.23	0.112	(0.015)	0.014	0.098
67	5.58	0.27	0.128	0.015 (0.016)		0.113
68	5.67	0.27	0.128	0.015 (0.016)		0.113
69	5.75	0.27	0.128	0.015 (0.016)		0.113
70	5.83	0.27	0.128	0.015 (0.016)		0.113
71	5.92	0.27	0.128	0.015 (0.016)		0.113
72	6.00	0.27	0.128	0.015 (0.016)		0.113
73	6.08	0.30	0.144	0.015 (0.018)		0.129
74	6.17	0.30	0.144	0.015 (0.018)		0.129
75	6.25	0.30	0.144	0.015 (0.018)		0.129
76	6.33	0.30	0.144	0.015 (0.018)		0.129
77	6.42	0.30	0.144	0.015 (0.018)		0.129
78	6.50	0.30	0.144	0.015 (0.018)		0.129
79	6.58	0.33	0.160	0.015 (0.020)		0.145
80	6.67	0.33	0.160	0.015 (0.020)		0.145
81	6.75	0.33	0.160	0.014 (0.020)		0.146
82	6.83	0.33	0.160	0.014 (0.020)		0.146
83	6.92	0.33	0.160	0.014 (0.020)		0.146
84	7.00	0.33	0.160	0.014 (0.020)		0.146
85	7.08	0.33	0.160	0.014 (0.020)		0.146
86	7.17	0.33	0.160	0.014 (0.020)		0.146
87	7.25	0.33	0.160	0.014 (0.020)		0.146
88	7.33	0.37	0.176	0.014 (0.022)		0.162
89	7.42	0.37	0.176	0.014 (0.022)		0.162
90	7.50	0.37	0.176	0.014 (0.022)		0.162
91	7.58	0.40	0.192	0.014 (0.024)		0.178
92	7.67	0.40	0.192	0.014 (0.024)		0.178
93	7.75	0.40	0.192	0.014 (0.024)		0.178
94	7.83	0.43	0.208	0.014 (0.026)		0.194
95	7.92	0.43	0.208	0.014 (0.026)		0.194
96	8.00	0.43	0.208	0.014 (0.026)		0.194
97	8.08	0.50	0.240	0.013 (0.030)		0.227
98	8.17	0.50	0.240	0.013 (0.030)		0.227
99	8.25	0.50	0.240	0.013 (0.030)		0.227
100	8.33	0.50	0.240	0.013 (0.030)		0.227
101	8.42	0.50	0.240	0.013 (0.030)		0.227
102	8.50	0.50	0.240	0.013 (0.030)		0.227
103	8.58	0.53	0.256	0.013 (0.032)		0.243
104	8.67	0.53	0.256	0.013 (0.032)		0.243
105	8.75	0.53	0.256	0.013 (0.032)		0.243

106	8.83	0.57	0.272	0.013	(0.034)	0.259
107	8.92	0.57	0.272	0.013	(0.034)	0.259
108	9.00	0.57	0.272	0.013	(0.034)	0.259
109	9.08	0.63	0.304	0.013	(0.038)	0.291
110	9.17	0.63	0.304	0.013	(0.038)	0.291
111	9.25	0.63	0.304	0.013	(0.038)	0.291
112	9.33	0.67	0.320	0.013	(0.040)	0.307
113	9.42	0.67	0.320	0.012	(0.040)	0.308
114	9.50	0.67	0.320	0.012	(0.040)	0.308
115	9.58	0.70	0.336	0.012	(0.042)	0.324
116	9.67	0.70	0.336	0.012	(0.042)	0.324
117	9.75	0.70	0.336	0.012	(0.042)	0.324
118	9.83	0.73	0.352	0.012	(0.044)	0.340
119	9.92	0.73	0.352	0.012	(0.044)	0.340
120	10.00	0.73	0.352	0.012	(0.044)	0.340
121	10.08	0.50	0.240	0.012	(0.030)	0.228
122	10.17	0.50	0.240	0.012	(0.030)	0.228
123	10.25	0.50	0.240	0.012	(0.030)	0.228
124	10.33	0.50	0.240	0.012	(0.030)	0.228
125	10.42	0.50	0.240	0.012	(0.030)	0.228
126	10.50	0.50	0.240	0.012	(0.030)	0.228
127	10.58	0.67	0.320	0.012	(0.040)	0.308
128	10.67	0.67	0.320	0.012	(0.040)	0.308
129	10.75	0.67	0.320	0.012	(0.040)	0.308
130	10.83	0.67	0.320	0.011	(0.040)	0.308
131	10.92	0.67	0.320	0.011	(0.040)	0.309
132	11.00	0.67	0.320	0.011	(0.040)	0.309
133	11.08	0.63	0.304	0.011	(0.038)	0.293
134	11.17	0.63	0.304	0.011	(0.038)	0.293
135	11.25	0.63	0.304	0.011	(0.038)	0.293
136	11.33	0.63	0.304	0.011	(0.038)	0.293
137	11.42	0.63	0.304	0.011	(0.038)	0.293
138	11.50	0.63	0.304	0.011	(0.038)	0.293
139	11.58	0.57	0.272	0.011	(0.034)	0.261
140	11.67	0.57	0.272	0.011	(0.034)	0.261
141	11.75	0.57	0.272	0.011	(0.034)	0.261
142	11.83	0.60	0.288	0.011	(0.036)	0.277
143	11.92	0.60	0.288	0.011	(0.036)	0.277
144	12.00	0.60	0.288	0.011	(0.036)	0.277
145	12.08	0.83	0.400	0.011	(0.050)	0.389
146	12.17	0.83	0.400	0.011	(0.050)	0.389
147	12.25	0.83	0.400	0.011	(0.050)	0.389
148	12.33	0.87	0.416	0.010	(0.052)	0.405
149	12.42	0.87	0.416	0.010	(0.052)	0.406
150	12.50	0.87	0.416	0.010	(0.052)	0.406
151	12.58	0.93	0.448	0.010	(0.056)	0.438
152	12.67	0.93	0.448	0.010	(0.056)	0.438
153	12.75	0.93	0.448	0.010	(0.056)	0.438
154	12.83	0.97	0.464	0.010	(0.058)	0.454
155	12.92	0.97	0.464	0.010	(0.058)	0.454
156	13.00	0.97	0.464	0.010	(0.058)	0.454
157	13.08	1.13	0.544	0.010	(0.067)	0.534
158	13.17	1.13	0.544	0.010	(0.067)	0.534
159	13.25	1.13	0.544	0.010	(0.067)	0.534

