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3100 Airway Ave. Suite 124

COSTA MESA, CA 92626

Phone 949/548-1192

Drainage Study

for

Haven Vineyards

Prepared for:

Haven Vinyardss, LLC

41625 Camino Del Vino

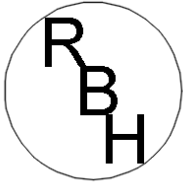
Temecula, CA 92590

Project Site Address

41625 Camino Del Vino, Temecula, CA

Date:

11/30/23



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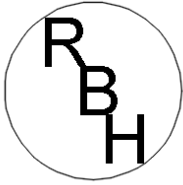
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Section 1. Discussion

Section 1.01 Purpose

The purpose of this preliminary study is to determine the anticipated 10 and 100 year peak storm runoff rate and runoff volume for the developed portion of the site for comparison to the existing flows. The drainage pipes and facilities will be sized accordingly as part of the final drainage study and shown on the construction plans for the site. The Riverside County Unit Hydrograph method is used to compare the existing condition runoff volumes to the post-development runoff volumes.

Section 2. Site

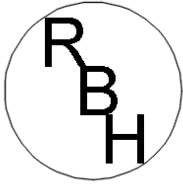
Section 2.01 Description

The project is the construction of a Wine Tasting & Production Building on a 9.26 acre parcel at the southwest corner of DePortola Road and Camino Del Vino. The construction and grading will disturb approximately 2.3 acres of the site and include 0.71 acres of paved parking and driveways, 0.27 acres of buildings and 0.29 acres of walkways and patios. There will also be 0.26 acres of pervious D.G. parking. The remainder of the disturbed area will be re-planted with drought tolerant landscaping. As part of the development, a 2,815 c.f. rainfall harvest and use tank and a 280 s.f. infiltration trench will be incorporated into the drainage system to both treat the runoff and mitigate the increase in runoff volume. The overflow from these BMPs will be routed to the existing natural drainage channel which crosses the northeastern portion of the site.

Section 2.02 Topography

The existing ground on the project site slopes generally from the south down to the north towards Camino Del Vino. There is an existing drainage course that crosses Camino Del Vino near the center of the site and flows through the site to the east towards DePortola Road.

There are some areas of stormwater run-on to the site, but the development is situated such that the flows bypass the area of development and do not impact it and do not contribute to the drainage system being constructed for the development.



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Section 3. Methodology

Section 3.01 Rational Method

The Rational Method as described in the Riverside County Hydrology Manual shall be used to determine peak storm runoff. The following values shall be used in the calculations:

Soil Groups	B per Soils group Map Plate C-1.53	See Attachment B.
C (Coefficient of Runoff)	From Plate D-5.3	See Attachment D.
2 Year 1 Hour Rainfall	0.53 in. per Plate D-4.3	See Attachment C.
100 Year 1 Hour Rainfall	1.27 in per Plate D-4.4	See Attachment C.
Slope of Rainfall Intensity Curve	0.55 per Plate D-4.3	See Attachment C.
10 Year 1 Hour Rainfall	0.83 in per Plate D-4.5	See Attachment D.
I-10	Per Plate D-4.7	See Attachment D.
I-100	Per Plate D-4.7	See Attachment D.

The site is first divided into drainage sub-areas. See the Hydrology Maps in **Attachments A.**

The time of concentration, T_c , for each sub-area along the drainage path is computed using Plate D-3 in **Attachment D.**

Based on the time of concentration, the rainfall intensity is determined using Plate D-4.7 (See **Attachment D**).

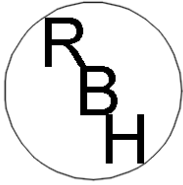
The the Coefficient of runoff is determined for the subarea using Plate D-5.3 (See **Attachment D**).

Then applying the rational method equation, the peak runoff is determined at each node along the drainage path. Q's are tabulated at each node along the drainage path.

The rational method calculations are in **Attachment E.**

Section 3.02 Unit Hydrograph

The Riverside County Synthetic Unit Hydrograph Method is use to determine the runoff volume from the site in the existing and the proposed development condition. The



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CIVILCADD/CIVILDESIGN Riverside County Unit Hydrograph program is used to obtain the results.

The following values shall be used in the calculations:

2 Year 6 Hour Precipitation 1.30 in. per Plate E-5.3 See **Attachment C.**

100 Year 6 Hour Precipitation 2.80 in per Plate E-5.4 See **Attachment C.**

The Synthetic Unit Hydrograph program results are in **Attachment G.**

Section 3.03 Storm Drain Hydraulic Calculations

Calculations to determine storm drain system sizing for use in the Rational Method routing calculations.

Storm Drain Capacity:

The Mannings equation is used to determine the capacity of the storm drain system.

The mannings equation for a pipe flowing full is:

$$Q=0.463D^{8/3}s^{1/2}/n$$

Where:

Q= flow capacity of pipe, cfs

D = diameter of pipe, ft

s = slope of pipe

n= Mannings n Factor, 0.013 for PVC pipe

Sump Inlet Capacity:

The proposed inlets are 24" square grated inlets. In the sump condition, the maximum ponding depth at the inlets will be 4" or 0.33'.

The capacity of a grate in sump is:

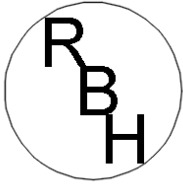
$$Q=3Lh^{3/2}$$

Where:

Q= flow capacity of inlet, cfs, L = preimeter length of grate, 8 ft, & h = depth of ponded water, ft

Therefore, the maximum capacity of the grates in a sump is:

$$Q=3(8)(0.33)^{3/2} = 4.5 \text{ cfs}$$



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Section 4. Summary

The calculations herein demonstrate that the proposed development will increase the runoff volume from the site in a 10-year or 100-year storm event. However, the increase in storm runoff is mitigated by the storage capacity of the Harvest and Use BMP and the Infiltration Trench BMP. Due to the BMPs, the development of the site will actually reduce the storm water runoff from the site in a 10 year storm event and only increase the runoff in a 100-year storm event by 0.52%.

The Harvest and Use Tank has a capacity of 1,833 c.f.

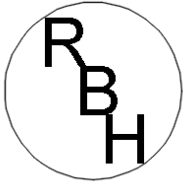
Per the Synthetic Unit Hydrograph calculation results in **Attachment D**:

10-year Storm Event

The pre-development runoff from the site is	24,517 c.f.
The post development runoff from the site is	25,718 c.f.
Increase in site runoff due to development	1,201 c.f. (25,718-24,517)
Site runoff accounting for BMP storage	23,885 c.f. (25,718 – 1,833)
Reduction of site runoff due to development	<u>632 c.f.</u> (24,517-23,885)

100-year Storm Event

The pre-development runoff from the site is	46,395 c.f.
The post development runoff from the site is	48,467 c.f.
Increase in site runoff due to development	2,072 c.f. (48,467-46,395)
Site runoff accounting for BMP storage	46,634 c.f. (48,467 - 1833)
Increase of site runoff due to development	<u>239 c.f.</u> (46,634 -46,395)
% Increase = $(239/46395)*100 =$	0.52%



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Section 5. Certification

Declaration of Responsible Charge

I hereby declare that I am the engineer of work for this project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with current standards.

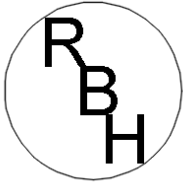
I understand that the check of project drawing and specifications by the County of Riverside is confined to a review only and does not relieve me, as engineer of work, of my responsibilities for project design.

Michael L Benesh, RCE 37893



11/30/23

Date



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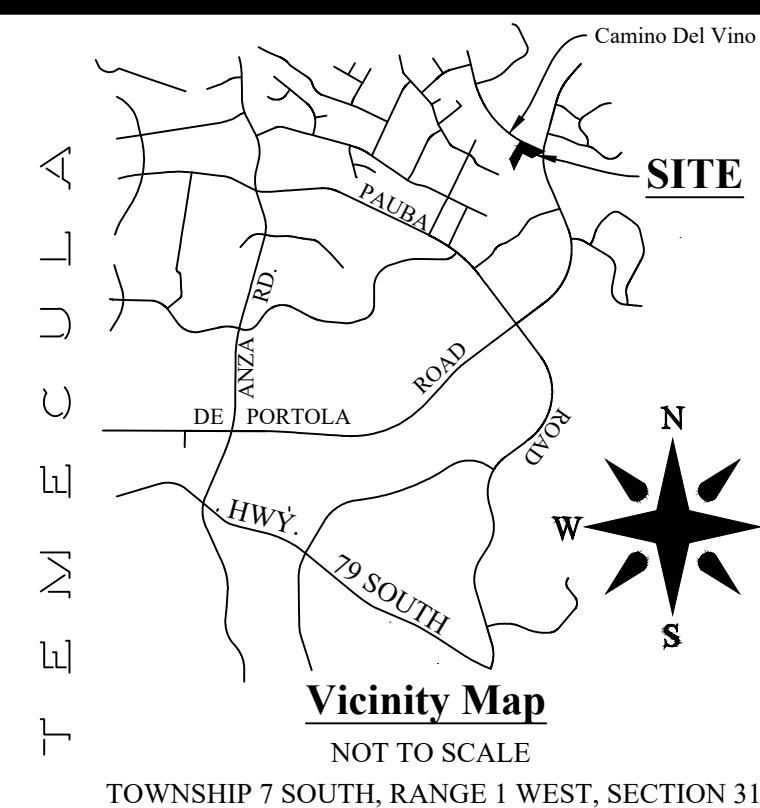
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Attachment A - Hydrology Map

Existing and Proposed Condition Hydrology Maps are in the folder at the back of the report.



A-1
1 AC
10.0% IMP

DMA BOUNDARY

[illegible]

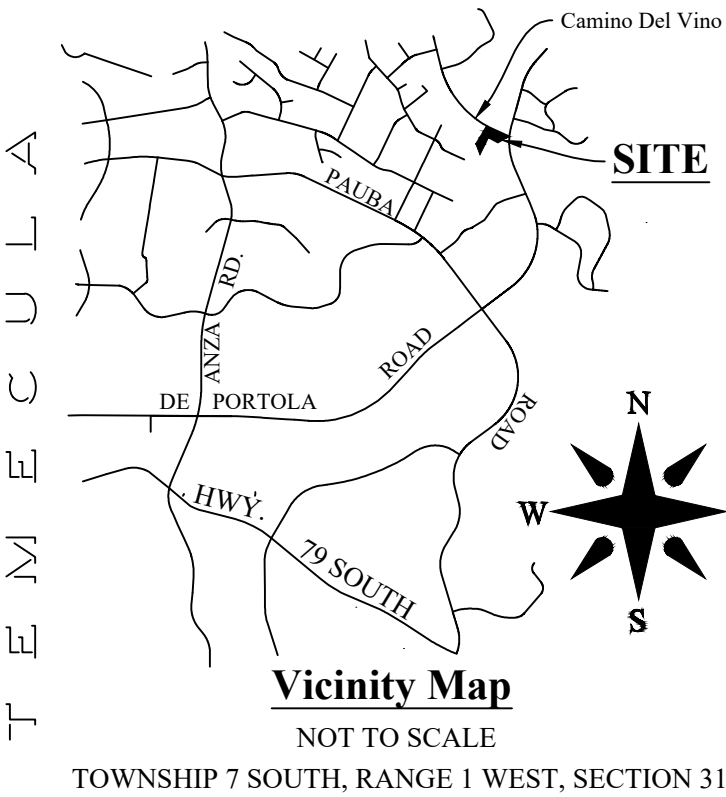
234 E. 17TH STREET, SUITE 205
COSTA MESA, CALIFORNIA 92627
(949) 548-1192

12/1/2023
DATE

41625 CAMINO DEL VINO, TEMECULA, CA

1

OF 1

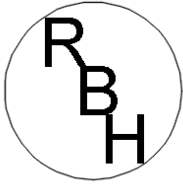
[illegible]

MICHAEL BENESH, R.C.E. 3789.