160	13.33	1.13	0.544	0.010	(0.067)	0.534
161	13.42	1.13	0.544	0.010	(0.067)	0.534
162	13.50	1.13	0.544	0.010	(0.067)	0.534
163	13.58	0.77	0.368	0.010	(0.046)	0.358
164	13.67	0.77	0.368	0.010	(0.046)	0.358
165	13.75	0.77	0.368	0.010	(0.046)	0.358
166	13.83	0.77	0.368	0.010	(0.046)	0.358
167	13.92	0.77	0.368	0.010	(0.046)	0.358
168	14.00	0.77	0.368	0.009	(0.046)	0.358
169	14.08	0.90	0.432	0.009	(0.054)	0.423
170	14.17	0.90	0.432	0.009	(0.054)	0.423
171	14.25	0.90	0.432	0.009	(0.054)	0.423
172	14.33	0.87	0.416	0.009	(0.052)	0.407
173	14.42	0.87	0.416	0.009	(0.052)	0.407
174	14.50	0.87	0.416	0.009	(0.052)	0.407
175	14.58	0.87	0.416	0.009	(0.052)	0.407
176	14.67	0.87	0.416	0.009	(0.052)	0.407
177	14.75	0.87	0.416	0.009	(0.052)	0.407
178	14.83	0.83	0.400	0.009	(0.050)	0.391
179	14.92	0.83	0.400	0.009	(0.050)	0.391
180	15.00	0.83	0.400	0.009	(0.050)	0.391
181	15.08	0.80	0.384	0.009	(0.048)	0.375
182	15.17	0.80	0.384	0.009	(0.048)	0.375
183	15.25	0.80	0.384	0.009	(0.048)	0.375
184	15.33	0.77	0.368	0.009	(0.046)	0.359
185	15.42	0.77	0.368	0.009	(0.046)	0.359
186	15.50	0.77	0.368	0.009	(0.046)	0.359
187	15.58	0.63	0.304	0.009	(0.038)	0.295
188	15.67	0.63	0.304	0.009	(0.038)	0.295
189	15.75	0.63	0.304	0.009	(0.038)	0.295
190	15.83	0.63	0.304	0.008	(0.038)	0.296
191	15.92	0.63	0.304	0.008	(0.038)	0.296
192	16.00	0.63	0.304	0.008	(0.038)	0.296
193	16.08	0.13	0.064	(0.008)	0.008	0.056
194	16.17	0.13	0.064	(0.008)	0.008	0.056
195	16.25	0.13	0.064	(0.008)	0.008	0.056
196	16.33	0.13	0.064	(0.008)	0.008	0.056
197	16.42	0.13	0.064	(0.008)	0.008	0.056
198	16.50	0.13	0.064	(0.008)	0.008	0.056
199	16.58	0.10	0.048	(0.008)	0.006	0.042
200	16.67	0.10	0.048	(0.008)	0.006	0.042
201	16.75	0.10	0.048	(0.008)	0.006	0.042
202	16.83	0.10	0.048	(0.008)	0.006	0.042
203	16.92	0.10	0.048	(0.008)	0.006	0.042
204	17.00	0.10	0.048	(0.008)	0.006	0.042
205	17.08	0.17	0.080	0.008	(0.010)	0.072
206	17.17	0.17	0.080	0.008	(0.010)	0.072
207	17.25	0.17	0.080	0.008	(0.010)	0.072
208	17.33	0.17	0.080	0.008	(0.010)	0.072
209	17.42	0.17	0.080	0.008	(0.010)	0.072
210	17.50	0.17	0.080	0.008	(0.010)	0.072
211	17.58	0.17	0.080	0.008	(0.010)	0.072
212	17.67	0.17	0.080	0.008	(0.010)	0.072
213	17.75	0.17	0.080	0.008	(0.010)	0.072

214	17.83	0.13	0.064	0.007	(0.008)	0.056
215	17.92	0.13	0.064	0.007	(0.008)	0.057
216	18.00	0.13	0.064	0.007	(0.008)	0.057
217	18.08	0.13	0.064	0.007	(0.008)	0.057
218	18.17	0.13	0.064	0.007	(0.008)	0.057
219	18.25	0.13	0.064	0.007	(0.008)	0.057
220	18.33	0.13	0.064	0.007	(0.008)	0.057
221	18.42	0.13	0.064	0.007	(0.008)	0.057
222	18.50	0.13	0.064	0.007	(0.008)	0.057
223	18.58	0.10	0.048	(0.007)	0.006	0.042
224	18.67	0.10	0.048	(0.007)	0.006	0.042
225	18.75	0.10	0.048	(0.007)	0.006	0.042
226	18.83	0.07	0.032	(0.007)	0.004	0.028
227	18.92	0.07	0.032	(0.007)	0.004	0.028
228	19.00	0.07	0.032	(0.007)	0.004	0.028
229	19.08	0.10	0.048	(0.007)	0.006	0.042
230	19.17	0.10	0.048	(0.007)	0.006	0.042
231	19.25	0.10	0.048	(0.007)	0.006	0.042
232	19.33	0.13	0.064	0.007	(0.008)	0.057
233	19.42	0.13	0.064	0.007	(0.008)	0.057
234	19.50	0.13	0.064	0.007	(0.008)	0.057
235	19.58	0.10	0.048	(0.007)	0.006	0.042
236	19.67	0.10	0.048	(0.007)	0.006	0.042
237	19.75	0.10	0.048	(0.007)	0.006	0.042
238	19.83	0.07	0.032	(0.007)	0.004	0.028
239	19.92	0.07	0.032	(0.007)	0.004	0.028
240	20.00	0.07	0.032	(0.007)	0.004	0.028
241	20.08	0.10	0.048	(0.007)	0.006	0.042
242	20.17	0.10	0.048	(0.007)	0.006	0.042
243	20.25	0.10	0.048	(0.007)	0.006	0.042
244	20.33	0.10	0.048	(0.007)	0.006	0.042
245	20.42	0.10	0.048	(0.006)	0.006	0.042
246	20.50	0.10	0.048	(0.006)	0.006	0.042
247	20.58	0.10	0.048	(0.006)	0.006	0.042
248	20.67	0.10	0.048	(0.006)	0.006	0.042
249	20.75	0.10	0.048	(0.006)	0.006	0.042
250	20.83	0.07	0.032	(0.006)	0.004	0.028
251	20.92	0.07	0.032	(0.006)	0.004	0.028
252	21.00	0.07	0.032	(0.006)	0.004	0.028
253	21.08	0.10	0.048	(0.006)	0.006	0.042
254	21.17	0.10	0.048	(0.006)	0.006	0.042
255	21.25	0.10	0.048	(0.006)	0.006	0.042
256	21.33	0.07	0.032	(0.006)	0.004	0.028
257	21.42	0.07	0.032	(0.006)	0.004	0.028
258	21.50	0.07	0.032	(0.006)	0.004	0.028
259	21.58	0.10	0.048	(0.006)	0.006	0.042
260	21.67	0.10	0.048	(0.006)	0.006	0.042
261	21.75	0.10	0.048	(0.006)	0.006	0.042
262	21.83	0.07	0.032	(0.006)	0.004	0.028
263	21.92	0.07	0.032	(0.006)	0.004	0.028
264	22.00	0.07	0.032	(0.006)	0.004	0.028
265	22.08	0.10	0.048	(0.006)	0.006	0.042
266	22.17	0.10	0.048	(0.006)	0.006	0.042
267	22.25	0.10	0.048	(0.006)	0.006	0.042

268	22.33	0.07	0.032	(0.006)	0.004	0.028
269	22.42	0.07	0.032	(0.006)	0.004	0.028
270	22.50	0.07	0.032	(0.006)	0.004	0.028
271	22.58	0.07	0.032	(0.006)	0.004	0.028
272	22.67	0.07	0.032	(0.006)	0.004	0.028
273	22.75	0.07	0.032	(0.006)	0.004	0.028
274	22.83	0.07	0.032	(0.006)	0.004	0.028
275	22.92	0.07	0.032	(0.006)	0.004	0.028
276	23.00	0.07	0.032	(0.006)	0.004	0.028
277	23.08	0.07	0.032	(0.006)	0.004	0.028
278	23.17	0.07	0.032	(0.006)	0.004	0.028
279	23.25	0.07	0.032	(0.006)	0.004	0.028
280	23.33	0.07	0.032	(0.006)	0.004	0.028
281	23.42	0.07	0.032	(0.006)	0.004	0.028
282	23.50	0.07	0.032	(0.006)	0.004	0.028
283	23.58	0.07	0.032	(0.006)	0.004	0.028
284	23.67	0.07	0.032	(0.006)	0.004	0.028
285	23.75	0.07	0.032	(0.006)	0.004	0.028
286	23.83	0.07	0.032	(0.006)	0.004	0.028
287	23.92	0.07	0.032	(0.006)	0.004	0.028
288	24.00	0.07	0.032	(0.006)	0.004	0.028

(Loss Rate Not Used)

Sum = 100.0

Sum = 45.4

Flood volume = Effective rainfall 3.78(In)

times area 2.1(Ac.)/[(In)/(Ft.)] = 0.7(Ac.Ft)

Total soil loss = 0.22(In)

Total soil loss = 0.038(Ac.Ft)

Total rainfall = 4.00(In)

Flood volume = 28815.8 Cubic Feet

Total soil loss = 1673.2 Cubic Feet

Peak flow rate of this hydrograph = 1.131(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0002	0.03	Q					
0+10	0.0006	0.06	Q					
0+15	0.0010	0.06	Q					
0+20	0.0015	0.08	Q					
0+25	0.0022	0.09	Q					
0+30	0.0028	0.09	Q					
0+35	0.0034	0.09	Q					
0+40	0.0040	0.09	Q					
0+45	0.0046	0.09	Q					
0+50	0.0053	0.11	Q					
0+55	0.0061	0.12	Q					
1+ 0	0.0070	0.12	Q					

1+ 5	0.0077	0.10	Q				
1+10	0.0083	0.09	Q				
1+15	0.0089	0.09	Q				
1+20	0.0095	0.09	Q				
1+25	0.0101	0.09	Q				
1+30	0.0107	0.09	Q				
1+35	0.0113	0.09	Q				
1+40	0.0120	0.09	Q				
1+45	0.0126	0.09	Q				
1+50	0.0133	0.11	Q				
1+55	0.0141	0.12	Q				
2+ 0	0.0149	0.12	Q				
2+ 5	0.0157	0.12	Q				
2+10	0.0166	0.12	QV				
2+15	0.0174	0.12	QV				
2+20	0.0182	0.12	QV				
2+25	0.0190	0.12	QV				
2+30	0.0198	0.12	QV				
2+35	0.0208	0.14	QV				
2+40	0.0218	0.15	QV				
2+45	0.0228	0.15	QV				
2+50	0.0238	0.15	QV				
2+55	0.0248	0.15	QV				
3+ 0	0.0259	0.15	QV				
3+ 5	0.0269	0.15	QV				
3+10	0.0279	0.15	QV				
3+15	0.0289	0.15	QV				
3+20	0.0299	0.15	QV				
3+25	0.0310	0.15	QV				
3+30	0.0320	0.15	QV				
3+35	0.0330	0.15	QV				
3+40	0.0340	0.15	Q V				
3+45	0.0351	0.15	Q V				
3+50	0.0362	0.17	Q V				
3+55	0.0374	0.18	Q V				
4+ 0	0.0386	0.18	Q V				
4+ 5	0.0399	0.18	Q V				
4+10	0.0411	0.18	Q V				
4+15	0.0423	0.18	Q V				
4+20	0.0437	0.19	Q V				
4+25	0.0451	0.21	Q V				
4+30	0.0465	0.21	Q V				
4+35	0.0479	0.21	Q V				
4+40	0.0494	0.21	Q V				
4+45	0.0508	0.21	Q V				
4+50	0.0523	0.22	Q V				
4+55	0.0540	0.24	Q V				
5+ 0	0.0556	0.24	Q V				
5+ 5	0.0570	0.20	Q V				
5+10	0.0583	0.18	Q V				
5+15	0.0595	0.18	Q V				
5+20	0.0608	0.19	Q V				
5+25	0.0622	0.21	Q V				
5+30	0.0637	0.21	Q V				