12/1/202
DATE

41625 CAMINO DEL VINO, TEMECULA, CA

OF 1



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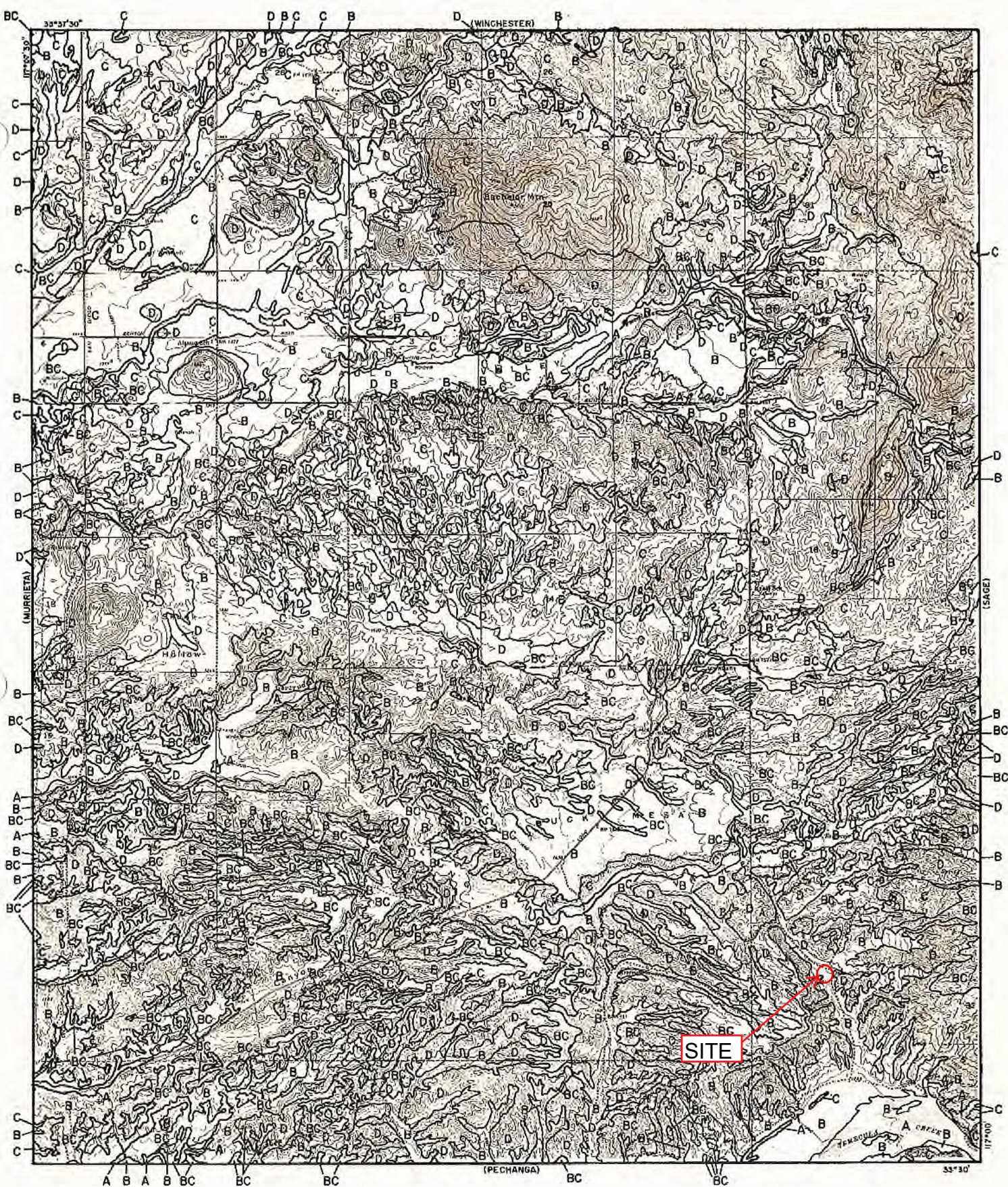
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Attachment B - Soils Group Map

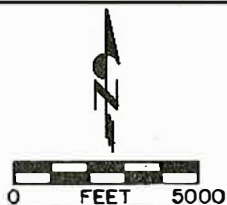
See Plate C-1.53 "Hydrologic Soils Group Map for Bachelor Mtn" on page B-2.



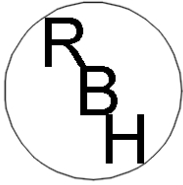
LEGEND

- SOILS GROUP BOUNDARY
- A SOILS GROUP DESIGNATION

RCFC&WCD
HYDROLOGY MANUAL



**HYDROLOGIC SOILS GROUP MAP
FOR
BACHELOR MTN.**



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Attachment C - Hydrology Manual Isohetyl Maps

See following sheets for following Exhibits from the Riverside County Hydrology Manual:

Plate D-4.3 – 2-Year 1-Hour Precipitation

Plate D-4.4 – 100-Year 1-Hour Precipitation

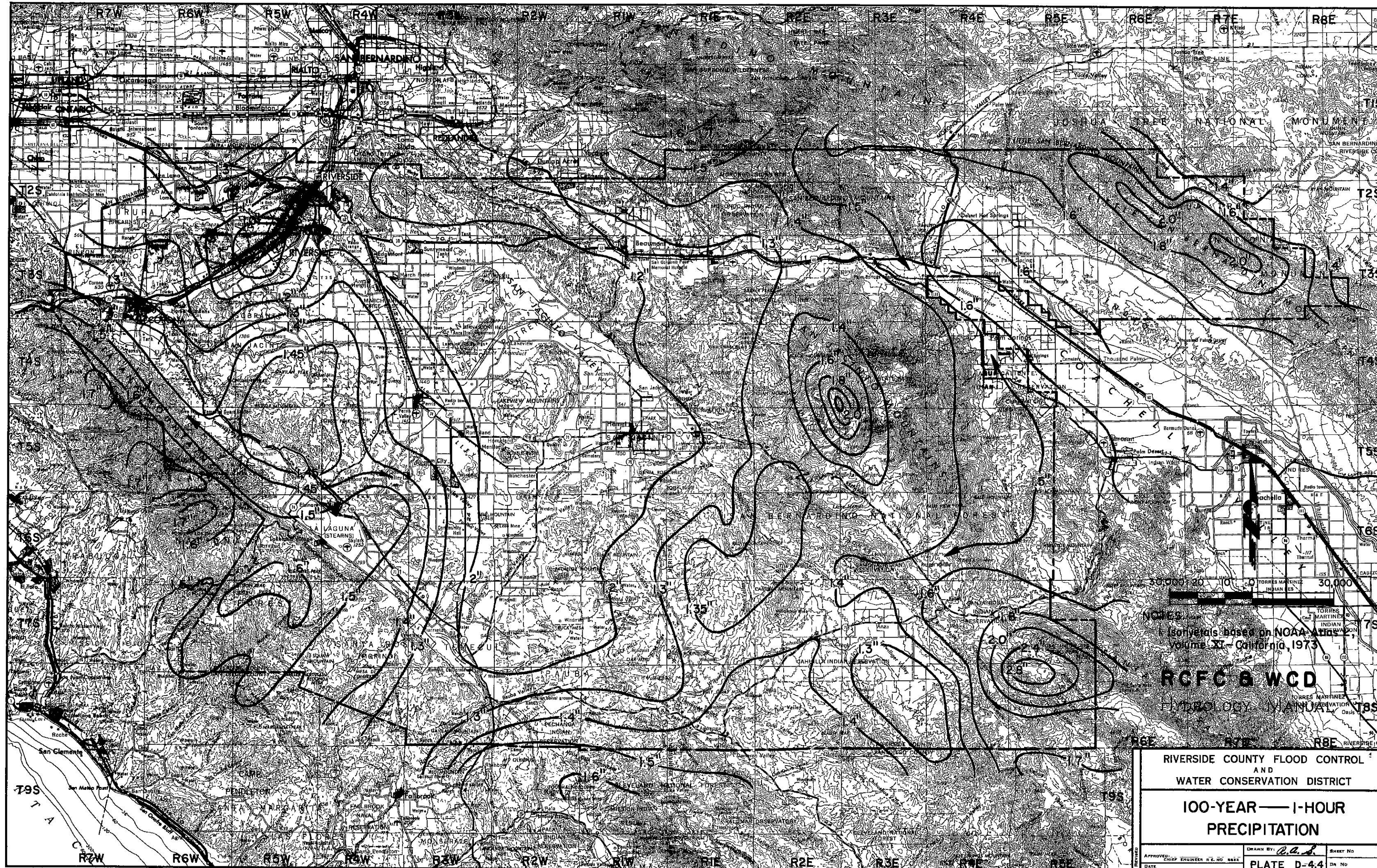
Plate D-4.6 – Slope of the Intensity Duration Curve

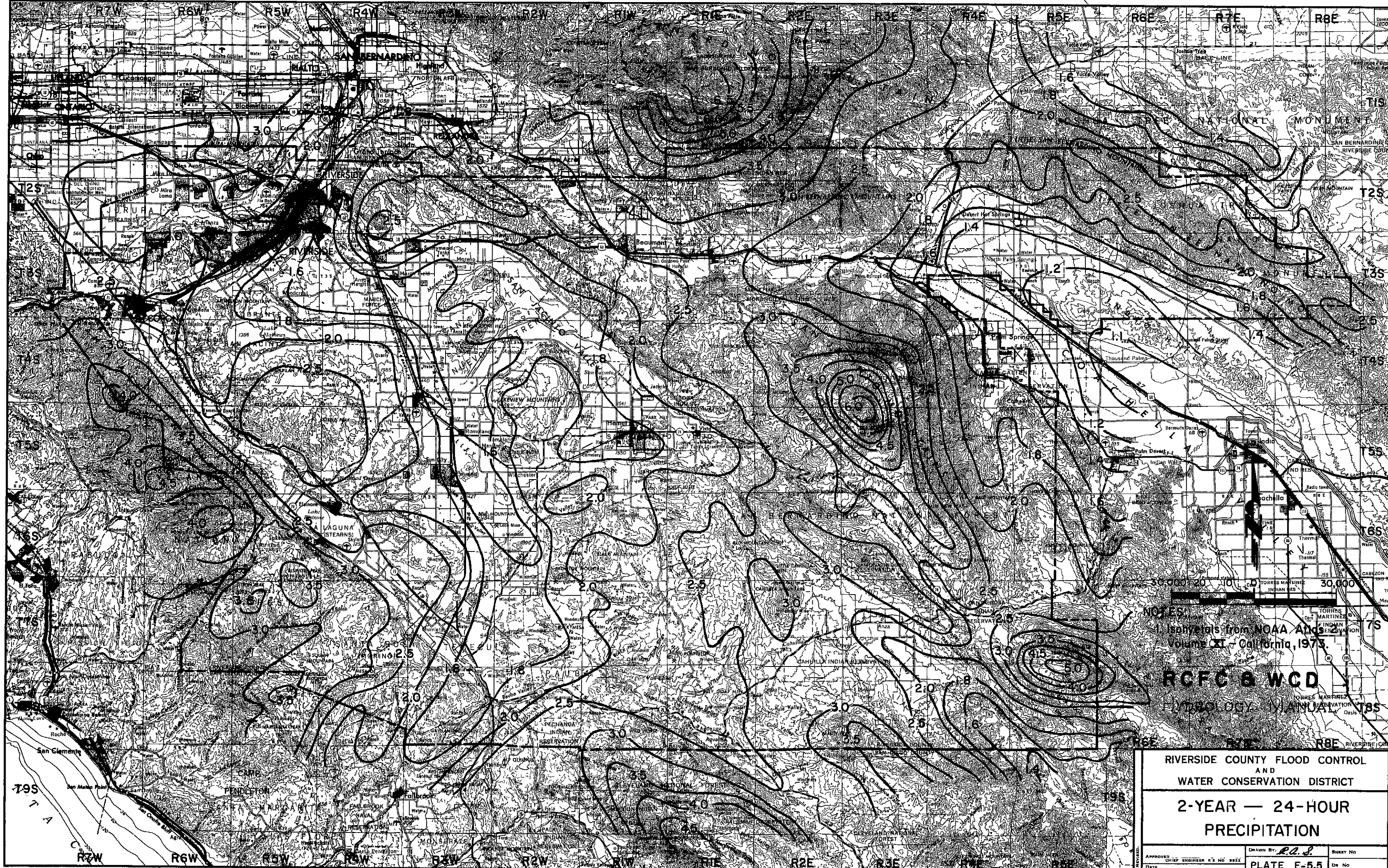
Plate E-5.3 2 Year 6 Hour Precipitation Plate