5+35	0.0652	0.23	Q	V				
5+40	0.0669	0.24	Q	V				
5+45	0.0685	0.24	Q	V				
5+50	0.0701	0.24	Q	V				
5+55	0.0718	0.24	Q	V				
6+ 0	0.0734	0.24	Q	V				
6+ 5	0.0752	0.26	Q	V				
6+10	0.0771	0.27	Q	V				
6+15	0.0790	0.27	Q	V				
6+20	0.0808	0.27	Q	V				
6+25	0.0827	0.27	Q	V				
6+30	0.0846	0.27	Q	V				
6+35	0.0866	0.29	Q	V				
6+40	0.0887	0.31	Q	V				
6+45	0.0909	0.31	Q	V				
6+50	0.0930	0.31	Q	V				
6+55	0.0951	0.31	Q	V				
7+ 0	0.0972	0.31	Q	V				
7+ 5	0.0994	0.31	Q	V				
7+10	0.1015	0.31	Q	V				
7+15	0.1036	0.31	Q	V				
7+20	0.1059	0.33	Q	V				
7+25	0.1082	0.34	Q	V				
7+30	0.1106	0.34	Q	V				
7+35	0.1131	0.36	Q	V				
7+40	0.1157	0.38	Q	V				
7+45	0.1183	0.38	Q	V				
7+50	0.1210	0.40	Q	V				
7+55	0.1238	0.41	Q	V				
8+ 0	0.1267	0.41	Q	V				
8+ 5	0.1298	0.45	Q	V				
8+10	0.1330	0.48	Q	V				
8+15	0.1363	0.48	Q	V				
8+20	0.1396	0.48	Q	V				
8+25	0.1429	0.48	Q	V				
8+30	0.1463	0.48	Q	V				
8+35	0.1497	0.50	Q	V				
8+40	0.1532	0.51	Q	V				
8+45	0.1568	0.51	Q	V				
8+50	0.1604	0.53	Q	V				
8+55	0.1642	0.55	Q	V				
9+ 0	0.1680	0.55	Q	V				
9+ 5	0.1720	0.59	Q	V				
9+10	0.1763	0.61	Q	V				
9+15	0.1805	0.62	Q	V				
9+20	0.1849	0.64	Q	V				
9+25	0.1894	0.65	Q	V				
9+30	0.1938	0.65	Q	V				
9+35	0.1985	0.67	Q	V				
9+40	0.2032	0.68	Q	V				
9+45	0.2079	0.69	Q	V				
9+50	0.2127	0.70	Q	V				
9+55	0.2177	0.72	Q	V				
10+ 0	0.2226	0.72	Q	V				

10+ 5	0.2267	0.59	Q	V		
10+10	0.2301	0.50	Q	V		
10+15	0.2334	0.48	Q	V		
10+20	0.2367	0.48	Q	V		
10+25	0.2401	0.48	Q	V		
10+30	0.2434	0.48	Q	V		
10+35	0.2474	0.58	Q	V		
10+40	0.2518	0.64	Q	V		
10+45	0.2563	0.65	Q	V		
10+50	0.2608	0.65	Q	V		
10+55	0.2653	0.65	Q	V		
11+ 0	0.2698	0.65	Q	V		
11+ 5	0.2742	0.63	Q	V		
11+10	0.2785	0.62	Q	V		
11+15	0.2827	0.62	Q	V		
11+20	0.2870	0.62	Q	V		
11+25	0.2913	0.62	Q	V		
11+30	0.2955	0.62	Q	V		
11+35	0.2996	0.58	Q	V		
11+40	0.3034	0.56	Q	V		
11+45	0.3072	0.55	Q	V		
11+50	0.3111	0.57	Q	V		
11+55	0.3152	0.58	Q	V		
12+ 0	0.3192	0.59	Q	V		
12+ 5	0.3242	0.72	Q	V		
12+10	0.3298	0.81	Q	V		
12+15	0.3354	0.82	Q	V		
12+20	0.3412	0.84	Q	V		
12+25	0.3471	0.86	Q	V		
12+30	0.3531	0.86	Q	V		
12+35	0.3592	0.90	Q	V		
12+40	0.3656	0.92	Q	V		
12+45	0.3720	0.93	Q	V		
12+50	0.3785	0.95	Q	V		
12+55	0.3851	0.96	Q	V		
13+ 0	0.3917	0.96	Q	V		
13+ 5	0.3990	1.06	Q	V		
13+10	0.4067	1.12	Q	V		
13+15	0.4145	1.13	Q	V		
13+20	0.4223	1.13	Q	V		
13+25	0.4301	1.13	Q	V		
13+30	0.4379	1.13	Q	V		
13+35	0.4442	0.92	Q	V		
13+40	0.4496	0.78	Q	V		
13+45	0.4548	0.76	Q	V		
13+50	0.4600	0.76	Q	V		
13+55	0.4653	0.76	Q	V		
14+ 0	0.4705	0.76	Q	V		
14+ 5	0.4762	0.84	Q	V		
14+10	0.4824	0.89	Q	V		
14+15	0.4885	0.89	Q	V		
14+20	0.4945	0.88	Q	V		
14+25	0.5005	0.86	Q	V		
14+30	0.5064	0.86	Q	V		

14+35	0.5124	0.86	Q			V	
14+40	0.5183	0.86	Q			V	
14+45	0.5242	0.86	Q			V	
14+50	0.5300	0.84	Q			V	
14+55	0.5357	0.83	Q			V	
15+ 0	0.5414	0.83	Q			V	
15+ 5	0.5470	0.81	Q			V	
15+10	0.5525	0.80	Q			V	
15+15	0.5580	0.79	Q			V	
15+20	0.5633	0.78	Q			V	
15+25	0.5686	0.76	Q			V	
15+30	0.5738	0.76	Q			V	
15+35	0.5785	0.68	Q			V	
15+40	0.5829	0.63	Q			V	
15+45	0.5872	0.63	Q			V	
15+50	0.5915	0.63	Q			V	
15+55	0.5958	0.63	Q			V	
16+ 0	0.6001	0.63	Q			V	
16+ 5	0.6024	0.34	Q			V	
16+10	0.6035	0.15	Q			V	
16+15	0.6043	0.12	Q			V	
16+20	0.6051	0.12	Q			V	
16+25	0.6059	0.12	Q			V	
16+30	0.6067	0.12	Q			V	
16+35	0.6074	0.10	Q			V	
16+40	0.6081	0.09	Q			V	
16+45	0.6087	0.09	Q			V	
16+50	0.6093	0.09	Q			V	
16+55	0.6099	0.09	Q			V	
17+ 0	0.6105	0.09	Q			V	
17+ 5	0.6114	0.13	Q			V	
17+10	0.6124	0.15	Q			V	
17+15	0.6135	0.15	Q			V	
17+20	0.6145	0.15	Q			V	
17+25	0.6156	0.15	Q			V	
17+30	0.6166	0.15	Q			V	
17+35	0.6177	0.15	Q			V	
17+40	0.6187	0.15	Q			V	
17+45	0.6198	0.15	Q			V	
17+50	0.6207	0.13	Q			V	
17+55	0.6216	0.12	Q			V	
18+ 0	0.6224	0.12	Q			V	
18+ 5	0.6232	0.12	Q			V	
18+10	0.6240	0.12	Q			V	
18+15	0.6249	0.12	Q			V	
18+20	0.6257	0.12	Q			V	
18+25	0.6265	0.12	Q			V	
18+30	0.6273	0.12	Q			V	
18+35	0.6280	0.10	Q			V	
18+40	0.6287	0.09	Q			V	
18+45	0.6293	0.09	Q			V	
18+50	0.6298	0.07	Q			V	
18+55	0.6302	0.06	Q			V	
19+ 0	0.6306	0.06	Q			V	

19+ 5	0.6311	0.08	Q				V
19+10	0.6317	0.09	Q				V
19+15	0.6324	0.09	Q				V
19+20	0.6331	0.11	Q				V
19+25	0.6339	0.12	Q				V
19+30	0.6347	0.12	Q				V
19+35	0.6355	0.10	Q				V
19+40	0.6361	0.09	Q				V
19+45	0.6367	0.09	Q				V
19+50	0.6372	0.07	Q				V
19+55	0.6376	0.06	Q				V
20+ 0	0.6380	0.06	Q				V
20+ 5	0.6385	0.08	Q				V
20+10	0.6391	0.09	Q				V
20+15	0.6398	0.09	Q				V
20+20	0.6404	0.09	Q				V
20+25	0.6410	0.09	Q				V
20+30	0.6416	0.09	Q				V
20+35	0.6422	0.09	Q				V
20+40	0.6428	0.09	Q				V
20+45	0.6434	0.09	Q				V
20+50	0.6439	0.07	Q				V
20+55	0.6444	0.06	Q				V
21+ 0	0.6448	0.06	Q				V
21+ 5	0.6453	0.08	Q				V
21+10	0.6459	0.09	Q				V
21+15	0.6465	0.09	Q				V
21+20	0.6470	0.07	Q				V
21+25	0.6474	0.06	Q				V
21+30	0.6478	0.06	Q				V
21+35	0.6484	0.08	Q				V
21+40	0.6490	0.09	Q				V
21+45	0.6496	0.09	Q				V
21+50	0.6501	0.07	Q				V
21+55	0.6505	0.06	Q				V
22+ 0	0.6509	0.06	Q				V
22+ 5	0.6514	0.08	Q				V
22+10	0.6520	0.09	Q				V
22+15	0.6526	0.09	Q				V
22+20	0.6531	0.07	Q				V
22+25	0.6536	0.06	Q				V
22+30	0.6540	0.06	Q				V
22+35	0.6544	0.06	Q				V
22+40	0.6548	0.06	Q				V
22+45	0.6552	0.06	Q				V
22+50	0.6556	0.06	Q				V
22+55	0.6560	0.06	Q				V
23+ 0	0.6564	0.06	Q				V
23+ 5	0.6568	0.06	Q				V
23+10	0.6572	0.06	Q				V
23+15	0.6576	0.06	Q				V
23+20	0.6580	0.06	Q				V
23+25	0.6585	0.06	Q				V
23+30	0.6589	0.06	Q				V

23+35	0.6593	0.06	Q				V
23+40	0.6597	0.06	Q				V
23+45	0.6601	0.06	Q				V
23+50	0.6605	0.06	Q				V
23+55	0.6609	0.06	Q				V
24+ 0	0.6613	0.06	Q				V
24+ 5	0.6615	0.03	Q				V
24+10	0.6615	0.00	Q				V

Unit Hydrograph Analysis

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Study date 07/11/22 File: 1162007PRUH1100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6335