Plate E-5.4 - 100 Year 6 Hour Precipitation

Plate E-5.5 - 2-Year 24-Hour Precipitation

Plate E-5.6 - 100-Year 24-Hour Precipitation

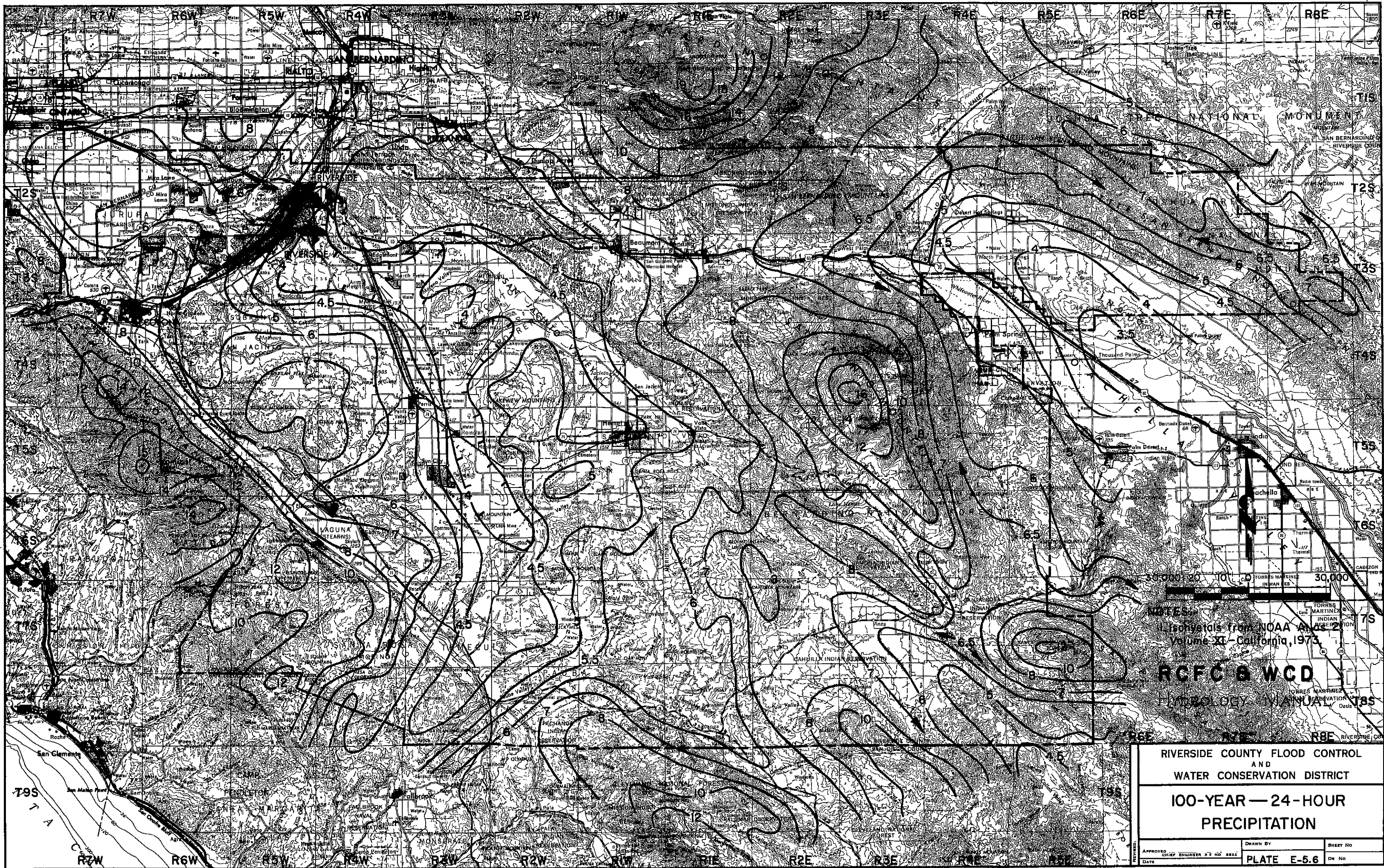




Isopleths from NOAA Atlas
Volume XI - California, 1973.

RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT		
2-YEAR — 24-HOUR PRECIPITATION		
APPROVED CHIEF ENGINEER R.E. NO. 8823	DRAWN BY P.O. J.	SHEET NO.
DATE	PLATE E-5.5	OR NO.



Isobars from NOAA Atlas 2
Volume XI - California, 1973

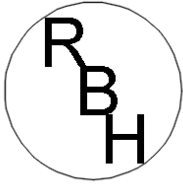
RCFC & WCD

HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

100-YEAR — 24-HOUR
PRECIPITATION

APPROVED	CHIEF ENGINEER	DATE	DRAWN BY	SHEET NO.
			PLATE E-5.6	DR No



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Attachment D - Hydrology Manual Exhibits

See following sheets for following Exhibits from the Riverside County Hydrology Manual:

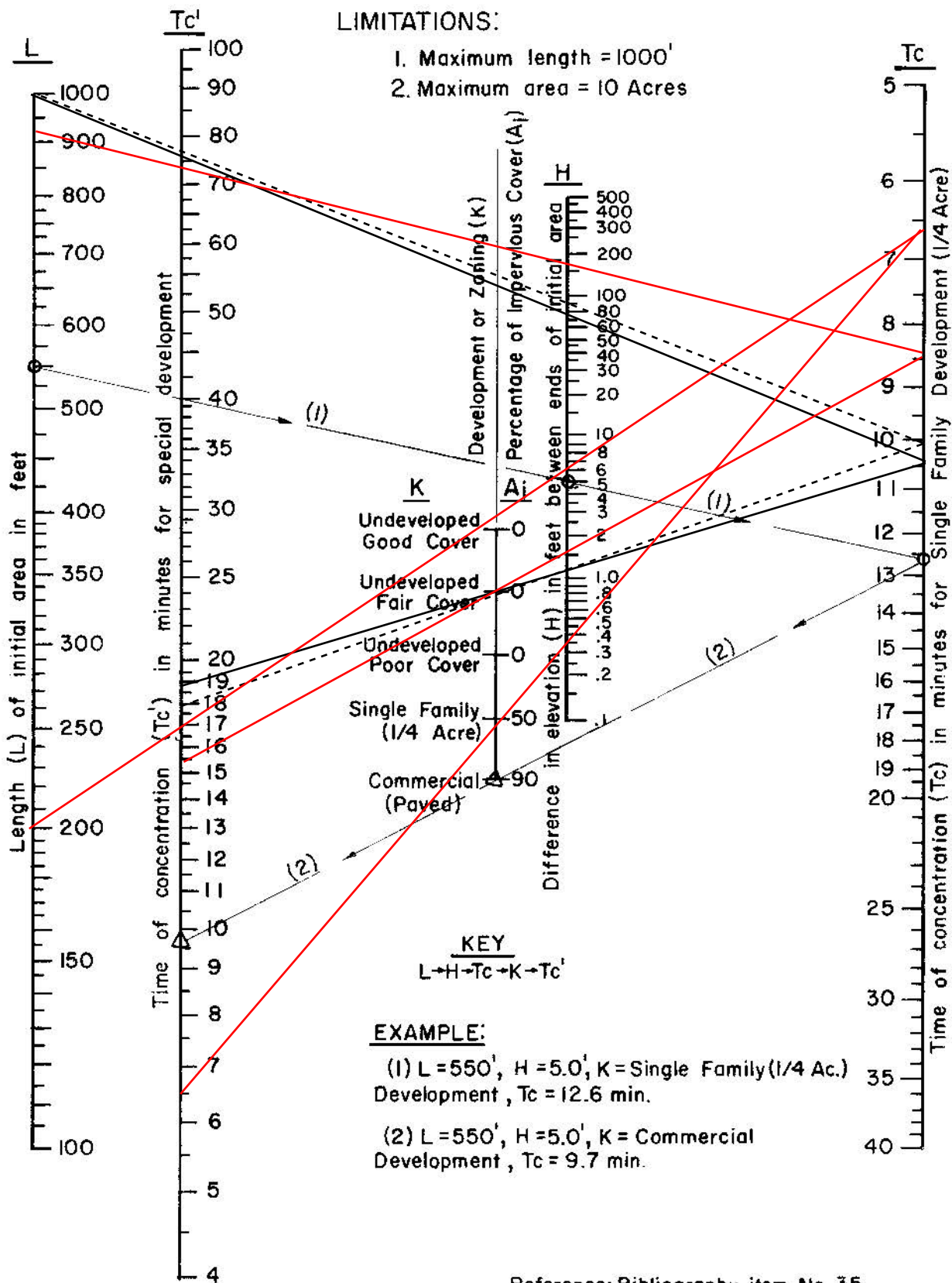
Plate D-3 – Time of Concentration Nomograph

Plate D-4.5 – Rainfall Depth vs Return Period

Plate D-4.7 – Intensity Duration Curves

Plate D-5.4 - Runoff Coefficient Curves

Plate E-5.7 – Rainfall Depth vs Return Period

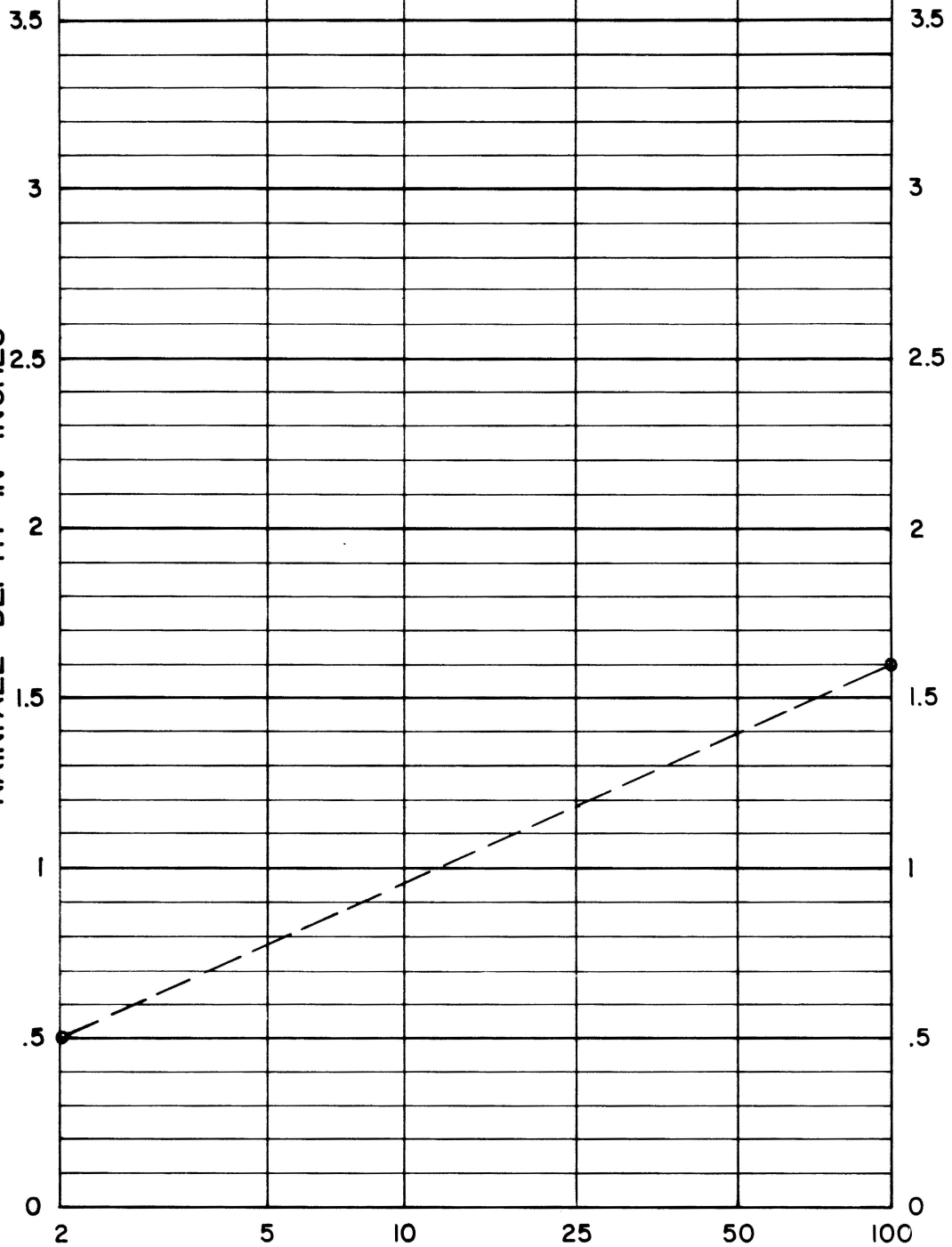


Reference: Bibliography item No. 35.

RCFC & WCD
 HYDROLOGY MANUAL

TIME OF CONCENTRATION
FOR INITIAL SUBAREA

RAINFALL DEPTH IN INCHES



NOTE:

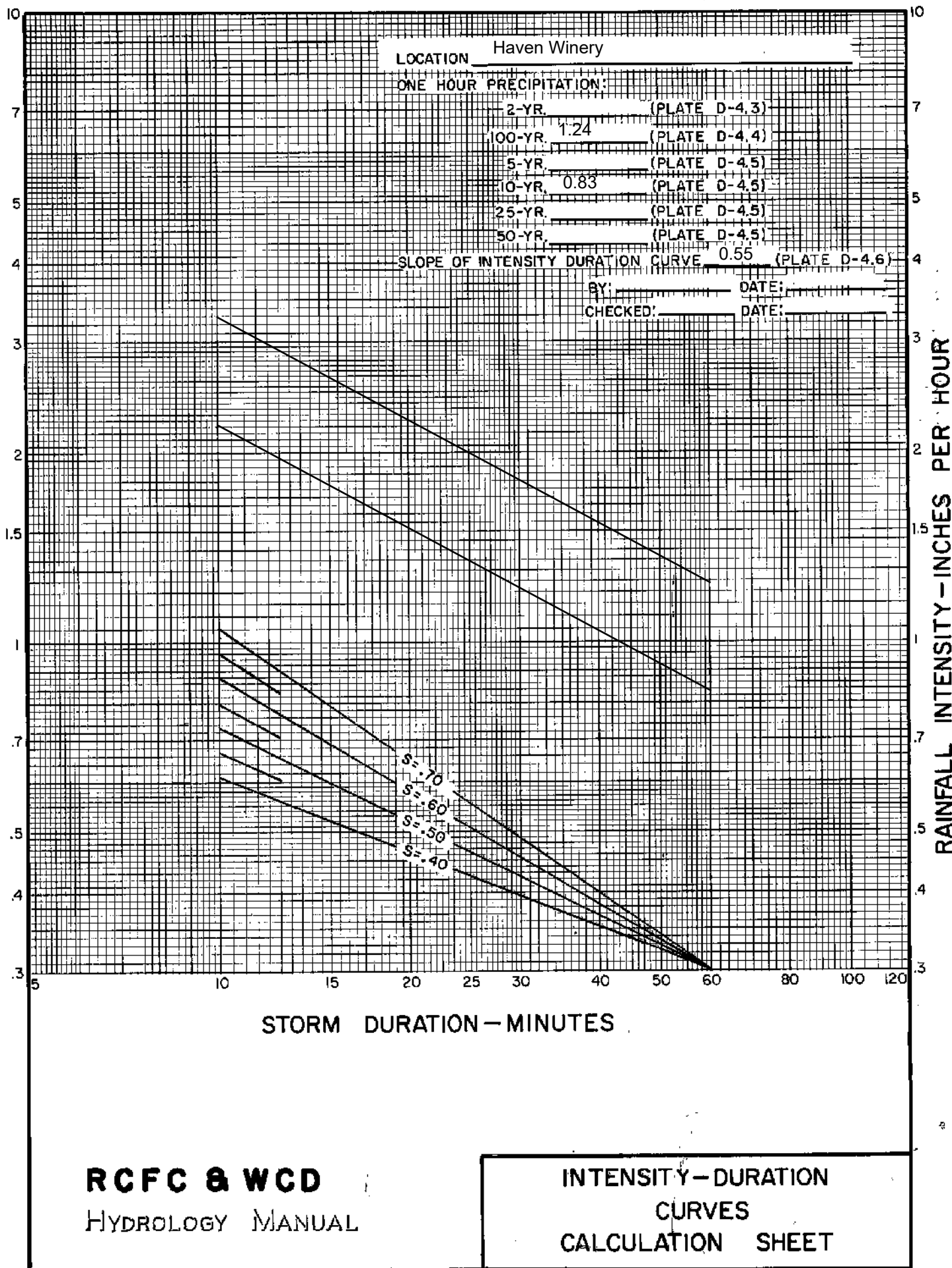
1. For intermediate return periods plot 2-year and 100-year one hour values from maps, then connect points and read value for desired return period. For example given 2-year one hour = .50" and 100-year one hour = 1.60", 25-year one hour = 1.18"

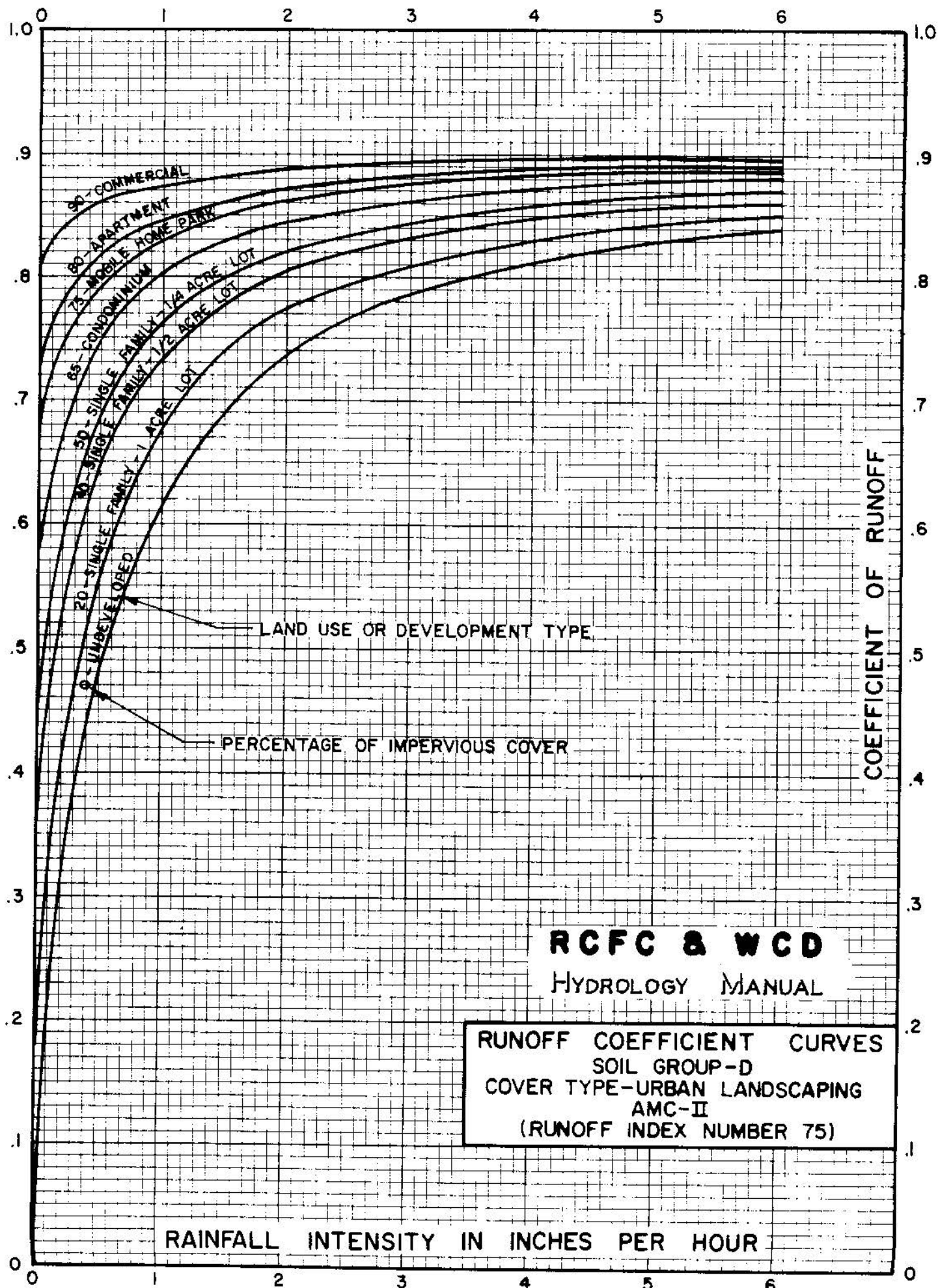
Reference: NOAA Atlas 2, Volume XI-California, 1973.

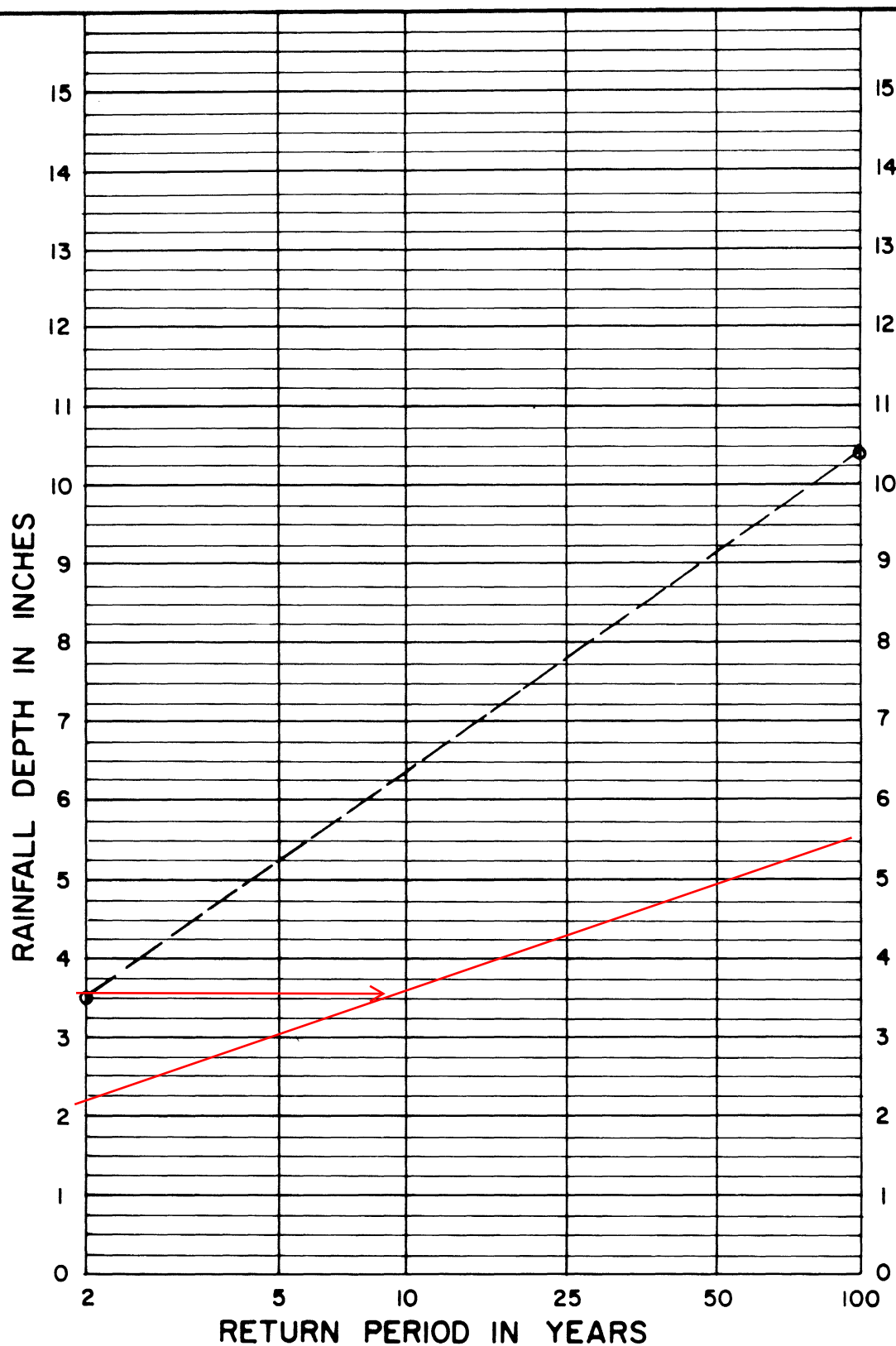
RCFC & WCD

HYDROLOGY MANUAL

RAINFALL DEPTH VERSUS
RETURN PERIOD FOR
PARTIAL DURATION SERIES







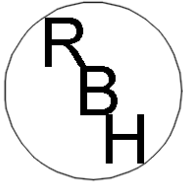
NOTE:

1. For intermediate return periods plot 2-year and 100-year values from maps for a specific duration, then connect points and read value for desired return period. For example given 2-year 24-hour = 3.50" and 100-year 24-hour = 10.40", 25-year 24-hour = 7.80"

Reference: NOAA Atlas 2, Volume **II**-California, 1973.