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

VALUED ENGINEERING, INC
1162007 - WINERY DEVELOPMENT
POST-DEVELOPED, UNIT-HYDROGRAPH
100-YEAR, 1-HOUR STORMEVENT

Drainage Area = 2.10(Ac.) = 0.003 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 2.10(Ac.) =
0.003 Sq. Mi.
Length along longest watercourse = 822.00(Ft.)
Length along longest watercourse measured to centroid =
420.00(Ft.)
Length along longest watercourse = 0.156 Mi.
Length along longest watercourse measured to centroid = 0.080 Mi.
Difference in elevation = 17.48(Ft.)
Slope along watercourse = 112.2803 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.028 Hr.
Lag time = 1.66 Min.
25% of lag time = 0.42 Min.
40% of lag time = 0.66 Min.
Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.10	0.51	1.08

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.10	1.65	3.46

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.514(In)
Area Averaged 100-Year Rainfall = 1.650(In)

Point rain (area averaged) = 1.650(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.650(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
2.050	98.00	1.000
0.050	69.00	0.000
Total Area Entered = 2.10(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
98.0	99.2	0.010	1.000	0.001	0.976	0.001
69.0	84.4	0.194	0.000	0.194	0.024	0.005
Sum (F) =						0.006

Area averaged mean soil loss (F) (In/Hr) = 0.006
Minimum soil loss rate ((In/Hr)) = 0.003
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.124

Slope of intensity-duration curve for a 1 hour storm =0.5500

U n i t H y d r o g r a p h VALLEY S-Curve

----- Unit Hydrograph Data

Unit time period	Time % of lag	Distribution	Unit Hydrograph
(hrs)		Graph %	(CFS)
1	0.083	301.155	56.798
2	0.167	602.309	37.065
3	0.250	903.464	6.137
		Sum = 100.000	Sum= 2.116

The following loss rate calculations reflect use of the minimum calculated loss

rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.08	3.30	0.653	0.006	(0.081)	0.648
2	0.17	4.20	0.832	0.006	(0.103)	0.826
3	0.25	4.40	0.871	0.006	(0.108)	0.866
4	0.33	4.80	0.950	0.006	(0.118)	0.945
5	0.42	5.20	1.030	0.006	(0.128)	1.024
6	0.50	6.20	1.228	0.006	(0.152)	1.222
7	0.58	6.80	1.346	0.006	(0.167)	1.341
8	0.67	8.80	1.742	0.006	(0.216)	1.737
9	0.75	13.90	2.752	0.006	(0.341)	2.747
10	0.83	31.40	6.217	0.006	(0.771)	6.211
11	0.92	7.20	1.426	0.006	(0.177)	1.420
12	1.00	3.80	0.752	0.006	(0.093)	0.747

(Loss Rate Not Used)

Sum = 100.0 Sum = 19.7

Flood volume = Effective rainfall 1.64(In)
times area 2.1(Ac.)/[(In)/(Ft.)] = 0.3(Ac.Ft)
Total soil loss = 0.01(In)
Total soil loss = 0.001(Ac.Ft)
Total rainfall = 1.65(In)
Flood volume = 12534.8 Cubic Feet
Total soil loss = 42.9 Cubic Feet

Peak flow rate of this hydrograph = 9.852(CFS)

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1 - H O U R S T O R M
Run o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0054	0.78	V Q				
0+10	0.0157	1.50	V Q				
0+15	0.0279	1.77	V Q				
0+20	0.0412	1.92	V Q				
0+25	0.0555	2.09	VQ				
0+30	0.0720	2.40	QV				
0+35	0.0907	2.70	Q V				
0+40	0.1134	3.30	Q V				
0+45	0.1467	4.84			QV		
0+50	0.2146	9.85				V	Q
0+55	0.2624	6.94				Q	V
1+ 0	0.2818	2.82		Q			V
1+ 5	0.2871	0.77	Q				V
1+10	0.2878	0.10	Q				V

APPENDIX “E”

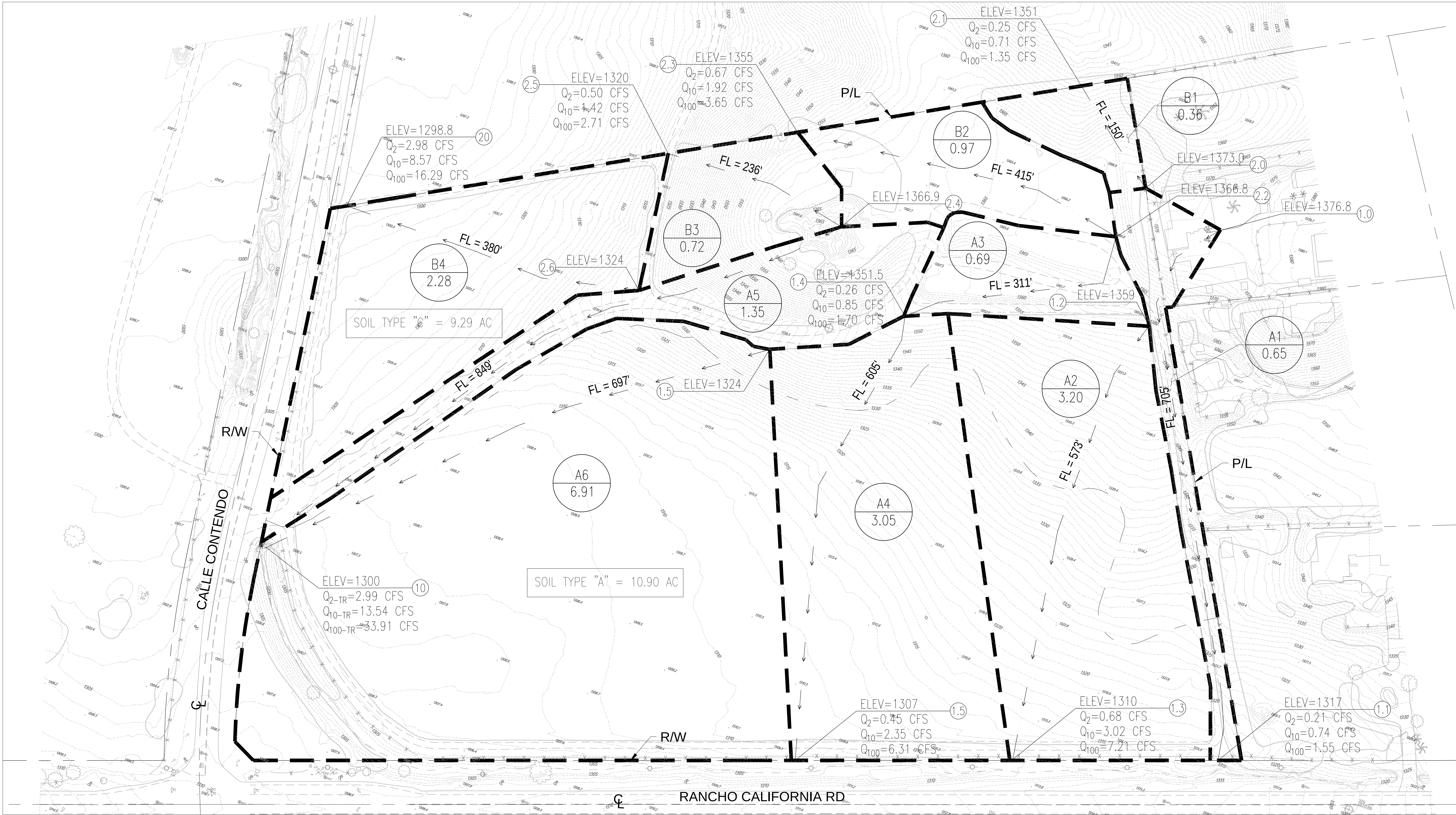
BASIN ROUTING:

APPENDIX "F"

STORMDRAIN CAPACITY:

APPENDIX “G”

HYDROLOGY MAPS:
PRE-DEVELOPED HYDROLOGY MAP
POST-DEVELOPED HYDROLOGY MAP



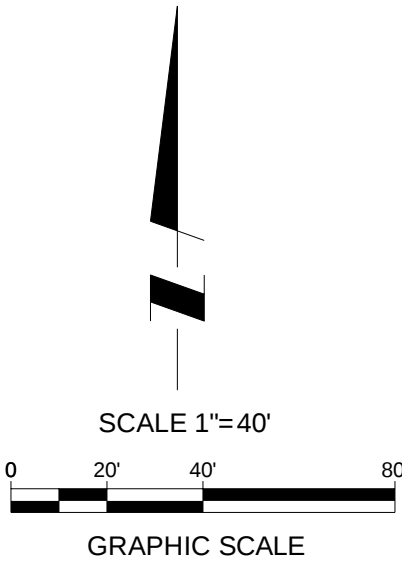
PRE-DEVELOPED HYDROLOGY - RATIONAL METHOD

SUBAREA	ACRE	Q ₂	CONFLUENCED Q _{2-TR}	Q ₁₀	CONFLUENCED Q _{10-TR}	Q ₁₀₀	CONFLUENCED Q _{100-TR}
A1	0.65	0.21	2.99	0.74	13.54	1.55	33.91
A2	3.20	0.68		3.02		7.21	
A3	0.69	0.26		0.85		1.70	
A4	3.05	0.45		2.35		6.31	
A5	1.35	0.51		1.66		3.33	
A6	6.91	0.88	2.98	4.92	8.57	13.81	16.29
B1	0.36	0.25		0.71		1.35	
B2	0.97	0.67		1.92		3.65	
B3	0.72	0.50		1.42		2.71	
B4	2.28	1.57		4.51		16.29	
TOTAL	20.19		5.972000		22.106		50.194