RCFC & WCD
HYDROLOGY MANUAL

RAINFALL DEPTH VERSUS
RETURN PERIOD FOR
PARTIAL DURATION SERIES



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Attachment E - Rational Method Calculations & Unit Hydrograph Results

See following pages

Rational Method Calculation Form
Project: Haven

Frequency 10 Year
Proposed Condition

Calculated by MB
Date: 2/23/2023

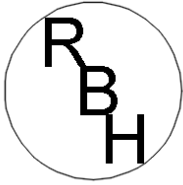
Drainage Area	Soil Type	% Imp.	A Acres	I In./Hr.	C	Q CFS	Sum Q CFS	Slope	Section	V '/Sec.	L Ft.	T Min.	Sum T	Remarks
10 YR STORM - PROPOSED														
A-10	B	45	0.929	3.09	0.82	2.35							5.5	L=160', h=5'
A-20	B	54	1.055	2.89	0.80	2.44	2.35	0.02	12" pvc	5	200	0.7	6.2	Add in Area
A-30	B	86	0.148	2.84	0.82	0.34	4.79	0.02	15" pvc	6.5	70	0.2	6.4	Add in Area
							5.13							
A-40	B	79	0.179	3.26	0.84	0.49							5.0	L=270', h=37'
A-60	B	0	2.31	2.01	0.74	3.44							12.0	L=1000', h=167'
Confl A-30	B	0	4.442			8.57							6.4	Confl A-30
A-40	B	79	0.179	2.42	0.84	0.36	8.57	0.04	12" pvc	5	670	2.2	8.6	Add in Area
A-50	B	41	4.641	2.42	0.84	9.42	8.93						8.6	Add in Area
							18.35							
10-YR STORM - EXIST														
B-10	B	0	2.97	2.01	0.74	4.41							12.0	L=1000', h=167'
B-20	B	0	6.29	1.83	0.76	8.77	4.41	0.04	12" pvc	5	670	2.2	14.2	Add in Area
							13.18							

Rational Method Calculation Form
Project: Haven

Frequency 100 Year
Proposed Condition

Calculated by MB
Date: 2/23/2023

Drainage Area	Soil Type	% Imp.	A Acres	I In./Hr.	C	Q CFS	Sum Q CFS	Slope	Section	V '/Sec.	L Ft.	T Min.	Sum T	Remarks
100 YR STORM - PROPOSED														
A-10	B	45	0.929	4.73	0.86	3.78							5.5	L=160', h=5'
A-20	B	54	1.055	4.43	0.86	4.02	3.78	0.02	12" pvc	5	200	0.7	6.2	Add in Area
A-30	B	86	0.148	4.35	0.89	0.57	7.80	0.02	15" pvc	6.5	70	0.2	6.4	Add in Area
							8.37							
A-40	B	79	0.179	4.98	0.84	0.75							5.0	L=270', h=37'
A-60	B	0	2.31	3.08	0.74	5.26							12.0	L=1000', h=167'
Confl A-30	B	0	4.442			13.63							6.4	Confl A-30
A-40	B	79	0.179	3.70	0.84	0.56	13.63	0.04	15" pvc	5	670	2.2	8.6	Add in Area
A-50	B	41	4.641	3.70	0.84	14.41	14.19						8.6	Add in Area
							28.60							
100-YR STORM - EXIST														
B-10	B	0	2.97	3.08	0.74	6.75							12.0	L=1000', h=167'
B-20	B	0	6.29	2.74	0.76	13.10	6.75	0.04	12" pvc	5	670	2.2	14.2	Add in Area
							19.85							



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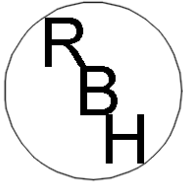
Phone 949/548-1192

Attachment F - Hydraulics

See following pages

Depth	Q	Area	Veloc	Wp
(ft)	(cfs)	(sqft)	(ft/s)	(ft)
0.10	0.106	0.041	2.58	0.64
0.20	0.446	0.113	3.96	0.93
0.30	0.988	0.198	4.98	1.16
0.40	1.699	0.294	5.79	1.37
0.50	2.536	0.395	6.42	1.57
0.60	3.396	0.493	6.88	1.77
0.70	4.226	0.588	7.18	1.98
0.80	4.925	0.674	7.31	2.22
0.90	5.369	0.745	7.21	2.50
1.00	5.036	0.785	6.41	3.14

Yc	TopWidth	Energy
(ft)	(ft)	(ft)
0.14	0.60	0.20
0.28	0.80	0.44
0.42	0.92	0.69
0.56	0.98	0.92
0.69	1.00	1.14
0.79	0.98	1.34
0.87	0.92	1.50
0.92	0.80	1.63
0.94	0.60	1.71
0.92	0.00	1.64



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Attachment G - Unit Hydrograph Results

See following pages

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 02/23/23 File: CAMINOE610.out

+++++

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

Program License Serial Number 6564

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

English Units used in output format

HAVEN 10 YR EXIST

Drainage Area = 9.26(Ac.) = 0.014 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.26(Ac.) = 0.014 Sq. Mi.
Length along longest watercourse = 1705.00(Ft.)
Length along longest watercourse measured to centroid = 600.00(Ft.)
Length along longest watercourse = 0.323 Mi.
Length along longest watercourse measured to centroid = 0.114 Mi.
Difference in elevation = 205.00(Ft.)
Slope along watercourse = 634.8387 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.050 Hr.
Lag time = 3.01 Min.
25% of lag time = 0.75 Min.
40% of lag time = 1.20 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.26	1.30	12.03

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.26	2.80	25.92

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.300(In)
Area Averaged 100-Year Rainfall = 2.800(In)

Point rain (area averaged) = 1.917(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.917(In)

Sub-Area Data:

Area(Ac.) Runoff Index Impervious %
9.257 79.00 0.000
Total Area Entered = 9.26(Ac.)

RI RI Infil. Rate Impervious Adj. Infil. Rate Area% F
AMC2 AMC-2 (In/Hr) (Dec.%) (In/Hr) (Dec.) (In/Hr)
79.0 79.0 0.256 0.000 0.256 1.000 0.256

Sum (F) = 0.256

Area averaged mean soil loss (F) (In/Hr) = 0.256

Minimum soil loss rate ((In/Hr)) = 0.128

(for 24 hour storm duration)

Soil loss rate (decimal) = 0.900

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1 0.083	166.197	36.878	3.440
2 0.167	332.394	45.801	4.273
3 0.250	498.590	10.323	0.963
4 0.333	664.787	4.384	0.409
5 0.417	830.984	2.615	0.244
Sum = 100.000		Sum=	9.329

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) Max Low	Effective (In/Hr)
1 0.08	0.50	0.115	(0.256) 0.104	0.012
2 0.17	0.60	0.138	(0.256) 0.124	0.014
3 0.25	0.60	0.138	(0.256) 0.124	0.014
4 0.33	0.60	0.138	(0.256) 0.124	0.014
5 0.42	0.60	0.138	(0.256) 0.124	0.014
6 0.50	0.70	0.161	(0.256) 0.145	0.016
7 0.58	0.70	0.161	(0.256) 0.145	0.016
8 0.67	0.70	0.161	(0.256) 0.145	0.016
9 0.75	0.70	0.161	(0.256) 0.145	0.016
10 0.83	0.70	0.161	(0.256) 0.145	0.016
11 0.92	0.70	0.161	(0.256) 0.145	0.016
12 1.00	0.80	0.184	(0.256) 0.166	0.018
13 1.08	0.80	0.184	(0.256) 0.166	0.018
14 1.17	0.80	0.184	(0.256) 0.166	0.018
15 1.25	0.80	0.184	(0.256) 0.166	0.018
16 1.33	0.80	0.184	(0.256) 0.166	0.018
17 1.42	0.80	0.184	(0.256) 0.166	0.018
18 1.50	0.80	0.184	(0.256) 0.166	0.018
19 1.58	0.80	0.184	(0.256) 0.166	0.018
20 1.67	0.80	0.184	(0.256) 0.166	0.018
21 1.75	0.80	0.184	(0.256) 0.166	0.018

22	1.83	0.80	0.184	(0.256)	0.166	0.018
23	1.92	0.80	0.184	(0.256)	0.166	0.018
24	2.00	0.90	0.207	(0.256)	0.186	0.021
25	2.08	0.80	0.184	(0.256)	0.166	0.018
26	2.17	0.90	0.207	(0.256)	0.186	0.021
27	2.25	0.90	0.207	(0.256)	0.186	0.021
28	2.33	0.90	0.207	(0.256)	0.186	0.021
29	2.42	0.90	0.207	(0.256)	0.186	0.021
30	2.50	0.90	0.207	(0.256)	0.186	0.021
31	2.58	0.90	0.207	(0.256)	0.186	0.021
32	2.67	0.90	0.207	(0.256)	0.186	0.021
33	2.75	1.00	0.230	(0.256)	0.207	0.023
34	2.83	1.00	0.230	(0.256)	0.207	0.023
35	2.92	1.00	0.230	(0.256)	0.207	0.023
36	3.00	1.00	0.230	(0.256)	0.207	0.023
37	3.08	1.00	0.230	(0.256)	0.207	0.023
38	3.17	1.10	0.253	(0.256)	0.228	0.025
39	3.25	1.10	0.253	(0.256)	0.228	0.025
40	3.33	1.10	0.253	(0.256)	0.228	0.025
41	3.42	1.20	0.276	(0.256)	0.248	0.028
42	3.50	1.30	0.299	0.256 (0.269)		0.043
43	3.58	1.40	0.322	0.256 (0.290)		0.066
44	3.67	1.40	0.322	0.256 (0.290)		0.066
45	3.75	1.50	0.345	0.256 (0.311)		0.089
46	3.83	1.50	0.345	0.256 (0.311)		0.089
47	3.92	1.60	0.368	0.256 (0.331)		0.112
48	4.00	1.60	0.368	0.256 (0.331)		0.112
49	4.08	1.70	0.391	0.256 (0.352)		0.135
50	4.17	1.80	0.414	0.256 (0.373)		0.158
51	4.25	1.90	0.437	0.256 (0.393)		0.181
52	4.33	2.00	0.460	0.256 (0.414)		0.204
53	4.42	2.10	0.483	0.256 (0.435)		0.227
54	4.50	2.10	0.483	0.256 (0.435)		0.227
55	4.58	2.20	0.506	0.256 (0.455)		0.250
56	4.67	2.30	0.529	0.256 (0.476)		0.273
57	4.75	2.40	0.552	0.256 (0.497)		0.296
58	4.83	2.40	0.552	0.256 (0.497)		0.296
59	4.92	2.50	0.575	0.256 (0.518)		0.319
60	5.00	2.60	0.598	0.256 (0.538)		0.342
61	5.08	3.10	0.713	0.256 (0.642)		0.457
62	5.17	3.60	0.828	0.256 (0.745)		0.572
63	5.25	3.90	0.897	0.256 (0.807)		0.641
64	5.33	4.20	0.966	0.256 (0.870)		0.710
65	5.42	4.70	1.081	0.256 (0.973)		0.825
66	5.50	5.60	1.288	0.256 (1.159)		1.032
67	5.58	1.90	0.437	0.256 (0.393)		0.181
68	5.67	0.90	0.207	(0.256)	0.186	0.021
69	5.75	0.60	0.138	(0.256)	0.124	0.014
70	5.83	0.50	0.115	(0.256)	0.104	0.012
71	5.92	0.30	0.069	(0.256)	0.062	0.007
72	6.00	0.20	0.046	(0.256)	0.041	0.005

(Loss Rate Not Used)

Sum =	100.0	Sum =	8.8
Flood volume =	Effective rainfall	0.73(In)	
times area	9.3(Ac.)/[(In)/(Ft.)] =	0.6(Ac.Ft)	
Total soil loss =	1.19(In)		
Total soil loss =	0.916(Ac.Ft)		
Total rainfall =	1.92(In)		
Flood volume =	24517.2 Cubic Feet		
Total soil loss =	39901.3 Cubic Feet		

Peak flow rate of this hydrograph = 8.169(CFS)

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6 - HOUR STORM
Runoff Hydrograph

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	0.0003	0.04	Q					
0+10	0.0009	0.10	Q					
0+15	0.0017	0.12	Q					
0+20	0.0026	0.12	Q					
0+25	0.0035	0.13	Q					
0+30	0.0044	0.14	Q					
0+35	0.0054	0.15	Q					
0+40	0.0065	0.15	Q					
0+45	0.0075	0.15	Q					
0+50	0.0085	0.15	Q					
0+55	0.0096	0.15	Q					
1+ 0	0.0107	0.16	Q					
1+ 5	0.0118	0.17	Q					
1+10	0.0130	0.17	Q					
1+15	0.0142	0.17	QV					
1+20	0.0153	0.17	QV					
1+25	0.0165	0.17	QV					
1+30	0.0177	0.17	QV					
1+35	0.0189	0.17	QV					
1+40	0.0201	0.17	QV					
1+45	0.0213	0.17	QV					
1+50	0.0224	0.17	QV					
1+55	0.0236	0.17	QV					
2+ 0	0.0249	0.18	QV					
2+ 5	0.0261	0.18	QV					
2+10	0.0274	0.18	QV					
2+15	0.0287	0.19	Q V					
2+20	0.0300	0.19	Q V					
2+25	0.0313	0.19	Q V					
2+30	0.0327	0.19	Q V					
2+35	0.0340	0.19	Q V					
2+40	0.0353	0.19	Q V					
2+45	0.0367	0.20	Q V					
2+50	0.0382	0.21	Q V					
2+55	0.0396	0.21	Q V					
3+ 0	0.0411	0.21	Q V					
3+ 5	0.0426	0.21	Q V					
3+10	0.0441	0.22	Q V					
3+15	0.0457	0.23	Q V					
3+20	0.0473	0.23	Q V					
3+25	0.0490	0.24	Q V					
3+30	0.0511	0.31	Q V					
3+35	0.0543	0.46	Q V					
3+40	0.0582	0.57	Q V					
3+45	0.0629	0.68	Q V					
3+50	0.0683	0.79	QV					
3+55	0.0745	0.90	Q V					
4+ 0	0.0814	1.01	QV					
4+ 5	0.0891	1.11	Q V					
4+10	0.0980	1.30	QV					
4+15	0.1084	1.50	QV					
4+20	0.1202	1.71	Q V					
4+25	0.1335	1.93	Q V					
4+30	0.1477	2.06	Q V					

4+35	0.1627	2.18		Q		V					
4+40	0.1790	2.37		Q		V					
4+45	0.1968	2.58		Q		V					
4+50	0.2155	2.71		Q		V					
4+55	0.2349	2.82			Q		V				
5+ 0	0.2557	3.02			Q		V				
5+ 5	0.2801	3.54			Q		V				
5+10	0.3108	4.46				Q		V			
5+15	0.3474	5.31					Q		V		
5+20	0.3887	6.01					Q		V		
5+25	0.4359	6.84						Q		V	
5+30	0.4921	8.17							Q		V
5+35	0.5354	6.28					Q				V
5+40	0.5516	2.35		Q							V
5+45	0.5580	0.93		Q							V
5+50	0.5611	0.44		Q							V
5+55	0.5620	0.14		Q							V
6+ 0	0.5625	0.07		Q							V
6+ 5	0.5627	0.03		Q							V
6+10	0.5628	0.01		Q							V
6+15	0.5628	0.00		Q							V
6+20	0.5628	0.00		Q							V

Unit Hydrograph Analysis

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Study date 02/23/23 File: CAMINOE610.out

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

Program License Serial Number 6564

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

English Units used in output format

10 YR PROP

Drainage Area = 9.26(Ac.) = 0.014 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.26(Ac.) = 0.014 Sq. Mi.
Length along longest watercourse = 1705.00(Ft.)
Length along longest watercourse measured to centroid = 600.00(Ft.)
Length along longest watercourse = 0.323 Mi.
Length along longest watercourse measured to centroid = 0.114 Mi.
Difference in elevation = 205.00(Ft.)
Slope along watercourse = 634.8387 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.050 Hr.
Lag time = 3.01 Min.
25% of lag time = 0.75 Min.
40% of lag time = 1.20 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.26	1.30	12.03

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.26	2.80	25.92

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.300(In)
Area Averaged 100-Year Rainfall = 2.800(In)

Point rain (area averaged) = 1.917(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.917(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.931	79.00	0.000
0.929	69.00	0.450
1.055	69.00	0.540
0.148	69.00	0.860
0.194	69.00	0.730
Total Area Entered = 9.26(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
79.0	79.0	0.256	0.000	0.256	0.749	0.192
69.0	69.0	0.373	0.450	0.222	0.100	0.022
69.0	69.0	0.373	0.540	0.192	0.114	0.022
69.0	69.0	0.373	0.860	0.084	0.016	0.001
69.0	69.0	0.373	0.730	0.128	0.021	0.003

Sum (F) = 0.240

Area averaged mean soil loss (F) (In/Hr) = 0.240

Minimum soil loss rate ((In/Hr)) = 0.120

(for 24 hour storm duration)

Soil loss rate (decimal) = 0.900

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1 0.083	166.197	36.878	3.440
2 0.167	332.394	45.801	4.273
3 0.250	498.590	10.323	0.963
4 0.333	664.787	4.384	0.409
5 0.417	830.984	2.615	0.244
Sum = 100.000		Sum=	9.329

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	0.50	0.115	(0.240)	0.104	0.012
2 0.17	0.60	0.138	(0.240)	0.124	0.014
3 0.25	0.60	0.138	(0.240)	0.124	0.014
4 0.33	0.60	0.138	(0.240)	0.124	0.014
5 0.42	0.60	0.138	(0.240)	0.124	0.014
6 0.50	0.70	0.161	(0.240)	0.145	0.016
7 0.58	0.70	0.161	(0.240)	0.145	0.016
8 0.67	0.70	0.161	(0.240)	0.145	0.016
9 0.75	0.70	0.161	(0.240)	0.145	0.016
10 0.83	0.70	0.161	(0.240)	0.145	0.016
11 0.92	0.70	0.161	(0.240)	0.145	0.016
12 1.00	0.80	0.184	(0.240)	0.166	0.018
13 1.08	0.80	0.184	(0.240)	0.166	0.018

14	1.17	0.80	0.184	(0.240)	0.166	0.018
15	1.25	0.80	0.184	(0.240)	0.166	0.018
16	1.33	0.80	0.184	(0.240)	0.166	0.018
17	1.42	0.80	0.184	(0.240)	0.166	0.018
18	1.50	0.80	0.184	(0.240)	0.166	0.018
19	1.58	0.80	0.184	(0.240)	0.166	0.018
20	1.67	0.80	0.184	(0.240)	0.166	0.018
21	1.75	0.80	0.184	(0.240)	0.166	0.018
22	1.83	0.80	0.184	(0.240)	0.166	0.018
23	1.92	0.80	0.184	(0.240)	0.166	0.018
24	2.00	0.90	0.207	(0.240)	0.186	0.021
25	2.08	0.80	0.184	(0.240)	0.166	0.018
26	2.17	0.90	0.207	(0.240)	0.186	0.021
27	2.25	0.90	0.207	(0.240)	0.186	0.021
28	2.33	0.90	0.207	(0.240)	0.186	0.021
29	2.42	0.90	0.207	(0.240)	0.186	0.021
30	2.50	0.90	0.207	(0.240)	0.186	0.021
31	2.58	0.90	0.207	(0.240)	0.186	0.021
32	2.67	0.90	0.207	(0.240)	0.186	0.021
33	2.75	1.00	0.230	(0.240)	0.207	0.023
34	2.83	1.00	0.230	(0.240)	0.207	0.023
35	2.92	1.00	0.230	(0.240)	0.207	0.023
36	3.00	1.00	0.230	(0.240)	0.207	0.023
37	3.08	1.00	0.230	(0.240)	0.207	0.023
38	3.17	1.10	0.253	(0.240)	0.228	0.025
39	3.25	1.10	0.253	(0.240)	0.228	0.025
40	3.33	1.10	0.253	(0.240)	0.228	0.025
41	3.42	1.20	0.276	0.240 (0.248)		0.036
42	3.50	1.30	0.299	0.240 (0.269)		0.059
43	3.58	1.40	0.322	0.240 (0.290)		0.082
44	3.67	1.40	0.322	0.240 (0.290)		0.082
45	3.75	1.50	0.345	0.240 (0.311)		0.105
46	3.83	1.50	0.345	0.240 (0.311)		0.105
47	3.92	1.60	0.368	0.240 (0.331)		0.128
48	4.00	1.60	0.368	0.240 (0.331)		0.128
49	4.08	1.70	0.391	0.240 (0.352)		0.151
50	4.17	1.80	0.414	0.240 (0.373)		0.174
51	4.25	1.90	0.437	0.240 (0.393)		0.197
52	4.33	2.00	0.460	0.240 (0.414)		0.220
53	4.42	2.10	0.483	0.240 (0.435)		0.243
54	4.50	2.10	0.483	0.240 (0.435)		0.243
55	4.58	2.20	0.506	0.240 (0.455)		0.266
56	4.67	2.30	0.529	0.240 (0.476)		0.289
57	4.75	2.40	0.552	0.240 (0.497)		0.312
58	4.83	2.40	0.552	0.240 (0.497)		0.312
59	4.92	2.50	0.575	0.240 (0.518)		0.335
60	5.00	2.60	0.598	0.240 (0.538)		0.358
61	5.08	3.10	0.713	0.240 (0.642)		0.473
62	5.17	3.60	0.828	0.240 (0.745)		0.589
63	5.25	3.90	0.897	0.240 (0.807)		0.658
64	5.33	4.20	0.966	0.240 (0.870)		0.727
65	5.42	4.70	1.081	0.240 (0.973)		0.842
66	5.50	5.60	1.288	0.240 (1.159)		1.049
67	5.58	1.90	0.437	0.240 (0.393)		0.197
68	5.67	0.90	0.207	(0.240)	0.186	0.021
69	5.75	0.60	0.138	(0.240)	0.124	0.014
70	5.83	0.50	0.115	(0.240)	0.104	0.012
71	5.92	0.30	0.069	(0.240)	0.062	0.007
72	6.00	0.20	0.046	(0.240)	0.041	0.005

(Loss Rate Not Used)

Sum = 100.0

Sum = 9.2

Flood volume = Effective rainfall 0.77(In)

times area 9.3(Ac.)/[(In)/(Ft.)] = 0.6(Ac.Ft)

Total soil loss = 1.15(In)
Total soil loss = 0.888(Ac.Ft)
Total rainfall = 1.92(In)
Flood volume = 25717.6 Cubic Feet
Total soil loss = 38700.9 Cubic Feet

Peak flow rate of this hydrograph = 8.320(CFS)