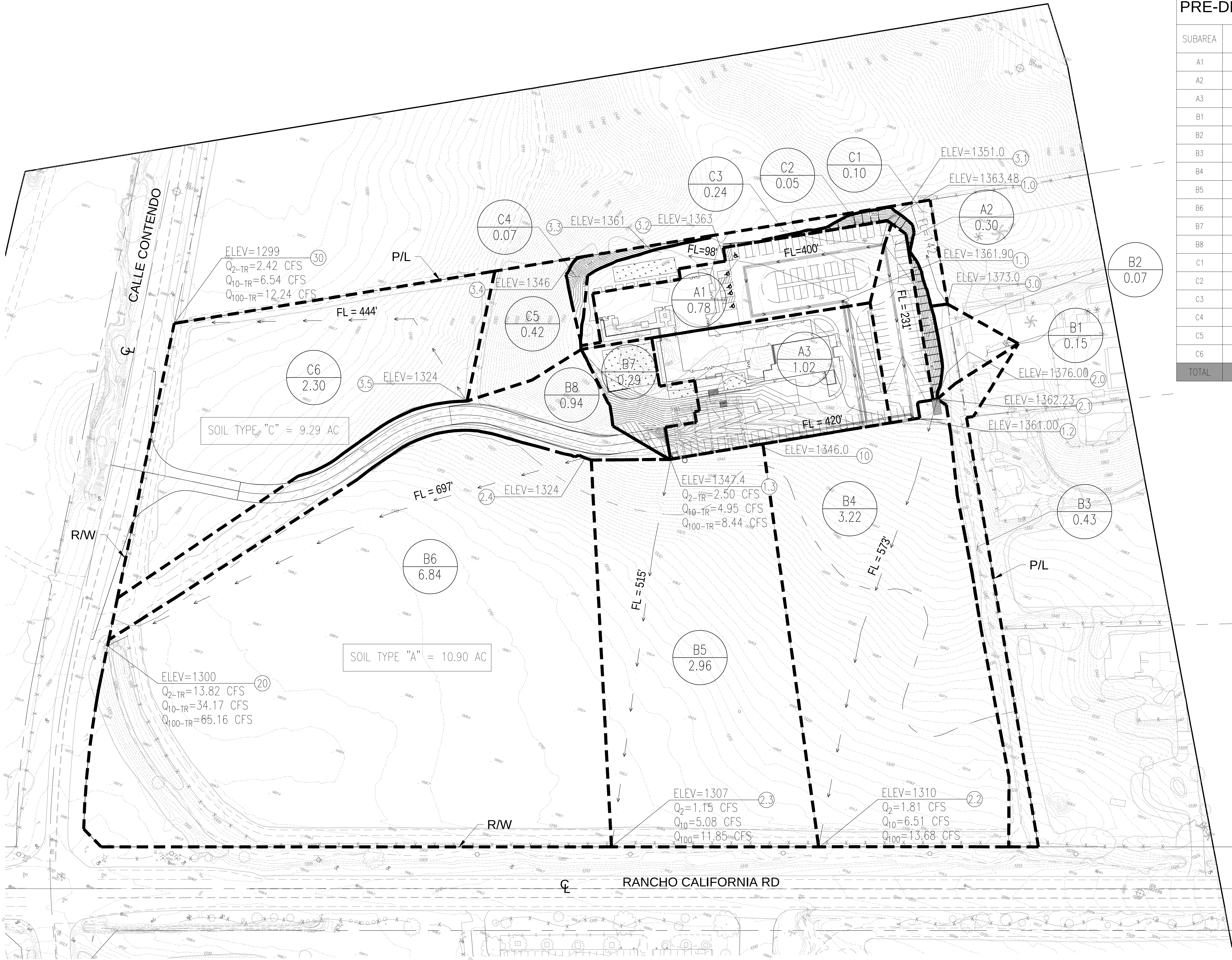
LEGEND

- BASIN BOUNDARY
- SURFACE ELEVATION
- SUBAREA NODE
- SUBAREA 100YR RUNOFF
- CUMULATIVE CONFLUENCED SUBAREA RUNOFF
- SUBAREA DESIGNATION
- SUBAREA AREA (IN ACRE)
- FLOW LENGTH
- BASIN AREA
- FLOW PATTERN
- HYDRAULIC SOIL PATTERN

HYDRAULIC SOIL TYPES
HYDROLOGIC SOIL GROUP-A = 10.90 AC
HYDROLOGIC SOIL GROUP-C = 9.29 AC



 CIVIL ENGINEERING • LAND SURVEYING • LAND PLANNING 600 N. MOUNTAIN AVE., STE. C102, UPLAND, CA 91786 PHONE: (909) 982-4601	CITY OF TEMECULA		SHEET 1 OF 1
	PRE-DEVELOPED HYDROLOGY MAP WINERY DEVELOPMENT 33990 RANCHO CALIFORNIA ROAD		
	DATE: MARCH 2021	PREPARED BY: DH REVIEWED BY: JDM	



PRE-DEVELOPED HYDROLOGY - RATIONAL METHOD

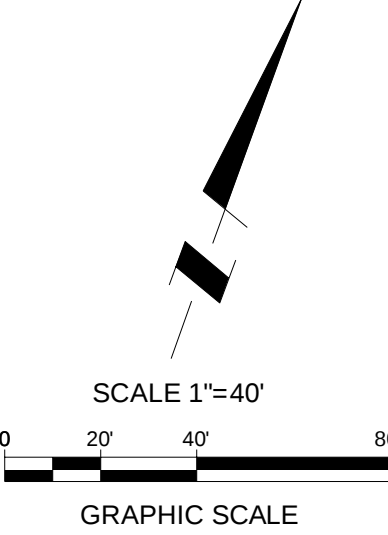
SUBAREA	ACRE	Q ₂	CONFLUENCED Q _{2-TR}	Q ₁₀	CONFLUENCED Q _{10-TR}	Q ₁₀₀	CONFLUENCED Q _{100-TR}
A1	0.78	0.92	2.50	1.82	4.95	3.09	8.44
A2	0.30	0.45		0.88		1.50	
A3	1.02	1.52		2.99		5.08	
B1	0.15	0.13	13.82	0.36	34.17	0.67	65.16
B2	0.07	0.10		0.19		0.32	
B3	0.43	0.31		0.96		1.89	
B4	3.22	1.81	2.42	6.51	6.54	13.68	12.24
B5	2.96	1.15		5.08		11.85	
B6	6.84	9.11		18.02		31.19	
B7	0.29	0.40	0.20	0.79	0.12	1.34	0.28
B8	0.94	0.82		2.26		4.21	
C1	0.10	0.07		0.20		0.38	
C2	0.05	0.06	0.56	0.12	0.16	0.20	0.28
C3	0.24	0.28		0.56		0.96	
C4	0.07	0.08		0.16		0.28	
C5	0.42	0.30	0.85	0.85	1.61	1.61	8.82
C6	2.30	1.63		4.65		8.82	
TOTAL	20.18						

- LEGEND
- BASIN BOUNDARY
 - 978.61 SURFACE ELEVATION
 - 8 SUBAREA NODE
 - Q₁₀₀ SUBAREA 100YR RUNOFF
 - Q_{TR} CUMULATIVE CONFLUENCED SUBAREA RUNOFF
 - DMA A SUBAREA DESIGNATION
 - 1.005 AC SUBAREA AREA (IN ACRE)
 - FL FLOW LENGTH
 - A BASIN AREA
 - FLOW PATTERN
 - HYDRAULIC SOIL PATTERN

HYDRAULIC SOIL TYPES

HYDROLOGIC SOIL GROUP-A = 10.90 AC

HYDROLOGIC SOIL GROUP-C = 9.29 AC



CITY OF TEMECULA

PRE-DEVELOPED
HYDROLOGY MAP
WINERY DEVELOPMENT
33990 RANCHO CALIFORNIA ROAD

SHEET

1
OF 1

DATE: MARCH 2021

PREPARED BY: DH
REVIEWED BY: JDM

FOR: MEXIN WINERY

W.O.