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6 - 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	0.0003	0.04	Q					
0+10	0.0009	0.10	Q					
0+15	0.0017	0.12	Q					
0+20	0.0026	0.12	Q					
0+25	0.0035	0.13	Q					
0+30	0.0044	0.14	Q					
0+35	0.0054	0.15	Q					
0+40	0.0065	0.15	Q					
0+45	0.0075	0.15	Q					
0+50	0.0085	0.15	Q					
0+55	0.0096	0.15	Q					
1+ 0	0.0107	0.16	Q					
1+ 5	0.0118	0.17	Q					
1+10	0.0130	0.17	Q					
1+15	0.0142	0.17	Q					
1+20	0.0153	0.17	QV					
1+25	0.0165	0.17	QV					
1+30	0.0177	0.17	QV					
1+35	0.0189	0.17	QV					
1+40	0.0201	0.17	QV					
1+45	0.0213	0.17	QV					
1+50	0.0224	0.17	QV					
1+55	0.0236	0.17	QV					
2+ 0	0.0249	0.18	QV					
2+ 5	0.0261	0.18	QV					
2+10	0.0274	0.18	QV					
2+15	0.0287	0.19	QV					
2+20	0.0300	0.19	Q V					
2+25	0.0313	0.19	Q V					
2+30	0.0327	0.19	Q V					
2+35	0.0340	0.19	Q V					
2+40	0.0353	0.19	Q V					
2+45	0.0367	0.20	Q V					
2+50	0.0382	0.21	Q V					
2+55	0.0396	0.21	Q V					
3+ 0	0.0411	0.21	Q V					
3+ 5	0.0426	0.21	Q V					
3+10	0.0441	0.22	Q V					
3+15	0.0457	0.23	Q V					
3+20	0.0473	0.23	Q V					
3+25	0.0492	0.27	Q V					
3+30	0.0520	0.40	Q V					
3+35	0.0560	0.59	QV					
3+40	0.0610	0.71	Q V					
3+45	0.0667	0.83	QV					
3+50	0.0731	0.94	QV					

3+55	0.0804	1.05	QV				
4+ 0	0.0883	1.16	QV				
4+ 5	0.0970	1.26	QV				
4+10	0.1070	1.45	Q V				
4+15	0.1184	1.66	Q V				
4+20	0.1312	1.86	QV				
4+25	0.1456	2.08	QV				
4+30	0.1608	2.21	Q V				
4+35	0.1769	2.33	Q V				
4+40	0.1943	2.52	Q V				
4+45	0.2130	2.73	Q V				
4+50	0.2327	2.86	Q V				
4+55	0.2532	2.98	Q V				
5+ 0	0.2750	3.17	Q V				
5+ 5	0.3004	3.69	Q V				
5+10	0.3322	4.61	Q V				
5+15	0.3698	5.46	Q V				
5+20	0.4122	6.16	Q V				
5+25	0.4604	6.99	Q V				
5+30	0.5177	8.32	Q V				
5+35	0.5620	6.43	Q			V	
5+40	0.5789	2.45	Q			V	
5+45	0.5855	0.96	Q			V	
5+50	0.5886	0.46	Q			V	
5+55	0.5896	0.14	Q			V	
6+ 0	0.5901	0.07	Q			V	
6+ 5	0.5903	0.03	Q			V	
6+10	0.5904	0.01	Q			V	
6+15	0.5904	0.00	Q			V	
6+20	0.5904	0.00	Q			V	

Unit Hydrograph Analysis

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Study date 02/23/23 File: caminoc6100.out

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

Program License Serial Number 6564

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

English Units used in output format

100 year exist

Drainage Area = 9.26(Ac.) = 0.014 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.26(Ac.) = 0.014 Sq. Mi.
Length along longest watercourse = 1705.00(Ft.)
Length along longest watercourse measured to centroid = 600.00(Ft.)
Length along longest watercourse = 0.323 Mi.
Length along longest watercourse measured to centroid = 0.114 Mi.
Difference in elevation = 205.00(Ft.)
Slope along watercourse = 634.8387 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.050 Hr.
Lag time = 3.01 Min.
25% of lag time = 0.75 Min.
40% of lag time = 1.20 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.26	1.30	12.03

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.26	2.80	25.92

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.300(In)
Area Averaged 100-Year Rainfall = 2.800(In)

Point rain (area averaged) = 2.800(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.800(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
9.257	79.00	0.000
Total Area Entered = 9.26(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
79.0	79.0	0.256	0.000	0.256	1.000	0.256

Sum (F) = 0.256

Area averaged mean soil loss (F) (In/Hr) = 0.256

Minimum soil loss rate ((In/Hr)) = 0.128

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.900

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1 0.083	166.197	36.878	3.440
2 0.167	332.394	45.801	4.273
3 0.250	498.590	10.323	0.963
4 0.333	664.787	4.384	0.409
5 0.417	830.984	2.615	0.244
Sum = 100.000		Sum=	9.329

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	0.50	0.168	(0.256)	0.151
2	0.17	0.60	0.202	(0.256)	0.181
3	0.25	0.60	0.202	(0.256)	0.181
4	0.33	0.60	0.202	(0.256)	0.181
5	0.42	0.60	0.202	(0.256)	0.181
6	0.50	0.70	0.235	(0.256)	0.212
7	0.58	0.70	0.235	(0.256)	0.212
8	0.67	0.70	0.235	(0.256)	0.212
9	0.75	0.70	0.235	(0.256)	0.212
10	0.83	0.70	0.235	(0.256)	0.212
11	0.92	0.70	0.235	(0.256)	0.212
12	1.00	0.80	0.269	(0.256)	0.242
13	1.08	0.80	0.269	(0.256)	0.242
14	1.17	0.80	0.269	(0.256)	0.242
15	1.25	0.80	0.269	(0.256)	0.242
16	1.33	0.80	0.269	(0.256)	0.242
17	1.42	0.80	0.269	(0.256)	0.242
18	1.50	0.80	0.269	(0.256)	0.242
19	1.58	0.80	0.269	(0.256)	0.242
20	1.67	0.80	0.269	(0.256)	0.242
21	1.75	0.80	0.269	(0.256)	0.242

22	1.83	0.80	0.269	(0.256)	0.242	0.027
23	1.92	0.80	0.269	(0.256)	0.242	0.027
24	2.00	0.90	0.302	0.256 (	0.272)	0.047
25	2.08	0.80	0.269	(0.256)	0.242	0.027
26	2.17	0.90	0.302	0.256 (	0.272)	0.047
27	2.25	0.90	0.302	0.256 (	0.272)	0.047
28	2.33	0.90	0.302	0.256 (	0.272)	0.047
29	2.42	0.90	0.302	0.256 (	0.272)	0.047
30	2.50	0.90	0.302	0.256 (	0.272)	0.047
31	2.58	0.90	0.302	0.256 (	0.272)	0.047
32	2.67	0.90	0.302	0.256 (	0.272)	0.047
33	2.75	1.00	0.336	0.256 (	0.302)	0.080
34	2.83	1.00	0.336	0.256 (	0.302)	0.080
35	2.92	1.00	0.336	0.256 (	0.302)	0.080
36	3.00	1.00	0.336	0.256 (	0.302)	0.080
37	3.08	1.00	0.336	0.256 (	0.302)	0.080
38	3.17	1.10	0.370	0.256 (	0.333)	0.114
39	3.25	1.10	0.370	0.256 (	0.333)	0.114
40	3.33	1.10	0.370	0.256 (	0.333)	0.114
41	3.42	1.20	0.403	0.256 (	0.363)	0.147
42	3.50	1.30	0.437	0.256 (	0.393)	0.181
43	3.58	1.40	0.470	0.256 (	0.423)	0.215
44	3.67	1.40	0.470	0.256 (	0.423)	0.215
45	3.75	1.50	0.504	0.256 (	0.454)	0.248
46	3.83	1.50	0.504	0.256 (	0.454)	0.248
47	3.92	1.60	0.538	0.256 (	0.484)	0.282
48	4.00	1.60	0.538	0.256 (	0.484)	0.282
49	4.08	1.70	0.571	0.256 (	0.514)	0.315
50	4.17	1.80	0.605	0.256 (	0.544)	0.349
51	4.25	1.90	0.638	0.256 (	0.575)	0.383
52	4.33	2.00	0.672	0.256 (	0.605)	0.416
53	4.42	2.10	0.706	0.256 (	0.635)	0.450
54	4.50	2.10	0.706	0.256 (	0.635)	0.450
55	4.58	2.20	0.739	0.256 (	0.665)	0.483
56	4.67	2.30	0.773	0.256 (	0.695)	0.517
57	4.75	2.40	0.806	0.256 (	0.726)	0.551
58	4.83	2.40	0.806	0.256 (	0.726)	0.551
59	4.92	2.50	0.840	0.256 (	0.756)	0.584
60	5.00	2.60	0.874	0.256 (	0.786)	0.618
61	5.08	3.10	1.042	0.256 (	0.937)	0.786
62	5.17	3.60	1.210	0.256 (	1.089)	0.954
63	5.25	3.90	1.310	0.256 (	1.179)	1.055
64	5.33	4.20	1.411	0.256 (	1.270)	1.155
65	5.42	4.70	1.579	0.256 (	1.421)	1.323
66	5.50	5.60	1.882	0.256 (	1.693)	1.626
67	5.58	1.90	0.638	0.256 (	0.575)	0.383
68	5.67	0.90	0.302	0.256 (	0.272)	0.047
69	5.75	0.60	0.202	(0.256)	0.181	0.020
70	5.83	0.50	0.168	(0.256)	0.151	0.017
71	5.92	0.30	0.101	(0.256)	0.091	0.010
72	6.00	0.20	0.067	(0.256)	0.060	0.007

(Loss Rate Not Used)

Sum = 100.0 Sum = 16.6
Flood volume = Effective rainfall 1.38(In)
times area 9.3(Ac.)/[(In)/(Ft.)] = 1.1(Ac.Ft)
Total soil loss = 1.42(In)
Total soil loss = 1.095(Ac.Ft)
Total rainfall = 2.80(In)
Flood volume = 46394.6 Cubic Feet
Total soil loss = 47690.5 Cubic Feet

Peak flow rate of this hydrograph = 13.031(CFS)

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6 - 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	5.0	10.0	15.0	20.0
0+ 5	0.0004	0.06	Q					
0+10	0.0014	0.14	Q					
0+15	0.0026	0.17	Q					
0+20	0.0038	0.18	Q					
0+25	0.0051	0.19	Q					
0+30	0.0065	0.20	Q					
0+35	0.0079	0.21	Q					
0+40	0.0094	0.22	Q					
0+45	0.0109	0.22	Q					
0+50	0.0125	0.22	Q					
0+55	0.0140	0.22	Q					
1+ 0	0.0156	0.23	Q					
1+ 5	0.0173	0.25	Q					
1+10	0.0190	0.25	Q					
1+15	0.0207	0.25	Q					
1+20	0.0224	0.25	Q					
1+25	0.0241	0.25	Q					
1+30	0.0259	0.25	Q					
1+35	0.0276	0.25	QV					
1+40	0.0293	0.25	QV					
1+45	0.0311	0.25	QV					
1+50	0.0328	0.25	QV					
1+55	0.0345	0.25	QV					
2+ 0	0.0367	0.32	QV					
2+ 5	0.0390	0.34	QV					
2+10	0.0413	0.34	QV					
2+15	0.0442	0.41	QV					
2+20	0.0471	0.43	QV					
2+25	0.0501	0.43	QV					
2+30	0.0531	0.43	QV					
2+35	0.0561	0.43	Q V					
2+40	0.0591	0.43	Q V					
2+45	0.0629	0.55	QV					
2+50	0.0676	0.69	QV					
2+55	0.0726	0.73	QV					
3+ 0	0.0777	0.74	QV					
3+ 5	0.0829	0.75	Q V					
3+10	0.0888	0.86	Q V					
3+15	0.0958	1.01	QV					
3+20	0.1029	1.04	QV					
3+25	0.1110	1.17	Q V					
3+30	0.1209	1.44	Q V					
3+35	0.1328	1.73	QV					
3+40	0.1460	1.92	Q V					
3+45	0.1604	2.09	Q V					
3+50	0.1759	2.25	Q V					
3+55	0.1925	2.41	Q V					
4+ 0	0.2102	2.57	Q V					
4+ 5	0.2290	2.72	Q V					
4+10	0.2496	3.00	Q V					
4+15	0.2723	3.30	Q V					
4+20	0.2971	3.60	Q V					
4+25	0.3241	3.92	Q V					
4+30	0.3524	4.11	Q V					

4+35	0.3819	4.28		Q		V					
4+40	0.4134	4.57		Q		V					
4+45	0.4469	4.86		Q		V					
4+50	0.4817	5.05		Q		V					
4+55	0.5177	5.22		Q		V					
5+ 0	0.5556	5.51			Q		V				
5+ 5	0.5988	6.27			Q		V				
5+10	0.6512	7.61				Q		V			
5+15	0.7122	8.86				Q		V			
5+20	0.7802	9.88				Q		V			
5+25	0.8566	11.09						Q		V	
5+30	0.9464	13.03						Q		V	
5+35	1.0171	10.27					Q			V	
5+40	1.0459	4.19		Q						V	
5+45	1.0571	1.63		Q						V	
5+50	1.0622	0.74		Q						V	
5+55	1.0639	0.24		Q						V	
6+ 0	1.0646	0.10		Q						V	
6+ 5	1.0649	0.05		Q						V	
6+10	1.0650	0.01		Q						V	
6+15	1.0651	0.01		Q						V	
6+20	1.0651	0.00		Q						V	

Unit Hydrograph Analysis

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Study date 02/23/23 File: CAMINOE6100.out

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

Program License Serial Number 6564

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

English Units used in output format

HAVEN WINERY 100 YR PROP

Drainage Area = 9.26(Ac.) = 0.014 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.26(Ac.) = 0.014 Sq. Mi.
Length along longest watercourse = 1705.00(Ft.)
Length along longest watercourse measured to centroid = 600.00(Ft.)
Length along longest watercourse = 0.323 Mi.
Length along longest watercourse measured to centroid = 0.114 Mi.
Difference in elevation = 205.00(Ft.)
Slope along watercourse = 634.8387 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.050 Hr.
Lag time = 3.01 Min.
25% of lag time = 0.75 Min.
40% of lag time = 1.20 Min.
Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.26	1.30	12.03

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.26	2.80	25.92

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.300(In)
Area Averaged 100-Year Rainfall = 2.800(In)

Point rain (area averaged) = 2.800(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.800(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
6.931	79.00	0.000
0.929	69.00	0.450
1.055	69.00	0.540
0.148	69.00	0.860
0.000	69.00	0.730
0.000	10.00	0.000
0.000	10.00	0.000
0.194	69.00	0.730
Total Area Entered = 9.26(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
79.0	79.0	0.256	0.000	0.256	0.749	0.192
69.0	69.0	0.373	0.450	0.222	0.100	0.022
69.0	69.0	0.373	0.540	0.192	0.114	0.022
69.0	69.0	0.373	0.860	0.084	0.016	0.001
69.0	69.0	0.373	0.730	0.128	0.000	0.000
10.0	10.0	0.920	0.000	0.920	0.000	0.000
10.0	10.0	0.920	0.000	0.920	0.000	0.000
69.0	69.0	0.373	0.730	0.128	0.021	0.003

Sum (F) = 0.240

Area averaged mean soil loss (F) (In/Hr) = 0.240

Minimum soil loss rate ((In/Hr)) = 0.120

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.900

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period	Time	% of lag	Distribution	Unit Hydrograph
(hrs)		Graph %	(CFS)	
1	0.083	166.197	36.878	3.440
2	0.167	332.394	45.801	4.273
3	0.250	498.590	10.323	0.963
4	0.333	664.787	4.384	0.409
5	0.417	830.984	2.615	0.244
Sum = 100.000			Sum=	9.329

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
(Hr.)	Percent	(In/Hr)	Max Low	(In/Hr)
1	0.08	0.50	0.168 (0.240)	0.151 0.017
2	0.17	0.60	0.202 (0.240)	0.181 0.020
3	0.25	0.60	0.202 (0.240)	0.181 0.020
4	0.33	0.60	0.202 (0.240)	0.181 0.020
5	0.42	0.60	0.202 (0.240)	0.181 0.020
6	0.50	0.70	0.235 (0.240)	0.212 0.024
7	0.58	0.70	0.235 (0.240)	0.212 0.024

8	0.67	0.70	0.235	(0.240)	0.212	0.024
9	0.75	0.70	0.235	(0.240)	0.212	0.024
10	0.83	0.70	0.235	(0.240)	0.212	0.024
11	0.92	0.70	0.235	(0.240)	0.212	0.024
12	1.00	0.80	0.269	0.240	(0.242)	0.029
13	1.08	0.80	0.269	0.240	(0.242)	0.029
14	1.17	0.80	0.269	0.240	(0.242)	0.029
15	1.25	0.80	0.269	0.240	(0.242)	0.029
16	1.33	0.80	0.269	0.240	(0.242)	0.029
17	1.42	0.80	0.269	0.240	(0.242)	0.029
18	1.50	0.80	0.269	0.240	(0.242)	0.029
19	1.58	0.80	0.269	0.240	(0.242)	0.029
20	1.67	0.80	0.269	0.240	(0.242)	0.029
21	1.75	0.80	0.269	0.240	(0.242)	0.029
22	1.83	0.80	0.269	0.240	(0.242)	0.029
23	1.92	0.80	0.269	0.240	(0.242)	0.029
24	2.00	0.90	0.302	0.240	(0.272)	0.063
25	2.08	0.80	0.269	0.240	(0.242)	0.029
26	2.17	0.90	0.302	0.240	(0.272)	0.063
27	2.25	0.90	0.302	0.240	(0.272)	0.063
28	2.33	0.90	0.302	0.240	(0.272)	0.063
29	2.42	0.90	0.302	0.240	(0.272)	0.063
30	2.50	0.90	0.302	0.240	(0.272)	0.063
31	2.58	0.90	0.302	0.240	(0.272)	0.063
32	2.67	0.90	0.302	0.240	(0.272)	0.063
33	2.75	1.00	0.336	0.240	(0.302)	0.096
34	2.83	1.00	0.336	0.240	(0.302)	0.096
35	2.92	1.00	0.336	0.240	(0.302)	0.096
36	3.00	1.00	0.336	0.240	(0.302)	0.096
37	3.08	1.00	0.336	0.240	(0.302)	0.096
38	3.17	1.10	0.370	0.240	(0.333)	0.130
39	3.25	1.10	0.370	0.240	(0.333)	0.130
40	3.33	1.10	0.370	0.240	(0.333)	0.130
41	3.42	1.20	0.403	0.240	(0.363)	0.164
42	3.50	1.30	0.437	0.240	(0.393)	0.197
43	3.58	1.40	0.470	0.240	(0.423)	0.231
44	3.67	1.40	0.470	0.240	(0.423)	0.231
45	3.75	1.50	0.504	0.240	(0.454)	0.264
46	3.83	1.50	0.504	0.240	(0.454)	0.264
47	3.92	1.60	0.538	0.240	(0.484)	0.298
48	4.00	1.60	0.538	0.240	(0.484)	0.298
49	4.08	1.70	0.571	0.240	(0.514)	0.332
50	4.17	1.80	0.605	0.240	(0.544)	0.365
51	4.25	1.90	0.638	0.240	(0.575)	0.399
52	4.33	2.00	0.672	0.240	(0.605)	0.432
53	4.42	2.10	0.706	0.240	(0.635)	0.466
54	4.50	2.10	0.706	0.240	(0.635)	0.466
55	4.58	2.20	0.739	0.240	(0.665)	0.500
56	4.67	2.30	0.773	0.240	(0.695)	0.533
57	4.75	2.40	0.806	0.240	(0.726)	0.567
58	4.83	2.40	0.806	0.240	(0.726)	0.567
59	4.92	2.50	0.840	0.240	(0.756)	0.600
60	5.00	2.60	0.874	0.240	(0.786)	0.634
61	5.08	3.10	1.042	0.240	(0.937)	0.802
62	5.17	3.60	1.210	0.240	(1.089)	0.970
63	5.25	3.90	1.310	0.240	(1.179)	1.071
64	5.33	4.20	1.411	0.240	(1.270)	1.172
65	5.42	4.70	1.579	0.240	(1.421)	1.339
66	5.50	5.60	1.882	0.240	(1.693)	1.642
67	5.58	1.90	0.638	0.240	(0.575)	0.399
68	5.67	0.90	0.302	0.240	(0.272)	0.063
69	5.75	0.60	0.202	(0.240)	0.181	0.020
70	5.83	0.50	0.168	(0.240)	0.151	0.017

71 5.92 0.30 0.101 (0.240) 0.091 0.010
 72 6.00 0.20 0.067 (0.240) 0.060 0.007

(Loss Rate Not Used)

Sum = 100.0 Sum = 17.3
 Flood volume = Effective rainfall 1.44(In)
 times area 9.3(Ac.)/[(In)/(Ft.)) = 1.1(Ac.Ft)
 Total soil loss = 1.36(In)
 Total soil loss = 1.047(Ac.Ft)
 Total rainfall = 2.80(In)
 Flood volume = 48466.6 Cubic Feet
 Total soil loss = 45618.5 Cubic Feet

 Peak flow rate of this hydrograph = 13.182(CFS)

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6 - 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 5.0 10.0 15.0 20.0

0+ 5	0.0004	0.06	Q				
0+10	0.0014	0.14	Q				
0+15	0.0026	0.17	Q				
0+20	0.0038	0.18	Q				
0+25	0.0051	0.19	Q				
0+30	0.0065	0.20	Q				
0+35	0.0079	0.21	Q				
0+40	0.0094	0.22	Q				
0+45	0.0109	0.22	Q				
0+50	0.0125	0.22	Q				
0+55	0.0140	0.22	Q				
1+ 0	0.0156	0.24	Q				
1+ 5	0.0174	0.26	Q				
1+10	0.0193	0.27	Q				
1+15	0.0211	0.27	Q				
1+20	0.0230	0.27	Q				
1+25	0.0249	0.27	Q				
1+30	0.0268	0.27	Q				
1+35	0.0286	0.27	QV				
1+40	0.0305	0.27	QV				
1+45	0.0324	0.27	QV				
1+50	0.0343	0.27	QV				
1+55	0.0361	0.27	QV				
2+ 0	0.0388	0.39	QV				
2+ 5	0.0417	0.42	QV				
2+10	0.0446	0.42	QV				
2+15	0.0483	0.55	Q				
2+20	0.0522	0.57	Q				
2+25	0.0562	0.58	QV				
2+30	0.0603	0.59	QV				
2+35	0.0643	0.59	QV				
2+40	0.0683	0.59	QV				
2+45	0.0732	0.70	QV				
2+50	0.0790	0.84	QV				
2+55	0.0850	0.88	Q V				
3+ 0	0.0911	0.89	Q V				
3+ 5	0.0973	0.90	Q V				
3+10	0.1043	1.01	QV				
3+15	0.1123	1.16	Q V				
3+20	0.1205	1.19	Q V				

3+25	0.1296	1.32	Q V				
3+30	0.1405	1.59	Q V				
3+35	0.1535	1.88	Q V				
3+40	0.1677	2.07	Q V				
3+45	0.1832	2.24	Q V				
3+50	0.1997	2.40	Q V				
3+55	0.2174	2.56	Q V				
4+ 0	0.2361	2.72	Q V				
4+ 5	0.2559	2.87	Q V				
4+10	0.2776	3.15	Q V				
4+15	0.3013	3.45	Q V				
4+20	0.3271	3.75	Q V				
4+25	0.3552	4.07	Q V				
4+30	0.3845	4.26	Q V				
4+35	0.4151	4.43	Q V				
4+40	0.4475	4.72	Q V				
4+45	0.4821	5.02	Q V				
4+50	0.5179	5.21	Q V				
4+55	0.5550	5.38	Q V				
5+ 0	0.5939	5.66	Q V				
5+ 5	0.6381	6.42	Q V				
5+10	0.6916	7.76	Q V				
5+15	0.7536	9.01	Q V				
5+20	0.8227	10.03	Q V				
5+25	0.9001	11.24	Q V				
5+30	0.9909	13.18	Q V				
5+35	1.0627	10.42	Q V				
5+40	1.0926	4.34	Q V				
5+45	1.1044	1.72	Q V				
5+50	1.1097	0.77	Q V				
5+55	1.1114	0.25	Q V				
6+ 0	1.1121	0.11	Q V				
6+ 5	1.1125	0.05	Q V				
6+10	1.1126	0.01	Q V				
6+15	1.1126	0.01	Q V				
6+20	1.1126	0.00	Q V				
